NOVATECH

Engineers, Planners & Landscape Architects

Engineering

- Land / Site Development
- Municipal Infrastructure
- Environmental / Water Resources
- Traffic / Transportation
- Structural
- Recreational

Planning

- Land / Site Development
- Planning Application Management
- Municipal Planning Documents & Studies
- Expert Witness (OMB)
- Wireless Industry

Landscape Architecture

- Urban Design & Streetscapes
- Open Space, Parks & Recreation Planning
- Community & Residential Developments
- Commercial & Institutional Sites
- Environmental Restoration

35 Years

East LeBreton Flats

201, 301 and 324 Lett Street

450 Lloyd Avenue

133 Booth Street

Transportation Impact Study

East LeBreton Flats
201, 301 and 324 Lett Street
450 Lloyd Avenue
133 Booth Street

Transportation Impact Study

Prepared for:

Claridge Homes

Prepared By:

NOVATECH
Suite 200, 240 Michael Cowpland Drive
Ottawa, Ontario
K2M 1P6

October 2017

Novatech File: 116042
Ref No. R-2016-054

NOVATECH
Engineers, Planners & Landscape Architects

October 11th, 2017

City of Ottawa
Planning and Growth Management Branch
110 Laurier Ave. W., 4th Floor,
Ottawa, Ontario K1P 1J1

Attention: **Wally Dubyk**
Project Manager, Infrastructure Approvals

Dear Sir:

Reference: **East LeBreton Flats Development**
Transportation Impact Study
Our File No. : 116042

We are pleased to submit the following Transportation Impact Study (TIS) in support of Zoning By-law Amendment and Official Plan Amendment applications for the east LeBreton Flats lands located at 201, 301 and 324 Lett Street, 450 Lloyd Avenue and 133 Booth Street.

The structure and format of this report is in accordance with the 2006 City of Ottawa Transportation Impact Assessment (TIA) Guidelines. A checklist of the documentation requirements as outlined in Appendix B of the TIA Guidelines is attached overleaf with reference to corresponding report sections.

A PDF version of this report and copies of the electronic software files are provided on the enclosed disk. Please call if you have any questions as you complete your review.

Yours truly,

NOVATECH

B. Byvelds

Brad Byvelds, P. Eng.
Project Coordinator | Transportation/Traffic

Suite 200, 240 Michael Cowpland Drive, Ottawa ON K2M 1P6 Tel: 613.254.9643 Fax: 613.254.5867 www.novatech-eng.com

Documentation and Reporting Checklist

Report Context (Section 1.0)

Description of the development (include all of the following that are known at the time of the application):

- ☐ Municipal address;
- ☐ Location relative to major elements of the existing transportation system (e.g., the site is located in the southwest quadrant of the intersection of Main Street/ First Street, 600 meters from the Maple Street Rapid Transit Station);
- ☐ Existing land uses or permitted use provisions in the Official Plan, Zoning By-law, etc.;
- ☐ Proposed land uses and relevant planning regulations to be used in the analysis;
- ☐ Proposed development size (building size, number of residential units, etc.) and location on site;
- ☐ Estimated date of occupancy;
- ☐ Planned phasing of development;
- ☐ Proposed number of parking spaces (not relevant for Draft Plans of Subdivision); and
- ☐ Proposed access points and type of access (full turns, right-in/ right-out, turning restrictions, etc.
- ☐ Study area;
- ☐ Time periods and phasing; and
- ☐ Horizon years (include reference to phased development).

The TIS must include a key plan that shows the general location of the development in relation to the surrounding area. The TIS must also provide a draft site plan of a suitable scale that shows the general location of the development and the proposed access. If the proposed development/ redevelopment is to be constructed in phases, a description must be provided for each phase, identifying the proposed timing of implementation.

Existing Conditions (Section 2.0)

- ☐ Existing roads and ramps in the study area, including jurisdiction, classification, number of lanes, and posted speed limit;
- ☐ Existing intersections, indicating type of control, lane configurations, turning restrictions, and any other relevant data (e.g., extraordinary lane widths, grades, etc.);
- ☐ Existing access points to adjacent developments (both sides of all roads bordering the site);
- ☐ Existing transit system, including stations and stops;
- ☐ Existing on- and off-road bicycle facilities and pedestrian sidewalks and pathway networks;
- ☐ Existing system operations (V/C, LOS); and
- ☐ Major trip generators/ attractors within the Study Area should be indicated.

The TIS report must include: a context plan of a suitable scale that shows the general location of the development, the proposed access locations and the existing conditions in the surrounding area; figures documenting the existing travel demands by mode; and a summary of collisions for the effected study area roads. A photographic inventory of the transportation network elements in

the vicinity of the proposed access points would be beneficial to staff in their review of the Consultant's report.

Demand Forecasting (Section 3.0)

- ☐ General background growth;
- ☐ Other study area developments;
- ☐ Changes to the study area road network;
- ☐ Future background system operations (V/C, LOS, queue lengths):
  - include figures documenting future background travel demands by mode for each horizon year
- ☐ Trip generation rates;
- ☐ Trip distribution and assignment:
  - include figures documenting forecasted site trip generation and assignment by mode; and
  - include figures documenting total future travel demands by mode for each horizon year.

Impact Analysis (Section 4.0-8.0)

- ☐ Total future system operations (V/C, LOS, queue lengths);
- ☐ Signal and auxiliary lane (device) warrants;
- ☐ Operational/ safety assessment (e.g., sight line assessment where grades are an issue);
- ☐ Storage analysis for closely spaced intersections;
- ☐ Pedestrian and bicycle network connections and continuity;
- ☐ On-site circulation and design;
- ☐ Potential for neighbourhood impacts; and
- ☐ TDM.

Mitigation Measures and Site Design Characteristics (Section 7.0, 8.0)

The TIS must identify all mitigation measures required to offset network impacts from the development. The TIS must also identify key site design features required to implement the Official Plan and Transportation Master Plan policies regarding site development.

The TIS must include all of the following, where they are required by the subject development:

- ☐ Location and timing of proposed changes to existing traffic controls at intersections (e.g., new traffic signals, Stop signs, etc.);
- ☐ Location and timing of new intersections, including proposed traffic control measures (e.g., traffic signals, etc.);
- ☐ Requirements for new auxiliary lanes;
- ☐ Mitigation measures required to offset impacts on the surface and Rapid Transit networks;
- ☐ New or modified elements of the bicycle and pedestrian networks;
- ☐ Community impact mitigation measures; and
- ☐ Proposed TDM features or programs to support the site development.

TABLE OF CONTENTS

EXECUTIVE SUMMARY ..... **I**

1.0 INTRODUCTION **1**

1.1 PROPOSED DEVELOPMENT 1
1.2 ANALYSIS METHODS 3
1.3 ANALYSIS PARAMETERS 4

2.0 EXISTING CONDITIONS **4**

2.1 ROADWAY FACILITIES 4
2.2 STUDY AREA INTERSECTIONS 5
2.3 EXISTING PEDESTRIAN AND BICYCLE FACILITIES 7
2.4 EXISTING TRANSIT FACILITIES 7
2.5 EXISTING TRAFFIC VOLUMES 8
2.6 COLLISION RECORDS 9
2.7 EXISTING MMLOS ANALYSIS 11
2.7.1 Pedestrian Level of Service (PLOS) *12*
2.7.2 Bicycle Level of Service (BLOS) *16*
2.7.3 Transit Level of Service (TLOS) *19*
2.7.4 Truck Level of Service (TkLOS) *20*
2.7.5 Auto LOS *21*
2.8 TRADE-OFF EVALUATION 22
2.8.1 Segment Evaluation *22*
2.8.2 Intersection Evaluation *26*

3.0 TRAVEL DEMAND FORECASTING **29**

3.1 PLANNED ROADWAY AND TRANSIT IMPROVEMENTS 29
3.2 PLANNED PEDESTRIAN AND CYCLING IMPROVEMENTS 30
3.3 BACKGROUND TRAFFIC GROWTH 30
3.4 OTHER STUDY AREA DEVELOPMENTS 31
3.5 TRIP GENERATION 34
3.6 TRIP DISTRIBUTION 38

4.0 FUTURE INTERSECTION OPERATIONS **40**

4.1 2031 BACKGROUND TRAFFIC 40
4.3 2031 TOTAL TRAFFIC 41

5.0 PROVISIONS FOR NON-AUTO MODES **43**

6.0 ON-SITE DESIGN **44**

7.0 COMMUNITY IMPACTS **45**

8.0 TRANSPORTATION DEMAND MANAGEMENT **46**

9.0 CONCLUSIONS AND RECOMMENDATIONS **46**

Figures

Figure 1: Aerial Photo of the East LeBreton Flats Lands 1
Figure 2: Proposed Concept Plan 2
Figure 3: LeBreton Transit Station Location 8
Figure 4: Existing Traffic Volumes 9
Figure 5: 2031 Background Growth 31
Figure 6: Rendezvous LeBreton Concept Plan 32
Figure 7: Domtar Lands Redevelopment Area 33
Figure 8: 2031 Background Traffic 34
Figure 9: Site Generated Traffic Volumes 39
Figure 10: 2031 Total Traffic Volumes 39
Figure 11: Conceptual Design of Lett Street at Wellington Street 43
Figure 12: Mobility Network Concept 44

Tables

Table 1: Reported Collisions 10
Table 2: PLOS Segment Analysis 12
Table 3: Sir John A MacDonald Parkway/Wellington Street/Booth Street Intersection PLOS 15
Table 4: Wellington Street/Lett Intersection PLOS 15
Table 5: Wellington Street/Portage Bridge Intersection PLOS 16
Table 6: Booth Street/Albert Street Intersection PLOS 16
Table 7: BLOS Segment Analysis 17
Table 8: BLOS Intersection Analysis 17
Table 9: TLOS Segment Analysis 19
Table 10: TLOS Intersection Analysis 20
Table 11: TkLOS Segment Analysis 20
Table 12: TkLOS Intersection Analysis 21
Table 13: Auto LOS Segment Analysis 21
Table 14: Intersection Analysis – Existing Traffic 22
Table 15: Segment MMLOS Summary 23
Table 16: Intersection MMLOS Summary 27
Table 17: ITE Trip Generation 34
Table 18: Person Trips 35
Table 19: Site-Generated Person Trips by Modal Share 36
Table 20: Primary and Pass-by Trips (Commercial) 36
Table 21: Internally Captured Trips 37
Table 22: Intersection Analysis – 2031 Background Traffic 40
Table 23: Intersection Analysis – 2031 Total Traffic 41

Appendices

Appendix A Block Subdivision Plan
Appendix B Booth Street Design Drawings
Appendix C OC Transpo System Map
Appendix D Traffic Count Information
Appendix E Collision Records
Appendix F Existing Intersection Operations
Appendix G Relevant Excerpts from Other Developments
Appendix H Internal Capture Summary Sheets
Appendix I Future Intersection Operations

EXECUTIVE SUMMARY

This Transportation Impact Study (TIS) has been prepared in support of Zoning By-law Amendment and Official Plan Amendment applications for the lands east of Booth Street between the historic aqueduct and Confederation Line LRT to the south and Fleet Street to the north. The subject lands will henceforth be referred to as the "East LeBreton Flats lands". The subject lands are designated as Block P, Q and I in the National Capital Commission's (NCC) Block Subdivision Plan.

The East LeBreton Flats lands will consist of five buildings, and will accommodate approximately 1950 residential units, a 35,000ft^2 (GFA) food store, 60,000ft^2 (GFA) of commercial development and 63,000 square feet (GFA) of institutional development. The proposed developments will include underground parking garages with accesses on Lett Street and Lloyd Street. The estimated completion date of the proposed development is 2031.

The study area for this report was confirmed with City staff, and includes the following intersections:

- Wellington Street/Sir John A MacDonald Parkway/Booth Street;
- Wellington Street/Lett Street;
- Wellington Street/Portage Bridge;
- Booth Street/Fleet Street;
- Booth Street/Albert Street.

The selected time periods for the analysis are the weekday AM and PM peak hours, as they represent the 'worst case' combination of site generated traffic and adjacent street traffic. Existing traffic conditions within the study area have been examined, along with background and total traffic conditions for the 2031 build-out year.

Intersection capacity analysis has been completed using the software package Synchro 10.0. This software uses methodology from the *Highway Capacity Manual 2010* (HCM), published by the Transportation Research Board, to evaluate signalized and unsignalized intersections. During the pre-consultation meeting on May 10th, 2017, City staff requested the TIS include a Multi-Modal Level of Service (MMLOS) analysis. The MMLOS analysis has been completed using the MMLOS Guidelines Supplement to the TIA Guidelines prepared by IBI Group in October 2015.

Based on the results of the analysis, the main conclusions and recommendations of this report are as follows:

Segment MMLOS Analysis

- All segments within the study area, excluding Booth Street south of Albert Street and Lett Street, do not meet the target PLOS. Sir John A MacDonald Parkway/Wellington Street, Booth Street north of Wellington Street and south of Albert Street do not meet the target BLOS. None of the segments within the study area are identified as a Transit Priority Corridor in the City's *Transportation Master Plan* and do not have a target TLOS in the MMLOS Guidelines. All of the segments within the study area meet the target TkLOS. All segments within the study area, excluding Booth Street south of Albert Street and Albert Street east/west of Booth Street, meet the target Auto LOS.

- The target PLOS A cannot be achieved along a roadway with an AADT greater than 3000 vpd and an operating speed greater than 30km/hr. As Sir John A MacDonald Parkway, Wellington Street, Portage Bridge, Booth Street (north of Albert Street) and Albert Street are arterial roadways with an AADT greater than 3000vpd and an operating speed greater than 30km/hr, a PLOS A cannot be achieved.

- The implementation of a separated cycling facility along Sir John A MacDonald Parkway/ Wellington Street from west of Booth Street to Portage Bridge would result in a BLOS A, meeting the target for the Central Area.

- If possible, physically separating the eastbound bike lane along Wellington Street east of Portage Bridge, similar to the westbound facility, would result in a BLOS A for this segment, meeting the target for the Central Area.

- As the Portage Bridge has a six-lane divided cross section with a median width of 1.5m, the existing width of the bridge limits the ability to provide a boulevard to improve the PLOS on the west side of this segment.

- The City's *Ottawa Cycling Plan* identifies the implementation of either bike lanes or a multi-use pathway along Booth Street north of Wellington Street. A reduction in other cross sectional elements will be required in order to accommodate either facility. The implementation of bike lanes would result in a BLOS B, while a multi-use pathway would result in a BLOS A.

- Traffic calming measures (on-street parking, curb extensions and speed humps) have been implemented along Booth Street south of Albert Street, which reduces the level of stress for cyclists along this segment. Consideration could be given to implementing bike lanes along this segment.

- Although the south side of the Albert Street does not meet the target PLOS, pedestrians requiring additional comfort or safety can use the multi-use pathway on the north side.

Intersection MMLOS Analysis

- All intersections within the study area do not meet the target PLOS and BLOS. All of the study area intersections are not located along a Transit Priority Corridor in the City's *Transportation Master Plan* and do not have a target TLOS in the MMLOS Guidelines. All intersections within the study area meet the target TkLOS. The Wellington Street/Portage Bridge and Albert Street/Booth Street intersections do not meet the target Auto LOS.

- Consideration could be given to providing either textured or zebra striped crosswalks at the Wellington Street/Sir John A MacDonald Parkway/Booth Street intersection to improve the pedestrian level of comfort crossing each approach. Consideration could also be given to implementing a two stage, left-turn bike box to facilitate the southbound left turn movement for cyclists at this intersection. Critical movements at this intersection are currently operating with a vehicle LOS F during the PM peak hour.

- Consideration could be given to implementing leading pedestrian intervals and a two stage, left-turn box to facilitate the westbound left turn movement for cyclists at the Wellington Street/Lett Street intersection.

- The Wellington Street/Portage Bridge intersection is not a standard configuration and the results of the PLOS and BLOS analysis should be treated with caution. The pedestrian and cycling facilities at the Wellington Street/Portage Bridge intersection are anticipated to have a higher PLOS and BLOS than represented by the analysis. Critical movements at this intersection are currently operating with a vehicle LOS F during both the AM and PM peak hours.

- The PLOS at the Albert Street/Booth Street intersection is highly influenced by the number of lanes crossed (5-6 lanes) along Albert Street. A reduction in east-west travel lanes is anticipated to have a significant impact on the vehicle operations at this intersection and is not recommended. It is noteworthy that leading pedestrian intervals and zebra striped crosswalks are currently implemented at this intersection to provide a higher level of comfort and safety for pedestrians crossing Albert Street. Critical movements at this intersection are currently operating with a vehicle LOS F during the PM peak hour.

Future Intersection Operations

- Under the 2031 background traffic conditions, critical movements at the Wellington Street/Sir John A MacDonald Parkway/Booth Street, Wellington/Portage Bridge and Albert Street/Booth Street intersections are anticipated to operate with a LOS F during the AM and PM peak hours.

- Continued support of transportation solutions that maximize the transit, bike and walk modes of travel will be critical in this area. Options to displace traffic along the study area roads include increased use of non-auto modes of transportation to/from the downtown core, alternate time of travel for drivers using the corridor to make use of off-peak capacity and alternate routes for travel to/from the downtown core.

- Under the 2031 total traffic conditions, critical movements at the Wellington Street/Sir John A MacDonald Parkway/Booth Street, Wellington/Portage Bridge and Albert Street/Booth Street intersections are anticipated to continue to operate with a LOS F during the AM and PM peak hours.

- A two-lane northbound approach is recommended at the Wellington Street/Lett Street intersection, to be implemented through line painting. Since the right turn movement is significantly heavier than the left turn movement, it is recommended that the right turn lane be painted as the continuous lane and the left turn lane is to be developed as the auxiliary lane. A storage length of approximately 20m is recommended for the proposed left turn lane.

Non-Auto Transportation, On-site Design, Community Impacts and Transportation Demand Management

- The proposed development will maintain a pedestrian/cyclist connection to Pooley's Bridge/Wellington Street via Fleet Street east of Lett Street. This connection provides access to a multi-use pathway network connecting to Wellington Street and the Trans Canada Trail.

- The proposed concept plan identifies City parkland south of Lett Street. Multi-use pathways will be provided within the park, providing an alternative pedestrian/cyclist connection to Pooley's Bridge, Wellington Street and the Trans Canada Trail. These multi-use pathways

will also cross under Booth Street adjacent to the aqueduct, travelling west to the future West LeBreton Flats lands.

- The proposed development will be within a walking distance of approximately 400m of the future Pimisi LRT station. This LRT station will provide comprehensive transit coverage across the City of Ottawa.

- Parking for the proposed development will be provided underground with accesses on Lett Street and Lloyd Street. The specific location of the parking garage accesses will be determined and reviewed through subsequent Site Plan Control applications for each phase as planning and design progresses.

- The number of parking spaces to be provided is unknown at this point and will be reviewed in subsequent Site Plan Control applications for each phase as planning and design progresses. The proposed development will be a transit oriented development located within a 400m walking distance of the future Pimisi LRT station, and is in close proximity to the downtown core. Parking to be provided for the proposed development will not exceed the maximum parking requirement in the City's ZBL. The proposed parking will reflect a transit oriented development, and encourage non-auto modes of transportation.

- As the only accesses to the subject lands are provided on Booth Street and Wellington Street, which are classified as arterial roadways in the City's 2013 TMP, the proposed development is not anticipated to have any measurable impact on the existing or future residential communities in the site's vicinity.

- The proposed development is anticipated to generate approximately 40 trips during the AM peak hour and 65 trips during the PM peak hour along Booth Street south of Albert Street. This equates to approximately one vehicle every one to two minutes during peak hours.

- Traffic calming measures have been implemented along Booth Street south of Albert Street, including on-street parking, curb extensions at intersections and mid-block speed humps. The increase in traffic attributable to the proposed development is not anticipated to have a significant impact on the local roadway intersection operations along Booth Street south of Albert Street.

- The proposed development conforms to the City's TDM initiatives by providing easy access to the local pedestrian, bicycle and transit systems. Further investigation into TDM initiatives will be conducted through subsequent Site Plan Control applications for each phase as planning and design proceeds.

1.0 INTRODUCTION

This Transportation Impact Study (TIS) has been prepared in support of Zoning By-law Amendment and Official Plan Amendment applications for the lands east of Booth Street between the historic aqueduct and Confederation Line LRT to the south and Fleet Street to the north. The subject lands will henceforth be referred to as the "East LeBreton Flats lands". The subject lands are designated as Block P, Q and I in the National Capital Commission's (NCC) Block Subdivision Plan, which can be found in **Appendix A**.

An aerial photo of the East LeBreton Flats lands is shown in **Figure 1**.

Figure 1: Aerial Photo of the East LeBreton Flats Lands

The East LeBreton Flats lands are currently zoned GM17[120] H(40) S94 or R5O H (20) and are currently vacant. The subject lands are bounded by the following:

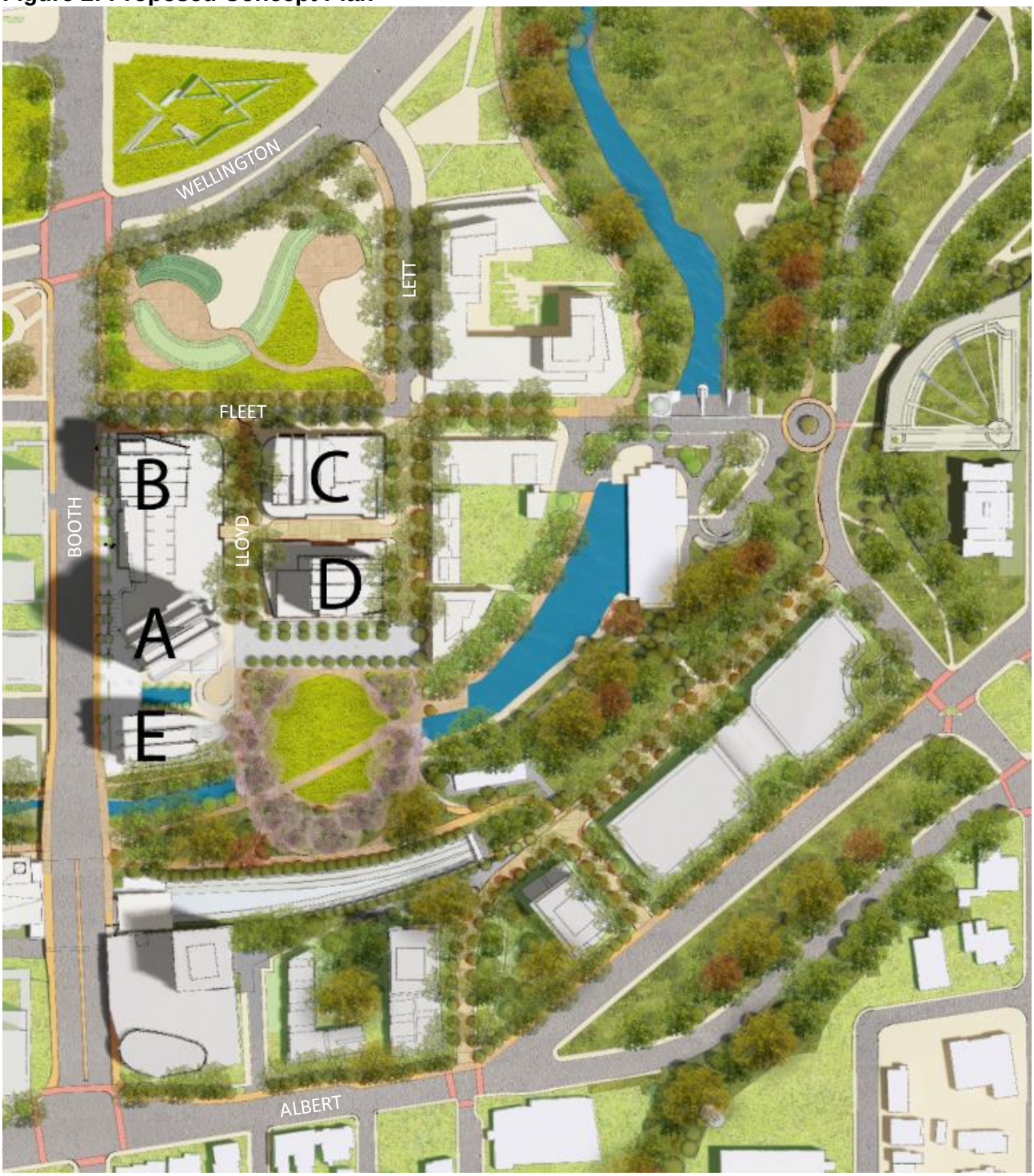
- To the north, Fleet Street and parkland;
- To the south, the historic aqueduct and Confederation Line LRT;
- To the east, existing residential development;
- To the west, Booth Street and vacant land planned for future mixed-use development.

1.1 Proposed Development

The East LeBreton Flats lands will consist of five buildings, and will accommodate approximately 1950 residential units, a 35,000ft^2 (GFA) food store, 60,000ft^2 (GFA) of commercial development and 63,000 square feet (GFA) of institutional development. The concept plan for the proposed development is shown in **Figure 2**. The proposed developments will include underground parking

garages with accesses on Lett Street and Lloyd Street. The estimated completion date of the proposed development is 2031.

Figure 2: Proposed Concept Plan



1.2 Analysis Methods

The types of analysis undertaken to assess the transportation impacts of the proposed development are consistent with the requirements of the City of Ottawa *Transportation Impact Assessment (TIA) Guidelines*, published in October 2006.

Intersection capacity analysis has been completed using the software package Synchro 10.0. This software uses methodology from the *Highway Capacity Manual 2010* (HCM), published by the Transportation Research Board, to evaluate signalized and unsignalized intersections.

Intersection operating conditions are commonly described in terms of a Level of Service (LOS). LOS is a qualitative measurement of speed, freedom to manoeuvre, interruptions, comfort and convenience. Letters are assigned to six levels, with LOS 'A' representing optimal operating conditions and LOS 'F' representing failing operating conditions.

The City of Ottawa has adopted criteria that directly relate the LOS of a signalized intersection to a volume to capacity (v/c) ratio. Vehicle capacity is defined as the maximum number of vehicles that can pass a given point during a specified period under prevailing traffic conditions. The City's criteria are as follows:

LOS	v/c ratio
A	0 to 0.60
B	0.61 to 0.70
C	0.71 to 0.80
D	0.81 to 0.90
E	0.91 to 1.00
F	**>1.00**

The LOS for an unsignalized intersection is based on average control delay and is defined for individual movements. Control delay includes initial deceleration, queue move-up time, stopped time and final acceleration. The HCM presents the following criteria relating the LOS for individual movements to average control delay:

LOS	Delay (sec/veh)
A	<10
B	10 to 15
C	15 to 25
D	25 to 35
E	35 to 50
F	**>50**

In this study, movements at signalized and unsignalized intersections have been evaluated in terms of the LOS as defined in the foregoing tables. Since all study area intersections are located within the urban core, mitigation measures in the form of additional lane capacity and/or signal adjustments have been identified for movements with LOS F.

During the pre-consultation meeting on May 10th, 2017, City staff requested the TIS include a Multi-Modal Level of Service (MMLOS) analysis. The MMLOS analysis has been completed using the MMLOS Guidelines Supplement to the TIA Guidelines prepared by IBI Group in October 2015.

The MMLOS guidelines outline LOS measures for each travel mode (Pedestrian, Bicycles, Trucks, Transit and Vehicles), to be completed for roadways and intersections.

This TIS has been prepared to provide an assessment of the development proposal. The methodologies used to analyze the transportation impacts of the proposed development are described as follows:

- An operational evaluation of the study area intersections under the background and total traffic conditions for the weekday AM and PM peak hours;
- An evaluation of the study area intersections and roadway segments for Pedestrians, Bicycles, Trucks and Transit LOS.
- An assessment of provisions for non-auto travel modes, including integration with local transit service, and connections with the local pedestrian and bicycle networks;
- A review of the proposed on-site design;
- Evaluation of potential community concerns, including neighbourhood infiltration and parking impacts; and
- An evaluation of conformance with Transportation Demand Management (TDM) principles.

1.3 Analysis Parameters

The study area for this report was confirmed with City staff, and includes the following intersections:

- Wellington Street/Sir John A MacDonald Parkway/Booth Street;
- Wellington Street/Lett Street;
- Wellington Street/Portage Bridge;
- Booth Street/Fleet Street;
- Booth Street/Albert Street.

The selected time periods for the analysis are the weekday AM and PM peak hours, as they represent the 'worst case' combination of site generated traffic and adjacent street traffic. Existing traffic conditions within the study area have been examined, along with background and total traffic conditions for the 2031 build-out of the subject lands. Due to the extended development period, a five-year period beyond build-out has not been analyzed.

2.0 EXISTING CONDITIONS

2.1 Roadway Facilities

Wellington Street
Wellington Street is an arterial roadway that runs on an east-west alignment between Booth Street and Elgin Street. Map 7 in the City of Ottawa's 2013 TMP identifies Wellington Street in the vicinity of the Portage Bridge a "Federally Owned Roadway". It has a four-lane divided urban cross section, transitioning to a six-lane divided urban cross section near the Portage Bridge, and a regulatory speed limit of 50km/hr within the study area.

Sir John A MacDonald Parkway
The Sir John A MacDonald Parkway is a federally owned roadway that runs on an east-west alignment between Carling Avenue and Booth Street. It is classified as an arterial roadway between Vimy Place and Booth Street. It has a four-lane divided urban cross section and a regulatory speed limit of 50km/hr within the study area.

Albert Street
Albert Street is an arterial roadway that runs on an east-west alignment between Bayview Road and the Mackenzie King Bridge. It has recently been reconstructed within the study area to provide transit lanes. The recently reconstructed Albert Street has a five-lane undivided urban cross-section and a regulatory speed limit of 50km/hr within the study area. It contains one transit lane in each direction, two westbound lanes for general traffic and one eastbound lane for general traffic. Albert Street is a full-load urban truck route.

Booth Street
Booth Street runs on a north-south alignment and is classified as an arterial between the Chaudière crossing and Albert Street. Booth Street south of Albert Street is classified as a major collector and has a two-lane undivided urban cross section with a regulatory speed limit of 50km/hr. Traffic calming measures (on-street parking, curb extensions and speed humps) have been implemented along Booth Street south of Albert Street. Booth Street between Albert Street and Wellington Street was recently reconstructed as part of the Confederation Line. Design drawings for Booth Street have been obtained from the City and are provided in **Appendix B**. Booth Street north of Albert Street is an urban truck route with load restrictions.

Portage Bridge
The Portage Bridge is a federally owned bridge connecting the provinces of Ontario and Quebec. The Portage Bridge runs on a north south alignment between Wellington Street (Ontario) and Rue Laurier (Quebec). It has a six-lane divided urban cross section and a regulatory speed limit of 50km/hr.

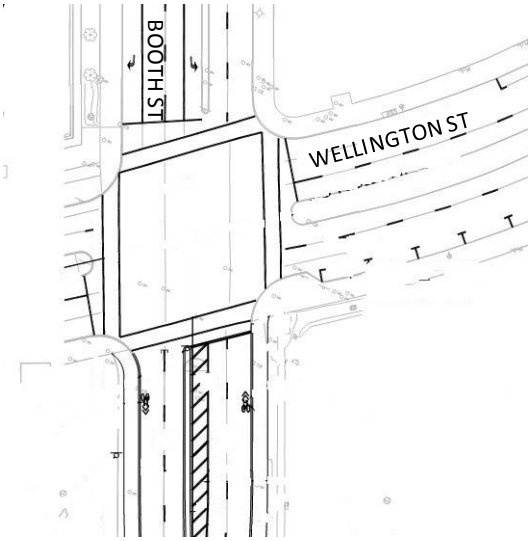
Lett Street and Fleet Street
Lett Street and Fleet Street are local roadways providing access to the overall East LeBreton Flats lands. Lett Street and Fleet Street have two lane undivided urban cross sections and a regulatory speed limit of 50km/hr.

2.2 Study Area Intersections

The existing lane arrangements at the study area intersections are described below.

Wellington Street/Sir John A MacDonald Parkway/Booth Street

- Northbound – two through lanes
- Southbound – two through lanes, a left turn lane and a right turn lane
- Eastbound – two through lanes
- Westbound – one through lane and one shared through/right turn lane
- The eastbound left/right turn movements as well as the northbound and westbound left turn movements are restricted
- The northbound left turn movement is temporarily permitted for buses only.



Wellington Street/Lett Street

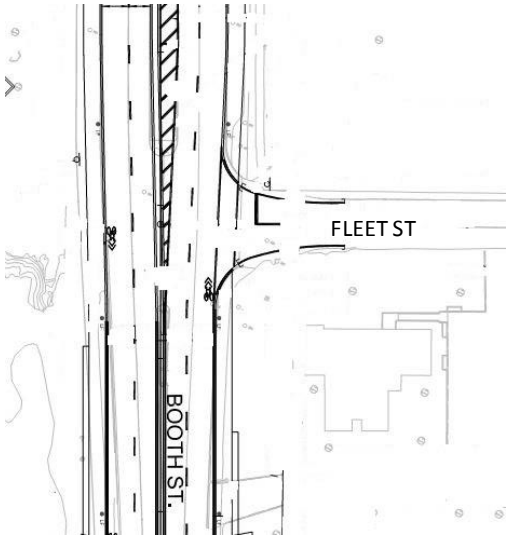
- Eastbound – one through lane and one shared through/right turn lane
- Westbound – two through lanes and a left turn lane
- Northbound – one shared left/right turn lane

Wellington Street/Portage Bridge

- Eastbound – three through lanes and dual left turn lanes
- Westbound – two through/left turn lanes and three right turn lanes
- Southbound – three left turn lanes and a right turn lane with smart channel

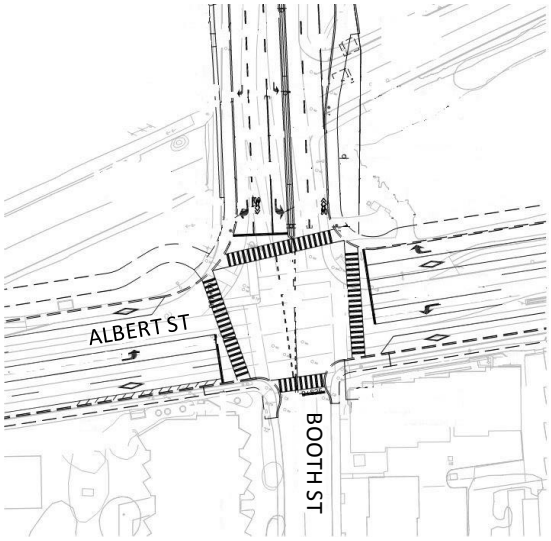
Booth Street/Fleet Street

- Northbound – one through lane and one shared through/right turn lane
- Southbound – two through lanes
- Westbound – One approach lane



Albert Street/Booth Street

- Northbound – one shared through/left turn lane and one shared through/right turn lane
- Southbound – one through lane, one left turn lane and one right turn lane
- Eastbound – one through lane, one transit lane and one left turn lane. The transit lane functions as a right turn lane on this approach
- Westbound – two through lanes, one transit lane, one left turn lane and one right turn lane
- It is noteworthy that the curb radii in the northwest corner of this intersection was reduced when constructed, and is not reflected in the design drawings in **Appendix B**
- Right turn on red restrictions are in place on the westbound and southbound approaches from 7:00AM to 9:00AM on weekdays
- The westbound left turn movement is restricted between 7:00AM to 9:00AM and 3:30PM to 5:30PM on weekdays
- The southbound through movement is restricted between 11:00PM to 6:00AM



2.3 Existing Pedestrian and Bicycle Facilities

Sidewalks are currently provided on both sides of Wellington Street, Sir John A MacDonald Parkway, Booth Street and the east side of Lett Street. Fleet Street, east of Lett Street, connects to Pooley's Bridge/Wellington Street.

A multi-use pathway network is currently provided just east of the existing residential development east of Lett Street. This multi-use pathway network provides connections from Fleet Street/Pooley's Bridge to Wellington Street and the Trans Canada Trail.

Booth Street, Sir John A MacDonald Parkway, Wellington Street and Albert Street are classified as Spine Cycling Routes in the City's Ultimate Cycling Network. A physically separated bike lane (westbound) and a standard bicycle lane (eastbound) are currently provided along Wellington Street east of the Portage Bridge. A segregated two-way cycle track is provided along the east side of Portage Bridge. A multi-use pathway was implemented on the north side of the recently reconstructed Albert Street. Bike lanes were implemented along the recently reconstructed Booth Street between Wellington Street and Albert Street. The bike lanes were implemented in place of the shared lanes shown on the design drawings in **Appendix B**. It is our understanding that the City is exploring the opportunity to further improve the cycling facilities along Booth Street.

2.4 Existing Transit Facilities

A copy of the 2017 OC Transpo system map for the study area is included in **Appendix C**. This report describes all existing transit facilities within a five-minute walk of the subject site, which equates to a walking distance of approximately 400m.

OC Transpo bus stops #0433 and #5722 are located along Booth Street, north of Wellington Street. These bus stops provide service to the OC Transpo routes 8, 95, 96 and 105. These transit routes provide interprovincial transit service, as shown in **Appendix C**.

The East LeBreton Flats lands are located within a 400m walking distance of the LeBreton Transit station along the OC Transpo east-west transitway. The LeBreton Transit Station provides service to numerous OC Transpo routes that provide comprehensive transit coverage across the City of Ottawa. The location of the LeBreton Transit Station compared to the subject lands is shown in **Figure 3**. It is noteworthy that the Lebreton Transit station has been temporarily relocated to Booth Street as part of the Confederation Line construction.

Figure 3: LeBreton Transit Station Location

2.5 Existing Traffic Volumes

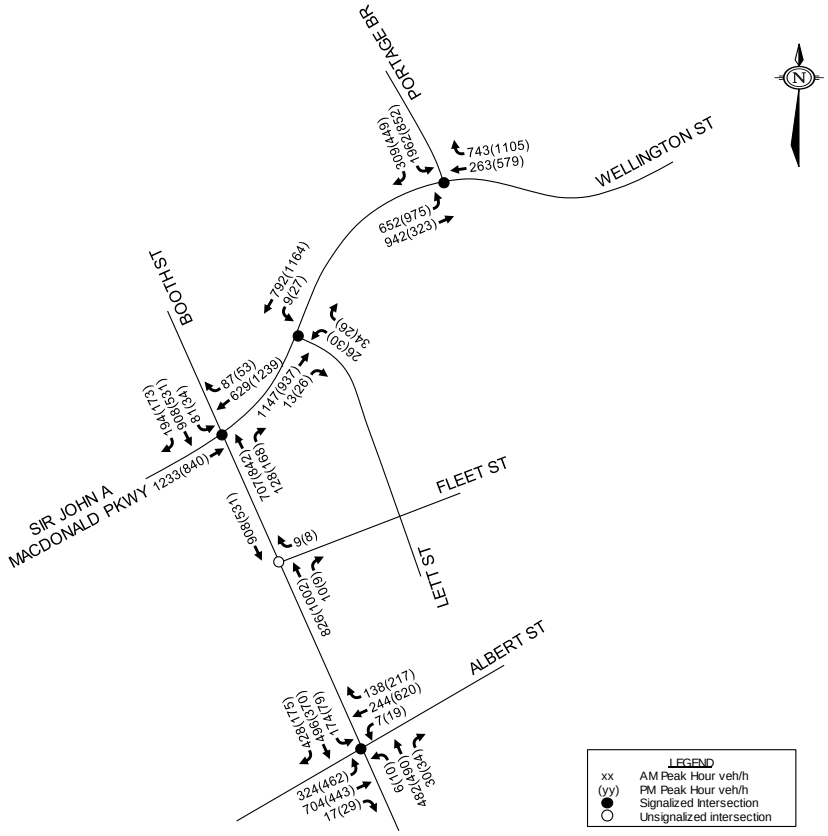
Weekday traffic counts completed by the City of Ottawa were used to determine the existing pedestrian and vehicular traffic volumes at the following study area intersections:

- Wellington Street /Sir John A MacDonald Parkway/Booth Street – May 10th, 2013
- Wellington Street/Lett Street – August 17th, 2015
- Wellington Street/Portage Bridge – June 11th, 2014
- Booth Street/Albert Street – April 2nd, 2014

It is noteworthy that the Wellington Street /Sir John A MacDonald Parkway/Booth Street and Booth Street/Albert Street intersections were counted prior to Booth Street reconstruction. The traffic volumes using the Booth Street/Fleet Street intersection have been estimated using the traffic volumes presented in the 300 Lett Street Transportation Brief (dated April 2011).

Peak hour summary sheets for the above traffic counts and an excerpt from the 300 Lett Street Transportation Brief are included in **Appendix D**. Existing weekday AM and PM peak hour traffic volumes at the study area intersections are shown in **Figure 4**.

Figure 4: Existing Traffic Volumes



2.6 Collision Records

Historical collision data from the last three years was obtained from the City's Public Works and Service Department for all study area intersections and roadways. Copies of the collision summary reports are included in **Appendix E**.

The collision data has been evaluated to determine if there are any identifiable collision patterns. The Ottawa TIA Guidelines define a collision pattern as more than one collision involving similar directions or impact types. Further analysis may be warranted for intersections with a pattern of six or more collisions for any one movement or a total of 33 or more collisions, over a three-year period.

The following table summarizes the number of collisions reported at each intersection and roadway segment from January 1st, 2013 to December 31st, 2015.

Table 1: Reported Collisions

Intersection / Street Segment	Number of Reported Collisions (Jan 1, 2013 to Dec 31, 2015)
Wellington Street / Sir John A MacDonald Parkway / Booth Street	31
Wellington Street / Lett Street	5
Wellington Street / Portage Bridge	10
Booth Street / Fleet Street	0
Booth Street / Albert Street	29
Booth Street / OC Transpo Transitway	12
Booth Street – OC Transpo Transitway to Wellington Street	1
Wellington Street – Booth Street to Portage Bridge	2

Wellington Street/Sir John A MacDonald Parkway/Booth Street

A total of 31 collisions occurred at the Wellington Street/Sir John A MacDonald Parkway/Booth Street intersection over the last three years. Fourteen of the collisions were rear-end impacts, seven were turning impacts, seven were sideswipe impacts, two were other impacts, and one was an angle impact. Nine of the collisions caused personal injuries, but no fatalities. Two of the collisions involved cyclists, and one involved a pedestrian.

Half of the rear-end impacts occurred in a clear environment with dry surface conditions, while the remaining occurred under unfavorable environmental or surface conditions. Seven of the rear-end collisions involved eastbound travelling vehicles, four involved northbound travelling vehicles, two involved westbound travelling vehicles and one involved southbound travelling vehicles.

Six of the turning impacts occurred in a clear environment with dry surface conditions. Three of the turning impacts involved northbound left or right turning vehicles, three involved westbound left or right turning vehicles and one involved an eastbound left turning vehicle.

All of the sideswipe impacts occurred in a clear environment with dry surface conditions. Three of the sideswipe collisions involved southbound travelling vehicles, two involved eastbound travelling vehicles and two involved westbound travelling vehicles.

It is noteworthy that a detour was in place from 2014 to 2016 to accommodate the closure of Booth Street for Confederation Line Light Rail Transit (LRT) construction. This detour required the construction of significant infrastructure at this intersection, including eastbound dual left turn lanes and converting the southbound lanes into dual right turn lanes. This detour significantly changed the traffic flow at this intersection, and may have had an impact on the collision history.

Booth Street/Albert Street

A total of 29 collisions occurred at the Booth Street/Albert Street intersection over the last three years. Nine of the collisions were rear-end impacts, eight were turning movement impacts, seven were angle impacts, four were sideswipe impacts and one was an other impacts. Three of the collisions caused personal injuries, but no fatalities. One of the collisions involved a pedestrian.

Eight of the rear-end impacts occurred in a clear environment with dry surface conditions. Three of the rear-end impacts involved southbound travelling vehicles, three involved eastbound travelling vehicles, two involved westbound travelling vehicles and one involved northbound travelling vehicles. The rear-end collision history at this intersection warrants further analysis based on the criteria identified in the City of Ottawa TIA guidelines.

Four of the eight turning movement impacts occurred under unfavorable environmental or surface conditions. This suggests environmental factors played a significant role in the collision history at this intersection. Five of the turning impacts involved eastbound left or right turning vehicles, two involved northbound left or right turning vehicles and one involved a southbound left turning vehicle.

Five of the seven angle impacts occurred in a clear environment with dry surface conditions. Two of the angle impacts involved a southbound vehicle and an eastbound vehicle, two involved a southbound vehicle and a westbound vehicle, two involved a northbound vehicle and an eastbound vehicle and one involved a northbound vehicle and a westbound vehicle.

It is noteworthy that the northern leg of this intersection was closed from 2014 to 2016 for the construction of the Confederation Line and all other approaches were recently reconstructed as part of the Albert Street Reconstruction project.

The changes implemented as part of the Albert Street/Confederation Line construction are expected to have a positive effect on the safety of this intersection, and by extension, the number and types of collisions that will be observed in years to come. As such, Novatech have not identified any potential mitigation measures at this intersection, since the conditions that may have warranted mitigation measures will be addressed by the reconstruction.

Booth Street/Transitway
A total of 12 collisions occurred at the Booth Street/Transitway intersection over the last three years. Seven of the collisions were angle impacts, four were rear-end impacts and one was an other impact. Four of the collisions caused personal injuries but no fatalities.

Four of the angle impacts occurred in a clear environment with dry surface conditions, while the remaining occurred under unfavorable environmental or surface conditions. Three of the angle collisions involved a northbound vehicle and an eastbound vehicle, two involved a southbound vehicle and westbound vehicle, two involved a southbound vehicle and an eastbound vehicle and one involved a northbound vehicle and a westbound vehicle.

It is noteworthy that this intersection has been removed as part of the Confederation Line construction.

2.7 Existing MMLOS Analysis

The MMLOS guidelines produced by IBI Group in October 2015 were used to evaluate the LOS of all roadway segments and signalized intersections for each mode of transportation. Schedule B of the City of Ottawa's Official Plan indicates all study area intersections and roadway segments are located in the Central Policy Area, except the Booth Street south of Albert Street roadway segment, which is located in the General Urban Policy Area.

2.7.1 Pedestrian Level of Service (PLOS)

The intent of the PLOS tool, as described in the MMLOS Guidelines, is to evaluate the level of pedestrian comfort, safety and convenience along roadway segments and intersections. Exhibits 4, 5, 6 and 7 of the MMLOS Guidelines have been used to evaluate the existing segment and intersection PLOS within the project limits. Exhibit 22 of the MMLOS Guidelines suggests that the minimum desirable PLOS target for the Central Area is LOS A for arterial, collector and local roads. Exhibit 22 of the MMLOS Guidelines suggests that the minimum desirable PLOS target for the General Urban Area is LOS C for arterial, collector and local roads.

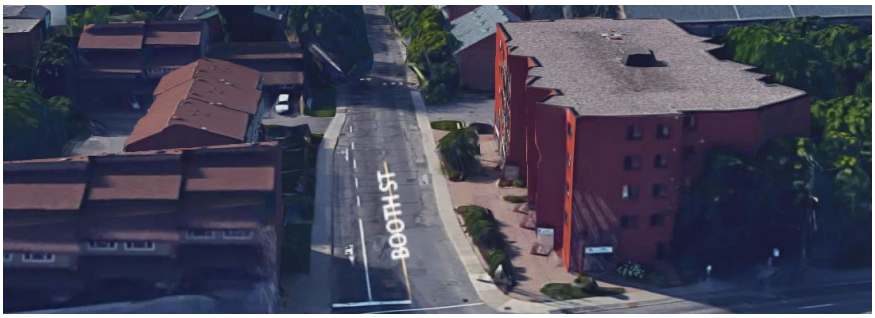
2.7.1.1 Segment PLOS

The results of the segment PLOS analysis are summarized as follows:

Table 2: PLOS Segment Analysis

Sidewalk Width	Boulevard Width	Motor Vehicle Volume (AADT)	Presence of On-Street Parking	Operating Speed[1]	Segment PLOS
Sir John A MacDonald Parkway/Wellington Street, West of Booth Street to Portage Bridge					
2m +	None	> 3000 vpd	Yes	30-50km/hr	B

Sidewalk Width	Boulevard Width	Motor Vehicle Volume (AADT)	Presence of On-Street Parking	Operating Speed[1]	Segment PLOS
Wellington Street, east of Portage Bridge					
2m +	None	> 3000 vpd	No	30-50km/hr	C
Portage Bridge, north of Wellington Street					
2m +	None	> 3000 vpd	No	30-50km/hr	C
Booth Street north of Wellington Street					
2m +	None	> 3000 vpd	No	30-50km/hr	C
Booth Street, Wellington Street to Albert Street					
2m +	None	> 3000 vpd	No	30-50km/hr	C
Booth Street, south of Albert Street					
2m	None	> 3000 vpd	No	30-50km/hr	C

Sidewalk Width	Boulevard Width	Motor Vehicle Volume (AADT)	Presence of On-Street Parking	Operating Speed[1]	Segment PLOS
					
Albert Street, east and west of Booth Street (North Side)					
2m +	None	> 3000 vpd	No	30-50km/hr	C
Albert Street, east and west of Booth Street (South Side)					
2m +	> 2m	> 3000 vpd	No	30-50km/hr	B
Lett Street, south of Wellington Street					
2m	None	≤ 3000 vpd	Yes	30-50km/hr	A

1. As speed surveys were unavailable from the City of Ottawa, speed is based on posted/regulatory speed limit

2.7.1.2 Intersection PLOS

Aerial photos of the study area intersections are shown in Section 2.2. The intersection PLOS for each intersection is calculated in the below tables.

Table 3: Sir John A MacDonald Parkway/Wellington Street/Booth Street Intersection PLOS

CRITERIA	NORTH APPROACH		SOUTH APPROACH		EAST APPROACH		WEST APPROACH	
PETSI SCORE								
CROSSING DISTANCE CONDITIONS								
MEDIAN	NO	55	NO	88	YES	90	YES	90
LANES CROSSED	6		4		4		4	
ISLAND REFUGE	NO	-4	NO	-4	NO	-4	NO	-4
SIGNAL PHASING AND TIMING								
LEFT TURN CONFLICT	PROHIBITED	0	PROHIBITED	0	PERM + PROT	-8	PERM + PROT	-8
RIGHT TURN CONFLICT	PERM	-5	NONE	0	PERM	-5	PERM	-5
RIGHT TURN ON RED	ALLOWED	-3	ALLOWED	-3	PROHIBITED	0	PROHIBITED	0
LEADING PEDESTRIAN INTERVAL	NO	-2	NO	-2	NO	-2	NO	-2
CORNER RADIUS								
RADIUS	> 5m to 10m	-5	> 5m to 10m	-5	> 5m to 10m	-5	> 5m to 10m	-5
CROSSING TREATMENT								
TREATMENT	STANDARD	-7	STANDARD	-7	STANDARD	-7	STANDARD	-7
PETSI SCORE		**29**		**67**		**59**		**59**
PETSI PLOS		**F**		**C**		**D**		**D**
DELAY SCORE								
CYCLE LENGTH		120		120		120		120
PEDESTRIAN WALK TIME		32		32		32		32
DELAY SCORE		**32**		**32**		**32**		**32**
DELAY PLOS		**D**		**D**		**D**		**D**
OVERALL PLOS		**F**		**D**		**D**		**D**

Table 4: Wellington Street/Lett Intersection PLOS

CRITERIA	SOUTH APPROACH		EAST APPROACH		WEST APPROACH	
PETSI SCORE						
CROSSING DISTANCE CONDITIONS						
MEDIAN	NO	120	NO	72	NO	88
LANES CROSSED	2		5		4	
ISLAND REFUGE	NO	-4	NO	-4	NO	-4
SIGNAL PHASING AND TIMING						
LEFT TURN CONFLICT	PERM	-8	NONE	0	PERM	-8
RIGHT TURN CONFLICT	PERM	-5	PERM	-5	NONE	0
RIGHT TURN ON RED	ALLOWED	-3	PROHIBITED	0	ALLOWED	-3
LEADING PEDESTRIAN INTERVAL	NO	-2	NO	-2	NO	-2
CORNER RADIUS						
RADIUS	> 5m to 10m	-5	> 5m to 10m	-5	No Right Turn	0
CROSSING TREATMENT						
TREATMENT	STANDARD	-7	STANDARD	-7	STANDARD	-7
PETSI SCORE		**86**		**49**		**64**
PETSI PLOS		**B**		**D**		**C**
DELAY SCORE						
CYCLE LENGTH		120		120		120
PEDESTRIAN WALK TIME		83		13		13
DELAY SCORE		**6**		**48**		**48**
DELAY PLOS		**A**		**E**		**E**
OVERALL PLOS		**B**		**E**		**E**

Table 5: Wellington Street/Portage Bridge Intersection PLOS

CRITERIA	NORTH APPROACH		EAST APPROACH		WEST APPROACH	
PETSI SCORE						
CROSSING DISTANCE CONDITIONS						
MEDIAN	YES	15	YES	0	NO	23
LANES CROSSED	9		11		8	
ISLAND REFUGE	YES	0	YES	0	YES	0
SIGNAL PHASING AND TIMING						
LEFT TURN CONFLICT	PROT	0	PROT	0	PROHIBITED	0
RIGHT TURN CONFLICT	NONE	0	NONE	0	PERM	-5
RIGHT TURN ON RED	ALLOWED	-3	PROHIBITED	0	PROHIBITED	0
LEADING PEDESTRIAN INTERVAL	NO	-2	NO	-2	NO	-2
CORNER RADIUS						
RADIUS	No Right Turn	0	No Right Turn	0	SMART CHANNEL	2
CROSSING TREATMENT						
TREATMENT	TEXTURED	-4	TEXTURED	-4	TEXTURED	-4
PETSI SCORE		**6**		**-6**		**14**
PETSI PLOS		**F**		**F**		**F**
DELAY SCORE						
CYCLE LENGTH		123		123		123
PEDESTRIAN WALK TIME		14		19		52
DELAY SCORE		**48**		**44**		**20**
DELAY PLOS		**E**		**E**		**C**
OVERALL PLOS		**F**		**F**		**F**

Table 6: Booth Street/Albert Street Intersection PLOS

CRITERIA	NORTH APPROACH		SOUTH APPROACH		EAST APPROACH		WEST APPROACH	
PETSI SCORE								
CROSSING DISTANCE CONDITIONS								
MEDIAN > 2.4m in Width	NO	72	NO	105	NO	39	NO	55
LANES CROSSED	5		3		7		6	
ISLAND REFUGE	NO	-4	NO	-4	NO	-4	NO	-4
SIGNAL PHASING AND TIMING								
LEFT TURN CONFLICT	PERM + PROT	-8	PERM	-8	PERM + PROT	-8	PERM	-8
RIGHT TURN CONFLICT	PERM	-5	PERM	-5	PERM	-5	PERM	-5
RIGHT TURN ON RED	CERTAIN TIMES	-2	ALLOWED	-3	CERTAIN TIMES	-2	ALLOWED	-3
LEADING PEDESTRIAN INTERVAL	NO	-2	NO	-2	YES	0	YES	0
CORNER RADIUS								
RADIUS	> 5m to 10m	-5	> 3m to 5m	-4	> 3m to 5m	-4	> 5m to 10m	-5
CROSSING TREATMENT								
TREATMENT	ZEBRA STRIPE	-4	ZEBRA STRIPE	-4	ZEBRA STRIPE	-4	ZEBRA STRIPE	-4
PETSI SCORE		**42**		**75**		**12**		**26**
PETSI PLOS		**E**		**B**		**F**		**F**
DELAY SCORE								
CYCLE LENGTH		120		120		120		120
PEDESTRIAN WALK TIME		19		48		17		28
DELAY SCORE		**43**		**22**		**44**		**35**
DELAY PLOS		**E**		**C**		**E**		**D**
OVERALL PLOS		**E**		**C**		**F**		**F**

2.7.2 Bicycle Level of Service (BLOS)

The intent of the BLOS tool, as described in the MMLOS Guidelines, is to evaluate both roadway segments and signalized intersections for the level of traffic stress experienced by cyclists using the corridor. Exhibits 11 and 12 of the MMLOS Guidelines have been used to evaluate the existing segment and intersection BLOS within the project limits.

Exhibit 22 of the MMLOS Guidelines suggests that the minimum desirable BLOS target for the subject study area is LOS C, except for Lett Street which has a BLOS D.

2.7.2.1 Segment BLOS

The results of the segment BLOS analysis are shown in the following table.

Table 7: BLOS Segment Analysis

Road Class/ Route Type	Type of Bikeway	Travel Lanes and/or Speed[1]	BLOS
Sir John A MacDonald Parkway/Wellington Street, West of Booth Street to Portage Bridge			
Arterial; Spine Route	Mixed Traffic	4 travel lanes; 50km/h	E
Wellington Street, East of Portage Bridge (Eastbound)			
Arterial; Spine Route	Bike Lanes – Not Adjacent to Parking Lane	6 travel lanes; 1.8m Bike Lane; 50km/h	D
Wellington Street, East of Portage Bridge (Westbound)			
Arterial; Spine Route	Physically Separated Facility	6 travel lanes; 50km/hr	A
Portage Bridge, North of Wellington Street			
Arterial	Physically Separated Bikeway	6 travel lanes; separated two-way cycle track	A
Booth Street, North of Wellington Street			
Arterial; Spine Route	Mixed Traffic	4-5 travel lanes; 50km/h	E
Booth Street, Wellington Street to Albert Street			
Arterial, Spine Route	Bike Lanes – Not Adjacent to Parking Lane	4 travel lanes; 50km/h; ≥1.2m to <1.5m	C
Booth Street, South of Albert Street			
Major Collector; Spine Route	Mixed Traffic	2 travel lanes; 50km/h	D
Albert Street, East and West of Booth Street			
Arterial; Spine Route	Physically Separated Bikeway	6 travel lanes; separated MUP	A
Lett Street, South of Wellington Street			
Local Route	Mixed Traffic	2 travel lanes; 50km/hr; no marked centerline	B

1. As speed surveys were unavailable from the City of Ottawa, speed is based on posted/regulatory speed limit

2.7.2.2 Intersection BLOS

The results of the intersection BLOS analysis are summarized in the following table.

Table 8: BLOS Intersection Analysis

Approach	Bikeway Facility Type	Criteria	Travel Lanes and/or Speed[1]	BLOS
Sir John A MacDonald Parkway/Wellington Street/Booth Street				
Northbound	Mixed Traffic Approach	Right turn lane characteristics	No right-turn lane; Motorists yield to cyclists; 50km/hr	A
		Left turn accommodation	Left turns prohibited	-

Approach	Bikeway Facility Type	Criteria	Travel Lanes and/or Speed[1]	BLOS
Southbound	Mixed Traffic Approach	Right turn lane characteristics	Right-turn lane 25 to 50m long; Turning speed ≤ 25km/hr	D
		Left turn accommodation	2 or more lanes crossed; ≥ 50km/hr	**F**
Eastbound	Mixed Traffic Approach	Right turn lane characteristics	No right-turn lane; Motorists yield to cyclists; 50km/hr	A
		Left turn accommodation	Left turns prohibited	-
Westbound	Mixed Traffic Approach	Right turn lane characteristics	No right-turn lane; Motorists yield to cyclists; 50km/hr	A
		Left turn accommodation	Left turns prohibited	-
Wellington Street/Lett Street				
Northbound	Mixed Traffic Approach	Right turn lane characteristics	No-right turn lane; Motorists yield to cyclists; 50km/hr	A
		Left turn accommodation	No lanes crossed; 50km/hr	B
Eastbound	Mixed Traffic Approach	Right turn lane characteristics	No right-turn lane; Motorists yield to cyclists; 50km/hr	A
Westbound	Mixed Traffic Approach	Left turn accommodation	2 or more lanes crossed; ≥ 50km/hr	**F**
Wellington Street/Portage Bridge				
Southbound	Bike Lanes	Right turn lane characteristics	Right-turn lane introduced to the right of the bike lane and ≤ 50m long; Turning speed ≤ 25km/hr	B
		Left turn accommodation	No left turn	-
Eastbound	Bike Lanes	Right turn lane characteristics	No right turn lane	-
		Left turn accommodation	3 lanes crossed; ≥ 50km/hr	**F**
Westbound	Bike Lanes	Right turn lane characteristics	No right turn lane	-
		Left turn accommodation	3 lanes crossed; ≥ 50km/hr	**F**
Booth Street/Albert Street				
Northbound	Mixed Traffic Approach	Right turn lane characteristics	No right-turn lane; Motorists yield to cyclists; 50km/hr	A
		Left turn accommodation	No lanes crossed; ≤ 50km/hr	B
Southbound	Bike Lanes	Right turn lane characteristics	Right-turn lane introduced to the right of the bike lane and > 50m long; Turning speed ≤ 30km/hr	D
		Left turn accommodation	1 lane crossed; 50km/hr	C

Approach	Bikeway Facility Type	Criteria	Travel Lanes and/or Speed[1]	BLOS
Eastbound/ Westbound	Separated Multi-Use Pathway and/or Mixed Traffic	Right turn lane characteristics	No right turn lane; Motorists yield to cyclists; 50km/hr	A
		Left turn accommodation	N/A	-

1. As speed surveys were unavailable from the City of Ottawa, speed is based on posted/regulatory speed limit

2.7.3 Transit Level of Service (TLOS)

The intent of TLOS, as described in the MMLOS Guidelines, is to evaluate the relative attractiveness of transit to support the City's aim to ultimately increase transit modal share. Exhibits 15 and 16 of the MMLOS Guidelines have been used to evaluate the existing segment and intersection TLOS within the project limits.

TLOS targets are identified in the MMLOS Guidelines for rapid transit and transit priority corridors. As the former/new transitway is segregated in this area (LOS A), the TLOS targets don't necessarily apply to other study area roads. Booth Street, Portage Bridge and Albert Street carry regular bus routes without transit priority measures, and do not have a target TLOS in the MMLOS Guidelines. The study area roadways and intersections have still been evaluated using the MMLOS methodology.

2.7.3.1 Segment TLOS

The results of the segment TLOS analysis is shown in the following table.

Table 9: TLOS Segment Analysis

Facility Type	Level/Exposure to Congestion Delay, Friction and Incidents			Quantitative Measurement[1]	LOS
	Congestion	Friction	Incident Potential		
Wellington Street, East of Portage Bridge					
Westbound Bus Lane – No/limited parking/driveway friction	NO	LOW	LOW	$C_f \leq 60$	B
Eastbound Mixed Traffic – Limited parking/driveway friction	YES	LOW	MEDIUM	$V_t / V_p \geq 0.8$	C
Portage Bridge, North of Wellington Street					
Bus Lane – No/limited parking/driveway friction	NO	LOW	LOW	$C_f \leq 60$	B
Booth Street, North of Albert Street					
Mixed Traffic – Limited parking/driveway friction	YES	LOW	MEDIUM	$V_t / V_p \geq 0.8$	C
Albert Street, East and West of Booth Street					
Bus Lane – No/limited parking/driveway friction	NO	LOW	LOW	$C_f \leq 60$	B

1. Cf, Conflict Factor = (Number of Driveways x Crossing Volume) / 1km; Vt/Vp is the ratio of average transit travel speed to posted speed limit

2.7.3.2 Intersection TLOS

The results of the intersection TLOS analysis is shown in the following table.

Table 10: TLOS Intersection Analysis

Approach	Delay[1]	LOS
Sir John A MacDonald Parkway/Wellington Street/Booth Street		
North	25s	D
South	35s	E
Wellington Street/Portage Bridge		
South	190s	F
East	20s	C
Booth Street/Albert Street		
North	40s	F
East	50s	F
West	45s	F

1. Delay based on vehicle delay outputs from Synchro analysis

2.7.4 Truck Level of Service (TkLOS)

The intent of the TkLOS, as described in the MMLOS Guidelines, is to compliment motor vehicle LOS by considering the physical space available for trucks to negotiate corners quickly and easily, and to operate safely within travel lanes. Exhibits 20 and 21 of the MMLOS Guidelines have been used to evaluate the existing segment and intersection TkLOS within the project limits. Booth Street and Albert Street are arterial truck routes with a target TLOS D in the Central Area, as defined in Exhibit 22 of the MMLOS Guidelines.

2.7.4.1 Segment TkLOS

The results of the segment TkLOS analysis is shown in the following table.

Table 11: TkLOS Segment Analysis

Curb Lane Width (m)	Number of Travel Lanes	LOS
Sir John A MacDonald Parkway/Wellington Street, West of Booth Street to Portage Bridge		
> 3.7	4	A
Wellington Street, East of Portage Bridge		
≤ 3.3	6	C
Portage Bridge, North of Wellington Street		
≤ 3.5	6	A
Booth Street, North of Wellington Street		
> 3.7	4	A
Booth Street, Wellington Street to Albert Street		
≤ 3.2	4	D
Albert Street, East and West of Booth Street		
≤ 3.3	4	C

2.7.4.2 Intersection TkLOS

The results of the intersection TkLOS analysis is shown in the following table.

Table 12: TkLOS Intersection Analysis

Approach	Effective Corner Radius (m)	Number of Receiving Lanes on Departure from Intersection	LOS
Sir John A MacDonald Parkway/Wellington Street/Booth Street			
Northbound	< 10	2	D
Southbound	< 10	2	D
Westbound	< 10	2	D
Wellington Street/Portage Bridge			
Southbound	10 to 15	2	B
Booth Street/Albert Street			
Southbound	> 15	2	A
Westbound	10 to 15	2	B

2.7.5 Auto LOS

The intent of the Auto LOS tool is to evaluate both roadway segments and intersections for the level of service provided for vehicles. Exhibit 22 of the MMLOS Guidelines suggests the minimum desirable Auto LOS in the Central Area is LOS E and LOS D in the General Urban Area.

2.7.5.1 Segment Auto LOS

The typical lane capacity along the study area roadways are based on the City's guidelines for the TRANS long-range Transportation Model. The lane capacity along the study area roadways has been estimated based on roadway classification and general characteristics (i.e. Suburban with limited access, urban with on-street parking, etc.). The segment Auto analysis is shown in the following table.

Table 13: Auto LOS Segment Analysis

Direction	Directional Capacity	Traffic Volumes		V/C Ratio and LOS			
		AM Peak	PM Peak	AM Peak		PM Peak	
				V/C	LOS	V/C	LOS
Sir John A MacDonald Parkway/Wellington Street, West of Booth Street to Portage Bridge							
Eastbound	2,000	1,141	963	0.57	A	0.48	A
Westbound	2,000	801	1,191	0.40	A	0.60	A
Wellington Street, East of Portage Bridge							
Eastbound	3,000	2,904	1,175	0.97	E	0.39	A
Westbound	2,000	1,006	1,684	0.50	A	0.84	D
Portage Bridge, North of Wellington Street							
Northbound	3,000	1,395	2,080	0.47	A	0.69	B
Southbound	3,000	2,271	1,301	0.76	C	0.43	A
Booth Street, North of Wellington Street to Albert Street							
Northbound	2,000	835	1,010	0.42	A	0.51	A
Southbound	2,000	908	531	0.45	A	0.27	A
Booth Street, South of Albert Street							
Northbound	400	518	534	1.3	**F**	1.34	**F**
Southbound	400	520	418	1.3	**F**	1.05	**F**

Direction	Directional Capacity	Traffic Volumes		V/C Ratio and LOS			
		AM Peak	PM Peak	AM Peak		PM Peak	
				V/C	LOS	V/C	LOS
Albert Street, East and West of Booth Street							
Eastbound	1,000	1,045	934	1.05	**F**	0.93	E
Westbound	2,000	678	805	0.34	A	0.40	A
Lett Street, South of Wellington Street							
Northbound	400	60	56	0.15	A	0.14	A
Southbound	400	18	53	0.05	A	0.13	A

2.7.5.2 Intersection Auto LOS

Intersection capacity analysis has been completed for the existing traffic conditions. The results of the analysis are summarized in the following table for the weekday AM and PM peak hours. Detailed reports are included in **Appendix F**.

Table 14: Intersection Analysis – Existing Traffic

Intersection	AM Peak			PM Peak		
	max v/c or Delay	LOS	Movement	max v/c or Delay	LOS	Movement
Wellington Street/Portage Bridge[1]	**1.22**	**F**	**SBL**	**1.26**	**F**	**EBL**
Albert Street/Booth Street[1]	0.89	D	EBT	**1.09**	**F**	**EBL**
Wellington Street/Sir John A MacDonald Parkway/Booth Street[1]	0.98	E	EB	**1.02**	**F**	**WB**
Wellington Street/Lett Street[1]	0.45	A	NB	0.45	A	WBT
Booth Street/Fleet Street[2]	10 sec	B	WB	11 sec	B	WB

1. Signalized Intersection
2. Unsignalized Intersection

2.8 Trade-off Evaluation

2.8.1 Segment Evaluation

A summary of the results of the segment MMLOS analysis is provided in the below table.

2.8.1.1 BLOS

Sir John A MacDonald Parkway/Wellington Street, Booth Street north of Wellington Street and south of Albert Street do not meet the target BLOS.

The implementation of a separated cycling facility along Sir John A MacDonald Parkway/Wellington Street from west of Booth Street to Portage Bridge would result in a BLOS A, meeting the target for the Central Area. In order to accommodate a separated cycling facility a reduction in the width of other cross section elements is required. No Projects are currently identified in the City's *Ottawa Cycling Plan* for Sir John A MacDonald Parkway and Wellington Street.

Table 15: Segment MMLOS Summary

	SEGMENT	SIR JAM PARKWAY/WELLINGTON ST, WEST OF BOOTH TO PORTAGE BRIDGE	WELLINGTON ST, EAST OF PORTAGE BRIDGE	PORTAGE BRIDGE, NORTH OF WELLINGTON ST	BOOTH ST, NORTH OF WELLINGTON ST	BOOTH ST, WELLINGTON ST TO ALBERT ST	BOOTH ST, SOUTH OF ALBERT ST	ALBERT ST, EAST/WEST OF BOOTH ST	LETT ST, SOUTH OF WELLINGTON ST
Pedestrian	Sidewalk Width	2m +	2m +	2m +	2m +	2m +	2m	2m +	2m
	Boulevard Width	None	None	None	None	None	None	None	None
	AADT	> 3000 vpd	> 3000 vpd	> 3000 vpd	> 3000 vpd	> 3000 vpd	> 3000 vpd	> 3000 vpd	≤ 3000 vpd
	On-Street Parking	Yes	No	No	No	No	No	No	Yes
	Operating Speed	30-50km/hr	30-50km/hr	30-50km/hr	30-50km/hr	30-50km/hr	30-50km/hr	30-50km/hr	30-50km/hr
	Level of Service	**B**	**C**	**C**	**C**	**C**	**C**	**C**	**A**
Cyclist	Number of Travel Lanes (Per Direction)	2	3	3	2	2	1	3	1
	Type of Bikeway	Mixed Traffic	Bike Lans	Physically Separated	Mixed Traffic	Bike Lanes	Mixed Traffic	Physically Separated	Mixed Traffic
	Bike Lane Width	N/A	1.8m	N/A	N/A	1.2m to 1.5m	N/A	N/A	N/A
	Operating Speed	50km/hr	50km/hr	50km/hr	50km/hr	50km/hr	50km/hr	50km/hr	50km/hr
	Bike Lane Blockages	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Unsignalized Lane Crossings (No Median)	N/A	N/A	N/A	N/A	2	N/A	N/A	N/A
	Unsignalized Lane Crossings (Median >1.8m)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Sidestreet Operating Speed	N/A	N/A	N/A	N/A	50km/hr	N/A	N/A	N/A
	Level of Service	**E**	**D**	**A**	**E**	**C**	**D**	**A**	**B**
Transit	Facility Type	-	Mixed Traffic	Bus Lane	Mixed Traffic	Mixed Traffic	-	Bus Lane	-
	Friction/Congestion/Incident Potential	-	Vt / Vp ≥ 0.8	Cf ≤ 60	Vt / Vp ≥ 0.8	Vt / Vp ≥ 0.8	-	Cf ≤ 60	-
	Level of Service	**-**	**C**	**B**	**C**	**C**	**-**	**B**	**-**
Truck	Lane Width	> 3.7m	≤ 3.3m	≤ 3.5m	> 3.7m	≤ 3.2m	-	≤ 3.3m	-
	Travel Lanes (Per Direction)	2	3	3	2	3	-	2	-
	Level of Service	**A**	**C**	**A**	**A**	**D**	**-**	**C**	**-**
Auto	**Level of Service**	**A**	**E**	**C**	**A**	**A**	**F**	**F**	**A**

The existing westbound bike lane provided along Wellington Street east of Portage Bridge is separated from general traffic by a barrier curb and delineation flex posts. If possible, physically separating the eastbound bike lane, similar to the westbound facility, would result in a BLOS A for this segment, meeting the target for the Central Area.

The City's *Ottawa Cycling Plan* identifies the implementation of either bike lanes or a multi-use pathway along Booth Street north of Wellington Street. A reduction in other cross sectional elements will be required in order to accommodate either facility. The implementation of bike lanes would result in a BLOS B, while a multi-use pathway would result in a BLOS A.

Traffic calming measures (on-street parking, curb extensions and speed humps) have been implemented along Booth Street south of Albert Street, which reduces the level of stress for cyclists along this segment. Consideration could be given to implementing bike lanes along this segment. In order to accommodate bike lanes, removal/reduction of other cross sectional elements may be required. The implementation of bike lanes would result in a BLOS A.

2.8.1.2 PLOS

All segments within the study area, excluding Booth Street south of Albert Street and Lett Street, do not meet the target PLOS. It is noteworthy that based on the MMLOS Guidelines, the target PLOS A cannot be achieved along a roadway with an AADT greater than 3000 vpd and an operating speed greater than 30km/hr. As Sir John A MacDonald Parkway, Wellington Street, Portage Bridge, Booth Street (north of Albert Street) and Albert Street are arterial roadways with an AADT greater than 3000vpd and an operating speed greater than 30km/hr, a PLOS A cannot be achieved.

The sidewalk on the north side of Wellington Street east of Portage Bridge is greater than 2m in width, with street lights/trees and separated bike lane between the roadway and the sidewalk. This configuration provides a higher level of pedestrian comfort and reflects a PLOS B. The sidewalk on the south side of this segment is greater than 2m in width, with street lights located near the curb edge. If the physically separated eastbound bike lane identified above is implemented, the cycling facility will act as a boulevard between the roadway and the sidewalk. This would improve pedestrian comfort along the south side of this segment, increasing this segment to a PLOS B.

The sidewalk on the east side of Portage Bridge is greater than 2m in width and is located adjacent to a bi-directional cycle track. The bi-directional cycle track separates the roadway and the sidewalk, providing a higher level of pedestrian comfort and reflects a PLOS B. The western sidewalk is approximately 3.5m in width, and located adjacent to the curb. As the Portage Bridge has a six-lane divided cross section with a median width of 1.5m, the existing width of the bridge limits the ability to provide a boulevard to improve the PLOS on the west side of this segment.

The sidewalks along Booth Street north of Wellington Street are greater than 2m in width and located adjacent to the curb. The implementation of a 2m boulevard between the roadway and the sidewalk would improve this segment to a PLOS B. The existing right-of-way (ROW) width is insufficient to accommodate both a 2m boulevard and the bike lanes (or multi-use pathway) identified above. It is noteworthy that bike lanes would meet the target BLOS for the area while providing a separation between the general travel lane and the sidewalk. This configuration would provide a higher level of comfort for pedestrians and reflect a PLOS B.

It is noteworthy that if the above-mentioned bike lanes are implemented along this segment, the bike lanes will provide a separation between the general travel lane and the sidewalk. This configuration would provide a higher level of comfort for pedestrians and reflect a PLOS B.

Booth Street between Wellington Street and Albert Street was recently reconstructed as part of the Confederation Line. This segment contains wide sidewalks. There is limited opportunity to provide additional measures to increase the PLOS along this segment due to ROW constraints and the grade separation of the LRT.

The sidewalk on the south side of Albert Street governs the PLOS analysis, and the multi-use pathway on the north side of the road provides a PLOS A. Although the south side of the road does not meet the target PLOS, pedestrians requiring additional comfort or safety can use the multi-use pathway on the north side.

2.8.1.3 TLOS, TkLOS and Auto LOS

None of the segments within the study area are identified as a Transit Priority Corridor in the City's *Transportation Master Plan* and do not have a target TLOS in the MMLOS Guidelines. All of the segments within the study area meet the target TkLOS. All segments within the study area, excluding Booth Street south of Albert Street and Albert Street east/west of Booth Street, meet the target Auto LOS.

2.8.2 Intersection Evaluation

A summary of the results of the intersection MMLOS analysis is provided in the below table.

All intersections within the study area do not meet the target PLOS and BLOS. All of the study area intersections are not located along a Transit Priority Corridor in the City's *Transportation Master Plan* and do not have a target TLOS in the MMLOS Guidelines. All intersections within the study area meet the target TkLOS. The Wellington Street/Portage Bridge and Albert Street/Booth Street intersections do not meet the target Auto LOS.

2.8.2.1 Sir John A MacDonald Parkway/Wellington Street/Booth Street

As all approaches to the Sir John A MacDonald Parkway/Wellington Street/Booth Street intersection have a minimum four-lane divided cross-section, there is limited opportunity to improve the overall PLOS. Left turn movements are restricted on the northbound, eastbound and westbound approaches of this intersection, and the right turn movement is restricted on the eastbound approach. The aforementioned turning restrictions reduce the potential for pedestrian/vehicle conflicts. Consideration could be given to providing zebra striped crosswalks to further improve the pedestrian level of comfort crossing each approach. It is noteworthy that zebra striped crosswalks are warranted on the north, east and west legs of this intersection based on the vehicle/pedestrian conflict warrants (>400,000 vehicle/pedestrian conflicts over an eight-hour period).

Consideration could be given to implementing a two stage, left-turn bike box to facilitate the southbound left turn movement for cyclists at the Sir John A MacDonald Parkway/Wellington Street/Booth Street intersection. The implementation of a two stage, left-turn bike box would improve the left turn accommodation to a PLOS A. As identified above, the City's *Ottawa Cycling Plan* identifies the implementation of either bike lanes or a multi-use pathway along Booth Street north of Wellington Street. The implementation of bike lanes would result in a BLOS B, while a multi-use pathway would result in a BLOS A based on the right turn criteria. Based on the foregoing, the implementation of a southbound two stage, left turn box in conjunction with the future cycling improvements along Booth Street north of Wellington Street would meet the Central Area BLOS target at this intersection.

Table 16: Intersection MMLOS Summary

	INTERSECTIONS	Wellington St/Sir JAM Pkwy/Booth St				Wellington St/Lett St				Wellington St/Portage Bridge				Albert St/Booth St			
		NORTH	SOUTH	EAST	WEST	NORTH	SOUTH	EAST	WEST	NORTH	SOUTH	EAST	WEST	NORTH	SOUTH	EAST	WEST
Pedestrian	Lanes	6	4	4	4	-	2	5	4	9	-	11	8	5	3	7	6
	Median	No	No	Yes	Yes	-	No	No	No	Yes	-	Yes	No	No	No	No	No
	Island Refuge	No	No	No	No	-	No	No	No	Yes	-	Yes	Yes	No	No	No	No
	Conflicting Left Turns	Prohibited	Prohibited	Perm + Prot	Perm + Prot	-	Permitted	None	Permitted	Protected	-	Protected	Prohibited	Perm + Prot	Permitted	Perm + Prot	Permitted
	Conflicting Right Turns	Permitted	None	Permitted	Permitted	-	Permitted	Permitted	None	None	-	None	Permitted	Permitted	Permitted	Permitted	Permitted
	Right Turn on Red	Permitted	Permitted	Prohibited	Prohibited	-	Permitted	None	Permitted	Permitted	-	Prohibited	None	Certain Times	Permitted	Certain Times	Permitted
	Ped Leading Interval	No	No	No	No	-	No	No	No	No	-	No	No	No	No	Yes	Yes
	Corner Radius	>5m to 10m	>5m to 10m	>5m to 10m	>5m to 10m	-	>5m to 10m	>5m to 10m	None	None	-	None	Smart Channel	>5m to 10m	>3m to 5m	>3m to 5m	>5m to 10m
	Crosswalk Type	Standard	Standard	Standard	Standard	-	Standard	Standard	Standard	Textured	-	Textured	Textured	Zebra Stripe	Zebra Stripe	Zebra Stripe	Zebra Stripe
	PETSI	29	67	59	59	-	86	49	64	6	-	-6	14	42	75	12	26
	Delay	32	32	32	32	-	6	48	48	48	-	44	20	43	22	44	35
	Level of Service	**F**	**D**	**D**	**D**	**-**	**B**	**E**	**E**	**F**	**-**	**F**	**F**	**E**	**C**	**F**	**F**
		F				**E**				**F**				**F**			
Cyclist	Type of Bikeway	MIXED TRAFFIC	MIXED TRAFFIC	MIXED TRAFFIC	MIXED TRAFFIC	-	MIXED TRAFFIC	MIXED TRAFFIC	MIXED TRAFFIC	SEPARATED	-	BIKE LANES	BIKE LANES	BIKE LANES	MIXED TRAFFIC	SEPARATED	SEPARATED
	Turning Speed	Slow	Slow	Slow	Slow	-	Slow	Slow	Slow	Slow	-	Slow	N/A	Slow	Slow	Slow	Slow
	Right Turn Storage Length	25m to 50m	None	None	None	-	None	None	None	≤ 50m	-	None	None	> 50m	None	> 50m	None
	Dual Right Turn	No	No	No	No	-	No	No	No	No	-	Yes	No	No	No	No	No
	Shared Through-Right	No	Yes	Yes	No	-	Yes	No	Yes	Yes	-	No	No	No	Yes	No	Yes
	Bike Box	No	No	No	No	-	No	No	No	No	-	No	No	No	No	No	No
	Number of Lanes Crossed for Left Turns	2 +	N/A	N/A	N/A	-	None	2 +	N/A	N/A	-	2 +	2 +	1	None	N/A	N/A
	Dual Left Turn Lanes	No	No	No	No	-	No	No	No	Yes	-	Yes	Yes	No	No	No	No
	Operating Speed on Approach	50km/hr	50km/hr	50km/hr	50km/hr	-	50km/hr	50km/hr	50km/hr	50km/hr	-	50km/hr	50km/hr	50km/hr	50km/hr	50km/hr	50km/hr
	Level of Service	**F**	**A**	**A**	**A**	**-**	**B**	**F**	**A**	**B**	**-**	**F**	**F**	**D**	**B**	**A**	**A**
		F				**F**				**F**				**D**			
Transit	Average Signal Delay	25s	35s	-	-	-	-	-	-	190s	-	20s	-	40s	-	50s	45s
	Level of Service	**D**	**E**	**-**	**-**	**-**	**-**	**-**	**-**	**F**	**-**	**C**	**-**	**F**	**-**	**F**	**F**
		E				**-**				**F**				**F**			
Truck	Turning Radius	< 10m	< 10m	< 10m	-	-	-	-	-	10m to 15m	-	-	-	> 15m	-	10m to 15m	-
	Number of Receiving Lanes	2	2	2	-	-	-	-	-	2	-	-	-	2	-	2	-
	Level of Service	**D**	**D**	**D**	**-**	**-**	**-**	**-**	**-**	**B**	**-**	**-**	**-**	**A**	**-**	**B**	**-**
		D				**-**				**B**				**B**			
Auto	**Level of Service**	**F**				**A**				**F**				**F**			

Critical auto movements at the Sir John A MacDonald Parkway/Wellington Street/Booth Street intersection are currently operating at with a vehicle LOS F during the PM peak hour. Traffic signal optimization is anticipated to decrease the critical v/c ratios at this intersection to 0.96 (LOS E) during the PM peak hour.

2.8.2.2 Wellington Street/Lett Street

Consideration could be given to providing zebra striped crosswalks, to improve the pedestrian level of comfort crossing each approach to the Wellington Street/Lett Street intersection. Zebra striped crosswalks are not currently warranted based on the vehicle/pedestrian conflict warrants (>400,000 vehicle/pedestrian conflicts over an eight-hour period). Consideration could also be given to implementing leading pedestrian intervals at this intersection. The implementation of leading pedestrian intervals would provide pedestrians with a head start when entering the intersection, but may have an impact on the intersection operations during peak hours. As the intersection is currently operating with a vehicle LOS A, leading pedestrian intervals are not anticipated to have a significant effect on the vehicular operations.

Consideration could be given to implementing a two stage, left-turn box to facilitate the westbound left turn movement for cyclists at the Wellington Street/Lett Street intersection. The implementation of a two stage, left-turn box to facilitate the westbound left turn movement would meet the Central Area BLOS target at this intersection.

2.8.2.3 Wellington Street/Portage Bridge

The Wellington Street/Portage Bridge intersection is not a standard configuration and the results of the PLOS and BLOS analysis should be treated with caution. The east and west approaches to the intersection have two stage pedestrian crossings, with a channelized island refuge area. All vehicular movements are fully protected, excluding southbound right turn smart channel, limiting the potential for vehicle/pedestrian conflict. Based on the foregoing, the pedestrian level of comfort crossing this intersection is anticipated to be higher than represented by the PLOS analysis. There is limited opportunity to improve the delay score for each pedestrian crossing, as the intersection is a major link to/from the downtown core and is currently operating with a vehicle LOS F.

The cyclist eastbound and westbound left turn accommodation at the Wellington Street/Portage Bridge intersection governs the BLOS analysis. The on-road cycling facilities require cyclists to cross three lanes of traffic into a pocket bike lane to perform an eastbound or westbound left turn. As this intersection has a two-stage pedestrian crossing on the east and west approaches, cyclists may alternatively choose to dismount adjacent to the curb to cross to the channelized island refuge area using the pedestrian crossing. Cyclists can then mount their bike and enter the pocket bike lane to perform the left turn movement. This approach reduces the level of traffic stress experienced by the cyclist. As this approach is not reflected in the MMLOS guidelines, it is reasonable to assume that the level of service at this intersection is higher than BLOS F.

Critical auto movements at the Wellington Street/Portage Bridge intersection are currently operating at with a vehicle LOS F during both the AM and PM peak hours. Traffic signal optimization is anticipated to decrease the critical v/c ratios at this intersection to 1.05 (LOS F) during the AM peak hour and 0.93 (LOS E) during the PM peak hour.

2.8.2.4 Albert Street/Booth Street

The east and west approaches to the Albert Street/Booth Street intersection currently have a PLOS F. The PLOS on these approaches is highly influenced by the number of lanes crossed (5-6

lanes) along Albert Street. A reduction in east-west travel lanes is anticipated to have a significant impact on the vehicle operations at this intersection and is not recommended. It is noteworthy that leading pedestrian intervals and zebra striped crosswalks are currently implemented at this intersection to provide a higher level of comfort and safety for pedestrians crossing Albert Street.

As a bi-directional multi-use pathway is provided on the north side of Albert Street, left turn movements for cyclists at the Albert Street/Booth Street intersection are not reflected in the MMLOS Guidelines. As the left turn maneuvers at this intersection are not reflected in the MMLOS Guidelines and a separated cycling facility is provided on the north side of Albert Street, it is reasonable to assume that the BLOS for the left turn accommodation criteria meets the Central Area target.

The BLOS at the Albert Street/Booth Street intersection is governed by the southbound right turn lane characteristics. The southbound right turn lane is approximately 55m in length, and located to the right of the southbound bike lane. The MMLOS Guidelines suggest a right turn lane of less than 50m in length and a small curb radii corresponds to a BLOS B. As the southbound right turn lane only exceeds the length threshold in the MMLOS guidelines by 5m and a reduced curb radii is provided in the northwest corner of the intersection, no modifications are recommended to improve the BLOS at the intersection.

Critical auto movements at the Albert Street/Booth Street intersection are currently operating at with a vehicle LOS F during the PM peak hour. Traffic signal optimization is anticipated to decrease the critical v/c ratios at this intersection to 1.01 (LOS F) during the PM peak hour.

3.0 TRAVEL DEMAND FORECASTING

3.1 Planned Roadway and Transit Improvements

OC Transpo is currently converting the east-west transitway between Tunney's Pasture and Blair stations to LRT, known as the Confederation Line. This construction is currently on-going and is anticipated to be complete by 2018. As part of the construction of the Confederation Line, Booth Street was temporarily closed between Albert Street and Wellington Street from 2014 to 2016 to grade separate the transit system.

As part of the closure of Booth Street, the City of Ottawa constructed major infrastructure to provide a detour leading to the Chaudière crossing to Quebec. This detour included an extension to Preston Street north to Sir John A MacDonald Parkway, and construction of eastbound dual left turn lanes at the Wellington Street/Booth Street intersection. This detour also included the conversion of the two southbound through lanes into dual right turn lanes at this intersection.

The construction of the Confederation Line within the study area is now complete, and the infrastructure developed for the Booth Street detour has been removed (extension of Preston Street and turn lanes at the Wellington Street/Booth Street intersection), reverting the Wellington Street/Booth Street intersection back to the previous lane configuration. A median has been constructed along Booth Street, restricting Fleet Street to right-in right-out operation. Pavement markings and signage drawings for Booth Street were received from the City of Ottawa and can be found in **Appendix B**.

As part of the Confederation Line construction, the LeBreton Transit Station will be renamed to be the Pimisi LRT station and will be relocated to the west side of Booth Street. Sidewalks have been constructed along both sides of Booth Street, providing direct access to the Pimisi LRT station entrances to be located along Booth Street north of Albert Street.

The Confederation Line will travel from the Tunney's Pasture station in the west and Blair station in the east, with new stations at Bayview, Pimisi, Lyon, Parliament, Rideau, uOttawa, Lees, Hurdman, Tremblay, St-Laurant and Cyrville. The Confederation Line will be served by 17 trains with a capacity of approximately 600 passengers per train (240 seated and 360 standing). Trains will run approximately every five minutes during peak hours, while train frequency will be reduced to approximately every 15 minutes during off peak hours. Based on the foregoing, the Confederation Line is anticipated to provide efficient and reliable travel to/from the downtown core and increase transit ridership in the City of Ottawa.

3.2 Planned Pedestrian and Cycling Improvements

The City of Ottawa's *Ottawa Cycling Plan* (OCP) Ultimate Cycling Network identifies the construction of bicycle lanes along Albert Street (Phase One – 2014 to 2019 implementation) and either bicycle lanes or a multi-use pathway along Booth Street between Sir John A MacDonald Parkway and the Ottawa River Pathway (Phase 2 – 2020 to 2025 implementation).

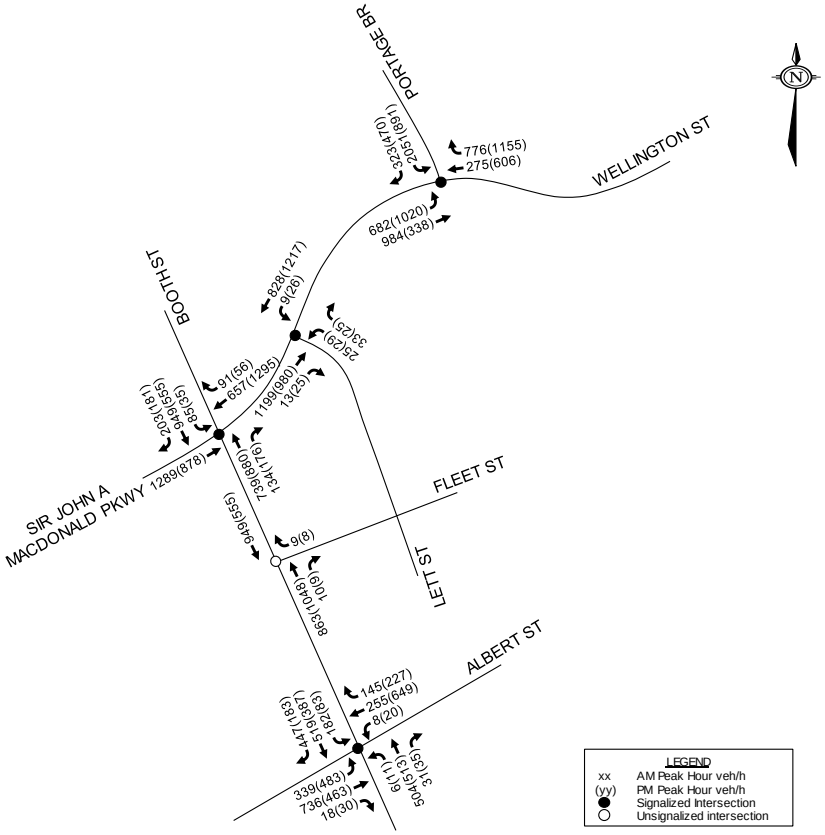
It is noteworthy that the Albert Street reconstruction project re-implemented a multi-use pathway on the north side of Albert Street, and the Confederation Line construction implemented bike lanes on Booth Street between Albert Street and Wellington Street. It is our understanding that the City is also exploring the opportunity to further improve the cycling facilities along Booth Street.

3.3 Background Traffic Growth

The City of Ottawa's TMP identifies the overall transit modal share (TMS) in the Ottawa Inner Area is anticipated to increase by 2% prior to the 2031 horizon year. The implementation of the Confederation Line in 2018 is anticipated to achieve the increased TMS prior to the 2031 build-out year. The projected traffic volumes at the study area intersections have been reduced to reflect the future TMS in the area.

Background traffic projections are based on 2011 and 2031 snapshots from the City of Ottawa's Strategic Long Range Model and traffic generated by other planned developments in the area. The City's long range model suggests a growth rate of approximately 0.5% per year along Wellington Street and Booth Street (north of Wellington Street). The long-range model suggests a -0.5% growth rate along Booth Street (south of Wellington Street). In order to provide a conservative and robust analysis, the traffic volumes along Wellington Street, Booth Street and Albert Street have been inflated using a growth rate of 0.5% per year. Background traffic growth projections for the 2031 build-out are shown in **Figure 5**.

Figure 5: 2031 Background Growth



3.4 Other Study Area Developments

The City of Ottawa's Strategic Long Range Model allows for the other developments in the LeBreton Flats area. The overall growth assumptions for the City's Long Range Model were confirmed with City staff, and found to underestimate the overall development anticipated from the LeBreton Flats area. For example, based on the proposed concept plan and the Rendezvous LeBreton concept described in the following section, it appears that the model accounts for approximately 60% of the residential development and 40% of the employment development.

Although the growth rates identified in Section 3.3 above account for some of the development in the area, traffic generated by other planned developments in the vicinity of the subject site have been added to the background traffic. This will provide a highly conservative and robust analysis of the study area intersections.

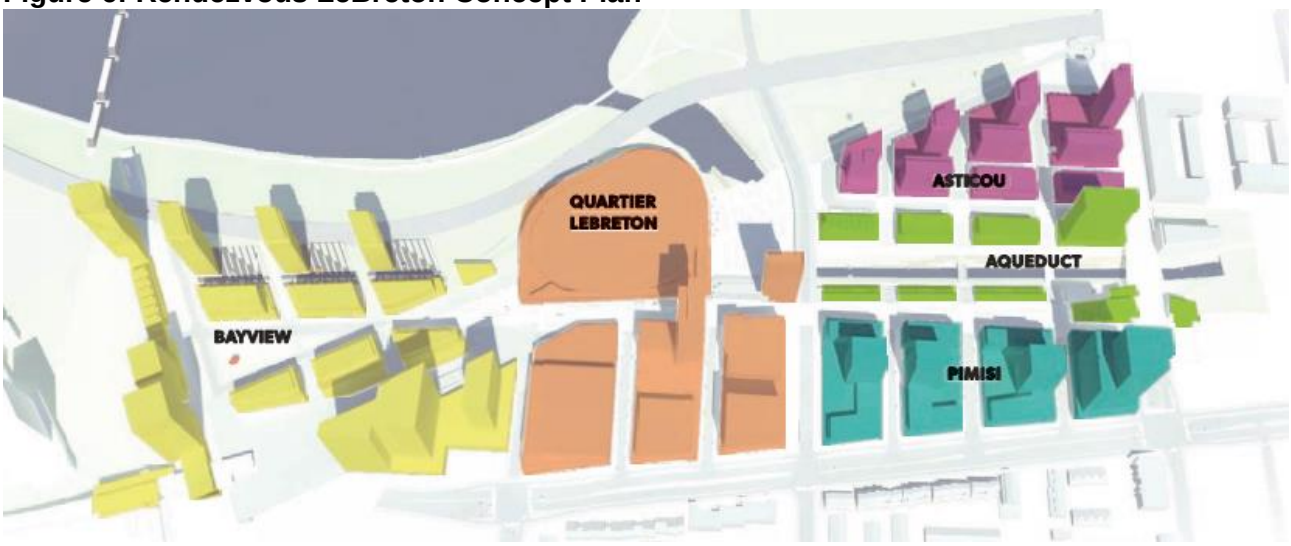
For the purposes of this analysis, the future development of the NCC lands west of Booth Street has been considered. The NCC lands west of Booth Street will henceforth be referred to as the "West LeBreton Flats lands".

In January 2016, the NCC received two proposals for the West LeBreton Flats lands. The Devcore Candarell DLS Group proposal included a high emphasis on public space/uses north of the Confederation Line and residential mixed uses south of the Confederation Line. The Rendezvous

LeBreton proposal included a higher emphasis on residential mixed uses along the exterior of the site and public space/uses on the interior.

On April 28, 2016, the NCC announced the Rendezvous LeBreton proposal as the preferred bid for the West LeBreton Flats lands. Novatech has broken down the NCC's preferred proposal (Rendezvous LeBreton) into residential units, office space and retail space. Based on the bids submitted in January 2016, the Rendezvous LeBreton proposal is anticipated to contain a total of 4,400 residential units and 2.8M square feet of retail/office space. For the purposes of this analysis, it has been assumed that the retail and office space will be split 50/50. A concept plan for the Rendezvous LeBreton proposal is shown in **Figure 6**.

Figure 6: Rendezvous LeBreton Concept Plan



It is understood that the overall development of the West LeBreton Flats lands is expected to take approximately 30 years, but residential and commercial development is expected to be well underway by 2031. For the purposes of this analysis, it is assumed that approximately 50% of the residential and commercial development within West LeBreton Flats lands will be constructed by the 2031 build-out year of the subject site. It is acknowledged that the aforementioned traffic projections do not account for a future arena within the West LeBreton Flats Lands. The traffic generated by the future arena is anticipated to have a high transit modal share, and generally occur during off-peak hours along the adjacent roadways. As such the background traffic projections in this report do not reflect the future arena within the West LeBreton Flats Lands.

The Ottawa Central Library is proposed to be relocated to the property south of the subject lands. The library is anticipated to be located along Albert Street east of Booth Street. For the purposes of this analysis, the new Ottawa Central Library has been assumed to be approximately 130,000 square feet (GFA).

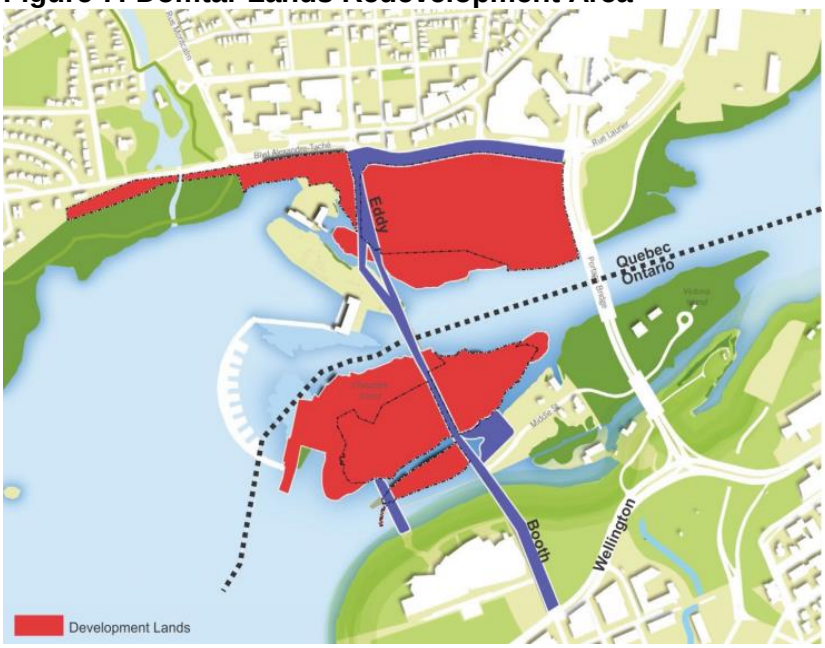
Trips generated by the West LeBreton Flats lands (based on the Rendezvous LeBreton proposal) and the proposed Ottawa Central Library have been generated and distributed to the study area intersections using a similar methodology as presented in **Section 3.5** and **3.6** below.

It has been assumed that the West Lebreton Flats lands will have right-in right-out access on Booth Street and all movement on access on Albert Street. It has been assumed that the Ottawa Central Library will have all movement access on Albert Street.

Windmill Development is proposing to redevelop the Domtar lands shown in **Figure 7**. The Domtar lands will contain approximately 1M square feet of mixed-use development on the on the Ontario side of the provincial border and 2M square feet of mixed-use development on the Quebec side. A

Multi-Modal Transportation Impact Study was prepared in support of the Domtar lands redevelopment in April 2014 by Delcan. This report projects traffic volumes from the development in the area of the subject site. This report suggests full build-out of the Domtar lands will take approximately 15-20 years. Relevant excerpts from the report are included in **Appendix G**.

Figure 7: Domtar Lands Redevelopment Area

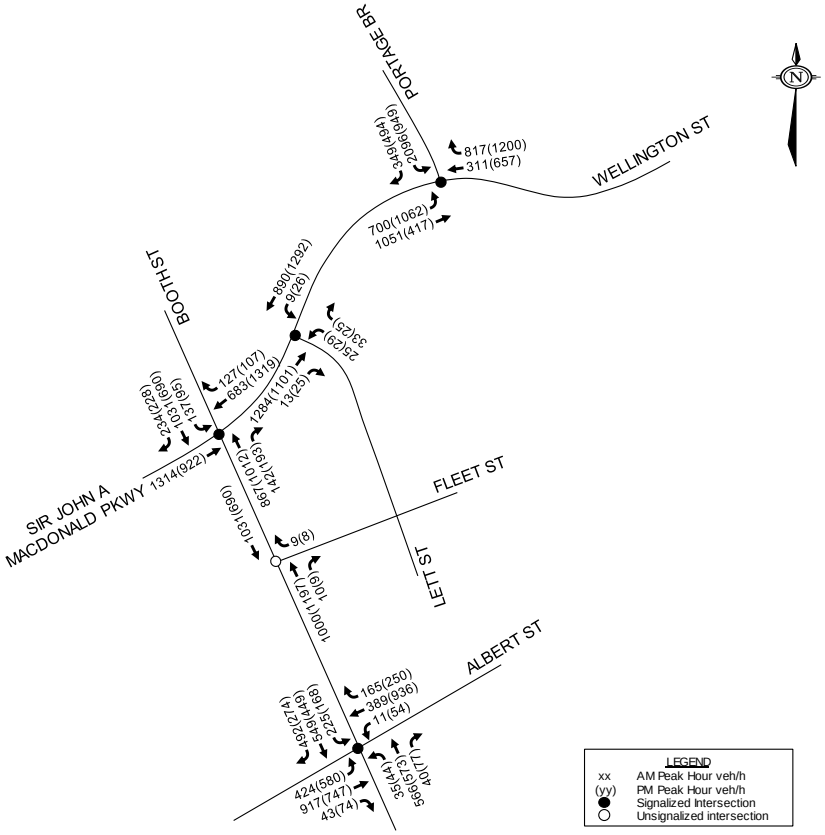


For the purposes of this analysis, a 20-year build-out has been assumed for the Domtar lands. Based on the foregoing build-out timeframe, the Domtar lands are anticipated to be 80% built-out by 2031.

Trinity Group are proposing a development at 900 Albert Street, consisting 1,632 residential units, 10,905m^2 of retail space, and 16,818m^2 of office space. The proposed Trinity development is anticipated to be fully built-out by 2025. Parsons Engineering have prepared a TIS in support of the aforementioned development, dated November 2016. Relevant excerpts from the report are included in **Appendix G**.

Traffic volumes from the West LeBreton Flats lands, the Ottawa Central Library, the Domtar Lands and 900 Albert Street have been added to the background growth projections presented above. The overall background traffic projections for the 2031 build-out year are shown in **Figure 8**.

Figure 8: 2031 Background Traffic



3.5 Trip Generation

Trips generated by the subject lands have been estimated using the relevant peak hour rates identified in the Institute of Transportation Engineers (*ITE) Trip Generation Manual, 9th Edition*. It is noteworthy that the specific institutional land use has not been confirmed at this point in time and could be a combination of school, day-care or cultural spaces. For the purposes of this analysis, trips generated by the institutional land use have been estimated using the Elementary School land use. The trips generated by the subject lands during the weekday AM and PM peak hours are outlined in the following table.

Table 17: ITE Trip Generation

Land Use	ITE Code	Units / GFA (s.f.)	AM Peak			PM Peak		
			In	Out	Total	In	Out	Total
Condominium	230	1,950	94	462	556	460	227	687
Supermarket	850	35,000	73	46	119	169	163	332
Specialty Retail	826	60,000	25	16	41	71	92	163
Institutional	520	63,000	183	145	328	34	42	76
		Total	**375**	**669**	**1,044**	**734**	**524**	**1,258**

The trip generation surveys compiled in the *ITE Trip Generation Manual* only record vehicle trips, and the sites surveyed are typically located in the suburban locations in the United States where non-auto modes of transportation typically have a modal share of 10% or less. For urban infill

developments where multiple modes of transportation are readily available, it is considered good practice to express projected trip generation volumes in terms of person trips instead of vehicle trips.

Based on our review of available literature, a factor of 1.3 applied to ITE vehicle trip generation rates is considered to be a reasonable estimate of "person" trips, given typical auto occupancy in North America is approximately 1.15 and the typical modal share of non-auto person trips is approximately 10% (e.g. 70% Auto Driver, 10% Auto Passenger, 10% Transit, and 10% Non-motorized). This factor was not applied to the trips generated by the congregate care facility due to the nature of the land uses.

For the purposes of this analysis, all trips generated by the institutional land use have been assumed to be vehicle trips.

Table 18: Person Trips

Land Use	In	Out	Total	Person Trip Factor	In	Out	Total
AM Peak							
Condominium	94	462	556	x 1.30 →	122	601	723
Supermarket	73	46	119		96	59	155
Specialty Retail	25	16	41		32	21	53
PM Peak							
Condominium	460	227	687	x 1.30 →	598	295	893
Supermarket	169	163	332		219	212	431
Specialty Retail	71	92	163		92	119	211

The number of car trips that the site will generate has been estimated by categorizing the person trips by modal share. The modal shares are based on observed percentages in the *2011 TRANS O-D Survey Report* that are specific to the region referred to as the Ottawa Inner Area.

The modal shares for the proposed residential development have been estimated based on trips made within the Ottawa Inner Area, trips exiting the region in the AM and trips entering the region in the PM.

The proposed retail development is anticipated to serve the local community and is not anticipated to have a large interregional draw. As such, the modal shares for the proposed retail development have been estimated based on trips made within the Ottawa Inner Area.

A full breakdown of the projected person trips by modal share and arrival/departure is shown in the following table.

Table 19: Site-Generated Person Trips by Modal Share

Travel Mode	Modal Share	AM Peak			PM Peak		
		In	Out	Total	In	Out	Total
Condominium Trips							
Condominium Person Trips		*122*	*601*	*723*	*598*	*295*	*893*
Auto Driver	**35%**	**43**	**211**	**254**	**210**	**104**	**314**
Auto Passenger	10%	13	60	73	60	29	89
Transit	20%	24	120	144	119	59	178
Non-Motorized	35%	42	210	252	209	103	312
Supermarket Trips							
Supermarket Person Trips		*96*	*59*	*155*	*219*	*212*	*431*
Auto Driver	**20%**	**20**	**12**	**32**	**44**	**43**	**87**
Auto Passenger	10%	10	6	16	22	22	44
Transit	15%	14	9	23	33	31	64
Non-Motorized	55%	52	32	84	120	116	236
Specialty Retail Trips							
Specialty Retail Person Trips		*32*	*21*	*53*	*92*	*119*	*211*
Auto Driver	**20%**	**7**	**5**	**12**	**19**	**24**	**43**
Auto Passenger	10%	4	2	6	10	12	22
Transit	15%	4	3	7	13	18	31
Non-Motorized	55%	17	11	28	50	65	115

The commercial land uses are expected to generate two types of external peak hour trips: primary and pass-by trips. Primary trips are made for the specific purpose of visiting the site and pass-by trips are made as intermediate stops on the way to another destination. Peak hour pass-by trips have been estimated based on a pass-by rate of 34%. The *ITE Trip Generation Handbook, 9th Edition* identifies this percentage as an average rate for the Shopping Centre land use. The pass-by trips generated by the commercial development are part of the observed background traffic and do not constitute 'new' trips on the adjacent road network. The primary and pass-by trip generation for the commercial land use is summarized in the following table.

Table 20: Primary and Pass-by Trips (Commercial)

Trip Type	AM Peak			PM Peak		
	In	Out	Total	In	Out	Total
Supermarket Trips						
Supermarket Vehicle Trips	*20*	*12*	*32*	*44*	*43*	*87*
Pass-by	5	5	10	15	15	30
Primary	**15**	**7**	**22**	**29**	**28**	**57**

Trip Type	AM Peak			PM Peak		
	In	Out	Total	In	Out	Total
Specialty Retail Trips						
Specialty Retail Vehicle Trips	*7*	*5*	*12*	*19*	*24*	*43*
Pass-by	2	2	4	7	7	14
Primary	**5**	**3**	**8**	**12**	**17**	**29**

Since the development is to contain a mix of residential, commercial and institutional land uses, some trips are anticipated to be internally captured within the subject lands. Internal capture rates for the residential and commercial land uses were determined using the methodology identified in Chapter 7 of the *ITE Trip Generation Handbook, 9th Edition.* Internal capture summary sheets are provided in **Appendix H**.

The *ITE Trip Generation Handbook* does not identify internal capture rates associated with institutional land uses. It is anticipated that some of the trips to/from the institutional land use will be residents of the subject development. For the purposes of this analysis, an internal capture rate of 50% has been applied to the trips generated by the institutional land use.

Table 21: Internally Captured Trips

Trip Type	AM Peak			PM Peak		
	In	Out	Total	In	Out	Total
Condominium Trips						
Condominium Primary Trips	*43*	*211*	*254*	*210*	*104*	*314*
Internal	1	1	2	5	4	9
External	**42**	**210**	**252**	**205**	**100**	**305**
Supermarket Trips						
Supermarket Primary Trips	*15*	*7*	*22*	*29*	*28*	*57*
Internal	1	1	2	3	3	6
External	**14**	**6**	**20**	**26**	**25**	**51**
Specialty Retail Trips						
Specialty Retail Primary Trips	*5*	*3*	*8*	*12*	*17*	*29*
Internal	0	0	0	1	2	3
External	**5**	**3**	**8**	**11**	**15**	**26**
Institutional Trips						
Institutional Primary Trips	*183*	*145*	*328*	*34*	*42*	*76*
Internal	92	72	164	17	21	38
External	**91**	**73**	**164**	**17**	**21**	**38**

Based on the above calculations, the multi-modal trip generation characteristics of the proposed development at ultimate build-out can be summarized as follows:

- The proposed development is expected to generate a total of **444** and **420** external vehicle trips in the weekday AM and PM peak hours respectively

- The proposed development is expected to generate a total of **95** and **155** auto passenger trips in the weekday AM and PM peak hours respectively
- The proposed development is expected to generate a total of **177** and **273** transit trips in the weekday AM and PM peak hours respectively
- The proposed development is expected to generate a total of **364** and **663** non-motorized trips during the weekday AM and PM peak hours respectively

3.6 Trip Distribution

The projected distribution of vehicular trips generated by the proposed development has been derived with appropriate consideration given to several key factors, including:

- The size and nature of the proposed development
- Existing traffic patterns
- The location of the site accesses with respect to the adjacent roadway system
- The principles of logical trip routing

Trips generated by the proposed development will be distributed differently based on arrival and departure due to the location of the accesses and the traffic restrictions at the Wellington Street/Sir John A MacDonald Parkway/Booth Street intersection. Trips generated by the proposed development have been distributed to the adjacent road network as follows:

Arrival

- 60% to/from the east via Wellington Street
- 25% to/from the south via Booth Street
- 10% to/from the west via Wellington Street/Sir John A MacDonald Parkway
- 5% to/from the north via the Portage Bridge

Departure

- 70% to/from the east via Wellington Street
- 20% to/from the west via Wellington Street/Sir John A MacDonald Parkway
- 5% to/from the north via Booth Street/Chaudiere Bridge
- 5% to/from the north via the Portage Bridge

Pass-by trips generated by the proposed development have been distributed to the site accesses based on existing traffic conditions.

Traffic volumes generated by the subject site are shown in **Figure 9**. Total traffic volumes for the 2031 build-out year are shown in **Figures 10**.

Figure 9: Site Generated Traffic Volumes

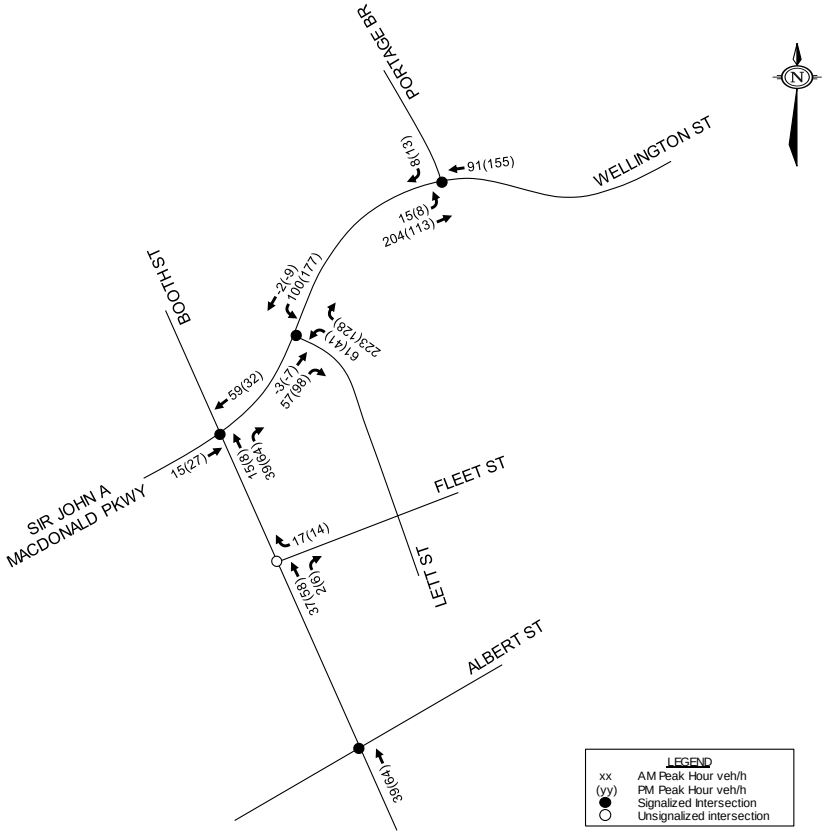
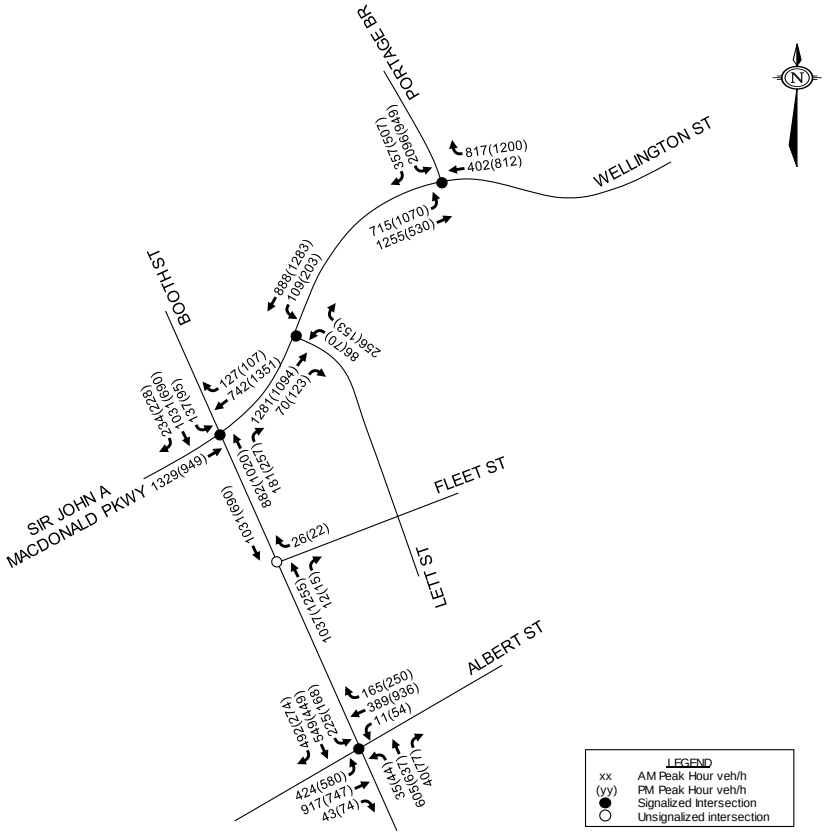


Figure 10: 2031 Total Traffic Volumes



4.0 FUTURE INTERSECTION OPERATIONS

4.1 2031 Background Traffic

Intersection capacity analysis has been completed for the 2031 background traffic conditions. The signal timing plans for each intersection is based on the existing signal timing plans received from the City of Ottawa.

The results of the analysis are summarized in the following table for the weekday AM and PM peak hours. Detailed reports are included in **Appendix I**.

Table 22: Intersection Analysis – 2031 Background Traffic

Intersection	AM Peak			PM Peak		
	max v/c or Delay	LOS	Mvmt	max v/c or Delay	LOS	Mvmt
Wellington Street/Portage Bridge[1]	**1.31**	**F**	**SBL**	**1.40**	**F**	**EBL**
Albert Street/Booth Street[1]	**1.30**	**F**	**EBT**	**1.70**	**F**	**EBL**
Wellington Street/Sir John A MacDonald Parkway/ Booth Street[1]	**1.12**	**F**	**NBT/R**	**1.49**	**F**	**SBL**
Wellington Street/Lett Street[1]	0.50	A	EBT/R	0.50	A	WBT
Booth Street/ Fleet Street[2]	10 sec	B	WB	11 sec	B	WB

1. Signalized Intersection
2. Unsignalized Intersection

Critical movements at the Wellington Street/Portage Bridge intersection are anticipated to continue to operate with a LOS F during the AM and PM peak hours. AM and PM peak hour traffic signal optimization is anticipated to yield improved results with critical v/c ratios of 1.17 and 0.98 respectively. To alleviate the projected failing conditions at this intersection during the AM peak hour, a reduction of 200 southbound left turning vehicles and 130 eastbound left turning vehicles is required.

Critical movements at the Albert Street/Booth Street intersection are anticipated to operate with a LOS F during the AM and PM peak hours respectively. AM and PM peak hour traffic signal optimization is anticipated to yield improved results with critical v/c ratios of 1.16 and 1.46 respectively. The anticipated background eastbound left turn volumes at this intersection are approximately 580 vph during the PM peak hour, which warrants consideration of dual left turn lanes. Dual eastbound left turn lanes are anticipated to improve conditions during the PM peak hour, but will increase the critical v/c ratio during the AM peak hour. Based on the foregoing, and in the interest of minimizing the pedestrian crossing distance, dual eastbound left turn lanes are not recommended. To alleviate the projected failing conditions at this intersection during the AM peak hour, a reduction in 110 eastbound through vehicles and 40 northbound through vehicles is required. To alleviate the projected failing conditions at this intersection during the PM peak hour, a reduction in 300 westbound through vehicles, 260 eastbound left turning vehicles and 100 northbound through vehicles through vehicles is required.

Critical movements at the Wellington Street/Sir John A MacDonald Parkway/Booth Street intersection are anticipated to operate with a LOS F during the AM and PM peak hours. AM and PM peak hour traffic signal optimization is anticipated to yield improved results with critical v/c ratios of 1.01 and 1.13 respectively. The aforementioned reduction of 130 eastbound vehicles along the Wellington Street corridor and 40 northbound vehicles along the Booth Street corridor, originating from the Wellington Street/Portage Bridge and Albert Street/Booth Street intersections, during the AM peak hour will also alleviate projected failing conditions at this intersection. The aforementioned reduction of 360 northbound vehicles along the Booth Street corridor, originating from the Albert Street/Booth Street intersection, during the PM peak hour will also alleviate projected failing conditions at this intersection.

Based on the foregoing, continued support of transportation solutions that maximize the transit, bike and walk modes of travel will be critical in this area. Options to displace traffic along the study area roads include:

- Increased use of non-auto modes of transportation to/from the downtown core
- Alternate time of travel for drivers using the corridor to make use of off-peak capacity
- Alternate routes for travel to/from the downtown core

4.3 2031 Total Traffic

Intersection capacity analysis has been completed for the 2031 total traffic conditions. The signal timing plans for each intersection is based on the existing signal timing plans received from the City of Ottawa.

The results of the analysis are summarized in the following table for the weekday AM and PM peak hours. Detailed reports are included in **Appendix I**.

Table 23: Intersection Analysis – 2031 Total Traffic

Intersection	AM Peak			PM Peak		
	max v/c or Delay	LOS	Mvmt	max v/c or Delay	LOS	Mvmt
Wellington Street/Portage Bridge[1]	**1.31**	**F**	**SBL**	**1.41**	**F**	**EBL**
Albert Street/Booth Street[1]	**1.33**	**F**	**EBT**	**1.70**	**F**	**EBL**
Wellington Street/Sir John A MacDonald Parkway/ Booth Street[1]	**1.18**	**F**	**NBT/R**	**1.49**	**F**	**SBL**
Wellington Street/Lett Street[1]	0.99	D	NBL	0.93	E	WBL
Booth Street/ Fleet Street[2]	10 sec	B	WB	11 sec	B	WB

1. Signalized Intersection
2. Unsignalized Intersection

Critical movements at the Wellington Street/Portage Bridge intersection are anticipated to continue to operate with a LOS F during the AM and PM peak hours. To alleviate the projected failing conditions at this intersection during the AM peak hour, an additional reduction of 10vph (beyond the reduction identified for background traffic) is required for the eastbound left turn movement. To

alleviate the projected failing conditions at this intersection during the PM peak hour, a reduction of 60 eastbound left turning vehicles and 50 westbound through vehicles is required.

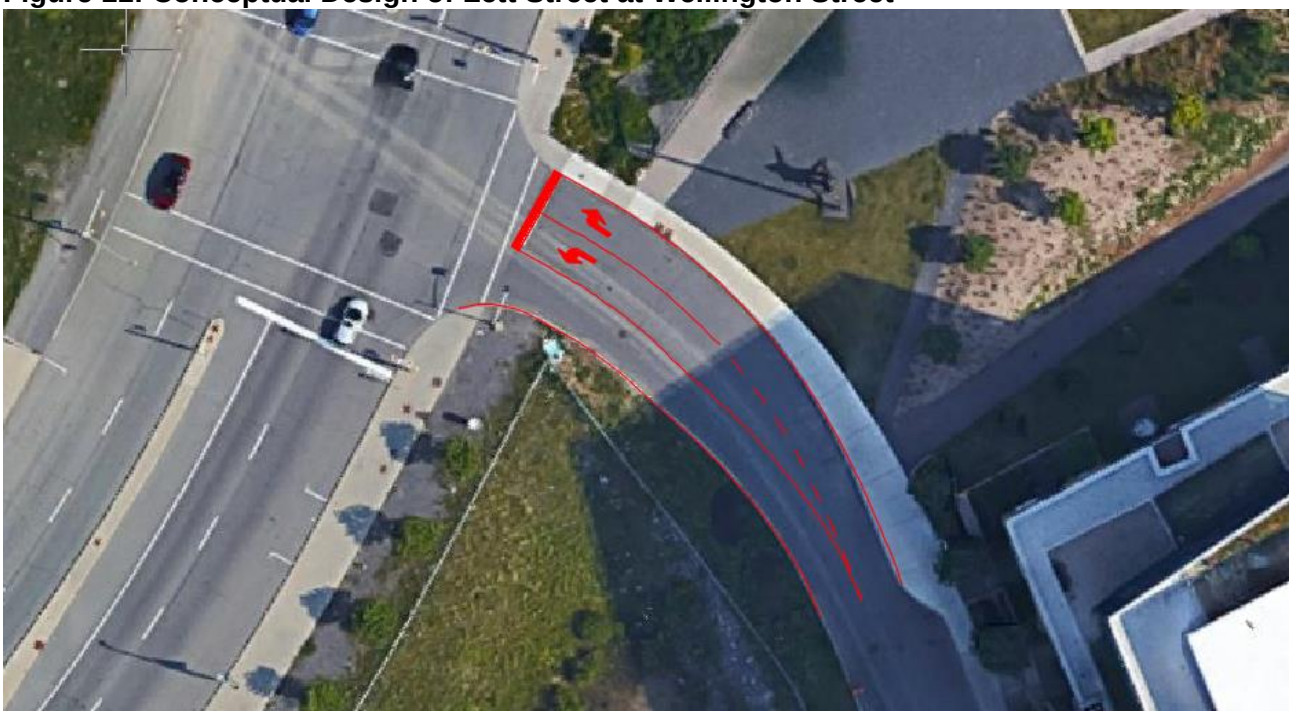
Critical movements at the Albert Street/Booth Street intersection are anticipated to operate with a LOS F during the AM and PM peak hours respectively. To alleviate the projected failing conditions at this intersection during the AM peak hour, an additional reduction of 40vph (beyond the reduction identified for background traffic) is required for the northbound through movement. To alleviate the projected failing conditions at this intersection during the PM peak hour, an additional reduction of 20vph (beyond the reduction identified for background traffic) is required for the westbound through, eastbound left and northbound through movements.

Critical movements at the Wellington Street/Sir John A MacDonald Parkway/Booth Street intersection are anticipated to operate with a LOS F during the AM and PM peak hours. The aforementioned reduction of 140 eastbound vehicles along the Wellington Street corridor and 80 northbound vehicles along the Booth Street corridor, originating from the Wellington Street/Portage Bridge and Albert Street/Booth Street intersections, during the AM peak hour will also alleviate projected failing conditions at this intersection. The aforementioned reduction of 60 eastbound and 50 westbound vehicles along the Wellington Street corridor and 400 northbound vehicles along the Booth Street corridor, originating from the Wellington Street/Portage Bridge and Albert Street/Booth Street intersections, during the PM peak hour will also alleviate projected failing conditions at this intersection.

It is noteworthy that significant queues are anticipated on the northbound approach to the Wellington Street/Lett Street intersection during the AM peak hour. The traffic volumes on the northbound approach total to 342 vehicles during the AM peak hour, 256 of which make a right onto Wellington Street. A two-lane northbound approach is recommended to alleviate the queue length on Lett Street during the AM peak hour. A permitted and protected phasing is recommended for the westbound left turn movement during the AM and PM peak hours to improve intersection operations and reduce queueing. The implementation of a two-lane northbound approach, and a permitted and protected phasing for the westbound left turn movement will decrease the critical v/c ratio at this intersection to 0.78 and 0.69 during the AM and PM peak hours respectively.

The existing northbound approach to the Wellington Street/Lett Street intersection has a curb-to-curb width of approximately 11m, tapering to 7m approximately 45m east of Wellington Street. It is recommended the two-lane approach be implemented through line painting. Since the right turn movement is significantly heavier than the left turn movement, it is recommended that the right turn lane be painted as the continuous lane and the left turn lane is to be developed as the auxiliary lane. A storage length of approximately 20m is recommended for the proposed left turn lane based on TAC Equation 2.3.3 (S = 1.5NL/[3600/CL]). **Figure 11** shows a conceptual design of the northbound approach to the Wellington Street/Lett Street intersection.

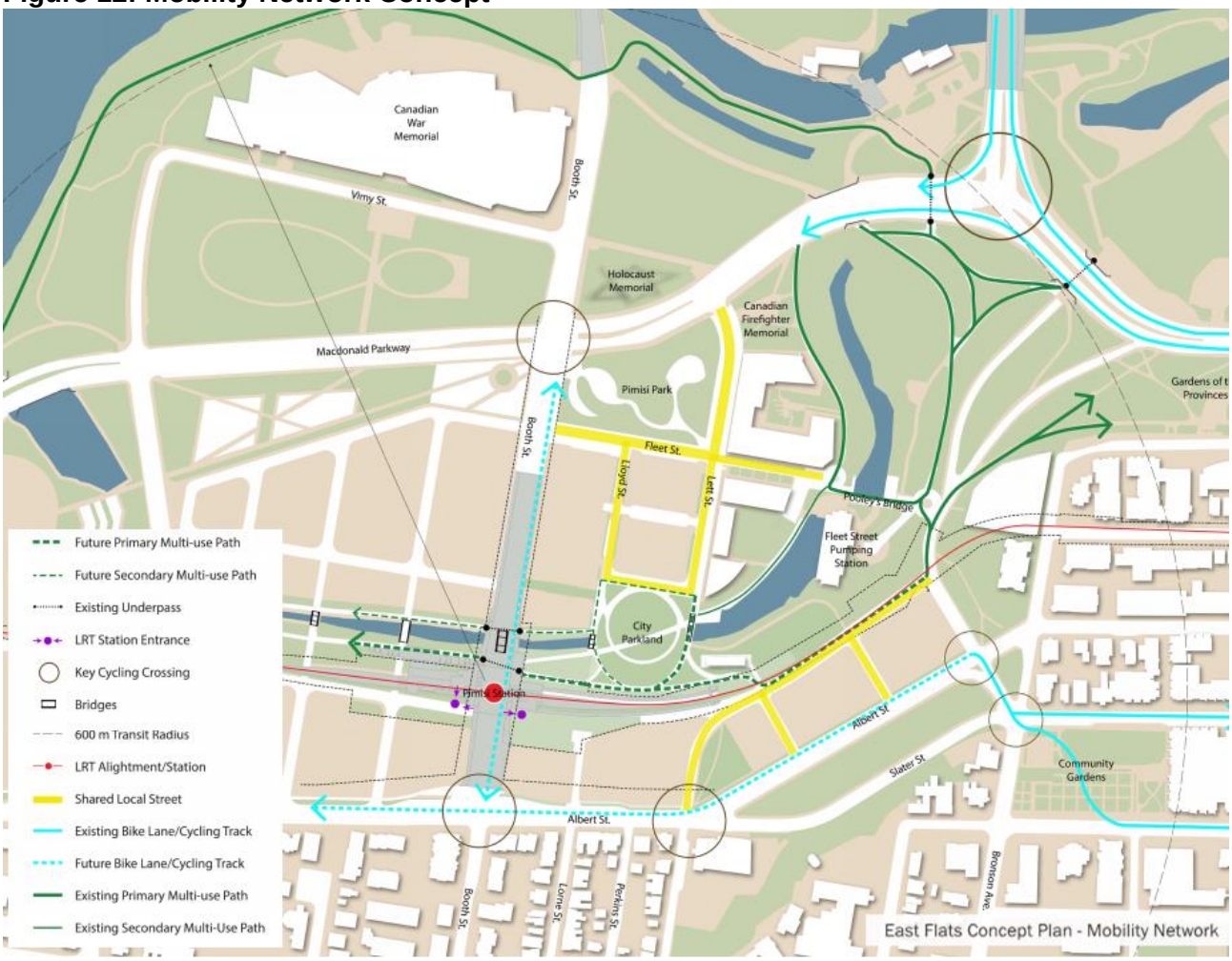
Figure 11: Conceptual Design of Lett Street at Wellington Street



5.0 PROVISIONS FOR NON-AUTO MODES

A mobility network concept map is shown in **Figure 12**. The proposed road lay-out is consistent with the Block Subdivision Plan, which can be found in **Appendix A**. Sidewalks are recommended along both sides of Lett Street, Lloyd Street and Fleet Street.

Figure 12: Mobility Network Concept



The proposed development will maintain a pedestrian/cyclist connection to Pooley's Bridge/Wellington Street via Fleet Street east of Lett Street. This connection provides access to a multi-use pathway network connecting to Wellington Street and the Trans Canada Trail.

The proposed concept plan identifies City parkland south of Lett Street. Multi-use pathways will be provided within the park, providing an alternative pedestrian/cyclist connection to Pooley's Bridge, Wellington Street and the Trans Canada Trail. These multi-sure pathways will also cross under Booth Street adjacent to the aqueduct, travelling west to the future West LeBreton Flats lands.

The proposed development will be within a walking distance of approximately 400m of the future Pimisi LRT station. This LRT station will provide comprehensive transit coverage across the City of Ottawa.

6.0 ON-SITE DESIGN

The proposed development will be accessed through the Booth Street/Fleet Street and Wellington Street/Lett Street intersections. This is consistent with the Block Subdivision Plan, which can be found in **Appendix A**.

The recently completed Confederation Line construction has developed a median along the entire length of Booth Street, restricting the Fleet Street intersection to right-in right-out. The Wellington Street/Lett Street intersection will remain signalized. Based on the intersection analysis presented in **Section 5.0**, a two-lane northbound approach is recommended to alleviate projected queuing at this intersection.

Parking for the proposed development will be provided underground with accesses on Lett Street and Lloyd Street. The specific location of the parking garage accesses will be determined and reviewed through subsequent Site Plan Control applications for each phase as planning and design progresses.

The proposed development is located within Area A of Schedule 1 and Area Z of Schedule 1A to the City's Zoning By-law (ZBL). The ZBL identifies no off-site motor vehicle parking is required to be provided for developments with Area Z. As the proposed development is within a 600m walking distance of the future Pimisi LRT station, the ZBL identifies the following maximum parking space rates for the proposed development:

- 1.5 spaces per dwelling unit (combined resident and visitor parking)
- 1.0 per 100m^2 of GFA for a retail store

The number of parking spaces to be provided is unknown at this point and will be reviewed in subsequent Site Plan Control applications for each phase as planning and design progresses. The proposed development will be a transit oriented development located within a 400m walking distance of the future Pimisi LRT station, and is in close proximity to the downtown core. Parking to be provided for the proposed development will not exceed the maximum parking requirement in the City's ZBL. The proposed parking will reflect a transit oriented development, and encourage non-auto modes of transportation.

7.0 COMMUNITY IMPACTS

The majority of the undeveloped lands surrounding the subject lands are those set aside for the LeBreton Flats Development, and are zoned for residential and general mixed use developments. The proposed concept plan is consistent with the Rendezvous LeBreton proposal for the West LeBreton Flats lands.

The subject lands are to be accessed through the Booth Street/Fleet Street and Wellington Street/Lett Street intersections. This is consistent with the Block Subdivision Plan, which can be found in **Appendix A**. As the only accesses to the subject lands are provided on Booth Street and Wellington Street, which are classified as arterial roadways in the City's 2013 TMP, the proposed development is not anticipated to have any measurable impact on the existing or future residential communities in the site's vicinity.

During the pre-consultation meeting held on May 10, 2017, a representative from the Dalhousie Community Association (DCA) expressed concerns regarding transportation impacts on the local streets south of the proposed development. The proposed development is anticipated to generate approximately 40 trips during the AM peak hour and 65 trips during the PM peak hour along Booth Street south of Albert Street. This equates to approximately one vehicle every one to two minutes during peak hours.

Traffic calming measures have been implemented along Booth Street south of Albert Street, including on-street parking, curb extensions at intersections and mid-block speed humps. The

increase in traffic attributable to the proposed development is not anticipated to have a significant impact on the local roadway intersection operations along Booth Street south of Albert Street.

8.0 TRANSPORTATION DEMAND MANAGEMENT

The City of Ottawa has developed a comprehensive Transportation Demand Management (TDM) strategy as part of its efforts to reduce automobile dependency. TDM measures can reduce transportation infrastructure requirements by encouraging people to change their travel mode, timing or destination.

The proposed development conforms to the City's TDM initiatives by providing easy access to the local pedestrian, bicycle and transit systems as outlined in **Section 6.0**. Further investigation into TDM initiatives will be conducted through subsequent Site Plan Control applications for each phase as planning and design proceeds.

9.0 CONCLUSIONS AND RECOMMENDATIONS

Based on the results of the foregoing analysis, the main conclusions and recommendations of this report are as follows:

Segment MMLOS Analysis

- All segments within the study area, excluding Booth Street south of Albert Street and Lett Street, do not meet the target PLOS. Sir John A MacDonald Parkway/Wellington Street, Booth Street north of Wellington Street and south of Albert Street do not meet the target BLOS. None of the segments within the study area are identified as a Transit Priority Corridor in the City's *Transportation Master Plan* and do not have a target TLOS in the MMLOS Guidelines. All of the segments within the study area meet the target TkLOS. All segments within the study area, excluding Booth Street south of Albert Street and Albert Street east/west of Booth Street, meet the target Auto LOS.

- The target PLOS A cannot be achieved along a roadway with an AADT greater than 3000 vpd and an operating speed greater than 30km/hr. As Sir John A MacDonald Parkway, Wellington Street, Portage Bridge, Booth Street (north of Albert Street) and Albert Street are arterial roadways with an AADT greater than 3000vpd and an operating speed greater than 30km/hr, a PLOS A cannot be achieved.

- The implementation of a separated cycling facility along Sir John A MacDonald Parkway/ Wellington Street from west of Booth Street to Portage Bridge would result in a BLOS A, meeting the target for the Central Area.

- If possible, physically separating the eastbound bike lane along Wellington Street east of Portage Bridge, similar to the westbound facility, would result in a BLOS A for this segment, meeting the target for the Central Area.

- As the Portage Bridge has a six-lane divided cross section with a median width of 1.5m, the existing width of the bridge limits the ability to provide a boulevard to improve the PLOS on the west side of this segment.

- The City's *Ottawa Cycling Plan* identifies the implementation of either bike lanes or a multi-use pathway along Booth Street north of Wellington Street. A reduction in other cross

sectional elements will be required in order to accommodate either facility. The implementation of bike lanes would result in a BLOS B, while a multi-use pathway would result in a BLOS A.

- Traffic calming measures (on-street parking, curb extensions and speed humps) have been implemented along Booth Street south of Albert Street, which reduces the level of stress for cyclists along this segment. Consideration could be given to implementing bike lanes along this segment.

- Although the south side of the Albert Street does not meet the target PLOS, pedestrians requiring additional comfort or safety can use the multi-use pathway on the north side.

Intersection MMLOS Analysis

- All intersections within the study area do not meet the target PLOS and BLOS. All of the study area intersections are not located along a Transit Priority Corridor in the City's *Transportation Master Plan* and do not have a target TLOS in the MMLOS Guidelines. All intersections within the study area meet the target TkLOS. The Wellington Street/Portage Bridge and Albert Street/Booth Street intersections do not meet the target Auto LOS.

- Consideration could be given to providing either textured or zebra striped crosswalks at the Wellington Street/Sir John A MacDonald Parkway/Booth Street intersection to improve the pedestrian level of comfort crossing each approach. Consideration could also be given to implementing a two stage, left-turn bike box to facilitate the southbound left turn movement for cyclists at this intersection. Critical movements at this intersection are currently operating with a vehicle LOS F during the PM peak hour.

- Consideration could be given to implementing leading pedestrian intervals and a two stage, left-turn box to facilitate the westbound left turn movement for cyclists at the Wellington Street/Lett Street intersection.

- The Wellington Street/Portage Bridge intersection is not a standard configuration and the results of the PLOS and BLOS analysis should be treated with caution. The pedestrian and cycling facilities at the Wellington Street/Portage Bridge intersection are anticipated to have a higher PLOS and BLOS than represented by the analysis. Critical movements at this intersection are currently operating with a vehicle LOS F during both the AM and PM peak hours.

- The PLOS at the Albert Street/Booth Street intersection is highly influenced by the number of lanes crossed (5-6 lanes) along Albert Street. A reduction in east-west travel lanes is anticipated to have a significant impact on the vehicle operations at this intersection and is not recommended. It is noteworthy that leading pedestrian intervals and zebra striped crosswalks are currently implemented at this intersection to provide a higher level of comfort and safety for pedestrians crossing Albert Street. Critical movements at this intersection are currently operating with a vehicle LOS F during the PM peak hour.

Future Intersection Operations

- Under the 2031 background traffic conditions, critical movements at the Wellington Street/Sir John A MacDonald Parkway/Booth Street, Wellington/Portage Bridge and Albert Street/Booth Street intersections are anticipated to operate with a LOS F during the AM and PM peak hours.

- Continued support of transportation solutions that maximize the transit, bike and walk modes of travel will be critical in this area. Options to displace traffic along the study area roads include increased use of non-auto modes of transportation to/from the downtown core, alternate time of travel for drivers using the corridor to make use of off-peak capacity and alternate routes for travel to/from the downtown core.

- Under the 2031 total traffic conditions, critical movements at the Wellington Street/Sir John A MacDonald Parkway/Booth Street, Wellington/Portage Bridge and Albert Street/Booth Street intersections are anticipated to continue to operate with a LOS F during the AM and PM peak hours.

- A two-lane northbound approach is recommended at the Wellington Street/Lett Street intersection, to be implemented through line painting. Since the right turn movement is significantly heavier than the left turn movement, it is recommended that the right turn lane be painted as the continuous lane and the left turn lane is to be developed as the auxiliary lane. A storage length of approximately 20m is recommended for the proposed left turn lane.

Non-Auto Transportation, On-site Design, Community Impacts and Transportation Demand Management

- The proposed development will maintain a pedestrian/cyclist connection to Pooley's Bridge/Wellington Street via Fleet Street east of Lett Street. This connection provides access to a multi-use pathway network connecting to Wellington Street and the Trans Canada Trail.

- The proposed concept plan identifies City parkland south of Lett Street. Multi-use pathways will be provided within the park, providing an alternative pedestrian/cyclist connection to Pooley's Bridge, Wellington Street and the Trans Canada Trail. These multi-use pathways will also cross under Booth Street adjacent to the aqueduct, travelling west to the future West LeBreton Flats lands.

- The proposed development will be within a walking distance of approximately 400m of the future Pimisi LRT station. This LRT station will provide comprehensive transit coverage across the City of Ottawa.

- Parking for the proposed development will be provided underground with accesses on Lett Street and Lloyd Street. The specific location of the parking garage accesses will be determined and reviewed through subsequent Site Plan Control applications for each phase as planning and design progresses.

- The number of parking spaces to be provided is unknown at this point and will be reviewed in subsequent Site Plan Control applications for each phase as planning and design progresses. The proposed development will be a transit oriented development located within a 400m walking distance of the future Pimisi LRT station, and is in close proximity to the downtown core. Parking to be provided for the proposed development will not exceed the maximum parking requirement in the City's ZBL. The proposed parking will reflect a transit oriented development, and encourage non-auto modes of transportation.

- As the only accesses to the subject lands are provided on Booth Street and Wellington Street, which are classified as arterial roadways in the City's 2013 TMP, the proposed development is not anticipated to have any measurable impact on the existing or future residential communities in the site's vicinity.

- The proposed development is anticipated to generate approximately 40 trips during the AM peak hour and 65 trips during the PM peak hour along Booth Street south of Albert Street. This equates to approximately one vehicle every one to two minutes during peak hours.

- Traffic calming measures have been implemented along Booth Street south of Albert Street, including on-street parking, curb extensions at intersections and mid-block speed humps. The increase in traffic attributable to the proposed development is not anticipated to have a significant impact on the local roadway intersection operations along Booth Street south of Albert Street.

- The proposed development conforms to the City's TDM initiatives by providing easy access to the local pedestrian, bicycle and transit systems. Further investigation into TDM initiatives will be conducted through subsequent Site Plan Control applications for each phase as planning and design proceeds.

NOVATECH

Prepared by:

Brad Byvelds, P. Eng.
Project Coordinator | Transportation/Traffic

APPENDIX A

BLOCK SUBDIVISION PLAN

NOTE: PROJECTION NAD 83, MTM 3°; ZONE 9

Project
National Capital Commission
LeBreton Flats Infrastructure and Remediation Project

Title
BLOCK SUBDIVISION OF LEBRETON FLATS

DESSAU SOPRIN

Dessau-Soprin inc.
920, blvd Saint-Joseph
Hull (Quebec) J8Z 1S9
Phone: (819) 770-6832
Fax: (819) 778-3786

Prepared D.MORIN	Discipline AR	Project Manager D.MORIN
Drawing F.BOUDREAU	Scale 1:4000	Sequence No. Rev.:
Verified C.MARCOTTE	Date 2002-11-18	

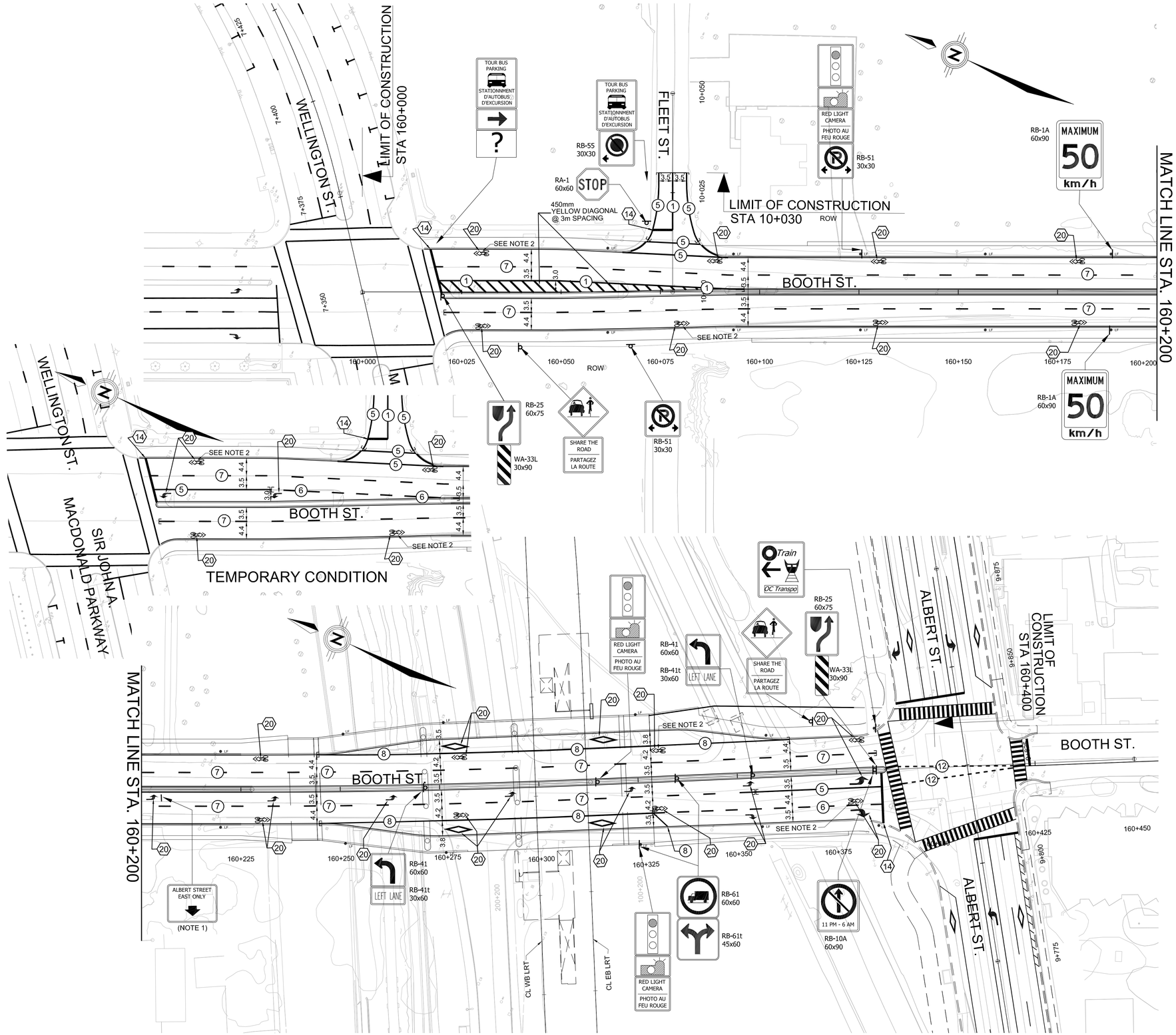
Project	Lot	Disc.	Drawing No.	Rev.
0480000	110	AR	00020	B

Fichier:G:\048\480000-LeBreton\Service 068\Cal\Nicolas\Decontamination South of LeBreton\Annexes\Annexes brutes\EXHIBIT-3.dwg

APPENDIX B

BOOTH STREET DESIGN DRAWINGS

TITLEBLOCK: 790mm x 534mm RTGE JV 2013



Confederation Line
Ligne de la Confédération

Ottawa

BOOTH STREET

PAVEMENT MARKINGS AND SIGNAGE

CONTRACT No.
OILC-11-00-P006

DESIGNED	CHECKED
R. COLLIER	R. KLEINE
DRAWN	SEALED
A. HUANG	

DRAWING NUMBER
REM-24-1-0000-DRD-5600

PRIMARY SEAL

DESIGN/BUILDER
OLRT CONSTRUCTORS CONSTRUCTEURS

ENGINEERING JV
RTGE Joint Venture

SECONDARY SEAL (IF REQUIRED)

DESIGN FIRM
MMM GROUP

SCALE
HORIZONTAL 1:500 1:1000 FULL SIZE HALF SIZE
0 5 10 20 40

ASSET No.
-

ASSET GROUP
-

REV	DESCRIPTION	BY	DATE
C	ISSUED FOR FINAL DESIGN DEVELOPMENT	R.C.	2014-05-21
D	ISSUED FOR PRE-FINAL CONSTRUCTION	R.C.	2014-07-17
E	ISSUED FOR FINAL CONSTRUCTION	R.C.	2015-01-30
F	ISSUED FOR FCD - OLRTC COMMENTS ADDRESSED	R.C.	2015-05-22
G	ISSUED FOR INFORMATION	R.C.	2015-08-31

KEY MAP
N.T.S.

NO PART OF THIS DOCUMENT MAY BE REPRODUCED, PUBLISHED, CONVERTED, OR STORED IN ANY DATA RETRIEVAL SYSTEM, OR TRANSMITTED IN ANY FORM BY ANY MEANS (ELECTRONIC, MECHANICAL, PHOTOCOPYING, RECORDING, OR OTHERWISE) WITHOUT THE PRIOR WRITTEN PERMISSION OF THE RTGE JOINT VENTURE.

FOR INFORMATION ONLY

LAYOUT INFORMATION BASED ON 3 DEGREE
MTM ZONE 9 NAD 83 (OLRT) COORDINATE SYSTEM
COMBINED SCALE FACTOR 0.999946

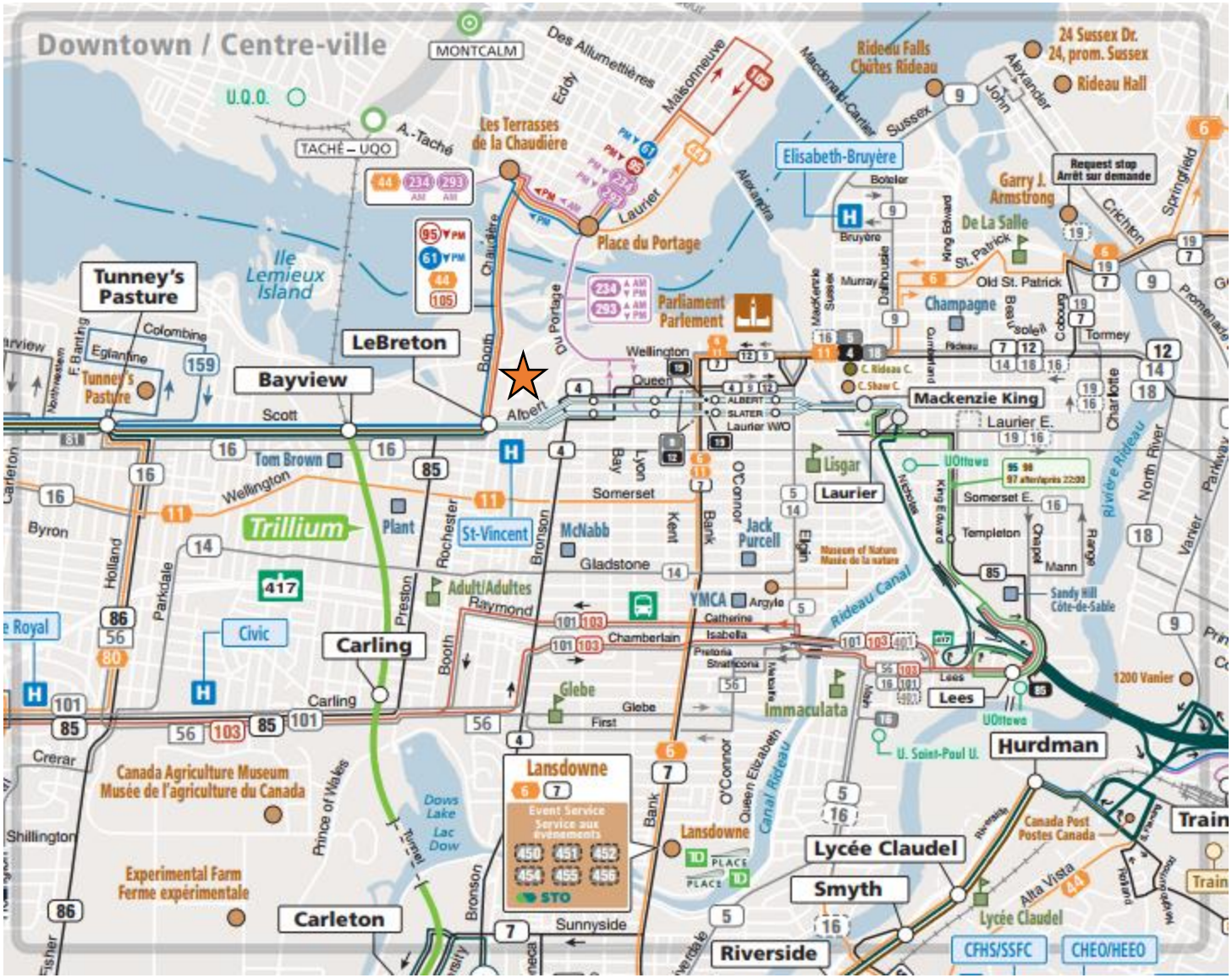
NOTES:

1. SIGNAGE SHOWN WITHIN LANES ON PLAN DRAWINGS ARE TO BE HUNG OVERHEAD MOUNTED TO MEDIAN POLE.
2. SHARROWS TO BE OFFSET FROM THE CURB BY 1.0m AS PER OTM BOOK 18, FIGURE 4.2 FOR A WIDE SHARED LANE.
3. SIGN PLACED ON LIGHT POLE.

2015-Aug-28 12:16:55 PM X:\DIV\16\2011\32-1113\6-OLRT\ACAD\08 Working\Booth Street\REM-24-1-0000-DRD-5600_G_PAVEMENT MARKINGS AND SIGNAGE.dwg

APPENDIX C

OC TRANSPO SYSTEM MAP



SUBJECT SITE

APPENDIX D

TRAFFIC COUNT INFORMATION

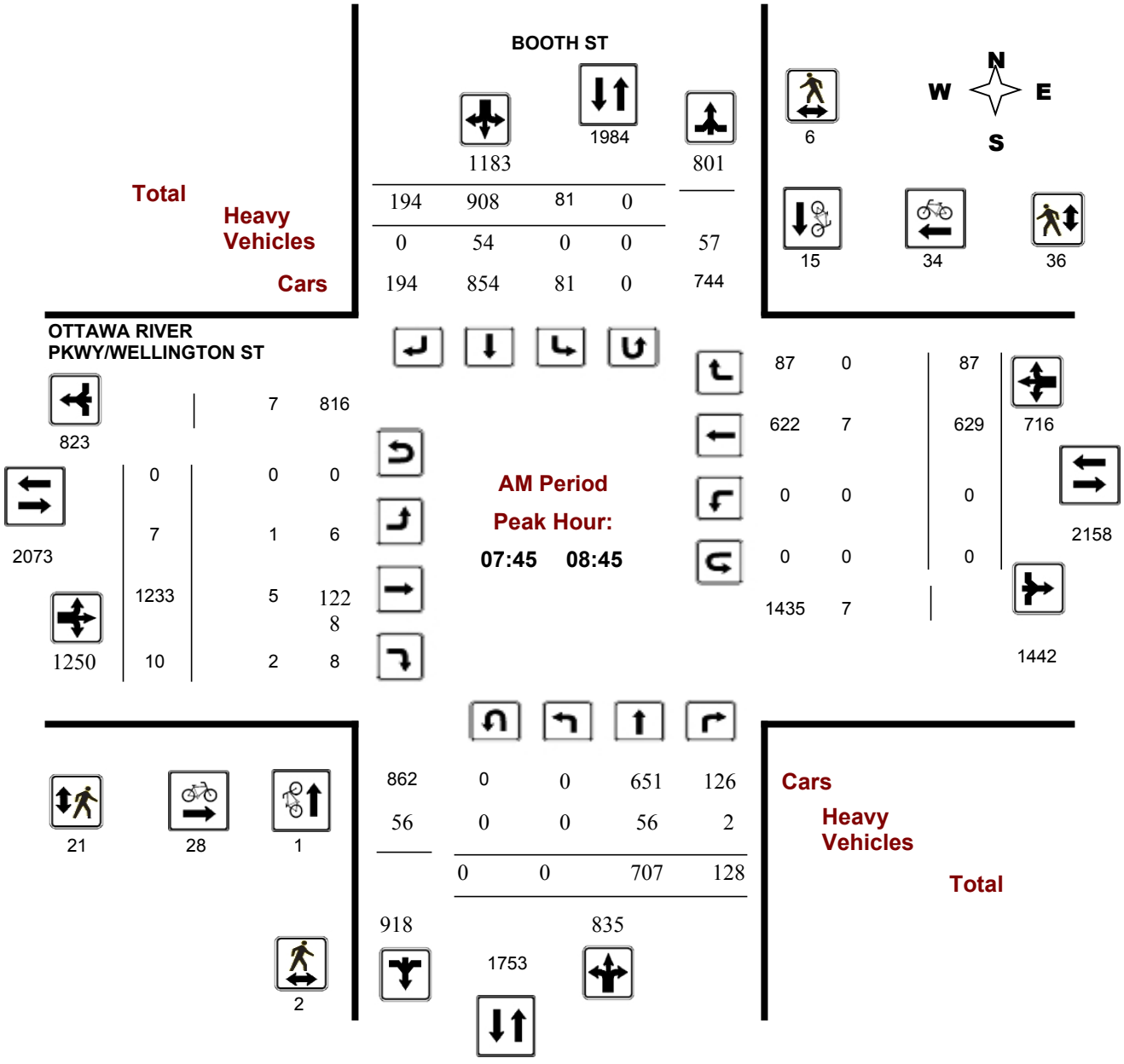
Public Works - Traffic Services

Turning Movement Count - Full Study Peak Hour Diagram

BOOTH ST @ OTTAWA RIVER PKWY/WELLINGTON ST

Survey Date: Friday, May 10, 2013 **WO No:** 31217

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



Comments

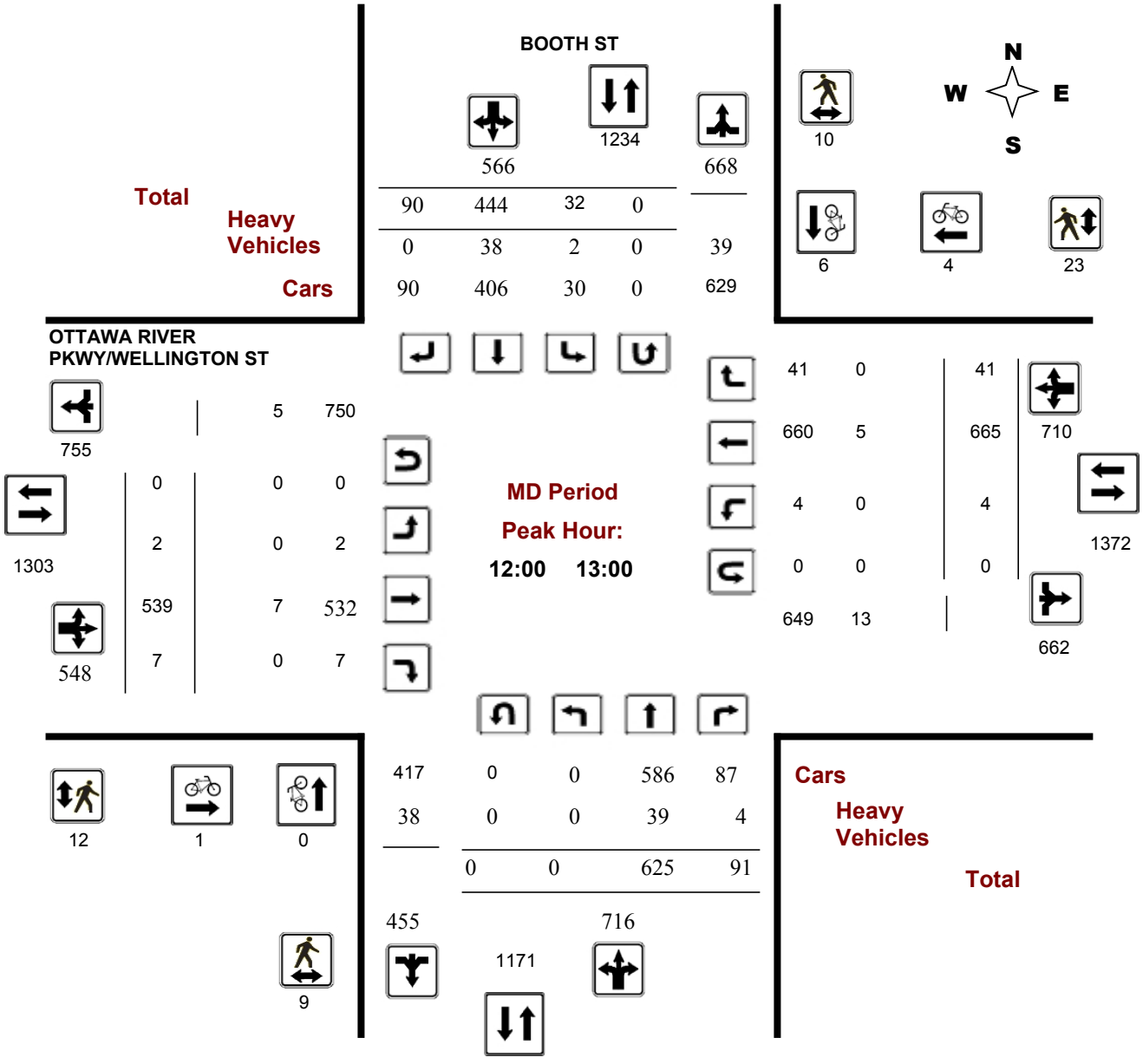
Public Works - Traffic Services

Turning Movement Count - Full Study Peak Hour Diagram

BOOTH ST @ OTTAWA RIVER PKWY/WELLINGTON ST

Survey Date: Friday, May 10, 2013 **WO No:** 31217

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



Comments

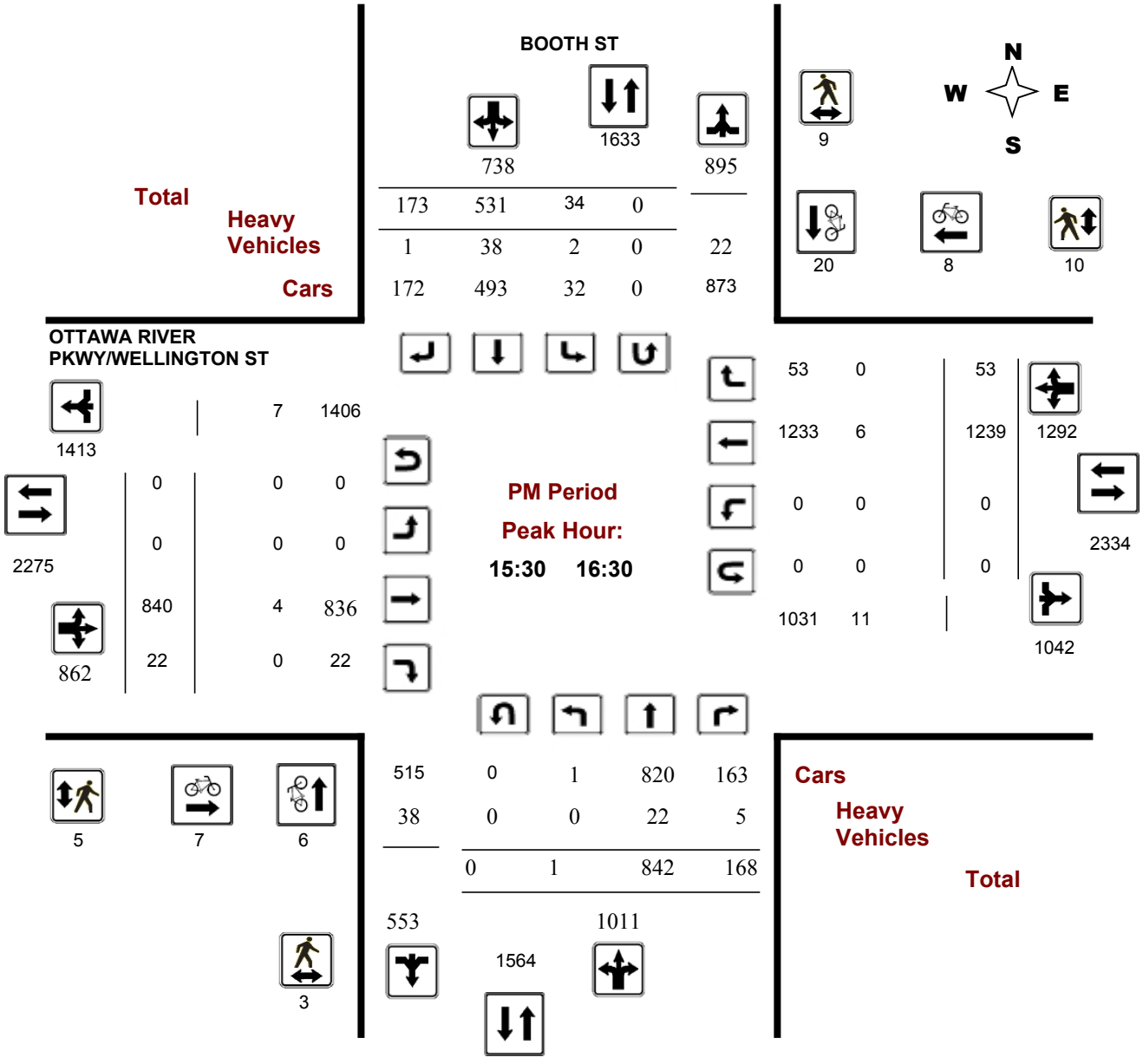
Public Works - Traffic Services

Turning Movement Count - Full Study Peak Hour Diagram

BOOTH ST @ OTTAWA RIVER PKWY/WELLINGTON ST

Survey Date: Friday, May 10, 2013 **WO No:** 31217

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



Comments

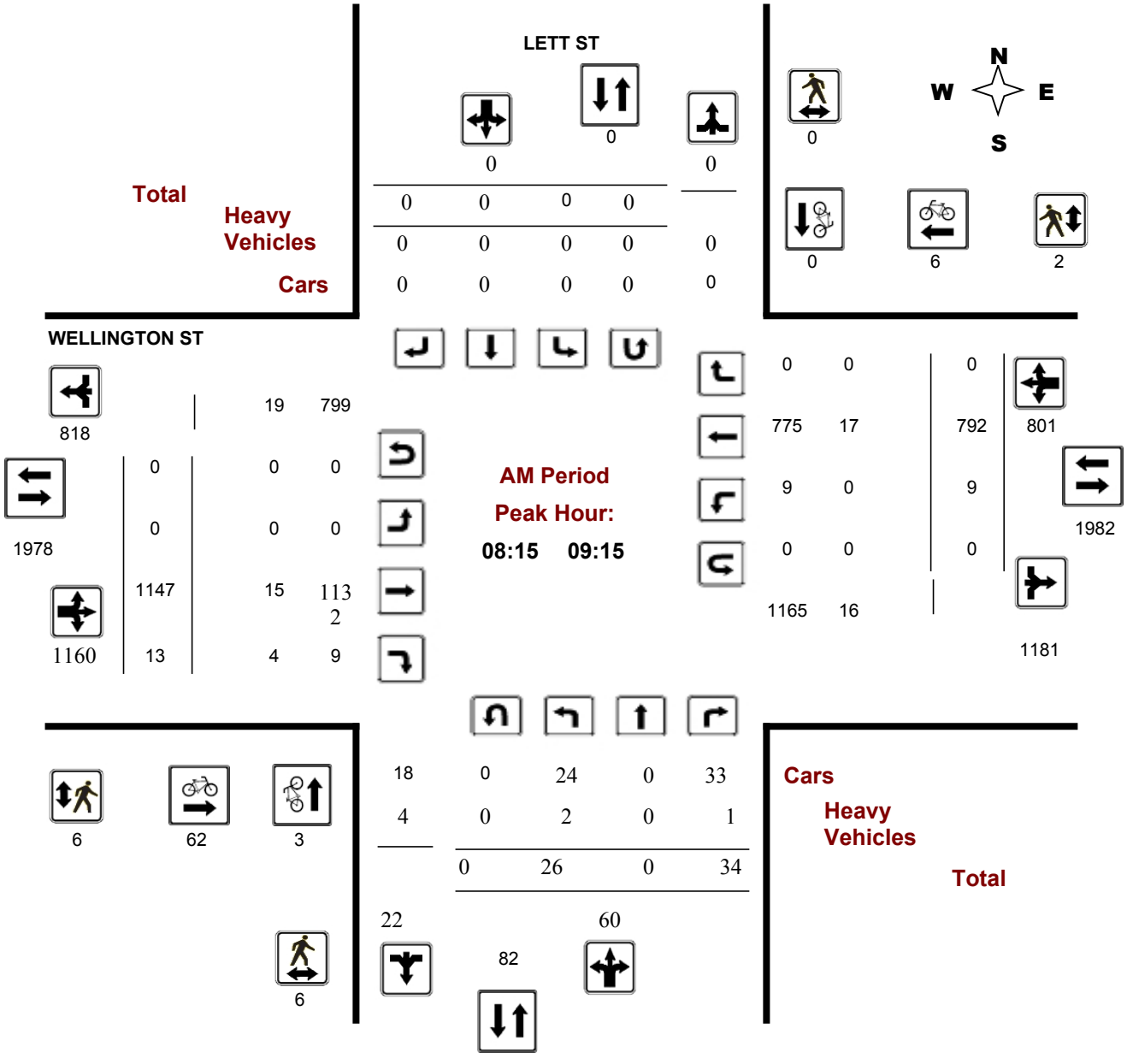
Public Works - Traffic Services

Turning Movement Count - Full Study Peak Hour Diagram

WELLINGTON ST @ LETT ST

Survey Date: Monday, August 17, 2015
Start Time: 07:00

WO No: 35251
Device: Jamar Technologies, Inc



Comments

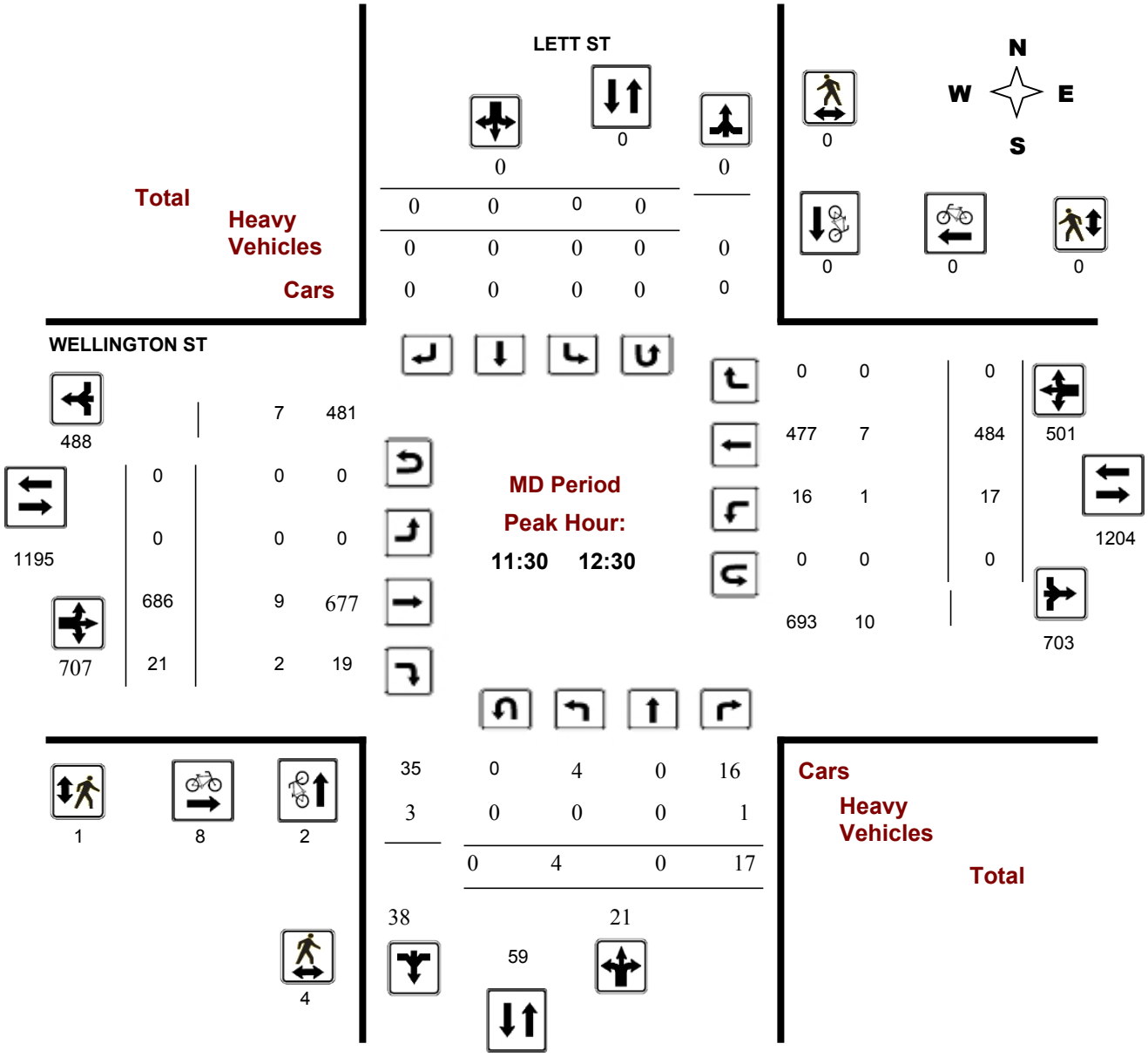
Public Works - Traffic Services

Turning Movement Count - Full Study Peak Hour Diagram

WELLINGTON ST @ LETT ST

Survey Date: Monday, August 17, 2015
Start Time: 07:00

WO No: 35251
Device: Jamar Technologies, Inc



Comments

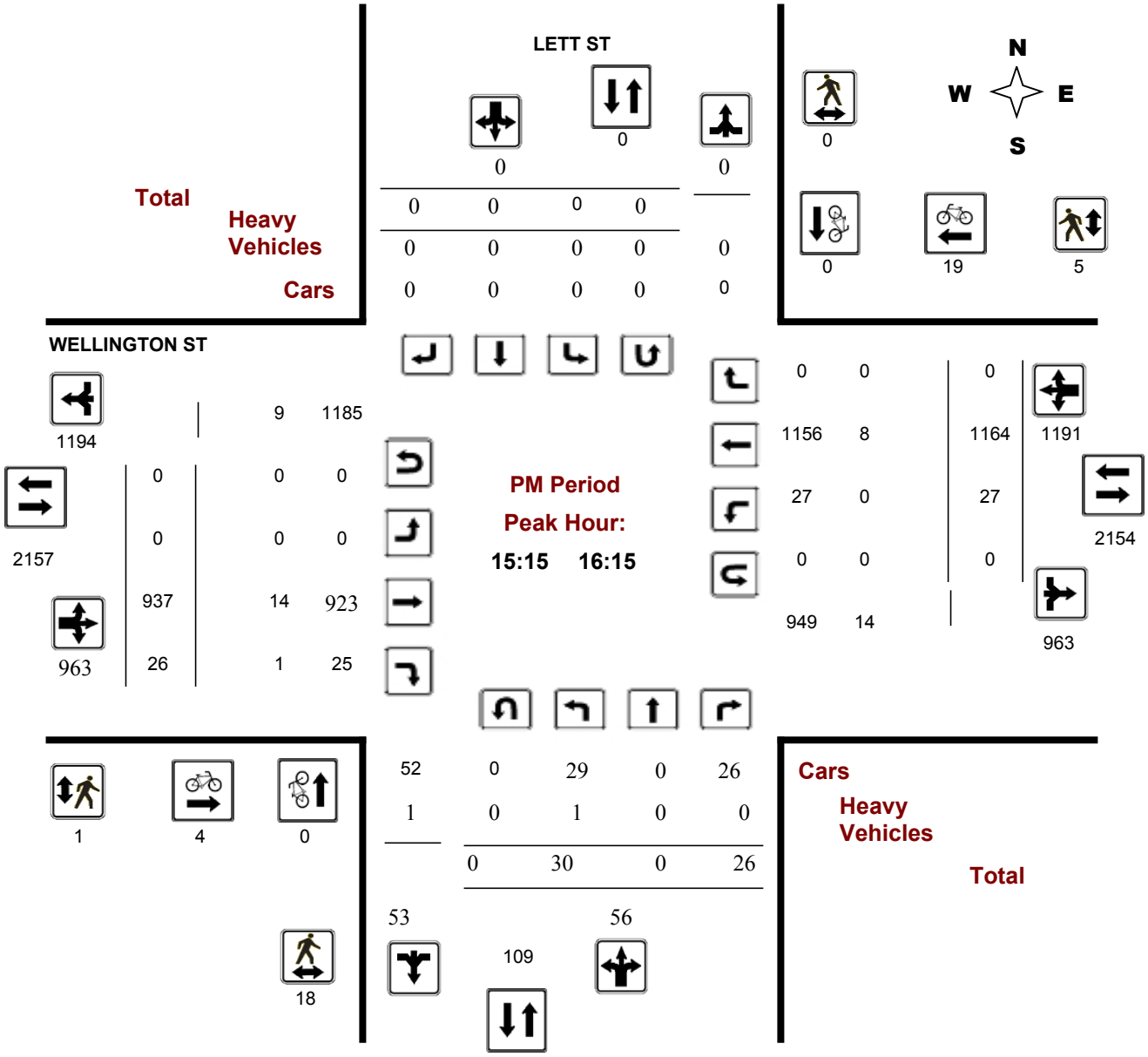
Public Works - Traffic Services

Turning Movement Count - Full Study Peak Hour Diagram

WELLINGTON ST @ LETT ST

Survey Date: Monday, August 17, 2015
Start Time: 07:00

WO No: 35251
Device: Jamar Technologies, Inc


LETT ST
WELLINGTON ST
N
W
E
S
Total
Heavy Vehicles
Cars
0
0
0

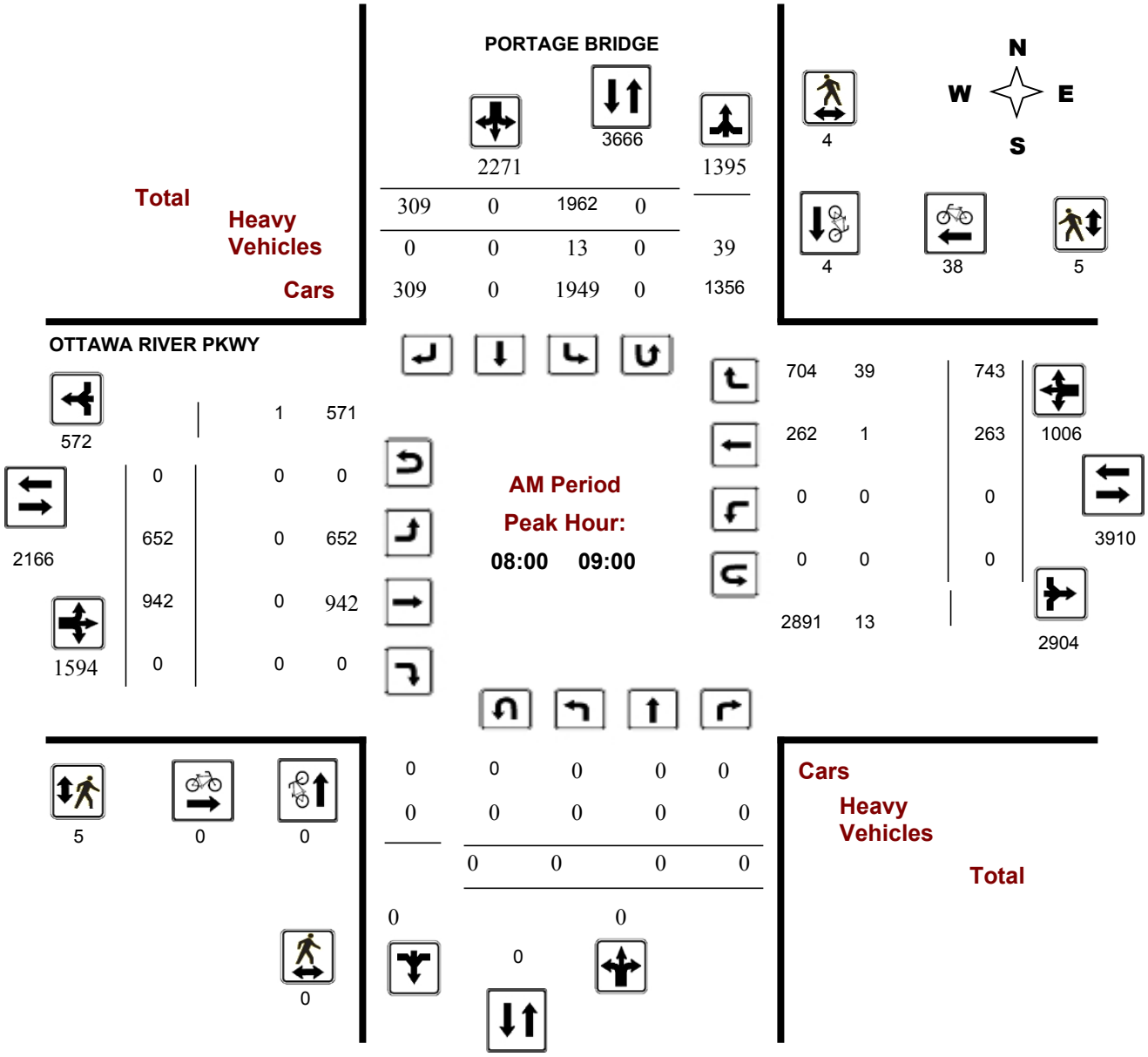
Public Works - Traffic Services

Turning Movement Count - Full Study Peak Hour Diagram

OTTAWA RIVER PKWY @ PORTAGE BRIDGE

Survey Date: Wednesday, June 11, 2014
Start Time: 07:00

WO No: 29831
Device: Jamar Technologies, Inc



Comments

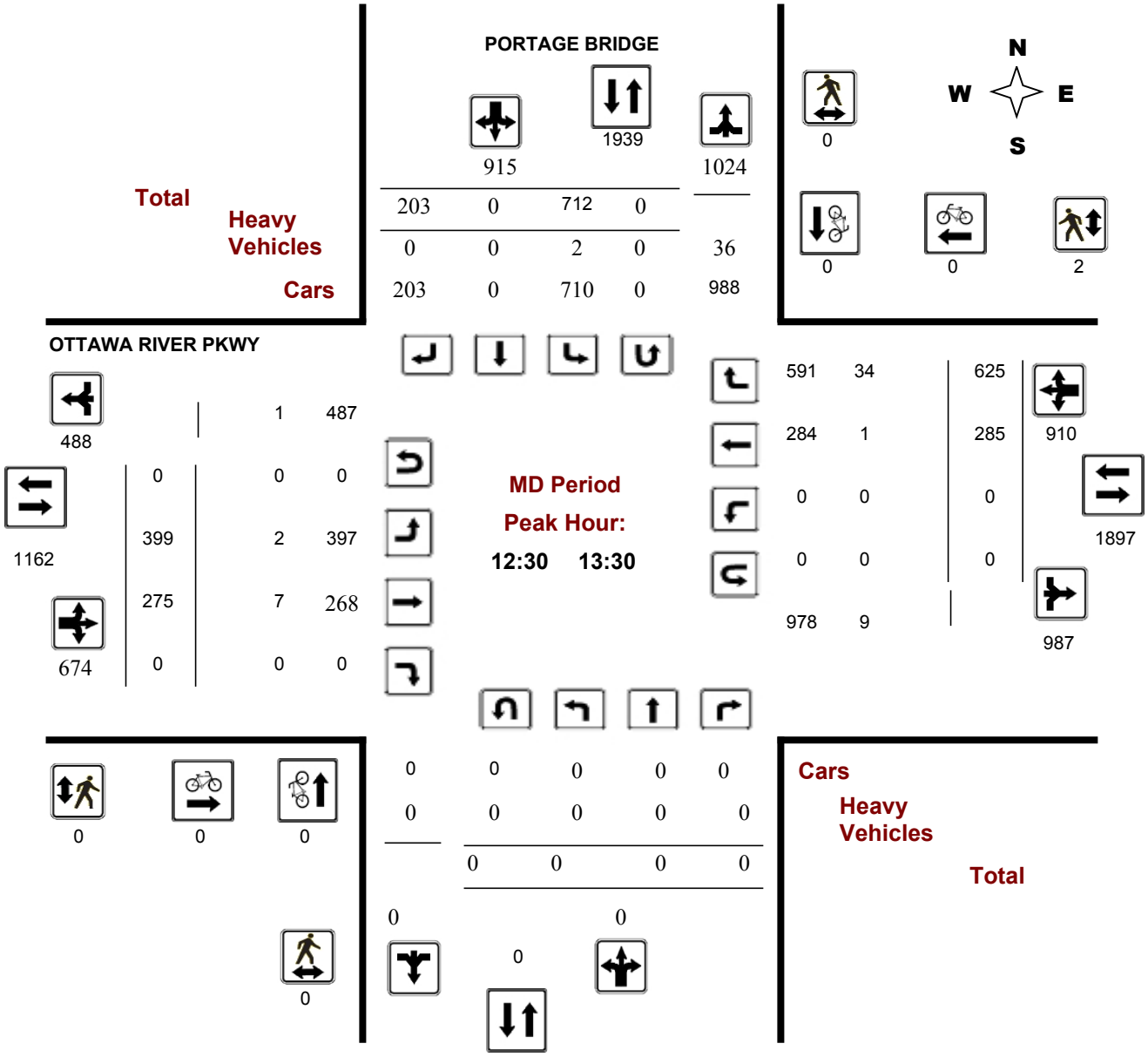
Public Works - Traffic Services

Turning Movement Count - Full Study Peak Hour Diagram

OTTAWA RIVER PKWY @ PORTAGE BRIDGE

Survey Date: Wednesday, June 11, 2014
Start Time: 07:00

WO No: 29831
Device: Jamar Technologies, Inc



Comments

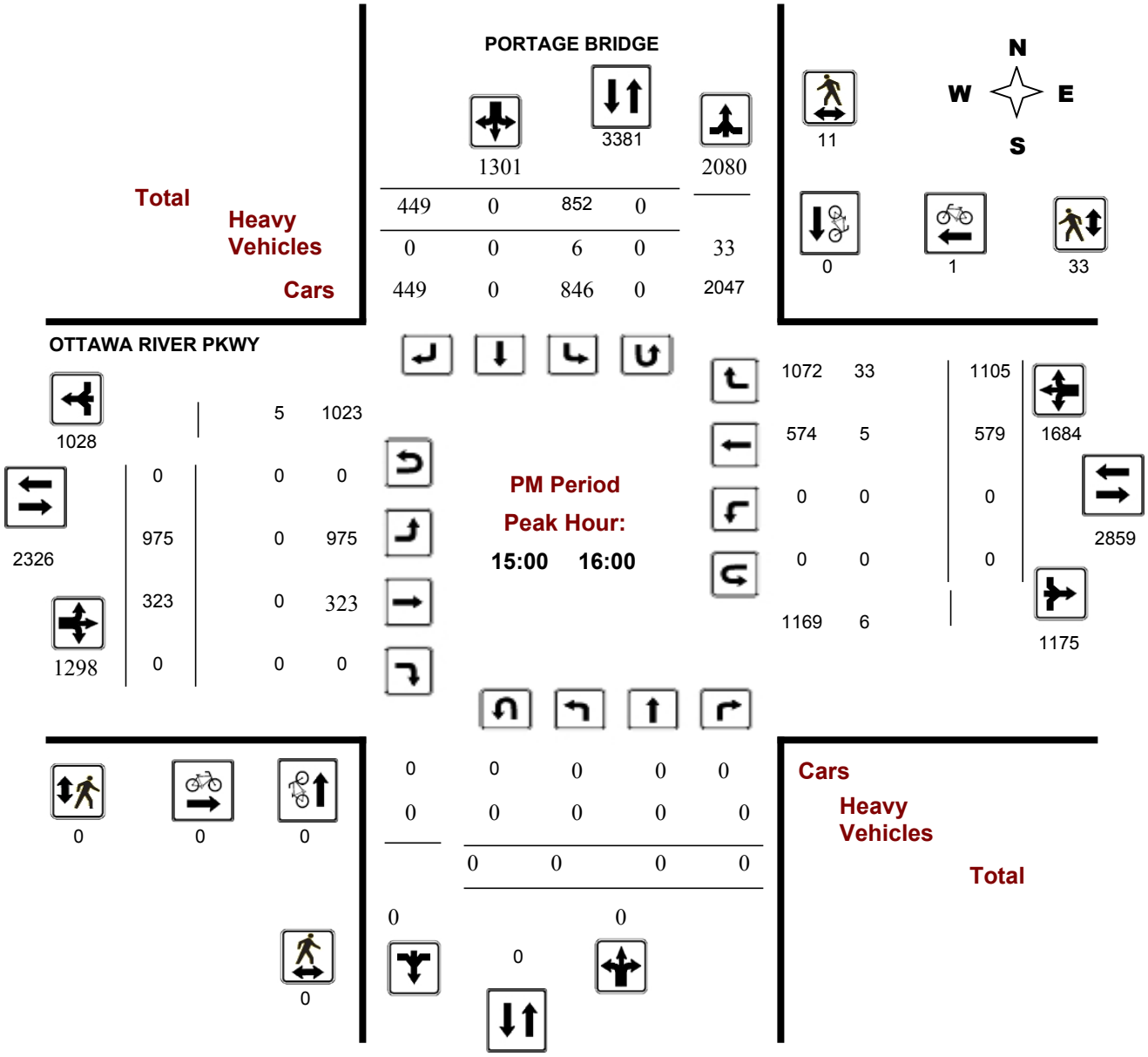
Public Works - Traffic Services

Turning Movement Count - Full Study Peak Hour Diagram

OTTAWA RIVER PKWY @ PORTAGE BRIDGE

Survey Date: Wednesday, June 11, 2014
Start Time: 07:00

WO No: 29831
Device: Jamar Technologies, Inc



Comments

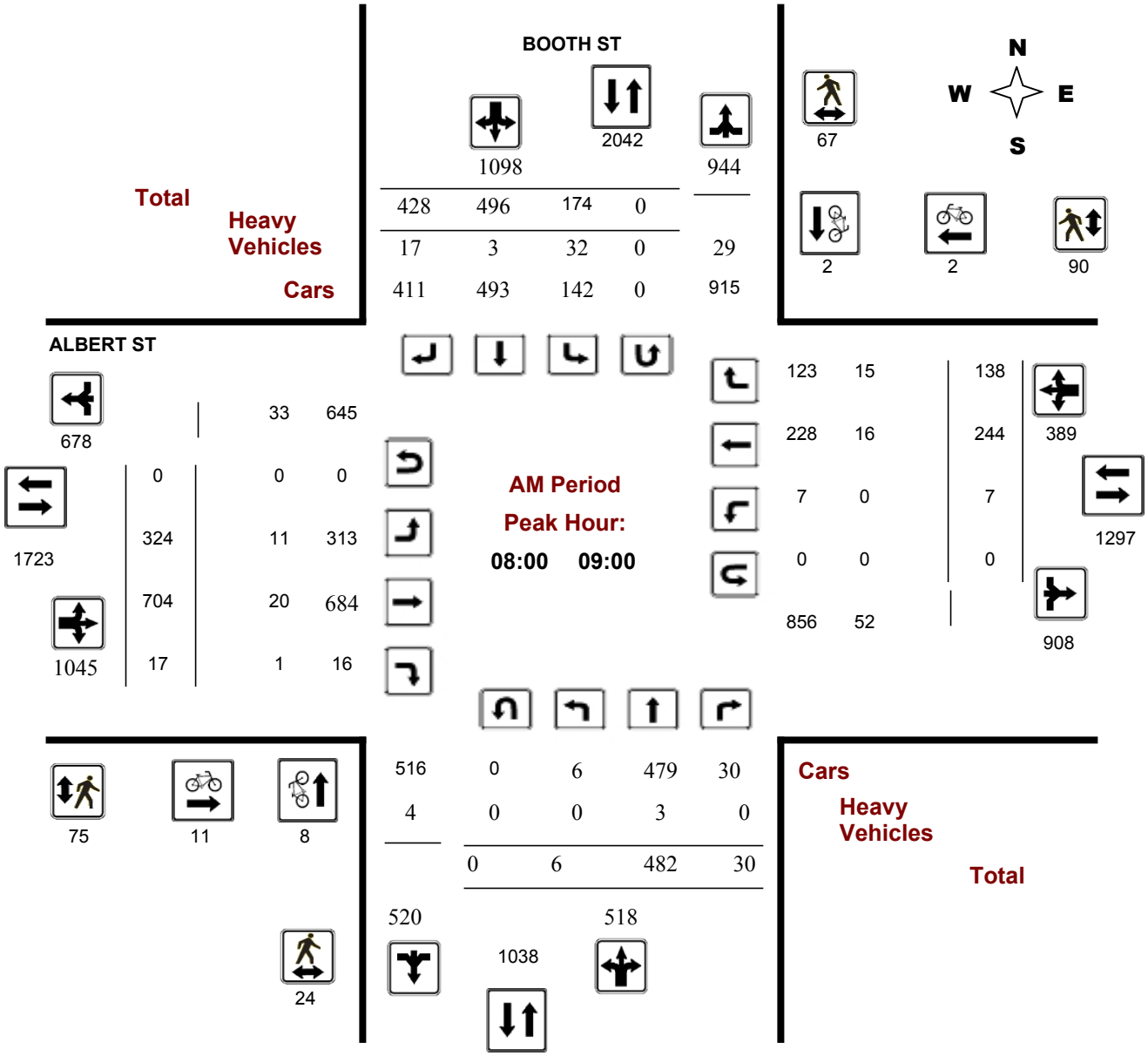
Public Works - Traffic Services

Turning Movement Count - Full Study Peak Hour Diagram

ALBERT ST @ BOOTH ST

Survey Date: Wednesday, April 02, 2014 **WO No:** 1294

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



Comments

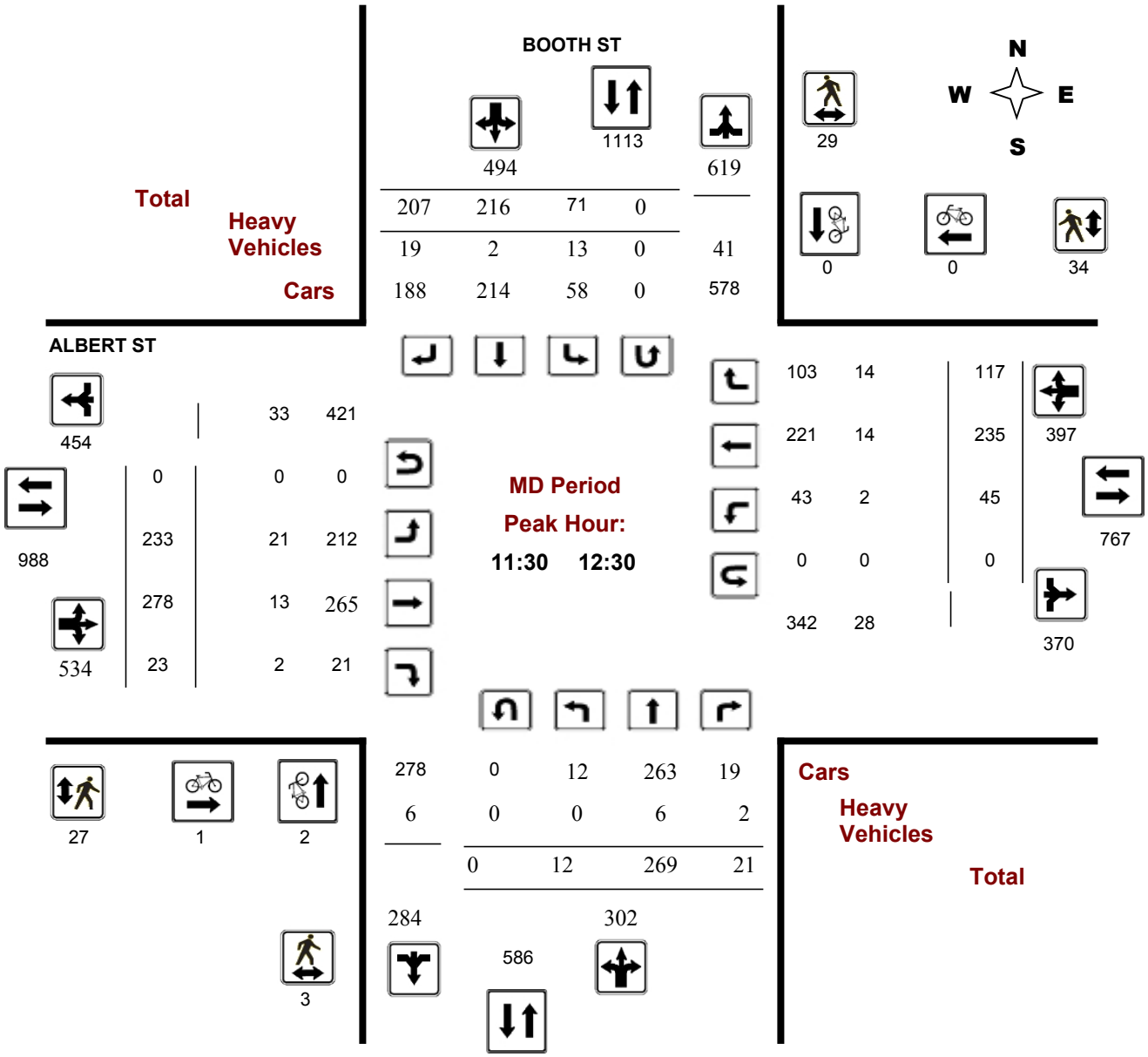
Public Works - Traffic Services

Turning Movement Count - Full Study Peak Hour Diagram

ALBERT ST @ BOOTH ST

Survey Date: Wednesday, April 02, 2014 **WO No:** 1294

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



Comments

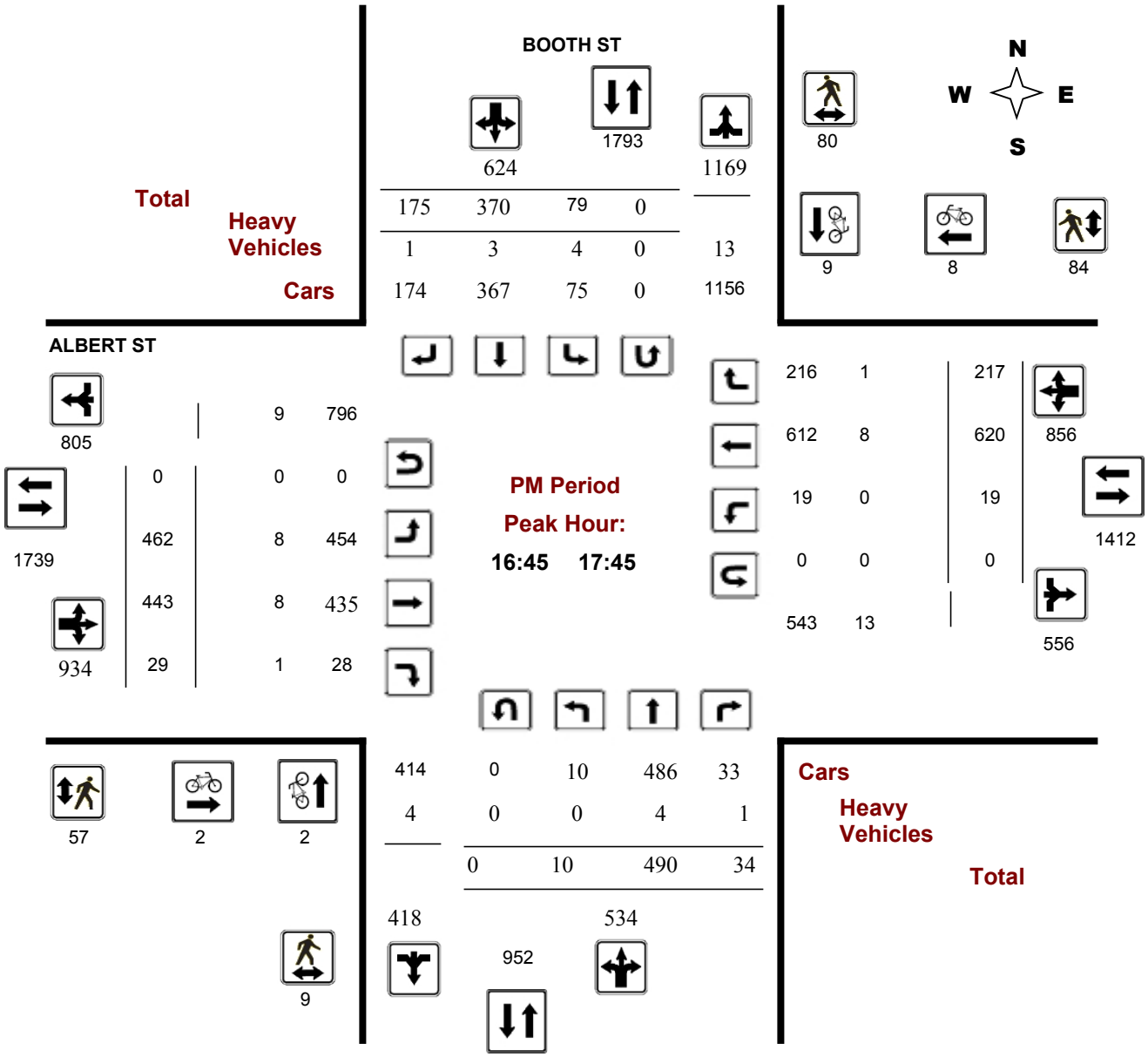
Public Works - Traffic Services

Turning Movement Count - Full Study Peak Hour Diagram

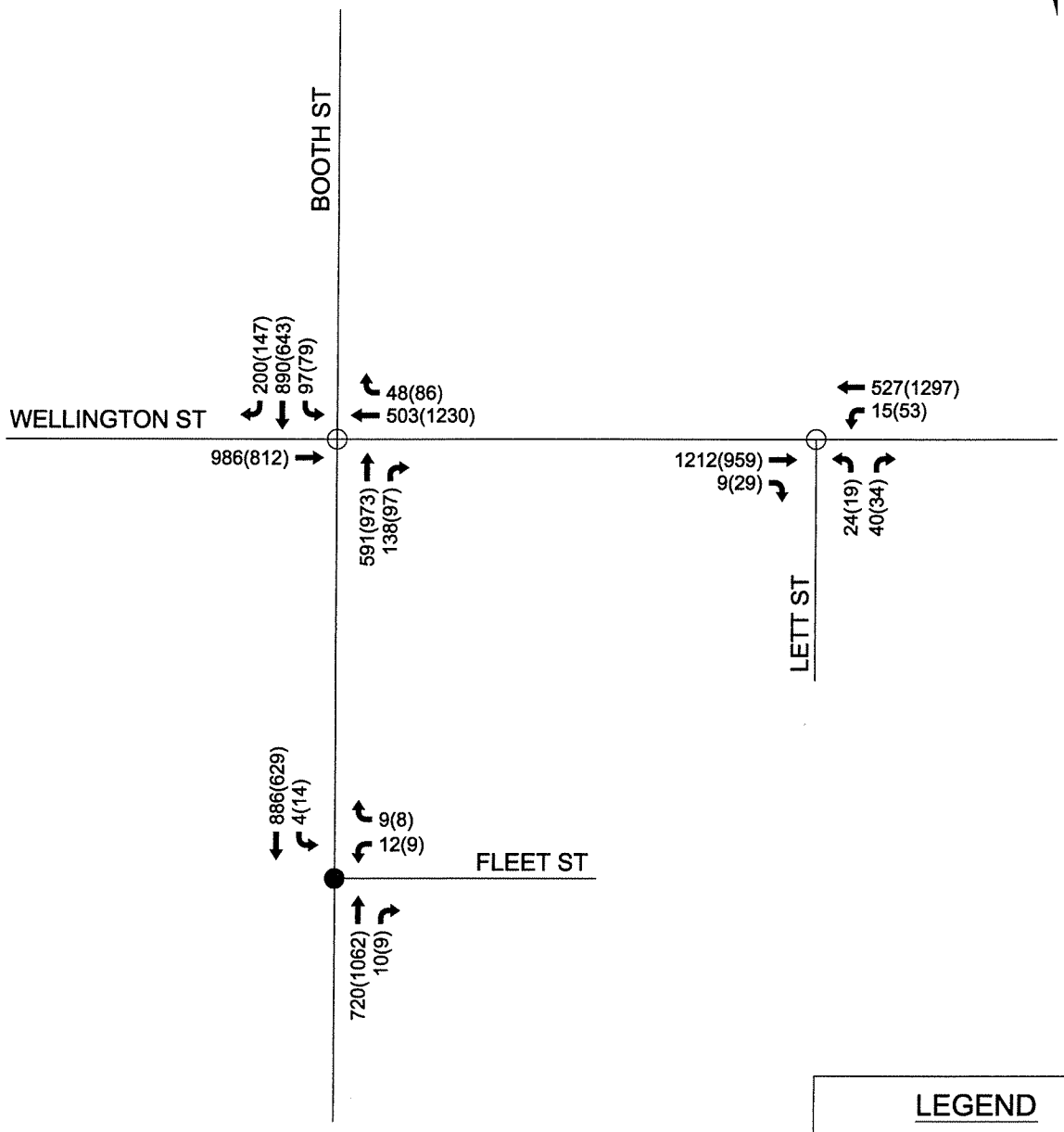
ALBERT ST @ BOOTH ST

Survey Date: Wednesday, April 02, 2014 **WO No:** 1294

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



Comments



LEGEND

- Unsignalized Intersection
- Signalized Intersection
- xx VPH AM Peak Hour
- (xx) VPH PM Peak Hour

NOVATECH
ENGINEERING CONSULTANTS LTD.
ENGINEERS & PLANNERS
Suite 200, 240 Michael Cowpland Drive
Ottawa, Ontario, Canada
K2M 1P6
Telephone (613) 254-9643
Facsimile (613) 254-5867
Email: novainfo@novatech-eng.com

LEBRETON PHASE III, 300 LETT STREET

2013 TOTAL TRAFFIC

105006 APRIL 2011 FIGURE 7

SHT8X11.DWG - 216mmX278mm

Traffic Signal Timing

City of Ottawa, Transportation Services Department

Traffic Operations Unit

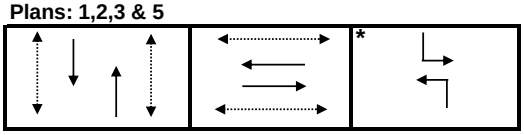
Intersection:	***Main:*** Booth	***Side:*** Wellington	
Controller:	**MS-3200**	**TSD:**	6567
Author:	Matthew Anderson	**Date:**	06-Jun-17

Existing Timing Plans†

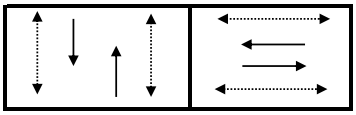
	Plan					Ped Minimum Time		
	AM Peak 1	**Off Peak** 2	**PM Peak** 3	**Night** 4	**Weekend** 5	***Walk***	***DW***	***A+R***
Cycle	95	85	120	75	85			
Offset	31	58	3	23	58			
NB Thru	35	35	53	35	35	7	21	3.3 + 3.5
SB Thru	35	35	53	35	35	7	21	3.3 + 3.5
EB Thru	45	39	56	40	39	7	24	3.7 + 2.6
WB Thru	45	39	56	40	39	7	24	3.7 + 2.6
SB Left	15	11	11	-	11	-	-	3.3 + 2.8
NB Left	15	11	11	-	11	-	-	3.3 + 2.8

Phasing Sequence‡

Plans: 1,2,3 & 5



Plan: 4



Notes:

1) NB Left movement is for buses only.
2) EB traffic cannot turn left or right.
3) WB traffic cannot turn left except from 7am to 1pm on Sundays for NCC Bike Days.
4) Max Recalls on fazes 4 and 8
5) The EB right turn is prohibited during the red light display

Schedule

Weekday

Time	Plan
0:15	4
6:00	1
9:30	2
15:00	3
18:00	2
23:45	4

Weekend

Time	Plan
0:15	4
8:00	2
12:00	5
18:00	2
22:00	4

Notes

†: Time for each direction includes amber and all red intervals

‡: Start of first phase should be used as reference point for offset

Asterisk (*) Indicates actuated phase

(fp): Fully Protected Left Turn

◄·····► *Pedestrian signal*

Cost is $56.50 ($50 + HST)

Traffic Signal Timing

City of Ottawa, Public Works Department

Traffic Operations Unit

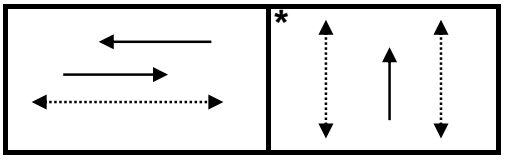
Intersection:	**Main:**	Wellington	**Side:**	Lett	
Controller:	**MS-3200**			**TSD:**	6565
Author:	Basel Ansari			**Date:**	05-Feb-2016

Existing Timing Plans†

	Plan					**Ped Minimum Time**		
	AM Peak 1	**Off Peak** 2	**PM Peak** 3	**Night** 4	**Weekend** 5	***Walk***	***DW***	***A+R***
Cycle	120	80	120	70	80			
Offset	93	X	1	X	X			
EB Thru	90	50	90	40	50	15	7	3.7 + 1.9
WB Thru	90	50	90	40	50	-	-	3.7 + 1.9
NB Thru	30	30	30	30	30	7	17	3.3 + 2.5

Phasing Sequence‡

Plan: All



Schedule

Weekday

Time	Plan
0:15	4
6:00	1
9:30	2
15:00	3
18:00	2
22:00	4

Weekend

Time	Plan
0:15	4
8:00	2
12:00	5
18:00	2
22:00	4

Notes

†: Time for each direction includes amber and all red intervals

‡: Start of first phase should be used as reference point for offset

Asterisk (*) Indicates actuated phase

(fp): Fully Protected Left Turn

◄·····► Pedestrian signal

Cost is $56.50 ($50 + HST)

Traffic Signal Timing

City of Ottawa, Public Works Department

Traffic Operations Unit

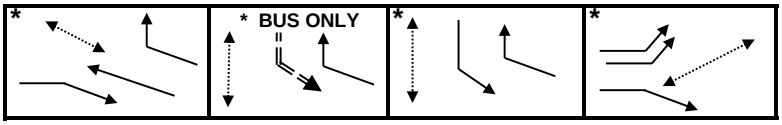
Intersection:	**Main:**	Wellington	**Side:**	Portage Bridge	
Controller:	**MS-3200**			**TSD:**	5474
Author:	Basel Ansari			**Date:**	05-Feb-2016

Existing Timing Plans†

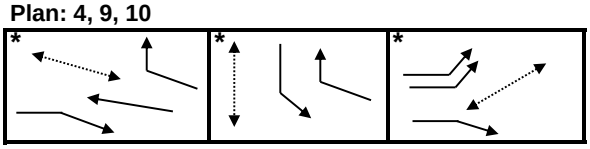
	Plan				**Ped Minimum Time**		
	Night 4	**AM Rush** 8	**Off Peak** 9	**PM Rush** 10	***Walk***	***DW***	***A+R***
Cycle	FREE	FREE	FREE	FREE			
Offset	X	X	X	X			
EB Thru	max 26.4	max 27.4	max 27.4	max 36.4	-	-	3.7 + 2.7
WB Thru	max 26.4	max 27.4	max 27.4	max 36.4	7	13	3.7 + 2.7
WBRT	max 52.5	max 91.6	max 58.5	max 77.5	-	-	3.7 + 2.4
SB Adv Bus ONLY	-	max 13.1	-	-	-	-	3.7 + 2.4
SB	max 26.1	max 51.1	max 31.1	max 41.1	26	12	3.7 + 2.4
EBLT	max 21	max 31	max 27	max 34	25	12	3.7 + 2.3

Phasing Sequence‡

Plan: 8



Plan: 4, 9, 10



Notes: 1) For all plans, there are only minimum recalls for EB and WB Thru of 10 second green.
2) For all plans, the maximum splits provided in the chart above are for vehicles. If the pedestrian phases are actuated, the splits will be extended to satisfy walk and flashing-don't-walk intervals.

Schedule

Weekday

Time	Plan
0:15	4
6:30	8
9:30	9
15:00	10
18:30	9
22:30	4

Saturday

Time	Plan
0:10	4
7:00	9
22:00	4

Sunday

Time	Plan
0:15	4
7:00	9
22:00	4

Notes

†: Time for each direction includes amber and all red intervals

‡: Start of first phase should be used as reference point for offset

Asterisk (*) Indicates actuated phase

(fp): Fully Protected Left Turn

◄·····► Pedestrian signal

Cost is $56.50 ($50 + HST)

Traffic Signal Timing

City of Ottawa, Transportation Services Department

Traffic Operations Unit

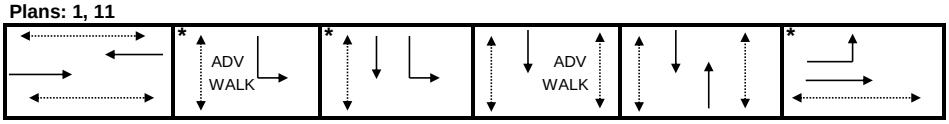
Intersection:	***Main:*** Albert St.	***Side:*** Booth St.	
Controller:	**ATC 3**	**TSD:**	5465
Author:	Matthew Anderson	**Date:**	06-Jun-17

Timing Plans†

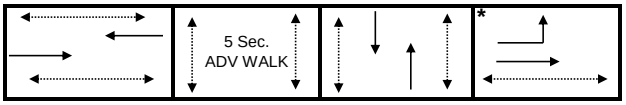
	Plan						Ped Minimum Time		
	AM Peak	Off Peak	PM Peak	Night	Weekend	AM Rush	*Walk*	*DW*	*A+R*
	1	2	3	4	5	11			
Cycle	120	85	120	85	85	120			
Offset	104	38	9	3	38	104			
EB Thru	55	50	71	37	50	67	7	23	3.3+3.2
WB Thru	37	37	42	37	37	36	7	23	3.3+3.2
SB Left	25	-	11	13	-	15	-	-	3.3+3.2
NB Thru	40	35	38	35	35	38	7	21	3.3+3.2
SB Thru	65	35	49	48	35	53	7	21	3.3+3.2
EB Left	18	13	29	-	13	31	-	-	3.3+3.2

Phasing Sequence‡

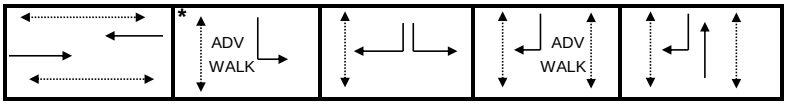
Plans: 1, 11



Plans: 2 and 5



Plans: 4



Note: For Plan 4, there is a bylaw prohibitting the SBT movement from 11:00pm to 6:00am
All plans have a ped recall
For Plans 1, 3, and 11 the walk time is 10 seconds instead of the usual 7 for fazes 4 and 8
The right turn movement is prohibited on the red light between 7 am and 9 pm on weekdays in the WB and SB directions
The WB left turn is prohibited between 7-9 am and 3:30-5:30 pm on weekdays

Schedule

Weekday

Time	Plan
0:15	4
6:00	1
8:00	11
9:30	2
15:00	3
18:30	2
23:00	4

Weekend

Time	Plan
0:15	4
6:00	2
8:00	5
18:00	2
23:00	4

Notes

†: Time for each direction includes amber and all red intervals

‡: Start of first phase should be used as reference point for offset

Asterisk (*) Indicates actuated phase

(fp): Fully Protected Left Turn

◄·····► *Pedestrian signal*

Cost is $56.50 ($50 + HST)

APPENDIX E

COLLISION RECORDS

Collision Main Detail Summary

OnTRAC Reporting System

FROM: 2012-01-01 TO: 2014-01-01

ALBERT ST & BOOTH ST

Former Municipality: **Ottawa** Traffic Control: **Traffic signal** Number of Collisions: **30**

	DATE	DAY	TIME	ENV	LIGHT	IMPACT TYPE	CLASS	DIR	SURFACE COND'N	VEHICLE MANOEUVRE	VEHICLE TYPE	FIRST EVENT	No. PED
1	2012-01-09	Mo	10:00	Clear	Daylight	Sideswipe	P.D. only	V1 W	Wet	Changing lanes	Pick-up truck	Other motor vehicle	0
								V2 W	Wet	Turning right	Truck - open	Other motor vehicle	
2	2012-02-09	Thu	16:47	Clear	Daylight	Other	P.D. only	V1 N	Dry	Reversing	Pick-up truck	Other motor vehicle	0
								V2 S	Dry	Stopped	Automobile, station	Other motor vehicle	
3	2012-03-20	Tue	11:30	Clear	Daylight	Angle	P.D. only	V1 E	Dry	Going ahead	Automobile, station	Other motor vehicle	0
								V2 S	Dry	Going ahead	Automobile, station	Other motor vehicle	
4	2012-03-20	Tue	12:50	Clear	Daylight	Sideswipe	P.D. only	V1 W	Dry	Changing lanes	Automobile, station	Other motor vehicle	0
								V2 W	Dry	Going ahead	Automobile, station	Other motor vehicle	
5	2012-03-30	Fri	15:30	Clear	Daylight	Rear end	P.D. only	V1 S	Dry	Turning right	Automobile, station	Other motor vehicle	0
								V2 S	Dry	Turning right	Automobile, station	Other motor vehicle	
6	2012-04-12	Thu	22:30	Clear	Dark	Rear end	P.D. only	V1 S	Dry	Turning left	Passenger van	Other motor vehicle	0
								V2 S	Dry	Turning left	Automobile, station	Other motor vehicle	
7	2012-05-30	We	16:15	Clear	Daylight	Rear end	P.D. only	V1 W	Dry	Going ahead	Automobile, station	Other motor vehicle	0
								V2 W	Dry	Slowing or	Pick-up truck	Other motor vehicle	
8	2012-06-13	We	17:39	Clear	Daylight	Angle	P.D. only	V1 S	Dry	Turning right	Motorcycle	Cyclist	0
								V2 W	Dry	Going ahead	Bicycle	Other motor vehicle	
9	2012-08-07	Tue	21:38	Rain	Dark	Turning	P.D. only	V1 S	Wet	Turning left	Automobile, station	Other motor vehicle	0
								V2 N	Dry	Going ahead	Automobile, station	Other motor vehicle	
10	2012-08-17	Fri	17:30	Clear	Daylight	Rear end	P.D. only	V1 S	Dry	Turning right	Automobile, station	Other motor vehicle	0
								V2 S	Dry	Turning right	Pick-up truck	Other motor vehicle	
11	2012-09-02	Sun	15:33	Clear	Daylight	Turning	P.D. only	V1 S	Dry	Turning left	Pick-up truck	Other motor vehicle	0
								V2 N	Dry	Going ahead	Automobile, station	Other motor vehicle	

(Note: Time of Day = "00:00" represents unknown collision time

12	2012-09-14	Fri	23:39	Rain	Dark	Turning	P.D. only	V1	N	Wet	Turning left	Passenger van	Other motor vehicle	0
								V2	S	Wet	Going ahead	Pick-up truck	Other motor vehicle	
13	2012-10-28	Sun	11:49	Rain	Daylight	Turning	P.D. only	V1	S	Wet	Turning left	Automobile, station	Other motor vehicle	0
								V2	N	Wet	Going ahead	Pick-up truck	Other motor vehicle	
14	2013-01-04	Fri	18:33	Rain	Dark	Turning	P.D. only	V1	E	Wet	Turning left	Automobile, station	Other motor vehicle	0
								V2	W	Wet	Going ahead	Automobile, station	Other motor vehicle	
15	2013-01-22	Tue	06:36	Clear	Dark	Angle	P.D. only	V1	W	Slush	Going ahead	Automobile, station	Other motor vehicle	0
								V2	N	Slush	Going ahead	Automobile, station	Other motor vehicle	
16	2013-02-06	We	16:00	Clear	Daylight	Rear end	P.D. only	V1	E	Dry	Going ahead	Pick-up truck	Other motor vehicle	0
								V2	E	Dry	Stopped	Pick-up truck	Other motor vehicle	
17	2013-02-13	We	11:53	Clear	Daylight	Turning	P.D. only	V1	E	Wet	Turning right	Delivery van	Other motor vehicle	0
								V2	E	Wet	Going ahead	Truck - dump	Other motor vehicle	
18	2013-03-08	Fri	09:04	Clear	Daylight	Rear end	P.D. only	V1	E	Dry	Slowing or	Truck - closed	Other motor vehicle	0
								V2	E	Dry	Stopped	Automobile, station	Other motor vehicle	
19	2013-03-29	Fri	01:49	Clear	Dark	Rear end	P.D. only	V1	E	Dry	Going ahead	Automobile, station	Other motor vehicle	0
								V2	E	Dry	Stopped	Automobile, station	Other motor vehicle	
20	2013-04-10	We	13:20	Clear	Daylight	Angle	P.D. only	V1	S	Dry	Going ahead	Automobile, station	Other motor vehicle	0
								V2	E	Dry	Going ahead	Pick-up truck	Other motor vehicle	
21	2013-04-16	Tue	08:00	Rain	Daylight	Sideswipe	P.D. only	V1	N	Wet	Changing lanes	Pick-up truck	Other motor vehicle	0
								V2	N	Wet	Going ahead	Automobile, station	Other motor vehicle	
22	2013-04-30	Tue	14:35	Clear	Daylight	Sideswipe	P.D. only	V1	N	Dry	Changing lanes	Automobile, station	Other motor vehicle	0
								V2	N	Dry	Going ahead	Automobile, station	Other motor vehicle	
23	2013-05-13	Mo	22:40	Clear	Dark	Angle	Non-fatal	V1	E	Dry	Going ahead	Automobile, station	Other motor vehicle	0
								V2	S	Dry	Going ahead	Pick-up truck	Other motor vehicle	
24	2013-07-20	Sat	13:45	Clear	Daylight	Turning	P.D. only	V1	N	Dry	Turning left	Pick-up truck	Other motor vehicle	0
								V2	S	Dry	Going ahead	Automobile, station	Other motor vehicle	

(Note: Time of Day = "00:00" represents unknown collision time

25	2013-08-12	Mo	22:00	Clear	Dark	Turning	P.D. only	V1	S	Dry	Turning left	Automobile, station	Other motor vehicle		0
								V2	N	Dry	Going ahead	Automobile, station	Other motor vehicle		
26	2013-08-13	Tue	15:17	Clear	Daylight	Rear end	P.D. only	V1	S	Dry	Going ahead	Automobile, station	Other motor vehicle		0
								V2	S	Dry	Stopped	Passenger van	Other motor vehicle		
27	2013-08-23	Fri	17:12	Clear	Daylight	Angle	Non-fatal	V1	E	Dry	Going ahead	Automobile, station	Other motor vehicle		1
								V2	N	Dry	Going ahead	Pick-up truck	Other motor vehicle		
28	2013-11-21	Thu	17:55	Clear	Dark	Sideswipe	P.D. only	V1	N	Dry	Changing lanes	Pick-up truck	Other motor vehicle		0
								V2	N	Dry	Going ahead	Automobile, station	Other motor vehicle		
29	2013-11-28	Thu	18:45	Clear	Dark	Sideswipe	P.D. only	V1	N	Wet	Turning right	Pick-up truck	Other motor vehicle		0
								V2	N	Wet	Going ahead	Automobile, station	Other motor vehicle		
30	2013-11-29	Fri	15:43	Clear	Daylight	Turning	P.D. only	V1	E	Wet	Turning left	Passenger van	Other motor vehicle		0
								V2	W	Wet	Going ahead	Automobile, station	Other motor vehicle		

BOOTH ST & FLEET ST

Former Municipality: **Ottawa** Traffic Control: **Stop sign** Number of Collisions: **1**

	DATE	DAY	TIME	ENV	LIGHT	IMPACT TYPE	CLASS	DIR		SURFACE COND'N	VEHICLE MANOEUVRE	VEHICLE TYPE	FIRST EVENT	No. PED
31	2012-05-11	Fri	17:00	Clear	Daylight	Single vehicle	Non-fatal	V1	S	Dry	Going ahead	Pick-up truck	Pedestrian		1

BOOTH ST, FLEET ST to OTTAWA RIVER PKWY

Former Municipality: **Ottawa** Traffic Control: **No control** Number of Collisions: **3**

	DATE	DAY	TIME	ENV	LIGHT	IMPACT TYPE	CLASS	DIR		SURFACE COND'N	VEHICLE MANOEUVRE	VEHICLE TYPE	FIRST EVENT	No. PED
32	2012-03-22	Thu	16:25	Clear	Daylight	Sideswipe	P.D. only	V1	S	Dry	Changing lanes	Truck - closed	Other motor vehicle		0
								V2	S	Dry	Going ahead	Automobile, station	Other motor vehicle		
	COMMENTS: EXACT LOCATION UNKNOWN														
33	2012-05-09	We	07:35	Clear	Daylight	Rear end	P.D. only	V1	S	Wet	Going ahead	Automobile, station	Other motor vehicle		0
								V2	S	Wet	Stopped	Pick-up truck	Other motor vehicle		
								V3	S	Wet	Stopped	Pick-up truck	Other motor vehicle		
34	2013-04-20	Sat	02:40	Clear	Dark	Single vehicle	P.D. only	V1	S	Dry	Going ahead	Automobile, station	Pole (sign, parking		0

(Note: Time of Day = "00:00" represents unknown collision time

BOOTH ST & OTTAWA RIVER PKWY

Former Municipality: **Ottawa** Traffic Control: **Traffic signal** Number of Collisions: **16**

	DATE	DAY	TIME	ENV	LIGHT	IMPACT TYPE	CLASS	DIR	SURFACE COND'N	VEHICLE MANOEUVRE	VEHICLE TYPE	FIRST EVENT	No. PED
35	2012-01-08	Sun	02:33	Clear	Dark	Single vehicle	P.D. only	V1 S	Dry	Turning right	Automobile, station	Skidding/Sliding	0
36	2012-02-10	Fri	00:09	Clear	Dark	Angle	Non-fatal	V1 W	Dry	Going ahead	Automobile, station	Other motor vehicle	0
								V2 N	Dry	Going ahead	Automobile, station	Other motor vehicle	
37	2012-02-12	Sun	02:27	Clear	Dark	Angle	P.D. only	V1 S	Dry	Going ahead	Automobile, station	Other motor vehicle	0
								V2 W	Dry	Going ahead	Police vehicle	Other motor vehicle	
38	2012-02-24	Fri	23:47	Snow	Dark	Angle	Non-fatal	V1 W	Wet	Going ahead	Automobile, station	Other motor vehicle	0
								V2 N	Wet	Going ahead	Automobile, station	Other motor vehicle	
39	2012-07-07	Sat	12:15	Clear	Daylight	Rear end	P.D. only	V1 E	Dry	Going ahead	Pick-up truck	Other motor vehicle	0
								V2 E	Dry	Stopped	Automobile, station	Other motor vehicle	
40	2012-08-05	Sun	11:33	Rain	Daylight	Turning	Non-fatal	V1 W	Wet	Turning left	Automobile, station	Other motor vehicle	0
								V2 E	Wet	Going ahead	Pick-up truck	Other motor vehicle	
41	2012-09-22	Sat	23:55	Clear	Dark	Sideswipe	P.D. only	V1 N	Dry	Changing lanes	Automobile, station	Other motor vehicle	0
								V2 N	Dry	Going ahead	Pick-up truck	Other motor vehicle	
42	2012-11-03	Sat	02:44	Clear	Dark	Turning	P.D. only	V1 W	Dry	Turning left	Pick-up truck	Other motor vehicle	0
								V2 E	Dry	Going ahead	Automobile, station	Other motor vehicle	
43	2012-12-08	Sat	01:03	Clear	Dark	Rear end	Non-fatal	V1 N	Dry	Going ahead	Automobile, station	Other motor vehicle	0
								V2 N	Dry	Stopped	Automobile, station	Other motor vehicle	
								V3 N	Dry	Stopped	Automobile, station	Other motor vehicle	
44	2012-12-28	Fri	14:38	Snow	Daylight	Angle	P.D. only	V1 N	Loose snow	Going ahead	Automobile, station	Skidding/Sliding	0
								V2 E	Loose snow	Going ahead	Municipal transit bus	Other motor vehicle	
45	2013-03-21	Thu	21:06	Clear	Dark	Rear end	Non-fatal	V1 W	Wet	Slowing or	Automobile, station	Other motor vehicle	0
								V2 W	Wet	Stopped	Automobile, station	Other motor vehicle	
46	2013-05-15	We	16:55	Clear	Daylight	Turning	P.D. only	V1 N	Dry	Turning right	Automobile, station	Cyclist	0
								V2 N	Dry	Going ahead	Bicycle	Other motor vehicle	

(Note: Time of Day = "00:00" represents unknown collision time

47	2013-05-21	Tue	23:24	Rain	Dark	Angle	P.D. only	V1	W	Wet	Going ahead	Pick-up truck	Other motor vehicle	0
								V2	N	Wet	Going ahead	Automobile, station	Other motor vehicle	
48	2013-05-23	Thu	09:29	Clear	Daylight	Sideswipe	Non	V1	S	Dry	Changing lanes	Municipal transit bus	Other motor vehicle	0
								V2	S	Dry	Going ahead	Pick-up truck	Other motor vehicle	
49	2013-06-27	Thu	15:20	Clear	Daylight	Rear end	P.D. only	V1	E	Dry	Stopped	Automobile, station	Other motor vehicle	0
								V2	E	Dry	Going ahead	Pick-up truck	Other motor vehicle	
50	2013-07-21	Sun	14:42	Clear	Daylight	Sideswipe	Non-fatal	V1	W	Dry	Changing lanes	Automobile, station	Other motor vehicle	0
								V2	W	Dry	Going ahead	Pick-up truck	Other motor vehicle	

BOOTH ST & TRANSITWAY

Former Municipality: **Ottawa** Traffic Control: **Traffic signal** Number of Collisions: **12**

	DATE	DAY	TIME	ENV	LIGHT	IMPACT TYPE	CLASS	DIR		SURFACE COND'N	VEHICLE MANOEUVRE	VEHICLE TYPE	FIRST EVENT	No. PED
51	2012-01-01	Sun	16:23	Freezin	Daylight	Angle	P.D. only	V1	S	Wet	Going ahead	Automobile, station	Other motor vehicle	0
								V2	W	Wet	Going ahead	Municipal transit bus	Other motor vehicle	
52	2012-02-03	Fri	08:20	Clear	Daylight	Single vehicle	Non-fatal	V1	W	Dry	Turning left	Municipal transit bus	Pedestrian	1
53	2012-03-14	We	17:40	Clear	Daylight	Single vehicle	Non-fatal	V1	N	Dry	Turning right	Municipal transit bus	Pedestrian	1
54	2012-04-06	Fri	09:00	Clear	Daylight	Angle	P.D. only	V1	N	Dry	Going ahead	Unknown	Other motor vehicle	0
								V2	W	Dry	Going ahead	Municipal transit bus	Other motor vehicle	
55	2012-11-11	Sun	03:20	Rain	Dark	Angle	Non-fatal	V1	S	Wet	Going ahead	Passenger van	Other motor vehicle	0
								V2	W	Wet	Going ahead	Municipal transit bus	Other motor vehicle	
56	2013-01-11	Fri	14:15	Rain	Daylight	Angle	P.D. only	V1	S	Wet	Going ahead	Automobile, station	Other motor vehicle	0
								V2	E	Wet	Going ahead	Municipal transit bus	Other motor vehicle	
57	2013-01-18	Fri	09:30	Clear	Daylight	Rear end	Non-fatal	V1	N	Dry	Going ahead	Automobile, station	Other motor vehicle	0
								V2	N	Dry	Stopped	Automobile, station	Other motor vehicle	
58	2013-01-24	Thu	08:35	Drifting	Daylight	Rear end	Non-fatal	V1	N	Ice	Slowing or	Pick-up truck	Other motor vehicle	0
								V2	N	Ice	Stopped	Automobile, station	Other motor vehicle	
59	2013-01-28	Mo	12:05	Snow	Daylight	Rear end	P.D. only	V1	N	Loose snow	Slowing or	Automobile, station	Other motor vehicle	0
								V2	N	Loose snow	Stopped	Passenger van	Other motor vehicle	

(Note: Time of Day = "00:00" represents unknown collision time

60	2013-02-08	Fri	17:37	Snow	Dusk	Angle	P.D. only	V1	N	Loose snow	Going ahead	Pick-up truck	Other motor vehicle		0
								V2	W	Loose snow	Going ahead	Intercity bus	Other motor vehicle		
61	2013-02-08	Fri	08:05	Snow	Daylight	Angle	Non-fatal	V1	N	Ice	Slowing or	Automobile, station	Other motor vehicle		0
								V2	E	Ice	Going ahead	Municipal transit bus	Other motor vehicle		
62	2013-02-08	Fri	17:00	Snow	Daylight	Other	P.D. only	V1	N	Packed snow	Slowing or	Passenger van	Snowbank / drift		0
								V2	N	Packed snow	Stopped	Automobile, station	Other motor vehicle		

BOOTH ST, TRANSITWAY to WELLINGTON ST

Former Municipality: **Ottawa** Traffic Control: **No control** Number of Collisions: **2**

	DATE	DAY	TIME	ENV	LIGHT	IMPACT TYPE	CLASS	DIR		SURFACE COND'N	VEHICLE MANOEUVRE	VEHICLE TYPE	FIRST EVENT	No. PED
63	2012-03-26	Mo	09:20	Clear	Daylight	Rear end	P.D. only	V1	N	Dry	Going ahead	Delivery van	Other motor vehicle	0
								V2	N	Dry	Slowing or	Automobile, station	Other motor vehicle	

COMMENTS: EXACT LOCATION UNKNOWN

64	2013-02-08	Fri	08:56	Snow	Daylight	Rear end	P.D. only	V1	N	Loose snow	Slowing or	Automobile, station	Other motor vehicle	0
								V2	N	Loose snow	Stopped	Municipal transit bus	Other motor vehicle	

OTTAWA RIVER PKWY, BOOTH ST to OTTAWA RIVER PKWY

Former Municipality: **Ottawa** Traffic Control: **No control** Number of Collisions: **2**

	DATE	DAY	TIME	ENV	LIGHT	IMPACT TYPE	CLASS	DIR		SURFACE COND'N	VEHICLE MANOEUVRE	VEHICLE TYPE	FIRST EVENT	No. PED
65	2012-09-04	Tue	17:00	Rain	Daylight	Rear end	Non	V1	W	Wet	Going ahead	Automobile, station	Other motor vehicle	0
								V2	W	Wet	Slowing or	Automobile, station	Other motor vehicle	
66	2013-02-14	Thu	11:51	Clear	Daylight	Single vehicle	P.D. only	V1	E	Wet	Changing lanes	Automobile, station	Ran off road	0

OTTAWA RIVER PKWY & PORTAGE BRIDGE

Former Municipality: **Ottawa** Traffic Control: **Traffic signal** Number of Collisions: **8**

	DATE	DAY	TIME	ENV	LIGHT	IMPACT TYPE	CLASS	DIR		SURFACE COND'N	VEHICLE MANOEUVRE	VEHICLE TYPE	FIRST EVENT	No. PED

(Note: Time of Day = "00:00" represents unknown collision time

67	2012-02-08	We	08:10	Clear	Daylight	Rear end	P.D. only	V1	S	Dry	Turning left	Municipal transit bus	Other motor vehicle		0
								V2	S	Dry	Turning left	Passenger van	Other motor vehicle		
68	2012-07-12	Thu	09:08	Clear	Daylight	Rear end	Non-fatal	V1	S	Dry	Turning right	Truck - dump	Other motor vehicle		0
								V2	S	Dry	Turning right	Automobile, station	Other motor vehicle		
								V3	S	Dry	Turning right	Automobile, station	Other motor vehicle		
69	2013-03-04	Mo	04:12	Snow	Dark	Single vehicle	P.D. only	V1	S	Loose snow	Turning left	Automobile, station	Skidding/Sliding		0
70	2013-03-28	Thu	22:50	Clear	Dark	Rear end	P.D. only	V1	W	Dry	Going ahead	Pick-up truck	Other motor vehicle		0
								V2	W	Dry	Stopped	Automobile, station	Other motor vehicle		
71	2013-07-13	Sat	19:49	Clear	Daylight	Sideswipe	P.D. only	V1	W	Dry	Turning left	Automobile, station	Other motor vehicle		0
								V2	W	Dry	Turning left	Automobile, station	Other motor vehicle		
72	2013-08-21	We	17:55	Clear	Daylight	Angle	P.D. only	V1	S	Dry	Going ahead	Bicycle	Other motor vehicle		0
								V2	W	Dry	Going ahead	Pick-up truck	Cyclist		
73	2013-09-01	Sun	14:41	Clear	Daylight	Sideswipe	P.D. only	V1	S	Dry	Overtaking	Automobile, station	Other motor vehicle		0
								V2	S	Dry	Going ahead	Automobile, station	Other motor vehicle		
74	2013-12-20	Fri	22:40	Clear	Dark	Rear end	P.D. only	V1	S	Loose snow	Going ahead	Automobile, station	Other motor vehicle		0
								V2	S	Loose snow	Stopped	Automobile, station	Other motor vehicle		
								V3	S	Loose snow	Stopped	Automobile, station	Other motor vehicle		

OTTAWA RIVER PKWY EB, 200 W OF PORTAGE BRIDG to PORTAGE BRIDGE

Former Municipality: **Ottawa** Traffic Control: **No control** Number of Collisions: **2**

	DATE	DAY	TIME	ENV	LIGHT	IMPACT TYPE	CLASS	DIR		SURFACE COND'N	VEHICLE MANOEUVRE	VEHICLE TYPE	FIRST EVENT	No. PED
75	2012-02-12	Sun	02:03	Clear	Dark	Single vehicle	Non-fatal	V1	E	Dry	Unknown	Automobile, station	Ran off road	0
76	2013-10-09	We	18:23	Clear	Dusk	Sideswipe	P.D. only	V1	E	Dry	Unknown	Automobile, station	Other motor vehicle	0
								V2	E	Dry	Unknown	Automobile, station	Other motor vehicle	

LETT ST & WELLINGTON ST

Former Municipality: **Ottawa** Traffic Control: **Traffic signal** Number of Collisions: **5**

	DATE	DAY	TIME	ENV	LIGHT	IMPACT TYPE	CLASS	DIR		SURFACE COND'N	VEHICLE MANOEUVRE	VEHICLE TYPE	FIRST EVENT	No. PED
77	2012-02-04	Sat	14:33	Clear	Daylight	Rear end	P.D. only	V1	E	Dry	Changing lanes	Passenger van	Other motor vehicle	0
								V2	E	Dry	Going ahead	Automobile, station	Other motor vehicle	
78	2012-07-02	Mo	02:15	Clear	Dark	Single vehicle	Non-fatal	V1	E	Dry	Going ahead	Automobile, station	Pedestrian	1
79	2012-12-23	Sun	16:54	Clear	Dark	Rear end	P.D. only	V1	W	Wet	Going ahead	Automobile, station	Other motor vehicle	0
								V2	W	Wet	Going ahead	Pick-up truck	Other motor vehicle	
80	2013-07-04	Thu	23:29	Clear	Dark	Rear end	Non-fatal	V1	E	Dry	Going ahead	Passenger van	Other motor vehicle	0
								V2	E	Dry	Stopped	Pick-up truck	Other motor vehicle	
81	2013-08-10	Sat	17:53	Clear	Daylight	Turning	P.D. only	V1	W	Dry	Making U-Turn	Automobile, station	Other motor vehicle	0
								V2	W	Dry	Going ahead	Automobile, station	Other motor vehicle	

(Note: Time of Day = "00:00" represents unknown collision time

CITY OPERATIONS - PUBLIC WORKS

Collision Details Report - Public Version

From: January 1, 2014 **To:** December 31, 2014

Location: BOOTH ST @ OTTAWA RIVER PKWY/WELLINGTON ST

Traffic Control: Traffic signal **Total Collisions:** 8

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuver	Vehicle type	First Event	No. Ped
2014-Feb-18, Tue,16:15	Snow	Rear end	P.D. only	Loose snow	North	Going ahead	Automobile, station wagon	Other motor vehicle	
					North	Stopped	Pick-up truck	Other motor vehicle	
2014-Mar-20, Thu,08:19	Rain	Rear end	P.D. only	Wet	North	Going ahead	Automobile, station wagon	Other motor vehicle	
					North	Stopped	Passenger van	Other motor vehicle	
2014-Apr-08, Tue,16:00	Rain	Rear end	Non-fatal injury	Wet	North	Going ahead	Municipal transit bus	Other motor vehicle	
					North	Turning right	Pick-up truck	Other motor vehicle	
2014-Jun-09, Mon,17:20	Clear	Rear end	P.D. only	Dry	North	Going ahead	Pick-up truck	Other motor vehicle	
					North	Slowing or stopping	Automobile, station wagon	Other motor vehicle	
2014-Jun-15, Sun,09:15	Clear	Turning movement	P.D. only	Dry	West	Turning left	Automobile, station wagon	Other motor vehicle	
					East	Going ahead	Automobile, station wagon	Other motor vehicle	
2014-Aug-18, Mon,12:20	Clear	Turning movement	Non-fatal injury	Dry	North	Turning left	Automobile, station wagon	Other motor vehicle	

					South	Going ahead	Automobile, station wagon	Other motor vehicle	
2014-Dec-13, Sat,16:50	Clear	Turning movement	P.D. only	Wet	South	Going ahead	Automobile, station wagon	Other motor vehicle	
					North	Turning left	Passenger van	Other motor vehicle	
2014-Nov-10, Mon,09:00	Clear	SMV other	Non-fatal injury	Dry	North	Turning right	Municipal transit bus	Pedestrian	1

Location: TURN LANE btwn Continuation of TURN LANE & WELLINGTON ST (1)

Traffic Control: No control

Total Collisions: 1

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuver	Vehicle type	First Event	No. Ped
2014-Mar-08, Sat,01:16	Clear	Rear end	P.D. only	Dry	North	Going ahead	Automobile, station wagon	Other motor vehicle	
					North	Going ahead	Pick-up truck	Other motor vehicle	

Location: WELLINGTON ST btwn OTTAWA RIVER PKWY & TO BE DETERMINED

Traffic Control: No control

Total Collisions: 1

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuver	Vehicle type	First Event	No. Ped
2014-Feb-07, Fri,17:56	Clear	Sideswipe	P.D. only	Dry	East	Going ahead	Automobile, station wagon	Other motor vehicle	
					East	Going ahead	Pick-up truck	Other motor vehicle	

CITY OPERATIONS - PUBLIC WORKS

Collision Details Report - Public Version

From: January 1, 2014 **To:** December 31, 2014

Location: ALBERT ST @ BOOTH ST

Traffic Control: Traffic signal

Total Collisions: 12

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuver	Vehicle type	First Event	No. Ped
2014-Jan-11, Sat,07:26	Rain	Rear end	P.D. only	Ice	South	Turning left	Pick-up truck	Other motor vehicle	
					South	Stopped	Automobile, station wagon	Other motor vehicle	
2014-Feb-07, Fri,16:05	Clear	Rear end	Non-fatal injury	Dry	West	Going ahead	Pick-up truck	Other motor vehicle	
					West	Slowing or stopping	Automobile, station wagon	Other motor vehicle	
					West	Slowing or stopping	Automobile, station wagon	Other motor vehicle	
2014-Feb-24, Mon,10:27	Clear	Angle	P.D. only	Dry	West	Going ahead	Automobile, station wagon	Other motor vehicle	
					South	Going ahead	Passenger van	Other motor vehicle	
2014-Feb-14, Fri,07:30	Snow	Angle	P.D. only	Loose snow	West	Turning right	Automobile, station wagon	Other motor vehicle	
					South	Stopped	Pick-up truck	Other motor vehicle	
2014-Mar-22, Sat,11:47	Snow	Other	P.D. only	Loose snow	West	Going ahead	Automobile, station wagon	Other motor vehicle	
					West	Stopped	Automobile, station wagon	Curb	

2014-Mar-06, Thu,16:06	Clear	Rear end	P.D. only	Dry	North	Slowing or stopping	Pick-up truck	Other motor vehicle
					North	Going ahead	Pick-up truck	Other motor vehicle
2014-May-05, Mon,18:05	Clear	Rear end	P.D. only	Dry	West	Going ahead	Automobile, station wagon	Other motor vehicle
					West	Stopped	Pick-up truck	Other motor vehicle
2014-May-10, Sat,13:44	Clear	Turning movement	P.D. only	Dry	West	Going ahead	Automobile, station wagon	Other motor vehicle
					East	Turning left	Automobile, station wagon	Other motor vehicle
2014-Aug-02, Sat,12:35	Clear	Angle	P.D. only	Dry	East	Going ahead	Automobile, station wagon	Other motor vehicle
					North	Going ahead	Pick-up truck	Other motor vehicle
2014-Sep-19, Fri,15:53	Clear	Turning movement	P.D. only	Dry	East	Turning left	Automobile, station wagon	Other motor vehicle
					West	Going ahead	Automobile, station wagon	Other motor vehicle
2014-Dec-12, Fri,14:06	Clear	Turning movement	P.D. only	Wet	North	Turning right	Passenger van	Other motor vehicle
					North	Going ahead	Automobile, station wagon	Other motor vehicle
2014-Dec-07, Sun,21:11	Clear	Rear end	P.D. only	Dry	South	Going ahead	Pick-up truck	Other motor vehicle
					South	Stopped	Automobile, station wagon	Other motor vehicle

Location: BOOTH ST @ FLEET ST

Traffic Control: Stop sign

Total Collisions: 1

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuver	Vehicle type	First Event	No. Ped
2014-Oct-22, Wed,13:10	Clear	Other	P.D. only	Dry	East	Reversing	Pick-up truck	Other motor vehicle	
					West	Stopped	Automobile, station wagon	Other motor vehicle	

Location: BOOTH ST @ TRANSITWAY

Traffic Control: Traffic signal

Total Collisions: 5

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuver	Vehicle type	First Event	No. Ped
2014-Jan-16, Thu,20:48	Clear	Angle	P.D. only	Dry	South	Going ahead	Automobile, station wagon	Other motor vehicle	
					East	Going ahead	Municipal transit bus	Other motor vehicle	
2014-Mar-12, Wed,15:45	Snow	Rear end	P.D. only	Loose snow	North	Slowing or stopping	Pick-up truck	Other motor vehicle	
					North	Stopped	Automobile, station wagon	Other motor vehicle	
2014-Feb-10, Mon,14:20	Clear	Angle	P.D. only	Dry	South	Going ahead	Automobile, station wagon	Other motor vehicle	
					West	Going ahead	Municipal transit bus	Other motor vehicle	
2014-Aug-03, Sun,16:38	Clear	Angle	Non-fatal injury	Dry	North	Going ahead	Automobile, station wagon	Other motor vehicle	
					East	Going ahead	Municipal transit bus	Other motor vehicle	
2014-Nov-11, Tue,12:30	Clear	Angle	P.D. only	Dry	North	Going ahead	Automobile, station wagon	Other motor vehicle	
					East	Going ahead	Municipal transit bus	Other motor vehicle	

City Operations - Transportation Services

Collision Details Report - Public Version

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

Location: BOOTH ST @ OTTAWA RIVER PKWY/WELLINGTON ST

Traffic Control: Traffic signal **Total Collisions:** 17

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuver	Vehicle type	First Event	No. Ped
2015-Jan-21, Wed,19:19	Clear	SMV other	P.D. only	Wet	East	Turning left	Automobile, station wagon	Ran off road	
2015-Jan-05, Mon,14:08	Clear	Rear end	P.D. only	Wet	South	Changing lanes	Unknown	Other motor vehicle	
					South	Turning right	Pick-up truck	Other motor vehicle	
2015-Jan-28, Wed,10:07	Clear	Sideswipe	P.D. only	Dry	South	Turning right	Delivery van	Other motor vehicle	
					South	Turning right	Automobile, station wagon	Other motor vehicle	
2015-Feb-12, Thu,10:10	Clear	Rear end	P.D. only	Slush	East	Slowing or stopping	Pick-up truck	Other motor vehicle	
					East	Stopped	Pick-up truck	Other motor vehicle	
2015-Mar-22, Sun,08:52	Snow	Rear end	P.D. only	Loose snow	West	Going ahead	Automobile, station wagon	Other motor vehicle	
					West	Stopped	Automobile, station wagon	Other motor vehicle	
2015-Feb-13, Fri,13:13	Clear	Rear end	P.D. only	Dry	East	Slowing or stopping	Automobile, station wagon	Other motor vehicle	
					East	Stopped	Automobile, station wagon	Other motor vehicle	

2015-Jul-20, Mon,16:15	Clear	Rear end	P.D. only	Dry	East	Turning left	Automobile, station wagon	Other motor vehicle
					East	Turning left	Automobile, station wagon	Other motor vehicle
2015-May-28, Thu,16:14	Clear	Turning movement	Non-fatal injury	Dry	West	Turning right	Automobile, station wagon	Cyclist
					West	Going ahead	Bicycle	Other motor vehicle
					South	Stopped	Automobile, station wagon	Cyclist
2015-Aug-01, Sat,01:38	Clear	Turning movement	P.D. only	Dry	East	Turning left	Truck and trailer	Other motor vehicle
					East	Stopped	Automobile, station wagon	Other motor vehicle
2015-Oct-02, Fri,08:00	Clear	Rear end	P.D. only	Dry	East	Stopped	Pick-up truck	Other motor vehicle
					East	Going ahead	Automobile, station wagon	Other motor vehicle
2015-Oct-14, Wed,17:09	Clear	Rear end	Non-fatal injury	Dry	East	Going ahead	Pick-up truck	Other motor vehicle
					East	Stopped	Pick-up truck	Other motor vehicle
					East	Unknown	Automobile, station wagon	Other motor vehicle
2015-Sep-03, Thu,09:48	Clear	Sideswipe	P.D. only	Dry	South	Turning right	Pick-up truck	Other motor vehicle
					South	Turning right	Automobile, station wagon	Other motor vehicle
2015-Aug-18, Tue,08:20	Clear	Rear end	Non-fatal injury	Dry	East	Slowing or stopping	Automobile, station wagon	Other motor vehicle

					East	Stopped	Automobile, station wagon	Other motor vehicle
2015-Nov-05, Thu,16:51	Clear	Sideswipe	P.D. only	Dry	East	Turning right	Fire vehicle	Other motor vehicle
					East	Turning right	Automobile, station wagon	Other motor vehicle
2015-Nov-26, Thu,23:43	Clear	Sideswipe	P.D. only	Dry	East	Going ahead	Automobile, station wagon	Other motor vehicle
					East	Turning left	Truck - dump	Other motor vehicle
2015-Dec-01, Tue,05:40	Clear	Sideswipe	P.D. only	Dry	West	Turning right	Delivery van	Other motor vehicle
					West	Turning right	Automobile, station wagon	Other motor vehicle
2015-Nov-17, Tue,20:00	Clear	Turning movement	P.D. only	Dry	West	Turning right	Truck - dump	Other motor vehicle
					West	Turning right	Automobile, station wagon	Other motor vehicle

Location: WELLINGTON ST @ LETT ST

Traffic Control: Traffic signal **Total Collisions:** 3

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuver	Vehicle type	First Event	No. Ped
2015-Jan-14, Wed,15:28	Clear	Rear end	P.D. only	Dry	West	Slowing or stopping	Automobile, station wagon	Other motor vehicle	
					West	Stopped	Automobile, station wagon	Other motor vehicle	
2015-Jan-29, Thu,11:15	Clear	Rear end	P.D. only	Dry	East	Going ahead	Automobile, station wagon	Other motor vehicle	
					East	Stopped	Automobile, station wagon	Other motor vehicle	

					East	Stopped	Automobile, station wagon	Other motor vehicle
2015-Oct-05, Mon,08:50	Clear	Angle	P.D. only	Dry	West	Going ahead	Pick-up truck	Other motor vehicle
					North	Turning left	Automobile, station wagon	Other motor vehicle

City Operations - Transportation Services

Collision Details Report - Public Version

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

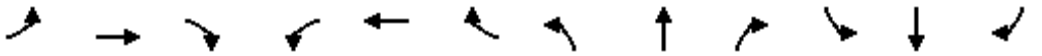
Location: OTTAWA RIVER PKWY @ PORTAGE BRIDGE

Traffic Control: Traffic signal **Total Collisions:** 4

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuver	Vehicle type	First Event	No. Ped
2015-Feb-04, Wed,15:16	Snow	Rear end	P.D. only	Loose snow	West	Slowing or stopping	Pick-up truck	Other motor vehicle	
					West	Stopped	Pick-up truck	Other motor vehicle	
2015-Feb-25, Wed,14:29	Clear	Sideswipe	P.D. only	Dry	South	Overtaking	Unknown	Other motor vehicle	
					South	Turning right	Bus (other)	Other motor vehicle	
2015-Dec-30, Wed,22:06	Snow	Rear end	Non-fatal injury	Slush	West	Turning right	Automobile, station wagon	Other motor vehicle	
					West	Turning right	Automobile, station wagon	Other motor vehicle	
2015-Jun-07, Sun,03:55	Clear	SMV other	P.D. only	Dry	West	Going ahead	Pick-up truck	Ran off road	

APPENDIX F

EXISTING INTERSECTION OPERATIONS



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	1233	0	0	629	87	5	707	128	81	908	194
Future Volume (vph)	0	1233	0	0	629	87	5	707	128	81	908	194
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0		0.0	0.0		0.0	10.0		0.0	135.0		50.0
Storage Lanes	0		0	0		0	1		0	1		1
Taper Length (m)	30.0			30.0			30.0			30.0		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	1.00
Ped Bike Factor					1.00		0.99	0.99		0.99		0.97
Frt					0.982			0.977				0.850
Flt Protected							0.950			0.950		
Satd. Flow (prot)	0	3353	0	0	3278	0	1676	3246	0	1676	3353	1500
Flt Permitted							0.950			0.950		
Satd. Flow (perm)	0	3353	0	0	3278	0	1667	3246	0	1659	3353	1449
Right Turn on Red			No			Yes			Yes			Yes
Satd. Flow (RTOR)					19			22				159
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		115.0			144.3			74.7			217.9	
Travel Time (s)		8.3			10.4			5.4			15.7	
Confl. Peds. (#/hr)	6		2	2		6	21		36	36		21
Confl. Bikes (#/hr)			28			34			15			1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	1340	0	0	684	95	5	768	139	88	987	211
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1340	0	0	779	0	5	907	0	88	987	211
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors		2			2		0	2		1	2	1
Detector Template		Thru			Thru			Thru		Left	Thru	Right
Leading Detector (m)		10.0			10.0		0.0	10.0		2.0	10.0	2.0
Trailing Detector (m)		0.0			0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Position(m)		0.0			0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Size(m)		0.6			0.6		0.0	0.6		2.0	0.6	2.0
Detector 1 Type		Cl+Ex			Cl+Ex			Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)		0.0			0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)		0.0			0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)		0.0			0.0		0.0	0.0		0.0	0.0	0.0
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type		NA			NA		Prot	NA		Prot	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases												6
Detector Phase		4			8		5	2		1	6	6
Switch Phase												
Minimum Initial (s)		10.0			10.0		5.0	10.0		5.0	10.0	10.0
Minimum Split (s)		37.3			37.3		11.1	34.8		11.1	34.8	34.8
Total Split (s)		45.0			45.0		15.0	35.0		15.0	35.0	35.0
Total Split (%)		47.4%			47.4%		15.8%	36.8%		15.8%	36.8%	36.8%
Maximum Green (s)		38.7			38.7		8.9	28.2		8.9	28.2	28.2
Yellow Time (s)		3.7			3.7		3.3	3.3		3.3	3.3	3.3
All-Red Time (s)		2.6			2.6		2.8	3.5		2.8	3.5	3.5

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lost Time Adjust (s)		0.0			0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)		6.3			6.3		6.1	6.8		6.1	6.8	6.8
Lead/Lag							Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)		3.0			3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode		Max			Max		None	C-Max		None	C-Max	C-Max
Walk Time (s)		7.0			7.0			7.0			7.0	7.0
Flash Dont Walk (s)		24.0			24.0			21.0			21.0	21.0
Pedestrian Calls (#/hr)		5			5			5			5	5
Act Effct Green (s)		38.7			38.7		5.9	31.2		8.3	40.6	40.6
Actuated g/C Ratio		0.41			0.41		0.06	0.33		0.09	0.43	0.43
v/c Ratio		0.98			0.58		0.05	0.84		0.60	0.69	0.30
Control Delay		49.2			23.4		42.6	38.6		58.9	26.5	7.3
Queue Delay		0.0			0.0		0.0	0.0		0.0	0.0	0.0
Total Delay		49.2			23.4		42.6	38.6		58.9	26.5	7.3
LOS		D			C		D	D		E	C	A
Approach Delay		49.2			23.4			38.6			25.5	
Approach LOS		D			C			D			C	
Queue Length 50th (m)		131.4			58.5		0.9	87.1		16.6	75.0	5.5
Queue Length 95th (m)		#182.5			77.7		4.6	#126.8		#35.0	#136.0	24.6
Internal Link Dist (m)		91.0			120.3			50.7			193.9	
Turn Bay Length (m)							10.0			135.0		50.0
Base Capacity (vph)		1365			1346		157	1082		157	1434	710
Starvation Cap Reductn		0			0		0	0		0	0	0
Spillback Cap Reductn		0			0		0	0		0	0	0
Storage Cap Reductn		0			0		0	0		0	0	0
Reduced v/c Ratio		0.98			0.58		0.03	0.84		0.56	0.69	0.30

Intersection Summary			
Area Type:	Other		
Cycle Length: 95			
Actuated Cycle Length: 95			
Offset: 31 (33%), Referenced to phase 2:NBT and 6:SBT, Start of Green			
Natural Cycle: 85			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.98			
Intersection Signal Delay: 35.2		Intersection LOS: D	
Intersection Capacity Utilization 82.6%		ICU Level of Service E	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

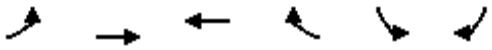
Splits and Phases: 1: Booth Street & Sir John A MacDonald Parkway/Wellington Street

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	1147	13	9	792	26	34
Future Volume (vph)	1147	13	9	792	26	34
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)		0.0	60.0		0.0	0.0
Storage Lanes		0	1		1	0
Taper Length (m)			30.0		30.0	
Lane Util. Factor	0.95	0.95	1.00	0.95	1.00	1.00
Ped Bike Factor	1.00		1.00		0.99	
Frt	0.998				0.923	
Flt Protected			0.950		0.979	
Satd. Flow (prot)	3344	0	1676	3353	1581	0
Flt Permitted			0.206		0.979	
Satd. Flow (perm)	3344	0	363	3353	1575	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)	2				37	
Link Speed (k/h)	50			50	50	
Link Distance (m)	144.3			270.2	146.6	
Travel Time (s)	10.4			19.5	10.6	
Confl. Peds. (#/hr)		6	6		6	2
Confl. Bikes (#/hr)		62				
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1247	14	10	861	28	37
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1261	0	10	861	65	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	7.2			7.2	3.6	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.07	1.07	1.07	1.07	1.07	1.07
Turning Speed (k/h)		15	25		25	15
Number of Detectors	2		1	2	1	
Detector Template	Thru		Left	Thru	Left	
Leading Detector (m)	10.0		2.0	10.0	2.0	
Trailing Detector (m)	0.0		0.0	0.0	0.0	
Detector 1 Position(m)	0.0		0.0	0.0	0.0	
Detector 1 Size(m)	0.6		2.0	0.6	2.0	
Detector 1 Type	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel						
Detector 1 Extend (s)	0.0		0.0	0.0	0.0	
Detector 1 Queue (s)	0.0		0.0	0.0	0.0	
Detector 1 Delay (s)	0.0		0.0	0.0	0.0	
Detector 2 Position(m)	9.4			9.4		
Detector 2 Size(m)	0.6			0.6		
Detector 2 Type	Cl+Ex			Cl+Ex		
Detector 2 Channel						
Detector 2 Extend (s)	0.0			0.0		
Turn Type	NA		Perm	NA	Prot	
Protected Phases	2			6	8	
Permitted Phases			6			
Detector Phase	2		6	6	8	
Switch Phase						
Minimum Initial (s)	10.0		10.0	10.0	5.0	
Minimum Split (s)	90.0		90.0	90.0	29.8	
Total Split (s)	90.0		90.0	90.0	30.0	
Total Split (%)	75.0%		75.0%	75.0%	25.0%	
Maximum Green (s)	84.4		84.4	84.4	24.2	
Yellow Time (s)	3.7		3.7	3.7	3.3	
All-Red Time (s)	1.9		1.9	1.9	2.5	

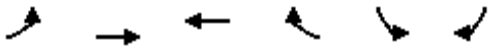
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	
Total Lost Time (s)	5.6		5.6	5.6	5.8	
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0		3.0	3.0	3.0	
Recall Mode	C-Max		C-Max	C-Max	None	
Walk Time (s)	15.0				7.0	
Flash Dont Walk (s)	17.0				17.0	
Pedestrian Calls (#/hr)	5				5	
Act Effct Green (s)	101.5		101.5	101.5	10.4	
Actuated g/C Ratio	0.85		0.85	0.85	0.09	
v/c Ratio	0.45		0.03	0.30	0.38	
Control Delay	4.3		4.0	3.4	30.7	
Queue Delay	0.6		0.0	0.0	0.0	
Total Delay	4.9		4.0	3.4	30.7	
LOS	A		A	A	C	
Approach Delay	4.9			3.4	30.7	
Approach LOS	A			A	C	
Queue Length 50th (m)	30.6		0.3	17.6	6.7	
Queue Length 95th (m)	85.0		2.5	49.9	18.4	
Internal Link Dist (m)	120.3			246.2	122.6	
Turn Bay Length (m)			60.0			
Base Capacity (vph)	2829		307	2837	348	
Starvation Cap Reductn	1061		0	0	0	
Spillback Cap Reductn	0		0	0	0	
Storage Cap Reductn	0		0	0	0	
Reduced v/c Ratio	0.71		0.03	0.30	0.19	

Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 109 (91%), Referenced to phase 2:EBT and 6:WBTL, Start of Green			
Natural Cycle: 120			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.45			
Intersection Signal Delay: 5.1		Intersection LOS: A	
Intersection Capacity Utilization 48.6%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 2: Lett Street & Wellington Street



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR	Ø3
Lane Configurations							
Traffic Volume (vph)	652	942	263	743	1962	309	
Future Volume (vph)	652	942	263	743	1962	309	
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	
Storage Length (m)	135.0			115.0	0.0	35.0	
Storage Lanes	2			3	3	1	
Taper Length (m)	30.0				30.0		
Lane Util. Factor	0.97	0.91	0.95	0.76	0.94	1.00	
Ped Bike Factor	1.00				0.99	0.98	
Frt				0.850		0.850	
Flt Protected	0.950				0.950		
Satd. Flow (prot)	3252	4818	3353	3420	4728	1500	
Flt Permitted	0.950				0.950		
Satd. Flow (perm)	3236	4818	3353	3420	4690	1475	
Right Turn on Red				Yes		Yes	
Satd. Flow (RTOR)				21		111	
Link Speed (k/h)		50	50		50		
Link Distance (m)		270.2	257.1		139.6		
Travel Time (s)		19.5	18.5		10.1		
Confl. Peds. (#/hr)	4			4	5	5	
Confl. Bikes (#/hr)				38			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	
Adj. Flow (vph)	709	1024	286	808	2133	336	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	709	1024	286	808	2133	336	
Enter Blocked Intersection	No	No	No	No	No	No	
Lane Alignment	Left	Left	Left	Right	Left	Right	
Median Width(m)		7.2	7.2		10.8		
Link Offset(m)		0.0	0.0		0.0		
Crosswalk Width(m)		4.8	4.8		4.8		
Two way Left Turn Lane							
Headway Factor	1.07	1.07	1.07	1.07	1.07	1.07	
Turning Speed (k/h)	25			15	25	15	
Number of Detectors	1	2	2	1	1	0	
Detector Template	Left	Thru	Thru	Right	Left		
Leading Detector (m)	2.0	10.0	10.0	2.0	2.0	0.0	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	2.0	0.6	0.6	2.0	2.0	0.0	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		
Detector 1 Channel							
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(m)		9.4	9.4				
Detector 2 Size(m)		0.6	0.6				
Detector 2 Type		Cl+Ex	Cl+Ex				
Detector 2 Channel							
Detector 2 Extend (s)		0.0	0.0				
Turn Type	Prot	NA	NA	custom	Prot	Perm	
Protected Phases	5	2	6	6 4 3	4		3
Permitted Phases		2				4	
Detector Phase	5	2	6	6 4 3	4	4	
Switch Phase							
Minimum Initial (s)	5.0	10.0	10.0		5.0	5.0	4.0
Minimum Split (s)	31.0	42.4	26.4		44.1	44.1	8.0
Total Split (s)	31.0	58.4	27.4		51.1	51.1	13.1
Total Split (%)	25.3%	47.6%	22.3%		41.7%	41.7%	11%
Maximum Green (s)	25.0	52.0	21.0		45.0	45.0	9.1
Yellow Time (s)	3.7	3.7	3.7		3.7	3.7	3.5
All-Red Time (s)	2.3	2.7	2.7		2.4	2.4	0.5



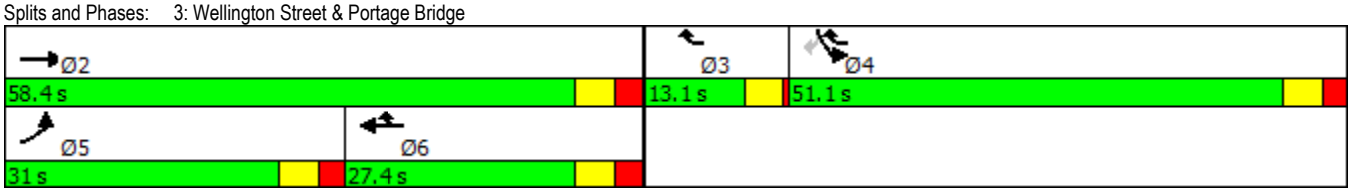
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR	Ø3
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.4	6.4		6.1	6.1	
Lead/Lag	Lead		Lag		Lag	Lag	Lead
Lead-Lag Optimize?	Yes		Yes		Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0	3.0
Recall Mode	None	Max	None		None	None	None
Walk Time (s)	13.0		7.0		26.0	26.0	
Flash Dont Walk (s)	12.0		13.0		12.0	12.0	
Pedestrian Calls (#/hr)	0		0		0	0	
Act Effct Green (s)	25.0	52.0	21.0	84.1	45.0	45.0	
Actuated g/C Ratio	0.21	0.43	0.17	0.69	0.37	0.37	
v/c Ratio	1.06	0.50	0.49	0.34	1.22	0.55	
Control Delay	98.2	26.4	48.9	7.8	138.2	23.6	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	98.2	26.4	48.9	7.8	138.2	23.6	
LOS	F	C	D	A	F	C	
Approach Delay		55.7	18.5		122.6		
Approach LOS		E	B		F		
Queue Length 50th (m)	~101.4	67.6	34.6	31.4	~234.2	43.9	
Queue Length 95th (m)	#141.1	82.0	49.7	39.5	#266.1	75.2	
Internal Link Dist (m)		246.2	233.1		115.6		
Turn Bay Length (m)	135.0			115.0		35.0	
Base Capacity (vph)	669	2062	579	2261	1751	616	
Starvation Cap Reductn	0	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	0	
Reduced v/c Ratio	1.06	0.50	0.49	0.36	1.22	0.55	

Intersection Summary			
Area Type:	Other		
Cycle Length: 122.6			
Actuated Cycle Length: 121.5			
Natural Cycle: 140			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 1.22			
Intersection Signal Delay: 79.2		Intersection LOS: E	
Intersection Capacity Utilization 83.8%		ICU Level of Service E	
Analysis Period (min) 15			

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

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

Splits and Phases: 3: Wellington Street & Portage Bridge



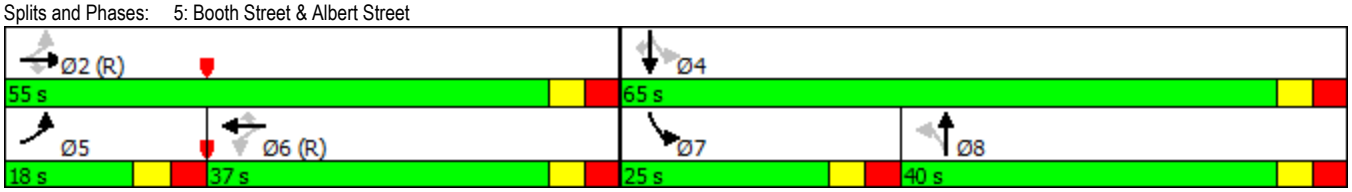
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	324	704	17	7	244	138	6	482	30	174	496	428
Future Volume (vph)	324	704	17	7	244	138	6	482	30	174	496	428
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0		50.0	0.0		50.0	0.0		0.0	100.0		0.0
Storage Lanes	1		1	1		1	0		0	1		1
Taper Length (m)	30.0			30.0			30.0			30.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	1.00	0.95	0.95	0.95	1.00	1.00	1.00
Ped Bike Factor	0.95		0.93	0.99		0.91		0.99		0.94		0.89
Frt			0.850			0.850		0.991				0.850
Flt Protected	0.950			0.950				0.999		0.950		
Satd. Flow (prot)	1676	1765	1500	1676	3353	1500	0	3279	0	1676	1765	1500
Flt Permitted	0.487			0.207				0.946		0.206		
Satd. Flow (perm)	818	1765	1399	362	3353	1364	0	3103	0	341	1765	1340
Right Turn on Red			Yes			No			Yes			No
Satd. Flow (RTOR)			91					5				
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		167.4			213.1			205.5			334.4	
Travel Time (s)		12.1			15.3			14.8			24.1	
Confl. Peds. (#/hr)	67		24	24		67	75		90	90		75
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	352	765	18	8	265	150	7	524	33	189	539	465
Shared Lane Traffic (%)												
Lane Group Flow (vph)	352	765	18	8	265	150	0	564	0	189	539	465
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2	0	1	2	0	1	2		1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (m)	2.0	10.0	0.0	2.0	10.0	0.0	2.0	10.0		2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6	0.0	2.0	0.6	0.0	2.0	0.6		2.0	0.6	2.0
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	NA	Perm	Perm	NA	Perm	Perm	NA		pm+pt	NA	Perm
Protected Phases	5	2			6			8		7	4	
Permitted Phases	2		2	6		6	8			4		4
Detector Phase	5	2	2	6	6	6	8	8		7	4	4
Switch Phase												
Minimum Initial (s)	5.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0		5.0	10.0	10.0
Minimum Split (s)	11.5	36.5	36.5	36.5	36.5	36.5	36.5	36.5		11.5	36.5	36.5
Total Split (s)	18.0	55.0	55.0	37.0	37.0	37.0	40.0	40.0		25.0	65.0	65.0
Total Split (%)	15.0%	45.8%	45.8%	30.8%	30.8%	30.8%	33.3%	33.3%		20.8%	54.2%	54.2%
Maximum Green (s)	11.5	48.5	48.5	30.5	30.5	30.5	33.5	33.5		18.5	58.5	58.5
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3		3.3	3.3	3.3
All-Red Time (s)	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2		3.2	3.2	3.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0		0.0		0.0	0.0	0.0

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Lost Time (s)	6.5	6.5	6.5	6.5	6.5	6.5		6.5		6.5	6.5	6.5
Lead/Lag	Lead			Lag	Lag	Lag	Lag	Lag		Lead		
Lead-Lag Optimize?	Yes			Yes	Yes	Yes	Yes	Yes		Yes		
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Recall Mode	None	C-Max	C-Max	C-Max	C-Max	C-Max	None	None		None	None	None
Walk Time (s)		7.0	7.0	7.0	7.0	7.0	7.0	7.0			7.0	7.0
Flash Dont Walk (s)		23.0	23.0	23.0	23.0	23.0	21.0	21.0			21.0	21.0
Pedestrian Calls (#/hr)		5	5	5	5	5	5	5			5	5
Act Effct Green (s)	58.4	58.4	58.4	35.1	35.1	35.1		27.7		48.6	48.6	48.6
Actuated g/C Ratio	0.49	0.49	0.49	0.29	0.29	0.29		0.23		0.40	0.40	0.40
v/c Ratio	0.68	0.89	0.02	0.08	0.27	0.38		0.78		0.63	0.75	0.86
Control Delay	31.4	43.9	0.1	36.9	35.1	39.2		50.6		32.5	37.0	47.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0		0.0		0.0	0.0	0.0
Total Delay	31.4	43.9	0.1	36.9	35.1	39.2		50.6		32.5	37.0	47.8
LOS	C	D	A	D	D	D		D		C	D	D
Approach Delay		39.3			36.6			50.6			40.5	
Approach LOS		D			D			D			D	
Queue Length 50th (m)	55.2	167.4	0.0	1.5	28.1	31.3		68.9		30.9	112.7	103.3
Queue Length 95th (m)	#113.8	#286.9	0.0	6.1	40.7	52.4		84.1		41.8	134.2	131.3
Internal Link Dist (m)		143.4			189.1			181.5			310.4	
Turn Bay Length (m)			50.0			50.0				100.0		
Base Capacity (vph)	517	858	727	106	981	398		871		344	860	653
Starvation Cap Reductn	0	0	0	0	0	0		0		0	0	0
Spillback Cap Reductn	0	0	0	0	0	0		0		0	0	0
Storage Cap Reductn	0	0	0	0	0	0		0		0	0	0
Reduced v/c Ratio	0.68	0.89	0.02	0.08	0.27	0.38		0.65		0.55	0.63	0.71

Intersection Summary

Area Type: Other
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green, Master Intersection
Natural Cycle: 100
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.89
Intersection Signal Delay: 41.3 Intersection LOS: D
Intersection Capacity Utilization 119.6% ICU Level of Service H
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 5: Booth Street & Albert Street



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	0	9	826	10	0	908
Future Volume (Veh/h)	0	9	826	10	0	908
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	10	898	11	0	987
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)			334			75
pX, platoon unblocked	0.79	0.90			0.90	
vC, conflicting volume	1397	454			909	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	401	169			674	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	99			100	
cM capacity (veh/h)	457	760			821	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	10	599	310	494	494
Volume Left	0	0	0	0	0
Volume Right	10	0	11	0	0
cSH	760	1700	1700	1700	1700
Volume to Capacity	0.01	0.35	0.18	0.29	0.29
Queue Length 95th (m)	0.3	0.0	0.0	0.0	0.0
Control Delay (s)	9.8	0.0	0.0	0.0	0.0
Lane LOS	A				
Approach Delay (s)	9.8	0.0		0.0	
Approach LOS	A				

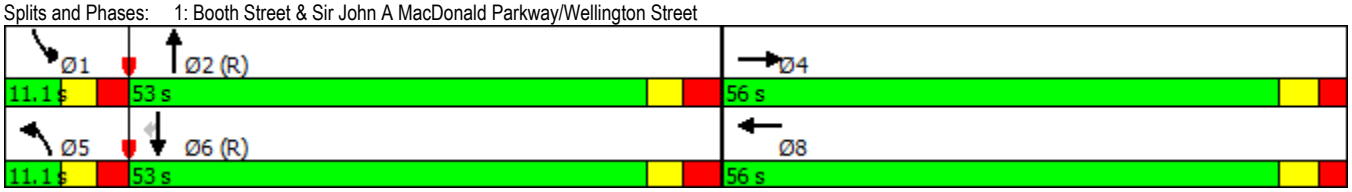
Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	34.4%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	840	0	0	1239	53	5	842	168	34	531	173
Future Volume (vph)	0	840	0	0	1239	53	5	842	168	34	531	173
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0		0.0	0.0		0.0	10.0		0.0	135.0		50.0
Storage Lanes	0		0	0		0	1		0	1		1
Taper Length (m)	30.0			30.0			30.0			30.0		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	1.00
Ped Bike Factor					1.00		1.00	1.00		1.00		0.97
Frt					0.994			0.975				0.850
Flt Protected							0.950			0.950		
Satd. Flow (prot)	0	3353	0	0	3329	0	1676	3254	0	1676	3353	1500
Flt Permitted							0.950			0.950		
Satd. Flow (perm)	0	3353	0	0	3329	0	1672	3254	0	1672	3353	1455
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					4			23				96
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		115.0			144.3			74.7			217.9	
Travel Time (s)		8.3			10.4			5.4			15.7	
Confl. Peds. (#/hr)	9		3	3		9	5		10	10		5
Confl. Bikes (#/hr)			7			8			6			20
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	913	0	0	1347	58	5	915	183	37	577	188
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	913	0	0	1405	0	5	1098	0	37	577	188
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors		2			2		0	2		1	2	1
Detector Template		Thru			Thru			Thru		Left	Thru	Right
Leading Detector (m)		10.0			10.0		0.0	10.0		2.0	10.0	2.0
Trailing Detector (m)		0.0			0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Position(m)		0.0			0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Size(m)		0.6			0.6		0.0	0.6		2.0	0.6	2.0
Detector 1 Type		Cl+Ex			Cl+Ex			Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)		0.0			0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)		0.0			0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)		0.0			0.0		0.0	0.0		0.0	0.0	0.0
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type		NA			NA		Prot	NA		Prot	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases												6
Detector Phase		4			8		5	2		1	6	6
Switch Phase												
Minimum Initial (s)		10.0			10.0		5.0	10.0		5.0	10.0	10.0
Minimum Split (s)		37.3			37.3		11.1	37.8		11.1	37.8	37.8
Total Split (s)		56.0			56.0		11.1	53.0		11.1	53.0	53.0
Total Split (%)		46.6%			46.6%		9.2%	44.1%		9.2%	44.1%	44.1%
Maximum Green (s)		49.7			49.7		5.0	46.2		5.0	46.2	46.2
Yellow Time (s)		3.7			3.7		3.3	3.3		3.3	3.3	3.3
All-Red Time (s)		2.6			2.6		2.8	3.5		2.8	3.5	3.5

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lost Time Adjust (s)		0.0			0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)		6.3			6.3		6.1	6.8		6.1	6.8	6.8
Lead/Lag							Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)		3.0			3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode		None			None		None	C-Max		None	C-Max	C-Max
Walk Time (s)		7.0			7.0			7.0			7.0	7.0
Flash Dont Walk (s)		24.0			24.0			21.0			21.0	21.0
Pedestrian Calls (#/hr)		5			5			5			5	5
Act Effct Green (s)		49.7			49.7		5.0	48.4		5.0	55.1	55.1
Actuated g/C Ratio		0.41			0.41		0.04	0.40		0.04	0.46	0.46
v/c Ratio		0.66			1.02		0.07	0.83		0.54	0.38	0.26
Control Delay		31.2			64.2		57.6	38.7		83.8	22.8	11.4
Queue Delay		0.0			31.5		0.0	0.0		0.0	0.0	0.0
Total Delay		31.2			95.7		57.6	38.7		83.8	22.8	11.4
LOS		C			F		E	D		F	C	B
Approach Delay		31.2			95.7			38.7			23.0	
Approach LOS		C			F			D			C	
Queue Length 50th (m)		94.5			~194.0		1.2	128.6		9.2	46.3	12.4
Queue Length 95th (m)		117.8			#239.3		5.7	159.3		#24.8	72.0	32.8
Internal Link Dist (m)		91.0			120.3			50.7			193.9	
Turn Bay Length (m)							10.0			135.0		50.0
Base Capacity (vph)		1387			1379		69	1325		69	1537	719
Starvation Cap Reductn		0			264		0	0		0	0	0
Spillback Cap Reductn		0			0		0	0		0	0	0
Storage Cap Reductn		0			0		0	0		0	0	0
Reduced v/c Ratio		0.66			1.26		0.07	0.83		0.54	0.38	0.26

Intersection Summary			
Area Type:	Other		
Cycle Length: 120.1			
Actuated Cycle Length: 120.1			
Offset: 3 (2%), Referenced to phase 2:NBT and 6:SBT, Start of Green			
Natural Cycle: 100			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 1.02			
Intersection Signal Delay: 53.1		Intersection LOS: D	
Intersection Capacity Utilization 81.5%		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: 1: Booth Street & Sir John A MacDonald Parkway/Wellington Street

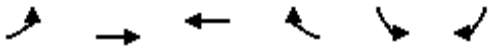


Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	937	26	27	1164	30	26
Future Volume (vph)	937	26	27	1164	30	26
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)		0.0	60.0		0.0	0.0
Storage Lanes		0	1		1	0
Taper Length (m)			30.0		30.0	
Lane Util. Factor	0.95	0.95	1.00	0.95	1.00	1.00
Ped Bike Factor	1.00		0.99		0.99	
Frt	0.996				0.938	
Flt Protected			0.950		0.974	
Satd. Flow (prot)	3335	0	1676	3353	1598	0
Flt Permitted			0.264		0.974	
Satd. Flow (perm)	3335	0	463	3353	1597	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)	5				28	
Link Speed (k/h)	50			50	50	
Link Distance (m)	144.3			270.2	146.6	
Travel Time (s)	10.4			19.5	10.6	
Confl. Peds. (#/hr)		18	18		1	5
Confl. Bikes (#/hr)		4				
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1018	28	29	1265	33	28
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1046	0	29	1265	61	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	7.2			7.2	3.6	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.07	1.07	1.07	1.07	1.07	1.07
Turning Speed (k/h)		15	25		25	15
Number of Detectors	2		1	2	1	
Detector Template	Thru		Left	Thru	Left	
Leading Detector (m)	10.0		2.0	10.0	2.0	
Trailing Detector (m)	0.0		0.0	0.0	0.0	
Detector 1 Position(m)	0.0		0.0	0.0	0.0	
Detector 1 Size(m)	0.6		2.0	0.6	2.0	
Detector 1 Type	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel						
Detector 1 Extend (s)	0.0		0.0	0.0	0.0	
Detector 1 Queue (s)	0.0		0.0	0.0	0.0	
Detector 1 Delay (s)	0.0		0.0	0.0	0.0	
Detector 2 Position(m)	9.4			9.4		
Detector 2 Size(m)	0.6			0.6		
Detector 2 Type	Cl+Ex			Cl+Ex		
Detector 2 Channel						
Detector 2 Extend (s)	0.0			0.0		
Turn Type	NA		Perm	NA	Prot	
Protected Phases	2			6	8	
Permitted Phases			6			
Detector Phase	2		6	6	8	
Switch Phase						
Minimum Initial (s)	10.0		10.0	10.0	5.0	
Minimum Split (s)	37.6		27.6	27.6	29.8	
Total Split (s)	90.0		90.0	90.0	30.0	
Total Split (%)	75.0%		75.0%	75.0%	25.0%	
Maximum Green (s)	84.4		84.4	84.4	24.2	
Yellow Time (s)	3.7		3.7	3.7	3.3	
All-Red Time (s)	1.9		1.9	1.9	2.5	

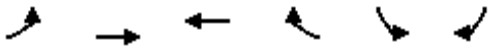
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	
Total Lost Time (s)	5.6		5.6	5.6	5.8	
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0		3.0	3.0	3.0	
Recall Mode	C-Max		C-Max	C-Max	None	
Walk Time (s)	15.0				7.0	
Flash Dont Walk (s)	17.0				17.0	
Pedestrian Calls (#/hr)	5				5	
Act Effct Green (s)	101.3		101.3	101.3	10.7	
Actuated g/C Ratio	0.84		0.84	0.84	0.09	
v/c Ratio	0.37		0.07	0.45	0.37	
Control Delay	3.8		4.0	4.3	35.0	
Queue Delay	0.5		0.0	0.0	0.0	
Total Delay	4.3		4.0	4.3	35.0	
LOS	A		A	A	D	
Approach Delay	4.3			4.3	35.0	
Approach LOS	A			A	D	
Queue Length 50th (m)	23.5		0.9	31.5	8.0	
Queue Length 95th (m)	64.4		5.4	85.5	19.1	
Internal Link Dist (m)	120.3			246.2	122.6	
Turn Bay Length (m)			60.0			
Base Capacity (vph)	2816		390	2831	344	
Starvation Cap Reductn	1167		0	0	0	
Spillback Cap Reductn	0		0	0	0	
Storage Cap Reductn	0		0	0	0	
Reduced v/c Ratio	0.63		0.07	0.45	0.18	

Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 1 (1%), Referenced to phase 2:EBT and 6:WBTL, Start of Green			
Natural Cycle: 70			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.45			
Intersection Signal Delay: 5.1		Intersection LOS: A	
Intersection Capacity Utilization 50.1%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 2: Lett Street & Wellington Street



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	975	323	579	1105	852	449
Future Volume (vph)	975	323	579	1105	852	449
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	135.0			115.0	0.0	35.0
Storage Lanes	2			3	3	1
Taper Length (m)	30.0				30.0	
Lane Util. Factor	0.97	0.91	0.95	0.76	0.94	1.00
Ped Bike Factor	0.99				0.95	
Frt				0.850		0.850
Flt Protected	0.950				0.950	
Satd. Flow (prot)	3252	4818	3353	3420	4728	1500
Flt Permitted	0.950				0.950	
Satd. Flow (perm)	3227	4818	3353	3420	4479	1500
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)				7		376
Link Speed (k/h)		50	50		50	
Link Distance (m)		270.2	257.1		139.6	
Travel Time (s)		19.5	18.5		10.1	
Confl. Peds. (#/hr)	11			11	33	
Confl. Bikes (#/hr)				1		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1060	351	629	1201	926	488
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1060	351	629	1201	926	488
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		7.2	7.2		10.8	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.8	4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.07	1.07	1.07	1.07	1.07	1.07
Turning Speed (k/h)	25			15	25	15
Number of Detectors	1	2	2	1	1	0
Detector Template	Left	Thru	Thru	Right	Left	
Leading Detector (m)	2.0	10.0	10.0	2.0	2.0	0.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6	0.6	2.0	2.0	0.0
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		9.4	9.4			
Detector 2 Size(m)		0.6	0.6			
Detector 2 Type		Cl+Ex	Cl+Ex			
Detector 2 Channel						
Detector 2 Extend (s)		0.0	0.0			
Turn Type	Prot	NA	NA	pt+ov	Prot	Perm
Protected Phases	5	2	6	6 4	4	
Permitted Phases		2				4
Detector Phase	5	2	6	6 4	4	4
Switch Phase						
Minimum Initial (s)	5.0	10.0	10.0		5.0	5.0
Minimum Split (s)	30.0	22.4	26.4		41.1	41.1
Total Split (s)	34.0	70.4	36.4		41.1	41.1
Total Split (%)	30.5%	63.1%	32.6%		36.9%	36.9%
Maximum Green (s)	28.0	64.0	30.0		35.0	35.0
Yellow Time (s)	3.7	3.7	3.7		3.7	3.7
All-Red Time (s)	2.3	2.7	2.7		2.4	2.4



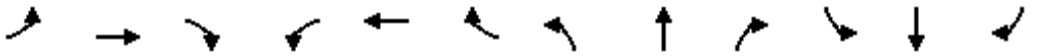
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	6.0	6.4	6.4		6.1	6.1
Lead/Lag	Lead		Lag			
Lead-Lag Optimize?	Yes		Yes			
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Recall Mode	None	Max	None		None	None
Walk Time (s)	12.0		7.0		23.0	23.0
Flash Dont Walk (s)	12.0		13.0		12.0	12.0
Pedestrian Calls (#/hr)	0		0		0	0
Act Effct Green (s)	28.0	64.1	30.0	68.2	32.0	32.0
Actuated g/C Ratio	0.26	0.59	0.28	0.63	0.29	0.29
v/c Ratio	1.26	0.12	0.68	0.56	0.66	0.69
Control Delay	163.5	10.4	39.9	12.7	36.1	13.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	163.5	10.4	39.9	12.7	36.1	13.5
LOS	F	B	D	B	D	B
Approach Delay		125.4	22.0		28.3	
Approach LOS		F	C		C	
Queue Length 50th (m)	~160.5	12.7	68.3	61.7	64.0	19.0
Queue Length 95th (m)	#201.9	17.7	89.2	76.4	78.5	58.2
Internal Link Dist (m)		246.2	233.1		115.6	
Turn Bay Length (m)	135.0			115.0		35.0
Base Capacity (vph)	839	2841	927	2243	1525	738
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	1.26	0.12	0.68	0.54	0.61	0.66

Intersection Summary			
Area Type:	Other		
Cycle Length: 111.5			
Actuated Cycle Length: 108.6			
Natural Cycle: 110			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 1.26			
Intersection Signal Delay: 55.3		Intersection LOS: E	
Intersection Capacity Utilization 78.8%		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: 3: Wellington Street & Portage Bridge



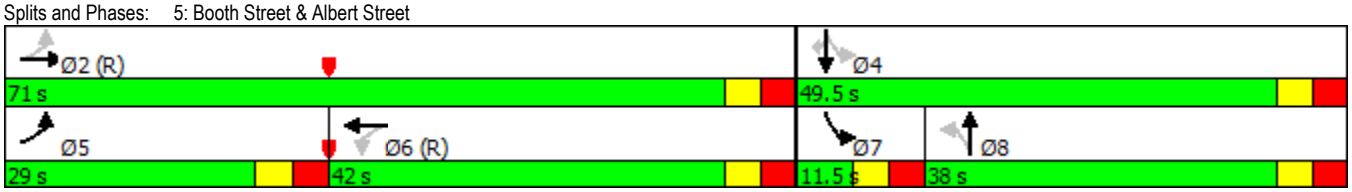
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	462	443	29	19	620	217	10	490	34	79	370	175
Future Volume (vph)	462	443	29	19	620	217	10	490	34	79	370	175
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0		0.0	0.0		50.0	0.0		0.0	100.0		0.0
Storage Lanes	1		0	1		0	0		0	1		1
Taper Length (m)	30.0			30.0			30.0			30.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	0.95	0.95	0.95	1.00	1.00	1.00
Ped Bike Factor		1.00		0.99	0.97			0.99		0.97		0.91
Frt		0.991			0.961			0.990				0.850
Flt Protected	0.950			0.950				0.999		0.950		
Satd. Flow (prot)	1676	3315	0	1676	3129	0	0	3291	0	1676	1765	1500
Flt Permitted	0.098			0.462				0.942		0.191		
Satd. Flow (perm)	173	3315	0	808	3129	0	0	3101	0	326	1765	1366
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		9			41			6				190
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		167.4			213.1			205.5			334.4	
Travel Time (s)		12.1			15.3			14.8			24.1	
Confl. Peds. (#/hr)	80		9	9		80	57		84	84		57
Confl. Bikes (#/hr)			2			8			2			9
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	502	482	32	21	674	236	11	533	37	86	402	190
Shared Lane Traffic (%)												
Lane Group Flow (vph)	502	514	0	21	910	0	0	581	0	86	402	190
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	2.0
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	NA		Perm	NA		Perm	NA		pm+pt	NA	Perm
Protected Phases	5	2			6			8		7	4	
Permitted Phases	2			6			8			4		4
Detector Phase	5	2		6	6		8	8		7	4	4
Switch Phase												
Minimum Initial (s)	5.0	10.0		10.0	10.0		10.0	10.0		5.0	10.0	10.0
Minimum Split (s)	11.5	36.5		36.5	36.5		36.5	36.5		11.5	36.5	36.5
Total Split (s)	29.0	71.0		42.0	42.0		38.0	38.0		11.5	49.5	49.5
Total Split (%)	24.1%	58.9%		34.9%	34.9%		31.5%	31.5%		9.5%	41.1%	41.1%
Maximum Green (s)	22.5	64.5		35.5	35.5		31.5	31.5		5.0	43.0	43.0
Yellow Time (s)	3.3	3.3		3.3	3.3		3.3	3.3		3.3	3.3	3.3
All-Red Time (s)	3.2	3.2		3.2	3.2		3.2	3.2		3.2	3.2	3.2

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0		0.0	0.0	0.0
Total Lost Time (s)	6.5	6.5		6.5	6.5			6.5		6.5	6.5	6.5
Lead/Lag	Lead			Lag	Lag		Lag	Lag		Lead		
Lead-Lag Optimize?	Yes			Yes	Yes		Yes	Yes		Yes		
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	C-Max		C-Max	C-Max		None	None		None	None	None
Walk Time (s)		7.0		7.0	7.0		7.0	7.0			7.0	7.0
Flash Dont Walk (s)		23.0		23.0	23.0		21.0	21.0			21.0	21.0
Pedestrian Calls (#/hr)		0		0	0		0	0			0	0
Act Effct Green (s)	70.8	70.8		35.5	35.5			27.5		36.7	36.7	36.7
Actuated g/C Ratio	0.59	0.59		0.29	0.29			0.23		0.30	0.30	0.30
v/c Ratio	1.09	0.26		0.09	0.96			0.82		0.55	0.75	0.35
Control Delay	102.9	13.3		32.2	60.8			53.5		43.3	46.3	5.6
Queue Delay	0.0	0.0		0.0	0.0			0.0		0.0	0.0	0.0
Total Delay	102.9	13.3		32.2	60.8			53.5		43.3	46.3	5.6
LOS	F	B		C	E			D		D	D	A
Approach Delay		57.5			60.2			53.5			34.5	
Approach LOS		E			E			D			C	
Queue Length 50th (m)	~133.5	32.0		3.8	112.8			71.9		15.2	87.3	0.0
Queue Length 95th (m)	#217.4	46.2		10.6	#156.6			89.8		26.6	118.5	15.9
Internal Link Dist (m)		143.4			189.1			181.5			310.4	
Turn Bay Length (m)										100.0		
Base Capacity (vph)	461	1951		238	950			815		155	629	609
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	1.09	0.26		0.09	0.96			0.71		0.55	0.64	0.31

Intersection Summary

Area Type: Other
Cycle Length: 120.5
Actuated Cycle Length: 120.5
Offset: 9 (7%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 140
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.09
Intersection Signal Delay: 52.7 Intersection LOS: D
Intersection Capacity Utilization 121.3% ICU Level of Service H
Analysis Period (min) 15
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

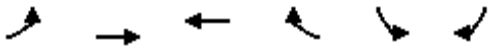
Splits and Phases: 5: Booth Street & Albert Street



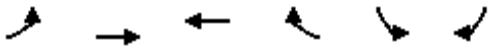
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	0	8	1002	9	0	531
Future Volume (Veh/h)	0	8	1002	9	0	531
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	9	1089	10	0	577
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)			334			75
pX, platoon unblocked	0.93	0.90			0.90	
vC, conflicting volume	1382	550			1099	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	786	279			889	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	99			100	
cM capacity (veh/h)	307	647			682	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	9	726	373	288	288
Volume Left	0	0	0	0	0
Volume Right	9	0	10	0	0
cSH	647	1700	1700	1700	1700
Volume to Capacity	0.01	0.43	0.22	0.17	0.17
Queue Length 95th (m)	0.3	0.0	0.0	0.0	0.0
Control Delay (s)	10.6	0.0	0.0	0.0	0.0
Lane LOS	B				
Approach Delay (s)	10.6	0.0		0.0	
Approach LOS	B				

Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	39.5%	ICU Level of Service	A
Analysis Period (min)	15		



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR	Ø3
Lane Configurations							
Traffic Volume (vph)	652	942	263	743	1962	309	
Future Volume (vph)	652	942	263	743	1962	309	
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	
Storage Length (m)	135.0			115.0	0.0	35.0	
Storage Lanes	2			3	3	1	
Taper Length (m)	30.0				30.0		
Lane Util. Factor	0.97	0.91	0.95	0.76	0.94	1.00	
Ped Bike Factor	0.99				0.99	0.98	
Frt				0.850		0.850	
Flt Protected	0.950				0.950		
Satd. Flow (prot)	3252	4818	3353	3420	4728	1500	
Flt Permitted	0.950				0.950		
Satd. Flow (perm)	3235	4818	3353	3420	4687	1474	
Right Turn on Red				Yes		Yes	
Satd. Flow (RTOR)				25		116	
Link Speed (k/h)		50	50		50		
Link Distance (m)		270.2	257.1		139.6		
Travel Time (s)		19.5	18.5		10.1		
Confl. Peds. (#/hr)	4			4	5	5	
Confl. Bikes (#/hr)				38			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	
Adj. Flow (vph)	709	1024	286	808	2133	336	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	709	1024	286	808	2133	336	
Enter Blocked Intersection	No	No	No	No	No	No	
Lane Alignment	Left	Left	Left	Right	Left	Right	
Median Width(m)		7.2	7.2		10.8		
Link Offset(m)		0.0	0.0		0.0		
Crosswalk Width(m)		4.8	4.8		4.8		
Two way Left Turn Lane							
Headway Factor	1.07	1.07	1.07	1.07	1.07	1.07	
Turning Speed (k/h)	25			15	25	15	
Number of Detectors	1	2	2	1	1	0	
Detector Template	Left	Thru	Thru	Right	Left		
Leading Detector (m)	2.0	10.0	10.0	2.0	2.0	0.0	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	2.0	0.6	0.6	2.0	2.0	0.0	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		
Detector 1 Channel							
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(m)		9.4	9.4				
Detector 2 Size(m)		0.6	0.6				
Detector 2 Type		Cl+Ex	Cl+Ex				
Detector 2 Channel							
Detector 2 Extend (s)		0.0	0.0				
Turn Type	Prot	NA	NA	custom	Prot	Perm	
Protected Phases	5	2	6	6 4 3	4		3
Permitted Phases		2				4	
Detector Phase	5	2	6	6 4 3	4	4	
Switch Phase							
Minimum Initial (s)	5.0	10.0	10.0		5.0	5.0	4.0
Minimum Split (s)	31.0	42.4	26.4		44.1	44.1	8.0
Total Split (s)	33.6	60.0	26.4		62.0	62.0	8.0
Total Split (%)	25.8%	46.2%	20.3%		47.7%	47.7%	6%
Maximum Green (s)	27.6	53.6	20.0		55.9	55.9	4.0
Yellow Time (s)	3.7	3.7	3.7		3.7	3.7	3.5
All-Red Time (s)	2.3	2.7	2.7		2.4	2.4	0.5



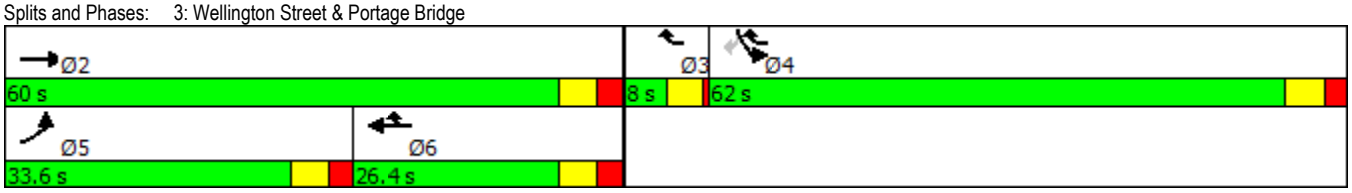
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR	Ø3
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.4	6.4		6.1	6.1	
Lead/Lag	Lead		Lag		Lag	Lag	Lead
Lead-Lag Optimize?	Yes		Yes		Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0	3.0
Recall Mode	None	Max	None		None	None	None
Walk Time (s)	13.0		7.0		26.0	26.0	
Flash Dont Walk (s)	12.0		13.0		12.0	12.0	
Pedestrian Calls (#/hr)	0		0		0	0	
Act Effct Green (s)	27.6	53.6	20.0	90.0	55.9	55.9	
Actuated g/C Ratio	0.21	0.41	0.15	0.69	0.43	0.43	
v/c Ratio	1.03	0.52	0.56	0.34	1.05	0.48	
Control Delay	91.4	29.7	55.5	8.2	70.6	19.4	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	91.4	29.7	55.5	8.2	70.6	19.4	
LOS	F	C	E	A	E	B	
Approach Delay		54.9	20.6		63.7		
Approach LOS		D	C		E		
Queue Length 50th (m)	~105.0	74.5	38.0	33.8	~221.8	41.1	
Queue Length 95th (m)	#144.3	88.6	53.5	42.1	#250.9	69.4	
Internal Link Dist (m)		246.2	233.1		115.6		
Turn Bay Length (m)	135.0			115.0		35.0	
Base Capacity (vph)	690	1986	515	2375	2033	699	
Starvation Cap Reductn	0	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	0	
Reduced v/c Ratio	1.03	0.52	0.56	0.34	1.05	0.48	

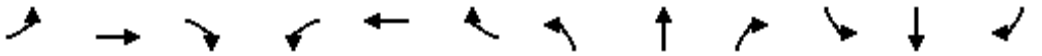
Intersection Summary			
Area Type:	Other		
Cycle Length: 130			
Actuated Cycle Length: 130			
Natural Cycle: 140			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 1.05			
Intersection Signal Delay: 51.9		Intersection LOS: D	
Intersection Capacity Utilization 83.8%		ICU Level of Service E	
Analysis Period (min) 15			

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

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

Splits and Phases: 3: Wellington Street & Portage Bridge



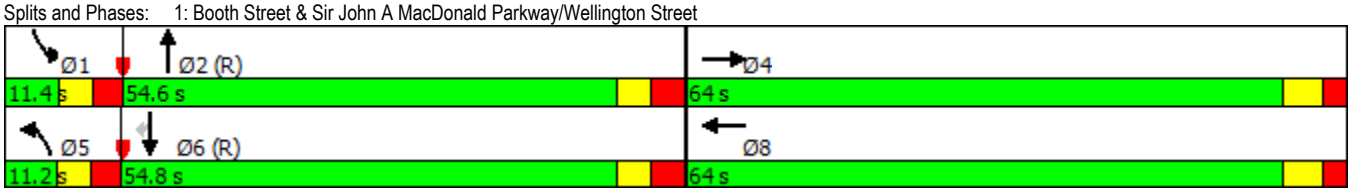


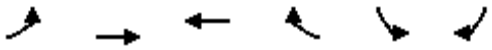
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	840	0	0	1239	53	5	842	168	34	531	173
Future Volume (vph)	0	840	0	0	1239	53	5	842	168	34	531	173
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0		0.0	0.0		0.0	10.0		0.0	135.0		50.0
Storage Lanes	0		0	0		0	1		0	1		1
Taper Length (m)	30.0			30.0			30.0			30.0		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	1.00
Ped Bike Factor					1.00		1.00	1.00		1.00		0.97
Frt					0.994			0.975				0.850
Flt Protected							0.950			0.950		
Satd. Flow (prot)	0	3353	0	0	3329	0	1676	3253	0	1676	3353	1500
Flt Permitted							0.950			0.950		
Satd. Flow (perm)	0	3353	0	0	3329	0	1671	3253	0	1671	3353	1454
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					4			20				90
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		115.0			144.3			74.7			217.9	
Travel Time (s)		8.3			10.4			5.4			15.7	
Confl. Peds. (#/hr)	9		3	3		9	5		10	10		5
Confl. Bikes (#/hr)			7			8			6			20
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	913	0	0	1347	58	5	915	183	37	577	188
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	913	0	0	1405	0	5	1098	0	37	577	188
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors		2			2		0	2		1	2	1
Detector Template		Thru			Thru			Thru		Left	Thru	Right
Leading Detector (m)		10.0			10.0		0.0	10.0		2.0	10.0	2.0
Trailing Detector (m)		0.0			0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Position(m)		0.0			0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Size(m)		0.6			0.6		0.0	0.6		2.0	0.6	2.0
Detector 1 Type		Cl+Ex			Cl+Ex			Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)		0.0			0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)		0.0			0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)		0.0			0.0		0.0	0.0		0.0	0.0	0.0
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type		NA			NA		Prot	NA		Prot	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases												6
Detector Phase		4			8		5	2		1	6	6
Switch Phase												
Minimum Initial (s)		10.0			10.0		5.0	10.0		5.0	10.0	10.0
Minimum Split (s)		37.3			37.3		11.1	37.8		11.1	37.8	37.8
Total Split (s)		64.0			64.0		11.2	54.6		11.4	54.8	54.8
Total Split (%)		49.2%			49.2%		8.6%	42.0%		8.8%	42.2%	42.2%
Maximum Green (s)		57.7			57.7		5.1	47.8		5.3	48.0	48.0
Yellow Time (s)		3.7			3.7		3.3	3.3		3.3	3.3	3.3
All-Red Time (s)		2.6			2.6		2.8	3.5		2.8	3.5	3.5

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lost Time Adjust (s)		0.0			0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)		6.3			6.3		6.1	6.8		6.1	6.8	6.8
Lead/Lag							Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)		3.0			3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode		None			None		None	C-Max		None	C-Max	C-Max
Walk Time (s)		7.0			7.0			7.0			7.0	7.0
Flash Dont Walk (s)		24.0			24.0			21.0			21.0	21.0
Pedestrian Calls (#/hr)		5			5			5			5	5
Act Effct Green (s)		57.2			57.2		5.2	50.6		5.4	57.5	57.5
Actuated g/C Ratio		0.44			0.44		0.04	0.39		0.04	0.44	0.44
v/c Ratio		0.62			0.96		0.08	0.86		0.54	0.39	0.27
Control Delay		30.2			50.9		65.8	38.6		88.6	26.2	13.7
Queue Delay		0.0			44.2		0.0	0.0		0.0	0.0	0.0
Total Delay		30.2			95.2		65.8	38.6		88.6	26.2	13.7
LOS		C			F		E	D		F	C	B
Approach Delay		30.2			95.2			38.7			26.1	
Approach LOS		C			F			D			C	
Queue Length 50th (m)		97.3			188.0		1.4	151.1		10.0	52.8	15.1
Queue Length 95th (m)		119.9			#240.6		m1.6	m162.6		#26.3	79.6	37.3
Internal Link Dist (m)		91.0			120.3			50.7			193.9	
Turn Bay Length (m)							10.0			135.0		50.0
Base Capacity (vph)		1488			1479		66	1278		69	1482	693
Starvation Cap Reductn		0			358		0	0		0	0	0
Spillback Cap Reductn		0			0		0	0		0	0	0
Storage Cap Reductn		0			0		0	0		0	0	0
Reduced v/c Ratio		0.61			1.25		0.08	0.86		0.54	0.39	0.27

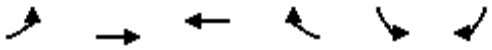
Intersection Summary			
Area Type:	Other		
Cycle Length: 130			
Actuated Cycle Length: 130			
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green			
Natural Cycle: 100			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.96			
Intersection Signal Delay: 53.3		Intersection LOS: D	
Intersection Capacity Utilization 81.5%		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.			
m Volume for 95th percentile queue is metered by upstream signal.			

Splits and Phases: 1: Booth Street & Sir John A MacDonald Parkway/Wellington Street





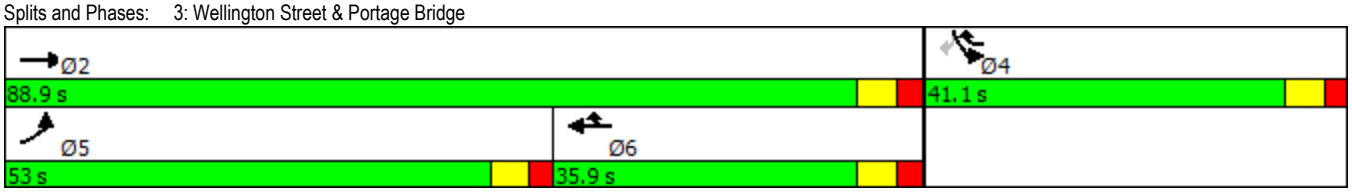
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	975	323	579	1105	852	449
Future Volume (vph)	975	323	579	1105	852	449
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	135.0			115.0	0.0	35.0
Storage Lanes	2			3	3	1
Taper Length (m)	30.0				30.0	
Lane Util. Factor	0.97	0.91	0.95	0.76	0.94	1.00
Ped Bike Factor	0.99				0.94	
Frt				0.850		0.850
Flt Protected	0.950				0.950	
Satd. Flow (prot)	3252	4818	3353	3420	4728	1500
Flt Permitted	0.950				0.950	
Satd. Flow (perm)	3223	4818	3353	3420	4438	1500
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)				46		303
Link Speed (k/h)		50	50		50	
Link Distance (m)		270.2	257.1		139.6	
Travel Time (s)		19.5	18.5		10.1	
Confl. Peds. (#/hr)	11			11	33	
Confl. Bikes (#/hr)				1		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1060	351	629	1201	926	488
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1060	351	629	1201	926	488
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		7.2	7.2		10.8	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.8	4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.07	1.07	1.07	1.07	1.07	1.07
Turning Speed (k/h)	25			15	25	15
Number of Detectors	1	2	2	1	1	0
Detector Template	Left	Thru	Thru	Right	Left	
Leading Detector (m)	2.0	10.0	10.0	2.0	2.0	0.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6	0.6	2.0	2.0	0.0
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		9.4	9.4			
Detector 2 Size(m)		0.6	0.6			
Detector 2 Type		Cl+Ex	Cl+Ex			
Detector 2 Channel						
Detector 2 Extend (s)		0.0	0.0			
Turn Type	Prot	NA	NA	pt+ov	Prot	Perm
Protected Phases	5	2	6	6 4	4	
Permitted Phases		2				4
Detector Phase	5	2	6	6 4	4	4
Switch Phase						
Minimum Initial (s)	5.0	10.0	10.0		5.0	5.0
Minimum Split (s)	30.0	22.4	26.4		41.1	41.1
Total Split (s)	53.0	88.9	35.9		41.1	41.1
Total Split (%)	40.8%	68.4%	27.6%		31.6%	31.6%
Maximum Green (s)	47.0	82.5	29.5		35.0	35.0
Yellow Time (s)	3.7	3.7	3.7		3.7	3.7
All-Red Time (s)	2.3	2.7	2.7		2.4	2.4

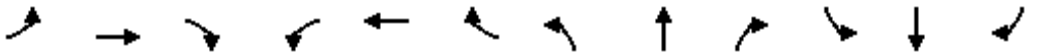


Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	6.0	6.4	6.4		6.1	6.1
Lead/Lag	Lead		Lag			
Lead-Lag Optimize?	Yes		Yes			
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Recall Mode	None	Max	None		None	None
Walk Time (s)	12.0		7.0		23.0	23.0
Flash Dont Walk (s)	12.0		13.0		12.0	12.0
Pedestrian Calls (#/hr)	0		0		0	0
Act Effct Green (s)	45.0	82.5	31.5	71.4	33.8	33.8
Actuated g/C Ratio	0.35	0.64	0.24	0.55	0.26	0.26
v/c Ratio	0.93	0.11	0.77	0.63	0.75	0.79
Control Delay	55.3	9.2	53.3	20.9	47.9	26.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	55.3	9.2	53.3	20.9	47.9	26.6
LOS	E	A	D	C	D	C
Approach Delay		43.9	32.0		40.5	
Approach LOS		D	C		D	
Queue Length 50th (m)	138.7	12.7	85.5	92.3	80.8	48.2
Queue Length 95th (m)	#179.0	17.2	#108.8	111.8	97.0	96.0
Internal Link Dist (m)		246.2	233.1		115.6	
Turn Bay Length (m)	135.0			115.0		35.0
Base Capacity (vph)	1186	3087	820	1948	1284	628
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.89	0.11	0.77	0.62	0.72	0.78

Intersection Summary			
Area Type:	Other		
Cycle Length: 130			
Actuated Cycle Length: 128.8			
Natural Cycle: 110			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.93			
Intersection Signal Delay: 38.2		Intersection LOS: D	
Intersection Capacity Utilization 78.8%		ICU Level of Service D	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 3: Wellington Street & Portage Bridge





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	462	443	29	19	620	217	10	490	34	79	370	175
Future Volume (vph)	462	443	29	19	620	217	10	490	34	79	370	175
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0		0.0	0.0		50.0	0.0		0.0	100.0		0.0
Storage Lanes	1		0	1		0	0		0	1		1
Taper Length (m)	30.0			30.0			30.0			30.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	0.95	0.95	0.95	1.00	1.00	1.00
Ped Bike Factor		1.00		0.99	0.97			0.99		0.97		0.90
Frt		0.991			0.961			0.990				0.850
Flt Protected	0.950			0.950				0.999		0.950		
Satd. Flow (prot)	1676	3314	0	1676	3123	0	0	3289	0	1676	1765	1500
Flt Permitted	0.093			0.462				0.942		0.169		
Satd. Flow (perm)	164	3314	0	808	3123	0	0	3099	0	288	1765	1357
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		9			37			5				190
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		167.4			213.1			205.5			334.4	
Travel Time (s)		12.1			15.3			14.8			24.1	
Confl. Peds. (#/hr)	80		9	9		80	57		84	84		57
Confl. Bikes (#/hr)			2			8			2			9
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	502	482	32	21	674	236	11	533	37	86	402	190
Shared Lane Traffic (%)												
Lane Group Flow (vph)	502	514	0	21	910	0	0	581	0	86	402	190
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	2.0
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	NA		Perm	NA		Perm	NA		pm+pt	NA	Perm
Protected Phases	5	2			6			8		7	4	
Permitted Phases	2			6			8			4		4
Detector Phase	5	2		6	6		8	8		7	4	4
Switch Phase												
Minimum Initial (s)	5.0	10.0		10.0	10.0		10.0	10.0		5.0	10.0	10.0
Minimum Split (s)	11.5	36.5		36.5	36.5		36.5	36.5		11.5	36.5	36.5
Total Split (s)	39.0	82.0		43.0	43.0		36.5	36.5		11.5	48.0	48.0
Total Split (%)	30.0%	63.1%		33.1%	33.1%		28.1%	28.1%		8.8%	36.9%	36.9%
Maximum Green (s)	32.5	75.5		36.5	36.5		30.0	30.0		5.0	41.5	41.5
Yellow Time (s)	3.3	3.3		3.3	3.3		3.3	3.3		3.3	3.3	3.3
All-Red Time (s)	3.2	3.2		3.2	3.2		3.2	3.2		3.2	3.2	3.2

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0		0.0	0.0	0.0
Total Lost Time (s)	6.5	6.5		6.5	6.5			6.5		6.5	6.5	6.5
Lead/Lag	Lead			Lag	Lag		Lag	Lag		Lead		
Lead-Lag Optimize?	Yes			Yes	Yes		Yes	Yes		Yes		
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	C-Max		C-Max	C-Max		None	None		None	None	None
Walk Time (s)		7.0		7.0	7.0		7.0	7.0			7.0	7.0
Flash Dont Walk (s)		23.0		23.0	23.0		21.0	21.0			21.0	21.0
Pedestrian Calls (#/hr)		0		0	0		0	0			0	0
Act Effct Green (s)	77.7	77.7		36.5	36.5			27.8		39.3	39.3	39.3
Actuated g/C Ratio	0.60	0.60		0.28	0.28			0.21		0.30	0.30	0.30
v/c Ratio	1.00	0.26		0.09	1.01			0.87		0.61	0.75	0.35
Control Delay	78.9	12.9		36.1	76.4			63.5		35.0	33.1	10.9
Queue Delay	0.0	0.0		0.0	0.0			0.0		0.0	0.0	0.0
Total Delay	78.9	12.9		36.1	76.4			63.5		35.0	33.1	10.9
LOS	E	B		D	E			E		C	C	B
Approach Delay		45.5			75.5			63.5			27.1	
Approach LOS		D			E			E			C	
Queue Length 50th (m)	~131.0	33.4		4.2	~127.1			78.4		17.9	102.7	26.7
Queue Length 95th (m)	#203.8	44.2		11.5	#174.2			100.6		#23.4	144.5	52.9
Internal Link Dist (m)		143.4			189.1			181.5			310.4	
Turn Bay Length (m)										100.0		
Base Capacity (vph)	501	1983		226	903			719		140	563	562
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	1.00	0.26		0.09	1.01			0.81		0.61	0.71	0.34

Intersection Summary

Area Type: Other
Cycle Length: 130
Actuated Cycle Length: 130
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 140
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.01
Intersection Signal Delay: 53.6 Intersection LOS: D
Intersection Capacity Utilization 121.3% ICU Level of Service H
Analysis Period (min) 15
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 5: Booth Street & Albert Street

APPENDIX G

RELAVENT EXCERPTS FROM OTHER DEVELOPMENTS

Windmill

Domtar Lands Redevelopment

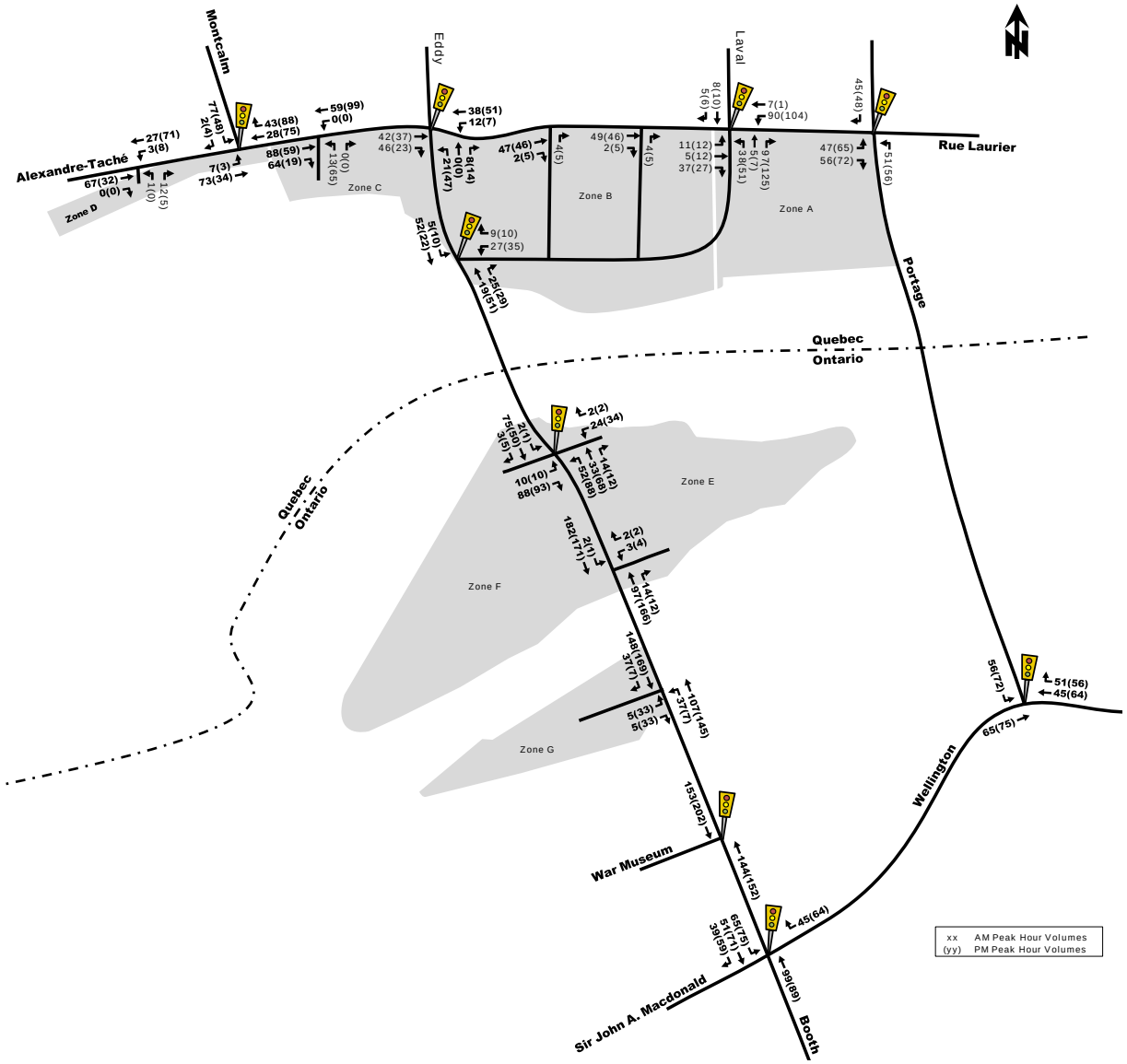
Multi-Modal Transportation Impact Study

April 2014

Prepared by:

Delcan
TRANSPORTATION • INFORMATION TECHNOLOGY • WATER

Figure 12: 'New' Site-Generated Traffic Volumes (Ottawa + Gatineau Sites)



5.4 Other Planned / Potential Development in the Vicinity of the Study Area

The Domtar lands are not the only site in this area of Gatineau and Ottawa that has development/redevelopment potential. The following Table 8 summarizes development sites identified by the Cities of Gatineau and Ottawa, as well their assumed development yield. Also included in this table are the assumptions used to estimate vehicle trips and the resultant peak hour vehicle trips. These being approximately 1000 vph two-way total during both peak hours for the Gatineau sites, and approximately 1300 vph two-way total during both peak hours for the Ottawa sites. Combining both provinces, the two-way peak hour total is approximately 2200 vph to 2400 vph.

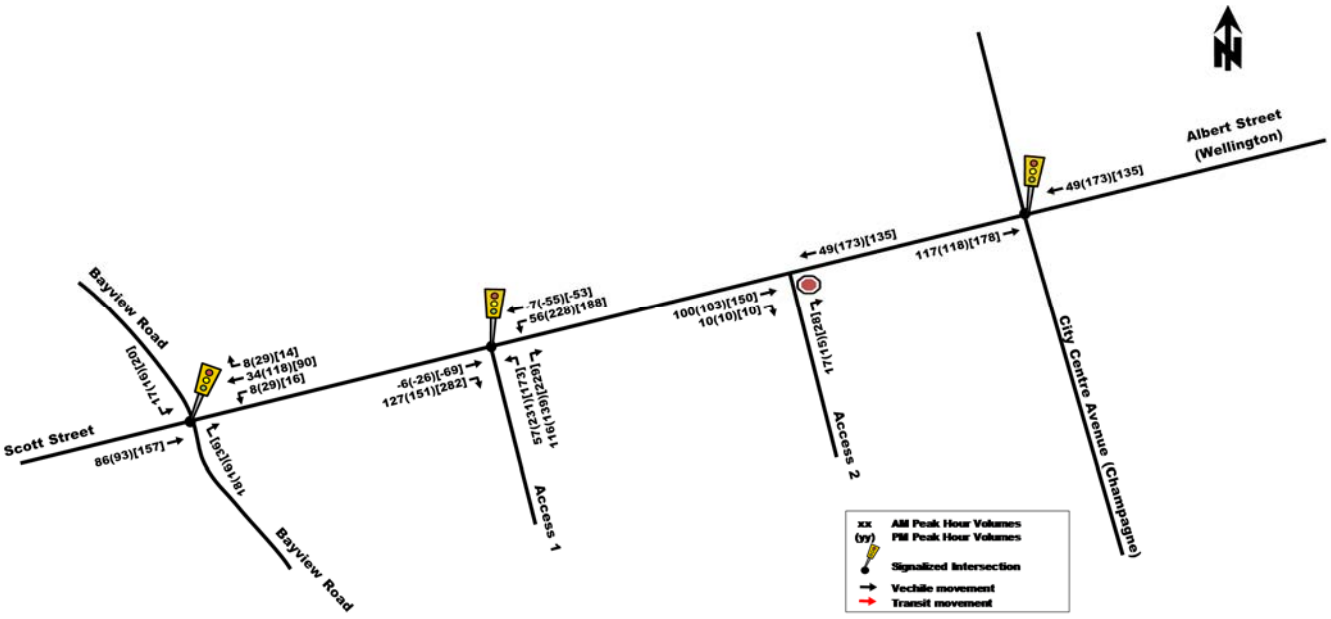
TRINITY
DESIGN. DEVELOP. BUILD.

November 2016

900 Albert Street
Transportation Impact Study
Including Multi-Modal Level of Service Analysis and Roadway Modification Approval Submission

PARSONS

Figure 11: New and Pass-by Site-Generated Traffic Volumes – 2025

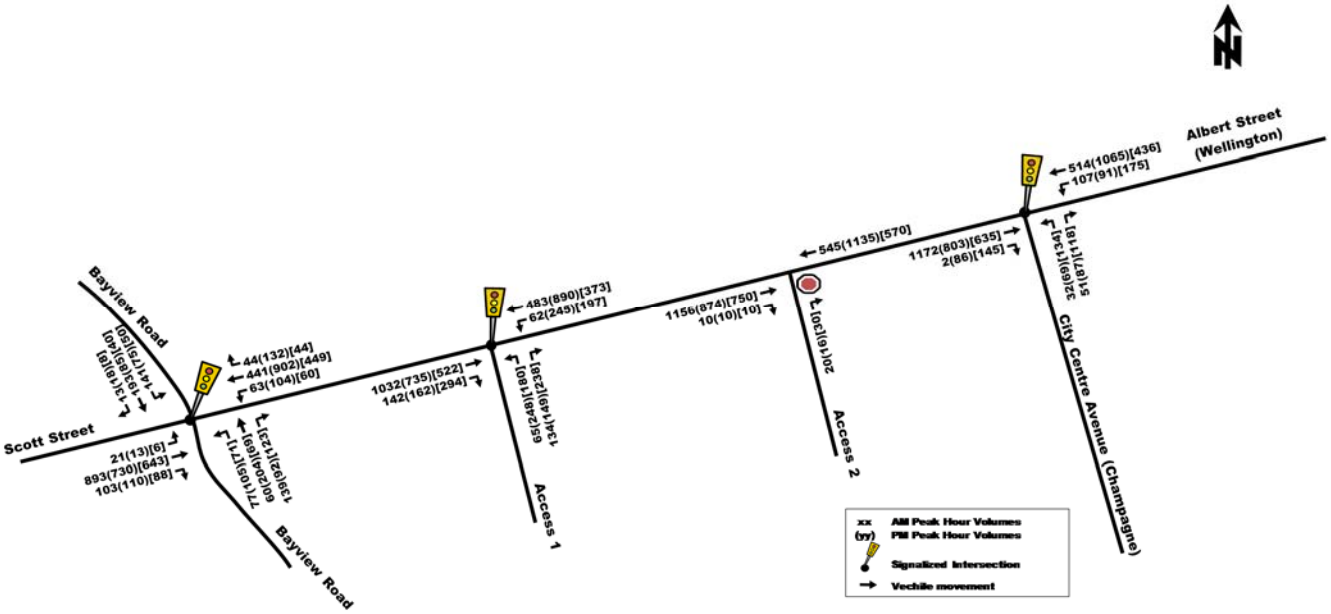


FUTURE TRAFFIC OPERATIONS

PROJECTED CONDITIONS AT FULL SITE DEVELOPMENT

The total projected volumes associated with the proposed development were derived by superimposing new and pass-by site-generated traffic volumes (Figure 10 and 11) onto projected background traffic volumes (Figure 7 and 8). The resulting total projected volumes for the horizon years 2020 and 2025 are illustrated as Figure 12 and 13, respectively.

Figure 12: Total Projected Peak Hour Traffic Volumes - 2020



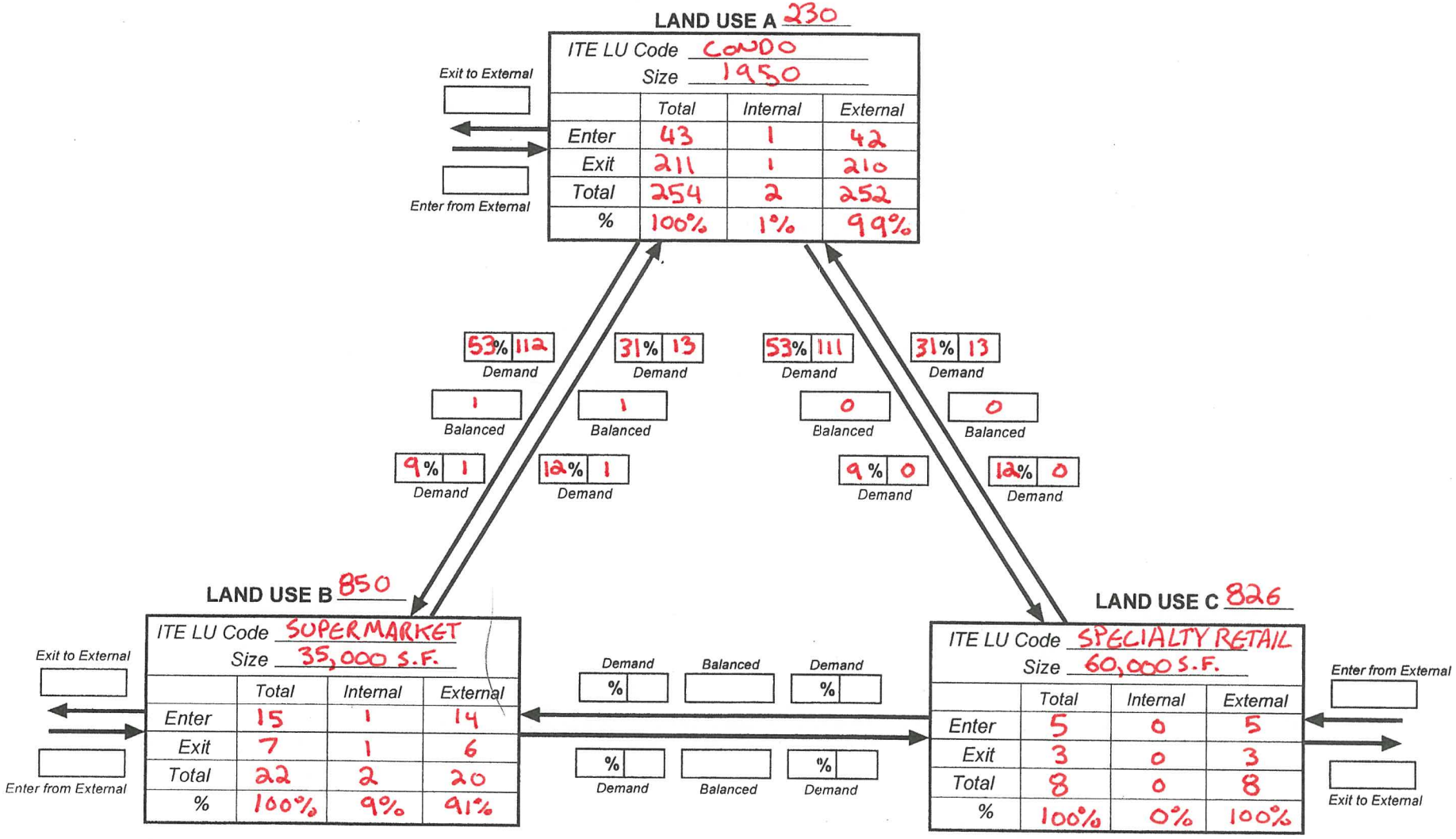
APPENDIX H

INTERNAL CAPTURE SUMMARY SHEETS

Analyst _____
Date _____

MULTI-USE DEVELOPMENT TRIP GENERATION AND INTERNAL CAPTURE SUMMARY

Name of Dvlpt _____
Time Period AMPEAK



Net External Trips for Multi-Use Development

	LAND USE A	LAND USE B	LAND USE C	TOTAL
Enter				
Exit				
Total				
Single-Use Trip Gen. Est.				

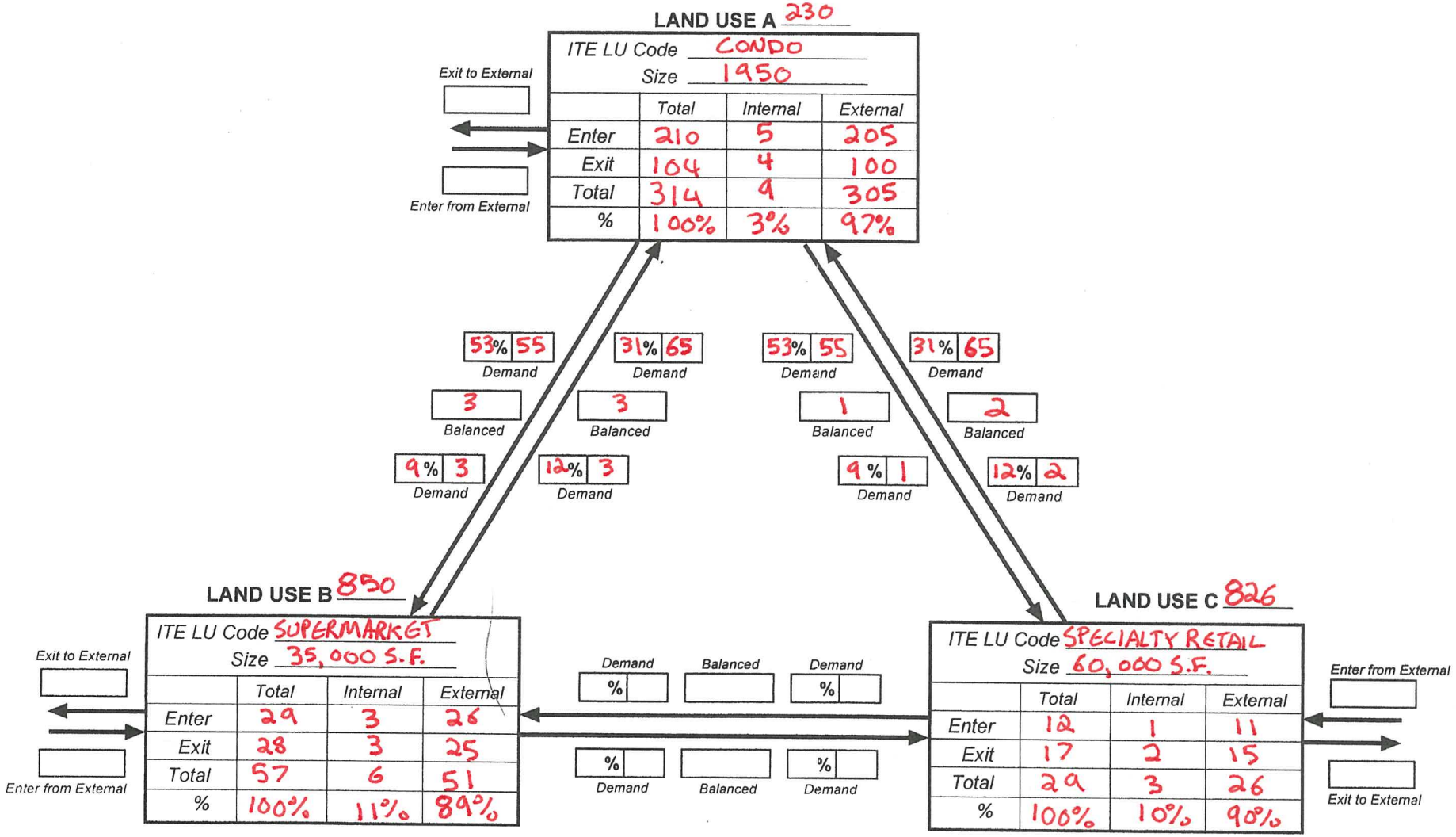
INTERNAL CAPTURE

Source: Kaku Associates, Inc.

Analyst _____
Date _____

MULTI-USE DEVELOPMENT TRIP GENERATION AND INTERNAL CAPTURE SUMMARY

Name of Dvlpt _____
Time Period PM PEAK



Net External Trips for Multi-Use Development

	LAND USE A	LAND USE B	LAND USE C	TOTAL
Enter				
Exit				
Total				
Single-Use Trip Gen. Est.				

INTERNAL CAPTURE

Source: Kaku Associates, Inc.

APPENDIX I

FUTURE INTERSECTION OPERATIONS

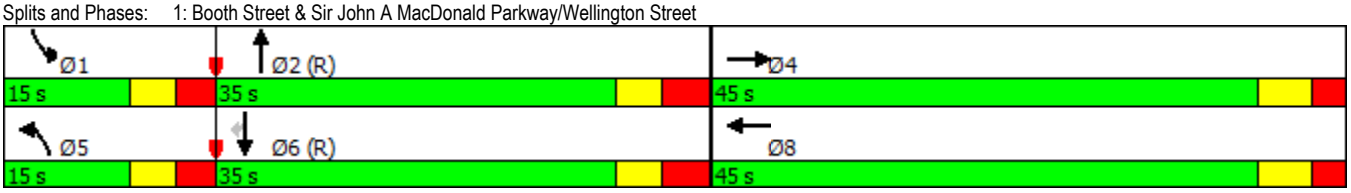
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	1314	0	0	683	127	0	867	142	137	1031	234
Future Volume (vph)	0	1314	0	0	683	127	0	867	142	137	1031	234
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0		0.0	0.0		0.0	10.0		0.0	135.0		50.0
Storage Lanes	0		0	0		0	1		0	1		1
Taper Length (m)	30.0			30.0			30.0			30.0		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	1.00
Ped Bike Factor					0.99			0.99		0.99		0.97
Frt					0.976			0.979				0.850
Flt Protected										0.950		
Satd. Flow (prot)	0	3353	0	0	3254	0	1765	3256	0	1676	3353	1500
Flt Permitted										0.950		
Satd. Flow (perm)	0	3353	0	0	3254	0	1765	3256	0	1663	3353	1449
Right Turn on Red			No			Yes			Yes			Yes
Satd. Flow (RTOR)					27			20				168
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		115.0			144.3			74.7			217.9	
Travel Time (s)		8.3			10.4			5.4			15.7	
Confl. Peds. (#/hr)	6		2	2		6	21		36	36		21
Confl. Bikes (#/hr)			28			34			15			1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	1428	0	0	742	138	0	942	154	149	1121	254
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1428	0	0	880	0	0	1096	0	149	1121	254
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors		1			1		1	1		1	1	1
Detector Template										Left		Right
Leading Detector (m)		10.0			10.0		0.0	10.0		2.0	10.0	2.0
Trailing Detector (m)		0.0			0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Position(m)		0.0			0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Size(m)		10.0			10.0		0.0	10.0		2.0	10.0	2.0
Detector 1 Type		Cl+Ex			Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)		0.0			0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)		0.0			0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)		0.0			0.0		0.0	0.0		0.0	0.0	0.0
Turn Type		NA			NA		Prot	NA		Prot	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases												6
Detector Phase		4			8		5	2		1	6	6
Switch Phase												
Minimum Initial (s)		10.0			10.0		5.0	10.0		5.0	10.0	10.0
Minimum Split (s)		37.3			37.3		11.1	34.8		11.1	34.8	34.8
Total Split (s)		45.0			45.0		15.0	35.0		15.0	35.0	35.0
Total Split (%)		47.4%			47.4%		15.8%	36.8%		15.8%	36.8%	36.8%
Maximum Green (s)		38.7			38.7		8.9	28.2		8.9	28.2	28.2
Yellow Time (s)		3.7			3.7		3.3	3.3		3.3	3.3	3.3
All-Red Time (s)		2.6			2.6		2.8	3.5		2.8	3.5	3.5
Lost Time Adjust (s)		0.0			0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)		6.3			6.3		6.1	6.8		6.1	6.8	6.8
Lead/Lag							Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)		3.0			3.0		3.0	3.0		3.0	3.0	3.0

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Recall Mode		Max			Max		None	C-Max		None	C-Max	C-Max
Walk Time (s)		7.0			7.0			7.0			7.0	7.0
Flash Dont Walk (s)		24.0			24.0			21.0			21.0	21.0
Pedestrian Calls (#/hr)		5			5			5			5	5
Act Effct Green (s)		38.7			38.7			28.2		8.9	43.2	43.2
Actuated g/C Ratio		0.41			0.41			0.30		0.09	0.45	0.45
v/c Ratio		1.05			0.66			1.12		0.95	0.74	0.34
Control Delay		66.3			24.9			99.2		104.7	24.8	7.2
Queue Delay		0.0			0.4			0.0		0.0	0.0	0.0
Total Delay		66.3			25.3			99.2		104.7	24.8	7.2
LOS		E			C			F		F	C	A
Approach Delay		66.3			25.3			99.2			29.7	
Approach LOS		E			C			F			C	
Queue Length 50th (m)		~158.6			68.5			~128.0		29.1	90.2	9.3
Queue Length 95th (m)		#201.6			90.1			#169.7		#67.8	115.7	25.2
Internal Link Dist (m)		91.0			120.3			50.7			193.9	
Turn Bay Length (m)										135.0		50.0
Base Capacity (vph)		1365			1341			980		157	1524	750
Starvation Cap Reductn		0			133			0		0	0	0
Spillback Cap Reductn		0			0			0		0	0	0
Storage Cap Reductn		0			0			0		0	0	0
Reduced v/c Ratio		1.05			0.73			1.12		0.95	0.74	0.34

Intersection Summary

Area Type: Other
Cycle Length: 95
Actuated Cycle Length: 95
Offset: 31 (33%), Referenced to phase 2:NBT and 6:SBT, Start of Green
Natural Cycle: 125
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.12
Intersection Signal Delay: 55.0 Intersection LOS: D
Intersection Capacity Utilization 92.9% ICU Level of Service F
Analysis Period (min) 15
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: Booth Street & Sir John A MacDonald Parkway/Wellington Street

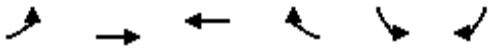


Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	1284	13	9	890	25	33
Future Volume (vph)	1284	13	9	890	25	33
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)		0.0	60.0		0.0	0.0
Storage Lanes		0	1		1	0
Taper Length (m)			30.0		30.0	
Lane Util. Factor	0.95	0.95	1.00	0.95	1.00	1.00
Ped Bike Factor	1.00		1.00		0.99	
Frt	0.999				0.923	
Flt Protected			0.950		0.979	
Satd. Flow (prot)	3347	0	1676	3353	1581	0
Flt Permitted			0.173		0.979	
Satd. Flow (perm)	3347	0	305	3353	1575	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)	2				36	
Link Speed (k/h)	50			50	50	
Link Distance (m)	144.3			270.2	146.6	
Travel Time (s)	10.4			19.5	10.6	
Confl. Peds. (#/hr)		6	6		6	2
Confl. Bikes (#/hr)		62				
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1396	14	10	967	27	36
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1410	0	10	967	63	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	7.2			7.2	3.6	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.07	1.07	1.07	1.07	1.07	1.07
Turning Speed (k/h)		15	25		25	15
Number of Detectors	1		1	1	1	
Detector Template			Left		Left	
Leading Detector (m)	10.0		2.0	10.0	2.0	
Trailing Detector (m)	0.0		0.0	0.0	0.0	
Detector 1 Position(m)	0.0		0.0	0.0	0.0	
Detector 1 Size(m)	10.0		2.0	10.0	2.0	
Detector 1 Type	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel						
Detector 1 Extend (s)	0.0		0.0	0.0	0.0	
Detector 1 Queue (s)	0.0		0.0	0.0	0.0	
Detector 1 Delay (s)	0.0		0.0	0.0	0.0	
Turn Type	NA		Perm	NA	Prot	
Protected Phases	2			6	8	
Permitted Phases			6			
Detector Phase	2		6	6	8	
Switch Phase						
Minimum Initial (s)	10.0		10.0	10.0	5.0	
Minimum Split (s)	90.0		90.0	90.0	29.8	
Total Split (s)	90.0		90.0	90.0	30.0	
Total Split (%)	75.0%		75.0%	75.0%	25.0%	
Maximum Green (s)	84.4		84.4	84.4	24.2	
Yellow Time (s)	3.7		3.7	3.7	3.3	
All-Red Time (s)	1.9		1.9	1.9	2.5	
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	
Total Lost Time (s)	5.6		5.6	5.6	5.8	
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0		3.0	3.0	3.0	

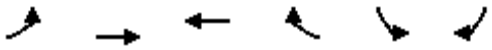
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Recall Mode	C-Max		C-Max	C-Max	None	
Walk Time (s)	15.0				7.0	
Flash Dont Walk (s)	17.0				17.0	
Pedestrian Calls (#/hr)	5				5	
Act Effct Green (s)	101.6		101.6	101.6	10.4	
Actuated g/C Ratio	0.85		0.85	0.85	0.09	
v/c Ratio	0.50		0.04	0.34	0.37	
Control Delay	4.7		4.1	3.6	30.5	
Queue Delay	0.7		0.0	0.0	0.0	
Total Delay	5.4		4.1	3.6	30.5	
LOS	A		A	A	C	
Approach Delay	5.4			3.6	30.5	
Approach LOS	A			A	C	
Queue Length 50th (m)	36.8		0.3	20.5	6.5	
Queue Length 95th (m)	101.9		2.5	58.0	18.2	
Internal Link Dist (m)	120.3			246.2	122.6	
Turn Bay Length (m)			60.0			
Base Capacity (vph)	2833		258	2837	347	
Starvation Cap Reductn	983		0	0	0	
Spillback Cap Reductn	0		0	0	0	
Storage Cap Reductn	0		0	0	0	
Reduced v/c Ratio	0.76		0.04	0.34	0.18	

Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 109 (91%), Referenced to phase 2:EBT and 6:WBTL, Start of Green			
Natural Cycle: 120			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.50			
Intersection Signal Delay: 5.3		Intersection LOS: A	
Intersection Capacity Utilization 52.6%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 2: Lett Street & Wellington Street



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR	Ø3
Lane Configurations							
Traffic Volume (vph)	700	1051	311	817	2096	349	
Future Volume (vph)	700	1051	311	817	2096	349	
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	
Storage Length (m)	135.0			115.0	0.0	35.0	
Storage Lanes	2			3	3	1	
Taper Length (m)	30.0				30.0		
Lane Util. Factor	0.97	0.91	0.95	0.76	0.94	1.00	
Ped Bike Factor	1.00				0.99	0.98	
Frt				0.850		0.850	
Flt Protected	0.950				0.950		
Satd. Flow (prot)	3252	4818	3353	3420	4728	1500	
Flt Permitted	0.950				0.950		
Satd. Flow (perm)	3237	4818	3353	3420	4690	1475	
Right Turn on Red				Yes		Yes	
Satd. Flow (RTOR)				14		117	
Link Speed (k/h)		50	50		50		
Link Distance (m)		270.2	257.1		139.6		
Travel Time (s)		19.5	18.5		10.1		
Confl. Peds. (#/hr)	4			4	5	5	
Confl. Bikes (#/hr)				38			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	
Adj. Flow (vph)	761	1142	338	888	2278	379	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	761	1142	338	888	2278	379	
Enter Blocked Intersection	No	No	No	No	No	No	
Lane Alignment	Left	Left	Left	Right	Left	Right	
Median Width(m)		7.2	7.2		10.8		
Link Offset(m)		0.0	0.0		0.0		
Crosswalk Width(m)		4.8	4.8		4.8		
Two way Left Turn Lane							
Headway Factor	1.07	1.07	1.07	1.07	1.07	1.07	
Turning Speed (k/h)	25			15	25	15	
Number of Detectors	1	1	1	1	1	1	
Detector Template	Left			Right	Left		
Leading Detector (m)	2.0	10.0	10.0	2.0	2.0	0.0	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	2.0	10.0	10.0	2.0	2.0	0.0	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel							
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	
Turn Type	Prot	NA	NA	custom	Prot	Perm	
Protected Phases	5	2	6	6 4 3	4		3
Permitted Phases		2				4	
Detector Phase	5	2	6	6 4 3	4	4	
Switch Phase							
Minimum Initial (s)	5.0	10.0	10.0		5.0	5.0	4.0
Minimum Split (s)	31.0	42.4	26.4		44.1	44.1	8.0
Total Split (s)	31.0	58.4	27.4		51.1	51.1	13.1
Total Split (%)	25.3%	47.6%	22.3%		41.7%	41.7%	11%
Maximum Green (s)	25.0	52.0	21.0		45.0	45.0	9.1
Yellow Time (s)	3.7	3.7	3.7		3.7	3.7	3.5
All-Red Time (s)	2.3	2.7	2.7		2.4	2.4	0.5
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.4	6.4		6.1	6.1	
Lead/Lag	Lead		Lag		Lag	Lag	Lead
Lead-Lag Optimize?	Yes		Yes		Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0	3.0



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR	Ø3
Recall Mode	None	Max	None		None	None	None
Walk Time (s)	13.0		7.0		26.0	26.0	
Flash Dont Walk (s)	12.0		13.0		12.0	12.0	
Pedestrian Calls (#/hr)	0		0		0	0	
Act Effct Green (s)	25.0	52.0	21.0	84.5	45.0	45.0	
Actuated g/C Ratio	0.21	0.43	0.17	0.69	0.37	0.37	
v/c Ratio	1.14	0.56	0.59	0.37	1.31	0.61	
Control Delay	124.9	27.6	51.2	8.1	175.2	26.2	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	124.9	27.6	51.2	8.1	175.2	26.2	
LOS	F	C	D	A	F	C	
Approach Delay		66.5	20.0		154.0		
Approach LOS		E	C		F		
Queue Length 50th (m)	~116.0	78.3	41.8	36.0	~262.3	53.7	
Queue Length 95th (m)	#156.1	93.5	58.4	45.0	#292.6	89.2	
Internal Link Dist (m)		246.2	233.1		115.6		
Turn Bay Length (m)	135.0			115.0		35.0	
Base Capacity (vph)	666	2054	577	2250	1744	618	
Starvation Cap Reductn	0	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	0	
Reduced v/c Ratio	1.14	0.56	0.59	0.39	1.31	0.61	

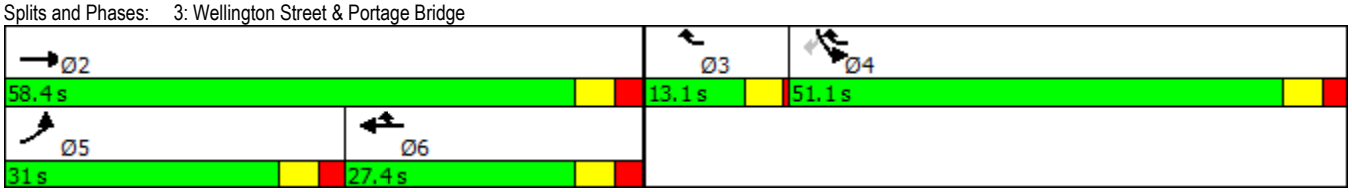
Intersection Summary

Area Type: Other
Cycle Length: 122.6
Actuated Cycle Length: 121.9
Natural Cycle: 150
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 1.31
Intersection Signal Delay: 96.8 Intersection LOS: F
Intersection Capacity Utilization 88.6% 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: 3: Wellington Street & Portage Bridge



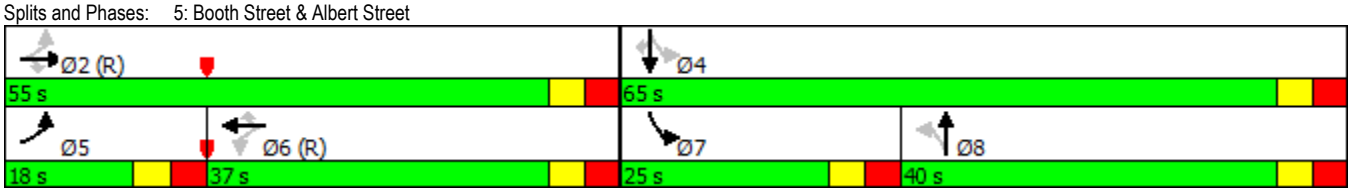
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	424	917	43	11	389	165	35	566	40	225	549	492
Future Volume (vph)	424	917	43	11	389	165	35	566	40	225	549	492
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0		50.0	0.0		50.0	0.0		0.0	100.0		0.0
Storage Lanes	1		1	1		1	0		0	1		1
Taper Length (m)	30.0			30.0			30.0			30.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	1.00	0.95	0.95	0.95	1.00	1.00	1.00
Ped Bike Factor	0.96		0.93			0.91		0.98		0.96		0.89
Frt			0.850			0.850		0.991				0.850
Flt Protected	0.950			0.950				0.997		0.950		
Satd. Flow (prot)	1676	1765	1500	1676	3353	1500	0	3270	0	1676	1765	1500
Flt Permitted	0.333			0.131				0.879		0.162		
Satd. Flow (perm)	567	1765	1399	231	3353	1364	0	2876	0	273	1765	1340
Right Turn on Red			Yes			No			Yes			No
Satd. Flow (RTOR)			91					6				
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		167.4			213.1			205.5			334.4	
Travel Time (s)		12.1			15.3			14.8			24.1	
Confl. Peds. (#/hr)	67		24	24		67	75		90	90		75
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	461	997	47	12	423	179	38	615	43	245	597	535
Shared Lane Traffic (%)												
Lane Group Flow (vph)	461	997	47	12	423	179	0	696	0	245	597	535
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	1	1	1	1	1	1	1		1	1	1
Detector Template	Left			Left			Left			Left		Right
Leading Detector (m)	2.0	10.0	0.0	2.0	10.0	0.0	2.0	10.0		2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Size(m)	2.0	10.0	0.0	2.0	10.0	0.0	2.0	10.0		2.0	10.0	2.0
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Turn Type	pm+pt	NA	Perm	Perm	NA	Perm	Perm	NA		pm+pt	NA	Perm
Protected Phases	5	2			6			8		7	4	
Permitted Phases	2		2	6		6	8			4		4
Detector Phase	5	2	2	6	6	6	8	8		7	4	4
Switch Phase												
Minimum Initial (s)	5.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0		5.0	10.0	10.0
Minimum Split (s)	11.5	36.5	36.5	36.5	36.5	36.5	36.5	36.5		11.5	36.5	36.5
Total Split (s)	18.0	55.0	55.0	37.0	37.0	37.0	40.0	40.0		25.0	65.0	65.0
Total Split (%)	15.0%	45.8%	45.8%	30.8%	30.8%	30.8%	33.3%	33.3%		20.8%	54.2%	54.2%
Maximum Green (s)	11.5	48.5	48.5	30.5	30.5	30.5	33.5	33.5		18.5	58.5	58.5
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3		3.3	3.3	3.3
All-Red Time (s)	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2		3.2	3.2	3.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0		0.0		0.0	0.0	0.0
Total Lost Time (s)	6.5	6.5	6.5	6.5	6.5	6.5		6.5		6.5	6.5	6.5
Lead/Lag	Lead			Lag	Lag	Lag	Lag	Lag		Lead		
Lead-Lag Optimize?	Yes			Yes	Yes	Yes	Yes	Yes		Yes		
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Recall Mode	None	C-Max	C-Max	C-Max	C-Max	C-Max	None	None		None	None	None

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Walk Time (s)		7.0	7.0	7.0	7.0	7.0	7.0	7.0			7.0	7.0
Flash Dont Walk (s)		23.0	23.0	23.0	23.0	23.0	21.0	21.0			21.0	21.0
Pedestrian Calls (#/hr)		5	5	5	5	5	5	5			5	5
Act Effct Green (s)	52.0	52.0	52.0	30.5	30.5	30.5		32.1		55.0	55.0	55.0
Actuated g/C Ratio	0.43	0.43	0.43	0.25	0.25	0.25		0.27		0.46	0.46	0.46
v/c Ratio	1.20	1.30	0.07	0.21	0.50	0.52		0.90		0.78	0.74	0.87
Control Delay	141.8	176.8	0.6	45.7	40.6	44.7		57.6		39.6	32.5	45.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0		0.0		0.0	0.0	0.0
Total Delay	141.8	176.8	0.6	45.7	40.6	44.7		57.6		39.6	32.5	45.2
LOS	F	F	A	D	D	D		E		D	C	D
Approach Delay		160.6			41.9			57.6			38.7	
Approach LOS		F			D			E			D	
Queue Length 50th (m)	~134.9	~330.3	0.0	2.4	47.2	38.3		84.2		35.4	111.2	109.8
Queue Length 95th (m)	#217.3	#410.7	1.0	8.7	63.8	62.4		#118.2		62.3	155.4	#176.6
Internal Link Dist (m)		143.4			189.1			181.5			310.4	
Turn Bay Length (m)			50.0			50.0				100.0		
Base Capacity (vph)	384	765	657	58	852	346		814		341	860	653
Starvation Cap Reductn	0	0	0	0	0	0		0		0	0	0
Spillback Cap Reductn	0	0	0	0	0	0		0		0	0	0
Storage Cap Reductn	0	0	0	0	0	0		0		0	0	0
Reduced v/c Ratio	1.20	1.30	0.07	0.21	0.50	0.52		0.86		0.72	0.69	0.82

Intersection Summary

Area Type: Other
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green, Master Intersection
Natural Cycle: 120
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.30
Intersection Signal Delay: 86.1 Intersection LOS: F
Intersection Capacity Utilization 134.6% ICU Level of Service H
Analysis Period (min) 15
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 5: Booth Street & Albert Street



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	0	9	1000	10	0	1031
Future Volume (Veh/h)	0	9	1000	10	0	1031
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	10	1087	11	0	1121
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)			334			75
pX, platoon unblocked	0.79	0.87			0.87	
vC, conflicting volume	1653	549			1098	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	576	198			826	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	99			100	
cM capacity (veh/h)	353	709			700	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	10	725	373	560	560
Volume Left	0	0	0	0	0
Volume Right	10	0	11	0	0
cSH	709	1700	1700	1700	1700
Volume to Capacity	0.01	0.43	0.22	0.33	0.33
Queue Length 95th (m)	0.3	0.0	0.0	0.0	0.0
Control Delay (s)	10.2	0.0	0.0	0.0	0.0
Lane LOS	B				
Approach Delay (s)	10.2	0.0		0.0	
Approach LOS	B				

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	39.5%	ICU Level of Service	A
Analysis Period (min)	15		

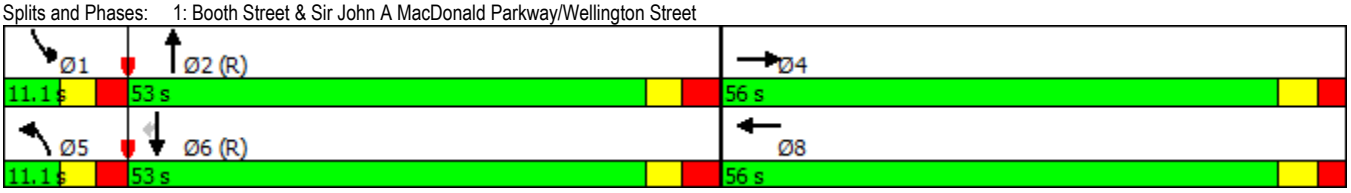
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	922	0	0	1319	107	0	1012	193	95	690	228
Future Volume (vph)	0	922	0	0	1319	107	0	1012	193	95	690	228
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0		0.0	0.0		0.0	10.0		0.0	135.0		50.0
Storage Lanes	0		0	0		0	1		0	1		1
Taper Length (m)	30.0			30.0			30.0			30.0		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	1.00
Ped Bike Factor					1.00			1.00		1.00		0.97
Frt					0.989			0.976				0.850
Flt Protected										0.950		
Satd. Flow (prot)	0	3353	0	0	3309	0	1765	3258	0	1676	3353	1500
Flt Permitted										0.950		
Satd. Flow (perm)	0	3353	0	0	3309	0	1765	3258	0	1673	3353	1455
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					8			21				108
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		115.0			144.3			74.7			217.9	
Travel Time (s)		8.3			10.4			5.4			15.7	
Confl. Peds. (#/hr)	9		3	3		9	5		10	10		5
Confl. Bikes (#/hr)			7			8			6			20
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	1002	0	0	1434	116	0	1100	210	103	750	248
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1002	0	0	1550	0	0	1310	0	103	750	248
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors		1			1		1	1		1	1	1
Detector Template		Thru			Thru			Thru		Left	Thru	Right
Leading Detector (m)		10.0			10.0		0.0	10.0		2.0	10.0	2.0
Trailing Detector (m)		0.0			0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Position(m)		0.0			0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Size(m)		10.0			10.0		0.0	10.0		2.0	10.0	2.0
Detector 1 Type		Cl+Ex			Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)		0.0			0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)		0.0			0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)		0.0			0.0		0.0	0.0		0.0	0.0	0.0
Turn Type		NA			NA		Prot	NA		Prot	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases												6
Detector Phase		4			8		5	2		1	6	6
Switch Phase												
Minimum Initial (s)		10.0			10.0		5.0	10.0		5.0	10.0	10.0
Minimum Split (s)		37.3			37.3		11.1	37.8		11.1	37.8	37.8
Total Split (s)		56.0			56.0		11.1	53.0		11.1	53.0	53.0
Total Split (%)		46.6%			46.6%		9.2%	44.1%		9.2%	44.1%	44.1%
Maximum Green (s)		49.7			49.7		5.0	46.2		5.0	46.2	46.2
Yellow Time (s)		3.7			3.7		3.3	3.3		3.3	3.3	3.3
All-Red Time (s)		2.6			2.6		2.8	3.5		2.8	3.5	3.5
Lost Time Adjust (s)		0.0			0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)		6.3			6.3		6.1	6.8		6.1	6.8	6.8
Lead/Lag							Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)		3.0			3.0		3.0	3.0		3.0	3.0	3.0

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Recall Mode		None			None		None	C-Max		None	C-Max	C-Max
Walk Time (s)		7.0			7.0			7.0			7.0	7.0
Flash Dont Walk (s)		24.0			24.0			21.0			21.0	21.0
Pedestrian Calls (#/hr)		5			5			5			5	5
Act Effct Green (s)		49.7			49.7			46.2		5.0	57.3	57.3
Actuated g/C Ratio		0.41			0.41			0.38		0.04	0.48	0.48
v/c Ratio		0.72			1.13			1.03		1.49	0.47	0.33
Control Delay		33.1			101.0			70.8		322.7	22.4	11.9
Queue Delay		0.0			0.8			0.0		0.0	0.0	0.0
Total Delay		33.1			101.8			70.8		322.7	22.4	11.9
LOS		C			F			E		F	C	B
Approach Delay		33.1			101.8			70.8			48.1	
Approach LOS		C			F			E			D	
Queue Length 50th (m)		107.7			~234.6			~182.3		~35.2	64.1	19.6
Queue Length 95th (m)		133.3			#280.2			#227.0		#72.3	81.3	38.6
Internal Link Dist (m)		91.0			120.3			50.7			193.9	
Turn Bay Length (m)										135.0		50.0
Base Capacity (vph)		1387			1374			1266		69	1599	750
Starvation Cap Reductn		0			237			0		0	0	0
Spillback Cap Reductn		0			0			0		0	0	0
Storage Cap Reductn		0			0			0		0	0	0
Reduced v/c Ratio		0.72			1.36			1.03		1.49	0.47	0.33

Intersection Summary

Area Type: Other
Cycle Length: 120.1
Actuated Cycle Length: 120.1
Offset: 3 (2%), Referenced to phase 2:NBT and 6:SBT, Start of Green
Natural Cycle: 150
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.49
Intersection Signal Delay: 67.8 Intersection LOS: E
Intersection Capacity Utilization 99.9% ICU Level of Service F
Analysis Period (min) 15
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: Booth Street & Sir John A MacDonald Parkway/Wellington Street



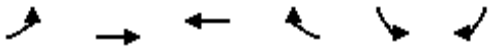
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	1101	25	26	1292	29	25
Future Volume (vph)	1101	25	26	1292	29	25
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)		0.0	60.0		0.0	0.0
Storage Lanes		0	1		1	0
Taper Length (m)			30.0		30.0	
Lane Util. Factor	0.95	0.95	1.00	0.95	1.00	1.00
Ped Bike Factor	1.00		1.00		0.99	
Frt	0.997				0.938	
Flt Protected			0.950		0.974	
Satd. Flow (prot)	3339	0	1676	3353	1598	0
Flt Permitted			0.215		0.974	
Satd. Flow (perm)	3339	0	378	3353	1597	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)	4				27	
Link Speed (k/h)	50			50	50	
Link Distance (m)	144.3			270.2	146.6	
Travel Time (s)	10.4			19.5	10.6	
Confl. Peds. (#/hr)		18	18		1	5
Confl. Bikes (#/hr)		4				
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1197	27	28	1404	32	27
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1224	0	28	1404	59	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	7.2			7.2	3.6	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.07	1.07	1.07	1.07	1.07	1.07
Turning Speed (k/h)		15	25		25	15
Number of Detectors	1		1	1	1	
Detector Template	Thru		Left	Thru	Left	
Leading Detector (m)	10.0		2.0	10.0	2.0	
Trailing Detector (m)	0.0		0.0	0.0	0.0	
Detector 1 Position(m)	0.0		0.0	0.0	0.0	
Detector 1 Size(m)	10.0		2.0	10.0	2.0	
Detector 1 Type	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel						
Detector 1 Extend (s)	0.0		0.0	0.0	0.0	
Detector 1 Queue (s)	0.0		0.0	0.0	0.0	
Detector 1 Delay (s)	0.0		0.0	0.0	0.0	
Turn Type	NA		Perm	NA	Prot	
Protected Phases	2			6	8	
Permitted Phases			6			
Detector Phase	2		6	6	8	
Switch Phase						
Minimum Initial (s)	10.0		10.0	10.0	5.0	
Minimum Split (s)	37.6		27.6	27.6	29.8	
Total Split (s)	90.0		90.0	90.0	30.0	
Total Split (%)	75.0%		75.0%	75.0%	25.0%	
Maximum Green (s)	84.4		84.4	84.4	24.2	
Yellow Time (s)	3.7		3.7	3.7	3.3	
All-Red Time (s)	1.9		1.9	1.9	2.5	
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	
Total Lost Time (s)	5.6		5.6	5.6	5.8	
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0		3.0	3.0	3.0	

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Recall Mode	C-Max		C-Max	C-Max	None	
Walk Time (s)	15.0				7.0	
Flash Dont Walk (s)	17.0				17.0	
Pedestrian Calls (#/hr)	5				5	
Act Effct Green (s)	101.4		101.4	101.4	10.6	
Actuated g/C Ratio	0.84		0.84	0.84	0.09	
v/c Ratio	0.43		0.09	0.50	0.36	
Control Delay	4.2		4.3	4.7	35.0	
Queue Delay	0.6		0.0	0.0	0.0	
Total Delay	4.8		4.3	4.7	35.0	
LOS	A		A	A	D	
Approach Delay	4.8			4.7	35.0	
Approach LOS	A			A	D	
Queue Length 50th (m)	29.7		0.9	37.3	7.7	
Queue Length 95th (m)	81.2		5.4	101.3	18.6	
Internal Link Dist (m)	120.3			246.2	122.6	
Turn Bay Length (m)			60.0			
Base Capacity (vph)	2821		319	2832	343	
Starvation Cap Reductn	1076		0	0	0	
Spillback Cap Reductn	0		0	0	0	
Storage Cap Reductn	0		0	0	0	
Reduced v/c Ratio	0.70		0.09	0.50	0.17	

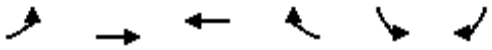
Intersection Summary

Area Type: Other
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 1 (1%), Referenced to phase 2:EBT and 6:WBTL, Start of Green
Natural Cycle: 70
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.50
Intersection Signal Delay: 5.4 Intersection LOS: A
Intersection Capacity Utilization 53.8% ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 2: Lett Street & Wellington Street



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	1062	417	657	1200	949	494
Future Volume (vph)	1062	417	657	1200	949	494
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	135.0			115.0	0.0	35.0
Storage Lanes	2			3	3	1
Taper Length (m)	30.0				30.0	
Lane Util. Factor	0.97	0.91	0.95	0.76	0.94	1.00
Ped Bike Factor	0.99				0.95	
Frt				0.850		0.850
Flt Protected	0.950				0.950	
Satd. Flow (prot)	3252	4818	3353	3420	4728	1500
Flt Permitted	0.950				0.950	
Satd. Flow (perm)	3230	4818	3353	3420	4479	1500
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)				4		371
Link Speed (k/h)		50	50		50	
Link Distance (m)		270.2	257.1		139.6	
Travel Time (s)		19.5	18.5		10.1	
Confl. Peds. (#/hr)	11			11	33	
Confl. Bikes (#/hr)				1		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1154	453	714	1304	1032	537
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1154	453	714	1304	1032	537
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		7.2	7.2		10.8	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.8	4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.07	1.07	1.07	1.07	1.07	1.07
Turning Speed (k/h)	25			15	25	15
Number of Detectors	1	1	1	1	1	1
Detector Template	Left	Thru	Thru	Right	Left	
Leading Detector (m)	2.0	10.0	10.0	2.0	2.0	0.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	10.0	10.0	2.0	2.0	0.0
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Turn Type	Prot	NA	NA	pt+ov	Prot	Perm
Protected Phases	5	2	6	6 4	4	
Permitted Phases		2				4
Detector Phase	5	2	6	6 4	4	4
Switch Phase						
Minimum Initial (s)	5.0	10.0	10.0		5.0	5.0
Minimum Split (s)	30.0	22.4	26.4		41.1	41.1
Total Split (s)	34.0	70.4	36.4		41.1	41.1
Total Split (%)	30.5%	63.1%	32.6%		36.9%	36.9%
Maximum Green (s)	28.0	64.0	30.0		35.0	35.0
Yellow Time (s)	3.7	3.7	3.7		3.7	3.7
All-Red Time (s)	2.3	2.7	2.7		2.4	2.4
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	6.0	6.4	6.4		6.1	6.1
Lead/Lag	Lead		Lag			
Lead-Lag Optimize?	Yes		Yes			
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Recall Mode	None	Max	None		None	None
Walk Time (s)	12.0		7.0		23.0	23.0
Flash Dont Walk (s)	12.0		13.0		12.0	12.0
Pedestrian Calls (#/hr)	0		0		0	0
Act Effct Green (s)	28.0	64.0	30.0	69.8	33.7	33.7
Actuated g/C Ratio	0.25	0.58	0.27	0.63	0.31	0.31
v/c Ratio	1.40	0.16	0.78	0.60	0.71	0.75
Control Delay	219.1	11.1	44.4	13.3	37.2	17.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	219.1	11.1	44.4	13.3	37.2	17.6
LOS	F	B	D	B	D	B
Approach Delay		160.5	24.3		30.5	
Approach LOS		F	C		C	
Queue Length 50th (m)	~183.7	16.9	80.1	70.4	73.4	32.8
Queue Length 95th (m)	#225.8	22.5	103.4	87.0	89.2	79.2
Internal Link Dist (m)		246.2	233.1		115.6	
Turn Bay Length (m)	135.0			115.0		35.0
Base Capacity (vph)	826	2799	913	2209	1502	729
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	1.40	0.16	0.78	0.59	0.69	0.74

Intersection Summary

Area Type: Other
Cycle Length: 111.5
Actuated Cycle Length: 110.2
Natural Cycle: 120
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 1.40
Intersection Signal Delay: 68.3 — Intersection LOS: E
Intersection Capacity Utilization 85.6% — 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: 3: Wellington Street & Portage Bridge

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	580	747	74	54	936	250	44	573	77	168	449	274
Future Volume (vph)	580	747	74	54	936	250	44	573	77	168	449	274
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0		0.0	0.0		50.0	0.0		0.0	100.0		0.0
Storage Lanes	1		0	1		0	0		0	1		1
Taper Length (m)	30.0			30.0			30.0			30.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	0.95	0.95	0.95	1.00	1.00	1.00
Ped Bike Factor		1.00		0.99	0.98			0.98		0.98		0.91
Frt		0.987			0.968			0.983				0.850
Flt Protected	0.950			0.950				0.997		0.950		
Satd. Flow (prot)	1676	3298	0	1676	3169	0	0	3242	0	1676	1765	1500
Flt Permitted	0.095			0.319				0.761		0.123		
Satd. Flow (perm)	168	3298	0	560	3169	0	0	2470	0	213	1765	1366
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		13			28			11				298
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		167.4			213.1			205.5			334.4	
Travel Time (s)		12.1			15.3			14.8			24.1	
Confl. Peds. (#/hr)	80		9	9		80	57		84	84		57
Confl. Bikes (#/hr)			2			8			2			9
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	630	812	80	59	1017	272	48	623	84	183	488	298
Shared Lane Traffic (%)												
Lane Group Flow (vph)	630	892	0	59	1289	0	0	755	0	183	488	298
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	1		1	1		1	1		1	1	1
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Size(m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	2.0
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Turn Type	pm+pt	NA		Perm	NA		Perm	NA		pm+pt	NA	Perm
Protected Phases	5	2			6			8		7	4	
Permitted Phases	2			6			8			4		4
Detector Phase	5	2		6	6		8	8		7	4	4
Switch Phase												
Minimum Initial (s)	5.0	10.0		10.0	10.0		10.0	10.0		5.0	10.0	10.0
Minimum Split (s)	11.5	36.5		36.5	36.5		36.5	36.5		11.5	36.5	36.5
Total Split (s)	29.0	71.0		42.0	42.0		38.0	38.0		11.5	49.5	49.5
Total Split (%)	24.1%	58.9%		34.9%	34.9%		31.5%	31.5%		9.5%	41.1%	41.1%
Maximum Green (s)	22.5	64.5		35.5	35.5		31.5	31.5		5.0	43.0	43.0
Yellow Time (s)	3.3	3.3		3.3	3.3		3.3	3.3		3.3	3.3	3.3
All-Red Time (s)	3.2	3.2		3.2	3.2		3.2	3.2		3.2	3.2	3.2
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0		0.0	0.0	0.0
Total Lost Time (s)	6.5	6.5		6.5	6.5			6.5		6.5	6.5	6.5
Lead/Lag	Lead			Lag	Lag		Lag	Lag		Lead		
Lead-Lag Optimize?	Yes			Yes	Yes		Yes	Yes		Yes		
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Recall Mode	None	C-Max		C-Max	C-Max		None	None		None	None	None
Walk Time (s)		7.0		7.0	7.0		7.0	7.0			7.0	7.0
Flash Dont Walk (s)		23.0		23.0	23.0		21.0	21.0			21.0	21.0
Pedestrian Calls (#/hr)		0		0	0		0	0			0	0
Act Effct Green (s)	64.5	64.5		35.5	35.5			31.5		43.0	43.0	43.0
Actuated g/C Ratio	0.54	0.54		0.29	0.29			0.26		0.36	0.36	0.36
v/c Ratio	1.70	0.50		0.36	1.35			1.16		1.35	0.78	0.44
Control Delay	352.2	18.8		41.3	199.7			126.6		225.3	44.4	5.2
Queue Delay	0.0	0.0		0.0	0.0			0.0		0.0	0.0	0.0
Total Delay	352.2	18.8		41.3	199.7			126.6		225.3	44.4	5.2
LOS	F	B		D	F			F		F	D	A
Approach Delay		156.8			192.8			126.6			66.5	
Approach LOS		F			F			F			E	
Queue Length 50th (m)	~216.7	70.3		11.6	~220.2			~116.0		~45.5	107.2	0.0
Queue Length 95th (m)	#290.5	88.3		25.4	#265.1			#156.7		#93.2	151.1	19.3
Internal Link Dist (m)		143.4			189.1			181.5			310.4	
Turn Bay Length (m)										100.0		
Base Capacity (vph)	371	1771		164	953			653		136	629	679
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	1.70	0.50		0.36	1.35			1.16		1.35	0.78	0.44

Intersection Summary

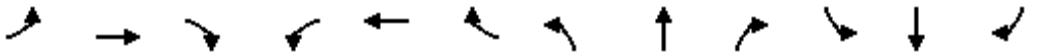
Area Type: Other
Cycle Length: 120.5
Actuated Cycle Length: 120.5
Offset: 9 (7%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 150
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.70
Intersection Signal Delay: 143.3 Intersection LOS: F
Intersection Capacity Utilization 140.6% ICU Level of Service H
Analysis Period (min) 15
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 5: Booth Street & Albert Street

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	0	8	1197	9	0	690
Future Volume (Veh/h)	0	8	1197	9	0	690
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	9	1301	10	0	750
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)			334			75
pX, platoon unblocked	0.91	0.88			0.88	
vC, conflicting volume	1681	656			1311	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	964	338			1082	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	98			100	
cM capacity (veh/h)	231	580			564	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	9	867	444	375	375
Volume Left	0	0	0	0	0
Volume Right	9	0	10	0	0
cSH	580	1700	1700	1700	1700
Volume to Capacity	0.02	0.51	0.26	0.22	0.22
Queue Length 95th (m)	0.4	0.0	0.0	0.0	0.0
Control Delay (s)	11.3	0.0	0.0	0.0	0.0
Lane LOS	B				
Approach Delay (s)	11.3	0.0		0.0	
Approach LOS	B				

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	45.2%	ICU Level of Service	A
Analysis Period (min)	15		



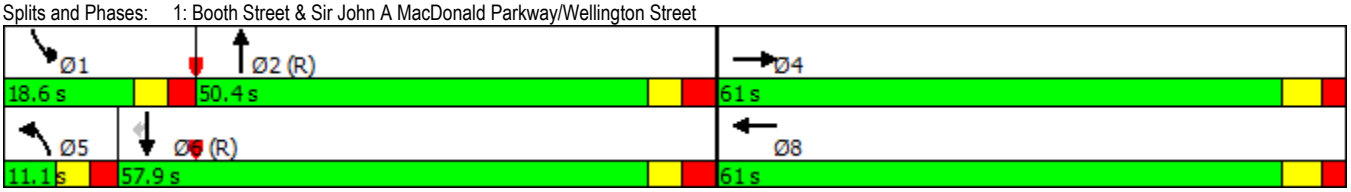
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	1314	0	0	683	127	0	867	142	137	1031	234
Future Volume (vph)	0	1314	0	0	683	127	0	867	142	137	1031	234
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0		0.0	0.0		0.0	10.0		0.0	135.0		50.0
Storage Lanes	0		0	0		0	1		0	1		1
Taper Length (m)	30.0			30.0			30.0			30.0		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	1.00
Ped Bike Factor					0.99			0.99		0.99		0.96
Frt					0.976			0.979				0.850
Flt Protected										0.950		
Satd. Flow (prot)	0	3353	0	0	3253	0	1765	3250	0	1676	3353	1500
Flt Permitted										0.950		
Satd. Flow (perm)	0	3353	0	0	3253	0	1765	3250	0	1658	3353	1438
Right Turn on Red			No			Yes			Yes			Yes
Satd. Flow (RTOR)					20			15				142
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		115.0			144.3			74.7			217.9	
Travel Time (s)		8.3			10.4			5.4			15.7	
Confl. Peds. (#/hr)	6		2	2		6	21		36	36		21
Confl. Bikes (#/hr)			28			34			15			1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	1428	0	0	742	138	0	942	154	149	1121	254
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1428	0	0	880	0	0	1096	0	149	1121	254
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors		1			1		1	1		1	1	1
Detector Template										Left		Right
Leading Detector (m)		10.0			10.0		0.0	10.0		2.0	10.0	2.0
Trailing Detector (m)		0.0			0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Position(m)		0.0			0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Size(m)		10.0			10.0		0.0	10.0		2.0	10.0	2.0
Detector 1 Type		Cl+Ex			Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)		0.0			0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)		0.0			0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)		0.0			0.0		0.0	0.0		0.0	0.0	0.0
Turn Type		NA			NA		Prot	NA		Prot	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases												6
Detector Phase		4			8		5	2		1	6	6
Switch Phase												
Minimum Initial (s)		10.0			10.0		5.0	10.0		5.0	10.0	10.0
Minimum Split (s)		37.3			37.3		11.1	34.8		11.1	34.8	34.8
Total Split (s)		61.0			61.0		11.1	50.4		18.6	57.9	57.9
Total Split (%)		46.9%			46.9%		8.5%	38.8%		14.3%	44.5%	44.5%
Maximum Green (s)		54.7			54.7		5.0	43.6		12.5	51.1	51.1
Yellow Time (s)		3.7			3.7		3.3	3.3		3.3	3.3	3.3
All-Red Time (s)		2.6			2.6		2.8	3.5		2.8	3.5	3.5
Lost Time Adjust (s)		0.0			0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)		6.3			6.3		6.1	6.8		6.1	6.8	6.8
Lead/Lag							Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)		3.0			3.0		3.0	3.0		3.0	3.0	3.0

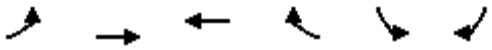
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Recall Mode		Max			Max		None	C-Max		None	C-Max	C-Max
Walk Time (s)		7.0			7.0			7.0			7.0	7.0
Flash Dont Walk (s)		24.0			24.0			21.0			21.0	21.0
Pedestrian Calls (#/hr)		5			5			5			5	5
Act Effct Green (s)		54.7			54.7			43.6		12.5	62.2	62.2
Actuated g/C Ratio		0.42			0.42			0.34		0.10	0.48	0.48
v/c Ratio		1.01			0.64			1.00		0.93	0.70	0.33
Control Delay		64.6			31.6			49.8		111.7	29.5	10.1
Queue Delay		0.0			3.1			0.0		0.0	0.0	0.0
Total Delay		64.6			34.7			49.8		111.7	29.5	10.1
LOS		E			C			D		F	C	B
Approach Delay		64.6			34.7			49.8			34.3	
Approach LOS		E			C			D			C	
Queue Length 50th (m)		~206.1			95.3			131.6		40.5	121.7	16.7
Queue Length 95th (m)		#257.8			118.4			m#142.6		#83.7	147.8	35.9
Internal Link Dist (m)		91.0			120.3			50.7			193.9	
Turn Bay Length (m)										135.0		50.0
Base Capacity (vph)		1410			1380			1099		161	1604	762
Starvation Cap Reductn		0			381			0		0	0	0
Spillback Cap Reductn		0			0			0		0	0	0
Storage Cap Reductn		0			0			0		0	0	0
Reduced v/c Ratio		1.01			0.88			1.00		0.93	0.70	0.33

Intersection Summary

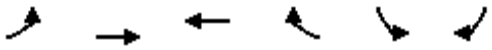
Area Type: Other
Cycle Length: 130
Actuated Cycle Length: 130
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green
Natural Cycle: 125
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.01
Intersection Signal Delay: 46.6 Intersection LOS: D
Intersection Capacity Utilization 92.9% ICU Level of Service F
Analysis Period (min) 15
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 1: Booth Street & Sir John A MacDonald Parkway/Wellington Street





Lane Group	EBL	EBT	WBT	WBR	SBL	SBR	Ø3
Lane Configurations							
Traffic Volume (vph)	700	1051	311	817	2096	349	
Future Volume (vph)	700	1051	311	817	2096	349	
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	
Storage Length (m)	135.0			115.0	0.0	35.0	
Storage Lanes	2			3	3	1	
Taper Length (m)	30.0				30.0		
Lane Util. Factor	0.97	0.91	0.95	0.76	0.94	1.00	
Ped Bike Factor	1.00				0.99	0.98	
Frt				0.850		0.850	
Flt Protected	0.950				0.950		
Satd. Flow (prot)	3252	4818	3353	3420	4728	1500	
Flt Permitted	0.950				0.950		
Satd. Flow (perm)	3236	4818	3353	3420	4687	1474	
Right Turn on Red				Yes		Yes	
Satd. Flow (RTOR)				13		121	
Link Speed (k/h)		50	50		50		
Link Distance (m)		270.2	257.1		139.6		
Travel Time (s)		19.5	18.5		10.1		
Confl. Peds. (#/hr)	4			4	5	5	
Confl. Bikes (#/hr)				38			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	
Adj. Flow (vph)	761	1142	338	888	2278	379	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	761	1142	338	888	2278	379	
Enter Blocked Intersection	No	No	No	No	No	No	
Lane Alignment	Left	Left	Left	Right	Left	Right	
Median Width(m)		7.2	7.2		10.8		
Link Offset(m)		0.0	0.0		0.0		
Crosswalk Width(m)		4.8	4.8		4.8		
Two way Left Turn Lane							
Headway Factor	1.07	1.07	1.07	1.07	1.07	1.07	
Turning Speed (k/h)	25			15	25	15	
Number of Detectors	1	1	1	1	1	1	
Detector Template	Left			Right	Left		
Leading Detector (m)	2.0	10.0	10.0	2.0	2.0	0.0	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	2.0	10.0	10.0	2.0	2.0	0.0	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel							
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	
Turn Type	Prot	NA	NA	custom	Prot	Perm	
Protected Phases	5	2	6	6 4 3	4		3
Permitted Phases		2				4	
Detector Phase	5	2	6	6 4 3	4	4	
Switch Phase							
Minimum Initial (s)	5.0	10.0	10.0		5.0	5.0	4.0
Minimum Split (s)	31.0	42.4	26.4		44.1	44.1	8.0
Total Split (s)	32.0	61.0	29.0		61.0	61.0	8.0
Total Split (%)	24.6%	46.9%	22.3%		46.9%	46.9%	6%
Maximum Green (s)	26.0	54.6	22.6		54.9	54.9	4.0
Yellow Time (s)	3.7	3.7	3.7		3.7	3.7	3.5
All-Red Time (s)	2.3	2.7	2.7		2.4	2.4	0.5
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.4	6.4		6.1	6.1	
Lead/Lag	Lead		Lag		Lag	Lag	Lead
Lead-Lag Optimize?	Yes		Yes		Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0	3.0



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR	Ø3
Recall Mode	None	Max	None		None	None	None
Walk Time (s)	13.0		7.0		26.0	26.0	
Flash Dont Walk (s)	12.0		13.0		12.0	12.0	
Pedestrian Calls (#/hr)	0		0		0	0	
Act Effct Green (s)	26.0	54.6	22.6	91.6	54.9	54.9	
Actuated g/C Ratio	0.20	0.42	0.17	0.70	0.42	0.42	
v/c Ratio	1.17	0.56	0.58	0.37	1.14	0.55	
Control Delay	137.9	30.0	53.9	8.0	105.5	22.0	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	137.9	30.0	53.9	8.0	105.5	22.0	
LOS	F	C	D	A	F	C	
Approach Delay		73.2	20.7		93.6		
Approach LOS		E	C		F		
Queue Length 50th (m)	~125.8	84.6	44.5	37.1	~254.2	51.1	
Queue Length 95th (m)	#165.9	99.7	61.2	45.8	#282.8	83.4	
Internal Link Dist (m)		246.2	233.1		115.6		
Turn Bay Length (m)	135.0			115.0		35.0	
Base Capacity (vph)	650	2023	582	2413	1996	692	
Starvation Cap Reductn	0	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	0	
Reduced v/c Ratio	1.17	0.56	0.58	0.37	1.14	0.55	

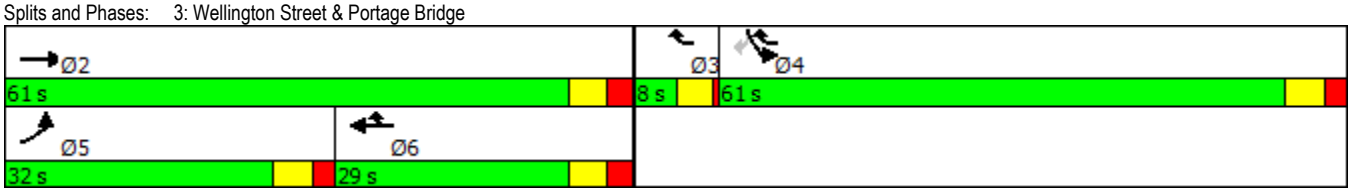
Intersection Summary

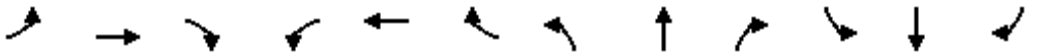
Area Type: Other
Cycle Length: 130
Actuated Cycle Length: 130
Natural Cycle: 150
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 1.17
Intersection Signal Delay: 71.4 — Intersection LOS: E
Intersection Capacity Utilization 88.6% — ICU Level of Service E
Analysis Period (min) 15

~ 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: 3: Wellington Street & Portage Bridge





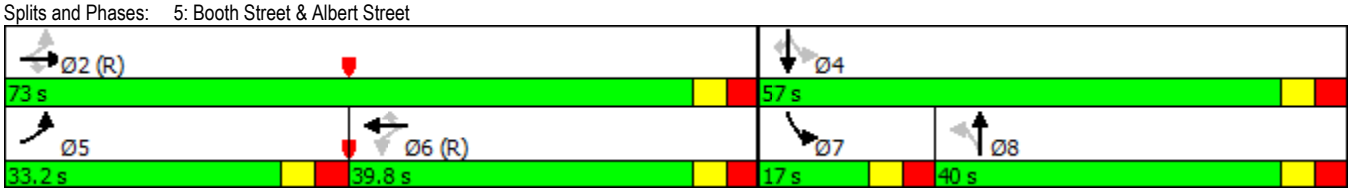
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	424	917	43	11	389	165	35	566	40	225	549	492
Future Volume (vph)	424	917	43	11	389	165	35	566	40	225	549	492
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0		50.0	0.0		50.0	0.0		0.0	100.0		0.0
Storage Lanes	1		1	1		1	0		0	1		1
Taper Length (m)	30.0			30.0			30.0			30.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	1.00	0.95	0.95	0.95	1.00	1.00	1.00
Ped Bike Factor	0.96		0.93			0.90		0.98		0.96		0.89
Frt			0.850			0.850		0.991				0.850
Flt Protected	0.950			0.950				0.997		0.950		
Satd. Flow (prot)	1676	1765	1500	1676	3353	1500	0	3267	0	1676	1765	1500
Flt Permitted	0.336			0.118				0.731		0.148		
Satd. Flow (perm)	571	1765	1394	208	3353	1354	0	2391	0	250	1765	1328
Right Turn on Red			Yes			No			Yes			No
Satd. Flow (RTOR)			84					5				
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		167.4			213.1			205.5			334.4	
Travel Time (s)		12.1			15.3			14.8			24.1	
Confl. Peds. (#/hr)	67		24	24		67	75		90	90		75
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	461	997	47	12	423	179	38	615	43	245	597	535
Shared Lane Traffic (%)												
Lane Group Flow (vph)	461	997	47	12	423	179	0	696	0	245	597	535
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	1	1	1	1	1	1	1		1	1	1
Detector Template	Left			Left			Left			Left		Right
Leading Detector (m)	2.0	10.0	0.0	2.0	10.0	0.0	2.0	10.0		2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Size(m)	2.0	10.0	0.0	2.0	10.0	0.0	2.0	10.0		2.0	10.0	2.0
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Turn Type	pm+pt	NA	Perm	Perm	NA	Perm	Perm	NA		pm+pt	NA	Perm
Protected Phases	5	2			6			8		7	4	
Permitted Phases	2		2	6		6	8			4		4
Detector Phase	5	2	2	6	6	6	8	8		7	4	4
Switch Phase												
Minimum Initial (s)	5.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0		5.0	10.0	10.0
Minimum Split (s)	11.5	36.5	36.5	36.5	36.5	36.5	36.5	36.5		11.5	36.5	36.5
Total Split (s)	33.2	73.0	73.0	39.8	39.8	39.8	40.0	40.0		17.0	57.0	57.0
Total Split (%)	25.5%	56.2%	56.2%	30.6%	30.6%	30.6%	30.8%	30.8%		13.1%	43.8%	43.8%
Maximum Green (s)	26.7	66.5	66.5	33.3	33.3	33.3	33.5	33.5		10.5	50.5	50.5
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3		3.3	3.3	3.3
All-Red Time (s)	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2		3.2	3.2	3.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0		0.0		0.0	0.0	0.0
Total Lost Time (s)	6.5	6.5	6.5	6.5	6.5	6.5		6.5		6.5	6.5	6.5
Lead/Lag	Lead			Lag	Lag	Lag	Lag	Lag		Lead		
Lead-Lag Optimize?	Yes			Yes	Yes	Yes	Yes	Yes		Yes		
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Recall Mode	None	C-Max	C-Max	C-Max	C-Max	C-Max	None	None		None	None	None

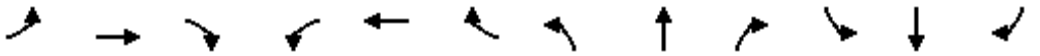
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Walk Time (s)		7.0	7.0	7.0	7.0	7.0	7.0	7.0			7.0	7.0
Flash Dont Walk (s)		23.0	23.0	23.0	23.0	23.0	21.0	21.0			21.0	21.0
Pedestrian Calls (#/hr)		5	5	5	5	5	5	5			5	5
Act Effct Green (s)	66.5	66.5	66.5	34.0	34.0	34.0		33.5		50.5	50.5	50.5
Actuated g/C Ratio	0.51	0.51	0.51	0.26	0.26	0.26		0.26		0.39	0.39	0.39
v/c Ratio	0.90	1.11	0.06	0.22	0.48	0.51		1.12		1.16	0.87	1.04
Control Delay	44.3	94.3	0.7	50.5	43.0	47.1		119.2		129.1	41.6	78.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0		0.0		0.0	0.0	0.0
Total Delay	44.3	94.3	0.7	50.5	43.0	47.1		119.2		129.1	41.6	78.8
LOS	D	F	A	D	D	D		F		F	D	E
Approach Delay		76.1			44.4			119.2			71.7	
Approach LOS		E			D			F			E	
Queue Length 50th (m)	81.2	~305.7	0.0	2.6	51.3	41.6		~113.6		~56.1	169.2	~159.0
Queue Length 95th (m)	#130.7	#387.4	1.4	9.4	68.4	66.8		#154.3		#107.8	#221.2	#232.6
Internal Link Dist (m)		143.4			189.1			181.5			310.4	
Turn Bay Length (m)			50.0			50.0				100.0		
Base Capacity (vph)	519	902	754	54	876	353		619		212	685	515
Starvation Cap Reductn	0	0	0	0	0	0		0		0	0	0
Spillback Cap Reductn	0	0	0	0	0	0		0		0	0	0
Storage Cap Reductn	0	0	0	0	0	0		0		0	0	0
Reduced v/c Ratio	0.89	1.11	0.06	0.22	0.48	0.51		1.12		1.16	0.87	1.04

Intersection Summary

Area Type: Other
Cycle Length: 130
Actuated Cycle Length: 130
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green, Master Intersection
Natural Cycle: 120
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.16
Intersection Signal Delay: 77.1 Intersection LOS: E
Intersection Capacity Utilization 134.6% ICU Level of Service H
Analysis Period (min) 15
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 5: Booth Street & Albert Street





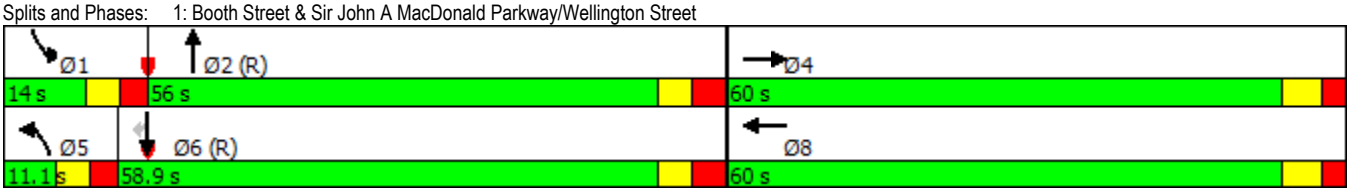
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	922	0	0	1319	107	0	1012	193	95	690	228
Future Volume (vph)	0	922	0	0	1319	107	0	1012	193	95	690	228
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0		0.0	0.0		0.0	10.0		0.0	135.0		50.0
Storage Lanes	0		0	0		0	1		0	1		1
Taper Length (m)	30.0			30.0			30.0			30.0		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	1.00
Ped Bike Factor					1.00			1.00		1.00		0.97
Frt					0.989			0.976				0.850
Flt Protected										0.950		
Satd. Flow (prot)	0	3353	0	0	3309	0	1765	3257	0	1676	3353	1500
Flt Permitted										0.950		
Satd. Flow (perm)	0	3353	0	0	3309	0	1765	3257	0	1673	3353	1455
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					8			20				101
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		115.0			144.3			74.7			217.9	
Travel Time (s)		8.3			10.4			5.4			15.7	
Confl. Peds. (#/hr)	9		3	3		9	5		10	10		5
Confl. Bikes (#/hr)			7			8			6			20
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	1002	0	0	1434	116	0	1100	210	103	750	248
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1002	0	0	1550	0	0	1310	0	103	750	248
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors		1			1		1	1		1	1	1
Detector Template		Thru			Thru			Thru		Left	Thru	Right
Leading Detector (m)		10.0			10.0		0.0	10.0		2.0	10.0	2.0
Trailing Detector (m)		0.0			0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Position(m)		0.0			0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Size(m)		10.0			10.0		0.0	10.0		2.0	10.0	2.0
Detector 1 Type		Cl+Ex			Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)		0.0			0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)		0.0			0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)		0.0			0.0		0.0	0.0		0.0	0.0	0.0
Turn Type		NA			NA		Prot	NA		Prot	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases												6
Detector Phase		4			8		5	2		1	6	6
Switch Phase												
Minimum Initial (s)		10.0			10.0		5.0	10.0		5.0	10.0	10.0
Minimum Split (s)		37.3			37.3		11.1	37.8		11.1	37.8	37.8
Total Split (s)		60.0			60.0		11.1	56.0		14.0	58.9	58.9
Total Split (%)		46.2%			46.2%		8.5%	43.1%		10.8%	45.3%	45.3%
Maximum Green (s)		53.7			53.7		5.0	49.2		7.9	52.1	52.1
Yellow Time (s)		3.7			3.7		3.3	3.3		3.3	3.3	3.3
All-Red Time (s)		2.6			2.6		2.8	3.5		2.8	3.5	3.5
Lost Time Adjust (s)		0.0			0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)		6.3			6.3		6.1	6.8		6.1	6.8	6.8
Lead/Lag							Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)		3.0			3.0		3.0	3.0		3.0	3.0	3.0

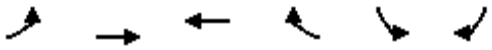
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Recall Mode		None			None		None	C-Max		None	C-Max	C-Max
Walk Time (s)		7.0			7.0			7.0			7.0	7.0
Flash Dont Walk (s)		24.0			24.0			21.0			21.0	21.0
Pedestrian Calls (#/hr)		5			5			5			5	5
Act Effct Green (s)		53.7			53.7			49.2		7.9	63.2	63.2
Actuated g/C Ratio		0.41			0.41			0.38		0.06	0.49	0.49
v/c Ratio		0.72			1.13			1.05		1.02	0.46	0.33
Control Delay		35.7			104.3			60.6		154.3	23.3	12.9
Queue Delay		0.0			0.9			0.0		0.0	0.0	0.0
Total Delay		35.7			105.1			60.6		154.3	23.3	12.9
LOS		D			F			E		F	C	B
Approach Delay		35.7			105.1			60.6			33.2	
Approach LOS		D			F			E			C	
Queue Length 50th (m)		117.6			~254.9			~202.8		~28.7	68.7	22.3
Queue Length 95th (m)		143.6			#300.4			m96.3		#67.8	85.9	41.6
Internal Link Dist (m)		91.0			120.3			50.7			193.9	
Turn Bay Length (m)										135.0		50.0
Base Capacity (vph)		1385			1371			1245		101	1630	759
Starvation Cap Reductn		0			270			0		0	0	0
Spillback Cap Reductn		0			0			0		0	0	0
Storage Cap Reductn		0			0			0		0	0	0
Reduced v/c Ratio		0.72			1.41			1.05		1.02	0.46	0.33

Intersection Summary

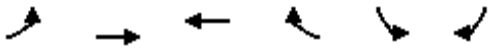
Area Type: Other
Cycle Length: 130
Actuated Cycle Length: 130
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green
Natural Cycle: 150
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.13
Intersection Signal Delay: 63.4 Intersection LOS: E
Intersection Capacity Utilization 99.9% ICU Level of Service F
Analysis Period (min) 15
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 1: Booth Street & Sir John A MacDonald Parkway/Wellington Street





Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	1062	417	657	1200	949	494
Future Volume (vph)	1062	417	657	1200	949	494
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	135.0			115.0	0.0	35.0
Storage Lanes	2			3	3	1
Taper Length (m)	30.0				30.0	
Lane Util. Factor	0.97	0.91	0.95	0.76	0.94	1.00
Ped Bike Factor	0.99				0.94	
Frt				0.850		0.850
Flt Protected	0.950				0.950	
Satd. Flow (prot)	3252	4818	3353	3420	4728	1500
Flt Permitted	0.950				0.950	
Satd. Flow (perm)	3226	4818	3353	3420	4438	1500
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)				31		299
Link Speed (k/h)		50	50		50	
Link Distance (m)		270.2	257.1		139.6	
Travel Time (s)		19.5	18.5		10.1	
Confl. Peds. (#/hr)	11			11	33	
Confl. Bikes (#/hr)				1		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1154	453	714	1304	1032	537
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1154	453	714	1304	1032	537
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		7.2	7.2		10.8	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.8	4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.07	1.07	1.07	1.07	1.07	1.07
Turning Speed (k/h)	25			15	25	15
Number of Detectors	1	1	1	1	1	1
Detector Template	Left	Thru	Thru	Right	Left	
Leading Detector (m)	2.0	10.0	10.0	2.0	2.0	0.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	10.0	10.0	2.0	2.0	0.0
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Turn Type	Prot	NA	NA	pt+ov	Prot	Perm
Protected Phases	5	2	6	6 4	4	
Permitted Phases		2				4
Detector Phase	5	2	6	6 4	4	4
Switch Phase						
Minimum Initial (s)	5.0	10.0	10.0		5.0	5.0
Minimum Split (s)	30.0	22.4	26.4		41.1	41.1
Total Split (s)	53.0	88.9	35.9		41.1	41.1
Total Split (%)	40.8%	68.4%	27.6%		31.6%	31.6%
Maximum Green (s)	47.0	82.5	29.5		35.0	35.0
Yellow Time (s)	3.7	3.7	3.7		3.7	3.7
All-Red Time (s)	2.3	2.7	2.7		2.4	2.4
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	6.0	6.4	6.4		6.1	6.1
Lead/Lag	Lead		Lag			
Lead-Lag Optimize?	Yes		Yes			
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0

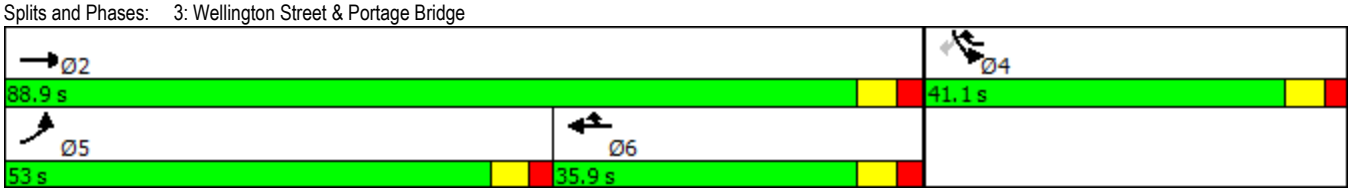


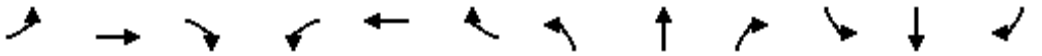
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Recall Mode	None	Max	None		None	None
Walk Time (s)	12.0		7.0		23.0	23.0
Flash Dont Walk (s)	12.0		13.0		12.0	12.0
Pedestrian Calls (#/hr)	0		0		0	0
Act Effct Green (s)	47.0	82.5	29.5	70.4	34.8	34.8
Actuated g/C Ratio	0.36	0.64	0.23	0.54	0.27	0.27
v/c Ratio	0.98	0.15	0.94	0.70	0.82	0.87
Control Delay	63.0	9.7	69.9	23.8	50.6	35.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	63.0	9.7	69.9	23.8	50.6	35.1
LOS	E	A	E	C	D	D
Approach Delay		47.9	40.1		45.3	
Approach LOS		D	D		D	
Queue Length 50th (m)	157.7	16.9	100.2	106.7	92.6	67.1
Queue Length 95th (m)	#206.5	22.0	#138.7	128.7	110.1	#134.9
Internal Link Dist (m)		246.2	233.1		115.6	
Turn Bay Length (m)	135.0			115.0		35.0
Base Capacity (vph)	1177	3063	761	1874	1274	623
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.98	0.15	0.94	0.70	0.81	0.86

Intersection Summary

Area Type: Other
Cycle Length: 130
Actuated Cycle Length: 129.8
Natural Cycle: 120
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.98
Intersection Signal Delay: 44.1 Intersection LOS: D
Intersection Capacity Utilization 85.6% 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: Wellington Street & Portage Bridge





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	580	747	74	54	936	250	44	573	77	168	449	274
Future Volume (vph)	580	747	74	54	936	250	44	573	77	168	449	274
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0		0.0	0.0		50.0	0.0		0.0	100.0		0.0
Storage Lanes	1		0	1		0	0		0	1		1
Taper Length (m)	30.0			30.0			30.0			30.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	0.95	0.95	0.95	1.00	1.00	1.00
Ped Bike Factor		1.00		0.99	0.97			0.98		0.98		0.91
Frt		0.987			0.968			0.983				0.850
Flt Protected	0.950			0.950				0.997		0.950		
Satd. Flow (prot)	1676	3297	0	1676	3164	0	0	3239	0	1676	1765	1500
Flt Permitted	0.095			0.319				0.743		0.107		
Satd. Flow (perm)	168	3297	0	560	3164	0	0	2409	0	185	1765	1358
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		13			26			10				286
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		167.4			213.1			205.5			334.4	
Travel Time (s)		12.1			15.3			14.8			24.1	
Confl. Peds. (#/hr)	80		9	9		80	57		84	84		57
Confl. Bikes (#/hr)			2			8			2			9
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	630	812	80	59	1017	272	48	623	84	183	488	298
Shared Lane Traffic (%)												
Lane Group Flow (vph)	630	892	0	59	1289	0	0	755	0	183	488	298
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	1		1	1		1	1		1	1	1
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Size(m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	2.0
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Turn Type	pm+pt	NA		Perm	NA		Perm	NA		pm+pt	NA	Perm
Protected Phases	5	2			6			8		7	4	
Permitted Phases	2			6			8			4		4
Detector Phase	5	2		6	6		8	8		7	4	4
Switch Phase												
Minimum Initial (s)	5.0	10.0		10.0	10.0		10.0	10.0		5.0	10.0	10.0
Minimum Split (s)	11.5	36.5		36.5	36.5		36.5	36.5		11.5	36.5	36.5
Total Split (s)	36.0	78.0		42.0	42.0		39.0	39.0		13.0	52.0	52.0
Total Split (%)	27.7%	60.0%		32.3%	32.3%		30.0%	30.0%		10.0%	40.0%	40.0%
Maximum Green (s)	29.5	71.5		35.5	35.5		32.5	32.5		6.5	45.5	45.5
Yellow Time (s)	3.3	3.3		3.3	3.3		3.3	3.3		3.3	3.3	3.3
All-Red Time (s)	3.2	3.2		3.2	3.2		3.2	3.2		3.2	3.2	3.2
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0		0.0	0.0	0.0
Total Lost Time (s)	6.5	6.5		6.5	6.5			6.5		6.5	6.5	6.5
Lead/Lag	Lead			Lag	Lag		Lag	Lag		Lead		
Lead-Lag Optimize?	Yes			Yes	Yes		Yes	Yes		Yes		
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Recall Mode	None	C-Max		C-Max	C-Max		None	None		None	None	None
Walk Time (s)		7.0		7.0	7.0		7.0	7.0			7.0	7.0
Flash Dont Walk (s)		23.0		23.0	23.0		21.0	21.0			21.0	21.0
Pedestrian Calls (#/hr)		0		0	0		0	0			0	0
Act Effct Green (s)	71.5	71.5		35.5	35.5			32.5		45.5	45.5	45.5
Actuated g/C Ratio	0.55	0.55		0.27	0.27			0.25		0.35	0.35	0.35
v/c Ratio	1.45	0.49		0.39	1.46			1.24		1.32	0.79	0.45
Control Delay	246.9	18.9		47.5	248.3			162.0		206.9	37.6	12.4
Queue Delay	0.0	0.0		0.0	0.0			0.0		0.0	0.0	0.0
Total Delay	246.9	18.9		47.5	248.3			162.0		206.9	37.6	12.4
LOS	F	B		D	F			F		F	D	B
Approach Delay		113.2			239.6			162.0			61.8	
Approach LOS		F			F			F			E	
Queue Length 50th (m)	~217.3	73.8		13.0	~248.8			~132.2		~47.7	127.7	39.7
Queue Length 95th (m)	#292.4	91.5		27.8	#294.1			#173.8		#97.4	174.4	67.7
Internal Link Dist (m)		143.4			189.1			181.5			310.4	
Turn Bay Length (m)										100.0		
Base Capacity (vph)	434	1819		152	882			609		139	617	661
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	1.45	0.49		0.39	1.46			1.24		1.32	0.79	0.45

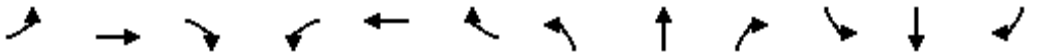
Intersection Summary

Area Type: Other
Cycle Length: 130
Actuated Cycle Length: 130
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 150
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.46
Intersection Signal Delay: 147.5 Intersection LOS: F
Intersection Capacity Utilization 140.6% ICU Level of Service H
Analysis Period (min) 15

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

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

Splits and Phases: 5: Booth Street & Albert Street



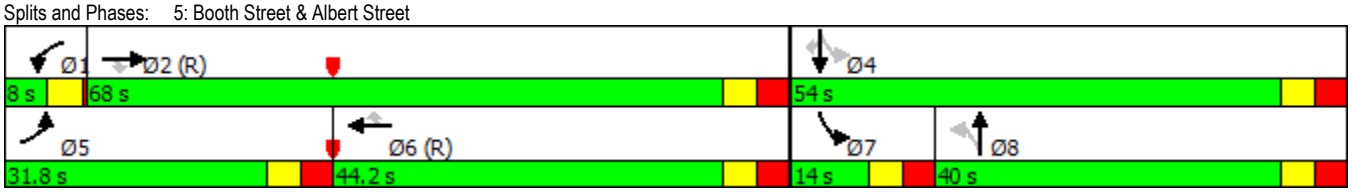
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	424	917	43	11	389	165	35	566	40	225	549	492
Future Volume (vph)	424	917	43	11	389	165	35	566	40	225	549	492
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0		50.0	0.0		50.0	0.0		0.0	100.0		0.0
Storage Lanes	2		1	1		1	0		0	1		1
Taper Length (m)	30.0			30.0			30.0			30.0		
Lane Util. Factor	0.97	1.00	1.00	1.00	0.95	1.00	0.95	0.95	0.95	1.00	1.00	1.00
Ped Bike Factor	0.92		0.93	0.99		0.90		0.98		0.96		0.89
Frt			0.850			0.850		0.991				0.850
Flt Protected	0.950			0.950				0.997		0.950		
Satd. Flow (prot)	3252	1765	1500	1676	3353	1500	0	3267	0	1676	1765	1500
Flt Permitted	0.950			0.950				0.675		0.148		
Satd. Flow (perm)	2990	1765	1394	1655	3353	1354	0	2208	0	250	1765	1328
Right Turn on Red			Yes			No			Yes			No
Satd. Flow (RTOR)			117					5				
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		167.4			213.1			205.5			334.4	
Travel Time (s)		12.1			15.3			14.8			24.1	
Confl. Peds. (#/hr)	67		24	24		67	75		90	90		75
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	461	997	47	12	423	179	38	615	43	245	597	535
Shared Lane Traffic (%)												
Lane Group Flow (vph)	461	997	47	12	423	179	0	696	0	245	597	535
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		7.2			7.2			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	1	1	1	1	1	1	1		1	1	1
Detector Template	Left			Left			Left			Left		Right
Leading Detector (m)	2.0	10.0	0.0	2.0	10.0	0.0	2.0	10.0		2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Size(m)	2.0	10.0	0.0	2.0	10.0	0.0	2.0	10.0		2.0	10.0	2.0
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA		pm+pt	NA	Perm
Protected Phases	5	2		1	6			8		7	4	
Permitted Phases			2			6	8			4		4
Detector Phase	5	2	2	1	6	6	8	8		7	4	4
Switch Phase												
Minimum Initial (s)	5.0	10.0	10.0	4.0	10.0	10.0	10.0	10.0		5.0	10.0	10.0
Minimum Split (s)	11.5	36.5	36.5	8.0	36.5	36.5	36.5	36.5		11.5	36.5	36.5
Total Split (s)	31.8	68.0	68.0	8.0	44.2	44.2	40.0	40.0		14.0	54.0	54.0
Total Split (%)	24.5%	52.3%	52.3%	6.2%	34.0%	34.0%	30.8%	30.8%		10.8%	41.5%	41.5%
Maximum Green (s)	25.3	61.5	61.5	4.0	37.7	37.7	33.5	33.5		7.5	47.5	47.5
Yellow Time (s)	3.3	3.3	3.3	3.5	3.3	3.3	3.3	3.3		3.3	3.3	3.3
All-Red Time (s)	3.2	3.2	3.2	0.5	3.2	3.2	3.2	3.2		3.2	3.2	3.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0		0.0		0.0	0.0	0.0
Total Lost Time (s)	6.5	6.5	6.5	4.0	6.5	6.5		6.5		6.5	6.5	6.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lag	Lag		Lead		
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		Yes		
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None		None	None	None

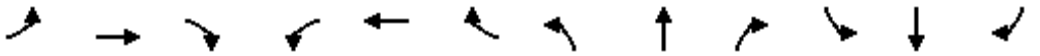
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Walk Time (s)		7.0	7.0		7.0	7.0	7.0	7.0			7.0	7.0
Flash Dont Walk (s)		23.0	23.0		23.0	23.0	21.0	21.0			21.0	21.0
Pedestrian Calls (#/hr)		5	5		5	5	5	5			5	5
Act Effct Green (s)	22.6	66.3	66.3	4.0	40.4	40.4		33.5		47.5	47.5	47.5
Actuated g/C Ratio	0.17	0.51	0.51	0.03	0.31	0.31		0.26		0.37	0.37	0.37
v/c Ratio	0.81	1.11	0.06	0.24	0.41	0.43		1.22		1.42	0.93	1.10
Control Delay	63.7	95.6	0.2	72.5	37.4	40.3		153.9		238.2	52.1	102.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0		0.0		0.0	0.0	0.0
Total Delay	63.7	95.6	0.2	72.5	37.4	40.3		153.9		238.2	52.1	102.4
LOS	E	F	A	E	D	D		F		F	D	F
Approach Delay		82.8			38.9			153.9			104.8	
Approach LOS		F			D			F			F	
Queue Length 50th (m)	61.8	~294.2	0.0	3.2	47.8	38.7		~120.7		~67.3	170.0	~167.8
Queue Length 95th (m)	80.1	#406.4	0.0	10.4	65.1	63.5		#161.5		#119.0	#233.0	#241.4
Internal Link Dist (m)		143.4			189.1			181.5			310.4	
Turn Bay Length (m)			50.0			50.0				100.0		
Base Capacity (vph)	632	899	768	51	1041	420		572		173	644	485
Starvation Cap Reductn	0	0	0	0	0	0		0		0	0	0
Spillback Cap Reductn	0	0	0	0	0	0		0		0	0	0
Storage Cap Reductn	0	0	0	0	0	0		0		0	0	0
Reduced v/c Ratio	0.73	1.11	0.06	0.24	0.41	0.43		1.22		1.42	0.93	1.10

Intersection Summary

Area Type: Other
Cycle Length: 130
Actuated Cycle Length: 130
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Green, Master Intersection
Natural Cycle: 150
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.42
Intersection Signal Delay: 95.4 Intersection LOS: F
Intersection Capacity Utilization 127.5% ICU Level of Service H
Analysis Period (min) 15
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 5: Booth Street & Albert Street





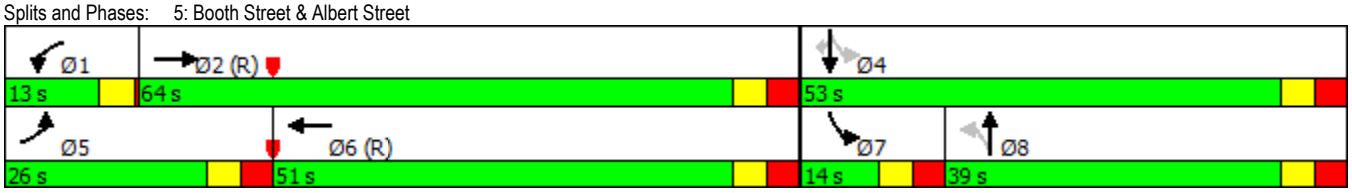
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	580	747	74	54	936	250	44	573	77	168	449	274
Future Volume (vph)	580	747	74	54	936	250	44	573	77	168	449	274
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0		0.0	0.0		50.0	0.0		0.0	100.0		0.0
Storage Lanes	2		0	1		0	0		0	1		1
Taper Length (m)	30.0			30.0			30.0			30.0		
Lane Util. Factor	0.97	0.95	0.95	1.00	0.95	0.95	0.95	0.95	0.95	1.00	1.00	1.00
Ped Bike Factor	0.97	1.00		0.99	0.98			0.98		0.98		0.91
Frt		0.987			0.968			0.983				0.850
Flt Protected	0.950			0.950				0.997		0.950		
Satd. Flow (prot)	3252	3297	0	1676	3165	0	0	3239	0	1676	1765	1500
Flt Permitted	0.950			0.950				0.762		0.107		
Satd. Flow (perm)	3158	3297	0	1667	3165	0	0	2471	0	185	1765	1358
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		10			28			10				289
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		167.4			213.1			205.5			334.4	
Travel Time (s)		12.1			15.3			14.8			24.1	
Confl. Peds. (#/hr)	80		9	9		80	57		84	84		57
Confl. Bikes (#/hr)			2			8			2			9
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	630	812	80	59	1017	272	48	623	84	183	488	298
Shared Lane Traffic (%)												
Lane Group Flow (vph)	630	892	0	59	1289	0	0	755	0	183	488	298
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		7.2			7.2			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	1		1	1		1	1		1	1	1
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Size(m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	2.0
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Turn Type	Prot	NA		Prot	NA		Perm	NA		pm+pt	NA	Perm
Protected Phases	5	2		1	6			8		7	4	
Permitted Phases							8			4		4
Detector Phase	5	2		1	6		8	8		7	4	4
Switch Phase												
Minimum Initial (s)	5.0	10.0		4.0	10.0		10.0	10.0		5.0	10.0	10.0
Minimum Split (s)	11.5	36.5		8.0	36.5		36.5	36.5		11.5	36.5	36.5
Total Split (s)	26.0	64.0		13.0	51.0		39.0	39.0		14.0	53.0	53.0
Total Split (%)	20.0%	49.2%		10.0%	39.2%		30.0%	30.0%		10.8%	40.8%	40.8%
Maximum Green (s)	19.5	57.5		9.0	44.5		32.5	32.5		7.5	46.5	46.5
Yellow Time (s)	3.3	3.3		3.5	3.3		3.3	3.3		3.3	3.3	3.3
All-Red Time (s)	3.2	3.2		0.5	3.2		3.2	3.2		3.2	3.2	3.2
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0		0.0	0.0	0.0
Total Lost Time (s)	6.5	6.5		4.0	6.5			6.5		6.5	6.5	6.5
Lead/Lag	Lead	Lag		Lead	Lag		Lag	Lag		Lead		
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes		
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0

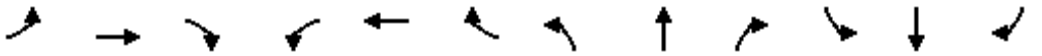
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Recall Mode	None	C-Max		None	C-Max		None	None		None	None	None
Walk Time (s)		7.0			7.0		7.0	7.0			7.0	7.0
Flash Dont Walk (s)		23.0			23.0		21.0	21.0			21.0	21.0
Pedestrian Calls (#/hr)		0			0		0	0			0	0
Act Effct Green (s)	19.5	60.2		8.3	44.5			32.5		46.5	46.5	46.5
Actuated g/C Ratio	0.15	0.46		0.06	0.34			0.25		0.36	0.36	0.36
v/c Ratio	1.29	0.58		0.56	1.17			1.21		1.20	0.77	0.44
Control Delay	190.3	27.9		78.5	124.6			149.5		165.7	43.5	16.2
Queue Delay	0.0	0.0		0.0	0.0			0.0		0.0	0.0	0.0
Total Delay	190.3	27.9		78.5	124.6			149.5		165.7	43.5	16.2
LOS	F	C		E	F			F		F	D	B
Approach Delay		95.1			122.6			149.5			58.2	
Approach LOS		F			F			F			E	
Queue Length 50th (m)	~111.4	93.9		15.6	~215.6			~129.8		~44.0	136.6	39.7
Queue Length 95th (m)	#149.6	116.2		31.0	#260.9			#171.5		#93.6	174.0	70.8
Internal Link Dist (m)		143.4			189.1			181.5			310.4	
Turn Bay Length (m)										100.0		
Base Capacity (vph)	487	1532		116	1101			625		152	631	671
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	1.29	0.58		0.51	1.17			1.21		1.20	0.77	0.44

Intersection Summary

Area Type: Other
Cycle Length: 130
Actuated Cycle Length: 130
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Green
Natural Cycle: 150
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.29
Intersection Signal Delay: 104.3 Intersection LOS: F
Intersection Capacity Utilization 124.1% ICU Level of Service H
Analysis Period (min) 15
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 5: Booth Street & Albert Street





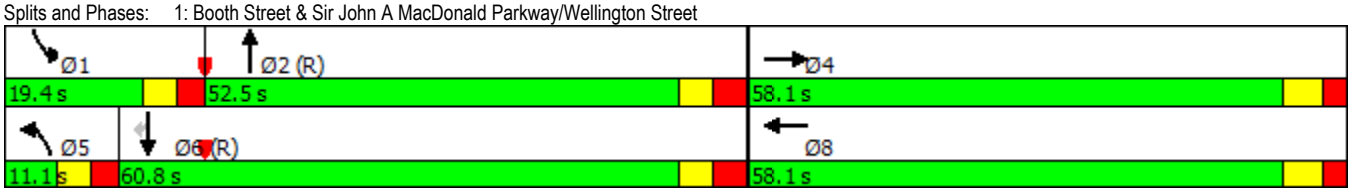
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	1184	0	0	683	127	0	827	142	137	1031	234
Future Volume (vph)	0	1184	0	0	683	127	0	827	142	137	1031	234
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0		0.0	0.0		0.0	10.0		0.0	135.0		50.0
Storage Lanes	0		0	0		0	1		0	1		1
Taper Length (m)	30.0			30.0			30.0			30.0		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	1.00
Ped Bike Factor					0.99			0.99		0.99		0.96
Frt					0.976			0.978				0.850
Flt Protected										0.950		
Satd. Flow (prot)	0	3353	0	0	3253	0	1765	3246	0	1676	3353	1500
Flt Permitted										0.950		
Satd. Flow (perm)	0	3353	0	0	3253	0	1765	3246	0	1657	3353	1438
Right Turn on Red			No			Yes			Yes			Yes
Satd. Flow (RTOR)					20			16				148
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		115.0			144.3			74.7			217.9	
Travel Time (s)		8.3			10.4			5.4			15.7	
Confl. Peds. (#/hr)	6		2	2		6	21		36	36		21
Confl. Bikes (#/hr)			28			34			15			1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	1287	0	0	742	138	0	899	154	149	1121	254
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1287	0	0	880	0	0	1053	0	149	1121	254
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors		1			1		1	1		1	1	1
Detector Template										Left		Right
Leading Detector (m)		10.0			10.0		0.0	10.0		2.0	10.0	2.0
Trailing Detector (m)		0.0			0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Position(m)		0.0			0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Size(m)		10.0			10.0		0.0	10.0		2.0	10.0	2.0
Detector 1 Type		Cl+Ex			Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)		0.0			0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)		0.0			0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)		0.0			0.0		0.0	0.0		0.0	0.0	0.0
Turn Type		NA			NA		Prot	NA		Prot	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases												6
Detector Phase		4			8		5	2		1	6	6
Switch Phase												
Minimum Initial (s)		10.0			10.0		5.0	10.0		5.0	10.0	10.0
Minimum Split (s)		37.3			37.3		11.1	34.8		11.1	34.8	34.8
Total Split (s)		58.1			58.1		11.1	52.5		19.4	60.8	60.8
Total Split (%)		44.7%			44.7%		8.5%	40.4%		14.9%	46.8%	46.8%
Maximum Green (s)		51.8			51.8		5.0	45.7		13.3	54.0	54.0
Yellow Time (s)		3.7			3.7		3.3	3.3		3.3	3.3	3.3
All-Red Time (s)		2.6			2.6		2.8	3.5		2.8	3.5	3.5
Lost Time Adjust (s)		0.0			0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)		6.3			6.3		6.1	6.8		6.1	6.8	6.8
Lead/Lag							Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)		3.0			3.0		3.0	3.0		3.0	3.0	3.0

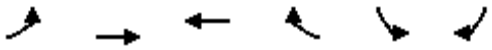
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Recall Mode		Max			Max		None	C-Max		None	C-Max	C-Max
Walk Time (s)		7.0			7.0			7.0			7.0	7.0
Flash Dont Walk (s)		24.0			24.0			21.0			21.0	21.0
Pedestrian Calls (#/hr)		5			5			5			5	5
Act Effct Green (s)		51.8			51.8			45.9		13.1	65.1	65.1
Actuated g/C Ratio		0.40			0.40			0.35		0.10	0.50	0.50
v/c Ratio		0.96			0.67			0.91		0.88	0.67	0.32
Control Delay		55.7			34.5			36.2		101.3	26.8	8.8
Queue Delay		0.0			3.7			0.0		0.0	0.0	0.0
Total Delay		55.7			38.1			36.2		101.3	26.8	8.8
LOS		E			D			D		F	C	A
Approach Delay		55.7			38.1			36.2			31.1	
Approach LOS		E			D			D			C	
Queue Length 50th (m)		176.5			99.4			117.1		40.2	115.9	15.0
Queue Length 95th (m)		#227.0			123.3			m136.6		#80.8	140.8	33.0
Internal Link Dist (m)		91.0			120.3			50.7			193.9	
Turn Bay Length (m)										135.0		50.0
Base Capacity (vph)		1336			1308			1155		171	1679	793
Starvation Cap Reductn		0			330			0		0	0	0
Spillback Cap Reductn		0			0			0		0	0	0
Storage Cap Reductn		0			0			0		0	0	0
Reduced v/c Ratio		0.96			0.90			0.91		0.87	0.67	0.32

Intersection Summary

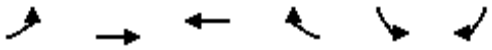
Area Type: Other
Cycle Length: 130
Actuated Cycle Length: 130
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green
Natural Cycle: 105
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.96
Intersection Signal Delay: 40.2 Intersection LOS: D
Intersection Capacity Utilization 87.9% ICU Level of Service E
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 1: Booth Street & Sir John A MacDonald Parkway/Wellington Street





Lane Group	EBL	EBT	WBT	WBR	SBL	SBR	Ø3
Lane Configurations							
Traffic Volume (vph)	570	1051	311	817	1896	349	
Future Volume (vph)	570	1051	311	817	1896	349	
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	
Storage Length (m)	135.0			115.0	0.0	35.0	
Storage Lanes	2			3	3	1	
Taper Length (m)	30.0				30.0		
Lane Util. Factor	0.97	0.91	0.95	0.76	0.94	1.00	
Ped Bike Factor	1.00				0.99	0.98	
Frt				0.850		0.850	
Flt Protected	0.950				0.950		
Satd. Flow (prot)	3252	4818	3353	3420	4728	1500	
Flt Permitted	0.950				0.950		
Satd. Flow (perm)	3236	4818	3353	3420	4687	1474	
Right Turn on Red				Yes		Yes	
Satd. Flow (RTOR)				30		137	
Link Speed (k/h)		50	50		50		
Link Distance (m)		270.2	257.1		139.6		
Travel Time (s)		19.5	18.5		10.1		
Confl. Peds. (#/hr)	4			4	5	5	
Confl. Bikes (#/hr)				38			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	
Adj. Flow (vph)	620	1142	338	888	2061	379	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	620	1142	338	888	2061	379	
Enter Blocked Intersection	No	No	No	No	No	No	
Lane Alignment	Left	Left	Left	Right	Left	Right	
Median Width(m)		7.2	7.2		10.8		
Link Offset(m)		0.0	0.0		0.0		
Crosswalk Width(m)		4.8	4.8		4.8		
Two way Left Turn Lane							
Headway Factor	1.07	1.07	1.07	1.07	1.07	1.07	
Turning Speed (k/h)	25			15	25	15	
Number of Detectors	1	1	1	1	1	1	
Detector Template	Left			Right	Left		
Leading Detector (m)	2.0	10.0	10.0	2.0	2.0	0.0	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	2.0	10.0	10.0	2.0	2.0	0.0	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel							
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	
Turn Type	Prot	NA	NA	custom	Prot	Perm	
Protected Phases	5	2	6	6 4 3	4		3
Permitted Phases		2				4	
Detector Phase	5	2	6	6 4 3	4	4	
Switch Phase							
Minimum Initial (s)	5.0	10.0	10.0		5.0	5.0	4.0
Minimum Split (s)	31.0	42.4	26.4		44.1	44.1	8.0
Total Split (s)	31.0	59.0	28.0		63.0	63.0	8.0
Total Split (%)	23.8%	45.4%	21.5%		48.5%	48.5%	6%
Maximum Green (s)	25.0	52.6	21.6		56.9	56.9	4.0
Yellow Time (s)	3.7	3.7	3.7		3.7	3.7	3.5
All-Red Time (s)	2.3	2.7	2.7		2.4	2.4	0.5
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.4	6.4		6.1	6.1	
Lead/Lag	Lead		Lag		Lag	Lag	Lead
Lead-Lag Optimize?	Yes		Yes		Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0	3.0

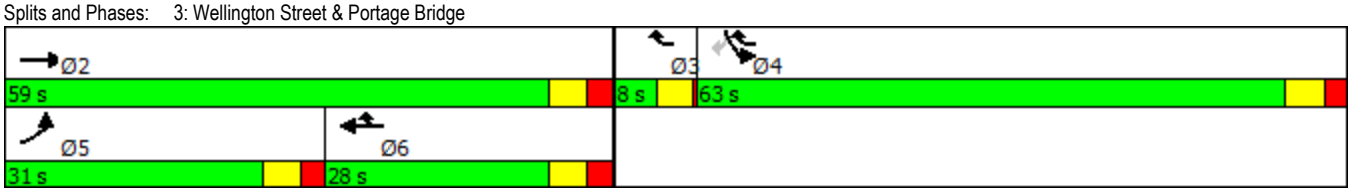


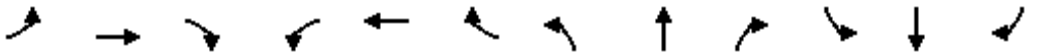
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR	Ø3
Recall Mode	None	Max	None		None	None	None
Walk Time (s)	13.0		7.0		26.0	26.0	
Flash Dont Walk (s)	12.0		13.0		12.0	12.0	
Pedestrian Calls (#/hr)	0		0		0	0	
Act Effct Green (s)	25.0	52.6	21.6	92.6	56.9	56.9	
Actuated g/C Ratio	0.19	0.40	0.17	0.71	0.44	0.44	
v/c Ratio	0.99	0.59	0.61	0.36	1.00	0.52	
Control Delay	86.4	31.7	55.5	7.5	55.4	19.3	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	86.4	31.7	55.5	7.5	55.4	19.3	
LOS	F	C	E	A	E	B	
Approach Delay		50.9	20.7		49.8		
Approach LOS		D	C		D		
Queue Length 50th (m)	86.9	87.0	45.0	35.2	193.1	46.1	
Queue Length 95th (m)	#126.8	102.6	61.7	43.5	#233.2	77.1	
Internal Link Dist (m)		246.2	233.1		115.6		
Turn Bay Length (m)	135.0			115.0		35.0	
Base Capacity (vph)	625	1949	557	2444	2069	722	
Starvation Cap Reductn	0	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	0	
Reduced v/c Ratio	0.99	0.59	0.61	0.36	1.00	0.52	

Intersection Summary

Area Type: Other
Cycle Length: 130
Actuated Cycle Length: 130
Natural Cycle: 120
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 1.00
Intersection Signal Delay: 43.6 Intersection LOS: D
Intersection Capacity Utilization 80.7% 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: 3: Wellington Street & Portage Bridge





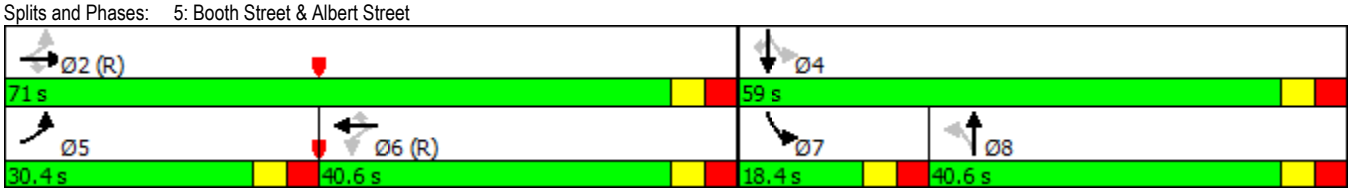
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	424	807	43	11	389	165	35	526	40	225	549	492
Future Volume (vph)	424	807	43	11	389	165	35	526	40	225	549	492
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0		50.0	0.0		50.0	0.0		0.0	100.0		0.0
Storage Lanes	1		1	1		1	0		0	1		1
Taper Length (m)	30.0			30.0			30.0			30.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	1.00	0.95	0.95	0.95	1.00	1.00	1.00
Ped Bike Factor	0.96		0.93	0.99		0.90		0.98		0.95		0.89
Frt			0.850			0.850		0.990				0.850
Flt Protected	0.950			0.950				0.997		0.950		
Satd. Flow (prot)	1676	1765	1500	1676	3353	1500	0	3260	0	1676	1765	1500
Flt Permitted	0.337			0.117				0.763		0.179		
Satd. Flow (perm)	572	1765	1394	205	3353	1354	0	2490	0	300	1765	1328
Right Turn on Red			Yes			No			Yes			No
Satd. Flow (RTOR)			84					5				
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		167.4			213.1			205.5			334.4	
Travel Time (s)		12.1			15.3			14.8			24.1	
Confl. Peds. (#/hr)	67		24	24		67	75		90	90		75
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	461	877	47	12	423	179	38	572	43	245	597	535
Shared Lane Traffic (%)												
Lane Group Flow (vph)	461	877	47	12	423	179	0	653	0	245	597	535
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	1	1	1	1	1	1	1		1	1	1
Detector Template	Left			Left			Left			Left		Right
Leading Detector (m)	2.0	10.0	0.0	2.0	10.0	0.0	2.0	10.0		2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Size(m)	2.0	10.0	0.0	2.0	10.0	0.0	2.0	10.0		2.0	10.0	2.0
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Turn Type	pm+pt	NA	Perm	Perm	NA	Perm	Perm	NA		pm+pt	NA	Perm
Protected Phases	5	2			6			8		7	4	
Permitted Phases	2		2	6		6	8			4		4
Detector Phase	5	2	2	6	6	6	8	8		7	4	4
Switch Phase												
Minimum Initial (s)	5.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0		5.0	10.0	10.0
Minimum Split (s)	11.5	36.5	36.5	36.5	36.5	36.5	36.5	36.5		11.5	36.5	36.5
Total Split (s)	30.4	71.0	71.0	40.6	40.6	40.6	40.6	40.6		18.4	59.0	59.0
Total Split (%)	23.4%	54.6%	54.6%	31.2%	31.2%	31.2%	31.2%	31.2%		14.2%	45.4%	45.4%
Maximum Green (s)	23.9	64.5	64.5	34.1	34.1	34.1	34.1	34.1		11.9	52.5	52.5
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3		3.3	3.3	3.3
All-Red Time (s)	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2		3.2	3.2	3.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0		0.0		0.0	0.0	0.0
Total Lost Time (s)	6.5	6.5	6.5	6.5	6.5	6.5		6.5		6.5	6.5	6.5
Lead/Lag	Lead			Lag	Lag	Lag	Lag	Lag		Lead		
Lead-Lag Optimize?	Yes			Yes	Yes	Yes	Yes	Yes		Yes		
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Recall Mode	None	C-Max	C-Max	C-Max	C-Max	C-Max	None	None		None	None	None

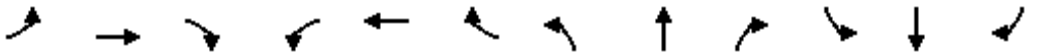
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Walk Time (s)		7.0	7.0	7.0	7.0	7.0	7.0	7.0			7.0	7.0
Flash Dont Walk (s)		23.0	23.0	23.0	23.0	23.0	21.0	21.0			21.0	21.0
Pedestrian Calls (#/hr)		5	5	5	5	5	5	5			5	5
Act Effct Green (s)	64.5	64.5	64.5	34.1	34.1	34.1		34.1		52.5	52.5	52.5
Actuated g/C Ratio	0.50	0.50	0.50	0.26	0.26	0.26		0.26		0.40	0.40	0.40
v/c Ratio	0.95	1.00	0.06	0.23	0.48	0.50		1.00		0.99	0.84	1.00
Control Delay	55.2	64.0	0.8	50.4	42.7	46.6		81.5		76.2	39.6	69.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0		0.0		0.0	0.0	0.0
Total Delay	55.2	64.0	0.8	50.4	42.7	46.6		81.5		76.2	39.6	69.2
LOS	E	E	A	D	D	D		F		E	D	E
Approach Delay		58.9			44.0			81.5			57.6	
Approach LOS		E			D			F			E	
Queue Length 50th (m)	84.2	~231.4	0.0	2.6	50.8	41.2		92.3		55.1	168.7	153.0
Queue Length 95th (m)	#138.9	#326.1	1.5	9.3	67.8	66.2		#135.2		#92.8	#213.5	#226.7
Internal Link Dist (m)		143.4			189.1			181.5			310.4	
Turn Bay Length (m)			50.0			50.0				100.0		
Base Capacity (vph)	486	875	733	53	879	355		656		247	712	536
Starvation Cap Reductn	0	0	0	0	0	0		0		0	0	0
Spillback Cap Reductn	0	0	0	0	0	0		0		0	0	0
Storage Cap Reductn	0	0	0	0	0	0		0		0	0	0
Reduced v/c Ratio	0.95	1.00	0.06	0.23	0.48	0.50		1.00		0.99	0.84	1.00

Intersection Summary

Area Type: Other
Cycle Length: 130
Actuated Cycle Length: 130
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green, Master Intersection
Natural Cycle: 110
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.00
Intersection Signal Delay: 59.9 Intersection LOS: E
Intersection Capacity Utilization 128.4% ICU Level of Service H
Analysis Period (min) 15
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 5: Booth Street & Albert Street





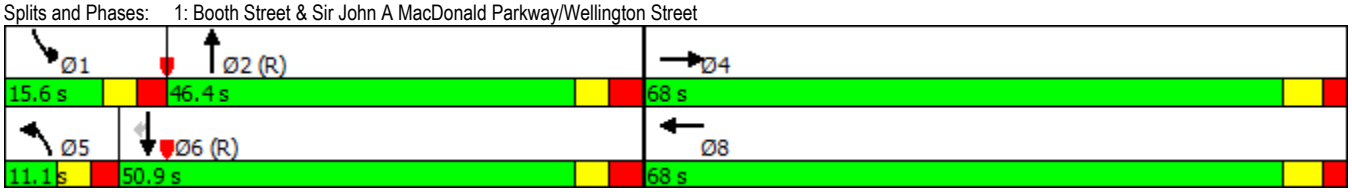
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	922	0	0	1319	107	0	652	193	95	690	228
Future Volume (vph)	0	922	0	0	1319	107	0	652	193	95	690	228
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0		0.0	0.0		0.0	10.0		0.0	135.0		50.0
Storage Lanes	0		0	0		0	1		0	1		1
Taper Length (m)	30.0			30.0			30.0			30.0		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	1.00
Ped Bike Factor					1.00			0.99		1.00		0.97
Frt					0.989			0.966				0.850
Flt Protected										0.950		
Satd. Flow (prot)	0	3353	0	0	3309	0	1765	3217	0	1676	3353	1500
Flt Permitted										0.950		
Satd. Flow (perm)	0	3353	0	0	3309	0	1765	3217	0	1670	3353	1452
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					9			31				97
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		115.0			144.3			74.7			217.9	
Travel Time (s)		8.3			10.4			5.4			15.7	
Confl. Peds. (#/hr)	9		3	3		9	5		10	10		5
Confl. Bikes (#/hr)			7			8			6			20
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	1002	0	0	1434	116	0	709	210	103	750	248
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1002	0	0	1550	0	0	919	0	103	750	248
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors		1			1		1	1		1	1	1
Detector Template		Thru			Thru			Thru		Left	Thru	Right
Leading Detector (m)		10.0			10.0		0.0	10.0		2.0	10.0	2.0
Trailing Detector (m)		0.0			0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Position(m)		0.0			0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Size(m)		10.0			10.0		0.0	10.0		2.0	10.0	2.0
Detector 1 Type		Cl+Ex			Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)		0.0			0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)		0.0			0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)		0.0			0.0		0.0	0.0		0.0	0.0	0.0
Turn Type		NA			NA		Prot	NA		Prot	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases												6
Detector Phase		4			8		5	2		1	6	6
Switch Phase												
Minimum Initial (s)		10.0			10.0		5.0	10.0		5.0	10.0	10.0
Minimum Split (s)		37.3			37.3		11.1	37.8		11.1	37.8	37.8
Total Split (s)		68.0			68.0		11.1	46.4		15.6	50.9	50.9
Total Split (%)		52.3%			52.3%		8.5%	35.7%		12.0%	39.2%	39.2%
Maximum Green (s)		61.7			61.7		5.0	39.6		9.5	44.1	44.1
Yellow Time (s)		3.7			3.7		3.3	3.3		3.3	3.3	3.3
All-Red Time (s)		2.6			2.6		2.8	3.5		2.8	3.5	3.5
Lost Time Adjust (s)		0.0			0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)		6.3			6.3		6.1	6.8		6.1	6.8	6.8
Lead/Lag							Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)		3.0			3.0		3.0	3.0		3.0	3.0	3.0

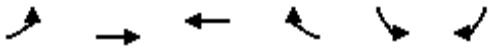
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Recall Mode		None			None		None	C-Max		None	C-Max	C-Max
Walk Time (s)		7.0			7.0			7.0			7.0	7.0
Flash Dont Walk (s)		24.0			24.0			21.0			21.0	21.0
Pedestrian Calls (#/hr)		5			5			5			5	5
Act Effct Green (s)		61.7			61.7			39.6		9.5	55.2	55.2
Actuated g/C Ratio		0.47			0.47			0.30		0.07	0.42	0.42
v/c Ratio		0.63			0.98			0.92		0.84	0.53	0.37
Control Delay		27.8			52.9			43.4		107.2	29.4	16.8
Queue Delay		0.0			40.2			0.0		0.0	0.0	0.0
Total Delay		27.8			93.1			43.4		107.2	29.4	16.8
LOS		C			F			D		F	C	B
Approach Delay		27.8			93.1			43.4			33.8	
Approach LOS		C			F			D			C	
Queue Length 50th (m)		104.2			211.1			120.5		27.9	77.7	26.3
Queue Length 95th (m)		127.2			#269.4			m121.3		#62.1	97.2	48.3
Internal Link Dist (m)		91.0			120.3			50.7			193.9	
Turn Bay Length (m)										135.0		50.0
Base Capacity (vph)		1591			1575			1001		122	1423	672
Starvation Cap Reductn		0			374			0		0	0	0
Spillback Cap Reductn		0			0			0		0	0	0
Storage Cap Reductn		0			0			0		0	0	0
Reduced v/c Ratio		0.63			1.29			0.92		0.84	0.53	0.37

Intersection Summary

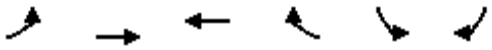
Area Type: Other
Cycle Length: 130
Actuated Cycle Length: 130
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green
Natural Cycle: 110
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.98
Intersection Signal Delay: 54.5 Intersection LOS: D
Intersection Capacity Utilization 89.5% ICU Level of Service E
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 1: Booth Street & Sir John A MacDonald Parkway/Wellington Street





Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	1062	417	657	1200	949	494
Future Volume (vph)	1062	417	657	1200	949	494
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	135.0			115.0	0.0	35.0
Storage Lanes	2			3	3	1
Taper Length (m)	30.0				30.0	
Lane Util. Factor	0.97	0.91	0.95	0.76	0.94	1.00
Ped Bike Factor	0.99				0.94	
Frt				0.850		0.850
Flt Protected	0.950				0.950	
Satd. Flow (prot)	3252	4818	3353	3420	4728	1500
Flt Permitted	0.950				0.950	
Satd. Flow (perm)	3226	4818	3353	3420	4438	1500
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)				31		299
Link Speed (k/h)		50	50		50	
Link Distance (m)		270.2	257.1		139.6	
Travel Time (s)		19.5	18.5		10.1	
Confl. Peds. (#/hr)	11			11	33	
Confl. Bikes (#/hr)				1		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1154	453	714	1304	1032	537
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1154	453	714	1304	1032	537
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		7.2	7.2		10.8	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.8	4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.07	1.07	1.07	1.07	1.07	1.07
Turning Speed (k/h)	25			15	25	15
Number of Detectors	1	1	1	1	1	1
Detector Template	Left	Thru	Thru	Right	Left	
Leading Detector (m)	2.0	10.0	10.0	2.0	2.0	0.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	10.0	10.0	2.0	2.0	0.0
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Turn Type	Prot	NA	NA	pt+ov	Prot	Perm
Protected Phases	5	2	6	6 4	4	
Permitted Phases		2				4
Detector Phase	5	2	6	6 4	4	4
Switch Phase						
Minimum Initial (s)	5.0	10.0	10.0		5.0	5.0
Minimum Split (s)	30.0	22.4	26.4		41.1	41.1
Total Split (s)	53.0	88.9	35.9		41.1	41.1
Total Split (%)	40.8%	68.4%	27.6%		31.6%	31.6%
Maximum Green (s)	47.0	82.5	29.5		35.0	35.0
Yellow Time (s)	3.7	3.7	3.7		3.7	3.7
All-Red Time (s)	2.3	2.7	2.7		2.4	2.4
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	6.0	6.4	6.4		6.1	6.1
Lead/Lag	Lead		Lag			
Lead-Lag Optimize?	Yes		Yes			
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0

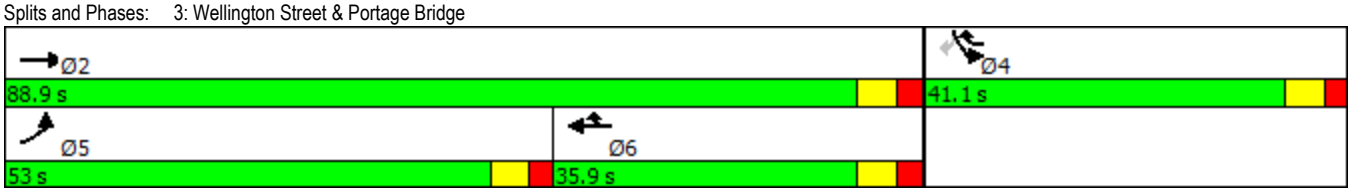


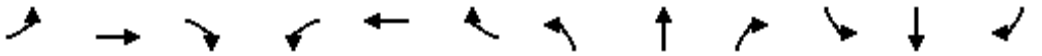
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Recall Mode	None	Max	None		None	None
Walk Time (s)	12.0		7.0		23.0	23.0
Flash Dont Walk (s)	12.0		13.0		12.0	12.0
Pedestrian Calls (#/hr)	0		0		0	0
Act Effct Green (s)	47.0	82.5	29.5	70.4	34.8	34.8
Actuated g/C Ratio	0.36	0.64	0.23	0.54	0.27	0.27
v/c Ratio	0.98	0.15	0.94	0.70	0.82	0.87
Control Delay	63.0	9.7	69.9	23.8	50.6	35.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	63.0	9.7	69.9	23.8	50.6	35.1
LOS	E	A	E	C	D	D
Approach Delay		47.9	40.1		45.3	
Approach LOS		D	D		D	
Queue Length 50th (m)	157.7	16.9	100.2	106.7	92.6	67.1
Queue Length 95th (m)	#206.5	22.0	#138.7	128.7	110.1	#134.9
Internal Link Dist (m)		246.2	233.1		115.6	
Turn Bay Length (m)	135.0			115.0		35.0
Base Capacity (vph)	1177	3063	761	1874	1274	623
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.98	0.15	0.94	0.70	0.81	0.86

Intersection Summary

Area Type: Other
Cycle Length: 130
Actuated Cycle Length: 129.8
Natural Cycle: 120
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.98
Intersection Signal Delay: 44.1 Intersection LOS: D
Intersection Capacity Utilization 85.6% 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: Wellington Street & Portage Bridge





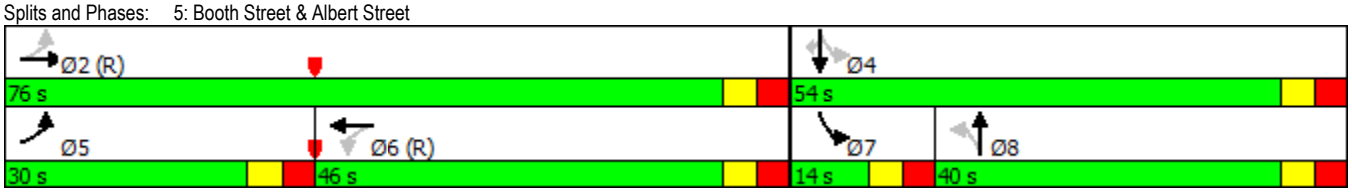
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	320	747	74	54	636	250	44	473	77	168	449	274
Future Volume (vph)	320	747	74	54	636	250	44	473	77	168	449	274
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0		0.0	0.0		50.0	0.0		0.0	100.0		0.0
Storage Lanes	1		0	1		0	0		0	1		1
Taper Length (m)	30.0			30.0			30.0			30.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	0.95	0.95	0.95	1.00	1.00	1.00
Ped Bike Factor		1.00		0.99	0.97			0.98		0.97		0.91
Frt		0.987			0.958			0.980				0.850
Flt Protected	0.950			0.950				0.996		0.950		
Satd. Flow (prot)	1676	3297	0	1676	3104	0	0	3218	0	1676	1765	1500
Flt Permitted	0.087			0.319				0.765		0.178		
Satd. Flow (perm)	154	3297	0	560	3104	0	0	2466	0	305	1765	1358
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		12			46			12				293
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		167.4			213.1			205.5			334.4	
Travel Time (s)		12.1			15.3			14.8			24.1	
Confl. Peds. (#/hr)	80		9	9		80	57		84	84		57
Confl. Bikes (#/hr)			2			8			2			9
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	348	812	80	59	691	272	48	514	84	183	488	298
Shared Lane Traffic (%)												
Lane Group Flow (vph)	348	892	0	59	963	0	0	646	0	183	488	298
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	1		1	1		1	1		1	1	1
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Size(m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	2.0
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Turn Type	pm+pt	NA		Perm	NA		Perm	NA		pm+pt	NA	Perm
Protected Phases	5	2			6			8		7	4	
Permitted Phases	2			6			8			4		4
Detector Phase	5	2		6	6		8	8		7	4	4
Switch Phase												
Minimum Initial (s)	5.0	10.0		10.0	10.0		10.0	10.0		5.0	10.0	10.0
Minimum Split (s)	11.5	36.5		36.5	36.5		36.5	36.5		11.5	36.5	36.5
Total Split (s)	30.0	76.0		46.0	46.0		40.0	40.0		14.0	54.0	54.0
Total Split (%)	23.1%	58.5%		35.4%	35.4%		30.8%	30.8%		10.8%	41.5%	41.5%
Maximum Green (s)	23.5	69.5		39.5	39.5		33.5	33.5		7.5	47.5	47.5
Yellow Time (s)	3.3	3.3		3.3	3.3		3.3	3.3		3.3	3.3	3.3
All-Red Time (s)	3.2	3.2		3.2	3.2		3.2	3.2		3.2	3.2	3.2
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0		0.0	0.0	0.0
Total Lost Time (s)	6.5	6.5		6.5	6.5			6.5		6.5	6.5	6.5
Lead/Lag	Lead			Lag	Lag		Lag	Lag		Lead		
Lead-Lag Optimize?	Yes			Yes	Yes		Yes	Yes		Yes		
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0

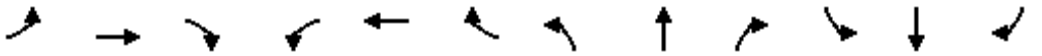
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Recall Mode	None	C-Max		C-Max	C-Max		None	None		None	None	None
Walk Time (s)		7.0		7.0	7.0		7.0	7.0			7.0	7.0
Flash Dont Walk (s)		23.0		23.0	23.0		21.0	21.0			21.0	21.0
Pedestrian Calls (#/hr)		0		0	0		0	0			0	0
Act Effct Green (s)	69.5	69.5		39.5	39.5			33.5		47.5	47.5	47.5
Actuated g/C Ratio	0.53	0.53		0.30	0.30			0.26		0.37	0.37	0.37
v/c Ratio	0.97	0.50		0.35	0.99			1.00		0.96	0.76	0.44
Control Delay	79.8	20.2		42.4	68.9			83.4		85.6	41.2	15.7
Queue Delay	0.0	0.0		0.0	0.0			0.0		0.0	0.0	0.0
Total Delay	79.8	20.2		42.4	68.9			83.4		85.6	41.2	15.7
LOS	E	C		D	E			F		F	D	B
Approach Delay		36.9			67.4			83.4			41.8	
Approach LOS		D			E			F			D	
Queue Length 50th (m)	78.3	76.8		12.4	130.8			~91.2		43.5	136.5	44.5
Queue Length 95th (m)	#141.6	95.1		26.6	#179.0			#133.9		#95.6	173.8	77.0
Internal Link Dist (m)		143.4			189.1			181.5			310.4	
Turn Bay Length (m)										100.0		
Base Capacity (vph)	357	1768		170	975			644		190	644	682
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	0.97	0.50		0.35	0.99			1.00		0.96	0.76	0.44

Intersection Summary

Area Type: Other
Cycle Length: 130
Actuated Cycle Length: 130
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 110
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.00
Intersection Signal Delay: 53.9 Intersection LOS: D
Intersection Capacity Utilization 116.9% ICU Level of Service H
Analysis Period (min) 15
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 5: Booth Street & Albert Street





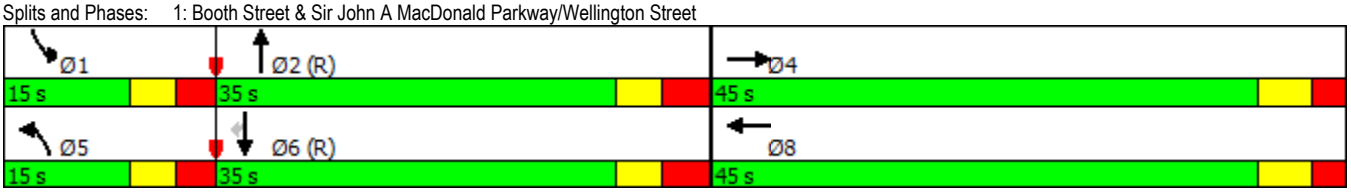
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	1329	0	0	742	127	0	882	181	137	1031	234
Future Volume (vph)	0	1329	0	0	742	127	0	882	181	137	1031	234
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0		0.0	0.0		0.0	10.0		0.0	135.0		50.0
Storage Lanes	0		0	0		0	1		0	1		1
Taper Length (m)	30.0			30.0			30.0			30.0		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	1.00
Ped Bike Factor					0.99			0.99		0.99		0.97
Frt					0.978			0.974				0.850
Flt Protected										0.950		
Satd. Flow (prot)	0	3353	0	0	3262	0	1765	3233	0	1676	3353	1500
Flt Permitted										0.950		
Satd. Flow (perm)	0	3353	0	0	3262	0	1765	3233	0	1664	3353	1449
Right Turn on Red			No			Yes			Yes			Yes
Satd. Flow (RTOR)					25			26				168
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		115.0			144.3			74.7			217.9	
Travel Time (s)		8.3			10.4			5.4			15.7	
Confl. Peds. (#/hr)	6		2	2		6	21		36	36		21
Confl. Bikes (#/hr)			28			34			15			1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	1445	0	0	807	138	0	959	197	149	1121	254
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1445	0	0	945	0	0	1156	0	149	1121	254
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors		1			1		1	1		1	1	1
Detector Template		Thru			Thru			Thru		Left	Thru	Right
Leading Detector (m)		10.0			10.0		0.0	10.0		2.0	10.0	2.0
Trailing Detector (m)		0.0			0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Position(m)		0.0			0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Size(m)		10.0			10.0		0.0	10.0		2.0	10.0	2.0
Detector 1 Type		Cl+Ex			Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)		0.0			0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)		0.0			0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)		0.0			0.0		0.0	0.0		0.0	0.0	0.0
Turn Type		NA			NA		Prot	NA		Prot	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases												6
Detector Phase		4			8		5	2		1	6	6
Switch Phase												
Minimum Initial (s)		10.0			10.0		5.0	10.0		5.0	10.0	10.0
Minimum Split (s)		37.3			37.3		11.1	34.8		11.1	34.8	34.8
Total Split (s)		45.0			45.0		15.0	35.0		15.0	35.0	35.0
Total Split (%)		47.4%			47.4%		15.8%	36.8%		15.8%	36.8%	36.8%
Maximum Green (s)		38.7			38.7		8.9	28.2		8.9	28.2	28.2
Yellow Time (s)		3.7			3.7		3.3	3.3		3.3	3.3	3.3
All-Red Time (s)		2.6			2.6		2.8	3.5		2.8	3.5	3.5
Lost Time Adjust (s)		0.0			0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)		6.3			6.3		6.1	6.8		6.1	6.8	6.8
Lead/Lag							Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)		3.0			3.0		3.0	3.0		3.0	3.0	3.0

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Recall Mode		Max			Max		None	C-Max		None	C-Max	C-Max
Walk Time (s)		7.0			7.0			7.0			7.0	7.0
Flash Dont Walk (s)		24.0			24.0			21.0			21.0	21.0
Pedestrian Calls (#/hr)		5			5			5			5	5
Act Effct Green (s)		38.7			38.7			28.2		8.9	43.2	43.2
Actuated g/C Ratio		0.41			0.41			0.30		0.09	0.45	0.45
v/c Ratio		1.06			0.70			1.18		0.95	0.74	0.34
Control Delay		70.3			26.2			124.2		104.7	24.8	7.2
Queue Delay		0.0			0.6			0.0		0.0	0.0	0.0
Total Delay		70.3			26.8			124.2		104.7	24.8	7.2
LOS		E			C			F		F	C	A
Approach Delay		70.3			26.8			124.2			29.7	
Approach LOS		E			C			F			C	
Queue Length 50th (m)		~162.3			76.0			~140.8		29.1	90.2	9.3
Queue Length 95th (m)		#205.3			99.2			#183.0		#67.8	115.7	25.2
Internal Link Dist (m)		91.0			120.3			50.7			193.9	
Turn Bay Length (m)										135.0		50.0
Base Capacity (vph)		1365			1343			977		157	1524	750
Starvation Cap Reductn		0			132			0		0	0	0
Spillback Cap Reductn		0			0			0		0	0	0
Storage Cap Reductn		0			0			0		0	0	0
Reduced v/c Ratio		1.06			0.78			1.18		0.95	0.74	0.34

Intersection Summary

Area Type: Other
Cycle Length: 95
Actuated Cycle Length: 95
Offset: 31 (33%), Referenced to phase 2:NBT and 6:SBT, Start of Green
Natural Cycle: 125
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.18
Intersection Signal Delay: 62.3 Intersection LOS: E
Intersection Capacity Utilization 95.2% 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: Booth Street & Sir John A MacDonald Parkway/Wellington Street



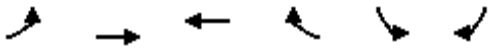
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	1281	70	109	888	86	256
Future Volume (vph)	1281	70	109	888	86	256
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)		0.0	60.0		0.0	0.0
Storage Lanes		0	1		1	0
Taper Length (m)			30.0		30.0	
Lane Util. Factor	0.95	0.95	1.00	0.95	1.00	1.00
Ped Bike Factor	1.00		1.00		0.99	
Frt	0.992				0.899	
Flt Protected			0.950		0.988	
Satd. Flow (prot)	3315	0	1676	3353	1550	0
Flt Permitted			0.134		0.988	
Satd. Flow (perm)	3315	0	236	3353	1546	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)	11				76	
Link Speed (k/h)	50			50	50	
Link Distance (m)	144.3			270.2	146.6	
Travel Time (s)	10.4			19.5	10.6	
Confl. Peds. (#/hr)		6	6		6	2
Confl. Bikes (#/hr)		62				
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1392	76	118	965	93	278
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1468	0	118	965	371	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	7.2			7.2	3.6	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.07	1.07	1.07	1.07	1.07	1.07
Turning Speed (k/h)		15	25		25	15
Number of Detectors	1		1	1	1	
Detector Template	Thru		Left	Thru	Left	
Leading Detector (m)	10.0		2.0	10.0	2.0	
Trailing Detector (m)	0.0		0.0	0.0	0.0	
Detector 1 Position(m)	0.0		0.0	0.0	0.0	
Detector 1 Size(m)	10.0		2.0	10.0	2.0	
Detector 1 Type	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel						
Detector 1 Extend (s)	0.0		0.0	0.0	0.0	
Detector 1 Queue (s)	0.0		0.0	0.0	0.0	
Detector 1 Delay (s)	0.0		0.0	0.0	0.0	
Turn Type	NA		Perm	NA	Prot	
Protected Phases	2			6	8	
Permitted Phases			6			
Detector Phase	2		6	6	8	
Switch Phase						
Minimum Initial (s)	10.0		10.0	10.0	5.0	
Minimum Split (s)	90.0		90.0	90.0	29.8	
Total Split (s)	90.0		90.0	90.0	30.0	
Total Split (%)	75.0%		75.0%	75.0%	25.0%	
Maximum Green (s)	84.4		84.4	84.4	24.2	
Yellow Time (s)	3.7		3.7	3.7	3.3	
All-Red Time (s)	1.9		1.9	1.9	2.5	
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	
Total Lost Time (s)	5.6		5.6	5.6	5.8	
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0		3.0	3.0	3.0	

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Recall Mode	C-Max		C-Max	C-Max	None	
Walk Time (s)	15.0				7.0	
Flash Dont Walk (s)	17.0				17.0	
Pedestrian Calls (#/hr)	5				5	
Act Effct Green (s)	84.4		84.4	84.4	24.2	
Actuated g/C Ratio	0.70		0.70	0.70	0.20	
v/c Ratio	0.63		0.72	0.41	0.99	
Control Delay	10.9		38.5	8.0	83.8	
Queue Delay	3.8		0.0	0.0	0.0	
Total Delay	14.6		38.5	8.0	83.8	
LOS	B		D	A	F	
Approach Delay	14.6			11.4	83.8	
Approach LOS	B			B	F	
Queue Length 50th (m)	90.4		15.6	46.8	76.0	
Queue Length 95th (m)	110.5		#57.3	58.2	#141.9	
Internal Link Dist (m)	120.3			246.2	122.6	
Turn Bay Length (m)			60.0			
Base Capacity (vph)	2334		165	2358	373	
Starvation Cap Reductn	759		0	0	0	
Spillback Cap Reductn	0		0	0	0	
Storage Cap Reductn	0		0	0	0	
Reduced v/c Ratio	0.93		0.72	0.41	0.99	

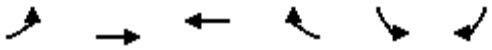
Intersection Summary

Area Type: Other
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 109 (91%), Referenced to phase 2:EBT and 6:WBTL, Start of Green
Natural Cycle: 120
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.99
Intersection Signal Delay: 22.2 Intersection LOS: C
Intersection Capacity Utilization 84.1% 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: 2: Lett Street & Wellington Street



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR	Ø3
Lane Configurations							
Traffic Volume (vph)	715	1255	402	817	2096	357	
Future Volume (vph)	715	1255	402	817	2096	357	
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	
Storage Length (m)	135.0			115.0	0.0	35.0	
Storage Lanes	2			3	3	1	
Taper Length (m)	30.0				30.0		
Lane Util. Factor	0.97	0.91	0.95	0.76	0.94	1.00	
Ped Bike Factor	1.00				0.99	0.98	
Frt				0.850		0.850	
Flt Protected	0.950				0.950		
Satd. Flow (prot)	3252	4818	3353	3420	4728	1500	
Flt Permitted	0.950				0.950		
Satd. Flow (perm)	3239	4818	3353	3420	4690	1475	
Right Turn on Red				Yes		Yes	
Satd. Flow (RTOR)				13		120	
Link Speed (k/h)		50	50		50		
Link Distance (m)		270.2	257.1		139.6		
Travel Time (s)		19.5	18.5		10.1		
Confl. Peds. (#/hr)	4			4	5	5	
Confl. Bikes (#/hr)				38			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	
Adj. Flow (vph)	777	1364	437	888	2278	388	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	777	1364	437	888	2278	388	
Enter Blocked Intersection	No	No	No	No	No	No	
Lane Alignment	Left	Left	Left	Right	Left	Right	
Median Width(m)		7.2	7.2		10.8		
Link Offset(m)		0.0	0.0		0.0		
Crosswalk Width(m)		4.8	4.8		4.8		
Two way Left Turn Lane							
Headway Factor	1.07	1.07	1.07	1.07	1.07	1.07	
Turning Speed (k/h)	25			15	25	15	
Number of Detectors	1	1	1	1	1	1	
Detector Template	Left	Thru	Thru	Right	Left		
Leading Detector (m)	2.0	10.0	10.0	2.0	2.0	0.0	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	2.0	10.0	10.0	2.0	2.0	0.0	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel							
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	
Turn Type	Prot	NA	NA	custom	Prot	Perm	
Protected Phases	5	2	6	6 4 3	4		3
Permitted Phases		2				4	
Detector Phase	5	2	6	6 4 3	4	4	
Switch Phase							
Minimum Initial (s)	5.0	10.0	10.0		5.0	5.0	4.0
Minimum Split (s)	31.0	42.4	26.4		44.1	44.1	8.0
Total Split (s)	31.0	58.4	27.4		51.1	51.1	13.1
Total Split (%)	25.3%	47.6%	22.3%		41.7%	41.7%	11%
Maximum Green (s)	25.0	52.0	21.0		45.0	45.0	9.1
Yellow Time (s)	3.7	3.7	3.7		3.7	3.7	3.5
All-Red Time (s)	2.3	2.7	2.7		2.4	2.4	0.5
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.4	6.4		6.1	6.1	
Lead/Lag	Lead		Lag		Lag	Lag	Lead
Lead-Lag Optimize?	Yes		Yes		Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0	3.0



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR	Ø3
Recall Mode	None	Max	None		None	None	None
Walk Time (s)	13.0		7.0		26.0	26.0	
Flash Dont Walk (s)	12.0		13.0		12.0	12.0	
Pedestrian Calls (#/hr)	0		0		0	0	
Act Effct Green (s)	25.0	52.0	21.0	84.5	45.0	45.0	
Actuated g/C Ratio	0.21	0.43	0.17	0.69	0.37	0.37	
v/c Ratio	1.17	0.66	0.76	0.37	1.31	0.63	
Control Delay	133.5	30.0	57.5	8.1	175.2	26.5	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	133.5	30.0	57.5	8.1	175.2	26.5	
LOS	F	C	E	A	F	C	
Approach Delay		67.6	24.4		153.6		
Approach LOS		E	C		F		
Queue Length 50th (m)	~120.3	99.5	55.9	36.0	~262.3	55.4	
Queue Length 95th (m)	#160.7	117.2	75.3	45.0	#292.6	91.8	
Internal Link Dist (m)		246.2	233.1		115.6		
Turn Bay Length (m)	135.0			115.0		35.0	
Base Capacity (vph)	666	2054	577	2250	1744	620	
Starvation Cap Reductn	0	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	0	
Reduced v/c Ratio	1.17	0.66	0.76	0.39	1.31	0.63	

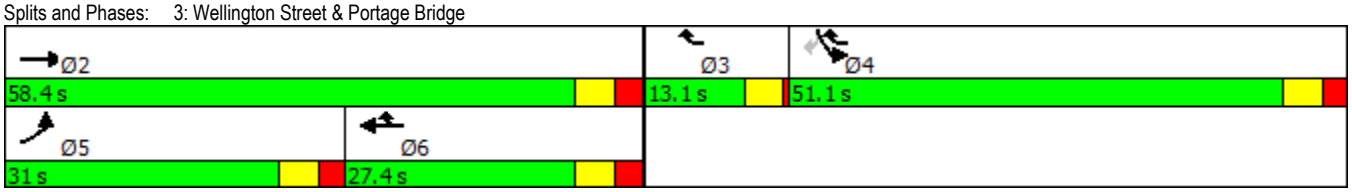
Intersection Summary

Area Type: Other
Cycle Length: 122.6
Actuated Cycle Length: 121.9
Natural Cycle: 150
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 1.31
Intersection Signal Delay: 95.6 — Intersection LOS: F
Intersection Capacity Utilization 91.4% — ICU Level of Service F
Analysis Period (min) 15

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

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

Splits and Phases: 3: Wellington Street & Portage Bridge

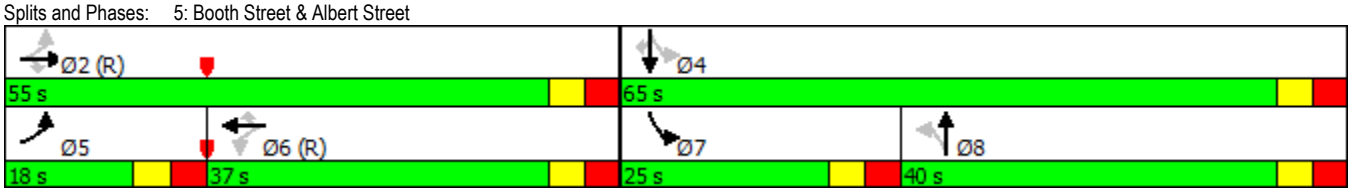


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	424	917	43	11	389	165	35	605	40	225	549	492
Future Volume (vph)	424	917	43	11	389	165	35	605	40	225	549	492
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0		50.0	0.0		50.0	0.0		0.0	100.0		0.0
Storage Lanes	1		1	1		1	0		0	1		1
Taper Length (m)	30.0			30.0			30.0			30.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	1.00	0.95	0.95	0.95	1.00	1.00	1.00
Ped Bike Factor	0.96		0.93			0.91		0.99		0.96		0.89
Frt			0.850			0.850		0.991				0.850
Flt Protected	0.950			0.950				0.997		0.950		
Satd. Flow (prot)	1676	1765	1500	1676	3353	1500	0	3273	0	1676	1765	1500
Flt Permitted	0.333			0.131				0.883		0.146		
Satd. Flow (perm)	567	1765	1399	231	3353	1364	0	2892	0	247	1765	1340
Right Turn on Red			Yes			No			Yes			No
Satd. Flow (RTOR)			91					5				
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		167.4			213.1			205.5			334.4	
Travel Time (s)		12.1			15.3			14.8			24.1	
Confl. Peds. (#/hr)	67		24	24		67	75		90	90		75
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	461	997	47	12	423	179	38	658	43	245	597	535
Shared Lane Traffic (%)												
Lane Group Flow (vph)	461	997	47	12	423	179	0	739	0	245	597	535
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	1	1	1	1	1	1	1		1	1	1
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (m)	2.0	10.0	0.0	2.0	10.0	0.0	2.0	10.0		2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Size(m)	2.0	10.0	0.0	2.0	10.0	0.0	2.0	10.0		2.0	10.0	2.0
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Turn Type	pm+pt	NA	Perm	Perm	NA	Perm	Perm	NA		pm+pt	NA	Perm
Protected Phases	5	2			6			8		7	4	
Permitted Phases	2		2	6		6	8			4		4
Detector Phase	5	2	2	6	6	6	8	8		7	4	4
Switch Phase												
Minimum Initial (s)	5.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0		5.0	10.0	10.0
Minimum Split (s)	11.5	36.5	36.5	36.5	36.5	36.5	36.5	36.5		11.5	36.5	36.5
Total Split (s)	18.0	55.0	55.0	37.0	37.0	37.0	40.0	40.0		25.0	65.0	65.0
Total Split (%)	15.0%	45.8%	45.8%	30.8%	30.8%	30.8%	33.3%	33.3%		20.8%	54.2%	54.2%
Maximum Green (s)	11.5	48.5	48.5	30.5	30.5	30.5	33.5	33.5		18.5	58.5	58.5
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3		3.3	3.3	3.3
All-Red Time (s)	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2		3.2	3.2	3.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0		0.0		0.0	0.0	0.0
Total Lost Time (s)	6.5	6.5	6.5	6.5	6.5	6.5		6.5		6.5	6.5	6.5
Lead/Lag	Lead			Lag	Lag	Lag	Lag	Lag		Lead		
Lead-Lag Optimize?	Yes			Yes	Yes	Yes	Yes	Yes		Yes		
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Recall Mode	None	C-Max	C-Max	C-Max	C-Max	C-Max	None	None		None	None	None

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Walk Time (s)		7.0	7.0	7.0	7.0	7.0	7.0	7.0			7.0	7.0
Flash Dont Walk (s)		23.0	23.0	23.0	23.0	23.0	21.0	21.0			21.0	21.0
Pedestrian Calls (#/hr)		5	5	5	5	5	5	5			5	5
Act Effct Green (s)	50.9	50.9	50.9	30.5	30.5	30.5		33.0		56.1	56.1	56.1
Actuated g/C Ratio	0.42	0.42	0.42	0.25	0.25	0.25		0.28		0.47	0.47	0.47
v/c Ratio	1.25	1.33	0.07	0.21	0.50	0.52		0.93		0.78	0.72	0.85
Control Delay	162.7	189.4	0.6	45.7	40.6	44.7		60.5		41.3	31.3	42.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0		0.0		0.0	0.0	0.0
Total Delay	162.7	189.4	0.6	45.7	40.6	44.7		60.5		41.3	31.3	42.7
LOS	F	F	A	D	D	D		E		D	C	D
Approach Delay		175.3			41.9			60.5			37.5	
Approach LOS		F			D			E			D	
Queue Length 50th (m)	~134.9	~330.3	0.0	2.4	47.2	38.3		91.5		35.4	111.2	109.8
Queue Length 95th (m)	#217.3	#410.7	1.0	8.7	63.8	62.4		#130.3		#69.2	155.4	#176.6
Internal Link Dist (m)		143.4			189.1			181.5			310.4	
Turn Bay Length (m)			50.0			50.0				100.0		
Base Capacity (vph)	368	748	645	58	852	346		817		335	860	653
Starvation Cap Reductn	0	0	0	0	0	0		0		0	0	0
Spillback Cap Reductn	0	0	0	0	0	0		0		0	0	0
Storage Cap Reductn	0	0	0	0	0	0		0		0	0	0
Reduced v/c Ratio	1.25	1.33	0.07	0.21	0.50	0.52		0.90		0.73	0.69	0.82

Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green, Master Intersection			
Natural Cycle: 120			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 1.33			
Intersection Signal Delay: 91.1		Intersection LOS: F	
Intersection Capacity Utilization 134.6%		ICU Level of Service H	
Analysis Period (min) 15			
~ Volume exceeds capacity, queue is theoretically infinite.			
Queue shown is maximum after two cycles.			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

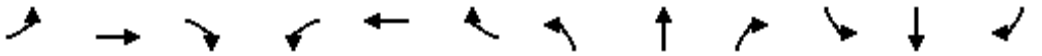
Splits and Phases: 5: Booth Street & Albert Street



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	0	26	1037	12	0	1031
Future Volume (Veh/h)	0	26	1037	12	0	1031
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	28	1127	13	0	1121
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)			334			75
pX, platoon unblocked	0.80	0.86			0.86	
vC, conflicting volume	1694	570			1140	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	555	165			830	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	96			100	
cM capacity (veh/h)	368	729			684	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	28	751	389	560	560
Volume Left	0	0	0	0	0
Volume Right	28	0	13	0	0
cSH	729	1700	1700	1700	1700
Volume to Capacity	0.04	0.44	0.23	0.33	0.33
Queue Length 95th (m)	1.0	0.0	0.0	0.0	0.0
Control Delay (s)	10.1	0.0	0.0	0.0	0.0
Lane LOS	B				
Approach Delay (s)	10.1	0.0		0.0	
Approach LOS	B				

Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	40.7%	ICU Level of Service	A
Analysis Period (min)	15		

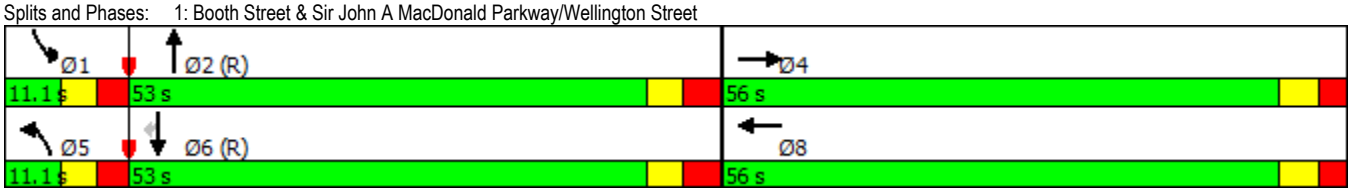


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	949	0	0	1351	107	0	1020	257	95	690	228
Future Volume (vph)	0	949	0	0	1351	107	0	1020	257	95	690	228
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0		0.0	0.0		0.0	10.0		0.0	135.0		50.0
Storage Lanes	0		0	0		0	1		0	1		1
Taper Length (m)	30.0			30.0			30.0			30.0		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	1.00
Ped Bike Factor					1.00			0.99		1.00		0.97
Frt					0.989			0.970				0.850
Flt Protected										0.950		
Satd. Flow (prot)	0	3353	0	0	3310	0	1765	3234	0	1676	3353	1500
Flt Permitted										0.950		
Satd. Flow (perm)	0	3353	0	0	3310	0	1765	3234	0	1673	3353	1455
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					8			30				107
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		115.0			144.3			74.7			217.9	
Travel Time (s)		8.3			10.4			5.4			15.7	
Confl. Peds. (#/hr)	9		3	3		9	5		10	10		5
Confl. Bikes (#/hr)			7			8			6			20
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	1032	0	0	1468	116	0	1109	279	103	750	248
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1032	0	0	1584	0	0	1388	0	103	750	248
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors		2			2		0	2		1	2	1
Detector Template		Thru			Thru			Thru		Left	Thru	Right
Leading Detector (m)		10.0			10.0		0.0	10.0		2.0	10.0	2.0
Trailing Detector (m)		0.0			0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Position(m)		0.0			0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Size(m)		0.6			0.6		0.0	0.6		2.0	0.6	2.0
Detector 1 Type		Cl+Ex			Cl+Ex			Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)		0.0			0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)		0.0			0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)		0.0			0.0		0.0	0.0		0.0	0.0	0.0
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type		NA			NA		Prot	NA		Prot	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases												6
Detector Phase		4			8		5	2		1	6	6
Switch Phase												
Minimum Initial (s)		10.0			10.0		5.0	10.0		5.0	10.0	10.0
Minimum Split (s)		37.3			37.3		11.1	37.8		11.1	37.8	37.8
Total Split (s)		56.0			56.0		11.1	53.0		11.1	53.0	53.0
Total Split (%)		46.6%			46.6%		9.2%	44.1%		9.2%	44.1%	44.1%
Maximum Green (s)		49.7			49.7		5.0	46.2		5.0	46.2	46.2
Yellow Time (s)		3.7			3.7		3.3	3.3		3.3	3.3	3.3
All-Red Time (s)		2.6			2.6		2.8	3.5		2.8	3.5	3.5

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lost Time Adjust (s)		0.0			0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)		6.3			6.3		6.1	6.8		6.1	6.8	6.8
Lead/Lag							Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)		3.0			3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode		None			None		None	C-Max		None	C-Max	C-Max
Walk Time (s)		7.0			7.0			7.0			7.0	7.0
Flash Dont Walk (s)		24.0			24.0			21.0			21.0	21.0
Pedestrian Calls (#/hr)		5			5			5			5	5
Act Effct Green (s)		49.7			49.7			46.2		5.0	57.3	57.3
Actuated g/C Ratio		0.41			0.41			0.38		0.04	0.48	0.48
v/c Ratio		0.74			1.15			1.10		1.49	0.47	0.33
Control Delay		33.9			110.8			92.1		322.7	22.4	12.0
Queue Delay		0.0			0.7			0.0		0.0	0.0	0.0
Total Delay		33.9			111.5			92.1		322.7	22.4	12.0
LOS		C			F			F		F	C	B
Approach Delay		33.9			111.5			92.1			48.1	
Approach LOS		C			F			F			D	
Queue Length 50th (m)		112.4			~243.9			~203.5		~35.2	64.1	19.8
Queue Length 95th (m)		138.8			#289.2			#248.8		#72.3	81.3	38.7
Internal Link Dist (m)		91.0			120.3			50.7			193.9	
Turn Bay Length (m)										135.0		50.0
Base Capacity (vph)		1387			1374			1262		69	1599	750
Starvation Cap Reductn		0			232			0		0	0	0
Spillback Cap Reductn		0			0			0		0	0	0
Storage Cap Reductn		0			0			0		0	0	0
Reduced v/c Ratio		0.74			1.39			1.10		1.49	0.47	0.33

Intersection Summary			
Area Type:	Other		
Cycle Length: 120.1			
Actuated Cycle Length: 120.1			
Offset: 3 (2%), Referenced to phase 2:NBT and 6:SBT, Start of Green			
Natural Cycle: 150			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 1.49			
Intersection Signal Delay: 76.9		Intersection LOS: E	
Intersection Capacity Utilization 103.3%		ICU Level of Service G	
Analysis Period (min) 15			
~ Volume exceeds capacity, queue is theoretically infinite.			
Queue shown is maximum after two cycles.			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 1: Booth Street & Sir John A MacDonald Parkway/Wellington Street

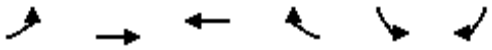


Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	1094	123	203	1283	70	153
Future Volume (vph)	1094	123	203	1283	70	153
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)		0.0	60.0		0.0	0.0
Storage Lanes		0	1		1	0
Taper Length (m)			30.0		30.0	
Lane Util. Factor	0.95	0.95	1.00	0.95	1.00	1.00
Ped Bike Factor	0.99		1.00		0.99	
Frt	0.985				0.907	
Flt Protected			0.950		0.985	
Satd. Flow (prot)	3284	0	1676	3353	1556	0
Flt Permitted			0.178		0.985	
Satd. Flow (perm)	3284	0	313	3353	1555	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)	24				82	
Link Speed (k/h)	50			50	50	
Link Distance (m)	144.3			270.2	146.6	
Travel Time (s)	10.4			19.5	10.6	
Confl. Peds. (#/hr)		18	18		1	5
Confl. Bikes (#/hr)		4				
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1189	134	221	1395	76	166
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1323	0	221	1395	242	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	7.2			7.2	3.6	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.07	1.07	1.07	1.07	1.07	1.07
Turning Speed (k/h)		15	25		25	15
Number of Detectors	2		1	2	1	
Detector Template	Thru		Left	Thru	Left	
Leading Detector (m)	10.0		2.0	10.0	2.0	
Trailing Detector (m)	0.0		0.0	0.0	0.0	
Detector 1 Position(m)	0.0		0.0	0.0	0.0	
Detector 1 Size(m)	0.6		2.0	0.6	2.0	
Detector 1 Type	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel						
Detector 1 Extend (s)	0.0		0.0	0.0	0.0	
Detector 1 Queue (s)	0.0		0.0	0.0	0.0	
Detector 1 Delay (s)	0.0		0.0	0.0	0.0	
Detector 2 Position(m)	9.4			9.4		
Detector 2 Size(m)	0.6			0.6		
Detector 2 Type	Cl+Ex			Cl+Ex		
Detector 2 Channel						
Detector 2 Extend (s)	0.0			0.0		
Turn Type	NA		Perm	NA	Prot	
Protected Phases	2			6	8	
Permitted Phases			6			
Detector Phase	2		6	6	8	
Switch Phase						
Minimum Initial (s)	10.0		10.0	10.0	5.0	
Minimum Split (s)	37.6		27.6	27.6	29.8	
Total Split (s)	90.0		90.0	90.0	30.0	
Total Split (%)	75.0%		75.0%	75.0%	25.0%	
Maximum Green (s)	84.4		84.4	84.4	24.2	
Yellow Time (s)	3.7		3.7	3.7	3.3	
All-Red Time (s)	1.9		1.9	1.9	2.5	

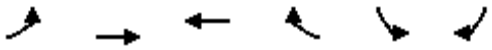
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	
Total Lost Time (s)	5.6		5.6	5.6	5.8	
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0		3.0	3.0	3.0	
Recall Mode	C-Max		C-Max	C-Max	None	
Walk Time (s)	15.0				7.0	
Flash Dont Walk (s)	17.0				17.0	
Pedestrian Calls (#/hr)	5				5	
Act Effct Green (s)	90.9		90.9	90.9	17.7	
Actuated g/C Ratio	0.76		0.76	0.76	0.15	
v/c Ratio	0.53		0.93	0.55	0.81	
Control Delay	7.3		62.0	7.7	52.5	
Queue Delay	1.2		0.0	0.0	0.0	
Total Delay	8.5		62.0	7.7	52.5	
LOS	A		E	A	D	
Approach Delay	8.5			15.1	52.5	
Approach LOS	A			B	D	
Queue Length 50th (m)	59.8		39.5	66.0	39.0	
Queue Length 95th (m)	92.2		#53.2	101.1	65.8	
Internal Link Dist (m)	120.3			246.2	122.6	
Turn Bay Length (m)			60.0			
Base Capacity (vph)	2494		237	2541	379	
Starvation Cap Reductn	870		0	0	0	
Spillback Cap Reductn	0		0	0	0	
Storage Cap Reductn	0		0	0	0	
Reduced v/c Ratio	0.81		0.93	0.55	0.64	

Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 1 (1%), Referenced to phase 2:EBT and 6:WBTL, Start of Green			
Natural Cycle: 130			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.93			
Intersection Signal Delay: 15.2		Intersection LOS: B	
Intersection Capacity Utilization 77.5%		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: 2: Lett Street & Wellington Street



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	1070	530	812	1200	949	507
Future Volume (vph)	1070	530	812	1200	949	507
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	135.0			115.0	0.0	35.0
Storage Lanes	2			3	3	1
Taper Length (m)	30.0				30.0	
Lane Util. Factor	0.97	0.91	0.95	0.76	0.94	1.00
Ped Bike Factor	0.99				0.95	
Frt				0.850		0.850
Flt Protected	0.950				0.950	
Satd. Flow (prot)	3252	4818	3353	3420	4728	1500
Flt Permitted	0.950				0.950	
Satd. Flow (perm)	3235	4818	3353	3420	4479	1500
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)				4		381
Link Speed (k/h)		50	50		50	
Link Distance (m)		270.2	257.1		139.6	
Travel Time (s)		19.5	18.5		10.1	
Confl. Peds. (#/hr)	11			11	33	
Confl. Bikes (#/hr)				1		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1163	576	883	1304	1032	551
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1163	576	883	1304	1032	551
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		7.2	7.2		10.8	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.8	4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.07	1.07	1.07	1.07	1.07	1.07
Turning Speed (k/h)	25			15	25	15
Number of Detectors	1	2	2	1	1	0
Detector Template	Left	Thru	Thru	Right	Left	
Leading Detector (m)	2.0	10.0	10.0	2.0	2.0	0.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6	0.6	2.0	2.0	0.0
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		9.4	9.4			
Detector 2 Size(m)		0.6	0.6			
Detector 2 Type		Cl+Ex	Cl+Ex			
Detector 2 Channel						
Detector 2 Extend (s)		0.0	0.0			
Turn Type	Prot	NA	NA	pt+ov	Prot	Perm
Protected Phases	5	2	6	6 4	4	
Permitted Phases		2				4
Detector Phase	5	2	6	6 4	4	4
Switch Phase						
Minimum Initial (s)	5.0	10.0	10.0		5.0	5.0
Minimum Split (s)	30.0	22.4	26.4		41.1	41.1
Total Split (s)	34.0	70.4	36.4		41.1	41.1
Total Split (%)	30.5%	63.1%	32.6%		36.9%	36.9%
Maximum Green (s)	28.0	64.0	30.0		35.0	35.0
Yellow Time (s)	3.7	3.7	3.7		3.7	3.7
All-Red Time (s)	2.3	2.7	2.7		2.4	2.4



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	6.0	6.4	6.4		6.1	6.1
Lead/Lag	Lead		Lag			
Lead-Lag Optimize?	Yes		Yes			
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Recall Mode	None	Max	None		None	None
Walk Time (s)	12.0		7.0		23.0	23.0
Flash Dont Walk (s)	12.0		13.0		12.0	12.0
Pedestrian Calls (#/hr)	0		0		0	0
Act Effct Green (s)	28.0	64.0	30.0	69.8	33.7	33.7
Actuated g/C Ratio	0.25	0.58	0.27	0.63	0.31	0.31
v/c Ratio	1.41	0.21	0.97	0.60	0.71	0.76
Control Delay	223.7	11.4	63.2	13.3	37.2	18.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	223.7	11.4	63.2	13.3	37.2	18.0
LOS	F	B	E	B	D	B
Approach Delay		153.4	33.5		30.5	
Approach LOS		F	C		C	
Queue Length 50th (m)	~185.9	22.1	105.8	70.4	73.4	34.1
Queue Length 95th (m)	#228.0	28.6	#149.4	87.0	89.2	81.5
Internal Link Dist (m)		246.2	233.1		115.6	
Turn Bay Length (m)	135.0			115.0		35.0
Base Capacity (vph)	826	2799	913	2209	1502	736
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	1.41	0.21	0.97	0.59	0.69	0.75

Intersection Summary			
Area Type:	Other		
Cycle Length: 111.5			
Actuated Cycle Length: 110.2			
Natural Cycle: 140			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 1.41			
Intersection Signal Delay: 70.5		Intersection LOS: E	
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: 3: Wellington Street & Portage Bridge

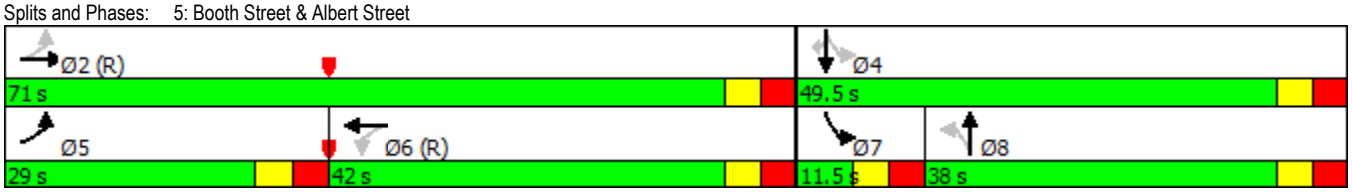
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	580	747	74	54	936	250	44	637	77	168	449	274
Future Volume (vph)	580	747	74	54	936	250	44	637	77	168	449	274
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0		0.0	0.0		50.0	0.0		0.0	100.0		0.0
Storage Lanes	1		0	1		0	0		0	1		1
Taper Length (m)	30.0			30.0			30.0			30.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	0.95	0.95	0.95	1.00	1.00	1.00
Ped Bike Factor		1.00		0.99	0.98			0.99				0.91
Frt		0.987			0.968			0.985				0.850
Flt Protected	0.950			0.950				0.997		0.950		
Satd. Flow (prot)	1676	3298	0	1676	3169	0	0	3253	0	1676	1765	1500
Flt Permitted	0.095			0.319				0.766		0.105		
Satd. Flow (perm)	168	3298	0	560	3169	0	0	2495	0	185	1765	1366
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		13			28			10				298
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		167.4			213.1			205.5			334.4	
Travel Time (s)		12.1			15.3			14.8			24.1	
Confl. Peds. (#/hr)	80		9	9		80	57		84	84		57
Confl. Bikes (#/hr)			2			8			2			9
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	630	812	80	59	1017	272	48	692	84	183	488	298
Shared Lane Traffic (%)												
Lane Group Flow (vph)	630	892	0	59	1289	0	0	824	0	183	488	298
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	2.0
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	NA		Perm	NA		Perm	NA		pm+pt	NA	Perm
Protected Phases	5	2			6			8		7	4	
Permitted Phases	2			6			8			4		4
Detector Phase	5	2		6	6		8	8		7	4	4
Switch Phase												
Minimum Initial (s)	5.0	10.0		10.0	10.0		10.0	10.0		5.0	10.0	10.0
Minimum Split (s)	11.5	36.5		36.5	36.5		36.5	36.5		11.5	36.5	36.5
Total Split (s)	29.0	71.0		42.0	42.0		38.0	38.0		11.5	49.5	49.5
Total Split (%)	24.1%	58.9%		34.9%	34.9%		31.5%	31.5%		9.5%	41.1%	41.1%
Maximum Green (s)	22.5	64.5		35.5	35.5		31.5	31.5		5.0	43.0	43.0
Yellow Time (s)	3.3	3.3		3.3	3.3		3.3	3.3		3.3	3.3	3.3
All-Red Time (s)	3.2	3.2		3.2	3.2		3.2	3.2		3.2	3.2	3.2

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0		0.0	0.0	0.0
Total Lost Time (s)	6.5	6.5		6.5	6.5			6.5		6.5	6.5	6.5
Lead/Lag	Lead			Lag	Lag		Lag	Lag		Lead		
Lead-Lag Optimize?	Yes			Yes	Yes		Yes	Yes		Yes		
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	C-Max		C-Max	C-Max		None	None		None	None	None
Walk Time (s)		7.0		7.0	7.0		7.0	7.0			7.0	7.0
Flash Dont Walk (s)		23.0		23.0	23.0		21.0	21.0			21.0	21.0
Pedestrian Calls (#/hr)		0		0	0		0	0			0	0
Act Effct Green (s)	64.5	64.5		35.5	35.5			31.5		43.0	43.0	43.0
Actuated g/C Ratio	0.54	0.54		0.29	0.29			0.26		0.36	0.36	0.36
v/c Ratio	1.70	0.50		0.36	1.35			1.25		1.44	0.78	0.44
Control Delay	352.2	18.8		41.3	199.7			162.6		264.8	44.4	5.2
Queue Delay	0.0	0.0		0.0	0.0			0.0		0.0	0.0	0.0
Total Delay	352.2	18.8		41.3	199.7			162.6		264.8	44.4	5.2
LOS	F	B		D	F			F		F	D	A
Approach Delay		156.8			192.8			162.6			74.0	
Approach LOS		F			F			F			E	
Queue Length 50th (m)	~216.7	70.3		11.6	~220.2			~134.4		~45.9	107.2	0.0
Queue Length 95th (m)	#290.5	88.3		25.4	#265.1			#176.0		#95.0	151.1	19.3
Internal Link Dist (m)		143.4			189.1			181.5			310.4	
Turn Bay Length (m)										100.0		
Base Capacity (vph)	371	1771		164	953			659		127	629	679
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	1.70	0.50		0.36	1.35			1.25		1.44	0.78	0.44

Intersection Summary

Area Type: Other
Cycle Length: 120.5
Actuated Cycle Length: 120.5
Offset: 9 (7%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 150
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.70
Intersection Signal Delay: 151.0 Intersection LOS: F
Intersection Capacity Utilization 140.7% ICU Level of Service H
Analysis Period (min) 15
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

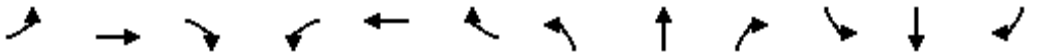
Splits and Phases: 5: Booth Street & Albert Street



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	0	22	1255	15	0	690
Future Volume (Veh/h)	0	22	1255	15	0	690
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	24	1364	16	0	750
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)			334			75
pX, platoon unblocked	0.92	0.84			0.84	
vC, conflicting volume	1747	690			1380	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	906	257			1076	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	96			100	
cM capacity (veh/h)	253	625			542	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	24	909	471	375	375
Volume Left	0	0	0	0	0
Volume Right	24	0	16	0	0
cSH	625	1700	1700	1700	1700
Volume to Capacity	0.04	0.53	0.28	0.22	0.22
Queue Length 95th (m)	1.0	0.0	0.0	0.0	0.0
Control Delay (s)	11.0	0.0	0.0	0.0	0.0
Lane LOS	B				
Approach Delay (s)	11.0	0.0		0.0	
Approach LOS	B				

Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	47.1%	ICU Level of Service	A
Analysis Period (min)	15		

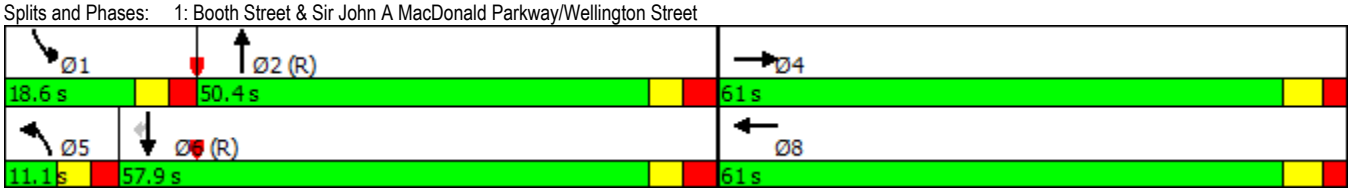


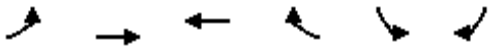
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	1189	95	0	742	127	0	802	181	137	1031	234
Future Volume (vph)	0	1189	95	0	742	127	0	802	181	137	1031	234
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0		0.0	0.0		0.0	10.0		0.0	135.0		50.0
Storage Lanes	0		0	0		0	1		0	1		1
Taper Length (m)	30.0			30.0			30.0			30.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	1.00
Ped Bike Factor		1.00			0.99			0.99		0.99		0.96
Frt		0.989			0.978			0.972				0.850
Flt Protected										0.950		
Satd. Flow (prot)	0	3309	0	0	3261	0	1765	3217	0	1676	3353	1500
Flt Permitted										0.950		
Satd. Flow (perm)	0	3309	0	0	3261	0	1765	3217	0	1657	3353	1438
Right Turn on Red			No			Yes			Yes			Yes
Satd. Flow (RTOR)					18			22				142
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		115.0			144.3			74.7			217.9	
Travel Time (s)		8.3			10.4			5.4			15.7	
Confl. Peds. (#/hr)	6		2	2		6	21		36	36		21
Confl. Bikes (#/hr)			28			34			15			1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	1292	103	0	807	138	0	872	197	149	1121	254
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1395	0	0	945	0	0	1069	0	149	1121	254
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors		2			2		0	2		1	2	1
Detector Template		Thru			Thru			Thru		Left	Thru	Right
Leading Detector (m)		10.0			10.0		0.0	10.0		2.0	10.0	2.0
Trailing Detector (m)		0.0			0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Position(m)		0.0			0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Size(m)		0.6			0.6		0.0	0.6		2.0	0.6	2.0
Detector 1 Type		Cl+Ex			Cl+Ex			Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)		0.0			0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)		0.0			0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)		0.0			0.0		0.0	0.0		0.0	0.0	0.0
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type		NA			NA		Prot	NA		Prot	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases												6
Detector Phase		4			8		5	2		1	6	6
Switch Phase												
Minimum Initial (s)		10.0			10.0		5.0	10.0		5.0	10.0	10.0
Minimum Split (s)		37.3			37.3		11.1	34.8		11.1	34.8	34.8
Total Split (s)		61.0			61.0		11.1	50.4		18.6	57.9	57.9
Total Split (%)		46.9%			46.9%		8.5%	38.8%		14.3%	44.5%	44.5%
Maximum Green (s)		54.7			54.7		5.0	43.6		12.5	51.1	51.1
Yellow Time (s)		3.7			3.7		3.3	3.3		3.3	3.3	3.3
All-Red Time (s)		2.6			2.6		2.8	3.5		2.8	3.5	3.5

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lost Time Adjust (s)		0.0			0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)		6.3			6.3		6.1	6.8		6.1	6.8	6.8
Lead/Lag							Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)		3.0			3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode		Max			Max		None	C-Max		None	C-Max	C-Max
Walk Time (s)		7.0			7.0			7.0			7.0	7.0
Flash Dont Walk (s)		24.0			24.0			21.0			21.0	21.0
Pedestrian Calls (#/hr)		5			5			5			5	5
Act Effct Green (s)		54.7			54.7			43.6		12.5	62.2	62.2
Actuated g/C Ratio		0.42			0.42			0.34		0.10	0.48	0.48
v/c Ratio		1.00			0.68			0.98		0.93	0.70	0.33
Control Delay		62.3			33.1			62.6		111.7	29.5	10.1
Queue Delay		0.0			5.6			0.0		0.0	0.0	0.0
Total Delay		62.3			38.7			62.6		111.7	29.5	10.1
LOS		E			D			E		F	C	B
Approach Delay		62.3			38.7			62.6			34.3	
Approach LOS		E			D			E			C	
Queue Length 50th (m)		~196.2			105.6			160.3		40.5	121.7	16.7
Queue Length 95th (m)		#250.5			130.3			m#172.3		#83.7	147.8	35.9
Internal Link Dist (m)		91.0			120.3			50.7			193.9	
Turn Bay Length (m)										135.0		50.0
Base Capacity (vph)		1392			1382			1093		161	1604	762
Starvation Cap Reductn		0			373			0		0	0	0
Spillback Cap Reductn		0			0			0		0	0	0
Storage Cap Reductn		0			0			0		0	0	0
Reduced v/c Ratio		1.00			0.94			0.98		0.93	0.70	0.33

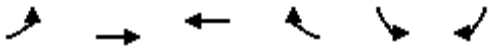
Intersection Summary			
Area Type:	Other		
Cycle Length: 130			
Actuated Cycle Length: 130			
Offset: 31 (24%), Referenced to phase 2:NBT and 6:SBT, Start of Green			
Natural Cycle: 125			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 1.00			
Intersection Signal Delay: 49.2		Intersection LOS: D	
Intersection Capacity Utilization 92.0%		ICU Level of Service F	
Analysis Period (min) 15			
~ Volume exceeds capacity, queue is theoretically infinite.			
Queue shown is maximum after two cycles.			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			
m Volume for 95th percentile queue is metered by upstream signal.			

Splits and Phases: 1: Booth Street & Sir John A MacDonald Parkway/Wellington Street





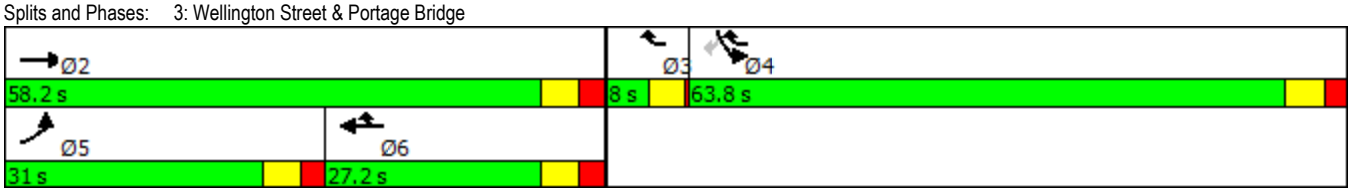
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR	Ø3
Lane Configurations							
Traffic Volume (vph)	575	1255	402	817	1896	357	
Future Volume (vph)	575	1255	402	817	1896	357	
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	
Storage Length (m)	135.0			115.0	0.0	35.0	
Storage Lanes	2			3	3	1	
Taper Length (m)	30.0				30.0		
Lane Util. Factor	0.97	0.91	0.95	0.76	0.94	1.00	
Ped Bike Factor	1.00				0.99	0.98	
Frt				0.850		0.850	
Flt Protected	0.950				0.950		
Satd. Flow (prot)	3252	4818	3353	3420	4728	1500	
Flt Permitted	0.950				0.950		
Satd. Flow (perm)	3239	4818	3353	3420	4687	1474	
Right Turn on Red				Yes		Yes	
Satd. Flow (RTOR)				29		142	
Link Speed (k/h)		50	50		50		
Link Distance (m)		270.2	257.1		139.6		
Travel Time (s)		19.5	18.5		10.1		
Confl. Peds. (#/hr)	4			4	5	5	
Confl. Bikes (#/hr)				38			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	
Adj. Flow (vph)	625	1364	437	888	2061	388	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	625	1364	437	888	2061	388	
Enter Blocked Intersection	No	No	No	No	No	No	
Lane Alignment	Left	Left	Left	Right	Left	Right	
Median Width(m)		7.2	7.2		10.8		
Link Offset(m)		0.0	0.0		0.0		
Crosswalk Width(m)		4.8	4.8		4.8		
Two way Left Turn Lane							
Headway Factor	1.07	1.07	1.07	1.07	1.07	1.07	
Turning Speed (k/h)	25			15	25	15	
Number of Detectors	1	2	2	1	1	0	
Detector Template	Left	Thru	Thru	Right	Left		
Leading Detector (m)	2.0	10.0	10.0	2.0	2.0	0.0	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	2.0	0.6	0.6	2.0	2.0	0.0	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		
Detector 1 Channel							
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(m)		9.4	9.4				
Detector 2 Size(m)		0.6	0.6				
Detector 2 Type		Cl+Ex	Cl+Ex				
Detector 2 Channel							
Detector 2 Extend (s)		0.0	0.0				
Turn Type	Prot	NA	NA	custom	Prot	Perm	
Protected Phases	5	2	6	6 4 3	4		3
Permitted Phases		2				4	
Detector Phase	5	2	6	6 4 3	4	4	
Switch Phase							
Minimum Initial (s)	5.0	10.0	10.0		5.0	5.0	4.0
Minimum Split (s)	31.0	42.4	26.4		44.1	44.1	8.0
Total Split (s)	31.0	58.2	27.2		63.8	63.8	8.0
Total Split (%)	23.8%	44.8%	20.9%		49.1%	49.1%	6%
Maximum Green (s)	25.0	51.8	20.8		57.7	57.7	4.0
Yellow Time (s)	3.7	3.7	3.7		3.7	3.7	3.5
All-Red Time (s)	2.3	2.7	2.7		2.4	2.4	0.5

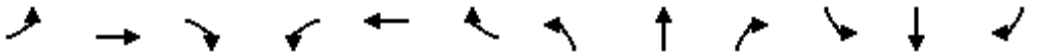


Lane Group	EBL	EBT	WBT	WBR	SBL	SBR	Ø3
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.4	6.4		6.1	6.1	
Lead/Lag	Lead		Lag		Lag	Lag	Lead
Lead-Lag Optimize?	Yes		Yes		Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0	3.0
Recall Mode	None	Max	None		None	None	None
Walk Time (s)	13.0		7.0		26.0	26.0	
Flash Dont Walk (s)	12.0		13.0		12.0	12.0	
Pedestrian Calls (#/hr)	0		0		0	0	
Act Effct Green (s)	25.0	51.8	20.8	92.6	57.7	57.7	
Actuated g/C Ratio	0.19	0.40	0.16	0.71	0.44	0.44	
v/c Ratio	1.00	0.71	0.82	0.36	0.98	0.53	
Control Delay	88.3	35.3	65.9	7.5	51.7	19.0	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	88.3	35.3	65.9	7.5	51.7	19.0	
LOS	F	D	E	A	D	B	
Approach Delay		52.0	26.7		46.5		
Approach LOS		D	C		D		
Queue Length 50th (m)	87.7	111.8	60.6	35.2	190.9	46.6	
Queue Length 95th (m)	#128.2	130.1	#84.8	43.5	#230.3	77.8	
Internal Link Dist (m)		246.2	233.1		115.6		
Turn Bay Length (m)	135.0			115.0		35.0	
Base Capacity (vph)	625	1919	536	2444	2098	733	
Starvation Cap Reductn	0	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	0	
Reduced v/c Ratio	1.00	0.71	0.82	0.36	0.98	0.53	

Intersection Summary			
Area Type:	Other		
Cycle Length: 130			
Actuated Cycle Length: 130			
Natural Cycle: 120			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 1.00			
Intersection Signal Delay: 43.8		Intersection LOS: D	
Intersection Capacity Utilization 83.1%		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: Wellington Street & Portage Bridge





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	424	807	43	11	389	165	35	525	40	225	549	492
Future Volume (vph)	424	807	43	11	389	165	35	525	40	225	549	492
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0		50.0	0.0		50.0	0.0		0.0	100.0		0.0
Storage Lanes	1		1	1		1	0		0	1		1
Taper Length (m)	30.0			30.0			30.0			30.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	1.00	0.95	0.95	0.95	1.00	1.00	1.00
Ped Bike Factor	0.96		0.93	0.99		0.90		0.98		0.95		0.89
Frt			0.850			0.850		0.990				0.850
Flt Protected	0.950			0.950				0.997		0.950		
Satd. Flow (prot)	1676	1765	1500	1676	3353	1500	0	3260	0	1676	1765	1500
Flt Permitted	0.337			0.117				0.763		0.179		
Satd. Flow (perm)	572	1765	1394	205	3353	1354	0	2490	0	300	1765	1328
Right Turn on Red			Yes			No			Yes			No
Satd. Flow (RTOR)			84					5				
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		167.4			213.1			205.5			334.4	
Travel Time (s)		12.1			15.3			14.8			24.1	
Confl. Peds. (#/hr)	67		24	24		67	75		90	90		75
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	461	877	47	12	423	179	38	571	43	245	597	535
Shared Lane Traffic (%)												
Lane Group Flow (vph)	461	877	47	12	423	179	0	652	0	245	597	535
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2	0	1	2	0	1	2		1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (m)	2.0	10.0	0.0	2.0	10.0	0.0	2.0	10.0		2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6	0.0	2.0	0.6	0.0	2.0	0.6		2.0	0.6	2.0
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	NA	Perm	Perm	NA	Perm	Perm	NA		pm+pt	NA	Perm
Protected Phases	5	2			6			8		7	4	
Permitted Phases	2		2	6		6	8			4		4
Detector Phase	5	2	2	6	6	6	8	8		7	4	4
Switch Phase												
Minimum Initial (s)	5.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0		5.0	10.0	10.0
Minimum Split (s)	11.5	36.5	36.5	36.5	36.5	36.5	36.5	36.5		11.5	36.5	36.5
Total Split (s)	30.4	71.0	71.0	40.6	40.6	40.6	40.6	40.6		18.4	59.0	59.0
Total Split (%)	23.4%	54.6%	54.6%	31.2%	31.2%	31.2%	31.2%	31.2%		14.2%	45.4%	45.4%
Maximum Green (s)	23.9	64.5	64.5	34.1	34.1	34.1	34.1	34.1		11.9	52.5	52.5
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3		3.3	3.3	3.3
All-Red Time (s)	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2		3.2	3.2	3.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0		0.0		0.0	0.0	0.0

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Lost Time (s)	6.5	6.5	6.5	6.5	6.5	6.5		6.5		6.5	6.5	6.5
Lead/Lag	Lead			Lag	Lag	Lag	Lag	Lag		Lead		
Lead-Lag Optimize?	Yes			Yes	Yes	Yes	Yes	Yes		Yes		
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Recall Mode	None	C-Max	C-Max	C-Max	C-Max	C-Max	None	None		None	None	None
Walk Time (s)		7.0	7.0	7.0	7.0	7.0	7.0	7.0			7.0	7.0
Flash Dont Walk (s)		23.0	23.0	23.0	23.0	23.0	21.0	21.0			21.0	21.0
Pedestrian Calls (#/hr)		5	5	5	5	5	5	5			5	5
Act Effct Green (s)	64.5	64.5	64.5	34.1	34.1	34.1		34.1		52.5	52.5	52.5
Actuated g/C Ratio	0.50	0.50	0.50	0.26	0.26	0.26		0.26		0.40	0.40	0.40
v/c Ratio	0.95	1.00	0.06	0.23	0.48	0.50		0.99		0.99	0.84	1.00
Control Delay	55.2	64.0	0.8	50.4	42.7	46.6		81.1		82.5	26.8	56.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0		0.0		0.0	0.0	0.0
Total Delay	55.2	64.0	0.8	50.4	42.7	46.6		81.1		82.5	26.8	56.5
LOS	E	E	A	D	D	D		F		F	C	E
Approach Delay		58.9			44.0			81.1			48.2	
Approach LOS		E			D			F			D	
Queue Length 50th (m)	84.2	~231.4	0.0	2.6	50.8	41.2		92.1		31.6	103.3	143.4
Queue Length 95th (m)	#138.9	#326.1	1.5	9.3	67.8	66.2		#134.9		m#89.5	m#173.3	m#218.1
Internal Link Dist (m)		143.4			189.1			181.5			310.4	
Turn Bay Length (m)			50.0			50.0				100.0		
Base Capacity (vph)	486	875	733	53	879	355		656		247	712	536
Starvation Cap Reductn	0	0	0	0	0	0		0		0	0	0
Spillback Cap Reductn	0	0	0	0	0	0		0		0	0	0
Storage Cap Reductn	0	0	0	0	0	0		0		0	0	0
Reduced v/c Ratio	0.95	1.00	0.06	0.23	0.48	0.50		0.99		0.99	0.84	1.00

Intersection Summary

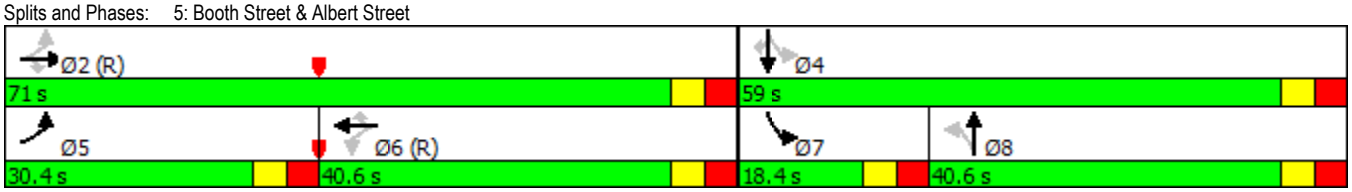
Area Type: Other
Cycle Length: 130
Actuated Cycle Length: 130
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green, Master Intersection
Natural Cycle: 110
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.00
Intersection Signal Delay: 56.6 Intersection LOS: E
Intersection Capacity Utilization 128.4% ICU Level of Service H
Analysis Period (min) 15

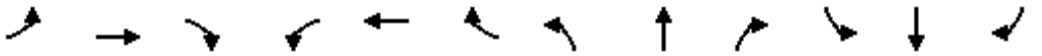
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

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

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

Splits and Phases: 5: Booth Street & Albert Street



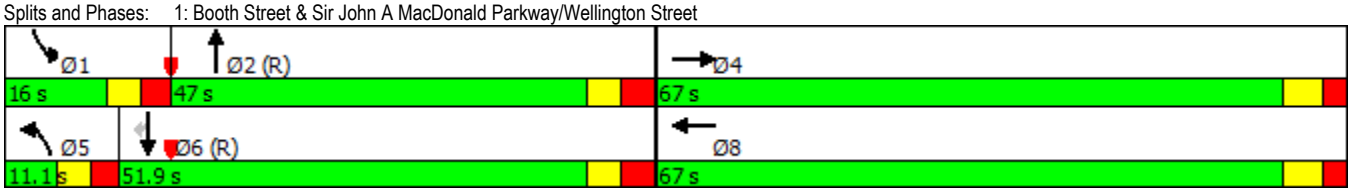


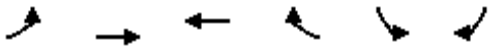
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	889	0	0	1301	107	0	620	257	95	690	228
Future Volume (vph)	0	889	0	0	1301	107	0	620	257	95	690	228
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0		0.0	0.0		0.0	10.0		0.0	135.0		50.0
Storage Lanes	0		0	0		0	1		0	1		1
Taper Length (m)	30.0			30.0			30.0			30.0		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	1.00
Ped Bike Factor					1.00			0.99		1.00		0.97
Frt					0.989			0.956				0.850
Flt Protected										0.950		
Satd. Flow (prot)	0	3353	0	0	3309	0	1765	3177	0	1676	3353	1500
Flt Permitted										0.950		
Satd. Flow (perm)	0	3353	0	0	3309	0	1765	3177	0	1670	3353	1453
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					9			50				98
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		115.0			144.3			74.7			217.9	
Travel Time (s)		8.3			10.4			5.4			15.7	
Confl. Peds. (#/hr)	9		3	3		9	5		10	10		5
Confl. Bikes (#/hr)			7			8			6			20
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	966	0	0	1414	116	0	674	279	103	750	248
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	966	0	0	1530	0	0	953	0	103	750	248
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors		2			2		0	2		1	2	1
Detector Template		Thru			Thru			Thru		Left	Thru	Right
Leading Detector (m)		10.0			10.0		0.0	10.0		2.0	10.0	2.0
Trailing Detector (m)		0.0			0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Position(m)		0.0			0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Size(m)		0.6			0.6		0.0	0.6		2.0	0.6	2.0
Detector 1 Type		Cl+Ex			Cl+Ex			Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)		0.0			0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)		0.0			0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)		0.0			0.0		0.0	0.0		0.0	0.0	0.0
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type		NA			NA		Prot	NA		Prot	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases												6
Detector Phase		4			8		5	2		1	6	6
Switch Phase												
Minimum Initial (s)		10.0			10.0		5.0	10.0		5.0	10.0	10.0
Minimum Split (s)		37.3			37.3		11.1	37.8		11.1	37.8	37.8
Total Split (s)		67.0			67.0		11.1	47.0		16.0	51.9	51.9
Total Split (%)		51.5%			51.5%		8.5%	36.2%		12.3%	39.9%	39.9%
Maximum Green (s)		60.7			60.7		5.0	40.2		9.9	45.1	45.1
Yellow Time (s)		3.7			3.7		3.3	3.3		3.3	3.3	3.3
All-Red Time (s)		2.6			2.6		2.8	3.5		2.8	3.5	3.5

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lost Time Adjust (s)		0.0			0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)		6.3			6.3		6.1	6.8		6.1	6.8	6.8
Lead/Lag							Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)		3.0			3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode		None			None		None	C-Max		None	C-Max	C-Max
Walk Time (s)		7.0			7.0			7.0			7.0	7.0
Flash Dont Walk (s)		24.0			24.0			21.0			21.0	21.0
Pedestrian Calls (#/hr)		5			5			5			5	5
Act Effct Green (s)		60.7			60.7			40.3		9.8	56.2	56.2
Actuated g/C Ratio		0.47			0.47			0.31		0.08	0.43	0.43
v/c Ratio		0.62			0.99			0.94		0.82	0.52	0.36
Control Delay		28.1			54.4			44.5		102.3	28.6	16.2
Queue Delay		0.0			39.6			0.0		0.0	0.0	0.0
Total Delay		28.1			93.9			44.5		102.3	28.6	16.2
LOS		C			F			D		F	C	B
Approach Delay		28.1			93.9			44.5			32.7	
Approach LOS		C			F			D			C	
Queue Length 50th (m)		100.5			209.4			133.9		27.8	76.6	25.7
Queue Length 95th (m)		123.2			#267.3			m137.9		#60.6	95.8	47.3
Internal Link Dist (m)		91.0			120.3			50.7			193.9	
Turn Bay Length (m)										135.0		50.0
Base Capacity (vph)		1565			1549			1019		127	1449	683
Starvation Cap Reductn		0			366			0		0	0	0
Spillback Cap Reductn		0			0			0		0	0	0
Storage Cap Reductn		0			0			0		0	0	0
Reduced v/c Ratio		0.62			1.29			0.94		0.81	0.52	0.36

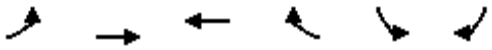
Intersection Summary			
Area Type:	Other		
Cycle Length: 130			
Actuated Cycle Length: 130			
Offset: 3 (2%), Referenced to phase 2:NBT and 6:SBT, Start of Green			
Natural Cycle: 110			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.99			
Intersection Signal Delay: 54.8		Intersection LOS: D	
Intersection Capacity Utilization 90.3%		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.			
m Volume for 95th percentile queue is metered by upstream signal.			

Splits and Phases: 1: Booth Street & Sir John A MacDonald Parkway/Wellington Street





Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	1010	530	762	1200	949	507
Future Volume (vph)	1010	530	762	1200	949	507
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	135.0			115.0	0.0	35.0
Storage Lanes	2			3	3	1
Taper Length (m)	30.0				30.0	
Lane Util. Factor	0.97	0.91	0.95	0.76	0.94	1.00
Ped Bike Factor	0.99				0.94	
Frt				0.850		0.850
Flt Protected	0.950				0.950	
Satd. Flow (prot)	3252	4818	3353	3420	4728	1500
Flt Permitted	0.950				0.950	
Satd. Flow (perm)	3230	4818	3353	3420	4438	1500
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)				29		307
Link Speed (k/h)		50	50		50	
Link Distance (m)		270.2	257.1		139.6	
Travel Time (s)		19.5	18.5		10.1	
Confl. Peds. (#/hr)	11			11	33	
Confl. Bikes (#/hr)				1		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1098	576	828	1304	1032	551
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1098	576	828	1304	1032	551
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		7.2	7.2		10.8	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.8	4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.07	1.07	1.07	1.07	1.07	1.07
Turning Speed (k/h)	25			15	25	15
Number of Detectors	1	2	2	1	1	0
Detector Template	Left	Thru	Thru	Right	Left	
Leading Detector (m)	2.0	10.0	10.0	2.0	2.0	0.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6	0.6	2.0	2.0	0.0
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		9.4	9.4			
Detector 2 Size(m)		0.6	0.6			
Detector 2 Type		Cl+Ex	Cl+Ex			
Detector 2 Channel						
Detector 2 Extend (s)		0.0	0.0			
Turn Type	Prot	NA	NA	pt+ov	Prot	Perm
Protected Phases	5	2	6	6 4	4	
Permitted Phases		2				4
Detector Phase	5	2	6	6 4	4	4
Switch Phase						
Minimum Initial (s)	5.0	10.0	10.0		5.0	5.0
Minimum Split (s)	30.0	22.4	26.4		41.1	41.1
Total Split (s)	50.0	88.9	38.9		41.1	41.1
Total Split (%)	38.5%	68.4%	29.9%		31.6%	31.6%
Maximum Green (s)	44.0	82.5	32.5		35.0	35.0
Yellow Time (s)	3.7	3.7	3.7		3.7	3.7
All-Red Time (s)	2.3	2.7	2.7		2.4	2.4

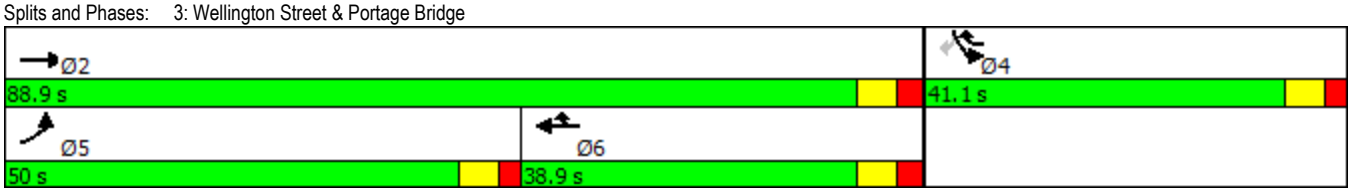


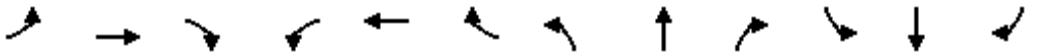
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	6.0	6.4	6.4		6.1	6.1
Lead/Lag	Lead		Lag			
Lead-Lag Optimize?	Yes		Yes			
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Recall Mode	None	Max	None		None	None
Walk Time (s)	12.0		7.0		23.0	23.0
Flash Dont Walk (s)	12.0		13.0		12.0	12.0
Pedestrian Calls (#/hr)	0		0		0	0
Act Effct Green (s)	44.0	82.5	32.5	73.4	34.8	34.8
Actuated g/C Ratio	0.34	0.64	0.25	0.57	0.27	0.27
v/c Ratio	1.00	0.19	0.99	0.67	0.82	0.88
Control Delay	69.1	10.0	76.3	21.4	50.6	36.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	69.1	10.0	76.3	21.4	50.6	36.4
LOS	E	A	E	C	D	D
Approach Delay		48.8	42.7		45.7	
Approach LOS		D	D		D	
Queue Length 50th (m)	152.0	22.1	117.7	101.0	92.6	69.8
Queue Length 95th (m)	#201.1	27.9	#162.1	121.7	110.1	#140.1
Internal Link Dist (m)		246.2	233.1		115.6	
Turn Bay Length (m)	135.0			115.0		35.0
Base Capacity (vph)	1102	3063	840	1952	1274	629
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	1.00	0.19	0.99	0.67	0.81	0.88

Intersection Summary			
Area Type:	Other		
Cycle Length: 130			
Actuated Cycle Length: 129.8			
Natural Cycle: 130			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 1.00			
Intersection Signal Delay: 45.5		Intersection LOS: D	
Intersection Capacity Utilization 87.1%		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: Wellington Street & Portage Bridge



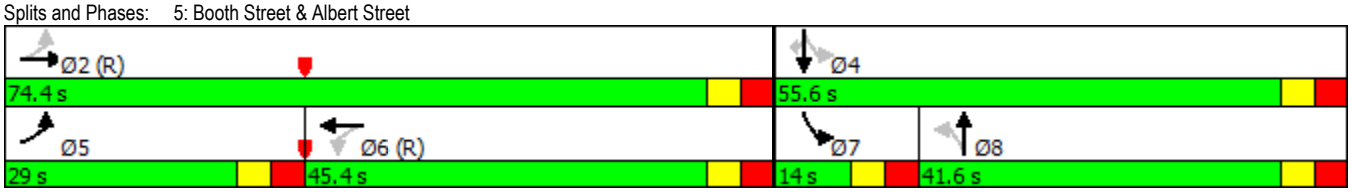


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	300	747	74	54	616	250	44	517	77	168	449	274
Future Volume (vph)	300	747	74	54	616	250	44	517	77	168	449	274
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0		0.0	0.0		50.0	0.0		0.0	100.0		0.0
Storage Lanes	1		0	1		0	0		0	1		1
Taper Length (m)	30.0			30.0			30.0			30.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	0.95	0.95	0.95	1.00	1.00	1.00
Ped Bike Factor		1.00		0.99	0.97			0.98		0.97		0.91
Frt		0.987			0.957			0.982				0.850
Flt Protected	0.950			0.950				0.997		0.950		
Satd. Flow (prot)	1676	3297	0	1676	3099	0	0	3232	0	1676	1765	1500
Flt Permitted	0.088			0.319				0.787		0.163		
Satd. Flow (perm)	155	3297	0	560	3099	0	0	2545	0	280	1765	1358
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		12			48			11				298
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		167.4			213.1			205.5			334.4	
Travel Time (s)		12.1			15.3			14.8			24.1	
Confl. Peds. (#/hr)	80		9	9		80	57		84	84		57
Confl. Bikes (#/hr)			2			8			2			9
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	326	812	80	59	670	272	48	562	84	183	488	298
Shared Lane Traffic (%)												
Lane Group Flow (vph)	326	892	0	59	942	0	0	694	0	183	488	298
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	2.0
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	NA		Perm	NA		Perm	NA		pm+pt	NA	Perm
Protected Phases	5	2			6			8		7	4	
Permitted Phases	2			6			8			4		4
Detector Phase	5	2		6	6		8	8		7	4	4
Switch Phase												
Minimum Initial (s)	5.0	10.0		10.0	10.0		10.0	10.0		5.0	10.0	10.0
Minimum Split (s)	11.5	36.5		36.5	36.5		36.5	36.5		11.5	36.5	36.5
Total Split (s)	29.0	74.4		45.4	45.4		41.6	41.6		14.0	55.6	55.6
Total Split (%)	22.3%	57.2%		34.9%	34.9%		32.0%	32.0%		10.8%	42.8%	42.8%
Maximum Green (s)	22.5	67.9		38.9	38.9		35.1	35.1		7.5	49.1	49.1
Yellow Time (s)	3.3	3.3		3.3	3.3		3.3	3.3		3.3	3.3	3.3
All-Red Time (s)	3.2	3.2		3.2	3.2		3.2	3.2		3.2	3.2	3.2

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0		0.0	0.0	0.0
Total Lost Time (s)	6.5	6.5		6.5	6.5			6.5		6.5	6.5	6.5
Lead/Lag	Lead			Lag	Lag		Lag	Lag		Lead		
Lead-Lag Optimize?	Yes			Yes	Yes		Yes	Yes		Yes		
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	C-Max		C-Max	C-Max		None	None		None	None	None
Walk Time (s)		7.0		7.0	7.0		7.0	7.0			7.0	7.0
Flash Dont Walk (s)		23.0		23.0	23.0		21.0	21.0			21.0	21.0
Pedestrian Calls (#/hr)		0		0	0		0	0			0	0
Act Effct Green (s)	67.9	67.9		39.2	39.2			35.1		49.1	49.1	49.1
Actuated g/C Ratio	0.52	0.52		0.30	0.30			0.27		0.38	0.38	0.38
v/c Ratio	0.96	0.52		0.35	0.97			1.00		0.98	0.73	0.43
Control Delay	76.7	21.3		43.0	65.9			80.4		95.2	44.1	17.9
Queue Delay	0.0	0.0		0.0	0.0			0.0		0.0	0.0	0.0
Total Delay	76.7	21.3		43.0	65.9			80.4		95.2	44.1	17.9
LOS	E	C		D	E			F		F	D	B
Approach Delay		36.2			64.6			80.4			45.7	
Approach LOS		D			E			F			D	
Queue Length 50th (m)	71.9	79.1		12.5	127.3			97.6		45.1	136.0	43.4
Queue Length 95th (m)	#131.9	97.9		26.8	#174.3			#141.6		#98.3	173.2	76.4
Internal Link Dist (m)		143.4			189.1			181.5			310.4	
Turn Bay Length (m)										100.0		
Base Capacity (vph)	344	1727		168	968			695		186	666	698
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	0.95	0.52		0.35	0.97			1.00		0.98	0.73	0.43

Intersection Summary			
Area Type:	Other		
Cycle Length: 130			
Actuated Cycle Length: 130			
Offset: 9 (7%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green			
Natural Cycle: 110			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 1.00			
Intersection Signal Delay: 53.8		Intersection LOS: D	
Intersection Capacity Utilization 115.2%		ICU Level of Service H	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 5: Booth Street & Albert Street



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	1281	70	109	888	86	256
Future Volume (vph)	1281	70	109	888	86	256
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)		0.0	60.0		45.0	0.0
Storage Lanes		0	1		1	1
Taper Length (m)			30.0		30.0	
Lane Util. Factor	0.95	0.95	1.00	0.95	1.00	1.00
Ped Bike Factor	1.00				0.99	0.99
Frt	0.992					0.850
Flt Protected			0.950		0.950	
Satd. Flow (prot)	3313	0	1676	3353	1676	1500
Flt Permitted			0.087		0.950	
Satd. Flow (perm)	3313	0	154	3353	1665	1479
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)	8					139
Link Speed (k/h)	50			50	50	
Link Distance (m)	144.3			270.2	146.6	
Travel Time (s)	10.4			19.5	10.6	
Confl. Peds. (#/hr)		6	6		6	2
Confl. Bikes (#/hr)		62				
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1392	76	118	965	93	278
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1468	0	118	965	93	278
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	7.2			7.2	3.6	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.07	1.07	1.07	1.07	1.07	1.07
Turning Speed (k/h)		15	25		25	15
Number of Detectors	1		1	1	1	1
Detector Template	Thru		Left	Thru	Left	
Leading Detector (m)	10.0		2.0	10.0	2.0	0.0
Trailing Detector (m)	0.0		0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0		0.0	0.0	0.0	0.0
Detector 1 Size(m)	10.0		2.0	10.0	2.0	0.0
Detector 1 Type	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0		0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0		0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0		0.0	0.0	0.0	0.0
Turn Type	NA		pm+pt	NA	Prot	Perm
Protected Phases	2		1	6	8	
Permitted Phases			6			8
Detector Phase	2		1	6	8	8
Switch Phase						
Minimum Initial (s)	10.0		4.0	10.0	5.0	5.0
Minimum Split (s)	37.6		9.6	15.6	29.8	29.8
Total Split (s)	49.0		11.0	60.0	30.0	30.0
Total Split (%)	54.4%		12.2%	66.7%	33.3%	33.3%
Maximum Green (s)	43.4		5.4	54.4	24.2	24.2
Yellow Time (s)	3.7		3.7	3.7	3.3	3.3
All-Red Time (s)	1.9		1.9	1.9	2.5	2.5
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	0.0
Total Lost Time (s)	5.6		5.6	5.6	5.8	5.8
Lead/Lag	Lag		Lead			
Lead-Lag Optimize?	Yes		Yes			
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Recall Mode	C-Max		None	C-Max	None	None
Walk Time (s)	15.0				7.0	7.0
Flash Dont Walk (s)	17.0				17.0	17.0
Pedestrian Calls (#/hr)	5				5	5
Act Effct Green (s)	51.1		63.8	63.8	14.8	14.8
Actuated g/C Ratio	0.57		0.71	0.71	0.16	0.16
v/c Ratio	0.78		0.51	0.41	0.34	0.77
Control Delay	20.6		17.1	6.9	34.2	31.6
Queue Delay	3.1		0.0	0.0	0.0	0.0
Total Delay	23.7		17.1	6.9	34.2	31.6
LOS	C		B	A	C	C
Approach Delay	23.7			8.0	32.2	
Approach LOS	C			A	C	
Queue Length 50th (m)	102.4		5.7	31.7	15.2	24.1
Queue Length 95th (m)	#176.8		#27.0	60.9	25.9	46.6
Internal Link Dist (m)	120.3			246.2	122.6	
Turn Bay Length (m)			60.0		45.0	
Base Capacity (vph)	1883		230	2377	450	499
Starvation Cap Reductn	307		0	0	0	0
Spillback Cap Reductn	0		0	0	0	0
Storage Cap Reductn	0		0	0	0	0
Reduced v/c Ratio	0.93		0.51	0.41	0.21	0.56

Intersection Summary

Area Type: Other
Cycle Length: 90
Actuated Cycle Length: 90
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBTL, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.78
Intersection Signal Delay: 19.0 Intersection LOS: B
Intersection Capacity Utilization 66.4% 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.

Splits and Phases: 2: Lett Street & Wellington Street

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	1094	123	203	1283	70	153
Future Volume (vph)	1094	123	203	1283	70	153
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)		0.0	60.0		45.0	0.0
Storage Lanes		0	1		1	1
Taper Length (m)			30.0		30.0	
Lane Util. Factor	0.95	0.95	1.00	0.95	1.00	1.00
Ped Bike Factor	1.00		1.00		1.00	0.98
Frt	0.985					0.850
Flt Protected			0.950		0.950	
Satd. Flow (prot)	3287	0	1676	3353	1676	1500
Flt Permitted			0.125		0.950	
Satd. Flow (perm)	3287	0	220	3353	1675	1474
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)	17					166
Link Speed (k/h)	50			50	50	
Link Distance (m)	144.3			270.2	146.6	
Travel Time (s)	10.4			19.5	10.6	
Confl. Peds. (#/hr)		18	18		1	5
Confl. Bikes (#/hr)		4				
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1189	134	221	1395	76	166
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1323	0	221	1395	76	166
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	7.2			7.2	3.6	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.07	1.07	1.07	1.07	1.07	1.07
Turning Speed (k/h)		15	25		25	15
Number of Detectors	2		1	2	1	0
Detector Template	Thru		Left	Thru	Left	
Leading Detector (m)	10.0		2.0	10.0	2.0	0.0
Trailing Detector (m)	0.0		0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0		0.0	0.0	0.0	0.0
Detector 1 Size(m)	0.6		2.0	0.6	2.0	0.0
Detector 1 Type	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel						
Detector 1 Extend (s)	0.0		0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0		0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0		0.0	0.0	0.0	0.0
Detector 2 Position(m)	9.4			9.4		
Detector 2 Size(m)	0.6			0.6		
Detector 2 Type	Cl+Ex			Cl+Ex		
Detector 2 Channel						
Detector 2 Extend (s)	0.0			0.0		
Turn Type	NA		pm+pt	NA	Prot	Perm
Protected Phases	2		1	6	8	
Permitted Phases			6			8
Detector Phase	2		1	6	8	8
Switch Phase						
Minimum Initial (s)	10.0		4.0	10.0	5.0	5.0
Minimum Split (s)	37.6		8.0	27.6	29.8	29.8
Total Split (s)	45.1		15.0	60.1	29.9	29.9
Total Split (%)	50.1%		16.7%	66.8%	33.2%	33.2%
Maximum Green (s)	39.5		11.0	54.5	24.1	24.1
Yellow Time (s)	3.7		3.5	3.7	3.3	3.3
All-Red Time (s)	1.9		0.5	1.9	2.5	2.5

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	0.0
Total Lost Time (s)	5.6		4.0	5.6	5.8	5.8
Lead/Lag	Lag		Lead			
Lead-Lag Optimize?	Yes		Yes			
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Recall Mode	C-Max		None	C-Max	None	None
Walk Time (s)	15.0				7.0	7.0
Flash Dont Walk (s)	17.0				17.0	17.0
Pedestrian Calls (#/hr)	5				5	5
Act Effct Green (s)	52.0		68.6	67.0	11.6	11.6
Actuated g/C Ratio	0.58		0.76	0.74	0.13	0.13
v/c Ratio	0.69		0.64	0.56	0.35	0.50
Control Delay	17.9		18.4	7.3	37.8	10.4
Queue Delay	1.1		0.0	0.0	0.0	0.0
Total Delay	19.0		18.4	7.3	37.8	10.4
LOS	B		B	A	D	B
Approach Delay	19.0			8.8	19.0	
Approach LOS	B			A	B	
Queue Length 50th (m)	79.2		7.6	41.5	13.2	0.0
Queue Length 95th (m)	#161.3		#46.8	106.2	22.0	15.0
Internal Link Dist (m)	120.3			246.2	122.6	
Turn Bay Length (m)			60.0		45.0	
Base Capacity (vph)	1907		361	2496	448	516
Starvation Cap Reductn	333		0	0	0	0
Spillback Cap Reductn	0		0	0	0	0
Storage Cap Reductn	0		0	0	0	0
Reduced v/c Ratio	0.84		0.61	0.56	0.17	0.32

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBTL, Start of Green			
Natural Cycle: 80			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.69			
Intersection Signal Delay: 13.8		Intersection LOS: B	
Intersection Capacity Utilization 67.5%		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.			

Splits and Phases: 2: Lett Street & Wellington Street