CITY OF OTTAWA

555 ALBERT STREET TRANSPORTATION IMPACT ASSESSMENT

FINAL REPORT

JULY 14, 2022

CERTIFICATION FORM FOR TIA STUDY PM

TRANSPORTATION IMPACT ASSESSMENT REPORTS

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

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

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

CERTIFICATION

☑ I have reviewed and have a sound understanding of the objectives, needs and requirements of the City of Ottawa's Official Plan, Transportation Master Plan and the Transportation Impact Assessment (2017) Guidelines;

☑ I have a sound knowledge of industry standard practice with respect to the preparation of transportation impact assessment reports, including multi modal level of service review;

☑ I have substantial experience (more than 5 years) in undertaking and delivering transportation impact studies (analysis, reporting and geometric design) with strong background knowledge in transportation planning, engineering or traffic operations; and

☑ I am either a licensed[1] or registered[2] professional in good standing, whose field of expertise is either

- ☐ Transportation engineering
- ☑ Transportation planning

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

Dated at Ottawa (City) this 14 day of July ,20 22

Name: Kimberley Hunton, P. Eng.

Professional Title: Senior Project Manager, Transportation Planning

Signature of individual certifier that they meet the above criteria

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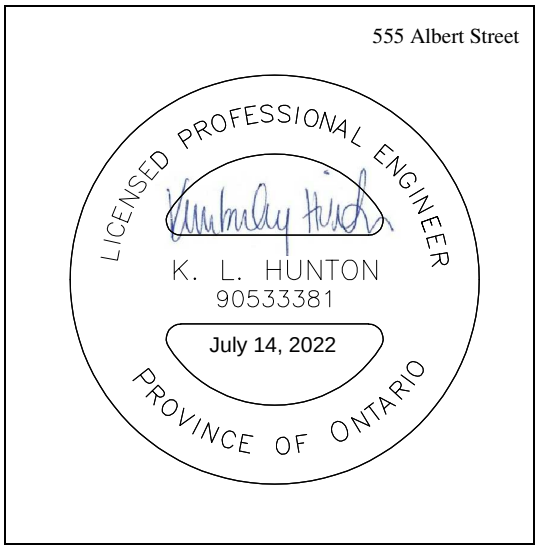
STAMP



555 ALBERT STREET TRANSPORTATION IMPACT ASSESSMENT

FINAL REPORT

CITY OF OTTAWA

PROJECT NO.: OUR REF. NO. 20M-00531-00
CLIENT REF:
DATE: JULY 14, 2022

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1 SCREENING

This Transportation Impact Assessment (TIA) has been prepared to support the Site Plan Control Application for the development of the Ottawa Public Library (OPL) and Library and Archives Canada (LAC) Joint Facility at 555 Albert Street. The TIA follows the City of Ottawa guidelines which includes 5 steps:

1 Screening
2 Scoping
3 Forecasting
4 Analysis
5 TIA Plan

The Screening Step determines the need to continue with a Transportation Impact Assessment (TIA) Study. The development is assessed against three triggers: trip generation, location, and safety to identify the next step of the study. If one or more of the triggers is satisfied, the Scoping Step must be completed. If none of the triggers are satisfied, the TIA is deemed complete. If one or more triggers are satisfied, specific TIA components are required to be carried out depending on the combination of triggers (**Table 1-1**) that have been satisfied.

The proposed development at 555 Albert Street **satisfied all three triggers** indicating that, as part of Steps Two through Five of the TIA process, the Design Review and Network Impact components should be completed. be addressed. For reference, the completed Screening Form is provided in **Appendix B**.

Table 1-1. Transportation Impact Assessment (TIA) Screening Options

	TIA TRIGGERS SATISFIED		
Next Step of the TIA Process	**Trip Generation**	**Location**	**Safety**
Deemed Complete	No	No	No
Step Two: *Design Review Only*	No	Yes (one or both)	
Step Two: *Design Review and Network Impact*	**Yes**	**Yes**	**Yes**

2 SCOPING

2.1 SCREENING FORM

Refer to **Section 1** for the completed Screening Form.

2.2 DESCRIPTION OF PROPOSED DEVELOPMENT

This Transportation Impact Assessment (TIA) has been prepared in support of the Site Plan Application for the Ottawa Public Library (OPL) and Library and Archives Canada (LAC) Joint Facility being developed at 555 Albert Street.

The 555 Albert Street site is an undeveloped property owned by the City of Ottawa in the Ottawa Inner Area. It is located at the southwest corner of the Albert Street and Commissioner Street intersection. The property consists of approximately 10,530 m² of land which is currently zoned as a Mixed-Use Downtown Zone (MD). **Figure 2-1** illustrates the Study Area Context. The estimated size of the facility is approximately 20,000 square meters and it is expected to attract an average of 5,000 visitors daily.

The draft site plan, attached as **Appendix C**, includes a five-storey building with two levels of underground parking. Notable transportation elements on the draft site plan include:

- Pedestrians can enter the building at a number of locations with main entrances at the southwest entry between the north and central amphitheatres; at the southeast entry near the Albert Street pedestrian signals, and northeast entry near the corner of Albert Street and Commissioner Street.
- Ring bike racks (28) are provided along the east exterior wall of the building
- Private vehicles access the underground parking structure from Commissioner Street near the north property line (53 parking spaces on P1 and 138 parking spaces on P2; including 10 accessible spaces)
- Private vehicles will also have street parking available on Albert Street (*Albert and Slater Improvement Project*)
- Operations and maintenance vehicles have a separate entrance from Commissioner Street to two interior loading bays and one exterior loading bay south of the parking garage access.

The facility will be built as a single phase with an estimated date of completion during the summer of 2024.

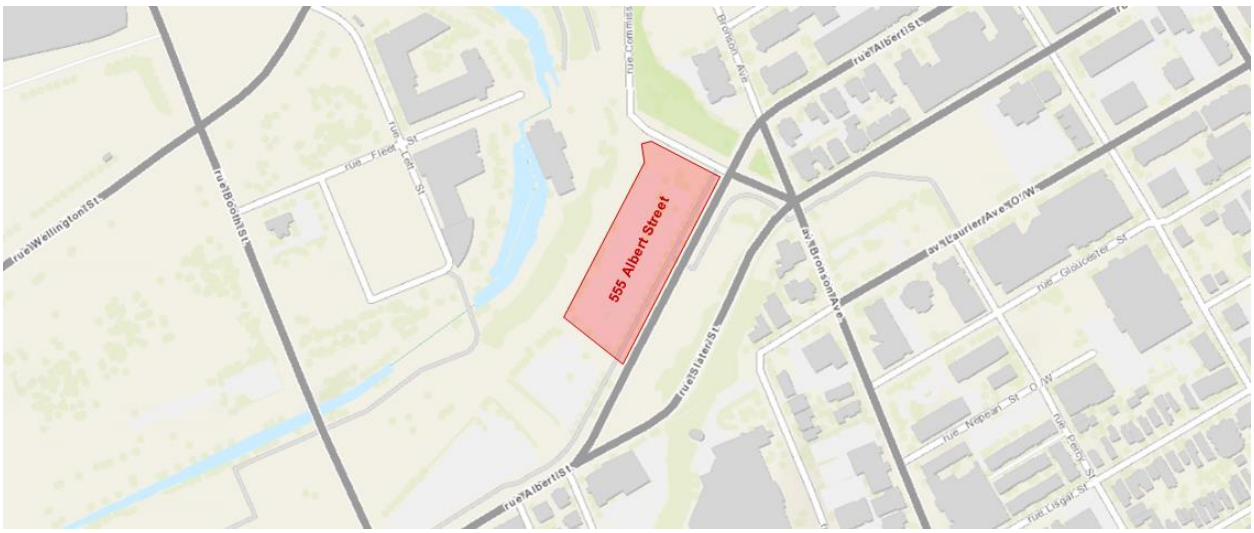

Figure 2-1. Area Context Plan

2.3 EXISTING CONDITIONS

2.3.1 ROADWAYS AND PEDESTRIAN / CYCLING FACILITIES

The eight existing roadways that the Transportation Impact Assessment will consider are Commissioner Avenue, Albert Street, Slater Street, Empress Avenue North, Bronson Avenue, Bay Street, Lyon Street, and Wellington Street. These roads are all under the jurisdiction of the City of Ottawa with the exception of Wellington Street which is also part of the National Capital Commissions (NCC) ceremonial and discovery route: Confederation Boulevard. The road classification for City of Ottawa roadways are defined in the City of Ottawa Official Plan, 2013, Volume 1, Section 7, Annex 1 Road Classifications and Rights-of-Way.

Commissioner Avenue is an urban local road north of Albert Street with a posted speed limit of 50 km/h and two lanes of two-way traffic. South of Albert Street, it is a one-way arterial The Right-of-Way adjacent to the proposed development is approximately 18 metres. There is tour bus parking for half of the street, then after the one-way starts, there is some street parking available. There are sidewalks on each side of the road.

Albert Street is an urban arterial road that runs east-west with a posted speed limit of 50 km/h. On the western section of the study area, Albert Street is a two-way road with 2 lanes of traffic in both directions. Upon leaving the intersection with Empress Ave North, the road splits into a Y-shape; the left side continues as Albert Street while the right side turns into Slater Street. Once Albert Street passes the intersection with Commissioner Street, it becomes a one-way road with 2 lanes (and an HOV lane) of traffic. The Official Plan reserves a 40 metre Right-of-Way in the study area. There is no on-street parking west of Bronson Avenue, but east of Bronson Avenue, there is on-street parking. There are sidewalks on each side east of Bronson Avenue and multi-use pathways west of Bronson Avenue.

Slater Street is an urban arterial one-way road with two lanes of traffic throughout the study area. It begins east of Empress Avenue North and continues east-west through the downtown area. The posted speed limit is 50 km/h, similar to Albert Street. The Official Plan reserves a 40 metre Right-of-Way in the study area. There is no on-street parking permitted west of Bronson Avenue. There are sidewalks available east of Bronson Avenue.

Empress Avenue North is an urban local road that runs north-south with a posted speed limit of 50 km/h and is not a through road. It is a two-way roadway with two lanes of traffic. The Right-of-Way is the study area is 15 metres. On-street parking is permitted with time limit restrictions. There is also a sidewalk on each side of the road.

Bronson Avenue is an urban arterial that runs north-south with a posted speed limit of 50 km/h. It has a varying cross-section through the study area.

- North of Queen Street it is a single lane one-way southbound street that is an extension of Sparks Street
- North of Albert Street and south of Queen Street it is a two-way street with one lane in each direction
- South of Albert Street and north of Slater Street it is a one-way northbound street with a northbound left turn lane and a northbound through lane
- South of Slater Street it is a two-way street with two lanes in each direction

The right-of-way is the study area is 23 metres. Bronson Avenue North of Slater Street is one-way northbound, but then turns into one-way Southbound, north of Queen Street. Between Queen Street and Slater Street, Bronson Avenue is a two-way road. There is no on-street parking provided and there are sidewalks on each side of the road.

Bay Street is an urban arterial that runs north-south with a posted speed limit of 50 km/h. It has 2 lanes of traffic in one direction (northbound). Furthermore, the Right-of-Way is the study area is 20 metres. On-street parking is available south of Sparks Street. There are sidewalks on each side of the road and separated bike lanes being constructed between Wellington Street and Laurier Street West as part of the Bay Street Cycling Facility project.

Lyon Street is a local road that runs north-south with a posted speed limit of 50 km/h. It has 2 lanes of traffic in one direction (southbound). Furthermore, the Right-of-Way is the study area is 23 metres. On-street parking is permitted on the east side of the road with time restrictions. There are sidewalks throughout and a bike lane on the west side of the street.

Wellington Street is an urban atrial road that runs east-west alignment with a posted speed of 40 km/h. Wellington Street has 4 to 6 lanes of traffic, with 2 to 3 in each direction, on various locations of the study area. Wellington Street is part of the NCCs Confederation Boulevard which is the Capital's ceremonial and discovery route and connects many sites and symbols of national significance. The Official Plan reserves a 40 metre Right-of-Way west of the Portage Bridge and a 27m Right-of-Way east of the Portage Bridge in the study area. On-street parking is not permitted. There are sidewalks on each side of the road and cycling facilities are provided with enhancements planned.

The existing pedestrian and cycling facilities providing a direct connection to the site are shown in **Figure 2-2** and the City's Ultimate Cycling Network (including pathways) is shown in **Figure 2-3**. The pedestrian and cycling facilities include:

- Commissioner Avenue: 1.6m asphalt pathway on the north and south side
- Albert Street: 3.0m multi-use pathway separated by 4.5m boulevard on west side and 3.0m asphalt pathway separated by curb / seasonal flexible bollards on the east side.
- Pooley's Bridge providing a pedestrian / bicycle connection from Commissioner Street to Fleet Street
- Direct access to the Trans-Canada Trail using paths to the north

Portage Bridge
Wellington St.
Albert St.
Slater St.
Kent St.
Lyon St. N
Bay St.
Bronson Ave
Project Site
Sir John A. Macdonald Pkwy
Booth St.
Albert St.
Slater St.

Legend:

- Study Intersections
- Bike Lane
- Multi-Use Path
- Cycle Track
- Suggested Route

Google

DRAWING:OLP Study Area.cdr DATE: 2020-05-15 DRAWN BY: adhikarb

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Issue Date - 2020-05-15
Scale: NTS
Aerial Imagery: 2016
Note: All Dimensions shown in Metres unless otherwise

Figure 2-2
Bicycle and Multi-Use Pathways

DRAWING:OLP Study Area.cdr DATE: 2020-05-15 DRAWN BY: adhikarb

Portage Bridge
Wellington St.
Albert St.
Slater St.
Kent St.
Lyon St. N
Bay St.
Bronson Ave.
Project Site
Sir John A. Macdonald Pkwy
Booth St.
Albert St.
Slater St.

Legend:
- Study Intersections
- Pedestrian Sidewalks
- Path

Google

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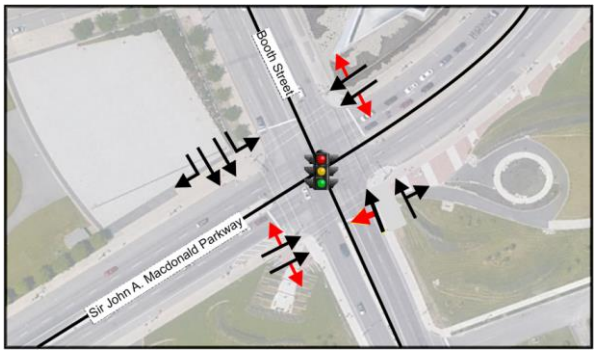
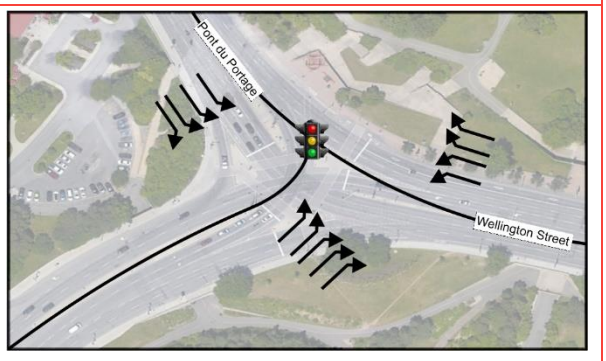
Note: All Dimensions shown in Metres unless otherwise

Figure 2-3
Pedestrian Pathways

2.3.2 INTERSECTIONS

The Transportation Impact Assessment will consider fourteen intersections as described in **Table 2-1**.

Table 2-1. Description of Study Area Intersections

INTERSECTION (DESCRIPTION)	LANE CONFIGURATION (YELLOW INDICATES BUS, RED INDICATES AUTHORIZED VEHICLES ONLY)
Booth Street and Wellington Street / Sir John A. Macdonald Parkway is a signalized intersection. North Approach: Two through lanes, 50-m right turn lane, 150-m left turn lane East Approach: Two through lanes with the left-turn restricted to authorized vehicles only (exception Sat 8h-16h) and no right-turn on reds permitted South Approach: One through/left lane, one through/right turn lane. Left turns are restricted to authorized vehicles only. West Approach: Two through lanes with the left-turn and right-turn restricted to authorized vehicles only Pedestrian/Bicycle: Separated pedestrian and bicycle crossings are provided across all four approaches. U-turns are prohibited at this intersection.	 Booth Street and Wellington Street/Sir John A. Macdonald Parkway Intersection
Wellington Street / Sir John A. Macdonald Parkway and Portage Bridge Street is a signalized intersection. Northwest Approach: Two left-turn lanes, Two right-turn lanes Southeast Approach: Two left-turn lanes, Two right-turn lanes Southwest Approach: Two left-turn lanes, three right-turn lanes Pedestrian/Bicycle: Shared pedestrian and on road cycling lane crossings across three approaches	 Wellington Street / Sir John A. Macdonald Parkway and Portage Bridge Intersection
Albert Street and Preston Street is a signalized intersection. North Approach: Formerly an LRT construction access East Approach: Two through lanes, one 115m left turn lane South Approach: One right turn lane, one left turn lane West Approach: One through lane, one right / HOV lane Pedestrian/Bicycle: Shared pedestrian and bicycle crossings across all approaches.	

Albert Street and Booth Street is a signalized intersection.

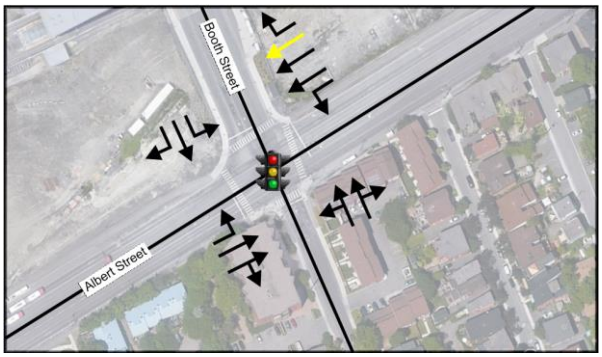
North Approach: One through lane, 130-m right turn lane; left turn lane extends all the way to the parkway with no right turn on reds permitted and no through movements during the night (23h00-6h00)

East Approach: Three through lanes (One is HOV), 130-m right turn lane; 80-m left turn lane with no right-turn on reds permitted and restricted left turns Monday-Friday 7h00-9h00 and 15h30-17h30

South Approach: One through/left turn lane, 50-m through/right turn lane

West Approach: 190-m left turn lane, one through lane and one through/right turn lane (HOV)

Pedestrian/Bicycle: Pedestrian crossing across all approaches. There are no bicycle lanes on this intersection and bicycles user have to mix with traffic.



Albert Street and Booth Street Intersection

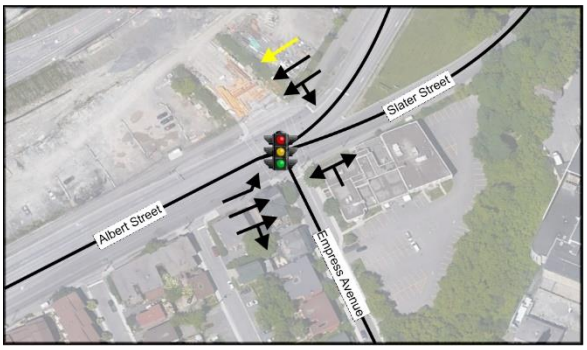
Albert Street and Empress Avenue North is a signalized intersection.

Northeast Approach: Two through lanes (one HOV), one through/left turn lane

South Approach: One left/right turn lane

West Approach: One lane continues northeast on Albert Street and two lanes continue east on Slater Street (right turn on one of the lanes – also HOV)

Pedestrian/Bicycle: Pedestrian crossings across all approaches.



Albert Street and Empress Avenue Intersection

Albert Street and Commissioner Street is a one-way stop-controlled intersection.

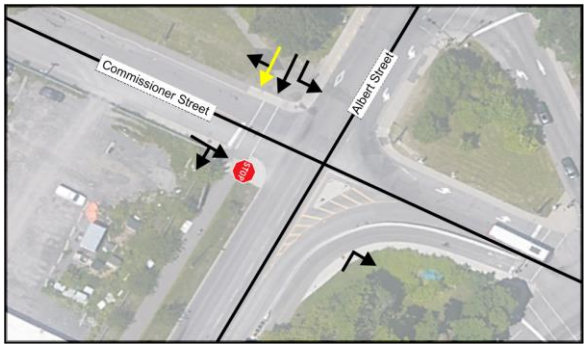
Northeast Approach: One right/through HOV lane, One through lane, and 50-m left turn lane

Northwest Approach: One through/right turn lane; left turns restricted

Southeast Approach: one-way going southbound

Southwest Approach: right-turn only lane

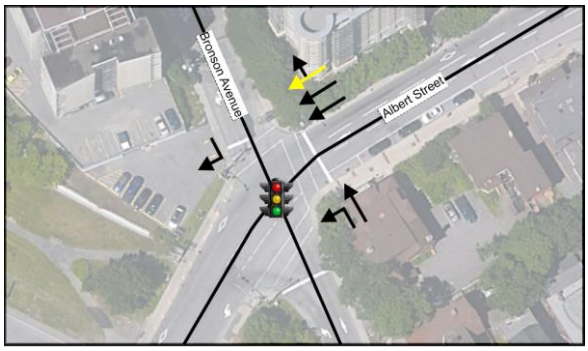
Pedestrian/Bicycle: Shared pedestrian and bicycle crossing across northwest approach.



Albert Street and Commissioner Street Intersection

Albert Street and Bronson Avenue is a signalized intersection.

- Northeast Approach: right lane is for HOV and right turns, two through lanes
- Southeast Approach: 40-m left turn lane, One through lane
- Southwest Approach: One-way westbound
- Northwest Approach: Only right turns allowed
- Pedestrian/Bicycle: Pedestrian crossing across the three approaches. There are no bicycle lanes on this intersection and bicycles mix with traffic.



Albert Street and Bronson Avenue Intersection

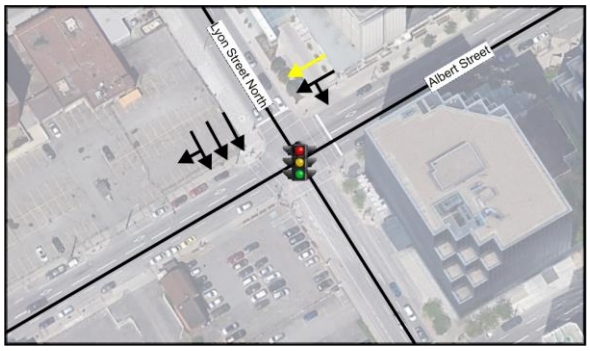
Albert Street and Bay Street is a signalized intersection.

- North Approach: One-way northbound
- East Approach: Two through lane, 50-m right turn lane
- South Approach: One through/left turn lane
- West Approach: One-way westbound
- Pedestrian/Bicycle: The Bay Street Cycling Facility project is upgrading this intersection to include separated pedestrian and bicycle crossings across the north, east, and west approaches. A shared crossing is provided across the south approach.

Albert Street and Bay Street Intersection

Albert Street and Lyon Street North is a signalized intersection.

- North Approach: Two through lanes, one through/right turn lane
- East Approach: One HOV through lane, one through/left turn lane, one through lane
- South Approach: One-way southbound
- West Approach: One-way westbound
- Pedestrian/Bicycle Infrastructure: Shared pedestrian and bicycle crossings across all approaches.



Albert Street and Lyon Street Intersection

Slater Street and Bronson Avenue is a signalized intersection.

North Approach: One-way northbound

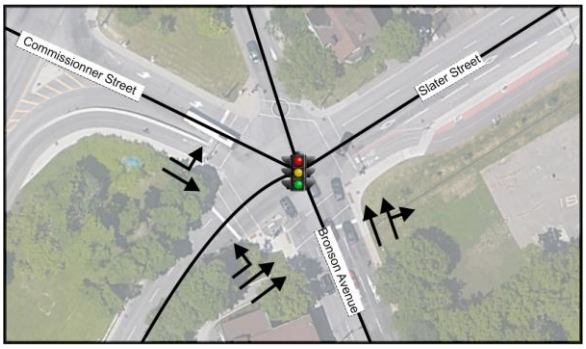
East Approach: One-way eastbound

South Approach: One through lane, one through/right turn lane

Southwest Approach: Two through lanes, one left turn lane

Northwest Approach: One left turn lane, one through lane

Pedestrian/Bicycle Infrastructure: bicycle crossing on south and southwest approaches and pedestrian crossings across all approaches.



Slater Street and Bronson Avenue Intersection

Slater Street and Bay Street is a signalized intersection.

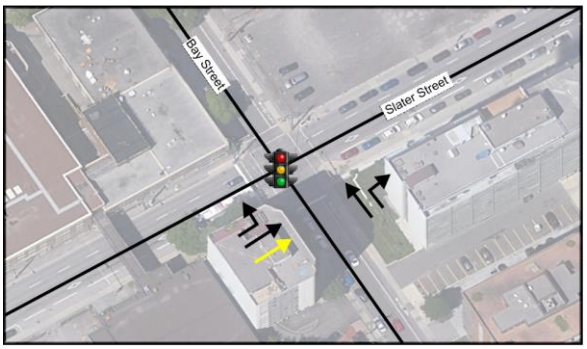
North Approach: one-way going northbound

East Approach: one-way going eastbound

South Approach: One through lane, one through/right-turn lane

West Approach: One left-turn lane, one through lane, one HOV through lane

Pedestrian/Bicycle: The Bay Street Cycling Facility project is upgrading this intersection to include separated pedestrian and bicycle crossings across the east and west approaches. A shared crossing is provided across the south and north approaches.



Slater Street and Bay Street Intersection

Slater Street and Lyon Street North is a signalized intersection.

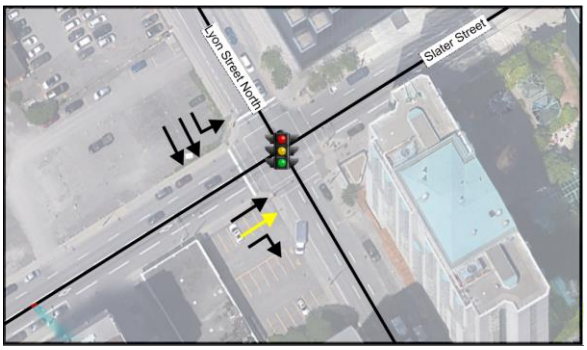
North Approach: Two through lanes, one left-turn lane

East Approach: One-way eastbound

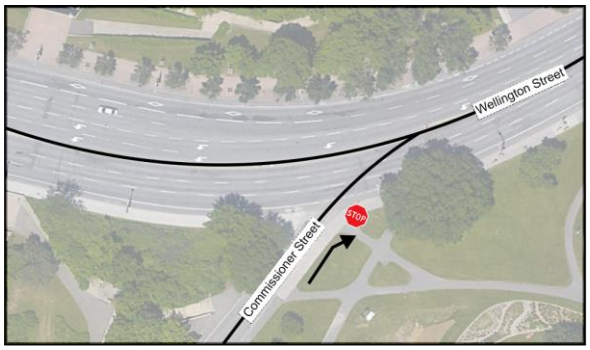
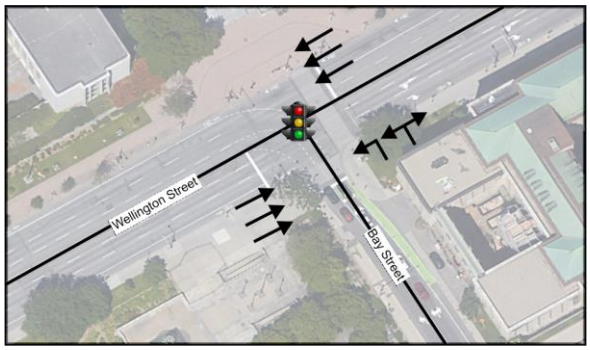
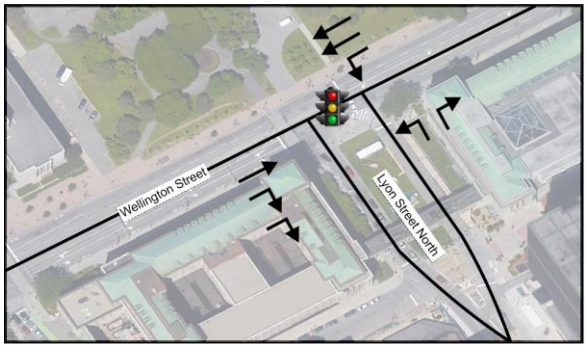
South Approach: One-way southbound

West Approach: One right-turn lane, one through lane, one HOV through lane

Pedestrian/Bicycle: Shared pedestrian and bicycle crossings across all approaches.



Slater Street and Lyon Street Intersection

Wellington Street and Commissioner Street is a one-way stop-controlled intersection. South Approach: merge onto Wellington Street; stop controlled Pedestrian/Bicycle: Bicycle and pedestrian crossing on south approach.	 Wellington Street and Commissioner Street Intersection
Wellington Street and Bay Street is signalized intersection East Approach: Three through lanes South Approach: one-way northbound; one left turn lane, one left/right turn lane West Approach: Three through lanes Pedestrian/Bicycle: The Bay Street Cycling Facility project is upgrading this intersection to include a bicycle crossings across the west approach with the existing pedestrian crossing across the east approach and shared crossing across the south approach.	 Wellington Street and Bay Street Intersection
Wellington Street and Lyon Street North is a signalized intersection. East Approach: Two through lanes, one left-turn lane South Approach: One-way northbound; one left turn lane, one right turn lane West Approach: One through lane, two right-turn lanes Pedestrian/Bicycle: Shared pedestrian and bicycle crossings across south east approaches.	 Wellington Street and Lyon Street North Intersection

2.3.3 DRIVEWAYS

The Cliff Heating and Cooling Plant (1 Fleet Street) main access intersections with Commissioner Street approximately 100m north of the proposed vehicle access to the OPL-LAC Joint Facility. There are no other existing private driveways that could influence access to the Joint Facility.

2.3.4 TRANSIT FACILITIES

OC Transpo routes providing service to the study area are shown in **Figure 2-4.** On October 6, 2019, the City of Ottawa's bus routes changed to provide connections from bus transit to the newly opened O-Train Line 1. The O-Train provides frequent and reliable service through downtown Ottawa and has a capacity of 600 passengers per train set.

The Pimisi Station is located approximately 400 metres west of the proposed development and is a key station people traveling between LeBreton Flats and Gatineau. OC Transpo provides an estimate of locations within a 5-minute walk of Pimisi Station (**Figure 2-5**) which includes the proposed development site. This development is also within 600m of Lyon Station.

Within 200m of 555 Albert Street there are two bus stops which are shown in **Figure 2-6**:

- Westbound Transit Stop #2392: Bus Routes 16, 57, 61, 75 on Albert Street
- Eastbound Transit Stop #2396: Bus Routes 16, 57, 61, 75 on Albert Street

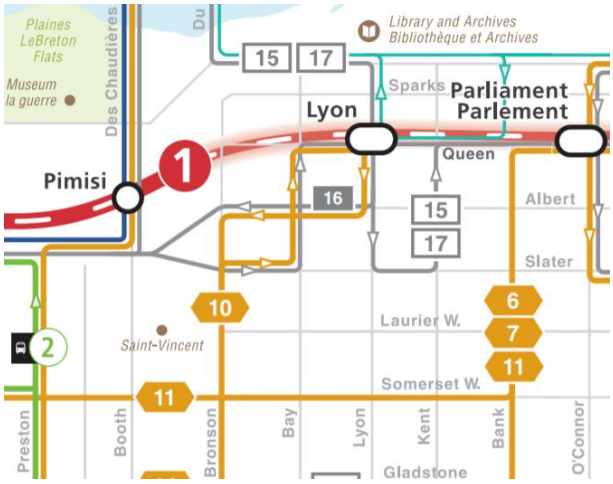


Figure 2-4: Bus Routes within Study Area

Figure 2-5: 5-Minute Radius from Pimisi Station

Portage Bridge
Wellington St.
Albert St.
Slater St.
Kent St.
Lyon St. N
Bay St.
Bronson Ave
Project Site
Sir John A. Macdonald Pkwy
Booth St.
Albert St.
Slater St.
Google

Legend:
- Study Intersections
- LRT Stops
- Bus Stops

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Aerial Imagery: 2016
Note: All Dimensions shown in Metres unless otherwise

Figure 2-6
Transit Services

DRAWING:OLP Study Area.cdr DATE: 2020-04-04 DRAWN BY: adhikarb

2.3.5 AREA TRAFFIC MANAGEMENT MEASURES

The identified area traffic management measures adjacent to the proposed development include:

- A signalized pedestrian crossing on Albert Street near the proposed pedestrian entrance to the OPL-LAC Joint Facility providing a connection between the continuous multi-use pathway on the west side and the multi-use pathway on the east side that begins at the pedestrian crossing and extends west towards the downtown.
- Seasonal flex posts on south side of Albert Street to separate the multi-use pathway from the driving lanes and improve visibility during poor weather conditions.

2.3.6 PEAK HOUR DEMANDS

The TRANS Committee was established to co-ordinate transportation planning efforts among various planning agencies located within the National Capital Region. The proposed development is located in the Ottawa Inner Area. The complete TRANS O-D results (including a map of the district area) is provided in Appendix D. The most recent Origin-Destination (O-D) survey was completed by TRANS in the Fall of 2011. The TRANS trip data for the Ottawa Inner Area is summarized in **Table 2-2**.

Table 2-2. TRANS Peak Period Trip Data for Ottawa Inner Area

TRAVEL MODE	AM PEAK PERIOD (6:30 A.M. – 9:00 A.M.)			PM PEAK PERIOD (3:30 P.M. – 6:00 P.M.)		
	FROM DISTRICT	TO DISTRICT	WITHIN DISTRICT	FROM DISTRICT	TO DISTRICT	WITHIN DISTRICT
Auto-Driver	40%	41%	20%	45%	43%	21%
Auto-Passenger	7%	9%	9%	11%	11%	8%
Transit	25%	41%	13%	33%	22%	10%
Bicycle	6%	4%	8%	5%	6%	7%
Walk	19%	3%	44%	5%	16%	53%
Other	4%	2%	6%	2%	2%	2%
Total Vehicles	**28,730**	**44,290**	**17,180**	**46,390**	**35,930**	**25,480**

Source: TRANS 2011 O-D Survey, Inner Area District

The existing vehicle turning movement volumes (at major intersections) and dates of the counts were obtained from the City of Ottawa. They are shown in **Figure 2-7** and include those at the following locations:

- Albert Street and Booth Street — Thursday December 5, 2019
- Albert Street and Bronson Avenue — Wednesday December 13, 2017
- Albert Street and Commissioner — Wednesday April 19, 2017
- Albert Street and Preston Street — Thursday August 18, 2016
- Albert Street and Empress Avenue North — Wednesday April 19, 2017
- Bay Street and Slater Street — Wednesday May 30, 2012
- Bay Street and Wellington Street — Tuesday December 3, 2019
- Booth Street and Wellington Street — Thursday June 8, 2017
- Bronson Avenue and Slater Street — Wednesday December 13, 2017

- Lyon Street and Slater Street — Thursday March 7, 2019
- Lyon Street and Wellington Street — Wednesday October 2, 2019
- Wellington Street and Portage Bridge — Thursday January 23, 2020

A 0% growth rate was applied to historical traffic counts and to future estimates (Section 3.2.2) based on a review of the 20-year historical screenline data across Screenline #35 which includes east-west trips along Wellington, Sparks, Queen, Albert, Slater, and Laurier along the general alignment of Bronson Avenue.

2.3.7 5-YEAR COLLISION HISTORY

The boundary streets for the development are Albert Street between Empress Avenue North and Commissioner Street and Commissioner Street from Albert Street and 100 metres north of the intersection. Upon receiving the collision history from the City of Ottawa, WSP reviewed the number and types of collisions on the boundary streets. The most recent five years of crash history for the study area (January 1, 2014 through December 31, 2018) are summarized in **Table 2-3**. The full list can be found in **Appendix E**.

Table 2-3. Five Year Collision History Summary

LOCATION	SUMMARY	TRENDS
Segment: Albert Street between Brickhill Street and Commissioner Street	One crash along this segment over five years with no fatalities. The westbound rear-end crash involved a transit bus and occurred on a January evening during clear, dry conditions.	There were no trends identified involving more than six crashes in five years.
Segment: Commissioner Street from Albert Street to 100m north of intersection	There were no recorded crashes on Commissioner Street.	
Intersection: Albert St & Commissioner St	Nine crashes at this location over five years with no fatalities. All crashes were during daylight hours. Notably, three crashes involved municipal transit buses (2014, 2017, and 2017) and two crashes involved cyclists (2016 and 2017).	

The transit and cycling related collisions at the intersection of Albert Street and Commissioner Street occurred during clear environmental conditions and resulted in property damages and non-fatal injuries, respectively. The collisions involving municipal transit buses were a result of two sideswipes and one angled collision. The vehicles involved in the sideswipe collisions were travelling in the same direction and the angled collision was the result of an improper westbound left-turn movement. The collisions involving cyclists occurred during a right-turn movement where the vehicles involved were travelling westbound for both cases.

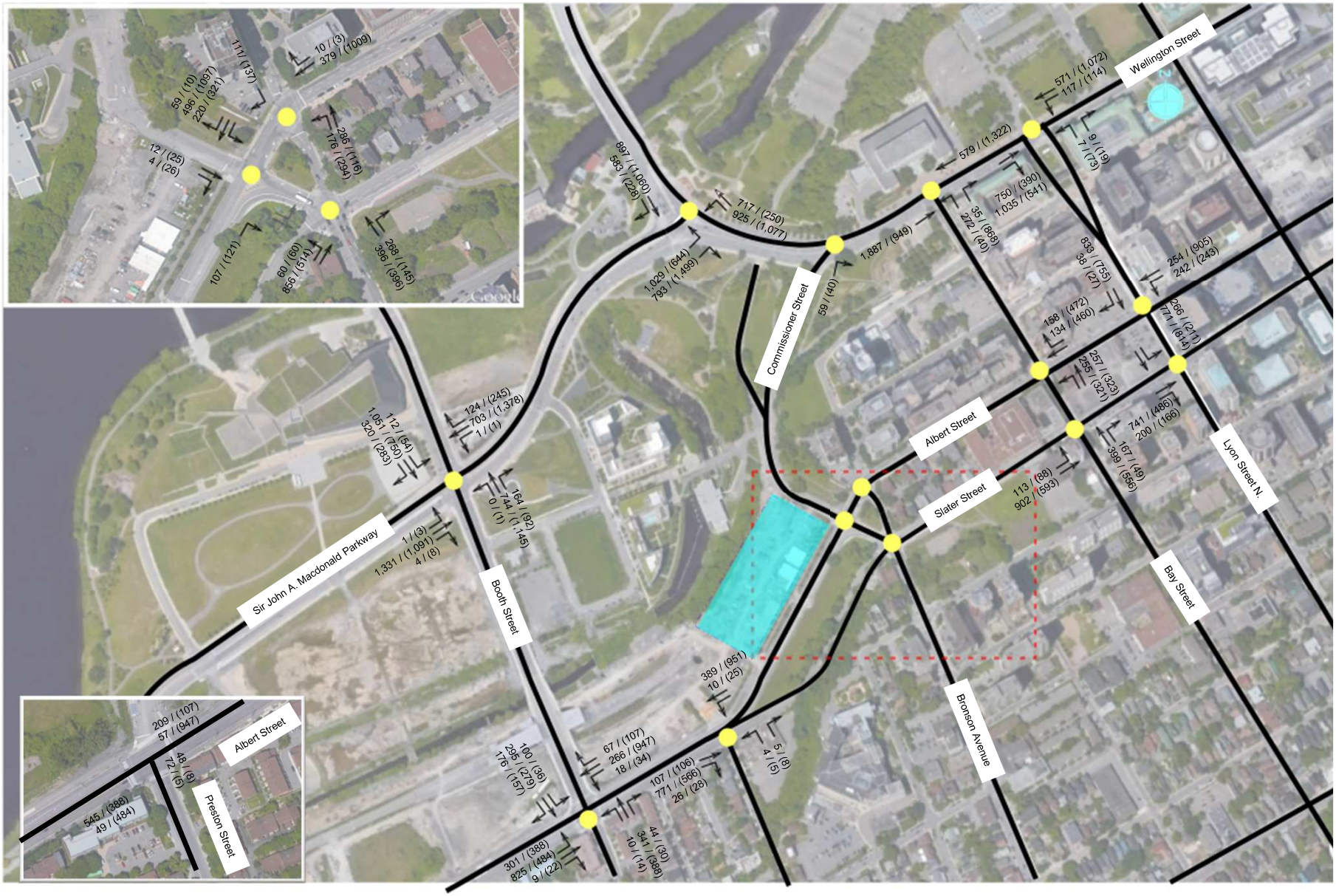

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Figure 2.7

Existing Traffic Volumes

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2.4 PLANNED CONDITIONS

2.4.1 CHANGES TO THE STUDY AREA TRANSPORTATION NETWORK

LRT Stage 2: The Confederation Line West is one of the three major extensions to Ottawa's light rail transit system. This extension will see LRT continue from Tunney's Pasture to Moodie and Baseline Stations. This extension will increase transit ridership through Pimisi Station. Revenue service for this extension is planned for 2025. This will also include the east and south extensions to the LRT which are expected to be in operation by 2024 and 2022, respectively.

Albert and Slater Streets Improvement: With the development and extension of the Confederation Line Light Rail Transit (LRT), the City of Ottawa is planning to repurpose the corridor of Albert and Slater Streets. By removing the dedicated bus lanes and improving the streetscape environment, the city aims to make these streets more friendly and accessible to pedestrians and cyclists. The project is currently in the design stage, which has been completed. Construction schedule has yet to be determined but is anticipated to be completed by 2024.

LeBreton Flats: The National Capital Commission (NCC) approved a Master Concept Plan for LeBreton Flats in January 2020 (**Figure 2-8**). The Master Concept Plan describes a pedestrian and cyclist friendly space with parks and plazas. In the long-term, it will feature a mixed-use community combining residential units that will be supported by retail and employment opportunities. The Master Concept Plan has been designed to encourage active mobility over all other modes of transportation by providing:

- Grand Staircase connecting Booth Street to the Aqueduct District
- Pimisi Underpass providing an accessible ramp and staircase connecting Albert Street to the urban playground
- Preston Street Connection extending a pedestrian and cycling bridge over the LRT from Albert Street to the Aqueduct District
- City Centre Avenue Connection extending a pedestrian and cycling bridge over the LRT from Albert Street to Capital Park
- Pathway Connections connecting the river pathway network to the site
- Flexibility for a Major Event Centre

The phasing and implementation aspect of the LeBreton Flats Master Concept Plan is still being developed.

Figure 2-8. LeBreton Flats Master Concept Plan (2020)

2.4.2 OTHER STUDY AREA DEVELOPMENTS

Developments noted in the City of Ottawa's Development Application Search tool that could have an influence on the study area include:

- 593 Laurier Avenue West (D02-02-19-0144): 17-floor apartment building with approximately 85 residential units
- 301 Lett Street (D07-12-20-0074): mixed-use development consisting of two towers providing approximately 600 dwelling units, commercial space and a daycare.
- 6 Booth Street (D07-12-19-0035): 6 storey office building
- 900 Albert Street: 1,632 residential dwellings with retail and office space

2.5 STUDY AREA

The limits for the Transportation Impact Assessment (TIA) study area are shown in **Figure 2-9**.

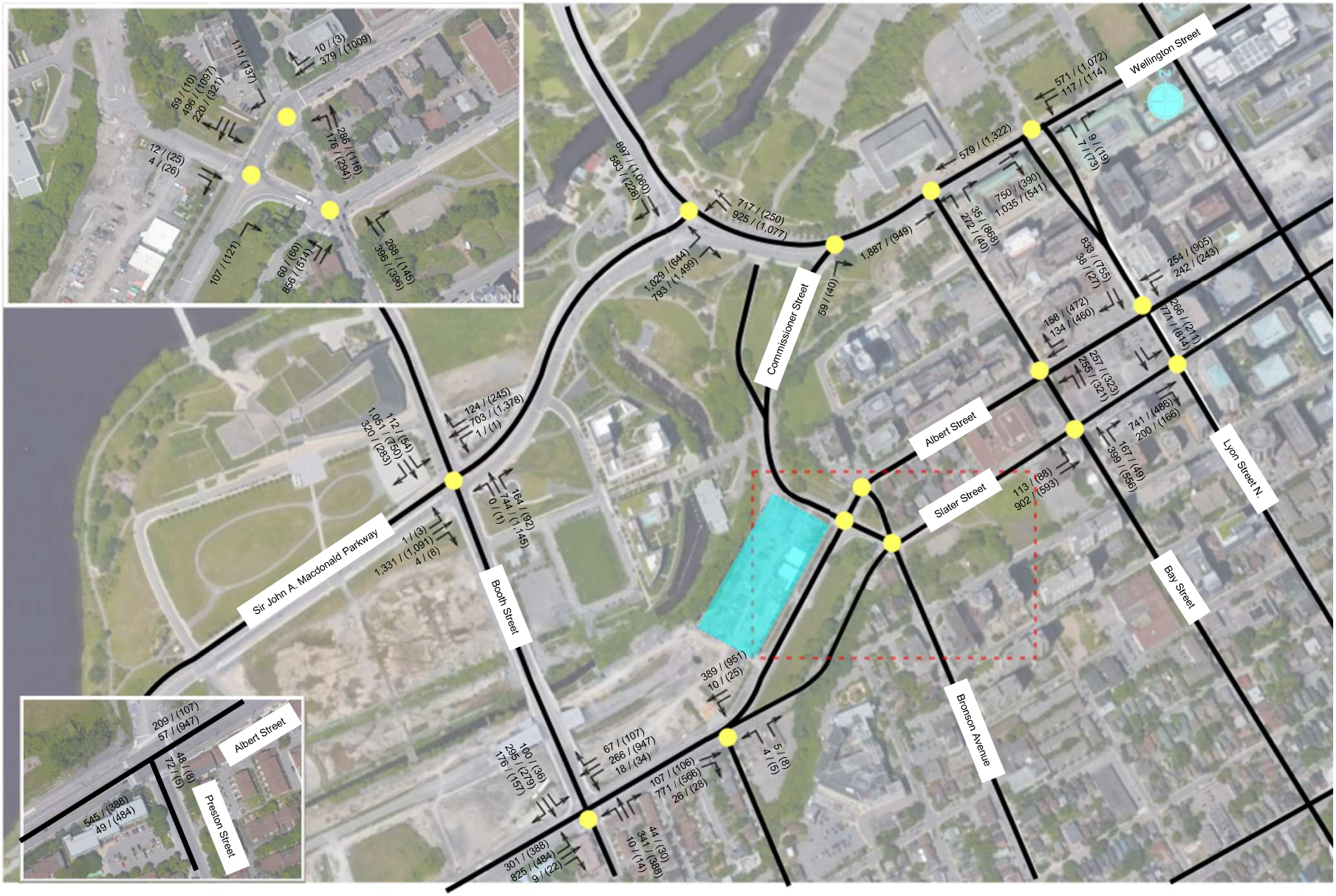

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Figure 2.7

Existing Traffic Volumes

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2.6 TIME PERIOD

The time periods identified for the traffic analysis are:

- AM Peak Hour: 7:45 a.m. to 8:45 a.m.
- PM Peak Hour: 4:30 p.m. to 5:30 p.m.

These are consistent with the AM and PM peak hours identified in the turning movement counts for the intersection of Albert Street and Commissioner Street dated Wednesday April 19, 2017.

2.7 HORIZON YEARS

The new Ottawa Public Library-Library of Archives Canada facility is expected to be completed in one phase with a target build-out year of 2024. In accordance with the TIA Guidelines, the following horizons will be considered for analysis

- 2024, which represents the anticipated buildout horizon
- 2029, which represents the buildout year plus five years

2.8 EXEMPTIONS REVIEW

Based on the review of the development and network conditions, the following elements shown in **Table 2-4** qualify for an exemption from this Transportation Impact Assessment.

Table 2-4. Exemptions Summary

MODULE	ELEMENT	EXEMPTIONS
DESIGN REVIEW COMPONENT		
4.1 Development Design	4.1.2 Circulation and Access	**Not Exempted.** This element is required for site plans.
	4.1.3 New Street Networks	**Exempted.** This element is only required for plans of subdivision.
4.2 Parking	4.2.1 Parking Supply	**Not Exempted.** This element is required for site plans.
	4.2.2 Spillover Parking	**Exempted.** This element is only required for site plans where parking supply is 15% below unconstrained demand.
NETWORK IMPACT COMPONENT		
4.5 Transportation Demand Management	All Elements	**Not Exempted.** Required for site plans expected to have more than 60 employees on location at any given time.
4.6 Neighborhood Traffic Management	4.6.1 Adjacent Neighbourhoods	**Not Exempted.** Required when the development relies on local access and total volumes exceed ATM capacity threshold of 1,000 vpd or 120 vph.
4.8 Network Concept		**Exempted.**

3 FORECASTING

3.1 DEVELOPMENT-GENERATED TRAVEL DEMAND

3.1.1 TRIP GENERATION

Select Base Trip Generation Rate. The City of Ottawa completed a Parking Requirement Assessment Study (2017) for the New Central Library to determine the minimum amount of parking required to accommodate visitors accessing the Central Library by car. The Study identified users of the facility, determined their travel behaviour, and ultimately proposed the number of parking spaces that would be suitable for the facility to accommodate peak demand.

The trip generation estimates provide in this Transportation Impact Assessment is based on the user profiles prepared as part of the 2017 Study. The user profiles identified are described in **Table 3-1** with supporting documents in **Appendix F**.

Table 3-1. Facility User Profiles

	EMPLOYEE		VISITOR		OPERATIONS AND MAINTENANCE
User Type	OPL	LAC	OPL	LAC	Service Vehicles, Deliveries, Contractors
Frequency	Throughout the day	Throughout the day	Throughout the day with peaks during the early afternoon and evening.	Many likely present at the same time (meetings), especially during the afternoon	Throughout the day
Typical Length of Stay	8	8	1-2 hours	4 hours	1 hour
Maximum Users / Day	105	90	5,850	350	>10
Auto Driver Mode Share	23% - 38%	23% - 38%	15% - 18%	20%	100%

Total Development-Generated Person-Trips. The projected development-generated person-trips are provided in **Table 3-2**. To convert between the maximum users during a Peak Period provided in the 2017 Parking Requirement Assessment Study and the Peak Hour to be assessed, the following factors were applied:

- Employee, AM Peak Period to AM Peak Hour: 0.60
- Employee, PM Peak Period to PM Peak Hour: 0.40
- Visitor, LAC PM Peak Period to PM Peak Hour: 0.40

The OPL Visitor Peak Hour person-trips were estimated based on the hourly distribution of weekday unique user barcodes provided in the 2017 Parking Requirement Assessment Study which indicated that there are fewer than 10 users prior to 9am and 800-900 users from 4:30pm – 5:30pm. The Peak Hour OPL Visitor user estimates were multiplied by 2 (two) to account for the short length of stay anticipated (arriving and departing during the peak hour).

Table 3-2: Projected Development-Generated Persons-Trips

		EMPLOYEE		VISITOR		OPERATIONS AND MAINTENANCE
User Type	-	OPL	LAC	OPL	LAC	Service Vehicles, Deliveries, Contractors
Maximum Users	Daily	105	90	5,850	350	>20
	7am – 10am	95	85	120	0	>10
	2pm – 6pm	105	70	2,050	280	>10
Peak Hour Person-Trips	7:45am – 8:45am	60	50	20	0	5
	4:30pm – 5:30pm	45	30	1,640	115	5

Based on the above, the total number of peak-hour person trips estimated during the peak hours are:

- AM Peak Hour: 185 person-trips
- PM Peak Hour: 1,830 person-trips

Existing Mode Share. The existing peak hour travel demand was identified from the most recent TRANS Origin-Destination Survey (Fall 2011). The existing mode share is based on those value and is shown in **Table 3-3**.

Table 3-3: Existing Mode Shares

PEAK HOUR	AUTO-DRIVER	AUTO-PASSENGER	TRANSIT	BICYCLE	WALK	OTHER
AM Peak Hour	37%	8%	31%	5%	16%	3%
PM Peak Hour	39%	10%	24%	6%	20%	2%

Future Mode Share Targets. The mode share targets for the proposed development are provided for the business users (OPL and LAC Employees, and LAC Visitors) and service users (OPL Visitors) are summarized in **Table 3-4**. It is anticipated that the business users will originate from around the National Capital Region while service users will have a higher percentage of users originating in the Central Area and surrounding neighbourhoods. The methodology used to determine the future mode share targets is provided below.

1 Identifying the facilities users and grouping them together based on anticipated origin-destinations (**Table 3-1**):

   a OPL & LAC Employees, LAC Visitors: Assumed to be commuters generally following the TRANS O-D survey travel patterns
   b OPL Visitors: Assumed to be primarily people living in the downtown area

2 Identifying the auto-driver mode share for each user group determined by the 2017 Parking Requirement Assessment Study for the New Central Library (**Appendix F**). The 2017 Study determined the auto-driver mode share by reviewing the existing facilities user information (parking entry, loan material barcodes, employment information) and suggesting an appropriate reduction from the existing based on the location of the new facility and other factors. The minimum auto-driver mode share was identified as:

a OPL & LAC Employees, LAC Visitor: 25%
b OPL Visitor: 15%

3 Identifying the anticipated transit mode share considering the proximity to PIMISI Station (**Section 2.3.4**), the City's Transit-Oriented Development (TOD) Plans suggest an aggressive 65% transit mode share. The Transportation Impact Assessment (TIA) suggests a 50% transit mode share for all users, which takes into consideration the auto-driver assumptions. This estimate includes residents living in downtown Ottawa who may use bus transit along Albert / Slater Street when convenient for the instead of walking. The transit mode share could see an increase up to 65% as rail transit is adopted more widely by residents; it is assumed that this increase would reduce the auto-driver mode share primarily for the OPL & LAC Employees and LAC Visitors.

a OPL & LAC Employees, LAC Visitor: 50%
b OPL Visitor: 50%

4 The Auto-Passenger mode share was selected based on the existing mode which assumed that families (OPL Visitors) would continue to travel together and that there would be a small percentage of business visitors who would travel together (meetings).

a OPL & LAC Employees, LAC Visitor: 5%
b OPL Visitor: 10%

5 The Other mode share was assumed to be Taxis and Ubers providing short distance door-to-door service for OPL visitors and was rounded up from the existing 2%-3%.

a OPL & LAC Employees, LAC Visitor: 0%
b OPL Visitor: 5%

6 The remaining 20% mode share was split evenly between pedestrians and cyclists to reflect improvements in cycling infrastructure between 2011 (O-D survey) and the existing and forecasted conditions.

The forecasted transit mode share for OPL Visitors (50%) assumes that people living in downtown Ottawa may opt for bus transit along Albert / Slater instead of walking if it is convenient; particularly during the winter months. A reduction in the OPL Visitor transit mode share would likely transfer to the pedestrian mode.

Table 3-4: Future Travel Mode Share Targets

	OPL & LAC EMPLOYEES, LAC VISITOR		OPL VISITOR	
TRAVEL MODE	**TARGET MODE SHARE**	**RATIONALE**	**TARGET MODE SHARE**	**RATIONALE**
Transit	50%	Proximity to PIMISI Station with CLE Expansion connecting more of the City	50%	Proximity to PIMISI Station and location along downtown east/west transit route.

	OPL & LAC EMPLOYEES, LAC VISITOR		OPL VISITOR	
TRAVEL MODE	TARGET MODE SHARE	RATIONALE	TARGET MODE SHARE	RATIONALE
Walking	10%	Consistent with existing mode	10%	Most users will originate from the Central Area and Neighbourhoods encouraging the active modes.
Cycling	10%	Improved on-street facilities and provision of 28 bike racks will encourage cycling.	10%	
Auto-Passenger	5%	-	10%	Consistent with existing mode (families travel together).
Auto-Driver	25%	Consistent with estimates used to determine Parking Demand.	15%	Consistent with estimates used to determine Parking Demand.
Other	0%	-	5%	Taxis and Ubers providing short distance door-to-door service

Development Persons Trips by Mode and Phase. The proposed development will be constructed in one phase. The development trips by mode are shown in **Table 3-5**.

Table 3-5: Development Persons Trip by Mode and Phase

USER TYPE	PEAK HOUR	AUTO-DRIVER	AUTO-PASSENGER	TRANSIT	BICYCLE	WALK	OTHER	TOTAL
Employees and LAC Visitors	AM	28	6	55	11	11	0	**110**
	PM	48	10	95	19	19	0	**190**
OPL Visitors	AM	3	2	10	2	2	1	**20**
	PM	246	164	820	164	164	82	**1,640**

Trip Reduction Factors. There are no existing trips to deduct. As a library development, pass-by trips are not expected to be reflected in the trip composition.

3.1.2 TRIP DISTRIBUTION

The are two vehicle accesses to the development; one from Commissioner Street leading to the underground parking lot and the other from Albert Street for passenger drop-off and pick-up. Vehicles will approach and depart from the proposed development following existing travel patterns. The trip distribution for the proposed development is presented as follows:

Table 3-6: Trip Distribution during the AM and PM Peak Hours

DIRECTION	% DISTRIBUTION	VIA (TO / FROM)			
		BOOTH	BRONSON	SLATER	ALBERT
North	5%	5%	-	-	-
East	30%	-	3%	27%	-
South	10%	-	10%	-	-
West	15%	-	15%	-	-
Internal	40%	2%	24%	10%	4%
Total	**100%**	**7%**	**52%**	**37%**	**4%**

3.1.3 TRIP ASSIGNMENT

Trips were assigned to adjacent the transportation network and have been based upon traffic patterns as identified from a review of the turning movement counts from intersections in the study area. The vehicle trip assignment for the proposed OPL – LAC Joint Facility are provided in **Figure 3-1**.

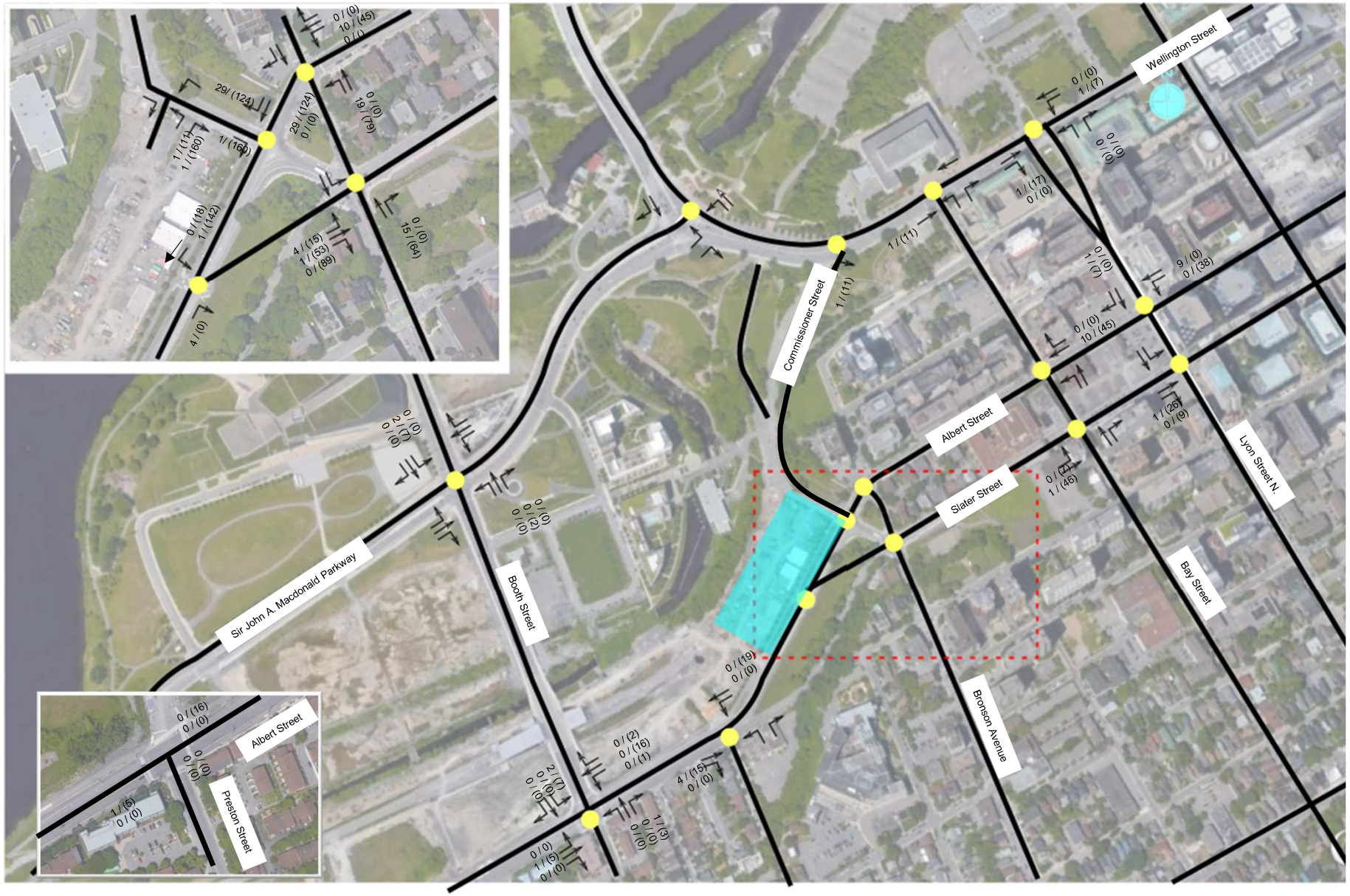

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Figure 3.1

Site Generated Vehicle Trips

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3.2 BACKGROUND NETWORK TRAVEL DEMANDS

3.2.1 CHANGES TO THE BACKGROUND TRANSPORTATION NETWORK TRAFFIC

The *Albert and Slater Streets Post Light-Rail Transit (LRT) Repurposing Functional Design Study* plan was approved by City Council on April 11, 2018. The approved plan (**Figure 3-2**) identifies wide sidewalks and separated cycle tracks on each side of the roadway with two travel lanes in each direction along Albert Street adjacent to the subject site. Bicycle cross-rides and improvement pedestrian crossings are provided at Commissioners Street and across Albert Street near the site access.

Other notable impacts to the transportation network include:

- Commissioner Street is reconfigured to a two-way stop-controlled T-intersection with Albert Street;
- Bronson Avenue is reconfigured to carry two-way traffic between Slater Street and Albert Street; and
- All turning movements will be permitted at the intersections of Bronson Avenue / Albert Street and Bronson Avenue / Slater Street.

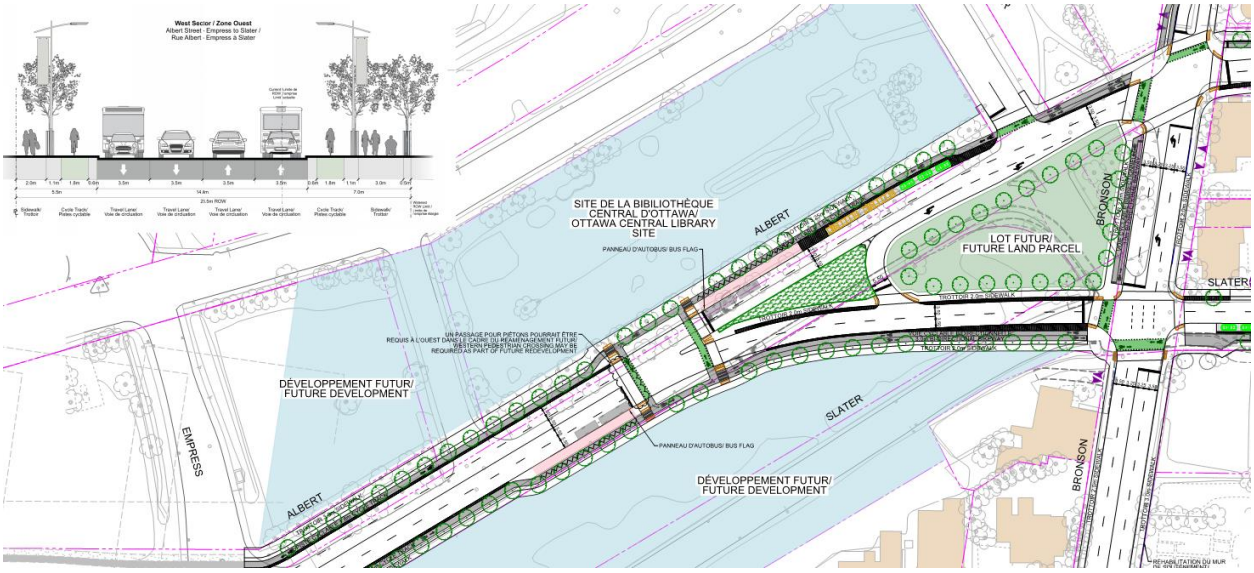

Figure 3-2. Albert-Slater Improvement Project: Reconfiguration

Booth Street is currently under construction (nearing completion) from the Ottawa River Pathway (Trans Canada Trail) intersection to Fleet Street. This segment of Booth Street will be improved with cycle tracks, which will provide continuous cycling facilities on Booth Street from the new bike lanes at the north end of the Zibi development to the existing cycle tracks between Fleet Street and Albert Street to the south. The reconstruction notably includes a fully protected intersection (cycle tracks and crossrides on all sides) at Booth Street and Sir John A. Macdonald Parkway/Wellington Street. From a vehicular capacity perspective, this reconstructed intersection will include a new WBR turn lane with approximately 70m of storage which will be considered in the future planning horizons.

3.2.2 GENERAL BACKGROUND GROWTH RATES

A 0% background growth rate has been selected based on a review of the 20-year historical screenline data across Screenline #35 (Downtown West). This is consistent with the shift from the auto mode to transit and active modes through the downtown area.

Currently, the phasing and implementation aspect of the *LeBreton Flats Master Concept Plan* is still being developed and has not been included in this Study's planning horizons.

The background traffic volumes for 2024 and 2029 are provided in **Figure 3-3**.

3.2.3 OTHER AREA DEVELOPMENTS

The developments with recent activity on their application that could impact this Study were identified in Section **2.4.2**. The supporting volume diagrams from their respective Transportation Impact Assessments can be found in **Appendix G**.

3.3 DEMAND RATIONALIZATION

3.3.1 DESCRIPTION OF CAPACITY ISSUES

Total traffic volumes for the 2024 and 2029 planning horizons were estimated by and adding trips generated by the proposed development and other area developments to the background traffic. The estimated total traffic volumes are shown in **Figure 3-4**.

Recent studies in this area have noted that the intersections at Booth Street / Wellington Street and Booth Street / Albert Street are approaching capacity. It is anticipated that these intersections will exceed a volume-to-capacity ratio of 1 as part of this Transportation Impact Assessment.

3.3.2 ADJUSTMENTS TO DEVELOPMENT GENERATED DEMANDS

There are no proposed adjustments to development generated demands since the trips generated by the development since the development is promoting the transit and active transportation mode shares and has a limited parking supply onsite which will encourage employees and visitors to use non-auto modes.

3.3.3 ADJUSTMENTS TO BACKGROUND NETWORK DEMANDS

There will be some necessary adjustments to the background network demands to ensure that the Level of Service at the intersection mentioned in Section 3.3.1 are no worse than LOS E. These adjustments can be justified due to the Albert-Slater Improvements, which will offer an acceptable Multi-Modal Level of Service adjacent to the site, peak spreading throughout the peak period and rerouting of demand to alternative routes. Further detail on the volume reduction will be completed in Section 4.9

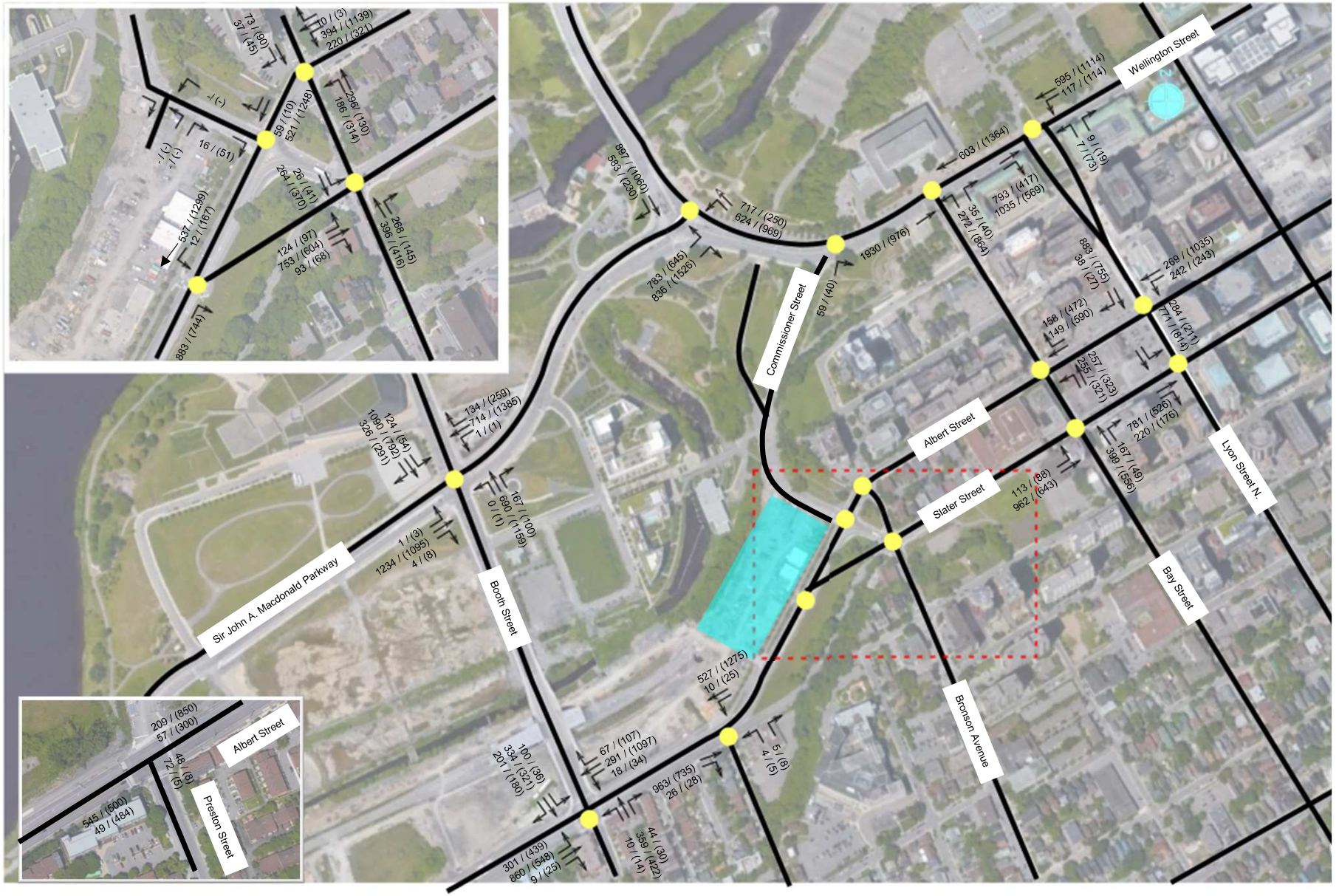

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Figure 3.3

Background Traffic (2024 and 2029)

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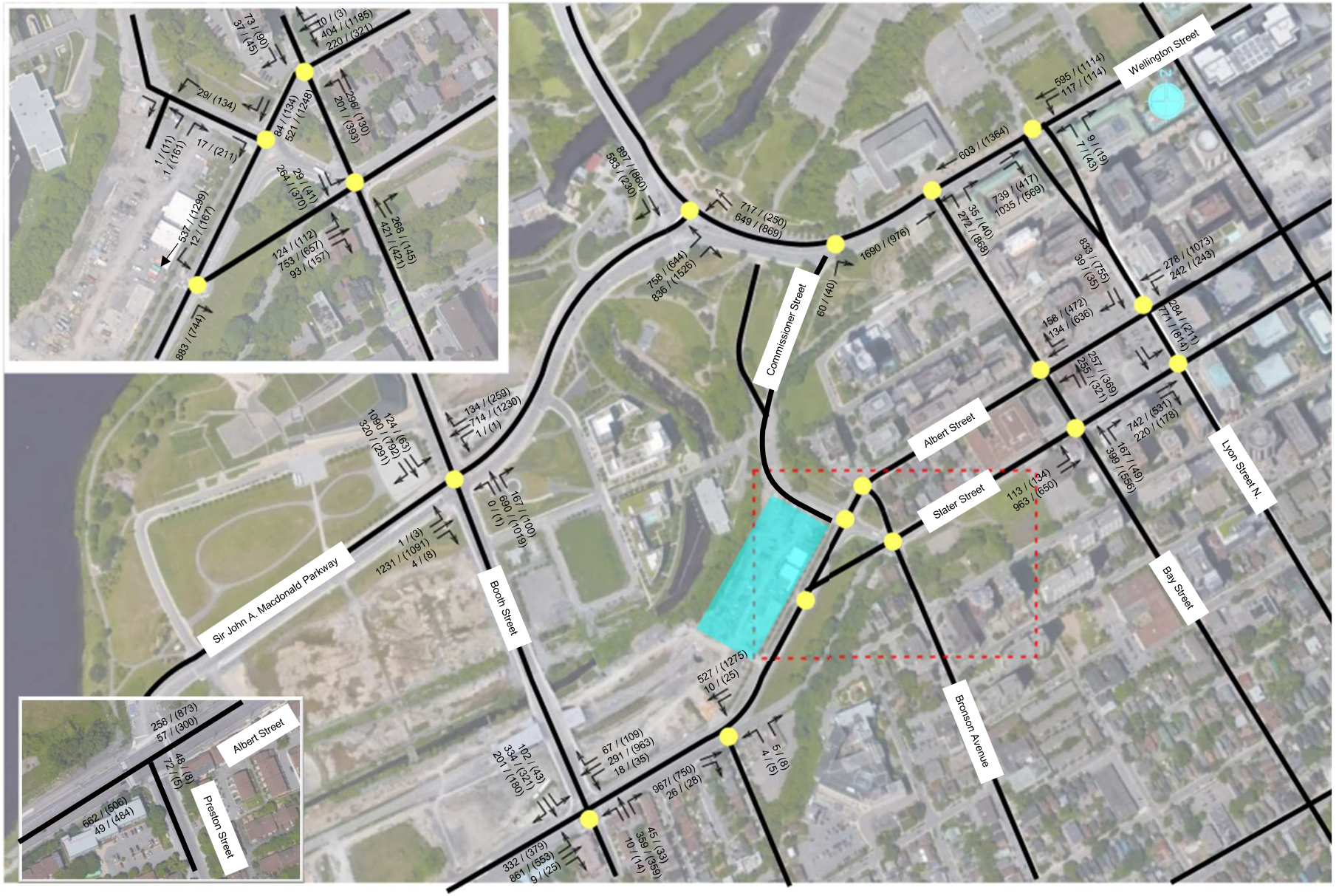

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Figure 3.4

Future Total (2024 and 2029)

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4 STRATEGY

4.1 DEVELOPMENT DESIGN

4.1.1 DESIGN FOR SUSTAINABLE MODES

In accordance with the TIA Guidelines, the TDM-Supportive Development Design and Infrastructure Checklist was completed to assess the opportunity to implement facilities that are supportive of sustainable modes. There are two checklists, one for non-residential developments and one for residential developments. As the proposed development is a public facility, only the non-residential checklist was completed. The completed checklist is attached as **Appendix H**.

Sustainable modes include cycling, walking, and transit. As indicated in the TDM-Supportive Development Design and Infrastructure Checklist and shown on the site plan (**Appendix C**) the proposed site surrounding the lands accommodates these modes by offering:

- Internal sidewalks and pathway connections to the City's multi-use pathways
- Walking distance from all the entrances to the bus shelter along Albert Street directly opposite the Fire Fighters Entrance (less than 600 m from all entrances)
- Exterior bicycle parking (62 horizonal) is provided along the south edge of the building providing quick access from the cycle tracks along Albert Street; and at the north-west corner of the building providing access from the multiuse pathways north of the site
- Interior bicycle parking (21 vertical) is also provided

4.1.2 CIRCULATION AND ACCESS

The proposed site plan (**Appendix C**) provides vehicular access to an underground parking lot and the loading docks from Commissioner Street. The loading dock area was assessed using AutoTURN to confirm suitability of the layout for the design vehicle. The swept path for the delivery vehicle maneuver is provided in **Figure 4-1**.

A bus layby is provided along Albert Street opposite the south east entrance to the OPL-LAC Facility, providing direct access to the building.

All pedestrian entrances have a sidewalk, pedestrian plaza, or multiuse path providing direct and accessible access at-grade.

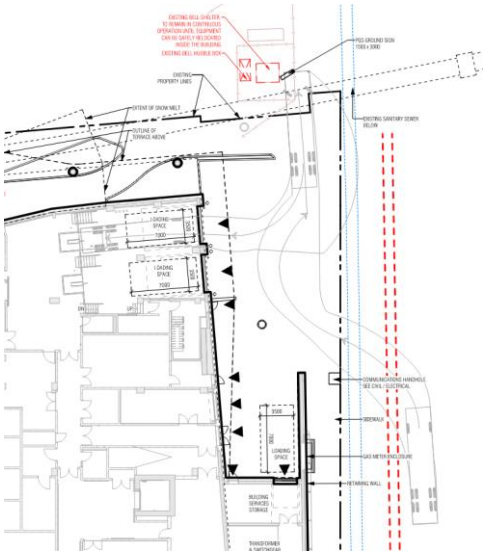

Figure 4-1. Loading Dock - Turning Template

4.1.3 NEW STREET NETWORKS

This section was exempted in the Transportation Impact Assessment Scoping Report submitted on June 1, 2020, 2020 and approved by the City of Ottawa on June 16, 2020. The approved exemptions table is found in **Section 2.8.**

4.2 PARKING

4.2.1 PARKING SUPPLY

VEHICLE PARKING SUPPLY

The proposed development is located within Area Z (Near Major LRT Station) of Schedule 1A of the Ottawa Zoning By-law No. 2008-250 Consolidation which has no requirement for off-street motor vehicle parking (By-law 2016-249). However, to meet the anticipated parking demand, the OPL-LAC facility proposes to provide **192 below grade vehicle parking spaces** as described in **Table 4-1**.

Table 4-1. Proposed Vehicle Parking Supply

STALL TYPE	P1 LEVEL	P2 LEVEL	TOTALS
Standard Spaces (2.6m x 5.2m)	39	119	159
EV Spaces	3	3	6
Reduced Spaces (2.4m x 5.2m)	1	5	6
Reduced Spaces (2.4m x 4.6m)	4	8	12
Accessible Type ‘A’	3	-	3
Accessible Type ‘B’	3	4	7
Total Provided			**192**

BICYCLE PARKING SUPPLY

The proposed development is providing 83 bicycle parking spaces according to **Table 4-2**, which exceeds the minimum of 27 bicycle parking spaces required by Table 111A of the Ottawa Zoning By-law No. 2008-250 Consolidation.

Table 4-2. Proposed Bicycle Parking Supply

TYPE	EXTERIOR	INTERIOR	TOTALS
Horizonal Spaces	62	-	62
Vertical Spaces	-	21	21
Total Provided			**83**

LOADING SPACES

The proposed development is providing 2 exterior loading spaces, which meets the minimum of 2 loading spaces required by Table 113A of the Ottawa Zoning By-law No. 2008-250 Consolidation.

SUMMARY

The proposed parking supply for the OPL-LAC Facility meets or exceeds the minimum requirements of the City of Ottawa Zoning By-law, as highlighted in the following table.

Table 4-3. Minimum Bylaw Requirements for Parking and Proposed Parking Supply

TYPE	REQUIRED	CALCULATION	SITE PLAN	COMPLIANCE WITH BY-LAW
Vehicle	0	N/A	192	Exceeds the minimum requirements of the Zoning By-law.
Bicycle	27	1 per 500m^2	83	Exceeds the minimum requirements of the Zoning By-law.
Loading	2	N/A	2	Meets the minimum requirements of the Zoning By-law.
Total	**29**		**277**	

A detailed parking analysis for the new OPL / LAC Facility was completed by WSP in 2017 as part of the Ottawa Public Library Parking Requirement Assessment (Parking Study) that identified the average daily parking demand. The Parking Study identified five user groups for consideration based on the study's background review of existing and planned conditions. These five user groups included: Service Vehicles, OPL Visitors, LAC Visitors, Employees, and Special Events. A summary of the Parking Study's estimates for daily demand, average length of stay, and driver mode share for each of the user groups is presented in **Table 4-4**.

Table 4-4. Parking Study - User Profiles

USER GROUPS	DESCRIPTION	DAILY DEMAND	AVERAGE LENGTH OF STAY	DISTRIBUTION OVER TIME	DRIVER MODE SHARE	PARKING BEHAVIOUR
Service Vehicles	Reserved spaces	5	24-hours	All Hours	100%	On-site
OPL Visitors	Users of main library facility	4,500 – 5,850	1.5 hours	Peaks during early afternoon and evening	15% - 18%	Short duration and likely to look for on-street parking depending on parking fee structure
LAC Visitors	Research and archives	300 - 350	4 hours	Daytime	20%	May look for on-street parking and move vehicle
Employees	OPL Branch Services and Corporate; LAC	179	8 hours	Peak during afternoon	23% - 38%	Likely to prefer on-site
Special Events	Worst-case large-scale event	< 600 daytime < 800 evening	-	-	10% - 25%	Likely to prefer on-site

The Parking Study concluded that the new OPL-LAC Facility would experience a parking demand of 220 – 330 vehicles during a typical weekday afternoon and a parking demand of 220 – 290 vehicles during a typical Saturday afternoon. The Parking Study also concluded that a large-scale event held on a Saturday evening could generate a parking demand for 100-200 vehicles; furthermore, that any events held during regular opening hours would require event parking management.

The proposed vehicle parking supply of 192 parking spaces will accommodate the employee parking demand and, considering the 1.5 hour turnover expected from OPL Visitors, the parking supply will likely meet the anticipated afternoon demand of 220 - 330 vehicles.

4.2.2 SPILLOVER PARKING

This section was exempted in the Transportation Impact Assessment Scoping Report submitted on June 1, 2020, 2020 and approved by the City of Ottawa on June 16, 2020. The approved exemptions table is found in **Section 2.8**.

4.3 BOUNDARY STREETS

4.3.1 ALBERT STREET

Albert Street is an arterial road with a right-of-way of 40 metres between Booth Street and Commissioner Street. The existing cross-section (**Figure 4-2**) includes a multi-use pathway, sidewalks and vehicle lanes. 3.0m multi-use pathway separated by 4.5m boulevard on west side and 3.0m asphalt pathway separated by curb / seasonal flexible bollards on the east side.

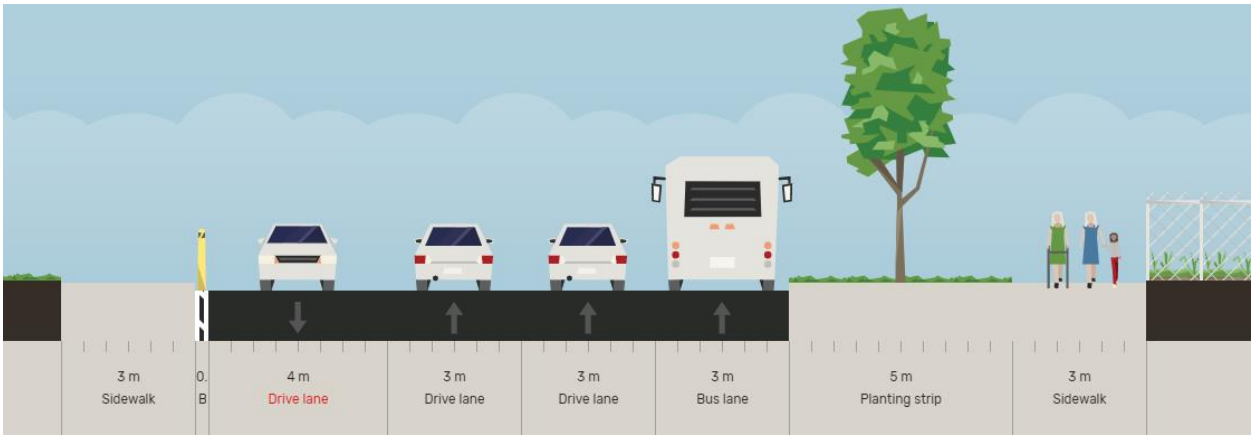

Figure 4-2. Albert Street – Existing Cross-Section

The Albert Street and Slater Street Improvement project is a repurpose of the corridor following the development and extension of the Confederation Line Light Rail Transit (LRT) with the aim of making these streets more friendly and accessible to pedestrians and cyclists. Through this area, the future cross-section of Albert Street includes separated pedestrian and cycling facilities and two travel lanes in each direction. The functional design cross-section is provided in **Figure 4-3**.

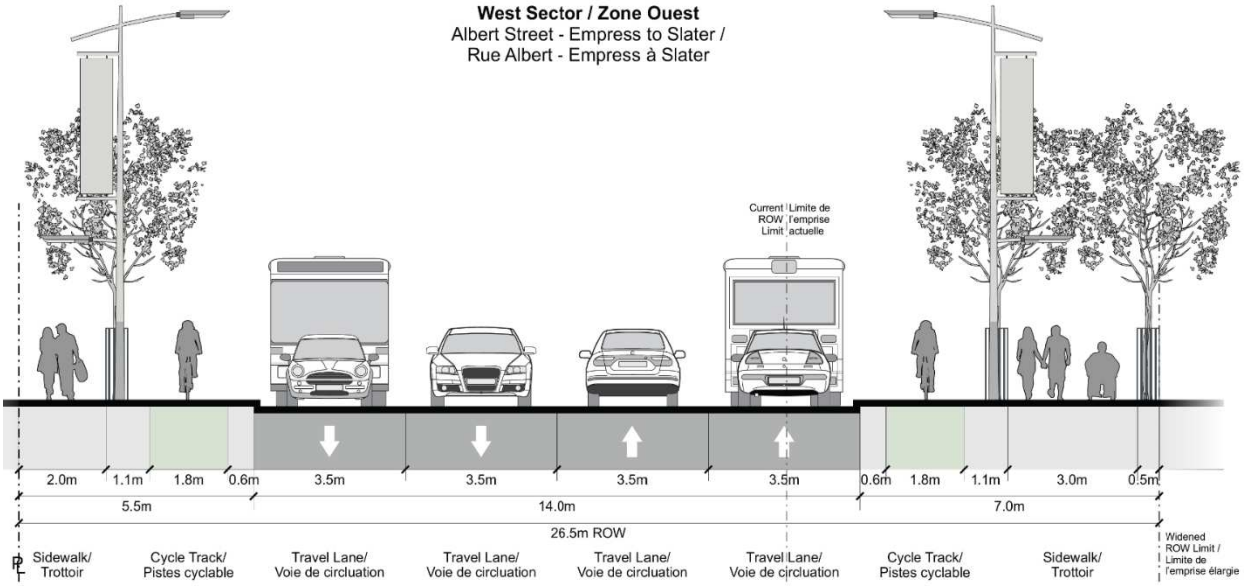

Figure 4-3: Albert Street - Future Cross-Section

4.3.1.1 *MOBILITY*

The City's Multi-Modal Level of Service (MMLOS) targets consider road classification, adjacent land-use designation, and special policy areas. Within the study area, Albert Street is classified as an urban arterial road that runs east-west with a posted speed limit of 50 km/h. The Official Plan reserves a 40 metre right-of-way through the study area. This allowance would provide sufficient space to meet any of the City's approved Arterial Road Cross-sections.

The proposed development is located within 600 metres of a rapid transit station (Pimisi), therefore the applicable MMLOS targets are related to the policy area instead of the specific land use designation. The current targets and segments scores are shown in **Table 4-5** and consider that Albert Street through this area is a cycling spine route, a full load truck route, and not a transit priority corridor.

Under future conditions, the Albert Street segment adjacent to the proposed development does not meet the target MMLOS for pedestrians and transit. However, the PLOS is improved from the Status Quo and while the TLOS has worsened, the proximity to the Pimisi Station is beneficial for all transit users along Albert Street.

Table 4-5: Albert Street MMLOS Analysis

	PLOS	BLOS	TLOS	TKLOS	VLOS
Target	**A**	**B**	**D**	**D**	VLOS Not Reported for Segments
Status Quo	**C**	A	B	**E**	
Future Horizon	**B**	A	**E**	A	

4.3.1.2 *ROAD SAFETY*

Historical crash records for the study area were obtained from the City of Ottawa for the 5-years between January 2014 through December 2019. The TIA Guidelines indicate that patterns with six or more crashes should be identified. In this timeframe, there was one crash along the roadway segments (excluding the intersections) on Albert Street between Booth Street and Commissioner Street.

4.3.2 COMMISSIONER STREET

Adjacent to the proposed development, Commissioner Street is an urban local road with a right-of-way of 18.0 metres. The existing cross-section (**Figure 4-4**) includes a paved area with wide vehicle lanes in each direction, a 1.8m wide sidewalk along the south side of the road, and a 2.0m wide sidewalk along the north side of the road. The existing Commissioner Street cross-section is consistent with the City's Standard Detail Drawing ROW-18A for Residential Roads with an 18.0m Road Allowance and a Sidewalk Option.

Figure 4-4. Commissioner Street - Existing Cross-Section

4.3.2.1 *MOBILITY*

The City's Multi-Modal Level of Service (MMLOS) targets consider road classification, adjacent land-use designation, and special policy areas. Commissioner Street is located within 600 metres of a rapid transit station (Pimisi), therefore the applicable MMLOS targets are related to the policy area instead of the specific land use designation. Commissioner Street is a local road with a full load truck route designation, a local route cycling designation, and no transit routes. The current MMLOS targets and segments scores are provided in **Table 4-6**.

Table 4-6: Commissioner Street MMLOS

	PLOS	BLOS	TLOS	TKLOS	VLOS
Target	**A**	**B**	**N/A**	**N/A**	VLOS Not Reported for Segments
Status Quo	**B**	**D**	-	-	
Future Horizon	**B**	**D**	-	-	

The **Status Quo** option is based on the existing conditions remaining in place along Commissioner Street. The MMLOS was assessed as:

- 1.8m sidewalks on each side of the road with an AADT < 3,000 vpd, no on-street parking, and an operating speed of 30-50 km/hr = PLOS 'B'
- Mixed traffic for bicycles with an operating speed of 40-50 km/ h = BLOS 'D'
- No transit operations
- No target for TKLOS

The **Future Horizon** option is based on the proposed site plan which includes a wider pedestrian walking area along the south side of the road adjacent to the property. Reducing the operating speed from 50km/h to 40km/h along Commissioner Street would allow the BLOS to meet the target of 'B'.

4.3.2.2 *ROAD SAFETY*

Historical crash records for the study area were obtained from the City of Ottawa for the 5-years between January 2014 through December 2019. The TIA Guidelines indicate that patterns with six or more crashes should be identified. In this timeframe, there were no crashes along the roadway segment (excluding the intersections) on Commissioner Street between Albert Street and Wellington Street.

4.4 ACCESS INTERSECTIONS

4.4.1 LOCATION AND DESIGN OF ACCESS

The site access was designed to accommodate a large delivery vehicle entering the site northbound from Commissioner Street. The delivery vehicle will drive forward onto the site from Commissioner Street with the vehicle fully off the public roadway before reversing into the loading area as shown in **Figure 4-1**.

The typical access criteria suggested by the Transportation Association of Canada's Geometric Design Guide for Canadian Roads (2017) have been exceeded to allow for sufficient pavement to reduce the amount of encroachment the delivery vehicle will have on Commissioner Street within the space available. The design access criteria that were considered and exceeded due to the delivery vehicle requirements were: entrance width, right-turn radius, throat length, and pedestrian crossing consideration. Other criteria that were analyzed but were not necessarily affected by the delivery truck requirements was consideration for a two-way driveway, sight distance, angle of intersection, and proximity to adjacent driveway. The design compliance check is summarized in **Table 4-7** with elements not in compliance with the requirements in red. See **Appendix I** for the Sight Distance Evaluation on Commissioner Street.

Table 4-7: Access Intersection Design Elements

DESIGN ELEMENTS	MINIMUM REQUIRED	COMMISSIONER ACCESS
Access Type	-	Full Movement
One-way vs. Two-way	<25 vpd = one-way driveway <750 vpd = two-way driveway	180 peak hour trips 400-600 daily trips Two-Way
Entrance Width	7.5m – 12.0m (TAC 2017)	Parking Garage: 7.6m Loading Area: 29.3m (includes Parking Garage width)
Corner Clearance	25 m to stop control (TAC 2017)	>25m
Right Turn Radius	4.5m – 12.0m (TAC 2017)	Right turn radius is not calculable due to delivery truck requirements
Sight Distance (Intersection with No Control)	Left turn:130m (TAC 2017)	No obstruction
	Right turn: 110m (TAC 2017)	No obstruction to Albert/Commissioner intersection

DESIGN ELEMENTS	MINIMUM REQUIRED	COMMISSIONER ACCESS
Throat Length	8m (TAC 2017)	No throat length due to delivery truck requirements
Angle of Intersection	At or near 90°	Access to Commissioner at intersection is 90°
Proximity to Adjacent Driveways	3m between driveways (TAC 2017)	Pooley's Bridge driveway 50 m north of access
Pedestrian Crossing Consideration	Ottawa Standard Drawing SC7.1 (Curb Return Private Entrance - Unsignalized)	>35m pedestrian crossing Ottawa Standard SC7.1 (Curb Return at a Private Entrance - Unsignalized)

The functional program for the OPL/LAC Joint Facility includes very specific requirements related to the delivery vehicles serving the facility and their frequency of service. As part of the design process the consultant team included the support of specialist material handling and traffic engineering consultants to ensure that the functional requirements for vehicular circulation on and off the site were met. This included vehicular access/egress to and from and within the parking garage and the service court.

This required a bespoke design response due to site topography and related site constraints such as the reconstruction and reconfiguration of Albert Street currently being undertaken by the City along the east-west frontage of the building which is required to accommodate pedestrian sidewalks, cycle lanes, transit stops, fire fighting access, street parking, along with vehicular traffic lanes. As a result, the parking garage and loading dock areas are necessarily concentrated along the Commissioner Street frontage which also poses grading challenges due to the relatively steep slope of Commissioner Street away from Albert Street.

Library and Archives Canada requires that its delivery trucks carry out their approach to the site in a forward traveling direction and that reversing manoeuvres are completed entirely on site. This required a larger than normal access width at the loading dock / service court entrance.

4.4.2 INTERSECTION CONTROL AND DESIGN

The site access is analysed with the study are intersections in **Section 4.9**.

4.5 TRANSPORTATION DEMAND MANAGEMENT

4.5.1 CONTEXT FOR TDM

Transportation Demand Management (TDM) describes a broad range of policies, programs and services designed to reduce the demand for vehicle use by influencing individual travel behaviour and providing expanded options. This development application proposes to build new central library for the City of Ottawa with many different user groups that can generally be separated by length of stay on-site: 4-8 hour users (employees and LAC visitors) and 1-2 hour users (OPL visitors). The estimated mode share by duration on site for the 2029 planning horizon are provided in **Table 4-8**.

Table 4-8: Peak Hour Mode Shares Compared to Duration on Site

DURATION	AUTO-DRIVER	AUTO-PASSENGER	TRANSIT	BICYCLE	WALK	OTHER	TOTAL
4-8 hours	48	10	95	19	19	0	**190**
1-2 hours	246	164	820	164	164	82	**1,640**

4.5.2 TDM PROGRAM

The following measures could be implemented to increase the likelihood that the travel mode shares will meet the TOD mode share targets:

- Designate an TDM internal coordinator
- Display local area maps with walking / cycling access routes and key destinations at major entrances to multi-family / condominium residential developments
- Display relevant transit schedules and route maps at entrances
- Unbundle marking cost from purchase price / monthly rent
- Provide a multimodal travel option information package to new employees

The complete TDM Measures Checklist can be found in Appendix J.

4.6 NEIGHBOURHOOD TRAFFIC MANAGEMENT

The development access is Commissioner Street for access and Commissioner Street is classified as a local road in the City of Ottawa's Official Plan (2013); the volume threshold is 1,000 vehicles per day or 120 vehicles per hour. The traffic volume thresholds provided in the TIA Guidelines (2017) for the various classifications of roads are:

— Local Road: 1,000 vehicles per day or 120 vehicles per peak hour

— Collector Road: 2,500 vehicles per day or 300 vehicles per peak hour

— Major Collector Road: 5,000 vehicles per day or 600 vehicles per peak hour

Considering the future volumes presented in **Section 3**, the future volumes expected on Commissioner Road between Albert Street and the site entrance during the 2029 planning horizon will exceed the volume thresholds for the local road classification. While Commissioner Street is considered a local road, it serves as a service road providing vehicle access to the OPL-LAC site and the Public Service and Procurement Canada Cliff Heating Plant.

The forecasted volumes compared to the volume thresholds are provided in **Table 4-9**. With a daily volume just over the local road threshold, Commissioner Road should now be considered a collector road while acknowledging that the PM peak hour volumes exceed 300 vehicles (AM peak hour is less than 50 vehicles). Given the expected auto driver mode share of 15-25%, there remains little that can be done to lower both the daily and peak hour volumes below the local road thresholds.

Table 4-9: Local Traffic Volume Thresholds

	COMMISSIONER ROAD	
PLANNING HORIZON	**DAILY THRESHOLD** **1,000 VPD**	**PEAK HOUR THRESHOLD** **120 VPH**

2019 Existing	601	61
2029 Background	601	61
2029 Total Forecast	1,034	346

4.7 TRANSIT

4.7.1 ROUTE CAPACITY

OC Transpo provided pre-pandemic transit passenger data from January 2020 to March 2020 within the Study Area. The transit data provided in **Table 4-10** includes the number of people boarding and alighting from Bus Stops #2396 and #2392; and the LRT Pimisi Station Stop #3010. The total load at departure was not available for trains at Pimisi Station.

Table 4-10. Existing Transit Peak Period Boardings and Alightings

LOCATION	ACTION	AM PEAK PERIOD (6AM – 9AM)	PM PEAK PERIOD (3PM – 6PM)
Albert west of Empress *Stop 2392*	Boarding	0	2
	Alighting	0	5
Slater east of Empress *Stop 2396*	Boarding	2	0
	Alighting	4	3
Pimisi Station *Stop 3010*	Boarding	715	1,379
	Alighting	1,222	805

The proposed development is anticipated to generate an estimated 915 transit passengers (**Table 3-5**) during the peak hour of the day and, to be comparable to the peak period data received from OC Transpo the 4-hour afternoon estimates have been distributed according to the mode share estimates (**Table 3-4**). The estimated number of passengers boarding and alighting during these time periods are provided in **Table 4-11**.

Table 4-11. Site Generated Transit Trips

FACILITY USER	ACTION	PM PEAK HOUR	2PM – 6PM
OPL-LAC Employees / LAC Visitors	Boarding	95	180
	Alighting	0	48
OPL Visitors	Boarding	410	515
	Alighting	410	515

The LRT has a capacity of 600 passengers per train set, with a planned peak capacity of 10,700 passengers per hour in each direction, with the potential to grow to 18,000 passengers per hour in each direction by 2031, and ultimately 24,000 passengers per hour in each direction. It is anticipated that the LRT can accommodate the additional person trips generated by the site.

4.7.2 TRANSIT PRIORITY

The site is within 600m of the Pimisi light-rail transit station and no transit priority is suggested along the sites boundary streets.

4.8 REVIEW OF NETWORK CONCEPT

This section was exempted in the Transportation Impact Assessment Scoping Report submitted on June 1, 2020, 2020 and approved by the City of Ottawa on June 16, 2020. The approved exemptions table is found in **Section 2.8**.

4.9 INTERSECTION DESIGN

4.9.1 INTERSECTION CONTROL

The identification of appropriate intersection controls to serve future background and future total travel demands were reviewed for the two unsignalized intersections in the study area which resulted in:

- Commissioner at the Site Access requires no traffic control along Commissioner
- Commissioner at Wellington is appropriate as a one-way stop from the minor street
- Commissioner at Albert Street is appropriate as a one-way stop from the minor street

The All-Way Stop Control Warrant from Book 5 of the Ontario Traffic Manual was applied to all intersections listed above. None met the requirements for an all-way stop.

4.9.2 INTERSECTION DESIGN

MULTI-MODAL LEVEL OF SERVICE ANALYSIS

A Multi-Modal Level of Service (MMLOS) analysis was carried out for the signalized intersections immediately adjacent to the OPL-LAC Facility in accordance with the methodology outlined in the City of Ottawa's MMLOS Guidelines (2015). The Guidelines state that intersection LOS measures are to be evaluated for signalized intersections and not unsignalized intersections. We have prepared a MMLOS analysis for the existing conditions (2019) and future total (2029) time horizon to provide a comparison between the baseline and future condition.

The MMLOS results, shown in **Table 4-12**, for the existing conditions and future total conditions (2029) indicate that the various changes to the background network (Section 3.2) contribute to slight improvements for pedestrian and cycling conditions at the three nearest intersections. See **Appendix K** for the MMLOS calculations.

Table 4-12. Intersection MMLOS (Existing and Future Total)

	PLOS	BLOS	TLOS	TKLOS	VLOS
Intersection: Albert Street and Slater Street and Empress Avenue					
Target	**A**	**A**	**D**	**D**	**E**
Existing (2020)	**F**	**B**	B	**F**	A
Future Total (2029)	**E**	**B**	C	**F**	C
Intersection: Slater Street and Bronson Avenue					
Target	**A**	**A**	**D**	**D**	**E**
Existing (2020)	**C**	**D**	**F**	D	B
Future Total (2029)	**C**	**D**	D	D	C
Intersection: Albert Street and Bronson Avenue					
Target	**A**	**B**	**D**	**D**	**E**
Existing (2020)	**C**	**F**	**E**	**F**	A
Future Total (2029)	**D**	A	**F**	**E**	D

METHODOLOGY

The existing and future conditions were analyzed based upon the weekday peak hour traffic volumes presented in **Section 3**. The City of Ottawa's MMLOS Guidelines assigns the vehicle level of service (VLOS) based on ranges of volume to capacity ratio, as indicated in **Table 4-13**.

Table 4-13. City of Ottawa MMLOS Guidelines, V/C Criteria

VLOS	VOLUME TO CAPACITY RATIO
A	0 – 0.60
B	0.61 – 0.70
C	0.71 – 0.80
D	0.80 – 0.90
E	0.91 – 1.00
F	> 1.00

The City's MMLOS Guidelines recommend targets for the Vehicle Level of Service (VLOS) based on their Official Plan Policy / Designation and Road Class. The VLOS targets for the study intersections are LOS E for a policy area within 600m of a rapid transit station.

The following sections present the results of the intersection capacity analysis. All intersections were analyzed using Synchro 11 following the analysis parameters in the TIA Guidelines. **Appendix L** contains the detailed Synchro analysis sheets.

EXISTING CONDITIONS

The existing intersection capacity analysis results are summarized in **Table 4-14**. Most intersections in our study area currently operate with an acceptable VLOS during each peak hour; with the exceptions of the Wellington / Booth and Wellington / Portage intersections which operate with a VLOS 'F' during both peak hours. Two additional intersections experience critical movements (movements with a volume / capacity ratio < 1.0):

— Albert / Booth has a v/c ratio > 1.0 in the eastbound direction during each peak hour

— Wellington / Lyon has a v/c ratio > 1.0 in the westbound left turning movement during the AM peak hour

Table 4-14. Intersection Capacity Summary for Existing Conditions (2020)

INTERSECTION (SIGNALIZED)	AM PEAK HOUR				PM PEAK HOUR			
	Delay (s)	VLOS	V/C	Critical Movement	Delay (s)	VLOS	V/C	Critical Movement
Albert / Preston	12.5	A	0.30	-	14.8	A	0.55	-
Albert / Booth***	91.4	E	0.95	**EBT = 1.34**	79.6	E	0.99	**EBL = 1.20**
Albert / Empress	12.5	A	0.33	-	12.6	A	0.28	-
Slater / Bronson*	32.6	C	0.78	-	20.3	A	0.58	-
Albert / Commissioner	10.2	A	0.24	-	10.2	A	0.24	-
Albert / Bronson**	9.0	A	0.37	-	23.2	B	0.63	-
Wellington / Bay**	17.1	A	0.59	-	37.6	D	0.83	-
Wellington / Booth***	43.1	**F**	**1.05**	**EBT = 1.02 NBT = 1.02**	91.6	**F**	**1.21**	**WBT = 1.24 NBT = 1.14**
Wellington / Portage***	85.1	**F**	**1.13**	**WBL = 1.43 SBL = 1.10**	95.2	**F**	**1.17**	**WBL = 1.43 SBL = 1.13**
Albert / Bay	10.7	A	0.23	-	16.1	A	0.50	-
Slater / Bay***	28.0	D	0.83	-	18.2	C	0.74	-
Albert / Lyon**	20.9	A	0.37	-	28.7	B	0.67	-
Slater / Lyon*	14.2	A	0.60	-	12.7	A	0.50	-
Wellington / Lyon***	33.5	C	0.77	**WBL = 1.43**	25.5	A	0.58	-

*95th Percentile Queue Length Exceeds Storage Capacity during AM Peak Hour (min. 1 turning movement)
**95th Percentile Queue Length Exceeds Storage Capacity during PM Peak Hour (min. 1 turning movement)
***95th Percentile Queue Length Exceeds Storage Capacity during AM and PM Peak Hour (min. 1 turning movement)
Detailed queue length information provided in **Appendix L**.

FUTURE BACKGROUND CONDITIONS

The future background (2029) intersection capacity analysis results are summarized in **Table 4-15**. For these future background scenarios, minor adjustments were made to signal timing to improve VLOS. The future transportation conditions described in **Section 3.2** were included in the analysis. It should be noted that the works resulting from the Booth Zibi project (new WBR lane at Booth/Wellington) have been included in the analysis, which included the use of an updated Timing Plan as provided by the City of Ottawa.

Improvements to the critical movement v/c ratios can be attributed to the increase in peak hour factor (PHF) mandated by the City of Ottawa's TIA Guidelines; with a 0.9 PHF applied to existing conditions and a 1.0 PHF applied to future conditions. As mentioned in Section 3.3, an adjustment to the background network demand was necessary for several intersection to avoid a LOS 'F'. These adjustments can be justified due to the Albert-Slater Improvements, which will offer an acceptable Multi-Modal Level of Service adjacent to the site, peak spreading throughout the peak period and rerouting of demand to alternative routes.

The following volume reductions were implemented:

— Albert / Booth: 50 for EBT (AM)
— Wellington/Booth: 100 for NBT & EBT (AM), and 60 for NBT (PM)
— Wellington/Portage: 275 for WBL (AM), 250 for EBL (AM), and 150 for WBL (PM)

Table 4-15. Intersection Capacity Summary for Future Background Conditions (2029)

INTERSECTION (SIGNALIZED)	AM PEAK HOUR				PM PEAK HOUR			
	Delay (s)	VLOS	V/C	Critical Movement	Delay (s)	VLOS	V/C	Critical Movement
Albert / Preston	12.4	A	0.30	-	15.2	A	0.53	-
Albert / Booth***	114.2	E	1.00	**EBT = 1.48**	95.7	E	0.99	**EBL = 1.21 WBT= 1.15**
Albert / Empress	13.2	A	0.39	-	13.7	A	0.33	-
Slater / Bronson	14.3	B	0.65	-	15.1	A	0.55	-
Albert / Slater	7.0	A	0.29	-	4.1	A	0.48	-
Albert / Bronson**	11.7	A	0.40	-	21.2	C	0.72	-
Wellington / Bay**	16.8	A	0.60	-	35.4	C	0.76	-
Wellington / Booth***	47.1	E	1.00	**EBT = 1.02 NBT = 1.08**	53.4	E	1.00	**NBT = 1.14**
Wellington / Portage***	149.6	E	1.00	**WBL = 2.02 EBT = 1.26**	85.3	E	1.00	**WBL = 1.44**
Albert / Bay	11.1	A	0.24	-	15.0	A	0.42	-
Slater / Bay***	33.5	D	0.86	**NBT = 1.05**	16.6	B	0.68	-
Albert / Lyon**	21.2	A	0.40	-	28.6	B	0.65	-
Slater / Lyon*	15.0	B	0.61	-	13.0	A	0.46	-
Wellington / Lyon***	45.9	D	0.89	**EBT = 1.06 WBL = 1.43**	24.0	A	0.53	-

*95th Percentile Queue Length Exceeds Storage Capacity during AM Peak Hour (min. 1 turning movement)
**95th Percentile Queue Length Exceeds Storage Capacity during PM Peak Hour (min. 1 turning movement)
***95th Percentile Queue Length Exceeds Storage Capacity during AM and PM Peak Hour (min. 1 turning movement)
Detailed queue length information provided in **Appendix L**.

FUTURE TOTAL CONDITIONS

The future total (2029) intersection capacity analysis results are summarized in **Table 4-16**. For these future total scenarios, small adjustments were made to signal timing to improve VLOS. As mentioned in Section 3.3, an adjustment to the background network demand was necessary for several intersection to avoid a LOS 'F'. These adjustments can be justified due to the Albert-Slater Improvements, which will offer an acceptable Multi-Modal Level of Service adjacent to the site, peak spreading throughout the peak period and rerouting of demand to alternative routes. The following volume reductions were implemented:

- Albert / Booth: 50 for EBT (AM), 150 for WBT (PM), and 60 for EBL (PM)
- Wellington/Booth: 100 for NBT & EBT (AM), 200 for NBT (PM), and 165 for WBT (PM)
- Wellington/Portage: 300 for WBL (AM), 275 for EBL (AM), 250 for WBL (PM), and 200 for SBL (PM)

Pedestrian volumes near the proposed site are expected to increase, but with negligible effects to the road network. The Albert/Booth intersection will see an increase of up to 8 pedestrians per cycle during the PM peak hour and the Albert/Bronson intersection will see an increase of up to 7 pedestrians per cycle during the same time period. The v/c impact on the affected turning movements is negligible.

Table 4-16. Intersection Capacity Summary for Future Total Conditions (2029)

INTERSECTION (SIGNALIZED)	AM PEAK HOUR				PM PEAK HOUR			
	Delay (s)	VLOS	V/C	Critical Movement	Delay (s)	VLOS	V/C	Critical Movement
Albert / Preston	11.9	A	0.35	-	13.1	A	0.57	-
Albert / Booth***	116.4	E	1.00	**EBL = 1.01 EBT = 1.48**	119.9	E	1.00	**EBL = 1.62 WBT = 1.20**
Albert / Empress	13.2	A	0.39	-	14.5	A	0.37	-
Slater / Bronson**	14.3	B	0.65	-	18.0	B	0.68	-
Albert / Slater	7.0	A	0.29	-	4.5	A	0.53	-
Albert / Bronson**	11.8	A	0.40	-	31.2	E	0.91	-
Wellington / Bay**	16.8	A	0.60	-	38.5	D	0.84	-
Wellington / Booth***	47.0	E	1.00	**EBT = 1.02 NBT = 1.08**	75.4	E	1.00	**WBT = 1.04 NBT = 1.28**
Wellington / Portage***	149.6	E	1.00	**WBL = 2.02 NEL = 1.26**	101.1	E	1.00	**WBL = 1.48 SBL = 1.13**
Albert / Bay	11.3	A	0.24	-	16.3	A	0.57	-
Slater / Bay***	33.5	D	0.86	**NBT = 1.05**	20.0	C	0.78	-
Albert / Lyon**	20.8	A	0.39	-	46.9	C	0.74	**WBT = 1.05**
Slater / Lyon*	14.2	A	0.60	-	13.0	A	0.52	-
Wellington / Lyon***	45.9	D	0.89	**EBT = 1.06 WBL = 1.43**	26.1	A	0.59	-

*95th Percentile Queue Length Exceeds Storage Capacity during AM Peak Hour (min. 1 turning movement)
**95th Percentile Queue Length Exceeds Storage Capacity during PM Peak Hour (min. 1 turning movement)
***95th Percentile Queue Length Exceeds Storage Capacity during AM and PM Peak Hour (min. 1 turning movement)
Detailed queue length information provided in **Appendix L**.

4.10 SUMMARY OF IMPROVEMENTS INDICATED AND MODIFICATION OPTIONS

A summary of transportation improvements proposed as part of this Transportation Impact Assessment carried out and the proposed modifications are presented as follows:

1. Development Design

a) Provision for sustainable modes has been provided as part of the site plan design for the OPL-LAC Facility including locating a main entrance near a transit stop and providing ample bicycle parking both inside and outside near main cycling corridors.

b) Pedestrian / cycling connections are provided between the facility and all sidewalks and multi-use pathways.

Reference: Section 4.1

2. Parking

c) The proposed parking supply of 192 vehicle spaces, 83 bicycle spaces, and 2 loading spaces for the OPL-LAC Facility meets or exceeds the minimum requirements of the City of Ottawa Zoning By-law.

Reference: Section 4.2

3. Boundary Street Design

d) The future Albert Street cross-section adjacent to the property includes separated pedestrian and cycling facilities and will meet or exceed all multi-modal level of service targets for the road segment.

e) The Commissioner Street cross-section adjacent to the property does not meet the multi-modal level of service for pedestrians or cyclists resulting from the narrow sidewalks (1.8m), mixed operations for bicycles, and operating speed.

Reference: Section 4.3

4. Transportation Demand Management

f) The OPL-LAC Facility is anticipated to have 190 trips for stays of 4-8 hours and 1,640 trips for stays of 1-2 hours during the weekdays. The proximity to the light-rail transit (LRT) station, pedestrian accommodation, exterior and interior bicycle parking, and underground parking; combined with TDM measures provided in the City of Ottawa's TDM Checklist is appropriate.

Reference: Section 4.5

5. Neighbourhood Traffic Management

g) The designation of local for Commissioner Street continues to be appropriate in the 2029 planning horizon with future traffic volumes at the daily volume threshold:

   a. Daily Threshold: 1,000vpd. Estimated Daily Volume: 1,034vpd

h) Commissioner Street provides direct access to the OPL-LAC site and the PSPC Cliff Heating Plant. During the peak hour, the future traffic volumes exceed at the daily volume threshold. However, given the usage of the road as a service road, the local road designation is likely still appropriate.

a. Peak Hour Threshold: 120vph. Estimated Peak Hour Volume: 346vph

Reference: Section 4.6

6. Transit

i) The development is anticipated to generate 915 transit trips during the peak hour. The site is located within a 600m walking distance of the Pimisi Light-Rail Transit station and based on the existing and projected capacity of the LRT, it is anticipated that Ottawa's LRT will have reserve capacity and can accommodate the increase in ridership generated by the OPL-LAC Facility.

Reference: Section 4.7

7. Intersection Design

j) With demand rationalization, the intersections that had exceeded the VLOS thresholds under existing conditions were able to operate at or below the VLOS thresholds under future background and future total conditions. No modifications are proposed, beyond the planned improvements to the Albert / Slater Corridor, to specifically support the development.

Reference: Section 4.9

8. Summary

Based on the results of this Transportation Impact Assessment, the proposed Site Plan Control Application for the OPL-LAC Facility located at 555 Albert Street:

a) Is appropriately designed for sustainable modes,

b) Is aligned with the City of Ottawa's broader city-building objectives, and

c) Can be accommodated without adverse impacts to planned transportation network and services associated with the future 2029 planning horizon.

APPENDIX

A CIRCULATION COMMENTS

MEMO

TO: Ralph Wiesbrock, Partner, KWC Architects Inc

FROM: Kimberley Hunton, Manager, WSP

SUBJECT: **Transportation Impact Study – Strategy Report- Comment Response**

DATE: **July 14, 2022**

NEW COMMENTS ON THE TIA REPORT

Demand rationalization is still not properly addressed. As per the Consultant's response, the report did indeed mention (in Section 4.9) where there are failing VLOS values in the road network but did not subsequently identify resulting demand rationalization strategies. As per the TIA Guidelines, "future peak hour serviced demand on the transportation network, by definition, cannot exceed future capacity". In such cases, the actual outcome is that the resulting congestion would lead to adjustments in travel behaviour—namely, a reduction in some peak hour demand, a spreading of peak hour demand to off-peak hours, a rerouting of demand to alternative routes, and/or an increase in non-auto mode shares. This applies to background and/or development-generated travel. The purpose of this module is, where necessary, to adjust projected background and/or development-generated travel demands to create a more realistic picture of future conditions". Revision to this TIA report module is recommended.

> **WSP reviewed the estimated over capacity volumes and readjusted the background demand. Adjustments are expected to be related to additional peak spreading and/or changes to mode share based on interprovincial transit upgrades. Reasoning is provided in Section 3.3.3 and 4.9**

In response to the City's previous comment requesting that the access design information (i.e., width, throat length, etc.) be provided in Section 4.4.1 of the report, the Consultant stated that "the design values can be identified in the revised TIA Final Report". In Section 4.4.1 of this revised report however, the text simply elaborates once again on what design information was considered, without providing any values. The purpose of the City's initial comment was to have the site access' actual width, throat length, slope, distance from nearest intersection, etc. values provided to be able to compare with TAC and City Private Approach Bylaw requirements. Please clearly identify all necessary values in the report and on the site plan.

> **The Access Intersection Design Elements table has been included in Section 4.4 along with additional explanation on why the design criteria suggested by the Transportation Association of Canada's Geometric Design Guide for Canadian Roads have been exceeded.**

The report now states in Section 4.6 that Commissioner St should be upgraded to a collector street due to elevated volumes. Please indicate what measures and/or road geometry changes would be required to accommodate this new roadway classification.

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Typically, the City of Ottawa's Designing Neighbourhood Collector Streets guidelines suggests no less than 22m ROW for a collector street. However, Commissioner Street is primarily a service access for the Cliff Plant and related federal government-controlled lands. Upgrading and reconfiguration of Commissioner Street cannot be carried without multi-jurisdictional negotiations. Work related to Commissioner Street is outside of the scope of this project which had a very specific mandate to maintain its current configuration. An updated site plan is provided in Appendix C.

Please indicate why Table 4-11 removed the existing/future MMLOS analysis of the Albert St / Commissioner St intersection.

The City of Ottawa's MMLOS Guidelines dictate that only signalized intersections be analyzed. Since Albert St/Commissioner St is not signalized, it was not evaluated.

In response to the City's previous comment regarding the implementation of cycling facilities on Commissioner St, the Consultant responded by stating that "access to the site by cyclists is available from multiple locations and directions tied into the future cycling networks". The Consultant then stated that "pedestrian/cycle access (is) provided to the P1 level" for the bike storage area there. Please indicate whether such access to the P1 level is expected to be via Commissioner St or not, and whether it ties directly into the future cycling network if not the case. When discussing site access in Section 4.4.1 however, the report mentioned that one of the design criteria evaluated was "cycling crossing consideration" - which leads to believe that cyclists may still be expected to be using Commissioner St. If cyclists will be using Commissioner St to access the site, they should be accommodated accordingly through appropriate cycling facilities. This would be even more important to implement if Commissioner St were to indeed have its roadway classification upgraded to 'collector' status.

Cycling and pedestrian access to the site is available from multiple locations and directions tied into the future pedestrian and cycling networks including the main building frontage along the reconfigured / reconstructed Albert Street corridor, from the west around the planned amphitheatre park space, as well as the planned the Multi-use Pathway along the Wellington right-of-way that follows alongside the Aqueduct above the LRT corridor. These routes and locations are equipped with bicycle racks and accessible slopes.

Additionally, the cycle track and related TWSIs etc. were extensively coordinated with the City's Albert-Queen-Slater-Bronson (AQSB) project team to ensure that cycling objectives and requirements were coordinated and addressed at this site. Pedestrian and cycling access are not planned or proposed from Commissioner Street. Please refer to the attached illustrated landscape material plan showing the planned bicycle routes and building approaches.

The underground parking ramp seems to show slopes of up to 15%. Please note that such a slope can be a psychological barrier to some drivers. Also note that when the underground parking ramp's slope exceeds 8%, a vertical-curve transition or a transition slope of half the ramp should be implemented. In addition, when the slope is exceeding 6%, a subsurface melting device should be used. If cyclists are expected to use this ramp access, 15% is not manageable.

Underground parking layouts and circulation have been the subject of extended discussions and consultations with specialist disciplines (traffic engineering) and applicable stakeholders (City of Ottawa parking operations). The underground parking garage ramp configuration including slopes, rollover transitions, overhead clearances, signage, mirrors, etc. have been checked against applicable zoning and building code requirements and reviewed in detail by all interested parties. There is no bicycle

parking provided on the lower level and therefore cyclists are not expected to use this ramp.

Please confirm that the current substandard asphalt sidewalk portion on Commissioner St will be upgraded to concrete sidewalk per City standards.

The existing sidewalk along the western side of Commissioner Street fronting the OPL/LAC project site will be replaced with a new concrete sidewalk as per City of Ottawa standards as part of this project scope.

In the updated Synchro Analysis files provided, the intersection of Wellington & Portage has been incorrectly modelled with a dual westbound left turn lane, into a single receiving lane. The affected synchro files that have the incorrect modelling noted above are: 2029_Future _Background_AM.syn', '2029_Future_Background_PM.syn', '2029_Future_Total_AM.syn' & '2029_Future_Total_PM.syn. 'The Synchro analysis and subsequent sections / tables in the report need to be updated / corrected. (i.e., Table 4-14 & Table 4-15).

The Synchro models have been updated to reflect the comment above.

The updated analysis should also include the intersection of Wellington & Lett.

Intersection was not identified during the Scoping Report. Due to the configuration of Lett Street, no additional traffic will be added to Lett Street. Furthermore, in the traffic assignment (Forecasting Report) no traffic was added to the Wellington/Lett intersection.

PREVIOUS COMMENTS FROM FORECASTING AND STRATEGY REPORT

Comments provided by the City of Ottawa (November 3, 2021) on the 555 Albert Street Transportation Impact Assessment Strategy Report (October 19, 2021) are provided in red. WSP's response are indicated in black tabbed to the right.

In Figures 2-2 and 2-3, the Pooley's Bridge connection is still not identified.

Noted. This will be updated in revised Transportation Impact Assessment (TIA) Final Report.

Despite mentioning that it was to be addressed in Section 4.3, the Strategy report did not provide as requested details on the transit and cycling collisions highlighted in Table 2-3.

Noted. Additional details will be provided in the revised TIA Final Report.

The report mentions that the 350 Sparks Street development was not included when considering future background traffic due to the application not being updated in 5 years. This development should still be included as the application can still resume in the future.

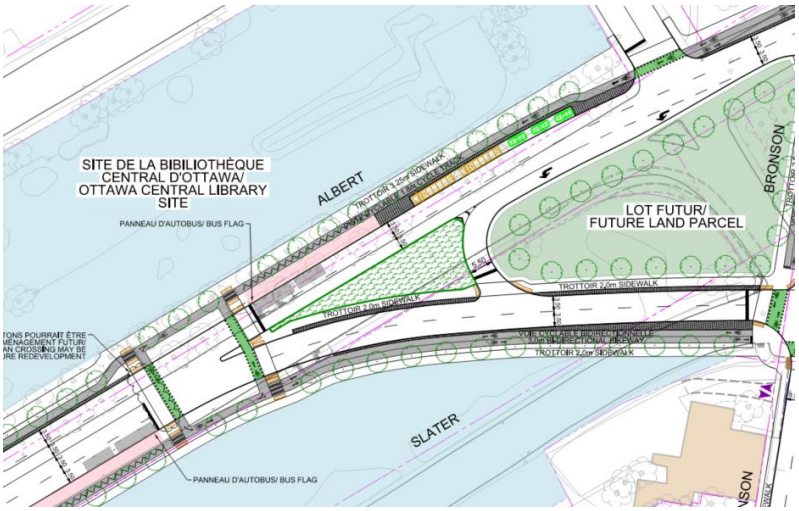
A response to this comment was provided at the time of the Forecasting Report submission to identify the rationale and approach in preparing the Forecasts excluding the development at 350 Sparks Street. The approach was approved by the City. As previously indicated, given that the proposed development at 350 Sparks Street has not been updated in six years, therefore the information within it likely requiring updates, it has not been included in the analysis.

Table 3-6 is still not correct. The total % distribution for the 'west' and 'internal' rows do not actually amount to the total of the adjacent columns.

Noted. Will be corrected in revised TIA Final Report.

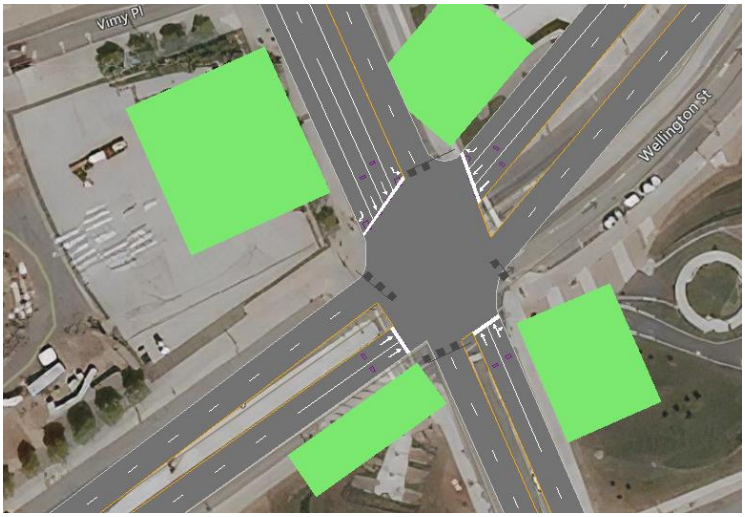
Figure 3-1 volumes for the Slater St / Bronson Ave intersection are still not correct. Also, please clarify which intersection is being referred to at the southwest of Albert St / Commissioner St intersection (showing only WBLT and EBRT volumes).

Noted. Corrections to Figure 3-1 will be made in the TIA Final Report. The intersection being referenced is the one immediately across from the OPL-LAC facility. The WBL movement is made upstream of the intersection (figure from Recommended Plan of Albert Street & Slater Street Corridor).



Please confirm in Section 4.9 that as per WSP's response to comments, the works resulting from the Booth St Zibi project (i.e., new WBRT lane at Booth St / Wellington St) have indeed been included in the 2029 LOS analysis.

It is confirmed that the lane arrangement changes as part of the Booth St Zibi project have been included in the future LOS analysis, screenshot of Synchro (future total) network below. Additional commentary will be added in Section 4.9 of the revised TIA to highlight that these changes have been included.



Demand rationalization has not been fully addressed. Based on the analysis provided in Section 4.9, traffic behaviour and reallocation as a result of certain travel movement demands exceeding theoretical capacities should be analyzed.

The report referenced the two intersections (Albert/Booth and Albert/Lyon) that were impacted by the additional traffic generated by the OPL-LAC Facility. Additional information will be provided to demonstrate the impacts of future total traffic over the future background traffic (VLOS) in the revised TIA.

Appendix G is missing from the report. The required TDM-Supportive Development Design and Infrastructure Checklist, as well as, the TDM Measures Checklist have not been provided. Please submit for City staff review.

Noted. Will be included in revised TIA Final Report as Appendix H.

In Section 4.1.1, the report seems to mention that the walking distance between all development entrances and transit stops will be less than 50m. Please state in this section which transit stops are being referenced.

The report is referring to a bus shelter along Albert Street directly opposite the Fire Fighters Entrance that is visible on the Site Plan. The clarification will be added to the revised TIA Final Report.

For both existing and future segments and intersections, please provide the MMLOS calculation tables/sheets in the Appendix. There are possible errors in the values provided in Tables 4-5 and 4-11.

Noted. The MMLOS tables will be provided in the Appendix of the revised TIA Final Report, and the values within Tables 4-5 and 4-11 will be verified.

Section 4.4.1 of the report states that the "typical access criteria (width, throat length, radius) suggested by TAC have been exceeded..." Please identify these design values that were considered in the report.

The design values can be identified in the revised TIA Final Report. It is noted that the general statement is due to the non-standard entrance configuration to accommodate maneuvering trucks on the site (as opposed to within the public right-of-way.)

Ensure that there are no sight line issues for vehicles using the proposed accesses. Review sightlines for all accesses and show them on drawings

Noted. Sightlines will be reviewed and shown in Appendix I of the revised TIA Final Report.

Table 4.8 shows the peak hour threshold for Commissioner St being nearly tripled in 2029 total traffic conditions. Please provide further analysis and clarify whether road classification for this street requires adjustment.

Noted. Additional information on the road classification will be included in the revised TIA Final Report.

Please identify how it was determined that this development will not be generating more than 200 peak hour person-trips over the equivalent volume permitted by the established zoning, to exempt Section 4.8 of the report.

The 557 & 584 Wellington Street Transportation Study (Stantec, 2018) has previously amended the zoning of this development which was taken as the rationale for this exemption. A comparison of the person-trips generated from the proposed development within the 2018 Transportation Study used for rezoning results in the added trips being less than the established zoning in both the AM and PM peak hours. The AM peak hour person-trips were 881 in the 2018 Transportation Study and 130 in this report; The PM peak hour person-trips were 2,786 in the 2018 Transportation Study and 1,830 in this report.

Section 4.9.1 states that the identification of appropriate intersection controls at various intersections was performed. Please elaborate on the methodology used.

Due to the downtown location, traffic volumes, existing intersection control and property constraints there are limited options for intersection control change and the results of an assessment would be traffic signals. Based on this engineering judgement detailed assessment was not carried out for other intersection control (e.g. roundabout, stop control). Additional commentary will be added to Section 4.9.1 in the revised TIA Final Report.

In Section 4.9.2. there is an incomplete sentence (paragraph?) just before Table 4-11. Also, in this section, confirm whether 2024 full buildout conditions (which were not included/addressed) are identical to 2029 conditions.

Noted. The incomplete sentence will be revised in the TIA Final Report. The results of the MMLOS indicate improved multi-modal conditions along the intersections referenced in Table 4-11. With a 0% background growth rate (see Section 3.2.2) there is no difference in the background volumes between 2024 and 2029 and thus the full buildout conditions are identical for both years.

In Table 4-11, note that all Slater St intersections should have a BLOS target of A due to Slater St being considered a cross-town bikeway up until Bronson Ave. The other two intersections should also show a BLOS target of B due to Bronson Ave and Commissioner St having approaches at Albert St designated as cycling local routes.

Noted. These corrections will be included in the in revised TIA Final Report.

All Bronson Ave intersections appear to have much better MMLOS values in the future (vs existing). Please provide future intersection layouts (and MMLOS calculations as mentioned before) to clarify these upgraded MMLOS values

Noted. MMLOS calculations will be included in the revised TIA Final Report. Many of the improvements are due to the Albert and Slater Streets Post Light-Rail Repurposing Functional Design Study, which was referenced in Section 3.2.1 and Figure 3-2.

Please provide MMLOS analysis for the Albert St / Empress Ave N intersection.

As noted, the MMLOS analysis will be appended to the revised TIA Final Report. Albert St / Empress Ave N will be included in that analysis.

When assessing for VLOS in Section 4.9.2, the report mentions (prior to Tables 4-13, 4-14, and 4-15) that certain movement v/c ratios are <1.0 when it seems it should instead be referring to >1.0. Tables 4-13 to 4-15 should also actually show the intersection overall v/c ratios instead of just the critical movement v/c ratios and the intersection 'delay' values.

Noted. These modifications will be reviewed and incorporated into the revised TIA Final Report where appropriate.

Traffic Signal Operations

Booth & SJAM: South Leg (Northbound Approach): two through lanes with 'No left turn - authorized vehicles accepted'. There is no dedicated northbound left turn lane as report suggests.

Noted. The wording in the report will be updated to better describe current conditions in the revised TIA Final Report

Wellington & Portage: Clarify that the intersection is currently equipped with on road cycling lanes. (The wording in report seems to suggest cycling crossrides are present)

Noted. The wording in the report will be updated to better describe current conditions in the revised TIA Final Report

Albert & Empress: Pedestrian crossings on all approaches. (The wording in report seems to suggest cycling crossrides are present)

Noted. The wording in the report will be updated to better describe current conditions in the revised TIA Final Report

Please provide impact on transportation network if the auto driver mode share is greater than current targets or if the 50% transit mode share is not met.

There has not been an analysis completed for variations in the auto driver mode. The future mode share targets and rationale for using these targets due to on the development's proximity to rapid transit, limited parking opportunities, development density and improved on-street cycling facilities were based on the City approved New Ottawa Central Parking Demand Study (March 2017) as presented and approved by the City in the Forecasting Report. It is noted that the VLOS at the Albert/Empress intersection for the future total traffic is LOS A and therefore with a lower transit mode share is expected to be well within the accepted VLOS in the downtown area of F.

Provide 95th percentile queue lengths and indicate when storage length, or distance to upstream intersection, is exceeded.

Noted. Intersections with 95th percentile queue lengths exceeding storage capacity are reported in Table 4-13,4-14 and 4-15. All queue length details are provided in the Synchro results in Appendix L.

SYNCHRO FILE COMMENTS

Preston & Albert: In all applicable 'PM' synchro files, WBLT is modelled as 'Protected', should be 'Protected-Permissive',

The updated signal timing plan has been requested and has been received on February 1, 2022. The Synchro analysis and summary has been updated to reflect the latest timing plan.

In all applicable 'AM' & 'PM' synchro files, NBLT Modelled as 'Protected', should be permissive.

The updated signal timing plan has been requested and has been received as of February 1, 2022. The Synchro analysis and summary will be updated to reflect the latest timing plan.

Albert & Booth: In all applicable 'AM' & 'PM' synchro files, the advanced walk must be modelled as a 5s phase (not 3s).

Noted. The Synchro Models show the advanced walk time as 3 seconds of green time and 2 seconds of yellow time. In Synchro, the minimum yellow time must be no less than 2 seconds. Ultimately, the advanced walk stage is still 5 seconds and is not expected to affect the results.

SJAM & Booth: In all synchro files, the existing 'protected-permissive' SBLT phase and the WBRT overlap phase (*operates concurrent with SBLT) are not modelled.

The updated signal timing plan has been requested and has been received as of February 1, 2022. The Synchro analysis and summary will be updated to reflect the latest timing plan.

SJAM & Portage: In all synchro files, the WBL & NER are modelled as 'permissive' movements, these should be modelled as protected movements.

Noted. This may be a function of coding within Synchro and will be reviewed as we update the analysis for the revised TIA Final Report.

Lyon & Slater: In all applicable synchro files Phase 1 is depicting 15s Green time in 'AM' models, whereas 'PM' models depicts Phase 1 with 40s, operating concurrently with phase 6. Review and revise discrepancies.

Noted. The Synchro Models will be updated and any changes to the results will be made in the revised TIA Final Report.

All future (horizon year) synchro analysis modelling must include projected pedestrian volumes / cycling volumes at all study area intersections.

The typical requirement for analysis is 400m within the development. The analysis for the proposed development went beyond this by 300m in all directions. Focusing on the intersections of Booth/Albert and Bronson/Albert and assuming the following for transit and pedestrian trips:

- **80% of transit trips arrives on LRT**
- **67% of transit trips – turned pedestrian start at Pimisi Station**
- **33% of transit trips – turned pedestrian start at Lyon Station**
- **Pimisi transit users exit equally between the west and east access points on Booth Street**

The increase in pedestrians due to the proposed development is negligible in the AM Peak Hour (1 pedestrian added per cycle)

The increase in pedestrians due to the proposed development in the PM Peak Hour will be:

- **Albert/Booth north crossing -- Additional 8 pedestrians/cycle (existing 2 pedestrians/cycle)**
- **Albert/Booth east crossing – Additional 3 pedestrians/cycle (existing 1 pedestrians/cycle)**
- **Albert/Bronson north crossing – additional 7 pedestrians/cycle (existing 1 pedestrians/cycle)**

The above additional pedestrian volumes have a negligible effect on the intersection operations:

- **Albert/Booth WBR has no added delay and v/c increases from 0.18 to 0.19**
- **Albert/Bronson there is no change to WBR v/c or delay**

A note will be added to the final report related to additional pedestrians at these two intersections.

Update synchro analysis modelling to depict correct lane configurations and any applicable turn restrictions at all study area intersections.

Noted. Comments made on lane configuration in Traffic Signal Operations, will be reviewed in revised Transportation Impact Assessment (TIA) Final Report.

Please note, only two synchro files were provided (20M-00531-00 2021_Existing.syn & 20M-00531-00_Future Scenarios.syn), neither of which were provided in the correct Synchro V10 format. It seems that there were synchro analysis files omitted in this submission.

This was an oversight. All Synchro files (saved down to v10) will be forwarded to you as part of the revised TIA Final Report submission.

New Comments on the TIA report:

Provide (and clearly identify on the site plan) access and underground parking ramp grades, as well as the actual widths and limits of the public and loading accesses off Commissioner St. Those must be compared with the requirements of the City's Private Approach By-Law.

Underground parking access is at the P1 level off Commissioner Street and is more or less flat. Internal parking garage circulation and ramp slopes were reviewed during the design process with City of Ottawa parking operations personnel who will be running the facility when it is completed.

Please refer to the attached Adisoke (Ottawa Public Library | Library and Archives Canada Joint Facility) site plans and P1 and P2 floor plans.

Please refer also to civil drawing C002 – Grading Plan for additional detail with respect to grading at the loading dock/service court area.

Additional Site Plan and General Comments:

Cycling facilities are required on Commissioner St to accommodate cyclists accessing and exiting the development. The cycling facilities should tie into the future cycling tracks provided on Albert St.

Access to the site by cyclists is available from multiple locations and directions tied into the future cycling track networks including:

- **Along Albert Street building frontage where bicycle racks are provided under the protected building overhang between the two Albert Street building entrances.**
- **At the southwestern end of the site using ramps around the amphitheatre which provide access to the Pimisi entrance which connects to the future MUP which will run along the Confederation Line LRT right of way between the Pimisi LRT station and Commissioner Street.**
- **Pedestrian/Cycle access provided to the P1 level which contains a secure bicycle storage area for staff.**
- **Additionally, the AQSB project includes a number of bike racks located between the seating benches at the westerly portion of the site.**
- **Please refer to the attached annotated site plan and P1 floor plans.**

The site plan shows a bike box within the bulb-out at the NW corner of the Albert St / Commissioner St intersection. Please clarify which southbound cycling crossing this bike box ties to.

Albert Street R.O.W. design is by the Albert-Queen-Slater-Bronson Rehabilitation project jurisdiction. Streetscape elements within the R.O.W. are shown on the Adisoke project site and landscape plans to illustrate the relationships and close coordination that was carried out between the two project teams.

Response to this comment should be provided by the AQSB project team.

Please demonstrate on the site plan how EB cyclists will be able to access the site (provide a high-level zoomed out version of the drawing if necessary).

Albert Street R.O.W. design including cycle tracks is under the Albert-Queen-Slater-Bronson Rehabilitation project jurisdiction. Streetscape elements within the R.O.W. are shown on the Adisoke project site and landscape plans to illustrate the relationships and close coordination that was carried out between the two project teams.

As noted, access to the site by cyclists is available from multiple locations and directions.

The site is directly abutting the Confederation Line LRT corridor. The City of Ottawa will not be responsible for any complaints or claims arising from use of such facilities and/or operations on, over or under the aforesaid rights-of-way.

Noted. Acoustic considerations related to the Confederation Line LRT corridor were accessed and incorporated into the design of the project.

Direct confirmation of noted condition to be provided by the City of Ottawa Project Management Office team responsible for the project.

In Design Priority Areas, all public projects, private developments, and community partnerships within the public realm will be reviewed for their contribution to an enhanced pedestrian environment and their response to the distinct character and unique opportunities of the area. The public realm/domain refers to all those private and publicly owned spaces and places, which are freely available to the public to see and use.

This project was subject of an extensive public consultation process in addition to a Joint Design Review Panel representing the City of Ottawa urban design review and the National Capital Commission Advisory Committee on Planning, Design and Realty and has obtained all design related approvals at the municipal and national levels.

Ensure paving materials used on City right of way are durable and appropriate to the harsh urban and climatic conditions of Ottawa. Use materials that can be sourced when needed to be replaced. Contact David Atkinson for additional information on paver selection. A maintenance and liability agreement may be required for these pavers placed in City ROW.

The project has been subject of extensive discussion and coordination with City of Ottawa representatives including David Atkinson through the related Albert Queen Slater Bronson (AQSB) road realignment project.

Traffic Signal Design
Before excavating, please call Ont1CALL (1-800-400-2255) for underground locates.

These requirements are written into the project specifications to ensure that they are carried out by project contractor (s).

Existing Traffic Plant:

There is existing underground traffic plant in the area of proposed construction. Underground traffic plant and traffic signal hardware is to be maintained and protected at all times during construction.

Noted. This is addressed through the Adisoke project construction contract requirements in addition to the project requirements stipulated by the AQSB project team for the related road realignment project.

Proposed Traffic Plant:

Traffic Signals is aware of the proposed works and is involved in the Albert-Queen-Slater-Bronson Rehab Project through Parsons. Traffic Plant design has been provided, please coordinate with Chris Redden chris.redden@parsons.com.

Noted. The Adisoke project team has carried out extensive design coordination with the AQSB road realignment project team throughout the design resolution process.

Please contact Jon Pach, jon.pach@ottawa.ca to coordinate any possible installation/relocation of underground traffic plant, traffic signal hardware; and to provide a cost estimate for such work.

Noted. This work is primarily the responsibility of the AQSB road realignment project team and it understood that this is captured in their project documentation.

The proponent of the project and its contractor are liable for all potential outages and fully responsible for reinstatement of all damages to existing underground traffic infrastructure including all the costs associated with it.

Noted. Extensive monitoring and reporting requirements related to existing underground infrastructure are included in the Adisoke construction contract requirements.

Provide a traffic control plan before/if entering a signalized intersection to do work.

Noted. This is addressed through the Adisoke project construction contract requirements in addition to the project requirements stipulated by the AQSB project team for the related road realignment project.

Street Lighting
Street Lighting Plant is located at this location. Locates required. Please contact Ontario One Call for locates prior to excavation.

Noted. This is addressed through the Adisoke project construction contract requirements in addition to the project requirements stipulated by the AQSB project team for the related road realignment project.

Please maintain a minimum of 1.0 m horizontal and 0.3 m vertical clearance from existing street light plant. The applicant is 100% responsible for all costs of any required Street Light Plant alterations and/or repairs.

Noted. This is addressed through the Adisoke project construction contract requirements in addition to the project requirements stipulated by the AQSB project team for the related road realignment project.

The applicant is 100% responsible for all costs of any required street light plant alterations and/or repairs.

Noted. This is addressed through the Adisoke project construction contract requirements in addition to the project requirements stipulated by the AQSB project team for the related road realignment project.

If conflict arises please contact Barrie Forrester (613) 580-2424 ext 23332 (Barrie.Forrester@ottawa.ca).

Noted.

Reserve the right to comment on future submissions.

Noted.

Kimberley Hunton, P.Eng
Manager, Transportation Planning and Science

ISSUED

No.	Date	Description
1	2019-07-10	ISSUED FOR SD COSTING
2	2019-08-30	ISSUED FOR SD COSTING
3	2020-01-06	ISSUED FOR DD COSTING
4	2020-03-30	ISSUED FOR 100% DD
5	2020-05-29	ISSUED FOR 30%CD COSTING
6	2020-06-05	ISSUED FOR SITE PLAN CONTROL REV.0
7	2020-09-29	ISSUED FOR 60%CD COSTING
8	2020-11-17	ISSUED FOR SITE PLAN CONTROL REV.1
9	2021-01-18	ISSUED FOR 90% CD COSTING
10	2021-02-26	ISSUED FOR COORDINATION
11	2021-03-15	ISSUED FOR SITE PLAN CONTROL REV.2
12	2021-03-19	ISSUED FOR BP COORDINATION
13	2021-03-24	ISSUED FOR BUILDING PERMIT
14	2021-04-09	ISSUED FOR CONSULTANT COORDINATION
15	2021-05-11	ISSUED FOR TENDER
16	2021-05-11	ISSUED FOR BUILDING PERMIT UPDATE
17	2021-08-20	ISSUED FOR SITE PLAN AGREEMENT
19	2021-09-23	ADDENDUM 04
10	2021-07-14	ADDENDUM 10
12	2021-07-21	ADDENDUM 12
14	2021-07-28	ADDENDUM 14
17	2021-08-18	ADDENDUM 17
20	2021-09-01	ADDENDUM 20
18	2021-11-22	ISSUED FOR CONSTRUCTION

0 10 20 METERS

N PROJECT NORTH

N TRUE NORTH

7 L9.02 PLANTING DIVIDER @ PL. TYP. AT PLAZA

5 L9.03 CONCRETE EDGE, SLOPING FROM 100 TO 450MM HT.

12 L9.02 TWSI - DIRECTIONAL INDICATOR (LP-3)

1 L9.03 BIKE RACKS C/W CONCRETE PAD

- L9.06 TREE IN SEATING PLINTH

SIM L9.05A SEATWALL WITH BACK INTEGRATED RETAINING WALL

5 L9.03 CONCRETE EDGE, SLOPING FROM 100 TO 450MM HT.

600MM CONCRETE RETAINING WALL, REFER TO ARCH

9 SIM L9.02 CIP CONCRETE PAVING BAND

BERMED PLANTED AREA REFER FOR DETAILS FOR PLANTING REQUIREMENTS -REFER TO PLANTING

9 L9.02 CONCRETE CURB

- L9.09 CIP CONCRETE PLANTER AT TERRACE

11 L9.02 HIDDEN CURB

BOTTLE FILLING STATION REFER TO SPECS/MECH

ARCHITECTURAL FEATURE WALL

PARKING GARAGE ENTRANCE SEE L1.03

CONCRETE CURB ENDS AT PROPERTY LINE TYP.

CONCRETE CURB 9 SIM L9.02

GATHERING CIRCLE - L9.02A

CONCRETE SEATWALL A WITH 'BB' BENCH 2 L9.04 7A L9.03

CONCRETE SEATWALL A WITH 'BA' BENCH 7A L9.03 2 L9.04

CONCRETE BENCH WALL A FROM 100MM TO 450MM HT. WALL WIDTH VARIES 5 L9.03

CIP CONCRETE PAVING BAND 9 SIM L9.02

CIP CONCRETE CURB 9 L9.02

CIP CONCRETE CURB 9 L9.02

CENTRAL AMPHITHEATRE REFER TO L8.01 SERIES

SOUTH WEST ENTRY

PARKADE OUTLINE

CIP CONC. SEATING WALL

STAGE - SEATING PLINTH - L9.07

ROOF CANOPY OUTLINE

5 SIM L9.03 CIP CONCRETE CURB, FROM 200 MM TO 450MM HT., TYP.

13 L9.04 SS HANDRAIL

2 L8.01C CIP CONCRETE STAIRS ON GRADE

8 L9.02 DRIP STRIP

9 L9.02 CONCRETE CURB

3 risers @133mm

SEATING PLATFORM

12 L9.04 SS HANDRAIL

13 SIM L9.02 CIP CONCRETE STAIRS ON STRUCTURE C/W HANDRAIL

2 L9.03 TRASH AND RECYCLING RECEPTACLES

OPL / LAC LOADING

COMISSIONER STREET

CONNECTOR PATH TO TERRACE (L1)

SEATWALL WITH BACK INTEGRATED WITH MECHANICAL VENT WALL - L9.05A

TRASH AND RECYCLING RECEPTACLES 2 L9.03

ALBERT ENTRY PLINTH - L9.06B

TWSI - DIRECTIONAL INDICATOR 12 L9.02

SEATING PLATFORM - L9.05B

CIP CONCRETE STAIRS C/W HANDRAIL 13 L9.02

2 L9.03 TRASH RECEPTACLES

1 L9.03 BIKE RACKS C/W CONCRETE PAD

NORTH EAST ENTRY

SOUTH EAST ENTRY

2 risers @150mm

ARCHITECTURAL WALL -GUARDRAIL HEIGHT

1 L9.03 BIKE RACKS C/W CONCRETE PAD

9 L9.02 SIM. CONCRETE CURB

INTAKE GRILL REFER TO ARCH.

13 L9.02 SIM. CONCRETE STAIR -3R @160mm HT

11 L9.04 BOULDERS WITH INDIGENOUS PLAQUE

12 L9.04 SS HANDRAIL

BIKE LANE

Soil Cell Area

NIS BUS STOP NIS

NEW LIGHT, BY OTHERS

2 L9.02 CONCRETE UNIT PAVING

1 L9.11 SECURITY BOLLARD

BIKE LANE TWSI'S, REFER TO CIVIL

1 L9.10 TREE W/ SILVA CELLS

1 L9.10 ALBERT ST TREE BENCH

2A,2B L9.10 ALBERT ST BENCH TYP.

10 L9.04 METAL EDGE, TYP.

1 L9.03 BIKE RACKS

5 L9.03 7B L9.03 CONCRETE SEATWALL B FROM 100MM TO 450MM HT

ALBERT STREET

1 LANDSCAPE MATERIALS PLAN - GROUND LEVEL

SCALE: 1:200

LEGEND

- PROPERTY LINE
- OUTSIDE PROJECT SCOPE
- UNDERGROUND SLAB
- BUILDING OVERHANG
- BUILDING ENTRY

PAVING:

- CONCRETE UNIT PAVING (LP-1 and LP-2) SEE L1.02
- CIP CONCRETE PAVING - PEDESTRIAN DETAIL x / L9.01
- CIP CONCRETE PAVING -VEHICULAR REFER TO CIVIL
- WOOD DECKING VARIES DETAILS
- TACTILE WARNING DETAIL x / L9.02
- DIRECTIONAL TWSI (LP-3) DETAIL x / L9.02

CONCRETE STRUCTURES:

- CIP CONCRETE SEAT WALL WITH IPE BENCH TOP CONDITIONS VARY: L9.02
- CIP CONCRETE SEAT WALL CONDITIONS VARY L9.02
- CIP CONCRETE CURB 9/L9.02
- ALBERT STREET TREE BENCH: CIP CONCRETE SEAT WALL WITH IPE BENCH TOP. DETAIL 1/L9.10
- ALBERT STREET TYP. BENCH: CIP CONCRETE SEAT WALL WITH IPE BENCH TOP. DETAIL 2A,2B/L9.10

SITE FURNISHINGS:

- B-R BOLLARD, REMOVEABLE DETAIL L9.11
- B-F BOLLARDS, FIXED DETAIL L9.11
- COLUMN PEDESTRIAN LIGHTS DETAIL 3/L9.03
- BIKE RACKS (61 RACKS / 122 STALLS) DETAIL 1/L9.03
- MOVABLE CHAIRS & TABLES REFER TO SPECIFICATIONS
- TRASH AND RECYCLING RECEPTACLES DETAIL 2/L9.03
- BA BENCH TYPE A WOOD BENCH TOP WITH BACK AND ARM RESTS: 3/L9.04
- BB BENCH TYPE B WOOD BENCH TOP BENCH: 1,2/L9.04

PLANTING:

- EXISTING TREE
- SITE AND STREET TREE L5.01, L9.01, L9.10
- OFFSITE TREE (N.I.S)
- PLANTING L5.02, L9.01
- EP EVENT POWER REFER TO ELEC.
- P GFRC RECEPTACLES REFER TO ELEC.

DRAINAGE:

- * CB CATCH BASIN REFER TO CIVIL
- * AD CATCH BASIN REFER TO MECH
- TD TRENCH DRAIN DETAIL 4 / L9.03
- SD SLAB DRAIN (UNDER PAVERS) REFER TO ARCH.
- PD PLANTER DRAIN C/W INSPECTION CHAMBER -REFER TO MECH.
- HB HOSE BIB -REFER TO MECH.
- (F) BOTTLE FILLING STATION -REFER TO SPEC AND CIVIL

GENERAL NOTES:

1. LAYOUT AND MATERIALS DRAWINGS ARE TO BE READ IN CONJUNCTION WITH LANDSCAPE SPECIFICATIONS FOR COMPLIANCE.
2. LANDSCAPE DRAWINGS ARE TO BE READ IN CONJUNCTION WITH ARCHITECTURAL AND ENGINEERING DRAWINGS. REPORT ANY DISCREPANCIES TO THE CONSULTANT FOR REVIEW AND RESPONSE.
3. REFER TO LIGHTING LAYOUT DRAWINGS FOR FIXTURE LOCATIONS. REFER TO ELECTRICAL FOR SYSTEM AND SPECIFICATIONS.
4. REFERENCE CIVIL ENGINEERS DRAWINGS FOR LAYOUT OF ROAD CURBS AND GUTTERS AND PEDESTRAIN LET-DOWNS. ALBERT STREET GRADING COORDINATION BY CIVIL. ALL SITE DRAINAGE TO BE PICKED UP BY CIVIL.
5. REFER TO LANDSCAPE DETAILS AND SECTIONS FOR ALL LANDSCAPE IMPROVEMENTS.
6. ALL DIMENSIONS ARE NOMINAL.
7. VERIFY ALL MEASUREMENTS ON SITE. PROVIDE AS-BUILIT SHOP DRAWINGS FOR DETAILED COORDINATION WITH ARCH OR STRUCTURAL.
8. ALL WOOD TO BE IPE, UNLESS OTHERWISE APPROVED HARDWOOD OR THERMALLY TREATED WOOD. MUST HAVE TACTILE SURFACE.
9. BUS SHELTER AND CURBS AT ALBERT ST IS N.I.S. LANDSCAPE IMPROVEMENTS TO BE TO BE COORDINATED WITH CITY OF OTTAWA / ALBERT-SLATER STREET PROJECT.
10. OFFSITE BOLLARDS ARE PART OF PROJECT SECURITY, AND MUST BE PROVIDED AS PART OF ALBERT-SLATER PROJECT.
11. REFER TO STRUCTURAL FOR ALL REINFORCING OF LANDSCAPE CONCRETE STRUCTURES.
12. PROVIDE STUBOUTS (MECH) FOR IRRIGATIONS AT ALL PLANTING AREAS. ALL NEW PLANTING TO BE IRRIGATED EXCEPT FOR ALBERT ST BLVD.

Diamond Schmitt Architects
384 Adelaide Street West, Suite 100, Toronto, Canada M5V1R7
Tel: 416 862 8800 Fax: 416 862 5508 infoudsai.ca www.dsai.ca

PFS STUDIO
1777 West 2nd Avenue, Vancouver BC V6J 1H7
604.734.5168
info@pfs.bc.ca
PLANNING + URBAN DESIGN + LANDSCAPE ARCHITECTURE www.pfsstudio.com

STAMP

OTTAWA PUBLIC LIBRARY AND LIBRARY AND ARCHIVES CANADA JOINT FACILITY

MATERIALS PLAN

Scale: 1/200
Project No: 19004
Date: –

DO7 NUMBER: D07-12-20-0077

L1.01

DWG #18176

APPENDIX

B SCREENING FORM

City of Ottawa 2017 TIA Guidelines Screening Form

1. Description of Proposed Development

Municipal Address	555 Albert Street
Description of Location	Sourth west corner of Albert / Commissioner
Land Use Classification	Mixed-Use Downtown (MD)
Development Size (units)	OPL-LAC Joint Facility, 5-storeys shared space
Development Size (m^2)	20,000 sq/m
Number of Accesses and Locations	1 private vehicle from Commissioner, 1 O&M from Commissioner
Phase of Development	One phase
Buildout Year	2024

If available, please attach a sketch of the development or site plan to this form.

2. Trip Generation Trigger

Considering the Development's Land Use type and Size (as filled out in the previous section), please refer to the Trip Generation Trigger checks below.

Land Use Type	Minimum Development Size
Single-family homes	40 units
Townhomes or apartments	90 units
Office	3,500 m^2
Industrial	5,000 m^2
Fast-food restaurant or coffee shop	100 m^2
Destination retail	1,000 m^2
Gas station or convenience market	75 m^2

** If the development has a land use type other than what is presented in the table above, estimates of person-trip generation may be made based on average trip generation characteristics represented in the current edition of the Institute of Transportation Engineers (ITE) Trip Generation Manual.*

If the proposed development size is greater than the sizes identified above, the Trip Generation Trigger is satisfied.

Estimated > 60 person-trips during peak hour

3. Location Triggers

	Yes	No
Does the development propose a new driveway to a boundary street that is designated as part of the City's Transit Priority, Rapid Transit or Spine Bicycle Networks?		X
Is the development in a Design Priority Area (DPA) or Transit-oriented Development (TOD) zone?*		X

**DPA and TOD are identified in the City of Ottawa Official Plan (DPA in Section 2.5.1 and Schedules A and B; TOD in Annex 6). See Chapter 4 for a list of City of Ottawa Planning and Engineering documents that support the completion of TIA).*

If any of the above questions were answered with 'Yes,' the Location Trigger is satisfied.

4. Safety Triggers

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

If any of the above questions were answered with 'Yes,' the Safety Trigger is satisfied.

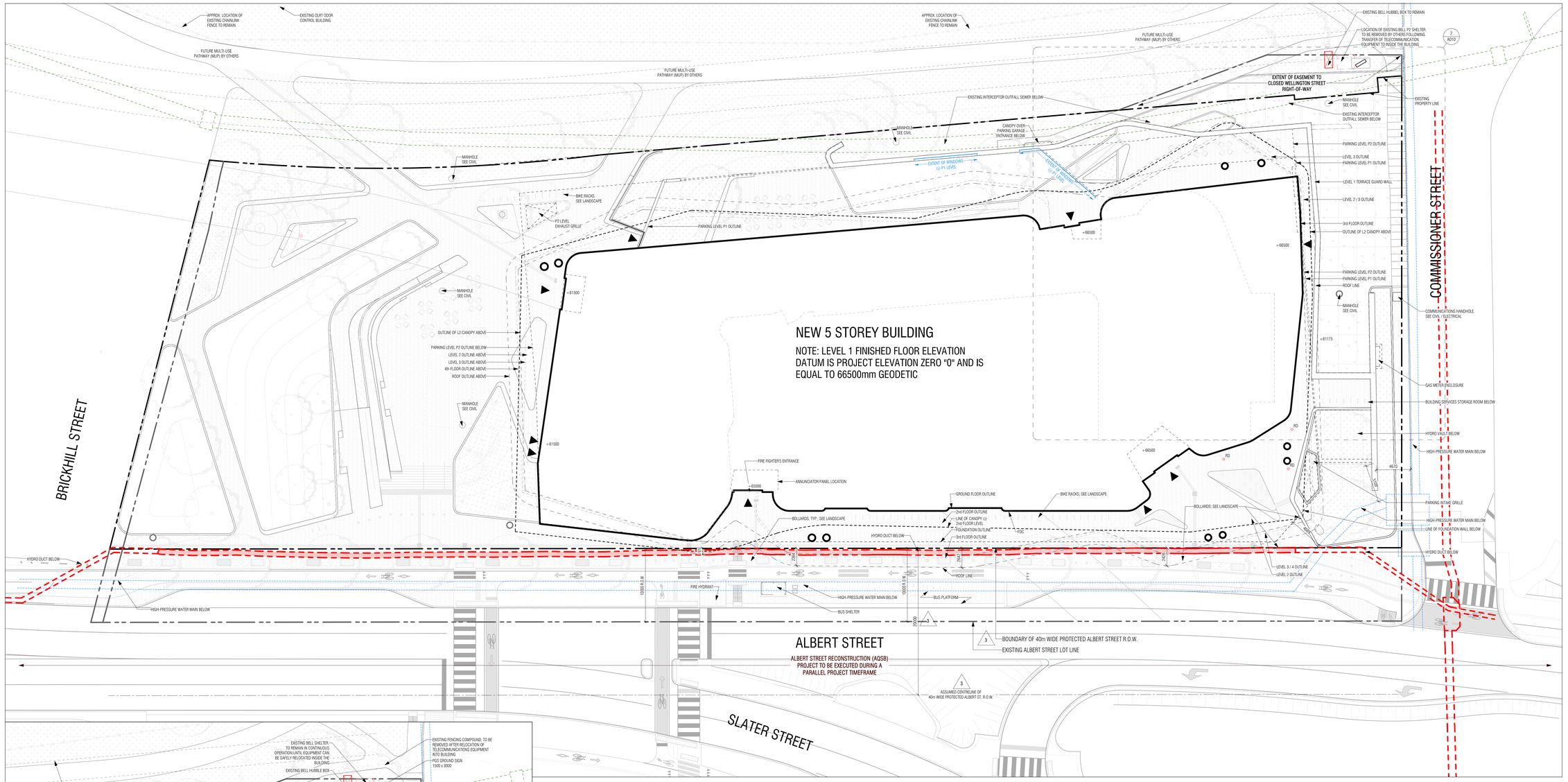
5. Summary

	Yes	No
Does the development satisfy the Trip Generation Trigger?	X	
Does the development satisfy the Location Trigger?		X
Does the development satisfy the Safety Trigger?	X	

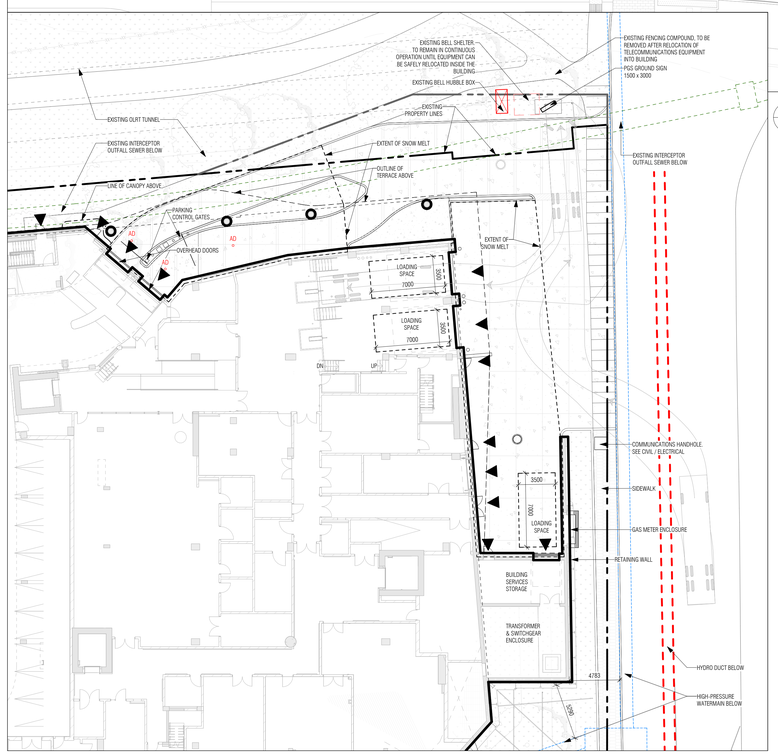
If none of the triggers are satisfied, the TIA Study is complete. If one or more of the triggers is satisfied, the TIA Study must continue into the next stage (Screening and Scoping).

APPENDIX

C DRAFT SITE PLAN



1 A010 **SITE PLAN**
1 : 200



2 A010 **SITE PLAN DETAIL - LOADING BAY**
1 : 200

BIM 360://1855-OPL-LAC-P20/1855-ARCH-OSA-Building-R20.rvt
2021-12-08 5:34:01 PM

CONTRACTOR MUST CHECK & VERIFY ALL DIMENSIONS ON THE JOB.

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THIS DRAWING IS NOT TO BE USED FOR CONSTRUCTION UNTIL SIGNED BY THE ARCHITECT.

ISSUED

No.	Date	Description
0	2020-05-28	ISSUED FOR CD 30%
1	2020-09-29	ISSUED FOR CD 60%
2	2020-10-06	ISSUED FOR CD 60% (ADDENDUM 1)
3	2020-11-16	RE-ISSUED FOR SITE PLAN CONTROL
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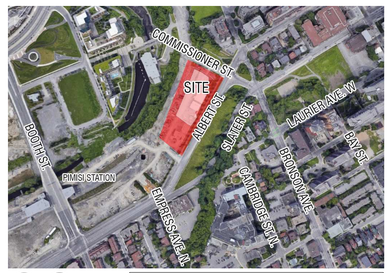
10	2021-05-11	ISSUED FOR BUILDING PERMIT UPDATE
11	2021-06-23	ISSUED FOR ADDENDUM NO. 4
12	2021-08-18	ISSUED FOR ADDENDUM NO. 17
13	2021-11-22	ISSUED FOR CONSTRUCTION
14	2021-12-09	ISSUED FOR SI-001 R1
15	2021-12-09	ISSUED FOR CONSTRUCTION UPDATE

Project Zoning Review/Statistics

Municipality:	City of Ottawa
Municipal Address:	555 Albert Street
Registered Owner:	City of Ottawa
Lot Area:	9,543 m² (2.39 acres)
Zoning Analysis	
Ottawa	
Zoning By-law:	2008-250
Zone:	MD H(40)
Proposed Use:	Library / Parking Facility

Building Areas

	Gross Floor Area (m²) (as per Zoning By-Law, Section 54)
Level P2 - Parking	---
Level P1 - Parking	1,585
Level 1	2,430
Level 1 Mezzanine	70
Level 2	2,717
Level 3	2,715
Level 4	2,732
Level 5	1,327
Level 5 Mezzaine	---
Grand Total	13,636



3 A010 **LOCATION PLAN**
N.T.S.

Development Standards

	Required	Provided
Minimum Lot Area	No min.	9,543 m²
Minimum Lot Width	No min.	178.9m
Minimum Required Yard		
Front Yard (min.)	No min.	0 to -2.63m Aerial Encroachment @ Albert St. R.O.W.
Corner Side Yard (min.)	No min.	11.9m
Interior Side Yard (min.)	No min.	44.3m
Rear Yard (min.)	No min.	7.65m
Maximum Building Height	40m	28.69m

Parking, Loading, Queuing — Area Z, Schedule 1A

Parking Spaces

Within the area shown as Area Z on Schedule 1A, no off-street motor vehicle parking is required to be provided under this section. (By-Law 2016-249)

Parking Provided: *(below grade)*

	P1 Level	P2 Level	Totals
Standard Spaces (2.6mw. 5.2m)	39	119	158
EV Parking Spaces	3	3	6
Reduced Spaces (2.4m x 5.2)	1	5	6
Reduced Spaces (2.6m x 4.6m)	4	8	12
Accessible Type A	3	---	3
Accessible Type B	3	4	7
Total Provided:	*53*	*139*	**192**
Reduced Spaces:	*18*	---	**9%**

Bicycle Parking

Required: Library (1 / 500 m²) — 27 *(Table 111A)*

Provided:

	Exterior	Interior	Totals
Horizontal Spaces	62	---	62
Vertical Spaces	---	21	21
Total Provided:			**83**

Loading Spaces (3.5m x 7.0m)	**Required:**	2 *(Table 113A)*
	Provided:	3

SURVEY INFORMATION:

STRATA PLAN OF SURVEY of

LOTS A, B, 5, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17 AND 18
PART OF LOT 6
IN BLOCK "L":
PART OF WELLINGTON STREET
(CLOSED BY INST. S-LT1743128 AND OC1457912)

REGISTERED PLAN 2
CITY OF OTTAWA

SURVEY PREPARED BY STANTEC GEOMATICS LTD., DATED NOVEMBER 14, 2019

Diamond Schmitt Architects
KWC Architects Inc.
Architects in Joint Venture for the OPL/LAC Joint Facility
384 Adelaide Street West, Suite 100, Toronto, Canada M5V1R7
Tel: 416 862 8800 Fax: 416 862 5508 info@dsai.ca www.dsai.ca

PN TN

OTTAWA PUBLIC LIBRARY - LIBRARY AND ARCHIVES CANADA JOINT FACILITY

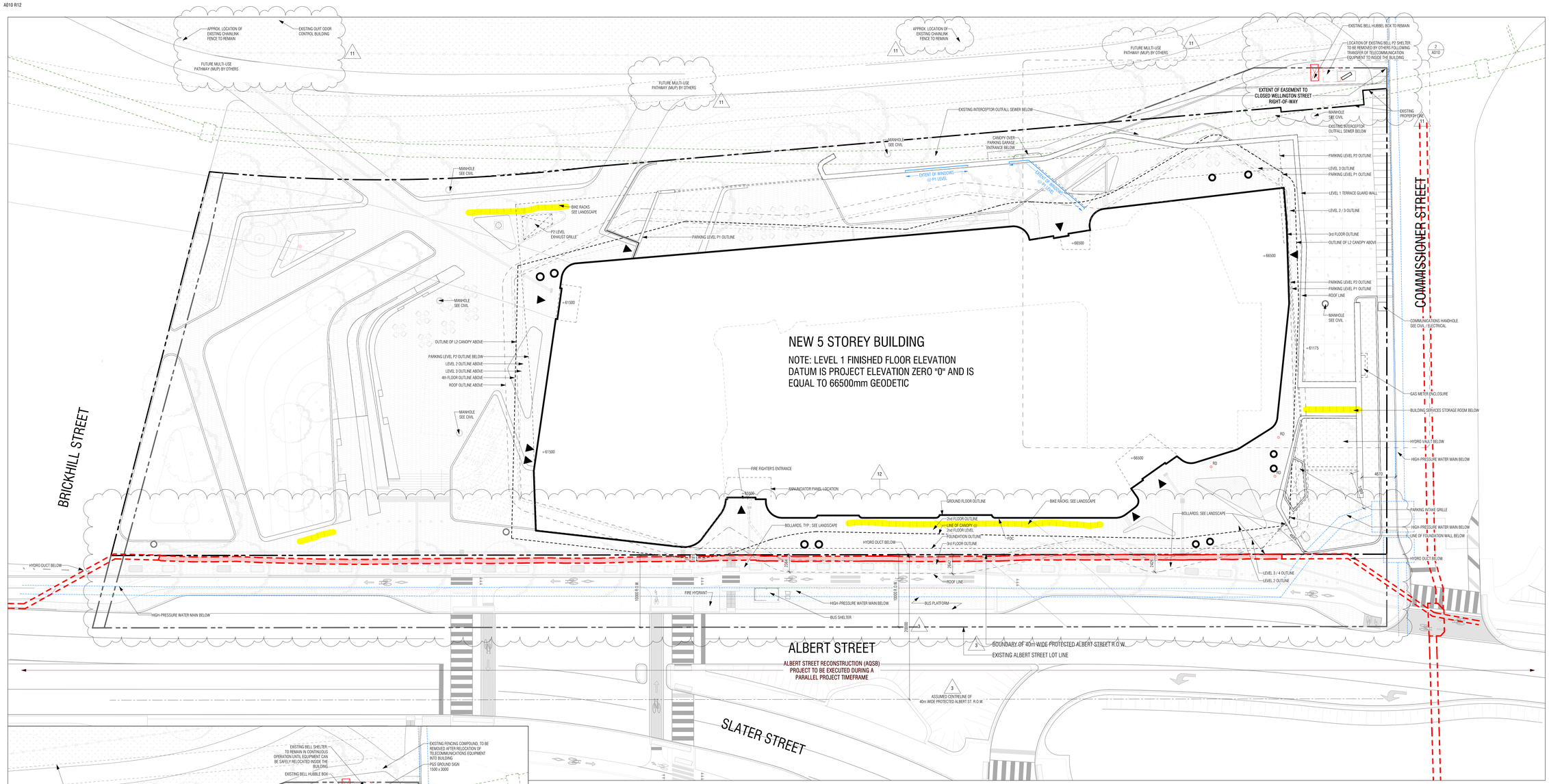
555 Albert St, Ottawa, ON, K1R 7X3

SITE PLAN

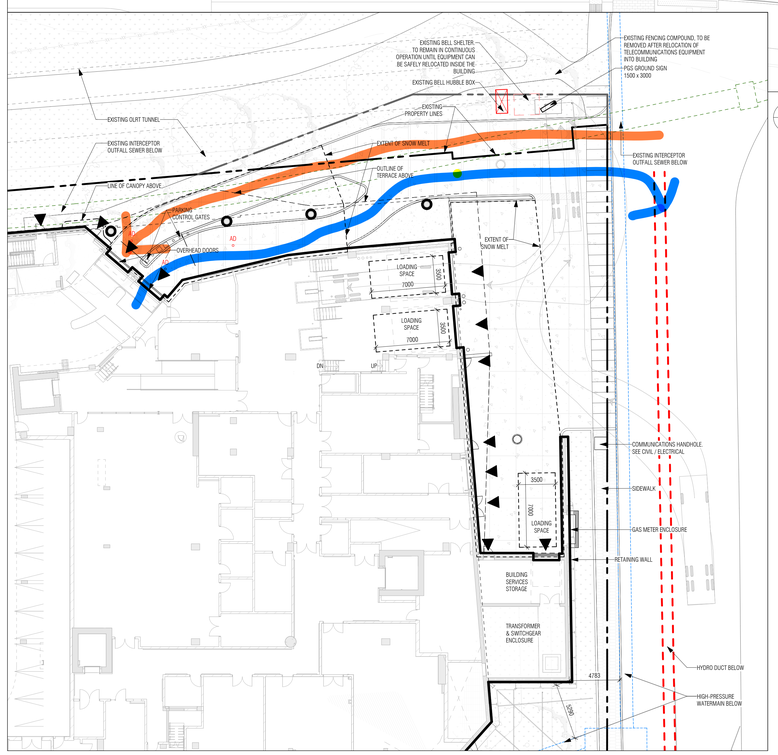
Scale: 1:200
Project No: 1855
Date:

A010 DWG # 18176

D07-12-20-077



1 A010 **SITE PLAN** 1 : 200



2 A010 **SITE PLAN DETAIL - LOADING BAY** 1 : 200

Bicycle Racks

Parking Garage Entrance

Parking Garage Exit

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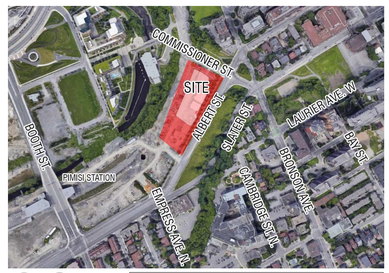

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(CLOSED BY INST. S-LT1743128 AND OC1457912)

REGISTERED PLAN 2
CITY OF OTTAWA

SURVEY PREPARED BY STANTEC GEOMATICS LTD., DATED NOVEMBER 14, 2019

CONTRACTOR MUST CHECK & VERIFY ALL DIMENSIONS ON THE JOB.

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ISSUED

No.	Date	Description
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2	2020-10-06	ISSUED FOR CD 60% (ADDENDUM 1)
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11	2021-06-23	ISSUED FOR ADDENDUM NO. 4
12	2021-08-18	ISSUED FOR ADDENDUM NO. 17

2021-12-02
Annotated for November 03 / 2021 TIA related comment responses

Diamond Schmitt Architects
KWC Architects Inc.
Architects in Joint Venture for the OPL/LAC Joint Facility
384 Adelaide Street West, Suite 100, Toronto, Canada M5V1R7
Tel: 416 862 8800 Fax: 416 862 5508 info@dsai.ca www.dsai.ca

PN TN

OTTAWA PUBLIC LIBRARY - LIBRARY AND ARCHIVES CANADA JOINT FACILITY

555 Albert St, Ottawa, ON, K1R 7X3

SITE PLAN

Scale: 1:200
Project No: 1855
Date:

A010 DWG # 18176

D07-12-20-077

P2 PARKING SCHEDULE	
Description	COUNT
PARKING STALL - STANDARD - 2600 x 5200	129
PARKING STALL - STANDARD EV - 2600 x 5200	3
PARKING STALL - REDUCED - 2400 x 5200	5
PARKING STALL - REDUCED - 2600 x 4600	8
PARKING STALL - ACCESSIBLE TYPE B - 2400 x 5200	4
Grand total	140

NOTE: (ADDENDUM No. 4)

PARKING SPACE NUMBERS REMOVED FROM PLAN; PAINT MARKINGS (OR OTHER) INDICATING INDIVIDUAL PARKING SPACE NUMBERS NOT REQUIRED

ISSUED

No.	Date	Description
0	2020-05-28	ISSUED FOR CD 30%
1	2020-08-29	ISSUED FOR CD 60%
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10	2021-05-11	ISSUED FOR BUILDING PERMIT UPDATE
11	2021-06-23	ISSUED FOR ADDENDUM NO. 4
12	2021-06-30	ISSUED FOR ADDENDUM NO. 6
13	2021-07-07	ISSUED FOR ADDENDUM NO. 8
14	2021-11-22	ISSUED FOR CONSTRUCTION

2021-12-02
Annotated for November 03 / 2021 TIA related comment responses

GENERAL NOTES - PARTITIONS:

1. **GYPSUM BOARD PARTITIONS AND FURRING:**
1.1 EXTEND GYPSUM BOARD PARTITIONS FULL HEIGHT TO U/S OF STRUCTURAL FLOOR SLAB OR ROOF SLAB ABOVE, UNLESS OTHERWISE INDICATED. AT RAISED ACCESS FLOORS, GYPSUM BOARD PARTITIONS EXTEND TO STRUCTURAL SLAB BELOW UNLESS OTHERWISE INDICATED.
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1.3 PROVIDE BACKER PLATES FOR HANDRAIL SUPPORT, BUMPER RAILS, WALL MOUNTED MILLWORK, WASHROOM ACCESSORIES, TACK BOARDS, WRITING SURFACES & AV EQUIPMENT, ETC. REFER TO PLANS AND ELEVATIONS FOR EXTENT AND LOCATIONS.
1.4 AT PARTITIONS TO RECEIVE CERAMIC TILE WALL FINISH PROVIDE TILE BACKER BOARD IN LIEU OF GYPSUM BOARD BEHIND TILES. BACKER BOARD TO BE FIRE RATED TYPE AT FIRE RATED PARTITIONS.
1.5 AT ACOUSTIC PARTITIONS, RECESSED ELECTRICAL BOXES ON OPPOSITE SIDES OF PARTITION TO BE STAGGERED MINIMUM 600mm.
1.6 SEE ROOM FINISH SCHEDULE FOR INTERIOR FINISHES.
1.7 HEIGHT OF FURRING WALL TO BE 150mm ABOVE FINISHED CEILING UNLESS OTHERWISE NOTED. IF THERE IS NO FINISHED CEILING THAT INTERSECTS WITH FURRING, EXTEND FURRING TO U/S OF FLOOR SLAB OR ROOF SLAB ABOVE.
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A: DENOTES PLENUM DIVIDER TO EXTEND BELOW ASSEMBLY FROM U/S OF ACCESS FLOOR TO T/O SLAB BELOW. PARTITION EXTENDS FROM T/O ACCESS FLOOR TO U/S OF FLOOR SLAB OR ROOF SLAB ABOVE. REFER TO 9/A53 & 10/A53.
B: DENOTES PARTITION EXTENDS FROM T/O ACCESS FLOOR TO U/S OF FLOOR OR ROOF SLAB ABOVE.
C: DENOTES PARTITION EXTENDS FROM T/O CONCRETE ON VOID FORM FLOOR TO U/S OF FLOOR SLAB OR ROOF SLAB ABOVE.
D: DENOTES FULL HEIGHT ENGINEERED METAL SUPPORT SYSTEM TO SATISFY GUARD LOADING REQUIREMENTS
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1.10 PROVIDE PLYWOOD FOR ELECTRICAL PANELS MOUNTING AS REQUIRED. REFER TO ELECTRICAL DRAWINGS FOR QUANTITY AND LOCATION.
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2. **CONCRETE MASONRY UNIT WALLS AND PARTITIONS:**
2.1 ALL CONCRETE MASONRY UNIT WALLS AND PARTITIONS TO U/S OF FLOOR OR ROOF SLAB ABOVE, UNLESS NOTED OTHERWISE. AT ACCESS FLOORS, CONCRETE MASONRY UNIT PARTITIONS EXTEND FROM STRUCTURAL SLAB BELOW UNLESS OTHERWISE INDICATED.
2.2 PROVIDE COMPRESSIBLE JOINT FILLER CONTINUOUS AT TOP OF ALL CMU WALLS AND PARTITIONS; SEAL JOINTS WHERE EXPOSED. PROVIDE FIRESTOPPING AND SMOKE SEALS AT PERIMETER JOINTS AND PENETRATIONS IN FIRE RATED PARTITIONS.
2.3 PROVIDE LATERAL BRACING AT TOP OF CMU WALLS AND PARTITIONS. REFER TO STRUCTURAL FOR DETAILS.
2.4 PROVIDE REINFORCEMENT OF CMU WALLS AND PARTITIONS AS REQUIRED BY STRUCTURAL.

3. **FIRE SEPARATIONS:**
3.1 REFER TO FIRE SEPARATION PLANS - FIRE SEPARATION REQUIREMENTS.
3.2 AT ALL FIRE RATED PARTITIONS: INSTALL CONTINUOUS FIRESTOPPING AND SMOKE SEALS AT ALL PERIMETER JOINTS AND PENETRATIONS.
3.3 AT RECESSED PANEL INSTALLATIONS (EG. ELECTRICAL PANELS) WITHIN RATED WALLS PROVIDE CONTINUITY OF THE REQUIRED RATING BEHIND AND AROUND THE PANEL.

GENERAL NOTES - PARKING AREA FINISHES:

1. **ACCENT PAINT COLOURS FOR WAYFINDING:**
1.1 ACCENT PAINT COLOURS TO BE USED ON LEVEL P2 & P1 IN SUPPORT OF WAYFINDING. ELEVATOR LOBBIES AND ALL COLUMNS TO BE PAINTED IN THE ACCENT COLOUR FOR EACH LEVEL INDICATED BELOW:
1.2 COLOURS:
1.2.1 LEVEL P2 = YELLOW
1.2.2 LEVEL P1 = GREEN
1.2.3 FINAL COLOUR CODING WILL BE ADDRESSED WHEN PAINT COLOUR SCHEDULES ARE CONFIRMED.

2. **WALL / CEILING COLOUR:**
2.1 BASES OF ALL WALLS & COLUMNS WITHIN PARKING AREAS ON P2 & P1 LEVELS TO BE PAINTED BLACK, TO 450mm HIGH ABOVE FLOOR.
2.2 ALL WALLS & CEILINGS TO BE PAINTED WHITE, UNLESS NOTED OTHERWISE ABOVE.
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GENERAL NOTES - PLANS:

1. REFER TO BUILDING ELEMENTS SCHEDULE FOR EXTERIOR WALL, PARTITION, ROOF, CEILING AND SOFFIT TYPES.
2. REFER TO MECHANICAL AND ELECTRICAL DRAWINGS FOR ADDITIONAL REQUIREMENTS.
3. AT LOCATIONS WHERE MECH. DUCTS INTERFERE WITH FULL HEIGHT CONSTRUCTION OF INTERIOR PARTITIONS, OFFSET PARTITION ABOVE CEILING AND BRACE AS REQUIRED. MAINTAIN FIRE SEPARATION/SOUND RATING OF PARTITION. OFFSETTING OF PARTITIONS WILL ONLY BE PERMITTED WHERE DUCTWORK CANNOT BE POSITIONED.
4. ALL DIMENSIONS ARE TAKEN TO FACE OF MASONRY OR CONCRETE AT MASONRY AND CONCRETE WALLS AND PARTITIONS; AT STEEL STUD PARTITIONS, DIMENSIONS ARE TAKEN TO FACE OF GYPSUM BOARD, UNLESS OTHERWISE NOTED.
5. INCREASE THICKNESS OF WALLS OR FURR OUT WALL THICKNESS AS REQUIRED TO ACCOMODATE MECHANICAL AND ELECTRICAL PANELS AND SERVICES. MAINTAIN FIRE SEPARATION AROUND BACK OF PANELS WHERE APPLICABLE.
6. FOR DIMENSIONS OF CONCRETE REFER TO SLAB EDGE DRAWINGS.

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OTTAWA PUBLIC LIBRARY - LIBRARY AND ARCHIVES CANADA JOINT FACILITY

555 Albert St, Ottawa, ON, K1R 7X3

FLOOR PLAN - LEVEL P2

Scale: 1:125
Project No: 1855
Date:

A100 DWG # 18176

D07-12-20-077

P1 PARKING SCHEDULE	
Description	COUNT
PARKING STALL - ACCESSIBLE TYPE A - 3400 x 5200	1
PARKING STALL - STANDARD - 2600 x 5200	40
PARKING STALL - STANDARD EV - 2600 x 5200	2
PARKING STALL - REDUCED - 2400 x 5200	1
PARKING STALL - REDUCED - 2600 x 4600	4
PARKING STALL - ACCESSIBLE TYPE A - 3400 x 5200	2
PARKING STALL - ACCESSIBLE TYPE B - 2400 x 5200	3
Grand total	53

NOTE (ADDENDUM No. 4)

PARKING SPACE NUMBERS REMOVED FROM PLAN; PAINT MARKINGS (OR OTHER) INDICATING INDIVIDUAL PARKING SPACE NUMBERS NOT REQUIRED

ISSUED

No.	Date	Description
0	2020-05-28	ISSUED FOR CD 30%
1	2020-08-29	ISSUED FOR CD 60%
2	2020-11-16	RE-ISSUED FOR SITE PLAN CONTROL
3	2020-11-23	ISSUED FOR SPC RESPONSE
4	2021-01-18	ISSUED FOR CD 90%
5	2021-02-26	ISSUED FOR COORDINATION
6	2021-03-19	ISSUED FOR REVIEW
7	2021-03-23	ISSUED FOR BUILDING PERMIT
8	2021-04-09	ISSUED FOR CONSULTANT COORDINATION
9	2021-05-11	ISSUED FOR TENDER
10	2021-05-11	ISSUED FOR BUILDING PERMIT UPDATE
11	2021-06-16	ISSUED FOR ADDENDUM NO. 3
12	2021-06-23	ISSUED FOR ADDENDUM NO. 4
13	2021-06-30	ISSUED FOR ADDENDUM NO. 6
14	2021-07-07	ISSUED FOR ADDENDUM NO. 8
15	2021-08-04	ISSUED FOR ADDENDUM NO. 15
16	2021-09-01	ISSUED FOR ADDENDUM NO. 20
17	2021-11-22	ISSUED FOR CONSTRUCTION

2021-12-02
Annotated for November 03 / 2021 TIA related comment responses

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OTTAWA PUBLIC LIBRARY - LIBRARY AND ARCHIVES CANADA JOINT FACILITY

555 Albert St, Ottawa, ON, K1R 7X3

FLOOR PLAN - LEVEL P1

Scale: 1:125
Project No: 1855
Date:

A101 DWG # 18176

D07-12-20-077

Bicycle Racks

Parking Garage Entrance

Parking Garage Exit

APPENDIX

D TRANS O-D SURVEY

Ottawa Inner Area

Demographic Characteristics

Population	86,790	Actively Travelled	72,340
Employed Population	45,370	Number of Vehicles	32,580
Households	45,430	Area (km^2)	16.4

Occupation

Status (age 5+)	Male	Female	Total
Full Time Employed	21,170	18,680	39,850
Part Time Employed	2,550	2,960	5,520
Student	8,310	9,560	17,870
Retiree	5,810	7,960	13,770
Unemployed	1,430	1,280	2,710
Homemaker	30	1,810	1,850
Other	1,030	1,030	2,050
Total:	40,340	43,290	83,630

Traveller Characteristics	Male	Female	Total
Transit Pass Holders	9,170	11,080	20,240
Licensed Drivers	28,610	29,590	58,200
Telecommuters	460	300	760
Trips made by residents	119,140	130,660	249,800

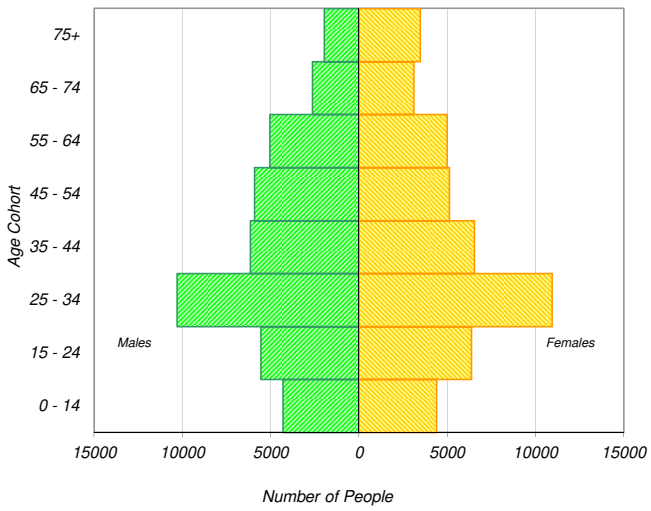
Selected Indicators	
Daily Trips per Person (age 5+)	2.99
Vehicles per Person	0.38
Number of Persons per Household	1.91
Daily Trips per Household	5.50
Vehicles per Household	0.72
Workers per Household	1.00
Population Density (Pop/km2)	5290

Household Size		
1 person	22,750	50%
2 persons	14,360	32%
3 persons	4,230	9%
4 persons	2,600	6%
5+ persons	1,480	3%
Total:	45,430	100%

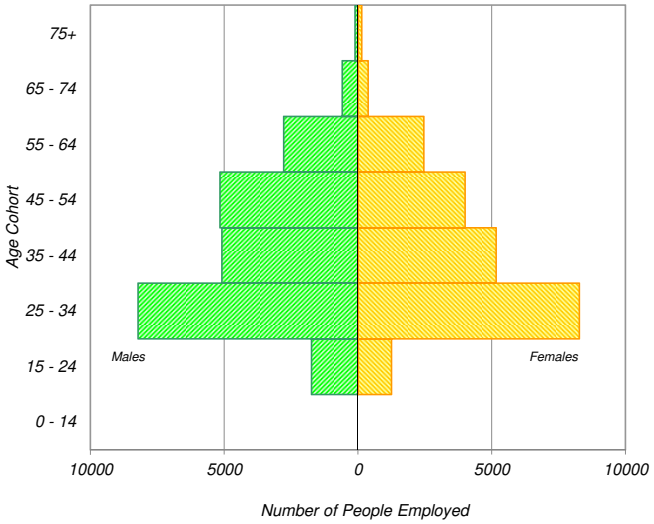
Households by Vehicle Availability		
0 vehicles	18,620	41%
1 vehicle	21,890	48%
2 vehicles	4,220	9%
3 vehicles	590	1%
4+ vehicles	120	0%
Total:	45,430	100%

Households by Dwelling Type		
Single-detached	6,530	14%
Semi-detached	2,860	6%
Townhouse	3,320	7%
Apartment/Condo	32,720	72%
Total:	45,430	100%

Population



Employed Population

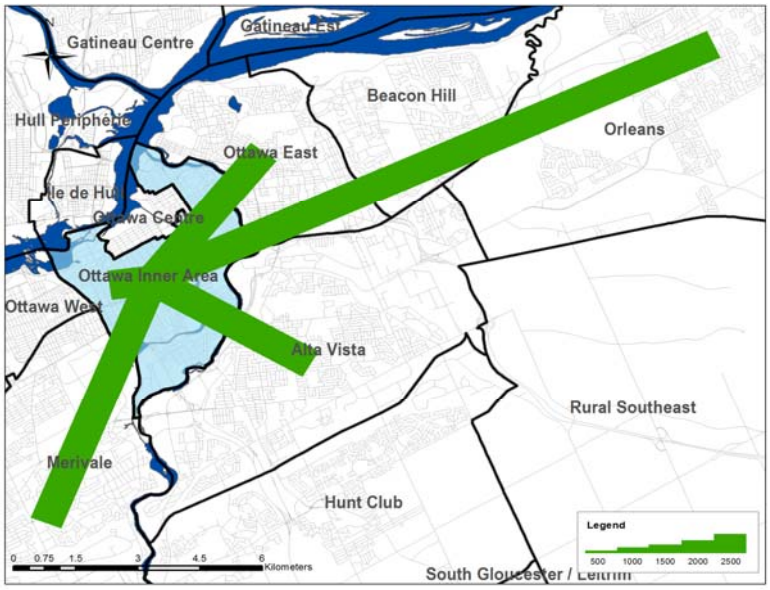


* In 2005 data was only collected for household members aged 11+ therefore these results cannot be compared to the 2011 data.

Travel Patterns

Top Five Origins of Trips to Ottawa Inner Area

AM Peak Period



Summary of Trips to and from Ottawa Inner Area

AM Peak Period (6:30 - 8:59) Districts	Destinations of Trips From District	% Total	Origins of Trips To District	% Total
Ottawa Centre	9,420	21%	1,160	2%
Ottawa Inner Area	17,180	37%	17,180	28%
Ottawa East	1,960	4%	3,670	6%
Beacon Hill	1,450	3%	1,380	2%
Alta Vista	4,270	9%	4,970	8%
Hunt Club	830	2%	3,060	5%
Merivale	3,260	7%	4,710	8%
Ottawa West	1,750	4%	3,080	5%
Bayshore / Cedarview	830	2%	2,860	5%
Orléans	630	1%	4,800	8%
Rural East	70	0%	250	0%
Rural Southeast	60	0%	830	1%
South Gloucester / Leitrim	250	1%	530	1%
South Nepean	340	1%	2,270	4%
Rural Southwest	150	0%	580	1%
Kanata / Stittsvile	970	2%	3,350	5%
Rural West	20	0%	380	1%
Île de Hull	1,330	3%	440	1%
Hull Périphérie	670	1%	1,350	2%
Plateau	0	0%	1,040	2%
Aylmer	200	0%	1,050	2%
Rural Northwest	40	0%	240	0%
Pointe Gatineau	130	0%	1,470	2%
Gatineau Est	110	0%	700	1%
Rural Northeast	0	0%	500	1%
Buckingham / Masson-Angers	10	0%	240	0%
Ontario Sub-Total:	43,440	95%	55,060	89%
Québec Sub-Total:	2,490	5%	7,030	11%
Total:	45,930	100%	62,090	100%

Trips by Trip Purpose

24 Hours	From District		To District		Within District	
Work or related	33,110	19%	37,330	21%	11,400	11%
School	4,810	3%	34,570	20%	10,560	10%
Shopping	19,380	11%	7,740	4%	11,860	11%
Leisure	15,940	9%	18,120	10%	16,560	15%
Medical	3,560	2%	4,220	2%	2,120	2%
Pick-up / drive passenger	7,310	4%	10,650	6%	5,660	5%
Return Home	84,260	48%	56,020	32%	44,570	41%
Other	6,860	4%	6,870	4%	5,630	5%
Total:	175,230	100%	175,520	100%	108,360	100%

AM Peak (06:30 - 08:59)	From District		To District		Within District	
Work or related	20,960	73%	23,220	52%	5,450	32%
School	3,200	11%	16,280	36%	6,270	37%
Shopping	440	2%	240	1%	290	2%
Leisure	790	3%	750	2%	940	5%
Medical	460	2%	500	1%	240	1%
Pick-up / drive passenger	1,120	4%	2,330	5%	1,490	9%
Return Home	1,180	4%	900	2%	1,170	7%
Other	590	2%	730	2%	1,320	8%
Total:	28,740	100%	44,950	100%	17,170	100%

PM Peak (15:30 - 17:59)	From District		To District		Within District	
Work or related	1,250	3%	880	2%	510	2%
School	90	0%	2,360	7%	770	3%
Shopping	4,250	9%	1,950	5%	3,320	13%
Leisure	3,140	7%	4,730	13%	3,240	13%
Medical	540	1%	490	1%	480	2%
Pick-up / drive passenger	2,490	5%	2,410	7%	1,560	6%
Return Home	32,930	71%	21,350	59%	14,280	56%
Other	1,690	4%	1,770	5%	1,350	5%
Total:	46,380	100%	35,940	100%	25,510	100%

Peak Period (%)	Total:	% of 24 Hours	Within District (%)
24 Hours	459,110		24%
AM Peak Period	90,860	20%	19%
PM Peak Period	107,830	23%	24%

Trips by Primary Travel Mode

24 Hours	From District		To District		Within District	
Auto Driver	76,930	44%	76,620	44%	23,390	22%
Auto Passenger	21,230	12%	21,160	12%	8,750	8%
Transit	49,630	28%	49,160	28%	10,530	10%
Bicycle	6,860	4%	6,780	4%	7,380	7%
Walk	16,280	9%	17,130	10%	55,680	51%
Other	4,280	2%	4,670	3%	2,640	2%
Total:	175,210	100%	175,520	100%	108,370	100%

AM Peak (06:30 - 08:59)	From District		To District		Within District	
Auto Driver	11,370	40%	18,290	41%	3,490	20%
Auto Passenger	2,040	7%	4,080	9%	1,520	9%
Transit	7,060	25%	18,340	41%	2,220	13%
Bicycle	1,780	6%	1,990	4%	1,400	8%
Walk	5,410	19%	1,160	3%	7,530	44%
Other	1,070	4%	1,060	2%	1,020	6%
Total:	28,730	100%	44,920	100%	17,180	100%

PM Peak (15:30 - 17:59)	From District		To District		Within District	
Auto Driver	20,690	45%	15,420	43%	5,250	21%
Auto Passenger	5,070	11%	3,950	11%	2,110	8%
Transit	15,190	33%	7,820	22%	2,430	10%
Bicycle	2,440	5%	2,130	6%	1,750	7%
Walk	2,100	5%	5,840	16%	13,460	53%
Other	900	2%	770	2%	480	2%
Total:	46,390	100%	35,930	100%	25,480	100%

Avg Vehicle Occupancy	From District	To District	Within District
24 Hours	1.28	1.28	1.37
AM Peak Period	1.18	1.22	1.44
PM Peak Period	1.25	1.26	1.40

Transit Modal Split	From District	To District	Within District
24 Hours	34%	33%	25%
AM Peak Period	34%	45%	31%
PM Peak Period	37%	29%	25%

APPENDIX

E COLLISION HISTORY

Accident Date	Accident Time	Location	Vehicle 1 Type	Vehicle 2 Type	Environment Condition 1	Light	Classification Of Accident	Initial Impact Type	X-Coordinate	Y-Coordinate	Vehicle 1 Initial Direction	Vehicle 1 Manoeuver	Apparent Driver 1 Action	Vehicle 2 Initial Direction	Vehicle 2 Manoeuver	Apparent Driver 2 Action	No Of Pedestrians
16/05/2014	10:13	ALBERT ST @ COMMISSIONER ST (00021	01 - Automobile, station wagon	01 - Automobile, station wagon	02 - Rain	01 - Daylight	03 - P.D. only	02 - Angle	366711.3276	5030971.57	02 - South	05 - Turning right	00 - Unknown	04 - West	01 - Going ahead	08 - Failed to yield right-of-way	0
29/10/2014	11:35	ALBERT ST @ COMMISSIONER ST (00021	01 - Automobile, station wagon	01 - Automobile, station wagon	01 - Clear	01 - Daylight	03 - P.D. only	02 - Angle	366714.0702	5030971.84	02 - South	01 - Going ahead	08 - Failed to yield right-of-way	04 - West	01 - Going ahead	01 - Driving properly	0
07/11/2014	7:59	ALBERT ST @ COMMISSIONER ST (00021	14 - Municipal transit bus	01 - Automobile, station wagon	01 - Clear	01 - Daylight	03 - P.D. only	04 - Sideswipe	366713.7011	5030971.405	04 - West	07 - Changing lanes	99 - Other	04 - West	04 - Turning left	01 - Driving properly	0
08/12/2015	15:16	ALBERT ST @ COMMISSIONER ST (00021	01 - Automobile, station wagon	05 - Pick-up truck	02 - Rain	01 - Daylight	03 - P.D. only	02 - Angle	366713.6973	5030970.126	02 - South	01 - Going ahead	08 - Failed to yield right-of-way	04 - West	01 - Going ahead	01 - Driving properly	0
05/10/2016	7:47	ALBERT ST @ COMMISSIONER ST (00021	01 - Automobile, station wagon	36 - Bicycle	01 - Clear	01 - Daylight	02 - Non-fatal injury	05 - Turning movement	366713.9168	5030971.35	04 - West	05 - Turning right	06 - Improper turn	04 - West	01 - Going ahead	01 - Driving properly	0
30/03/2017	9:18	ALBERT ST @ COMMISSIONER ST (00021	14 - Municipal transit bus	01 - Automobile, station wagon	01 - Clear	01 - Daylight	03 - P.D. only	02 - Angle	366714.0318	5030972.239	04 - West	04 - Turning left	06 - Improper turn	02 - South	10 - Stopped	01 - Driving properly	0
17/05/2017	15:30	ALBERT ST @ COMMISSIONER ST (00021	36 - Bicycle	16 - Bus (other)	01 - Clear	01 - Daylight	02 - Non-fatal injury	05 - Turning movement	366714.0318	5030972.908	04 - West	01 - Going ahead	99 - Other	04 - West	05 - Turning right	01 - Driving properly	0
12/10/2017	11:45	ALBERT ST @ COMMISSIONER ST (00021	00 - Unknown	14 - Municipal transit bus	01 - Clear	01 - Daylight	03 - P.D. only	04 - Sideswipe	366714.7006	5030970.901	02 - South	00 - Unknown	00 - Unknown	02 - South	01 - Going ahead	01 - Driving properly	0
23/12/2017	12:11	ALBERT ST @ COMMISSIONER ST (00021	04 - Passenger van	01 - Automobile, station wagon	03 - Snow	01 - Daylight	03 - P.D. only	04 - Sideswipe	366714.6441	5030972.753	02 - South	07 - Changing lanes	12 - Improper lane change	02 - South	01 - Going ahead	01 - Driving properly	0

Transportation Services - Traffic Services

Collision Details Report - Public Version

From: January 1, 2014 **To:** December 31, 2018

Location: 105 S OF COMMISSIONER ST @ ALBERT ST

Traffic Control: Traffic signal **Total Collisions:** 1

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuver	Vehicle type	First Event	No. Ped
2016-Aug-04, Thu,17:03	Clear	Sideswipe	P.D. only	Dry	West	Going ahead	Pick-up truck	Other motor vehicle	0
					West	Stopped	Municipal transit bus	Other motor vehicle	

Location: ALBERT ST @ BRICKHILL ST

Traffic Control: Stop sign **Total Collisions:** 3

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuver	Vehicle type	First Event	No. Ped
2016-Jul-22, Fri,06:01	Clear	Angle	Non-fatal injury	Dry	East	Going ahead	Bicycle	Other motor vehicle	0
					South	Stopped	Pick-up truck	Cyclist	
2017-Feb-21, Tue,15:02	Clear	Sideswipe	Non-reportable	Dry	West	Going ahead	Pick-up truck	Other motor vehicle	0
					West	Going ahead	Municipal transit bus	Other motor vehicle	
2017-Sep-08, Fri,15:31	Clear	Angle	P.D. only	Dry	South	Going ahead	Automobile, station wagon	Other motor vehicle	0
					West	Going ahead	Pick-up truck	Other motor vehicle	

Location: ALBERT ST @ COMMISSIONER ST

Traffic Control: Stop sign **Total Collisions:** 9

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuver	Vehicle type	First Event	No. Ped
2014-May-16, Fri,10:13	Rain	Angle	P.D. only	Wet	South	Turning right	Automobile, station wagon	Other motor vehicle	0
					West	Going ahead	Automobile, station wagon	Other motor vehicle	
2014-Oct-29, Wed,11:35	Clear	Angle	P.D. only	Dry	South	Going ahead	Automobile, station wagon	Other motor vehicle	0
					West	Going ahead	Automobile, station wagon	Other motor vehicle	
2014-Nov-07, Fri,07:59	Clear	Sideswipe	P.D. only	Dry	West	Changing lanes	Municipal transit bus	Other motor vehicle	0
					West	Turning left	Automobile, station wagon	Other motor vehicle	
2015-Dec-08, Tue,15:16	Rain	Angle	P.D. only	Wet	South	Going ahead	Automobile, station wagon	Other motor vehicle	0
					West	Going ahead	Pick-up truck	Other motor vehicle	

Transportation Services - Traffic Services

Collision Details Report - Public Version

From: January 1, 2014 **To:** December 31, 2018

Location: ALBERT ST @ COMMISSIONER ST

Traffic Control: Stop sign **Total Collisions:** 9

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuver	Vehicle type	First Event	No. Ped
2016-Oct-05, Wed,07:47	Clear	Turning movement	Non-fatal injury	Dry	West	Turning right	Automobile, station wagon	Cyclist	0
					West	Going ahead	Bicycle	Other motor vehicle	
2017-Mar-30, Thu,09:18	Clear	Angle	P.D. only	Dry	West	Turning left	Municipal transit bus	Other motor vehicle	0
					South	Stopped	Automobile, station wagon	Other motor vehicle	
2017-May-17, Wed,15:30	Clear	Turning movement	Non-fatal injury	Dry	West	Going ahead	Bicycle	Other motor vehicle	0
					West	Turning right	Bus (other)	Cyclist	
2017-Oct-12, Thu,11:45	Clear	Sideswipe	P.D. only	Dry	South	Unknown	Unknown	Other motor vehicle	0
					South	Going ahead	Municipal transit bus	Other motor vehicle	
2017-Dec-23, Sat,12:11	Snow	Sideswipe	P.D. only	Loose snow	South	Changing lanes	Passenger van	Other motor vehicle	0
					South	Going ahead	Automobile, station wagon	Other motor vehicle	

Location: ALBERT ST @ EMPRESS AVE

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-Feb-18, Tue,08:17	Snow	SMV other	P.D. only	Loose snow	South	Turning left	Municipal transit bus	Pole (utility, power)	0
2014-Jun-07, Sat,16:51	Clear	Rear end	P.D. only	Dry	West	Going ahead	Passenger van	Other motor vehicle	0
					West	Slowing or stopping	Automobile, station wagon	Other motor vehicle	
2014-Dec-15, Mon,09:59	Clear	Angle	P.D. only	Wet	East	Going ahead	Automobile, station wagon	Other motor vehicle	0
					North	Turning left	Automobile, station wagon	Other motor vehicle	
2015-Jan-05, Mon,08:33	Strong wind	Rear end	Non-fatal injury	Ice	East	Going ahead	Pick-up truck	Other motor vehicle	0
					East	Stopped	Pick-up truck	Other motor vehicle	
2015-Jan-16, Fri,14:29	Clear	Other	P.D. only	Dry	South	Reversing	Pick-up truck	Other motor vehicle	0
					West	Going ahead	Municipal transit bus	Other motor vehicle	
2015-Feb-20, Fri,06:16	Clear	SMV other	P.D. only	Wet	West	Unknown	Unknown	Skidding/sliding	0

Transportation Services - Traffic Services

Collision Details Report - Public Version

From: January 1, 2014 **To:** December 31, 2018

Location: ALBERT ST @ EMPRESS AVE

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
2016-Jun-14, Tue,18:41	Clear	Rear end	P.D. only	Dry	West	Slowing or stopping	Municipal transit bus	Other motor vehicle	0
					West	Stopped	Municipal transit bus	Other motor vehicle	
2017-Mar-01, Wed,12:00	Rain	Rear end	P.D. only	Wet	West	Going ahead	Automobile, station wagon	Other motor vehicle	0
					West	Going ahead	Automobile, station wagon	Other motor vehicle	
					West	Stopped	Automobile, station wagon	Other motor vehicle	
2017-Mar-13, Mon,09:31	Clear	Sideswipe	P.D. only	Dry	East	Changing lanes	Truck and trailer	Other motor vehicle	0
					East	Going ahead	Automobile, station wagon	Other motor vehicle	
2017-Sep-19, Tue,15:32	Clear	Sideswipe	P.D. only	Dry	West	Going ahead	Truck - open	Other motor vehicle	0
					West	Going ahead	Truck - tank	Other motor vehicle	
2017-Nov-08, Wed,12:58	Clear	Sideswipe	P.D. only	Dry	West	Changing lanes	Pick-up truck	Other motor vehicle	0
					West	Going ahead	Pick-up truck	Other motor vehicle	
2018-May-15, Tue,18:30	Clear	Sideswipe	P.D. only	Dry	West	Unknown	Automobile, station wagon	Other motor vehicle	0
					West	Unknown	Truck - closed	Other motor vehicle	

Location: ALBERT ST btwn BRICKHILL ST & COMMISSIONER ST

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-Jan-20, Mon,17:28	Clear	Rear end	P.D. only	Dry	West	Changing lanes	Intercity bus	Other motor vehicle	0
					West	Stopped	Truck - closed	Other motor vehicle	

Location: ALBERT ST btwn SLATER ST & BRICKHILL ST

Traffic Control: No control **Total Collisions:** 2

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuver	Vehicle type	First Event	No. Ped
2016-Oct-29, Sat,12:26	Rain	Sideswipe	P.D. only	Wet	East	Changing lanes	Pick-up truck	Other motor vehicle	0
					East	Going ahead	Automobile, station wagon	Other motor vehicle	

Transportation Services - Traffic Services

Collision Details Report - Public Version

From: January 1, 2014 **To:** December 31, 2018

Location: ALBERT ST btwn SLATER ST & BRICKHILL ST

Traffic Control: No control **Total Collisions:** 2

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuver	Vehicle type	First Event	No. Ped
2017-Apr-07, Fri,09:46	Clear	Sideswipe	P.D. only	Dry	West	Unknown	Unknown	Other motor vehicle	0
					West	Going ahead	Municipal transit bus	Other motor vehicle	

Location: WELLINGTON ST btwn COMMISSIONER ST & TO BE DETERMINED

Traffic Control: No control **Total Collisions:** 2

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuver	Vehicle type	First Event	No. Ped
2015-Sep-24, Thu,10:05	Clear	Sideswipe	P.D. only	Dry	West	Slowing or stopping	Automobile, station wagon	Other motor vehicle	0
					West	Changing lanes	Automobile, station wagon	Other motor vehicle	
2016-Jun-13, Mon,11:45	Clear	SMV unattended vehicle	P.D. only	Dry	Unknown	Unknown	Unknown	Unattended vehicle	0

APPENDIX

F

TRIP GENERATION SUPPORTING DOCUMENTATION

PARKING REQUIREMENT ASSESSMENT

NEW CENTRAL LIBRARY

FEBRUARY 24, 2017
VERSION 5.0

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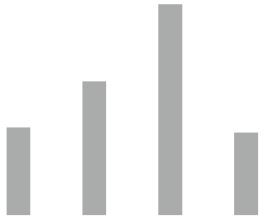
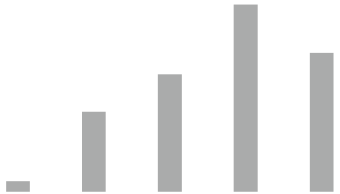
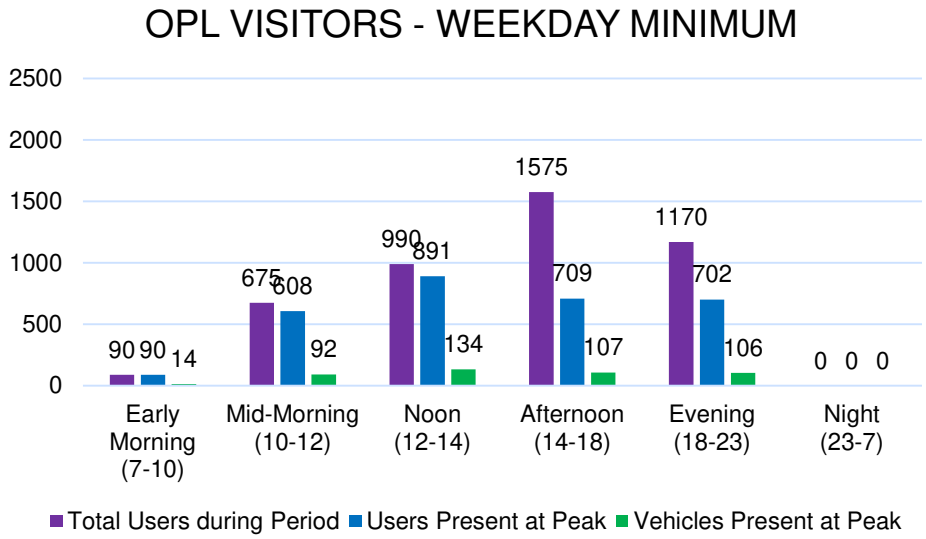
PROJECT NO. 17M-00028-00

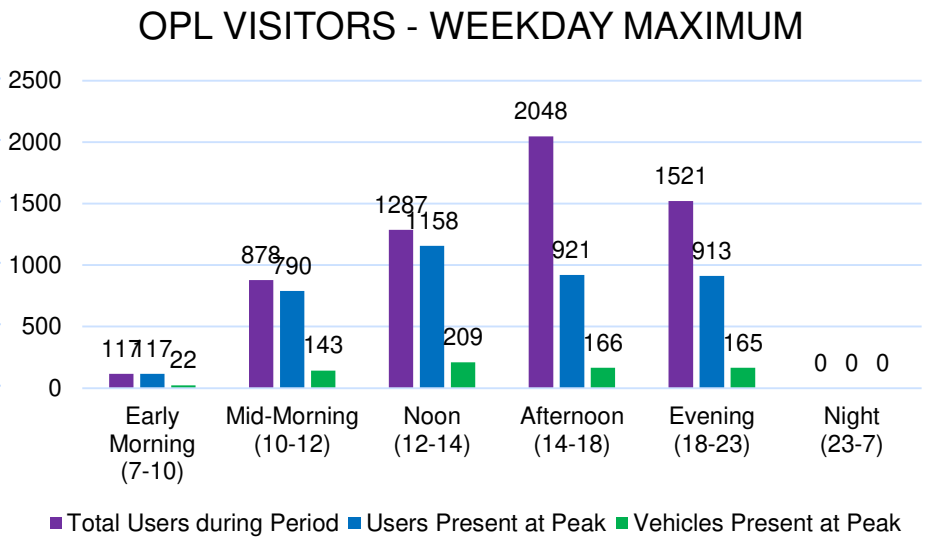
PARKING USERS – REGULAR OPL VISITORS

→ SENSITIVE TO MODAL SHARE AND DISTRIBUTION

PARAMETERS INFLUENCING DEMAND	MIN.	MAX.
NUMBER OF VISITORS/USERS PER DAY	4,500	5,850
HOURLY DISTRIBUTION		
AVERAGE LENGTH OF STAY (HR)	1.5	1.5
DRIVER MODAL SHARE (PERCENT OF CAR USERS)	15%	18%

OPL VISITORS – MINIMUM VS. MAXIMUM PARKING DEMAND





TOTAL USERS: 4,500
DRIVER MODAL SHARE: 15%
SIMILAR DISTRIBUTION OF VISITORS FOR AFTERNOON AND EVENING.

TOTAL USERS: 5,850
DRIVER MODAL SHARE: 18%
SIMILAR DISTRIBUTION OF VISITORS FOR AFTERNOON AND EVENING.

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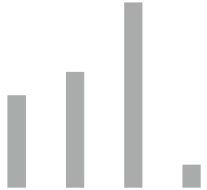
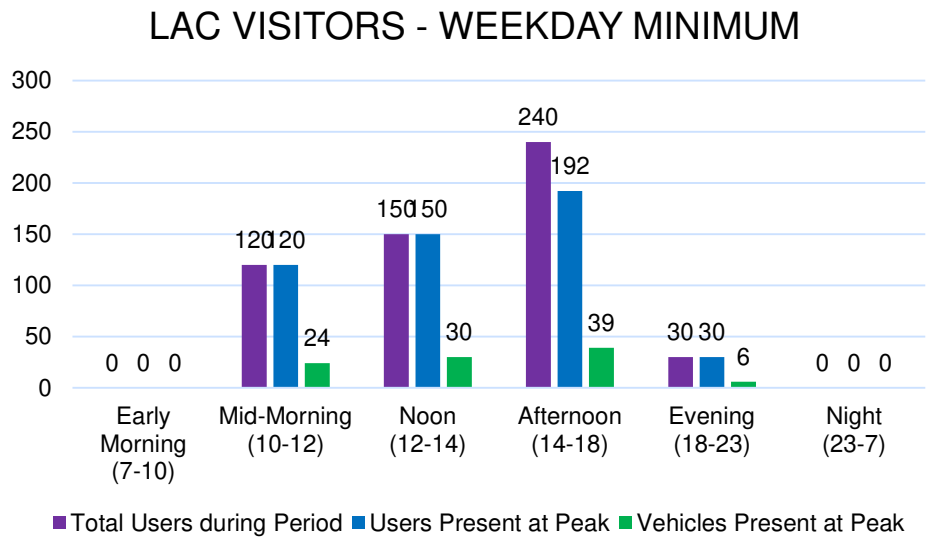
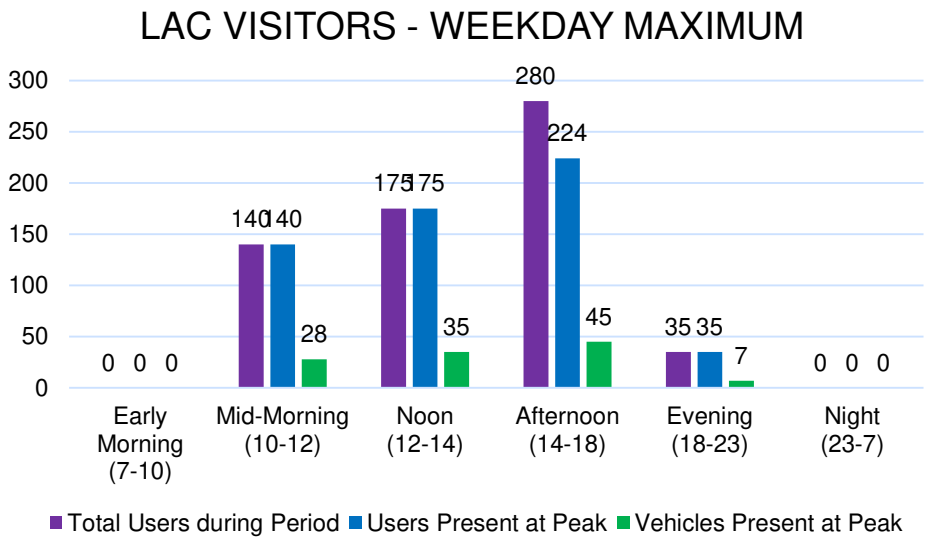
PARKING USERS – LAC VISITORS

→ SENSITIVE TO MODAL SHARE AND DISTRIBUTION

PARAMETERS INFLUENCING DEMAND	MIN.	MAX.
NUMBER OF VISITORS/USERS PER DAY	300	350
HOURLY DISTRIBUTION		
AVERAGE LENGTH OF STAY (HR)	4	4
DRIVER MODAL SHARE (PERCENT OF CAR USERS)	20%	20%

LAC VISITORS – MINIMUM VS. MAXIMUM PARKING DEMAND





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PARKING USERS – OPL EMPLOYEE – BRANCH SERVICES

→ SENSITIVE TO MODAL SHARE AND DISTRIBUTION

PARAMETERS INFLUENCING DEMAND	MIN.	MAX.
NUMBER OF VISITORS/USERS PER DAY	49	49
HOURLY DISTRIBUTION		
AVERAGE LENGTH OF STAY (HR)	8	8
DRIVER MODAL SHARE (PERCENT OF CAR USERS)	23%	38%

PARKING USERS – OPL EMPLOYEE – CORPORATE

→ SENSITIVE TO MODAL SHARE AND DISTRIBUTION

PARAMETERS INFLUENCING DEMAND	MIN.	MAX.
NUMBER OF VISITORS/USERS PER DAY	54	54
HOURLY DISTRIBUTION		
AVERAGE LENGTH OF STAY (HR)	8	8
DRIVER MODAL SHARE (PERCENT OF CAR USERS)	23%	38%

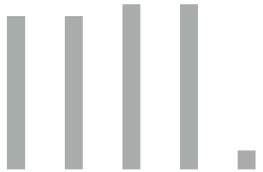
PARKING USERS – LAC EMPLOYEE

→ SENSITIVE TO MODAL SHARE AND DISTRIBUTION

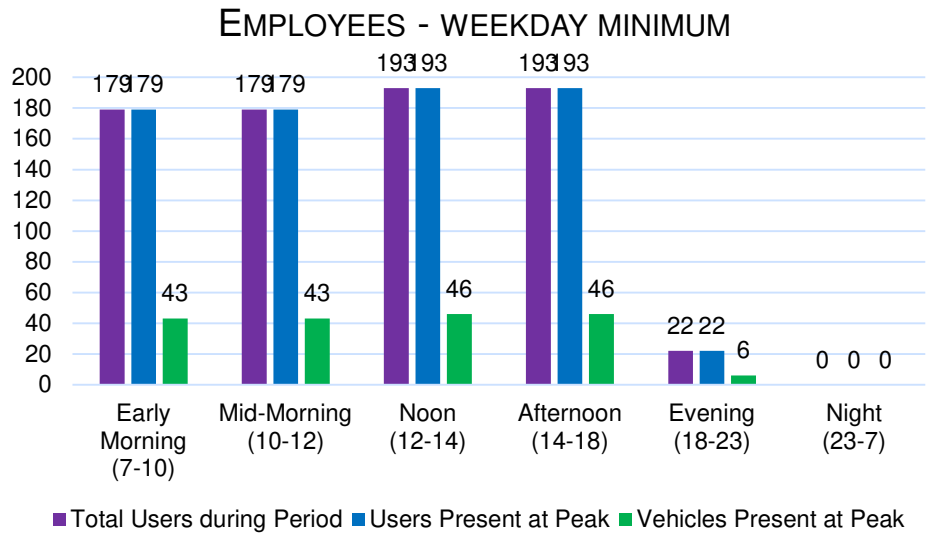
PARAMETERS INFLUENCING DEMAND	MIN.	MAX.
NUMBER OF VISITORS/USERS PER DAY	90	90
HOURLY DISTRIBUTION		
AVERAGE LENGTH OF STAY (HR)	8	8
DRIVER MODAL SHARE (PERCENT OF CAR USERS)	23%	38%

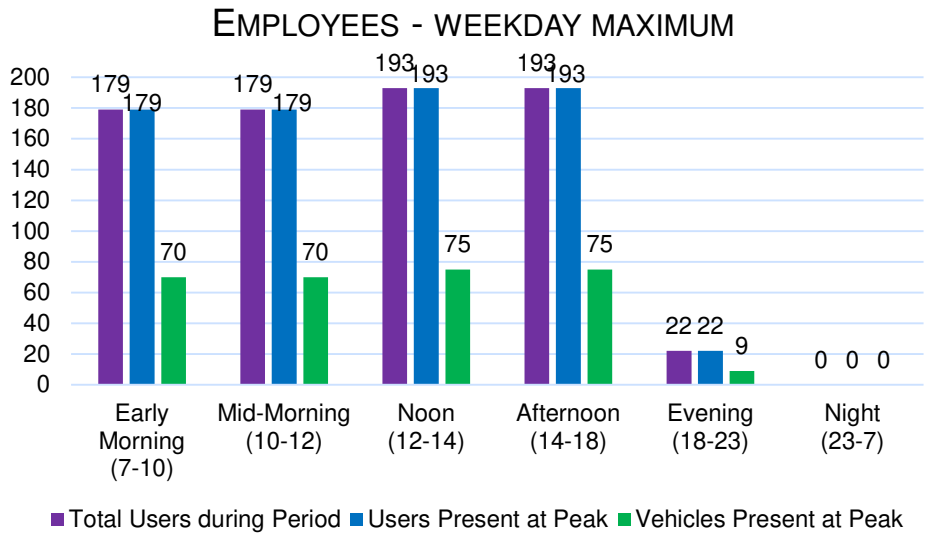
PARKING USERS – ALL EMPLOYEES

→ SENSITIVE TO MODAL SHARE AND DISTRIBUTION

PARAMETERS INFLUENCING DEMAND	MIN.	MAX.
NUMBER OF VISITORS/USERS PER DAY	179	179
HOURLY DISTRIBUTION		
AVERAGE LENGTH OF STAY (HR)	8	8
DRIVER MODAL SHARE (PERCENT OF CAR USERS)	23%	38%

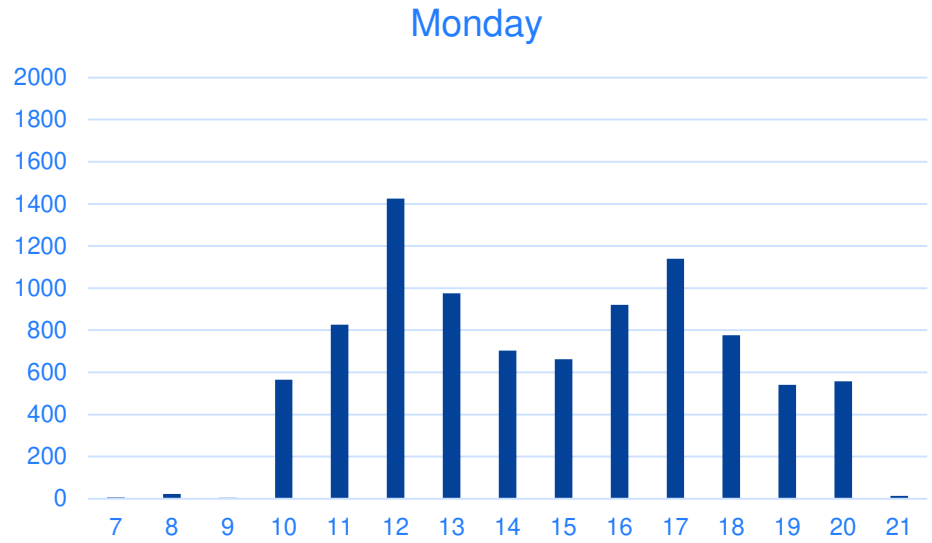
ALL EMPLOYEES – MINIMUM VS. MAXIMUM WEEKDAY PARKING DEMAND

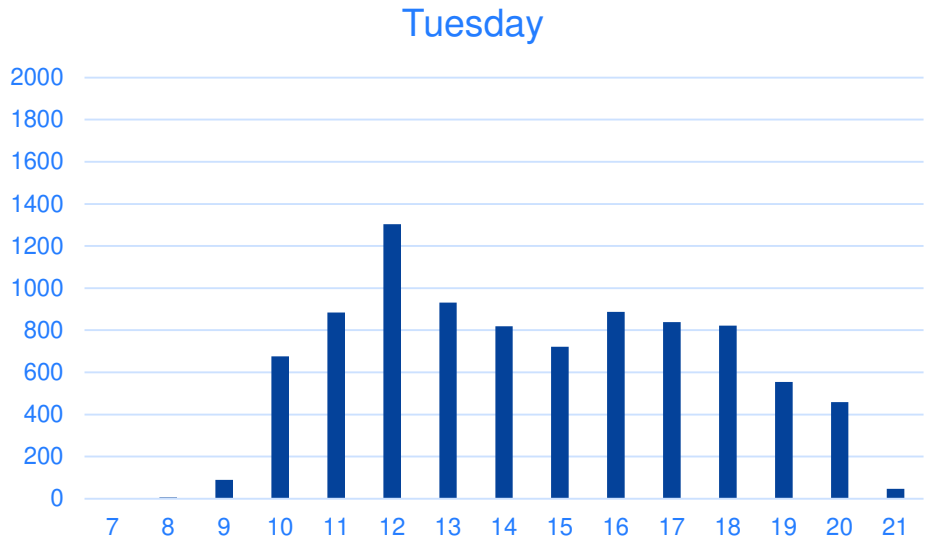




EXISTING CONDITIONS – REGULAR OPL VISITOR

UNIQUE USER BARCODE BY DAY OF WEEKDAY





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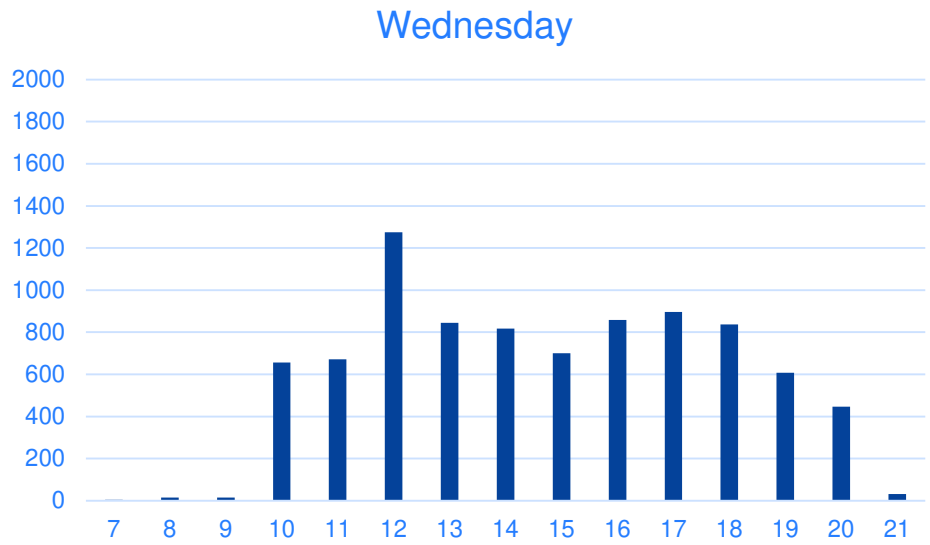
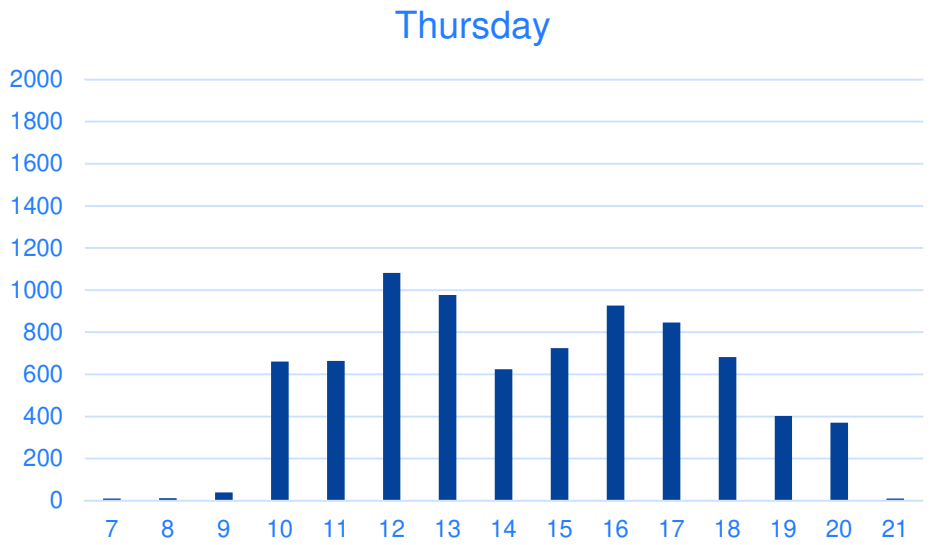
PARKING USERS – REGULAR OPL VISITOR

UNIQUE USER BARCODE BY DAY OF WEEKDAY





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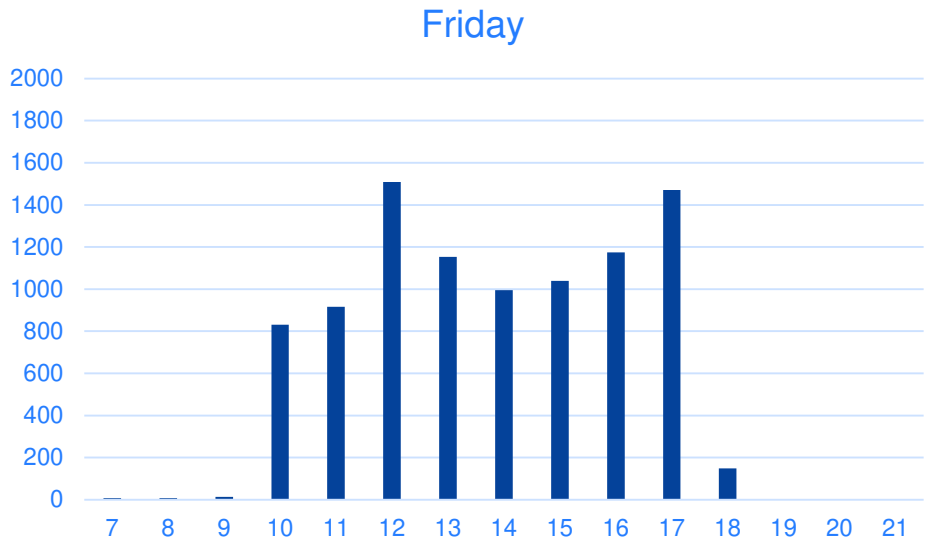
PARKING USERS – REGULAR OPL VISITOR

UNIQUE USER BARCODE BY DAY OF WEEKDAY



APPENDIX

G OTHER AREA DEVELOPMENT EXCERPTS

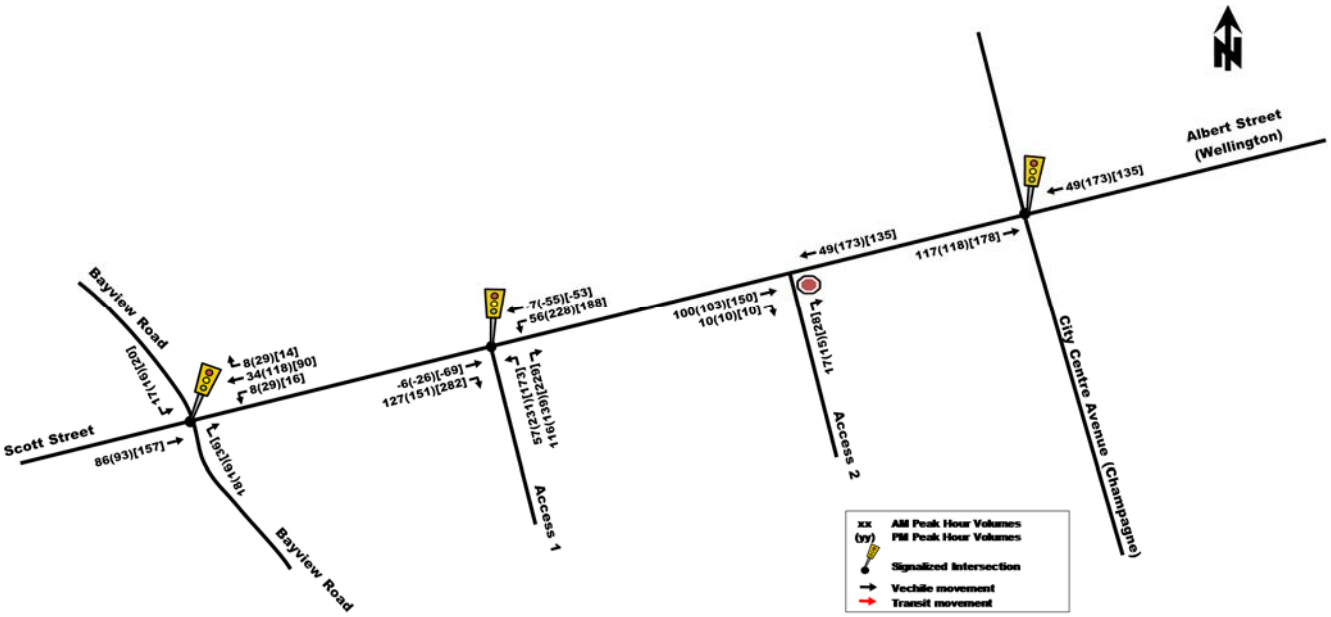
TRINITY
DESIGN. DEVELOP. BUILD.

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

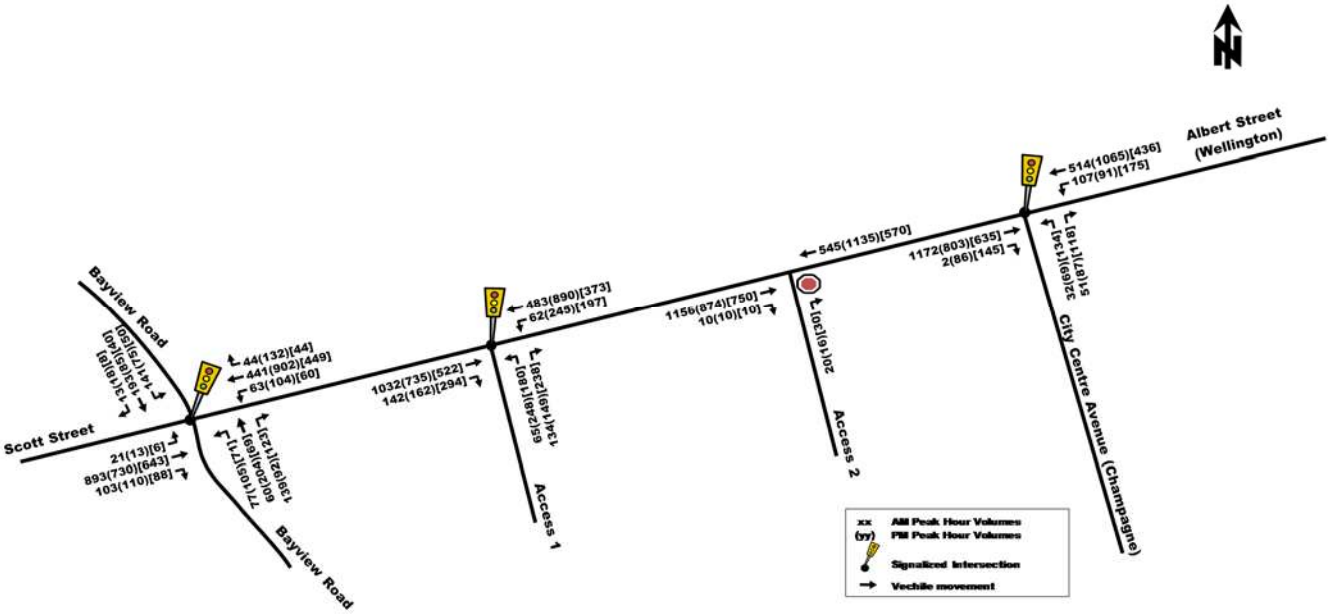


FUTURE TRAFFIC OPERATIONS

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



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- Community & Residential Developments
- Commercial & Institutional Sites
- Environmental Restoration

37 Years

593 Laurier Avenue West

Transportation Impact Assessment

Engineering excellence. Planning precision. Inspired landscapes.

Based on the foregoing, the following modules will be included in the TIA report:

- Module 4.1: Development Design
- Module 4.2: Parking
- Module 4.3: Boundary Streets
- Module 4.4: Access Design
- Module 4.5: Transportation Demand Management

3.0 FORECASTING

3.1 Development-Generated Traffic

3.1.1 Trip Generation

The proposed development is a nine-storey residential building addition to the existing building at 593 Laurier Avenue West. The proposed development will maintain the six dwelling units in the existing building and provide 57 units in the new addition.

Trips generated by the proposed residential uses during the weekday AM and PM peak hours have been estimated using the relevant recommended rates outlined in the 2009 TRANS *Trip Generation Manual*. The vehicle trip generation rates, taken from Table 6.3 of the TRANS report, correspond to Mid-Rise Apartments (3-10 Floors) in the Urban Area (inside the greenbelt). The vehicle trip generation using the aforementioned rates have been converted to person trips using the assumed modal shares in the in Table 3.13 of the TRANS report. The directional split between inbound and outbound trips are based on the blended splits presented in Table 3.17 of the TRANS report.

Estimates of the person trips generated by the proposed development are summarized in **Table 4**.

Table 4: Person Trip Generation

Land Use	Units/ GFA	AM Peak (PPH)			PM Peak (PPH)		
		IN	OUT	TOT	IN	OUT	TOT
Mid-Rise Apartments	63	10	31	41	28	17	45

The 2011 TRANS O-D Survey Report indicates that the proposed development is located within the Ottawa Inner Area along the border with the Ottawa Centre District. As the subject site is also located within 600m of the Lyon Street and Pimisi LRT Stations, the site is also located within a Transit-Oriented Development (TOD) Zone. In TOD Zones, the transit share is assumed to increase significantly compared to the TRANS O-D district.

A comparison of the assumed modal shares for a TOD zone and the modal shares for both the Ottawa Inner Area and Ottawa Centre District is presented in **Table 5**. The modal shares for the TRANS districts are based on all observed trips from/within the district during the AM peak and to/within the district during the PM peak.

Table 5: Modal Share by District/Zone

Travel Mode	TOD Zone	Ottawa Inner Area	Ottawa Centre
Auto Driver	15%	35%	30%
Auto Passenger	5%	10%	10%
Transit	65%	20%	25%
Non-Auto	15%	35%	35%

Given the sites proximity to rapid transit and limited number of parking spaces (two visitor parking spaces only) the above modal shares have been adjusted as follows:

- 5% Auto Driver – Reduced to reflect the limited number of on-site parking spaces
- 5% Auto Passenger – Consistent with TOD Zone
- 35% Non-Auto – Consistent with both Ottawa Inner Area and Ottawa Centre
- 55% Transit – increased to reflect TOD Zone

A full breakdown of the projected person trips by modal share are shown in **Table 6**.

Table 6: Person Trips by Modal Share

Travel Mode	Modal Share	AM Peak			PM Peak		
		IN	OUT	TOT	IN	OUT	TOT
Person Trips		10	31	41	28	17	45
Auto Driver	5%	0	2	2	1	1	2
Auto Passenger	5%	0	2	2	1	1	2
Transit	55%	6	17	23	16	9	25
Non-Auto	35%	3	11	14	10	6	16

From the previous table, the proposed development is projected to generate an additional two vehicle trips during the AM and PM peak hours.

As the development does not meet the 60 person trip generation trigger discussed in Section 3.0, trip distribution and trip assignment is not required.

3.2 Background Traffic

A review of the City of Ottawa's Strategic Long-Range Transportation Model (comparing snapshots of 2011 and 2031 AM peak hour volumes) to determine an appropriate background growth rate for the study area roadways. Based on discussions with City staff, following removal of transit lanes, Slater Street is anticipated to be more attractive to drivers due to less friction from bus traffic. As such, the removal of bus lanes along Slater Street will have implications on the traffic volumes and travel patterns on the adjacent road network.

Based on the Long-Range Model, traffic volumes along Bronson Avenue are anticipated to increase by approximately 2% per annum. Traffic volumes along Laurier Avenue West west of Bronson are anticipated to increase by approximately 1% per annum, while Laurier Avenue West east of Bronson Avenue is anticipated to decrease by approximately 1% per annum. Captures of the Long-Range Model in the vicinity of the subject site are included in **Appendix D**.

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

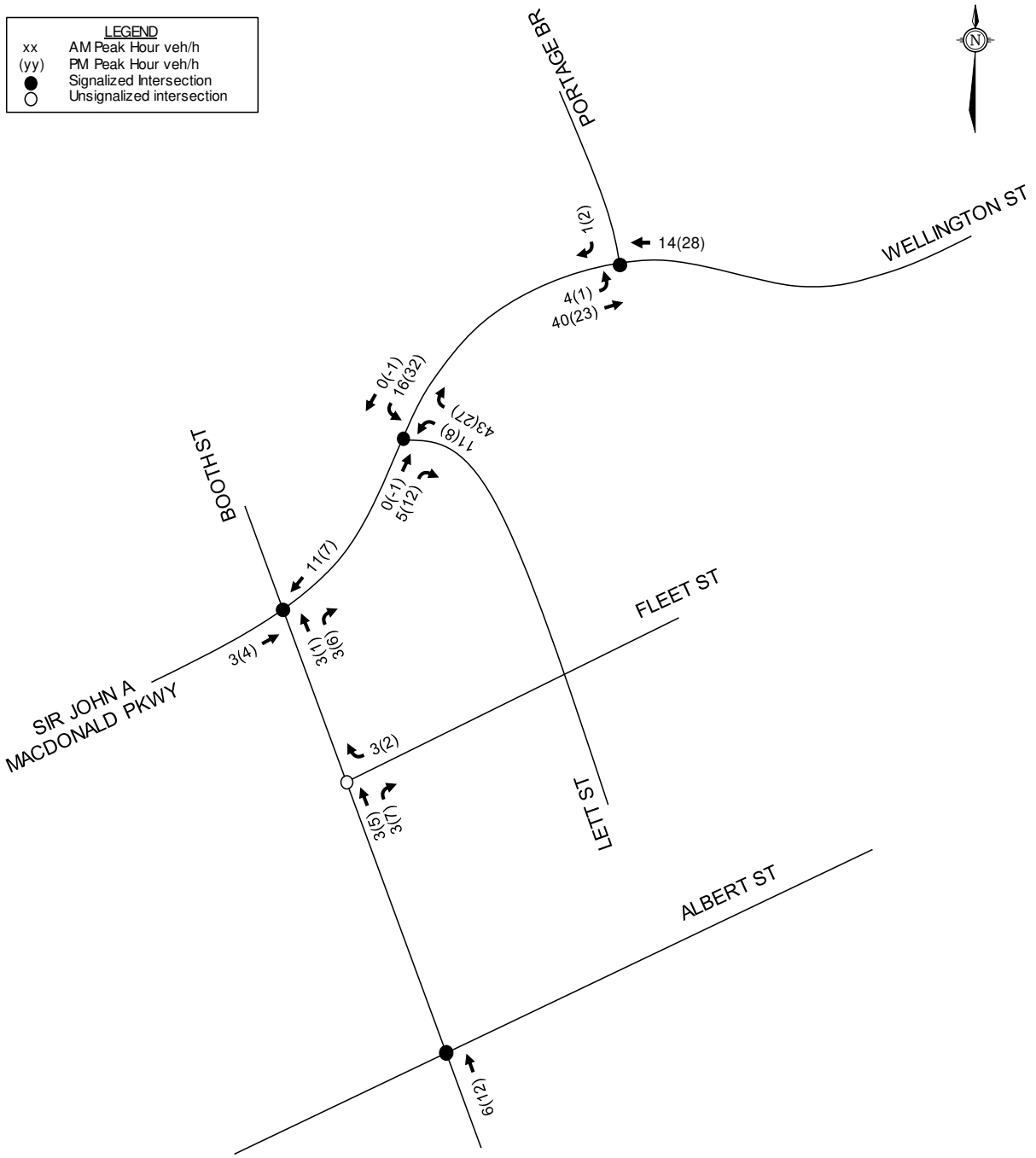
- Urban Design & Streetscapes
- Open Space, Parks & Recreation Planning
- Community & Residential Developments
- Commercial & Institutional Sites
- Environmental Restoration

37 Years

East LeBreton Flats
301 Lett Street

Transportation Impact Study

Figure 7: Site Generated Traffic



zibi

Windmill | dream

September 2015

Zibi Ontario: Phase 1A

Transportation Impact Study

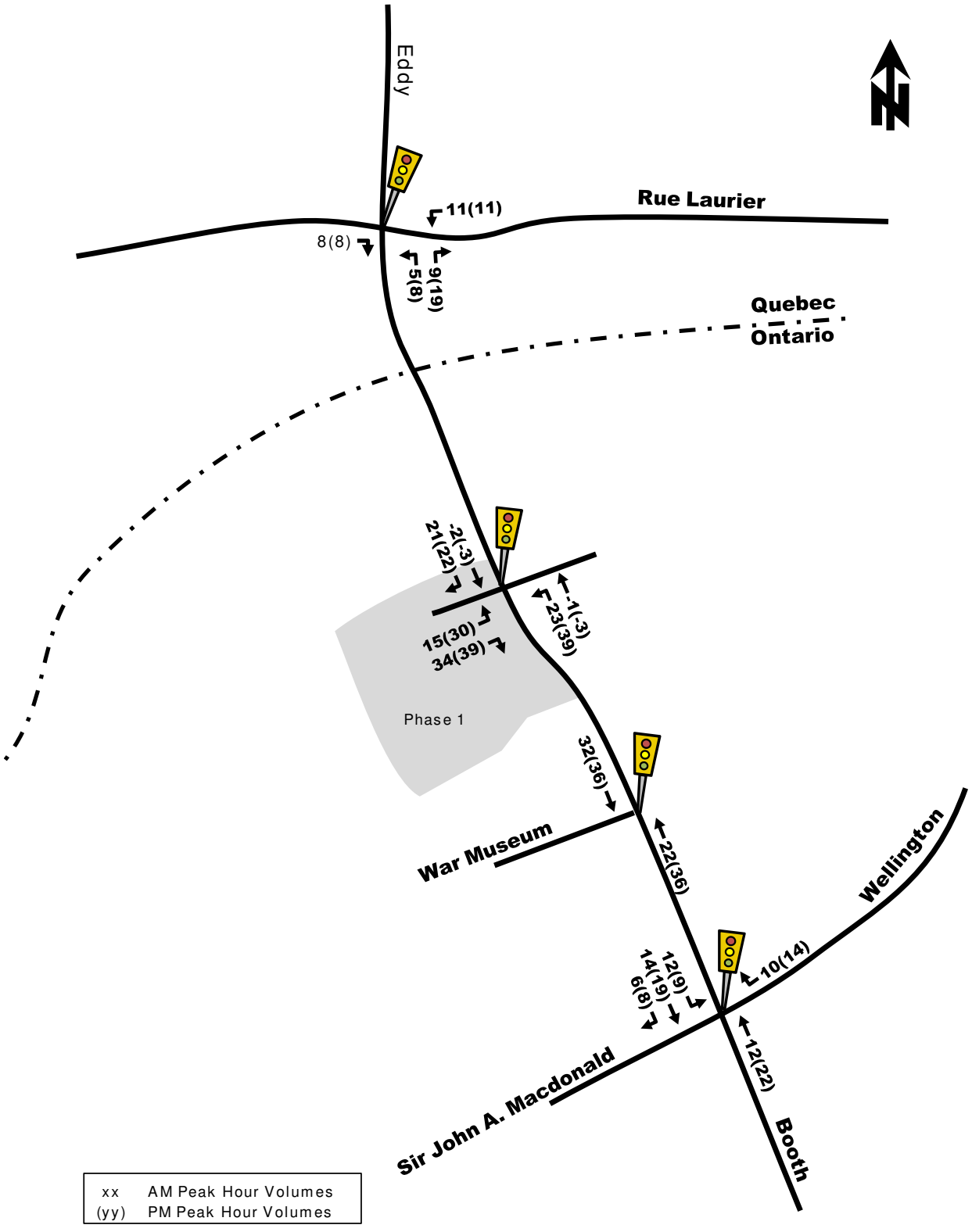
Prepared for:

Windmill Development Group Ltd.

Prepared by:

PARSONS

Figure 7: Phase I Site-Generated Traffic Volumes (New and Pass-by)



APPENDIX

H DEVELOPMENT DESIGN CHECKLIST

TDM-Supportive Development Design and Infrastructure Checklist:
Non-Residential Developments (office, institutional, retail or industrial)

Legend

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

		TDM-supportive design & infrastructure measures: *Non-residential developments*	Check if completed & add descriptions, explanations or plan/drawing references
	1.	**WALKING & CYCLING: ROUTES**	
	1.1	**Building location & access points**	
BASIC	1.1.1	Locate building close to the street, and do not locate parking areas between the street and building entrances	☑ Located at southwest corner of Albert St. / Commissioner St.
BASIC	1.1.2	Locate building entrances in order to minimize walking distances to sidewalks and transit stops/stations	☑
BASIC	1.1.3	Locate building doors and windows to ensure visibility of pedestrians from the building, for their security and comfort	☑
	1.2	**Facilities for walking & cycling**	
REQUIRED	1.2.1	Provide convenient, direct access to stations or major stops along rapid transit routes within 600 metres; minimize walking distances from buildings to rapid transit; provide pedestrian-friendly, weather-protected (where possible) environment between rapid transit accesses and building entrances; ensure quality linkages from sidewalks through building entrances to integrated stops/stations *(see Official Plan policy 4.3.3)*	☑ LRT Pimisi Station is located approx. 400m west of the proposed development
REQUIRED	1.2.2	Provide safe, direct and attractive pedestrian access from public sidewalks to building entrances through such measures as: reducing distances between public sidewalks and major building entrances; providing walkways from public streets to major building entrances; within a site, providing walkways along the front of adjoining buildings, between adjacent buildings, and connecting areas where people may congregate, such as courtyards and transit stops; and providing weather protection through canopies, colonnades, and other design elements wherever possible *(see Official Plan policy 4.3.12)*	☑ All pedestrian entrances have a sidewalk, pedestrian plaza, or multi-use path providing direct and accessible access at-grade

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

		TDM-supportive design & infrastructure measures: *Non-residential developments*	Check if completed & add descriptions, explanations or plan/drawing references
	2.	**WALKING & CYCLING: END-OF-TRIP FACILITIES**	
	2.1	**Bicycle parking**	
REQUIRED	2.1.1	Provide bicycle parking in highly visible and lighted areas, sheltered from the weather wherever possible *(see Official Plan policy 4.3.6)*	☑ A mix of exterior and interior proposed bicycle parking. Bike racks located between the northeast and southeast entries to be covered by roof line.
REQUIRED	2.1.2	Provide the number of bicycle parking spaces specified for various land uses in different parts of Ottawa; provide convenient access to main entrances or well-used areas *(see Zoning By-law Section 111)*	☑ 83 bicycle parking spaces to be provided, exceeding the minimum of 27
REQUIRED	2.1.3	Ensure that bicycle parking spaces and access aisles meet minimum dimensions; that no more than 50% of spaces are vertical spaces; and that parking racks are securely anchored *(see Zoning By-law Section 111)*	☑ The 21 interior bicycle parking spaces are vertical spaces
BASIC	2.1.4	Provide bicycle parking spaces equivalent to the expected number of commuter cyclists (assuming the cycling mode share target is met), plus the expected peak number of customer/visitor cyclists	☐
BETTER	2.1.5	Provide bicycle parking spaces equivalent to the expected number of commuter and customer/visitor cyclists, plus an additional buffer (e.g. 25 percent extra) to encourage other cyclists and ensure adequate capacity in peak cycling season	☐
	2.2	**Secure bicycle parking**	
REQUIRED	2.2.1	Where more than 50 bicycle parking spaces are provided for a single office building, locate at least 25% of spaces within a building/structure, a secure area (e.g. supervised parking lot or enclosure) or bicycle lockers *(see Zoning By-law Section 111)*	☑ 62 exterior and 21 interior proposed bicycle parking spaces
BETTER	2.2.2	Provide secure bicycle parking spaces equivalent to the expected number of commuter cyclists (assuming the cycling mode share target is met)	☑
	2.3	**Shower & change facilities**	
BASIC	2.3.1	Provide shower and change facilities for the use of active commuters	☐
BETTER	2.3.2	In addition to shower and change facilities, provide dedicated lockers, grooming stations, drying racks and laundry facilities for the use of active commuters	☐
	2.4	**Bicycle repair station**	
BETTER	2.4.1	Provide a permanent bike repair station, with commonly used tools and an air pump, adjacent to the main bicycle parking area (or secure bicycle parking area, if provided)	☐

		TDM-supportive design & infrastructure measures: *Non-residential developments*	Check if completed & add descriptions, explanations or plan/drawing references
	3.	**TRANSIT**	
	3.1	**Customer amenities**	
BASIC	3.1.1	Provide shelters, lighting and benches at any on-site transit stops	☑
BASIC	3.1.2	Where the site abuts an off-site transit stop and insufficient space exists for a transit shelter in the public right-of-way, protect land for a shelter and/or install a shelter	☐
BETTER	3.1.3	Provide a secure and comfortable interior waiting area by integrating any on-site transit stops into the building	☐
	4.	**RIDESHARING**	
	4.1	**Pick-up & drop-off facilities**	
BASIC	4.1.1	Provide a designated area for carpool drivers (plus taxis and ride-hailing services) to drop off or pick up passengers without using fire lanes or other no-stopping zones	☐
	4.2	**Carpool parking**	
BASIC	4.2.1	Provide signed parking spaces for carpools in a priority location close to a major building entrance, sufficient in number to accommodate the mode share target for carpools	☐
BETTER	4.2.2	At large developments, provide spaces for carpools in a separate, access-controlled parking area to simplify enforcement	☐
	5.	**CARSHARING & BIKESHARING**	
	5.1	**Carshare parking spaces**	
BETTER	5.1.1	Provide carshare parking spaces in permitted non-residential zones, occupying either required or provided parking spaces *(see Zoning By-law Section 94)*	☐
	5.2	**Bikeshare station location**	
BETTER	5.2.1	Provide a designated bikeshare station area near a major building entrance, preferably lighted and sheltered with a direct walkway connection	☐

		TDM-supportive design & infrastructure measures: *Non-residential developments*	Check if completed & add descriptions, explanations or plan/drawing references
	6.	**PARKING**	
	6.1	**Number of parking spaces**	
REQUIRED	6.1.1	Do not provide more parking than permitted by zoning, nor less than required by zoning, unless a variance is being applied for	☑
BASIC	6.1.2	Provide parking for long-term and short-term users that is consistent with mode share targets, considering the potential for visitors to use off-site public parking	☐
BASIC	6.1.3	Where a site features more than one use, provide shared parking and reduce the cumulative number of parking spaces accordingly *(see Zoning By-law Section 104)*	☐
BETTER	6.1.4	Reduce the minimum number of parking spaces required by zoning by one space for each 13 square metres of gross floor area provided as shower rooms, change rooms, locker rooms and other facilities for cyclists in conjunction with bicycle parking *(see Zoning By-law Section 111)*	☐
	6.2	**Separate long-term & short-term parking areas**	
BETTER	6.2.1	Separate short-term and long-term parking areas using signage or physical barriers, to permit access controls and simplify enforcement (i.e. to discourage employees from parking in visitor spaces, and vice versa)	☐
	7.	**OTHER**	
	7.1	**On-site amenities to minimize off-site trips**	
BETTER	7.1.1	Provide on-site amenities to minimize mid-day or mid-commute errands	☐

APPENDIX

I SIGHT DISTANCE EVALUATION

Sightlines at Proposed OPL Vehicle Access

Reference: TAC Geometric Design Guide for Canadian Roads – Chapter 9 Intersections

AASHTO Intersection Sight Distance Model
Case A – Intersections with no control

Approaching sight triangle for viewing traffic approaching the minor road from the right

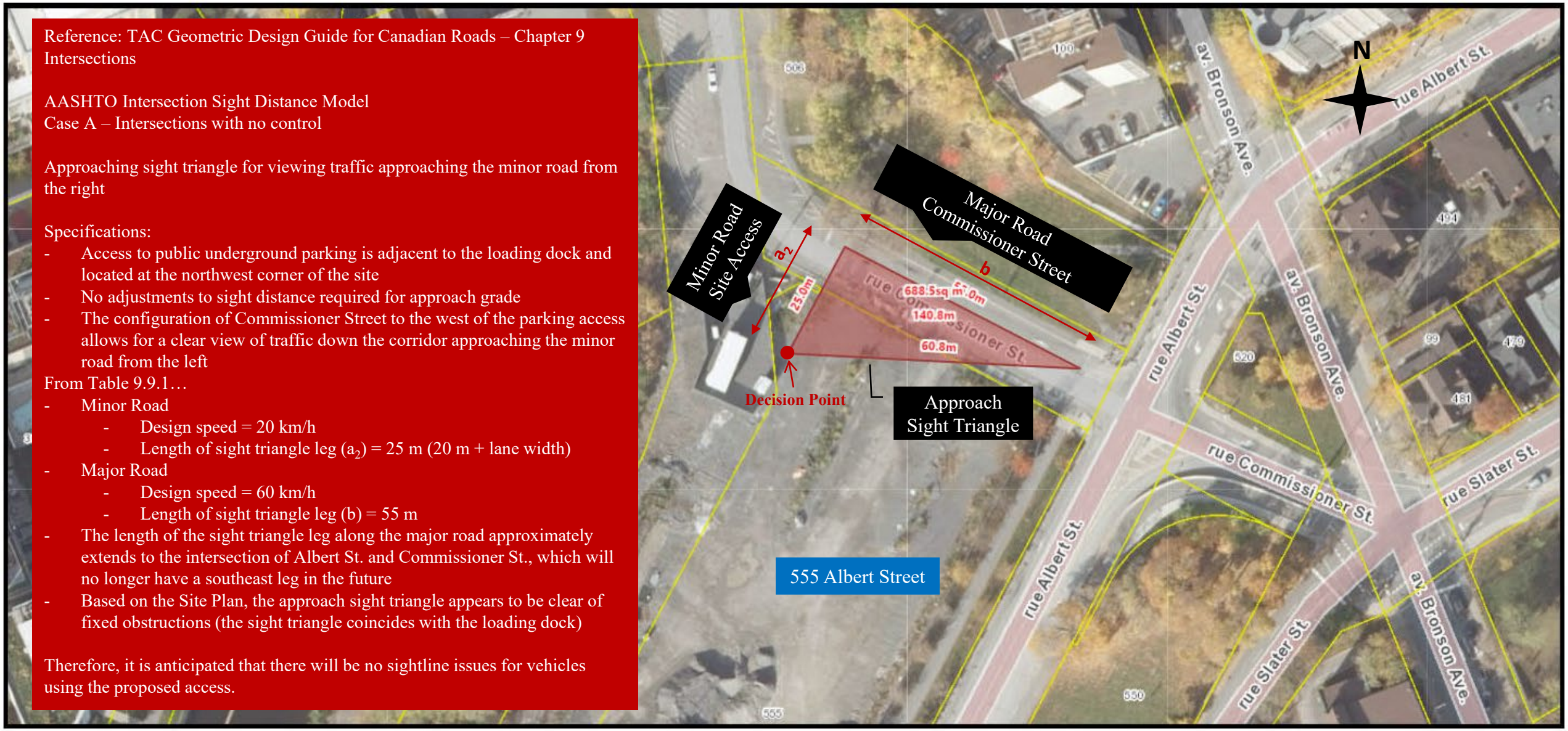
Specifications:

- Access to public underground parking is adjacent to the loading dock and located at the northwest corner of the site
- No adjustments to sight distance required for approach grade
- The configuration of Commissioner Street to the west of the parking access allows for a clear view of traffic down the corridor approaching the minor road from the left

From Table 9.9.1…

- Minor Road
  - Design speed = 20 km/h
  - Length of sight triangle leg (a_2) = 25 m (20 m + lane width)
- Major Road
  - Design speed = 60 km/h
  - Length of sight triangle leg (b) = 55 m
- The length of the sight triangle leg along the major road approximately extends to the intersection of Albert St. and Commissioner St., which will no longer have a southeast leg in the future
- Based on the Site Plan, the approach sight triangle appears to be clear of fixed obstructions (the sight triangle coincides with the loading dock)

Therefore, it is anticipated that there will be no sightline issues for vehicles using the proposed access.



APPENDIX

J TDM-CHECKLIST

TDM Measures Checklist:
Non-Residential Developments (office, institutional, retail or industrial)

Legend

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

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

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

		TDM measures: *Non-residential developments*	Check if proposed & add descriptions
		1. TDM PROGRAM MANAGEMENT	
		1.1 Program coordinator	
BASIC ★	1.1.1	Designate an internal coordinator, or contract with an external coordinator	☑
		1.2 Travel surveys	
BETTER	1.2.1	Conduct periodic surveys to identify travel-related behaviours, attitudes, challenges and solutions, and to track progress	☐
		2. WALKING AND CYCLING	
		2.1 Information on walking/cycling routes & destinations	
BASIC	2.1.1	Display local area maps with walking/cycling access routes and key destinations at major entrances	☑
		2.2 Bicycle skills training	
		Commuter travel	
BETTER ★	2.2.1	Offer on-site cycling courses for commuters, or subsidize off-site courses	☐
		2.3 Valet bike parking	
		Visitor travel	
BETTER	2.3.1	Offer secure valet bike parking during public events when demand exceeds fixed supply (e.g. for festivals, concerts, games)	☐

		TDM measures: *Non-residential developments*	Check if proposed & add descriptions
		3. TRANSIT	
		3.1 Transit information	
BASIC	3.1.1	Display relevant transit schedules and route maps at entrances	☑
BASIC	3.1.2	Provide online links to OC Transpo and STO information	☐
BETTER	3.1.3	Provide real-time arrival information display at entrances	☐
		3.2 Transit fare incentives	
		Commuter travel	
BETTER	3.2.1	Offer preloaded PRESTO cards to encourage commuters to use transit	☐
BETTER ★	3.2.2	Subsidize or reimburse monthly transit pass purchases by employees	☑
		Visitor travel	
BETTER	3.2.3	Arrange inclusion of same-day transit fare in price of tickets (e.g. for festivals, concerts, games)	☐
		3.3 Enhanced public transit service	
		Commuter travel	
BETTER	3.3.1	Contract with OC Transpo to provide enhanced transit services (e.g. for shift changes, weekends)	☐
		Visitor travel	
BETTER	3.3.2	Contract with OC Transpo to provide enhanced transit services (e.g. for festivals, concerts, games)	☐
		3.4 Private transit service	
		Commuter travel	
BETTER	3.4.1	Provide shuttle service when OC Transpo cannot offer sufficient quality or capacity to serve demand (e.g. for shift changes, weekends)	☐
		Visitor travel	
BETTER	3.4.2	Provide shuttle service when OC Transpo cannot offer sufficient quality or capacity to serve demand (e.g. for festivals, concerts, games)	☐

			TDM measures: *Non-residential developments*	Check if proposed & add descriptions
		4.	**RIDESHARING**	
		4.1	**Ridematching service**	
			Commuter travel	
BASIC	★	4.1.1	Provide a dedicated ridematching portal at OttawaRideMatch.com	☐
		4.2	**Carpool parking price incentives**	
			Commuter travel	
BETTER		4.2.1	Provide discounts on parking costs for registered carpools	☐
		4.3	**Vanpool service**	
			Commuter travel	
BETTER		4.3.1	Provide a vanpooling service for long-distance commuters	☐
		5.	**CARSHARING & BIKESHARING**	
		5.1	**Bikeshare stations & memberships**	
BETTER		5.1.1	Contract with provider to install on-site bikeshare station for use by commuters and visitors	☐
			Commuter travel	
BETTER		5.1.2	Provide employees with bikeshare memberships for local business travel	☐
		5.2	**Carshare vehicles & memberships**	
			Commuter travel	
BETTER		5.2.1	Contract with provider to install on-site carshare vehicles and promote their use by tenants	☐
BETTER		5.2.2	Provide employees with carshare memberships for local business travel	☐
		6.	**PARKING**	
		6.1	**Priced parking**	
			Commuter travel	
BASIC	★	6.1.1	Charge for long-term parking (daily, weekly, monthly)	☐
BASIC		6.1.2	Unbundle parking cost from lease rates at multi-tenant sites	☑
			Visitor travel	
BETTER		6.1.3	Charge for short-term parking (hourly)	☐

			TDM measures: *Non-residential developments*	Check if proposed & add descriptions
		7.	**TDM MARKETING & COMMUNICATIONS**	
		7.1	**Multimodal travel information**	
			Commuter travel	
BASIC	★	7.1.1	Provide a multimodal travel option information package to new/relocating employees and students	☑
			Visitor travel	
BETTER	★	7.1.2	Include multimodal travel option information in invitations or advertising that attract visitors or customers (e.g. for festivals, concerts, games)	☐
		7.2	**Personalized trip planning**	
			Commuter travel	
BETTER	★	7.2.1	Offer personalized trip planning to new/relocating employees	☐
		7.3	**Promotions**	
			Commuter travel	
BETTER		7.3.1	Deliver promotions and incentives to maintain awareness, build understanding, and encourage trial of sustainable modes	☐
		8.	**OTHER INCENTIVES & AMENITIES**	
		8.1	**Emergency ride home**	
			Commuter travel	
BETTER	★	8.1.1	Provide emergency ride home service to non-driving commuters	☐
		8.2	**Alternative work arrangements**	
			Commuter travel	
BASIC	★	8.2.1	Encourage flexible work hours	☐
BETTER		8.2.2	Encourage compressed workweeks	☐
BETTER	★	8.2.3	Encourage telework	☐
		8.3	**Local business travel options**	
			Commuter travel	
BASIC	★	8.3.1	Provide local business travel options that minimize the need for employees to bring a personal car to work	☐
		8.4	**Commuter incentives**	
			Commuter travel	
BETTER		8.4.1	Offer employees a taxable, mode-neutral commuting allowance	☐
		8.5	**On-site amenities**	
			Commuter travel	
BETTER		8.5.1	Provide on-site amenities/services to minimize mid-day or mid-commute errands	☐

APPENDIX

K MMLOS

Multi-Modal Level of Service - Intersections Form

Consultant	**WSP**	**Project**	**20M-00534-00**
Scenario	**Existing Conditions**	**Date**	
Comments			

To add intersections
Select columns LMNO, right-click and *Copy;*
Then select column P, right-click and *Insert Copied Cells*

INTERSECTIONS		Albert St and Empress Ave N				Albert St and Bronson Ave				Slater St and Bronson Ave			
Crossing Side		NORTH	SOUTH	EAST	WEST	NORTH	SOUTH	EAST	WEST	NORTH	SOUTH	EAST	WEST
Pedestrian	Lanes		0 - 2	7	6	0 - 2	0 - 2	3		4	4	3	0 - 2
	Median		No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m		Median > 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m
	Conflicting Left Turns		Protected	No left turn / Prohib.	Protected/ Permissive	No left turn / Prohib.	No left turn / Prohib.	No left turn / Prohib.		Protected/ Permissive	No left turn / Prohib.	Protected	Protected/ Permissive
	Conflicting Right Turns		Protected	Protected/ Permissive	No right turn	Protected/ Permissive	No right turn	No right turn		No right turn	Protected/ Permissive	Permissive or yield control	Protected/ Permissive
	Right Turns on Red (RToR) ?		RTOR prohibited	RTOR allowed	RTOR prohibited	RTOR allowed	RTOR prohibited	RTOR prohibited		RTOR prohibited	RTOR prohibited	RTOR prohibited	RTOR prohibited
	Ped Signal Leading Interval?		No	Yes	Yes	No	No	No		No	No	No	No
	Right Turn Channel		No Channel	No Channel	No Right Turn	No Channel	No Right Turn	No Channel		No Channel	No Channel	No Channel	No Channel
	Corner Radius		5-10m	5-10m	5-10m	5-10m	No Right Turn	5-10m		5-10m	5-10m	5-10m	5-10m
	Crosswalk Type		Std transverse markings	Std transverse markings	Std transverse markings	Std transverse markings	Std transverse markings	Std transverse markings		Std transverse markings	Std transverse markings	Std transverse markings	Std transverse markings
	PETSI Score		**102**	**15**	**35**	**94**	**111**	**87**		**64**	**65**	**82**	**89**
	Ped. Exposure to Traffic LoS	-	**A**	**F**	**E**	**A**	**A**	**B**	-	**C**	**C**	**B**	**B**
	Cycle Length		120	120	120	65	65	65		70	70	70	70
	Effective Walk Time		10	7	7	11	11	10		7	7		
	Average Pedestrian Delay		**50**	**53**	**53**	**22**	**22**	**23**		**28**	**28**		
	Pedestrian Delay LoS	-	**E**	**E**	**E**	**C**	**C**	**C**	-	**C**	**C**	-	-
	Level of Service	**-**	**E**	**F**	**E**	**C**	**C**	**C**	**-**	**C**	**C**	**B**	**B**
		F				**C**				**C**			
Approach From		NORTH	SOUTH	EAST	WEST	NORTH	SOUTH	EAST	WEST	NORTH	SOUTH	EAST	WEST
Bicycle	Bicycle Lane Arrangement on Approach		Mixed Traffic	Curb Bike Lane, Cycletrack or MUP	Curb Bike Lane, Cycletrack or MUP	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic	Curb Bike Lane, Cycletrack or MUP	Mixed Traffic	Curb Bike Lane, Cycletrack or MUP	Mixed Traffic
	IF Dedicated Right Turn Lane, THEN Right Turn Configuration, ELSE <blank>			Not Applicable	Not Applicable	> 50 m	≤ 50 m	> 50 m	≤ 50 m	Not Applicable		Not Applicable	
	Dedicated Right Turning Speed			Not Applicable	Not Applicable	≤ 25 km/h	≤ 25 km/h	≤ 25 km/h	≤ 25 km/h	Not Applicable		Not Applicable	
	Cyclist Through Movement	-		**Not Applicable**	**Not Applicable**	**F**	**D**	**F**	**D**	**Not Applicable**		**Not Applicable**	
	Separated or Mixed Traffic	-	**Mixed Traffic**	**Separated**	**Separated**	**Mixed Traffic**	**Mixed Traffic**	**Mixed Traffic**	**Mixed Traffic**	**Separated**	**Mixed Traffic**	**Separated**	**Mixed Traffic**
	Left Turn Approach		No lane crossed	No lane crossed	2-stage, LT box	Other LT config	One lane crossed	Other LT config	Other LT config	2-stage, LT box	One lane crossed	No lane crossed	≥ 2 lanes crossed
	Operating Speed		> 40 to ≤ 50 km/h	> 40 to ≤ 50 km/h	> 40 to ≤ 50 km/h	> 40 to ≤ 50 km/h	> 40 to ≤ 50 km/h	> 40 to ≤ 50 km/h	> 40 to ≤ 50 km/h	> 40 to ≤ 50 km/h	> 40 to ≤ 50 km/h	> 40 to ≤ 50 km/h	> 40 to ≤ 50 km/h
	Left Turning Cyclist	-	**B**	**B**	**A**	**F**	**D**	**F**	**F**	**A**	**D**	**B**	**E**
	Level of Service	**-**	**B**	**B**	**A**	**F**	**D**	**F**	**F**	**A**	**D**	**B**	**E**
		B				**F**				**E**			
Transit	Average Signal Delay			≤ 10 sec	≤ 10 sec	≤ 10 sec	≤ 40 sec	≤ 20 sec		> 40 sec	≤ 20 sec	≤ 30 sec	≤ 30 sec
	Level of Service	**-**	**-**	**B**	**B**	**B**	**E**	**C**	**-**	**F**	**C**	**D**	**D**
		B				**E**				**F**			
Truck	Effective Corner Radius			< 10 m	< 10 m	< 10 m	< 10 m	< 10 m		< 10 m		< 10 m	< 10 m
	Number of Receiving Lanes on Departure from Intersection			1	1	≥ 2	≥ 2	1		≥ 2		≥ 2	≥ 2
	Level of Service	**-**	**-**	**F**	**F**	**D**	**D**	**F**	**-**	**D**	**-**	**D**	**D**
		F				**F**				**D**			
Auto	Volume to Capacity Ratio	0.0 - 0.60				0.0 - 0.60				0.61 - 0.70			
	Level of Service	**A**				**A**				**B**			

Multi-Modal Level of Service - Segments Form

Consultant	**WSP**	**Project**	**20M-00534-00**
Scenario	**Existing Conditions**	**Date**	
Comments			

SEGMENTS		Segment A	Albert Street		Commissioner Street	
			East	West	North	South
Pedestrian	Sidewalk Width Boulevard Width	E	≥ 2 m < 0.5	≥ 2 m > 2 m	1.5 m < 0.5 m	1.5 m < 0.5 m
	Avg Daily Curb Lane Traffic Volume		> 3000	> 3000	≤ 3000	≤ 3000
	Operating Speed On-Street Parking		> 30 to 50 km/h no	> 30 to 50 km/h no	> 30 to 50 km/h no	> 30 to 50 km/h no
	Exposure to Traffic PLoS		**C**	**B**	**E**	**E**
	Effective Sidewalk Width		3.0 m	3.0 m	1.5 m	1.5 m
	Pedestrian Volume		250 ped/hr	250 ped/hr	250 ped/hr	250 ped/hr
	Crowding PLoS		**A**	**A**	**B**	**B**
	Level of Service		**C**	**B**	**E**	**E**
Bicycle	Type of Cycling Facility	D	Physically Separated	Physically Separated	Mixed Traffic	Mixed Traffic
	Number of Travel Lanes				2-3 lanes total	2-3 lanes total
	Operating Speed				>40 to <50 km/h	>40 to <50 km/h
	# of Lanes & Operating Speed LoS		**-**	**-**	**D**	**D**
	Bike Lane (+ Parking Lane) Width					
	Bike Lane Width LoS		**-**	**-**	**-**	**-**
	Bike Lane Blockages					
	Blockage LoS		**-**	**-**	**-**	**-**
	Median Refuge Width (no median = < 1.8 m)				< 1.8 m refuge	< 1.8 m refuge
	No. of Lanes at Unsignalized Crossing				≤ 3 lanes	≤ 3 lanes
	Sidestreet Operating Speed				>40 to 50 km/h	>40 to 50 km/h
	Unsignalized Crossing - Lowest LoS		**~~A~~**	**~~A~~**	**B**	**B**
	Level of Service		**A**	**A**	**D**	**D**
Transit	Facility Type	B		Bus lane	Mixed Traffic	Mixed Traffic
	Friction or Ratio Transit:Posted Speed			Cf ≤ 60		
	Level of Service		**-**	**B**	**-**	**-**
Truck	Truck Lane Width	E	> 3.7 m	≤ 3.0 m	> 3.7 m	> 3.7 m
	Travel Lanes per Direction		1	> 1	1	1
	Level of Service		**B**	**E**	**B**	**B**
Auto	**Level of Service**	**Not Applicable**				

Multi-Modal Level of Service - Intersections Form

Consultant	WSP	Project	20M-00534-00
Scenario	Future Conditions	Date	
Comments			

To add intersections
Select columns LMNO, right-click and *Copy;*
Then select column P, right-click and *Insert Copied Cells*

INTERSECTIONS		Albert St and Empress Ave N				Albert St and Bronson Ave				Slater St and Bronson Ave			
	Crossing Side	NORTH	SOUTH	EAST	WEST	NORTH	SOUTH	EAST	WEST	NORTH	SOUTH	EAST	WEST
Pedestrian	Lanes	3	0 - 2	4	4	0 - 2	5	0 - 2	0 - 2	4	4	0 - 2	0 - 2
	Median	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m
	Conflicting Left Turns	Permissive	Permissive	Permissive	Permissive	No left turn / Prohib.	Permissive	Permissive	No left turn / Prohib.	Permissive	No left turn / Prohib.	Protected/ Permissive	No left turn / Prohib.
	Conflicting Right Turns	Permissive or yield control	Permissive or yield control	Permissive or yield control	No right turn	Permissive or yield control	No right turn	Permissive or yield control	Permissive or yield control	No right turn	Permissive or yield control	Permissive or yield control	Protected/ Permissive
	Right Turns on Red (RToR) ?	RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed	RTOR prohibited	RTOR allowed	RTOR allowed	RTOR prohibited	RTOR prohibited	RTOR prohibited	RTOR allowed
	Ped Signal Leading Interval?	No	No	Yes	Yes	No	No	No	No	No	No	No	No
	Right Turn Channel	No Channel	No Channel	Conventional with Receiving Lane	No Channel	No Channel	No Right Turn	No Channel	No Channel	No Channel	No Channel	No Right Turn	No Channel
	Corner Radius	5-10m	5-10m	5-10m	5-10m	10-15m	No Right Turn	5-10m	10-15m	5-10m	5-10m	5-10m	5-10m
	Crosswalk Type	Textured/coloured pavement	Textured/coloured pavement	Textured/coloured pavement	Textured/coloured pavement	Std transverse markings	Std transverse markings	Std transverse markings	Textured/coloured pavement	Std transverse markings	Std transverse markings	Std transverse markings	Std transverse markings
	PETSI Score	**74**	**89**	**60**	**64**	**93**	**55**	**86**	**96**	**62**	**65**	**93**	**94**
	Ped. Exposure to Traffic LoS	**C**	**B**	**C**	**C**	**A**	**D**	**B**	**A**	**C**	**C**	**A**	**A**
	Cycle Length	120	120	120	120	70	70	70	70	70	70	70	70
	Effective Walk Time	10	10	7	7	11	11	10	10	7	7	7	7
	Average Pedestrian Delay	**50**	**50**	**53**	**53**	**25**	**25**	**26**	**26**	**28**	**28**	**28**	**28**
	Pedestrian Delay LoS	**E**	**E**	**E**	**E**	**C**	**C**	**C**	**C**	**C**	**C**	**C**	**C**
	Level of Service	**E**	**E**	**E**	**E**	**C**	**D**	**C**	**C**	**C**	**C**	**C**	**C**
		E				**D**				**C**			
	Approach From	**NORTH**	**SOUTH**	**EAST**	**WEST**	**NORTH**	**SOUTH**	**EAST**	**WEST**	**NORTH**	**SOUTH**	**EAST**	**WEST**
Bicycle	Bicycle Lane Arrangement on Approach	Mixed Traffic	Mixed Traffic	Curb Bike Lane, Cycletrack or MUP	Curb Bike Lane, Cycletrack or MUP	Curb Bike Lane, Cycletrack or MUP	Curb Bike Lane, Cycletrack or MUP	Curb Bike Lane, Cycletrack or MUP	Curb Bike Lane, Cycletrack or MUP	Curb Bike Lane, Cycletrack or MUP	Mixed Traffic	Curb Bike Lane, Cycletrack or MUP	Curb Bike Lane, Cycletrack or MUP
	IF Dedicated Right Turn Lane, THEN Right Turn Configuration, ELSE <blank>			Not Applicable	Not Applicable					Not Applicable	≤ 50 m	Not Applicable	Not Applicable
	Dedicated Right Turning Speed			Not Applicable	Not Applicable					Not Applicable	≤ 25 km/h	Not Applicable	Not Applicable
	Cyclist Through Movement			**Not Applicable**	**Not Applicable**	**Not Applicable**	**Not Applicable**	**Not Applicable**	**Not Applicable**	**Not Applicable**	**D**	**Not Applicable**	**Not Applicable**
	Separated or Mixed Traffic	**Mixed Traffic**	**Mixed Traffic**	**Separated**	**Separated**	**Separated**	**Separated**	**Separated**	**Separated**	**Separated**	**Mixed Traffic**	**Separated**	**Separated**
	Left Turn Approach	No lane crossed	No lane crossed	2-stage, LT box	2-stage, LT box	2-stage, LT box	Other LT config		2-stage, LT box	2-stage, LT box	One lane crossed	No lane crossed	No lane crossed
	Operating Speed	≤ 40 km/h	≤ 40 km/h	> 40 to ≤ 50 km/h	> 40 to ≤ 50 km/h	> 50 to < 60 km/h			> 50 to < 60 km/h	> 40 to ≤ 50 km/h	> 40 to ≤ 50 km/h	> 40 to ≤ 50 km/h	> 40 to ≤ 50 km/h
	Left Turning Cyclist	**B**	**B**	**A**	**A**	**A**	**-**	**-**	**A**	**A**	**D**	**B**	**B**
	Level of Service	**B**	**B**	**A**	**A**	**A**	**-**	**-**	**A**	**A**	**D**	**B**	**B**
		B				**A**				**D**			
Transit	Average Signal Delay			≤ 20 sec	≤ 20 sec	≤ 20 sec	> 40 sec	≤ 40 sec		≤ 30 sec	≤ 10 sec		≤ 30 sec
	Level of Service	**-**	**-**	**C**	**C**	**C**	**F**	**E**	**-**	**D**	**B**	**-**	**D**
		C				**F**				**D**			
Truck	Effective Corner Radius			< 10 m	< 10 m	> 15 m	> 15 m	10 - 15 m		< 10 m	< 10 m		10 - 15 m
	Number of Receiving Lanes on Departure from Intersection			1	1	≥ 2	≥ 2	1		≥ 2	≥ 2		≥ 2
	Level of Service	**-**	**-**	**F**	**F**	**A**	**A**	**E**	**-**	**D**	**D**	**-**	**B**
		F				**E**				**D**			
Auto	Volume to Capacity Ratio	0.71 - 0.80				0.81 - 0.90				0.71 - 0.80			
	Level of Service	**C**				**D**				**C**			

Multi-Modal Level of Service - Segments Form

Consultant	**WSP**	**Project**	**20M-00534-00**
Scenario	**Future Conditions**	**Date**	
Comments			

SEGMENTS		Segment A	Albert Street		Commissioner Street	
			East	West	North	South
Pedestrian	Sidewalk Width Boulevard Width	E	≥ 2 m > 2 m	≥ 2 m > 2 m	1.5 m < 0.5 m	1.5 m < 0.5 m
	Avg Daily Curb Lane Traffic Volume		> 3000	> 3000	≤ 3000	≤ 3000
	Operating Speed On-Street Parking		> 30 to 50 km/h no	> 30 to 50 km/h no	> 30 to 50 km/h no	> 30 to 50 km/h no
	Exposure to Traffic PLoS		**B**	**B**	**E**	**E**
	Effective Sidewalk Width		2.5 m	3.5 m	1.5 m	1.5 m
	Pedestrian Volume		250 ped/hr	250 ped/hr	250 ped/hr	250 ped/hr
	Crowding PLoS		**B**	**A**	**B**	**B**
	Level of Service		**B**	**B**	**E**	**E**
Bicycle	Type of Cycling Facility	D	Physically Separated	Physically Separated	Mixed Traffic	Mixed Traffic
	Number of Travel Lanes				2-3 lanes total	2-3 lanes total
	Operating Speed				>40 to <50 km/h	>40 to <50 km/h
	# of Lanes & Operating Speed LoS		**-**	**-**	**D**	**D**
	Bike Lane (+ Parking Lane) Width					
	Bike Lane Width LoS		**-**	**-**	**-**	**-**
	Bike Lane Blockages					
	Blockage LoS		**-**	**-**	**-**	**-**
	Median Refuge Width (no median = < 1.8 m)				< 1.8 m refuge	< 1.8 m refuge
	No. of Lanes at Unsignalized Crossing				≤ 3 lanes	≤ 3 lanes
	Sidestreet Operating Speed				>40 to 50 km/h	>40 to 50 km/h
	Unsignalized Crossing - Lowest LoS		**~~A~~**	**~~A~~**	**B**	**B**
	Level of Service		**A**	**A**	**D**	**D**
Transit	Facility Type	E	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic
	Friction or Ratio Transit:Posted Speed		Vt/Vp ≥ 0.8	Vt/Vp ≤ 0.6		
	Level of Service		**D**	**E**	**-**	**-**
Truck	Truck Lane Width	B	≤ 3.5 m	≤ 3.5 m	> 3.7 m	> 3.7 m
	Travel Lanes per Direction		> 1	> 1	1	1
	Level of Service		**A**	**A**	**B**	**B**
Auto	**Level of Service**	**Not Applicable**				

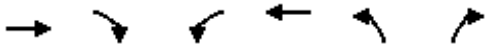
APPENDIX

L SYNCHRO ANALYSIS SHEETS

Lane Group	EBT	WBL	WBT	NBL	NBR	Ø9	Ø13
Lane Configurations							
Traffic Volume (vph)	545	57	209	72	48		
Future Volume (vph)	545	57	209	72	48		
Lane Group Flow (vph)	660	63	232	80	53		
Turn Type	NA	pm+pt	NA	Perm	Perm		
Protected Phases	2	1	6			9	13
Permitted Phases		6		8	8		
Detector Phase	2	1	6	8	8		
Switch Phase							
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	1.0	1.0
Minimum Split (s)	31.8	11.2	31.8	29.3	29.3	3.0	3.0
Total Split (s)	65.0	25.0	90.0	30.0	30.0	5.0	5.0
Total Split (%)	52.0%	20.0%	72.0%	24.0%	24.0%	4%	4%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	2.0	2.0
All-Red Time (s)	3.5	2.9	3.5	3.0	3.0	0.0	0.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		
Total Lost Time (s)	6.8	6.2	6.8	6.3	6.3		
Lead/Lag	Lag	Lead					
Lead-Lag Optimize?	Yes	Yes					
Recall Mode	C-Max	None	C-Max	None	None	None	None
Act Effct Green (s)	90.3	101.2	100.6	11.3	11.3		
Actuated g/C Ratio	0.72	0.81	0.80	0.09	0.09		
v/c Ratio	0.28	0.11	0.09	0.53	0.39		
Control Delay	7.1	5.8	5.8	66.0	60.8		
Queue Delay	0.0	0.0	0.0	0.0	0.0		
Total Delay	7.1	5.8	5.8	66.0	60.8		
LOS	A	A	A	E	E		
Approach Delay	7.1		5.8	63.9			
Approach LOS	A		A	E			
Queue Length 50th (m)	29.3	7.2	19.0	20.1	13.2		
Queue Length 95th (m)	44.6	19.2	28.2	35.8	25.9		
Internal Link Dist (m)	195.9		296.6	186.4			
Turn Bay Length (m)		115.0					
Base Capacity (vph)	2395	679	2698	317	284		
Starvation Cap Reductn	0	0	0	0	0		
Spillback Cap Reductn	0	0	0	0	0		
Storage Cap Reductn	0	0	0	0	0		
Reduced v/c Ratio	0.28	0.09	0.09	0.25	0.19		

Intersection Summary	
Cycle Length: 125	
Actuated Cycle Length: 125	
Offset: 55 (44%), Referenced to phase 2:EBT and 6:WBTL, Start of Green	
Natural Cycle: 80	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.53	
Intersection Signal Delay: 13.7	Intersection LOS: B
Intersection Capacity Utilization 42.0%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 4: Preston St & Albert St



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	545	49	57	209	72	48
Future Volume (vph)	545	49	57	209	72	48
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Total Lost time (s)	6.8		6.2	6.8	6.3	6.3
Lane Util. Factor	0.95		1.00	0.95	1.00	1.00
Frt	0.99		1.00	1.00	1.00	0.85
Flt Protected	1.00		0.95	1.00	0.95	1.00
Satd. Flow (prot)	3312		1676	3353	1676	1500
Flt Permitted	1.00		0.37	1.00	0.95	1.00
Satd. Flow (perm)	3312		648	3353	1676	1500
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	606	54	63	232	80	53
RTOR Reduction (vph)	3	0	0	0	0	0
Lane Group Flow (vph)	657	0	63	232	80	53
Turn Type	NA		pm+pt	NA	Perm	Perm
Protected Phases	2		1	6		
Permitted Phases			6		8	8
Actuated Green, G (s)	89.0		100.6	100.6	11.3	11.3
Effective Green, g (s)	89.0		100.6	100.6	11.3	11.3
Actuated g/C Ratio	0.71		0.80	0.80	0.09	0.09
Clearance Time (s)	6.8		6.2	6.8	6.3	6.3
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	2358		565	2698	151	135
v/s Ratio Prot	c0.20		0.00	c0.07		
v/s Ratio Perm			0.08		c0.05	0.04
v/c Ratio	0.28		0.11	0.09	0.53	0.39
Uniform Delay, d1	6.5		2.8	2.6	54.3	53.6
Progression Factor	1.00		1.93	2.02	1.00	1.00
Incremental Delay, d2	0.3		0.1	0.1	3.3	1.9
Delay (s)	6.8		5.4	5.2	57.6	55.5
Level of Service	A		A	A	E	E
Approach Delay (s)	6.8			5.3	56.8	
Approach LOS	A			A	E	

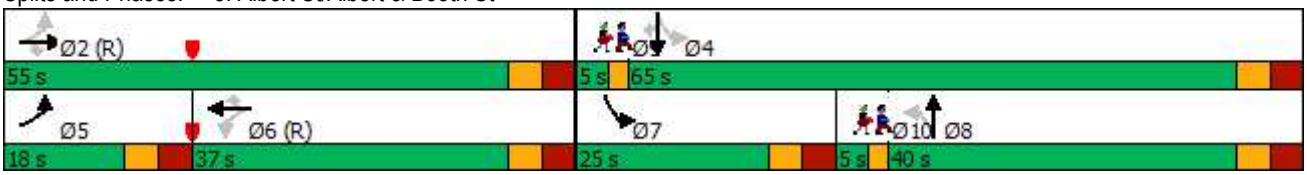
Intersection Summary			
HCM 2000 Control Delay	12.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.30		
Actuated Cycle Length (s)	125.0	Sum of lost time (s)	21.3
Intersection Capacity Utilization	42.0%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR	Ø9
Lane Configurations												
Traffic Volume (vph)	301	825	9	18	266	67	10	341	100	295	176	
Future Volume (vph)	301	825	9	18	266	67	10	341	100	295	176	
Lane Group Flow (vph)	334	917	10	20	296	74	0	439	111	328	196	
Turn Type	pm+pt	NA	Perm	Perm	NA	Perm	Perm	NA	pm+pt	NA	Perm	
Protected Phases	5	2			6			8	7	4		9
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	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	1.0
Minimum Split (s)	11.5	36.5	36.5	36.5	36.5	36.5	34.5	34.5	11.5	34.5	34.5	5.0
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	5.0
Total Split (%)	14.4%	44.0%	44.0%	29.6%	29.6%	29.6%	32.0%	32.0%	20.0%	52.0%	52.0%	4%
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	2.0
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	0.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.5	6.5	6.5	6.5	6.5	6.5		6.5	6.5	6.5	6.5	
Lead/Lag	Lead			Lag	Lag	Lag			Lead			
Lead-Lag Optimize?	Yes			Yes	Yes	Yes			Yes			
Recall Mode	None	C-Max	C-Max	C-Max	C-Max	C-Max	Max	Max	None	Max	Max	Max
Act Effct Green (s)	48.5	48.5	48.5	30.5	30.5	30.5		33.5	63.5	58.5	58.5	
Actuated g/C Ratio	0.39	0.39	0.39	0.24	0.24	0.24		0.27	0.51	0.47	0.47	
v/c Ratio	0.88	1.34	0.02	0.36	0.36	0.15		0.52	0.35	0.40	0.24	
Control Delay	55.9	195.2	0.0	59.7	40.7	0.6		40.6	19.4	23.6	3.3	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	
Total Delay	55.9	195.2	0.0	59.7	40.7	0.6		40.6	19.4	23.6	3.3	
LOS	E	F	A	E	D	A		D	B	C	A	
Approach Delay		156.8			34.1			40.6		16.6		
Approach LOS		F			C			D		B		
Queue Length 50th (m)	66.7	~312.0	0.0	4.3	33.6	0.0		49.7	14.7	54.1	0.0	
Queue Length 95th (m)	#121.5	#393.3	0.0	13.5	47.4	0.0		67.2	25.5	78.6	13.2	
Internal Link Dist (m)		296.6			179.0			146.1		395.0		
Turn Bay Length (m)			45.0								126.0	
Base Capacity (vph)	380	684	656	56	818	501		840	404	826	806	
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	0.88	1.34	0.02	0.36	0.36	0.15		0.52	0.27	0.40	0.24	

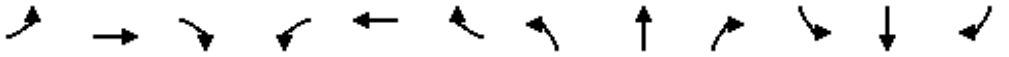
Intersection Summary		
Cycle Length: 125		
Actuated Cycle Length: 125		
Offset: 104 (83%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green		
Natural Cycle: 120		
Control Type: Actuated-Coordinated		
Maximum v/c Ratio: 1.34		
Intersection Signal Delay: 87.8	Intersection LOS: F	
Intersection Capacity Utilization 99.8%	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: 5: Albert St/Albert & Booth St



Lane Group	Ø10
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Lane Group Flow (vph)	
Turn Type	
Protected Phases	10
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	1.0
Minimum Split (s)	5.0
Total Split (s)	5.0
Total Split (%)	4%
Yellow Time (s)	2.0
All-Red Time (s)	0.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	Lag
Lead-Lag Optimize?	Yes
Recall Mode	Max
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (m)	
Queue Length 95th (m)	
Internal Link Dist (m)	
Turn Bay Length (m)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	

Intersection Summary



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	301	825	9	18	266	67	10	341	44	100	295	176
Future Volume (vph)	301	825	9	18	266	67	10	341	44	100	295	176
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	6.5	6.5	6.5	6.5	6.5	6.5		6.5		6.5	6.5	6.5
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	1.00		0.95		1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85		0.98		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		1.00		0.95	1.00	1.00
Satd. Flow (prot)	1676	1765	1500	1676	3353	1500		3293		1676	1765	1500
Flt Permitted	0.43	1.00	1.00	0.13	1.00	1.00		0.94		0.25	1.00	1.00
Satd. Flow (perm)	764	1765	1500	231	3353	1500		3105		434	1765	1500
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	334	917	10	20	296	74	11	379	49	111	328	196
RTOR Reduction (vph)	0	0	6	0	0	56	0	8	0	0	0	104
Lane Group Flow (vph)	334	917	4	20	296	18	0	431	0	111	328	92
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
Actuated Green, G (s)	48.5	48.5	48.5	30.5	30.5	30.5		33.5		63.5	58.5	58.5
Effective Green, g (s)	48.5	48.5	48.5	30.5	30.5	30.5		33.5		63.5	58.5	58.5
Actuated g/C Ratio	0.39	0.39	0.39	0.24	0.24	0.24		0.27		0.51	0.47	0.47
Clearance Time (s)	6.5	6.5	6.5	6.5	6.5	6.5		6.5		6.5	6.5	6.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	380	684	582	56	818	366		832		318	826	702
v/s Ratio Prot	0.08	c0.52			0.09					c0.03	c0.19	
v/s Ratio Perm	0.26		0.00	0.09		0.01		c0.14		0.15		0.06
v/c Ratio	0.88	1.34	0.01	0.36	0.36	0.05		0.52		0.35	0.40	0.13
Uniform Delay, d1	33.9	38.2	23.5	39.1	39.2	36.2		38.9		19.6	21.7	18.8
Progression Factor	0.97	0.98	1.00	1.00	1.00	1.00		1.00		1.00	1.00	1.00
Incremental Delay, d2	19.9	163.0	0.0	16.9	1.2	0.3		2.3		0.7	1.4	0.4
Delay (s)	52.6	200.5	23.5	56.0	40.4	36.4		41.2		20.2	23.2	19.2
Level of Service	D	F	C	E	D	D		D		C	C	B
Approach Delay (s)		159.9			40.5			41.2			21.4	
Approach LOS		F			D			D			C	

Intersection Summary			
HCM 2000 Control Delay	91.4	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	0.95		
Actuated Cycle Length (s)	125.0	Sum of lost time (s)	28.0
Intersection Capacity Utilization	99.8%	ICU Level of Service	F
Analysis Period (min)	15		

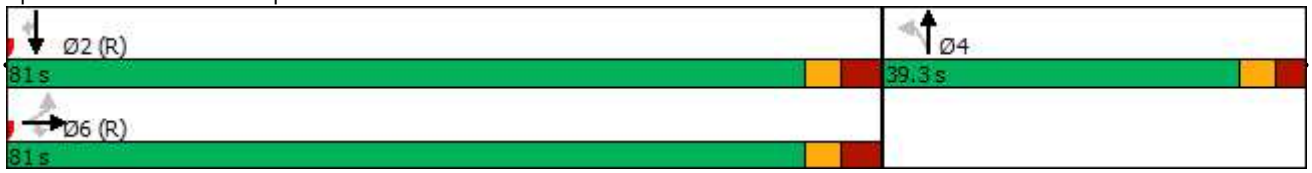
c Critical Lane Group

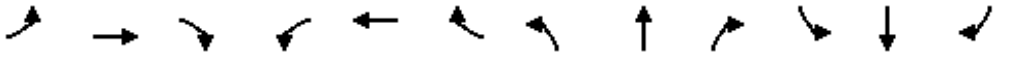
Lane Group	EBT	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	771	26	4	0	10	389
Future Volume (vph)	771	26	4	0	10	389
Lane Group Flow (vph)	976	29	0	10	223	220
Turn Type	NA	Perm	Perm	NA	NA	Perm
Protected Phases	6!			4	2!	
Permitted Phases		6	4			2
Detector Phase	6	6	4	4	2	2
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	29.1	29.1	39.0	39.0	29.1	29.1
Total Split (s)	81.0	81.0	39.3	39.3	81.0	81.0
Total Split (%)	67.3%	67.3%	32.7%	32.7%	67.3%	67.3%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	3.8	3.8	3.0	3.0	3.8	3.8
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	7.1	7.1		6.3	7.1	7.1
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	Max	Max	Max	Max	Max	Max
Act Effct Green (s)	73.9	73.9		33.0	73.9	73.9
Actuated g/C Ratio	0.61	0.61		0.27	0.61	0.61
v/c Ratio	0.48	0.03		0.02	0.23	0.23
Control Delay	13.6	3.1		0.1	2.1	1.8
Queue Delay	0.0	0.0		0.0	0.0	0.0
Total Delay	13.6	3.1		0.1	2.1	1.8
LOS	B	A		A	A	A
Approach Delay	13.3			0.1	2.0	
Approach LOS	B			A	A	
Queue Length 50th (m)	65.2	0.0		0.0	1.0	0.0
Queue Length 95th (m)	80.8	3.6		0.0	11.1	10.0
Internal Link Dist (m)	179.0			98.2	262.7	
Turn Bay Length (m)		15.0				
Base Capacity (vph)	2047	933		429	964	960
Starvation Cap Reductn	0	0		0	0	0
Spillback Cap Reductn	0	0		0	0	0
Storage Cap Reductn	0	0		0	0	0
Reduced v/c Ratio	0.48	0.03		0.02	0.23	0.23

Intersection Summary	
Cycle Length: 120.3	
Actuated Cycle Length: 120.3	
Offset: 87 (72%), Referenced to phase 2:SBT and 6:EBTL, Start of Green	
Natural Cycle: 70	
Control Type: Pretimed	
Maximum v/c Ratio: 0.48	
Intersection Signal Delay: 9.8	Intersection LOS: A
Intersection Capacity Utilization 46.6%	ICU Level of Service A
Analysis Period (min) 15	

! Phase conflict between lane groups.

Splits and Phases: 6: Empress Ave & Albert





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	107	771	26	0	0	0	4	0	5	0	10	389
Future Volume (vph)	107	771	26	0	0	0	4	0	5	0	10	389
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)		7.1	7.1					6.3			7.1	7.1
Lane Util. Factor		0.95	1.00					1.00			0.95	0.95
Frt		1.00	0.85					0.92			0.86	0.85
Flt Protected		0.99	1.00					0.98			1.00	1.00
Satd. Flow (prot)		3333	1500					1590			1437	1425
Flt Permitted		0.99	1.00					0.91			1.00	1.00
Satd. Flow (perm)		3333	1500					1468			1437	1425
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	119	857	29	0	0	0	4	0	6	0	11	432
RTOR Reduction (vph)	0	0	11	0	0	0	0	7	0	0	82	85
Lane Group Flow (vph)	0	976	18	0	0	0	0	3	0	0	141	135
Turn Type	Perm	NA	Perm				Perm	NA			NA	Perm
Protected Phases		6!						4			2!	
Permitted Phases	6!		6				4					2
Actuated Green, G (s)		73.9	73.9					33.0			73.9	73.9
Effective Green, g (s)		73.9	73.9					33.0			73.9	73.9
Actuated g/C Ratio		0.61	0.61					0.27			0.61	0.61
Clearance Time (s)		7.1	7.1					6.3			7.1	7.1
Lane Grp Cap (vph)		2047	921					402			882	875
v/s Ratio Prot											0.10	
v/s Ratio Perm		0.29	0.01					c0.00				0.09
v/c Ratio		0.48	0.02					0.01			0.16	0.15
Uniform Delay, d1		12.7	9.1					31.7			9.9	9.9
Progression Factor		1.00	1.00					1.00			1.00	1.00
Incremental Delay, d2		0.8	0.0					0.0			0.4	0.4
Delay (s)		13.5	9.1					31.8			10.3	10.3
Level of Service		B	A					C			B	B
Approach Delay (s)		13.3			0.0			31.8			10.3	
Approach LOS		B			A			C			B	

Intersection Summary			
HCM 2000 Control Delay	12.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.33		
Actuated Cycle Length (s)	120.3	Sum of lost time (s)	13.4
Intersection Capacity Utilization	46.6%	ICU Level of Service	A
Analysis Period (min)	15		

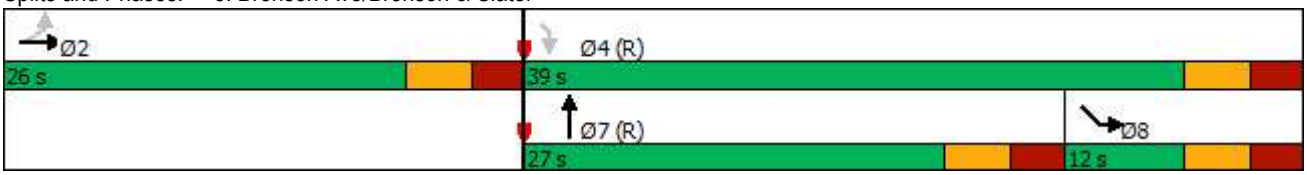
! Phase conflict between lane groups.
c Critical Lane Group

Lane Group	EBT	NBT	SEL	SER
Lane Configurations				
Traffic Volume (vph)	853	396	54	269
Future Volume (vph)	853	396	54	269
Lane Group Flow (vph)	1015	738	60	299
Turn Type	NA	NA	Prot	Perm
Protected Phases	2	7	8	
Permitted Phases				4
Detector Phase	2	7	8	4
Switch Phase				
Minimum Initial (s)	5.0	5.0	5.0	5.0
Minimum Split (s)	12.0	24.2	12.0	12.0
Total Split (s)	26.0	27.0	12.0	39.0
Total Split (%)	40.0%	41.5%	18.5%	60.0%
Yellow Time (s)	3.3	3.3	3.3	3.3
All-Red Time (s)	2.6	2.7	2.7	2.7
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.9	6.0	6.0	6.0
Lead/Lag		Lead	Lag	
Lead-Lag Optimize?		Yes	Yes	
Recall Mode	Max	Max	Max	Max
Act Effct Green (s)	20.1	21.0	6.0	33.0
Actuated g/C Ratio	0.31	0.32	0.09	0.51
v/c Ratio	0.98	0.67	0.39	0.39
Control Delay	48.8	19.3	35.7	11.8
Queue Delay	0.0	0.0	0.0	22.7
Total Delay	48.8	19.4	35.7	34.5
LOS	D	B	D	C
Approach Delay	48.8	19.4	34.7	
Approach LOS	D	B	C	
Queue Length 50th (m)	66.3	34.7	7.3	21.6
Queue Length 95th (m)	#106.8	52.7	18.0	38.4
Internal Link Dist (m)	176.3	290.7	27.9	
Turn Bay Length (m)				
Base Capacity (vph)	1033	1098	154	761
Starvation Cap Reductn	0	0	0	455
Spillback Cap Reductn	0	9	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.98	0.68	0.39	0.98

Intersection Summary	
Cycle Length: 65	
Actuated Cycle Length: 65	
Offset: 8 (12%), Referenced to phase 4:SER and 7:NBT, Start of Green	
Natural Cycle: 60	
Control Type: Pretimed	
Maximum v/c Ratio: 0.98	
Intersection Signal Delay: 36.1	Intersection LOS: D
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: 8: Bronson Ave/Bronson & Slater



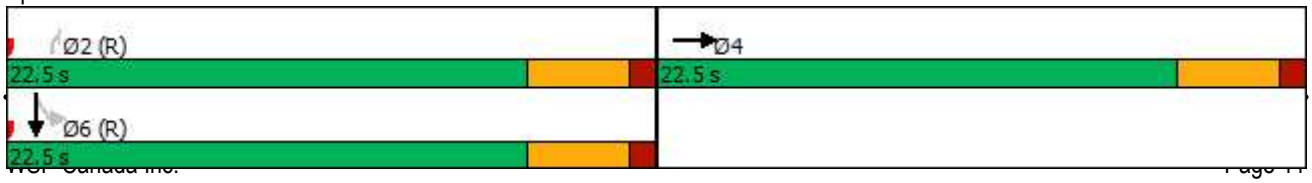
Movement	EBL	EBT	NBT	NBR	SEL	SER
Lane Configurations						
Traffic Volume (vph)	60	853	396	268	54	269
Future Volume (vph)	60	853	396	268	54	269
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Total Lost time (s)		5.9	6.0		6.0	6.0
Lane Util. Factor		0.95	0.95		1.00	1.00
Frt		1.00	0.94		1.00	0.85
Flt Protected		1.00	1.00		0.95	1.00
Satd. Flow (prot)		3342	3150		1676	1500
Flt Permitted		1.00	1.00		0.95	1.00
Satd. Flow (perm)		3342	3150		1676	1500
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	67	948	440	298	60	299
RTOR Reduction (vph)	0	0	82	0	0	0
Lane Group Flow (vph)	0	1015	656	0	60	299
Turn Type	Perm	NA	NA		Prot	Perm
Protected Phases		2	7		8	
Permitted Phases	2					4
Actuated Green, G (s)		20.1	21.0		6.0	33.0
Effective Green, g (s)		20.1	21.0		6.0	33.0
Actuated g/C Ratio		0.31	0.32		0.09	0.51
Clearance Time (s)		5.9	6.0		6.0	6.0
Lane Grp Cap (vph)		1033	1017		154	761
v/s Ratio Prot			c0.21		0.04	
v/s Ratio Perm		0.30				c0.20
v/c Ratio		0.98	0.65		0.39	0.39
Uniform Delay, d1		22.3	18.8		27.8	9.8
Progression Factor		1.00	1.00		1.00	1.00
Incremental Delay, d2		24.1	3.2		7.3	1.5
Delay (s)		46.4	22.0		35.0	11.4
Level of Service		D	C		D	B
Approach Delay (s)		46.4	22.0		15.3	
Approach LOS		D	C		B	

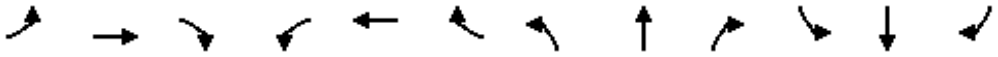
Intersection Summary			
HCM 2000 Control Delay	32.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	17.9
Intersection Capacity Utilization	66.4%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBT	NBR	SBL	SBT
Lane Configurations				
Traffic Volume (vph)	12	107	220	496
Future Volume (vph)	12	107	220	496
Lane Group Flow (vph)	17	119	244	617
Turn Type	NA	Perm	Perm	NA
Protected Phases	4			6
Permitted Phases		2	6	
Detector Phase	4	2	6	6
Switch Phase				
Minimum Initial (s)	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	22.5	22.5	22.5
Total Split (s)	22.5	22.5	22.5	22.5
Total Split (%)	50.0%	50.0%	50.0%	50.0%
Yellow Time (s)	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	Max	Max	Max	Max
Act Effct Green (s)	18.0	18.0	18.0	18.0
Actuated g/C Ratio	0.40	0.40	0.40	0.40
v/c Ratio	0.02	0.10	0.30	0.46
Control Delay	7.5	0.2	2.8	10.7
Queue Delay	0.0	0.0	1.0	6.4
Total Delay	7.5	0.2	3.8	17.2
LOS	A	A	A	B
Approach Delay	7.5			13.4
Approach LOS	A			B
Queue Length 50th (m)	0.6	0.0	0.0	17.4
Queue Length 95th (m)	3.2	0.0	9.6	28.2
Internal Link Dist (m)	74.6			29.8
Turn Bay Length (m)				
Base Capacity (vph)	685	1238	816	1340
Starvation Cap Reductn	0	0	353	661
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.02	0.10	0.53	0.91

Intersection Summary	
Cycle Length: 45	
Actuated Cycle Length: 45	
Offset: 0 (0%), Referenced to phase 2:NBR and 6:SBTL, Start of Green	
Natural Cycle: 45	
Control Type: Pretimed	
Maximum v/c Ratio: 0.46	
Intersection Signal Delay: 11.7	Intersection LOS: B
Intersection Capacity Utilization 35.3%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 10: Commissioner & Albert





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	12	4	0	0	0	0	0	107	220	496	59
Future Volume (vph)	0	12	4	0	0	0	0	0	107	220	496	59
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)		4.5							4.5	4.5	4.5	
Lane Util. Factor		1.00							1.00	1.00	0.95	
Frt		0.97							0.86	1.00	0.98	
Flt Protected		1.00							1.00	0.95	1.00	
Satd. Flow (prot)		1709							1526	1676	3299	
Flt Permitted		1.00							1.00	0.95	1.00	
Satd. Flow (perm)		1709							1526	1676	3299	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	0	13	4	0	0	0	0	0	119	244	551	66
RTOR Reduction (vph)	0	2	0	0	0	0	0	0	71	146	20	0
Lane Group Flow (vph)	0	15	0	0	0	0	0	0	48	98	597	0
Turn Type		NA							Perm	Perm	NA	
Protected Phases		4									6	
Permitted Phases									2	6		
Actuated Green, G (s)		18.0							18.0	18.0	18.0	
Effective Green, g (s)		18.0							18.0	18.0	18.0	
Actuated g/C Ratio		0.40							0.40	0.40	0.40	
Clearance Time (s)		4.5							4.5	4.5	4.5	
Lane Grp Cap (vph)		683							610	670	1319	
v/s Ratio Prot		c0.01									c0.18	
v/s Ratio Perm									0.03	0.06		
v/c Ratio		0.02							0.08	0.15	0.45	
Uniform Delay, d1		8.2							8.4	8.6	9.9	
Progression Factor		1.00							1.00	1.00	1.00	
Incremental Delay, d2		0.1							0.2	0.5	1.1	
Delay (s)		8.2							8.6	9.1	11.0	
Level of Service		A							A	A	B	
Approach Delay (s)		8.2			0.0			8.6			10.5	
Approach LOS		A			A			A			B	

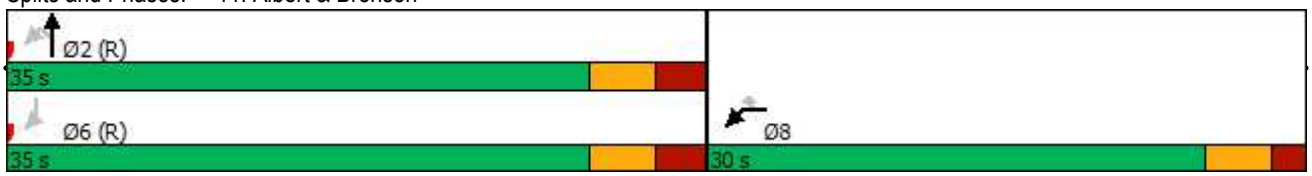
Intersection Summary			
HCM 2000 Control Delay	10.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.24		
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	35.3%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	WBL	WBR	NBL	NBT	SBR
Lane Configurations					
Traffic Volume (vph)	379	10	176	286	111
Future Volume (vph)	379	10	176	286	111
Lane Group Flow (vph)	421	11	196	318	123
Turn Type	Prot	Perm	Perm	NA	Perm
Protected Phases	8			2	
Permitted Phases		8	2		6
Detector Phase	8	8	2	2	6
Switch Phase					
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	26.1	26.1	27.9	27.9	23.9
Total Split (s)	30.0	30.0	35.0	35.0	35.0
Total Split (%)	46.2%	46.2%	53.8%	53.8%	53.8%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	1.8	1.8	2.6	2.6	2.6
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.1	5.1	5.9	5.9	5.9
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	Max	Max	Max	Max	Max
Act Effct Green (s)	24.9	24.9	29.1	29.1	29.1
Actuated g/C Ratio	0.38	0.38	0.45	0.45	0.45
v/c Ratio	0.34	0.02	0.23	0.40	0.15
Control Delay	15.2	0.1	0.4	6.0	0.4
Queue Delay	0.0	0.0	0.6	1.5	0.0
Total Delay	15.2	0.1	1.1	7.5	0.4
LOS	B	A	A	A	A
Approach Delay	14.8			5.1	
Approach LOS	B			A	
Queue Length 50th (m)	18.8	0.0	0.0	9.5	0.0
Queue Length 95th (m)	29.0	0.0	m0.0	m12.5	0.0
Internal Link Dist (m)	177.9			50.9	
Turn Bay Length (m)		50.0			
Base Capacity (vph)	1245	604	858	790	826
Starvation Cap Reductn	0	0	383	297	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.34	0.02	0.41	0.65	0.15

Intersection Summary	
Cycle Length: 65	
Actuated Cycle Length: 65	
Offset: 14 (22%), Referenced to phase 2:NBTL and 6:SBR, Start of Green	
Natural Cycle: 55	
Control Type: Pretimed	
Maximum v/c Ratio: 0.40	
Intersection Signal Delay: 8.5	Intersection LOS: A
Intersection Capacity Utilization 36.5%	ICU Level of Service A
Analysis Period (min) 15	

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

Splits and Phases: 11: Albert & Bronson



Movement	WBL	WBR	NBL	NBT	NBR	SBL	SBT	SBR	NEL	NER
Lane Configurations										
Traffic Volume (vph)	379	10	176	286	0	0	0	111	0	0
Future Volume (vph)	379	10	176	286	0	0	0	111	0	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	5.1	5.1	5.9	5.9				5.9		
Lane Util. Factor	0.97	1.00	1.00	1.00				1.00		
Frt	1.00	0.85	1.00	1.00				0.86		
Flt Protected	0.95	1.00	0.95	1.00				1.00		
Satd. Flow (prot)	3252	1500	1676	1765				1526		
Flt Permitted	0.95	1.00	0.95	1.00				1.00		
Satd. Flow (perm)	3252	1500	1676	1765				1526		
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	421	11	196	318	0	0	0	123	0	0
RTOR Reduction (vph)	0	7	108	0	0	0	0	68	0	0
Lane Group Flow (vph)	421	4	88	318	0	0	0	55	0	0
Turn Type	Prot	Perm	Perm	NA				Perm		
Protected Phases	8			2						
Permitted Phases		8	2					6		
Actuated Green, G (s)	24.9	24.9	29.1	29.1				29.1		
Effective Green, g (s)	24.9	24.9	29.1	29.1				29.1		
Actuated g/C Ratio	0.38	0.38	0.45	0.45				0.45		
Clearance Time (s)	5.1	5.1	5.9	5.9				5.9		
Lane Grp Cap (vph)	1245	574	750	790				683		
v/s Ratio Prot	c0.13			c0.18						
v/s Ratio Perm		0.00	0.05					0.04		
v/c Ratio	0.34	0.01	0.12	0.40				0.08		
Uniform Delay, d1	14.2	12.4	10.5	12.1				10.3		
Progression Factor	1.00	1.00	0.01	0.40				1.00		
Incremental Delay, d2	0.7	0.0	0.2	1.1				0.2		
Delay (s)	14.9	12.4	0.3	5.9				10.5		
Level of Service	B	B	A	A				B		
Approach Delay (s)	14.9			3.7			10.5		0.0	
Approach LOS	B			A			B		A	

Intersection Summary			
HCM 2000 Control Delay	9.0	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.37		
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	36.5%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBT	WBT	NBL
Lane Configurations			
Traffic Volume (vph)	1887	579	272
Future Volume (vph)	1887	579	272
Lane Group Flow (vph)	2097	643	341
Turn Type	NA	NA	Prot
Protected Phases	4	8	2
Permitted Phases			
Detector Phase	4	8	2
Switch Phase			
Minimum Initial (s)	5.0	5.0	5.0
Minimum Split (s)	36.7	23.7	26.9
Total Split (s)	95.0	95.0	35.0
Total Split (%)	73.1%	73.1%	26.9%
Yellow Time (s)	3.3	3.3	3.3
All-Red Time (s)	2.4	2.4	2.6
Lost Time Adjust (s)	0.0	0.0	0.0
Total Lost Time (s)	5.7	5.7	5.9
Lead/Lag			
Lead-Lag Optimize?			
Recall Mode	None	None	C-Max
Act Effct Green (s)	79.5	79.5	38.9
Actuated g/C Ratio	0.61	0.61	0.30
v/c Ratio	0.71	0.31	0.35
Control Delay	18.6	3.2	38.8
Queue Delay	0.0	0.0	0.0
Total Delay	18.6	3.2	38.8
LOS	B	A	D
Approach Delay	18.6	3.2	38.8
Approach LOS	B	A	D
Queue Length 50th (m)	133.0	0.4	37.4
Queue Length 95th (m)	118.8	0.4	57.0
Internal Link Dist (m)	74.9	134.0	213.7
Turn Bay Length (m)			
Base Capacity (vph)	3309	2303	965
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	19	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.64	0.28	0.35

Intersection Summary	
Cycle Length: 130	
Actuated Cycle Length: 130	
Offset: 101 (78%), Referenced to phase 2:NBL and 6:, Start of Green	
Natural Cycle: 65	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.71	
Intersection Signal Delay: 17.6	Intersection LOS: B
Intersection Capacity Utilization 57.5%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 13: Bay St & Wellington

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	1887	0	0	579	272	35
Future Volume (vph)	1887	0	0	579	272	35
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Total Lost time (s)	5.7			5.7	5.9	
Lane Util. Factor	0.91			0.95	0.97	
Frt	1.00			1.00	0.98	
Flt Protected	1.00			1.00	0.96	
Satd. Flow (prot)	4818			3353	3222	
Flt Permitted	1.00			1.00	0.96	
Satd. Flow (perm)	4818			3353	3222	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	2097	0	0	643	302	39
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	2097	0	0	643	341	0
Turn Type	NA			NA	Prot	
Protected Phases	4			8	2	
Permitted Phases						
Actuated Green, G (s)	79.5			79.5	38.9	
Effective Green, g (s)	79.5			79.5	38.9	
Actuated g/C Ratio	0.61			0.61	0.30	
Clearance Time (s)	5.7			5.7	5.9	
Vehicle Extension (s)	3.0			3.0	3.0	
Lane Grp Cap (vph)	2946			2050	964	
v/s Ratio Prot	c0.44			0.19	c0.11	
v/s Ratio Perm						
v/c Ratio	0.71			0.31	0.35	
Uniform Delay, d1	17.4			12.1	35.7	
Progression Factor	1.00			0.24	1.00	
Incremental Delay, d2	0.8			0.1	1.0	
Delay (s)	18.2			3.0	36.7	
Level of Service	B			A	D	
Approach Delay (s)	18.2			3.0	36.7	
Approach LOS	B			A	D	

Intersection Summary			
HCM 2000 Control Delay	17.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	11.6
Intersection Capacity Utilization	57.5%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

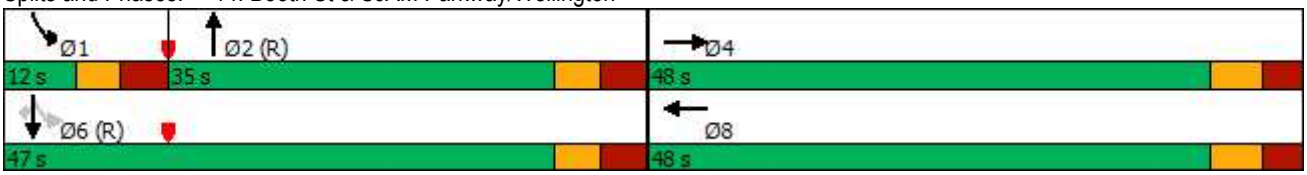
Lane Group	EBT	WBT	NBT	SBL	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	1331	708	744	112	1051	320
Future Volume (vph)	1331	708	744	112	1051	320
Lane Group Flow (vph)	1479	925	1009	124	1168	356
Turn Type	NA	NA	NA	pm+pt	NA	Perm
Protected Phases	4	8	2	1	6	
Permitted Phases				6		6
Detector Phase	4	8	2	1	6	6
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	40.4	40.4	31.8	11.8	37.9	37.9
Total Split (s)	48.0	48.0	35.0	12.0	47.0	47.0
Total Split (%)	50.5%	50.5%	36.8%	12.6%	49.5%	49.5%
Yellow Time (s)	3.7	3.7	3.3	3.3	3.3	3.3
All-Red Time (s)	3.1	3.1	3.5	3.5	3.5	3.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.8	6.8	6.8	6.8	6.8	6.8
Lead/Lag			Lag	Lead		
Lead-Lag Optimize?			Yes	Yes		
Recall Mode	None	None	C-Max	None	C-Max	C-Max
Act Effct Green (s)	41.2	41.2	28.2	40.2	40.2	40.2
Actuated g/C Ratio	0.43	0.43	0.30	0.42	0.42	0.42
v/c Ratio	1.02	0.65	1.02	0.75	0.82	0.52
Control Delay	55.8	23.9	67.7	47.6	30.3	17.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	55.8	23.9	67.7	47.6	30.3	17.4
LOS	E	C	E	D	C	B
Approach Delay	55.8	23.9	67.7		28.8	
Approach LOS	E	C	E		C	
Queue Length 50th (m)	~152.5	72.1	~104.1	14.5	102.2	35.0
Queue Length 95th (m)	#203.1	93.9	#148.7	#37.4	131.1	61.7
Internal Link Dist (m)	216.1	376.9	395.0		194.6	
Turn Bay Length (m)				150.0		55.0
Base Capacity (vph)	1454	1422	987	165	1418	691
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	1.02	0.65	1.02	0.75	0.82	0.52

Intersection Summary	
Cycle Length: 95	
Actuated Cycle Length: 95	
Offset: 31 (33%), Referenced to phase 2:NBT and 6:SBTL, Start of Green	
Natural Cycle: 105	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 1.02	
Intersection Signal Delay: 43.6	Intersection LOS: D
Intersection Capacity Utilization 89.6%	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: 14: Booth St & SJAM Parkway/Wellington



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	1331	0	0	708	124	0	744	164	112	1051	320
Future Volume (vph)	0	1331	0	0	708	124	0	744	164	112	1051	320
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)		6.8			6.8			6.8		6.8	6.8	6.8
Lane Util. Factor		0.95			0.95			0.95		1.00	0.95	1.00
Frt		1.00			0.98			0.97		1.00	1.00	0.85
Flt Protected		1.00			1.00			1.00		0.95	1.00	1.00
Satd. Flow (prot)		3353			3278			3262		1676	3353	1500
Flt Permitted		1.00			1.00			1.00		0.11	1.00	1.00
Satd. Flow (perm)		3353			3278			3262		202	3353	1500
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	0	1479	0	0	787	138	0	827	182	124	1168	356
RTOR Reduction (vph)	0	0	0	0	0	0	0	20	0	0	0	57
Lane Group Flow (vph)	0	1479	0	0	925	0	0	989	0	124	1168	299
Turn Type		NA			NA			NA		pm+pt	NA	Perm
Protected Phases		4			8			2		1	6	
Permitted Phases										6		6
Actuated Green, G (s)		41.2			41.2			28.2		40.2	40.2	40.2
Effective Green, g (s)		41.2			41.2			28.2		40.2	40.2	40.2
Actuated g/C Ratio		0.43			0.43			0.30		0.42	0.42	0.42
Clearance Time (s)		6.8			6.8			6.8		6.8	6.8	6.8
Vehicle Extension (s)		3.0			3.0			3.0		3.0	3.0	3.0
Lane Grp Cap (vph)		1454			1421			968		166	1418	634
v/s Ratio Prot		c0.44			0.28			c0.30		0.04	c0.35	
v/s Ratio Perm										0.28		0.20
v/c Ratio		1.02			0.65			1.02		0.75	0.82	0.47
Uniform Delay, d1		26.9			21.2			33.4		21.8	24.3	19.8
Progression Factor		1.00			1.00			1.00		1.00	1.00	1.00
Incremental Delay, d2		28.0			1.1			34.6		16.6	5.5	2.5
Delay (s)		54.9			22.3			68.0		38.4	29.8	22.3
Level of Service		D			C			E		D	C	C
Approach Delay (s)		54.9			22.3			68.0			28.8	
Approach LOS		D			C			E			C	

Intersection Summary			
HCM 2000 Control Delay	43.1	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.05		
Actuated Cycle Length (s)	95.0	Sum of lost time (s)	20.4
Intersection Capacity Utilization	89.6%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

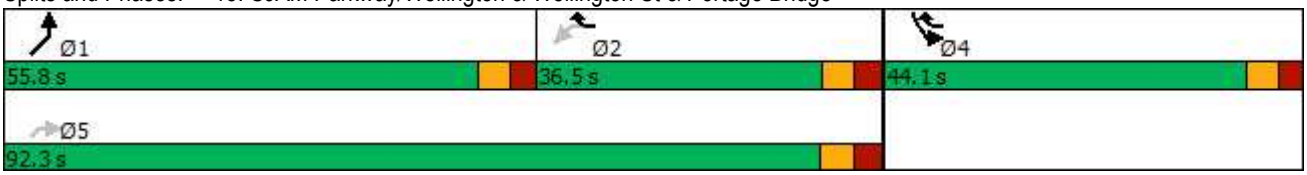
Lane Group	WBL	WBR	SBL	SBR	NEL	NER
Lane Configurations						
Traffic Volume (vph)	925	717	897	583	1029	793
Future Volume (vph)	925	717	897	583	1029	793
Lane Group Flow (vph)	1028	797	997	648	1143	881
Turn Type	Perm	pt+ov	Prot	Free	Prot	Perm
Protected Phases		2 4	4		1	
Permitted Phases	2			Free		5
Detector Phase	2	2 4	4		1	5
Switch Phase						
Minimum Initial (s)	5.0		5.0		5.0	5.0
Minimum Split (s)	26.5		44.1		43.1	11.7
Total Split (s)	36.5		44.1		55.8	92.3
Total Split (%)	26.8%		32.3%		40.9%	67.7%
Yellow Time (s)	3.3		3.3		3.3	3.5
All-Red Time (s)	3.2		2.8		2.8	3.2
Lost Time Adjust (s)	0.0		0.0		0.0	0.0
Total Lost Time (s)	6.5		6.1		6.1	6.7
Lead/Lag	Lag				Lead	
Lead-Lag Optimize?	Yes				Yes	
Recall Mode	None		None		None	None
Act Effct Green (s)	30.0	74.1	38.0	135.9	49.2	85.1
Actuated g/C Ratio	0.22	0.55	0.28	1.00	0.36	0.63
v/c Ratio	1.43	0.55	1.10	0.43	0.97	0.41
Control Delay	238.4	21.2	105.5	0.9	62.9	13.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	238.4	21.2	105.5	0.9	62.9	13.2
LOS	F	C	F	A	E	B
Approach Delay	143.5		64.3		41.3	
Approach LOS	F		E		D	
Queue Length 50th (m)	~202.8	78.2	~165.1	0.0	162.9	50.5
Queue Length 95th (m)	#245.6	99.2	#207.8	0.0	#210.4	62.1
Internal Link Dist (m)	177.8		125.3		376.9	
Turn Bay Length (m)	150.0	150.0		15.0	150.0	150.0
Base Capacity (vph)	721	1451	908	1500	1189	2160
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	1.43	0.55	1.10	0.43	0.96	0.41

Intersection Summary	
Cycle Length: 136.4	
Actuated Cycle Length: 135.9	
Natural Cycle: 145	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 1.43	
Intersection Signal Delay: 82.1	Intersection LOS: F
Intersection Capacity Utilization 101.4%	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: 15: SJAM Parkway/Wellington & Wellington St & Portage Bridge



Movement	WBL	WBR	SBL	SBR	NEL	NER
Lane Configurations						
Traffic Volume (vph)	925	717	897	583	1029	793
Future Volume (vph)	925	717	897	583	1029	793
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Total Lost time (s)	6.5	6.5	6.1	4.0	6.1	6.7
Lane Util. Factor	0.97	0.88	0.97	1.00	0.97	0.76
Frt	1.00	0.85	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	3252	2640	3252	1500	3252	3420
Flt Permitted	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	3269	2640	3252	1500	3252	3420
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	1028	797	997	648	1143	881
RTOR Reduction (vph)	0	12	0	0	0	7
Lane Group Flow (vph)	1028	785	997	648	1143	874
Turn Type	Perm	pt+ov	Prot	Free	Prot	Perm
Protected Phases		2 4	4		1	
Permitted Phases	2			Free		5
Actuated Green, G (s)	30.0	74.5	38.0	135.9	49.2	85.1
Effective Green, g (s)	30.0	74.5	38.0	135.9	49.2	85.1
Actuated g/C Ratio	0.22	0.55	0.28	1.00	0.36	0.63
Clearance Time (s)	6.5		6.1		6.1	6.7
Vehicle Extension (s)	3.0		3.0		3.0	3.0
Lane Grp Cap (vph)	721	1447	909	1500	1177	2141
v/s Ratio Prot		0.30	c0.31		c0.35	
v/s Ratio Perm	c0.31			0.43		0.26
v/c Ratio	1.43	0.54	1.10	0.43	0.97	0.41
Uniform Delay, d1	53.0	19.7	49.0	0.0	42.7	12.8
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	199.6	0.4	59.9	0.9	19.5	0.1
Delay (s)	252.6	20.2	108.8	0.9	62.2	12.9
Level of Service	F	C	F	A	E	B
Approach Delay (s)	151.1		66.3		40.7	
Approach LOS	F		E		D	

Intersection Summary			
HCM 2000 Control Delay	85.1	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.13		
Actuated Cycle Length (s)	135.9	Sum of lost time (s)	18.7
Intersection Capacity Utilization	101.4%	ICU Level of Service	G
Analysis Period (min)	15		

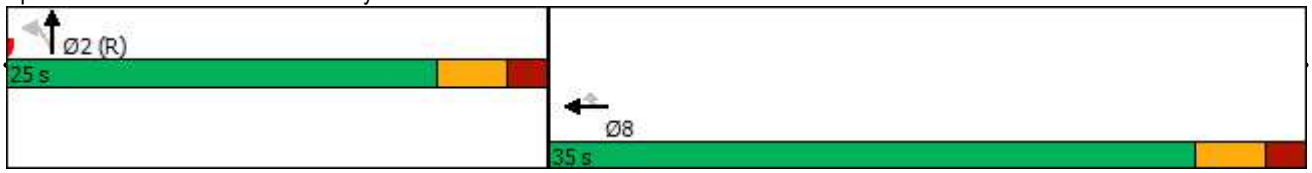
c Critical Lane Group

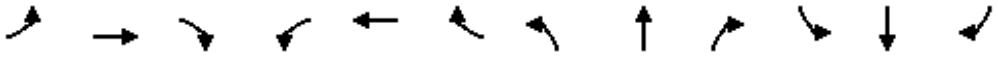
Lane Group	WBT	WBR	NBT
Lane Configurations			
Traffic Volume (vph)	134	158	257
Future Volume (vph)	134	158	257
Lane Group Flow (vph)	149	176	569
Turn Type	NA	Perm	NA
Protected Phases	8		2
Permitted Phases		8	
Detector Phase	8	8	2
Switch Phase			
Minimum Initial (s)	5.0	5.0	5.0
Minimum Split (s)	23.2	23.2	23.2
Total Split (s)	35.0	35.0	25.0
Total Split (%)	58.3%	58.3%	41.7%
Yellow Time (s)	3.3	3.3	3.3
All-Red Time (s)	1.9	1.9	1.9
Lost Time Adjust (s)	0.0	0.0	0.0
Total Lost Time (s)	5.2	5.2	5.2
Lead/Lag			
Lead-Lag Optimize?			
Recall Mode	None	None	C-Max
Act Effct Green (s)	8.3	8.3	41.3
Actuated g/C Ratio	0.14	0.14	0.69
v/c Ratio	0.32	0.49	0.24
Control Delay	24.6	9.4	2.0
Queue Delay	0.0	0.0	0.3
Total Delay	24.6	9.4	2.4
LOS	C	A	A
Approach Delay	16.4		2.4
Approach LOS	B		A
Queue Length 50th (m)	8.3	0.0	1.5
Queue Length 95th (m)	14.9	14.1	m4.2
Internal Link Dist (m)	133.2		48.0
Turn Bay Length (m)		50.0	
Base Capacity (vph)	1665	833	2341
Starvation Cap Reductn	0	0	1152
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.09	0.21	0.48

Intersection Summary	
Cycle Length: 60	
Actuated Cycle Length: 60	
Offset: 58 (97%), Referenced to phase 2:NBTL and 6:, Start of Green	
Natural Cycle: 50	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.49	
Intersection Signal Delay: 7.5	Intersection LOS: A
Intersection Capacity Utilization 34.3%	ICU Level of Service A
Analysis Period (min) 15	

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

Splits and Phases: 20: Albert & Bay St





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	0	134	158	255	257	0	0	0	0
Future Volume (vph)	0	0	0	0	134	158	255	257	0	0	0	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)					5.2	5.2		5.2				
Lane Util. Factor					0.95	1.00		0.95				
Frt					1.00	0.85		1.00				
Flt Protected					1.00	1.00		0.98				
Satd. Flow (prot)					3353	1500		3272				
Flt Permitted					1.00	1.00		0.98				
Satd. Flow (perm)					3353	1500		3272				
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	0	0	0	0	149	176	283	286	0	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	152	0	88	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	149	24	0	481	0	0	0	0
Turn Type					NA	Perm	Perm	NA				
Protected Phases					8			2				
Permitted Phases						8	2					
Actuated Green, G (s)					8.3	8.3		41.3				
Effective Green, g (s)					8.3	8.3		41.3				
Actuated g/C Ratio					0.14	0.14		0.69				
Clearance Time (s)					5.2	5.2		5.2				
Vehicle Extension (s)					3.0	3.0		3.0				
Lane Grp Cap (vph)					463	207		2252				
v/s Ratio Prot					c0.04							
v/s Ratio Perm						0.02		0.15				
v/c Ratio					0.32	0.12		0.21				
Uniform Delay, d1					23.3	22.6		3.4				
Progression Factor					1.00	1.00		1.02				
Incremental Delay, d2					0.4	0.3		0.1				
Delay (s)					23.7	22.9		3.6				
Level of Service					C	C		A				
Approach Delay (s)		0.0			23.3			3.6			0.0	
Approach LOS		A			C			A			A	

Intersection Summary			
HCM 2000 Control Delay	10.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.23		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	10.4
Intersection Capacity Utilization	34.3%	ICU Level of Service	A
Analysis Period (min)	15		

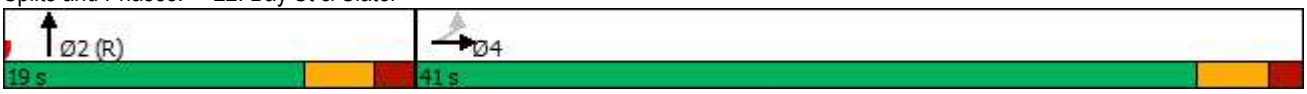
c Critical Lane Group

Lane Group	EBT	NBT
Lane Configurations		
Traffic Volume (vph)	902	399
Future Volume (vph)	902	399
Lane Group Flow (vph)	1128	629
Turn Type	NA	NA
Protected Phases	4	2
Permitted Phases		
Detector Phase	4	2
Switch Phase		
Minimum Initial (s)	5.0	5.0
Minimum Split (s)	35.0	19.0
Total Split (s)	41.0	19.0
Total Split (%)	68.3%	31.7%
Yellow Time (s)	3.3	3.3
All-Red Time (s)	1.7	1.9
Lost Time Adjust (s)	0.0	0.0
Total Lost Time (s)	5.0	5.2
Lead/Lag		
Lead-Lag Optimize?		
Recall Mode	None	C-Max
Act Effct Green (s)	28.0	21.8
Actuated g/C Ratio	0.47	0.36
v/c Ratio	0.72	0.99
Control Delay	14.6	58.4
Queue Delay	0.0	0.0
Total Delay	14.6	58.4
LOS	B	E
Approach Delay	14.6	58.4
Approach LOS	B	E
Queue Length 50th (m)	49.2	67.6
Queue Length 95th (m)	53.1	#156.1
Internal Link Dist (m)	195.9	236.7
Turn Bay Length (m)		
Base Capacity (vph)	2015	635
Starvation Cap Reductn	0	0
Spillback Cap Reductn	0	0
Storage Cap Reductn	0	0
Reduced v/c Ratio	0.56	0.99

Intersection Summary	
Cycle Length: 60	
Actuated Cycle Length: 60	
Offset: 3 (5%), Referenced to phase 2:NBT and 6:, Start of Green	
Natural Cycle: 65	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.99	
Intersection Signal Delay: 30.3	Intersection LOS: C
Intersection Capacity Utilization 71.2%	ICU Level of Service C
Analysis Period (min) 15	

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

Splits and Phases: 22: Bay St & Slater



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	113	902	0	0	0	0	0	399	167	0	0	0
Future Volume (vph)	113	902	0	0	0	0	0	399	167	0	0	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)		5.0						5.2				
Lane Util. Factor		0.95						1.00				
Frt		1.00						0.96				
Flt Protected		0.99						1.00				
Satd. Flow (prot)		3334						1694				
Flt Permitted		0.99						1.00				
Satd. Flow (perm)		3334						1694				
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	126	1002	0	0	0	0	0	443	186	0	0	0
RTOR Reduction (vph)	0	21	0	0	0	0	0	21	0	0	0	0
Lane Group Flow (vph)	0	1107	0	0	0	0	0	608	0	0	0	0
Turn Type	Perm	NA						NA				
Protected Phases		4						2				
Permitted Phases	4											
Actuated Green, G (s)		28.0						21.8				
Effective Green, g (s)		28.0						21.8				
Actuated g/C Ratio		0.47						0.36				
Clearance Time (s)		5.0						5.2				
Vehicle Extension (s)		3.0						3.0				
Lane Grp Cap (vph)		1555						615				
v/s Ratio Prot								c0.36				
v/s Ratio Perm		0.33										
v/c Ratio		0.71						0.99				
Uniform Delay, d1		12.8						19.0				
Progression Factor		1.00						1.00				
Incremental Delay, d2		1.6						33.6				
Delay (s)		14.3						52.6				
Level of Service		B						D				
Approach Delay (s)		14.3			0.0			52.6			0.0	
Approach LOS		B			A			D			A	

Intersection Summary			
HCM 2000 Control Delay	28.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	10.2
Intersection Capacity Utilization	71.2%	ICU Level of Service	C
Analysis Period (min)	15		

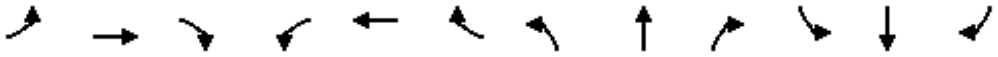
c Critical Lane Group

Lane Group	WBT	SBT	Ø5
Lane Configurations			
Traffic Volume (vph)	254	817	
Future Volume (vph)	254	817	
Lane Group Flow (vph)	551	950	
Turn Type	NA	NA	
Protected Phases	8	6	5
Permitted Phases			
Detector Phase	8	6	
Switch Phase			
Minimum Initial (s)	5.0	5.0	5.0
Minimum Split (s)	23.4	23.5	10.0
Total Split (s)	27.0	28.0	10.0
Total Split (%)	41.5%	43.1%	15%
Yellow Time (s)	3.3	3.3	2.0
All-Red Time (s)	2.1	2.2	0.0
Lost Time Adjust (s)	0.0	0.0	
Total Lost Time (s)	5.4	5.5	
Lead/Lag		Lag	Lead
Lead-Lag Optimize?		Yes	Yes
Recall Mode	None	C-Max	Max
Act Effct Green (s)	11.5	22.5	
Actuated g/C Ratio	0.18	0.35	
v/c Ratio	0.69	0.57	
Control Delay	16.7	17.9	
Queue Delay	0.0	0.0	
Total Delay	16.7	17.9	
LOS	B	B	
Approach Delay	16.7	17.9	
Approach LOS	B	B	
Queue Length 50th (m)	17.2	44.1	
Queue Length 95th (m)	28.5	m43.1	
Internal Link Dist (m)	197.0	214.4	
Turn Bay Length (m)			
Base Capacity (vph)	1266	1663	
Starvation Cap Reductn	0	0	
Spillback Cap Reductn	0	0	
Storage Cap Reductn	0	0	
Reduced v/c Ratio	0.44	0.57	

Intersection Summary	
Cycle Length: 65	
Actuated Cycle Length: 65	
Offset: 24 (37%), Referenced to phase 2: and 6:SBT, Start of Green	
Natural Cycle: 60	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.69	
Intersection Signal Delay: 17.5	Intersection LOS: B
Intersection Capacity Utilization 52.9%	ICU Level of Service A
Analysis Period (min) 15	

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

Splits and Phases: 27: Albert/Albert St & Lyon St N



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	242	254	0	0	0	0	0	817	38
Future Volume (vph)	0	0	0	242	254	0	0	0	0	0	817	38
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)					5.4						5.5	
Lane Util. Factor					0.95						0.91	
Frt					1.00						0.99	
Flt Protected					0.98						1.00	
Satd. Flow (prot)					3273						4786	
Flt Permitted					0.98						1.00	
Satd. Flow (perm)					3273						4786	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	0	0	0	269	282	0	0	0	0	0	908	42
RTOR Reduction (vph)	0	0	0	0	221	0	0	0	0	0	8	0
Lane Group Flow (vph)	0	0	0	0	330	0	0	0	0	0	942	0
Turn Type				Perm	NA						NA	
Protected Phases					8						6	
Permitted Phases				8								
Actuated Green, G (s)					11.5						22.5	
Effective Green, g (s)					11.5						22.5	
Actuated g/C Ratio					0.18						0.35	
Clearance Time (s)					5.4						5.5	
Vehicle Extension (s)					3.0						3.0	
Lane Grp Cap (vph)					579						1656	
v/s Ratio Prot											c0.20	
v/s Ratio Perm					0.10							
v/c Ratio					0.57						0.57	
Uniform Delay, d1					24.5						17.3	
Progression Factor					1.00						0.99	
Incremental Delay, d2					1.3						0.9	
Delay (s)					25.8						18.1	
Level of Service					C						B	
Approach Delay (s)		0.0			25.8			0.0			18.1	
Approach LOS		A			C			A			B	

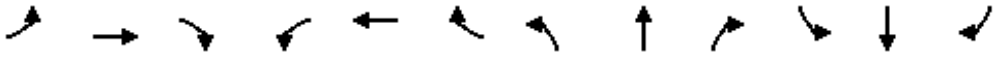
Intersection Summary			
HCM 2000 Control Delay	20.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.37		
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	12.9
Intersection Capacity Utilization	52.9%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBT	EBR	SBL	SBT
Lane Configurations				
Traffic Volume (vph)	741	200	266	771
Future Volume (vph)	741	200	266	771
Lane Group Flow (vph)	823	222	296	857
Turn Type	NA	Perm	pm+pt	NA
Protected Phases	4		1	6
Permitted Phases		4	6	
Detector Phase	4	4	1	6
Switch Phase				
Minimum Initial (s)	5.0	5.0	5.0	5.0
Minimum Split (s)	21.2	21.2	10.3	29.3
Total Split (s)	25.0	25.0	15.0	40.0
Total Split (%)	38.5%	38.5%	23.1%	61.5%
Yellow Time (s)	3.3	3.3	3.3	3.3
All-Red Time (s)	1.9	1.9	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.2	5.2	5.3	5.3
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	None	None	None	C-Max
Act Effct Green (s)	19.1	19.1	35.4	35.4
Actuated g/C Ratio	0.29	0.29	0.54	0.54
v/c Ratio	0.84	0.42	0.32	0.47
Control Delay	30.6	10.6	3.1	4.1
Queue Delay	0.0	0.0	0.4	0.2
Total Delay	30.6	10.6	3.6	4.4
LOS	C	B	A	A
Approach Delay	26.4			4.1
Approach LOS	C			A
Queue Length 50th (m)	50.1	8.5	3.3	8.8
Queue Length 95th (m)	#78.0	24.5	6.8	12.4
Internal Link Dist (m)	132.9			47.5
Turn Bay Length (m)		50.0		
Base Capacity (vph)	1021	548	930	1827
Starvation Cap Reductn	0	0	284	329
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.81	0.41	0.46	0.57

Intersection Summary	
Cycle Length: 65	
Actuated Cycle Length: 65	
Offset: 24 (37%), Referenced to phase 2: and 6:SBTL, Start of Green	
Natural Cycle: 55	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.84	
Intersection Signal Delay: 14.7	Intersection LOS: B
Intersection Capacity Utilization 52.9%	ICU Level of Service A
Analysis Period (min) 15	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	

Splits and Phases: 28: Lyon St N & Slater St



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	741	200	0	0	0	0	0	0	266	771	0
Future Volume (vph)	0	741	200	0	0	0	0	0	0	266	771	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)		5.2	5.2							5.3	5.3	
Lane Util. Factor		0.95	1.00							1.00	0.95	
Frt		1.00	0.85							1.00	1.00	
Flt Protected		1.00	1.00							0.95	1.00	
Satd. Flow (prot)		3353	1500							1676	3353	
Flt Permitted		1.00	1.00							0.95	1.00	
Satd. Flow (perm)		3353	1500							1676	3353	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	0	823	222	0	0	0	0	0	0	296	857	0
RTOR Reduction (vph)	0	0	93	0	0	0	0	0	0	17	0	0
Lane Group Flow (vph)	0	823	129	0	0	0	0	0	0	279	857	0
Turn Type		NA	Perm							pm+pt	NA	
Protected Phases		4								1	6	
Permitted Phases			4							6		
Actuated Green, G (s)		19.1	19.1							35.4	35.4	
Effective Green, g (s)		19.1	19.1							35.4	35.4	
Actuated g/C Ratio		0.29	0.29							0.54	0.54	
Clearance Time (s)		5.2	5.2							5.3	5.3	
Vehicle Extension (s)		3.0	3.0							3.0	3.0	
Lane Grp Cap (vph)		985	440							912	1826	
v/s Ratio Prot		c0.25								0.17	c0.26	
v/s Ratio Perm			0.09									
v/c Ratio		0.84	0.29							0.31	0.47	
Uniform Delay, d1		21.5	17.7							8.1	9.1	
Progression Factor		1.00	1.00							0.32	0.37	
Incremental Delay, d2		6.2	0.4							0.2	0.7	
Delay (s)		27.7	18.1							2.8	4.1	
Level of Service		C	B							A	A	
Approach Delay (s)		25.7			0.0			0.0			3.7	
Approach LOS		C			A			A			A	

Intersection Summary			
HCM 2000 Control Delay	14.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	10.5
Intersection Capacity Utilization	52.9%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

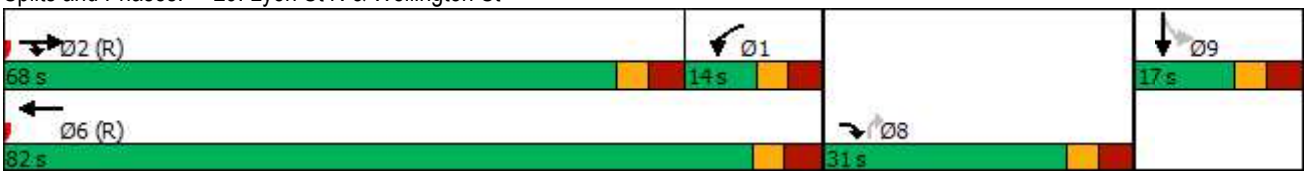
Lane Group	EBT	EBR	WBL	WBT	NBR	Ø9
Lane Configurations						
Traffic Volume (vph)	639	1035	117	571	9	
Future Volume (vph)	639	1035	117	571	9	
Lane Group Flow (vph)	710	1150	130	634	10	
Turn Type	NA	custom	Prot	NA	Perm	
Protected Phases	2	2 8	1	6		9
Permitted Phases					8	
Detector Phase	2	2 8	1	6	8	
Switch Phase						
Minimum Initial (s)	5.0		5.0	5.0	5.0	5.0
Minimum Split (s)	31.0		11.9	25.3	31.0	25.1
Total Split (s)	68.0		14.0	82.0	31.0	17.0
Total Split (%)	52.3%		10.8%	63.1%	23.8%	13%
Yellow Time (s)	3.3		3.3	3.3	3.3	3.3
All-Red Time (s)	3.6		3.6	4.0	3.6	3.8
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	
Total Lost Time (s)	6.9		6.9	7.3	6.9	
Lead/Lag	Lead		Lag			
Lead-Lag Optimize?	Yes		Yes			
Recall Mode	C-Max		None	C-Max	Max	Max
Act Effct Green (s)	61.1	85.2	7.1	74.7	24.1	
Actuated g/C Ratio	0.47	0.66	0.05	0.57	0.19	
v/c Ratio	0.86	0.66	1.43	0.33	0.02	
Control Delay	33.5	7.7	287.4	15.1	0.1	
Queue Delay	1.0	0.0	0.0	0.0	0.0	
Total Delay	34.5	7.7	287.4	15.1	0.1	
LOS	C	A	F	B	A	
Approach Delay	17.9			61.4		
Approach LOS	B			E		
Queue Length 50th (m)	85.0	52.7	~47.2	45.0	0.0	
Queue Length 95th (m)	#124.9	68.0	#89.8	57.3	0.0	
Internal Link Dist (m)	134.0			168.5		
Turn Bay Length (m)						
Base Capacity (vph)	829	1730	91	1926	568	
Starvation Cap Reductn	25	4	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	
Reduced v/c Ratio	0.88	0.67	1.43	0.33	0.02	

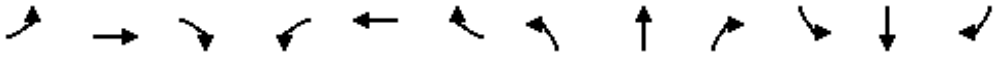
Intersection Summary	
Cycle Length: 130	
Actuated Cycle Length: 130	
Offset: 120 (92%), Referenced to phase 2:EBT and 6:WBT, Start of Green	
Natural Cycle: 130	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 1.43	
Intersection Signal Delay: 30.5	Intersection LOS: C
Intersection Capacity Utilization 56.6%	ICU Level of Service B
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: 29: Lyon St N & Wellington St





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	639	1035	117	571	0	0	0	9	0	0	0
Future Volume (vph)	0	639	1035	117	571	0	0	0	9	0	0	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)		6.9	6.9	6.9	7.3				6.9			
Lane Util. Factor		1.00	0.88	1.00	0.95				1.00			
Frt		1.00	0.85	1.00	1.00				0.86			
Flt Protected		1.00	1.00	0.95	1.00				1.00			
Satd. Flow (prot)		1765	2640	1676	3353				1526			
Flt Permitted		1.00	1.00	0.95	1.00				1.00			
Satd. Flow (perm)		1765	2640	1676	3353				1526			
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	0	710	1150	130	634	0	0	0	10	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	8	0	0	0
Lane Group Flow (vph)	0	710	1150	130	634	0	0	0	2	0	0	0
Turn Type		NA	custom	Prot	NA				Perm			
Protected Phases		2	2 8	1	6						9	
Permitted Phases									8	9		
Actuated Green, G (s)		61.1	85.2	7.1	74.7				24.1			
Effective Green, g (s)		61.1	85.2	7.1	74.7				24.1			
Actuated g/C Ratio		0.47	0.66	0.05	0.57				0.19			
Clearance Time (s)		6.9		6.9	7.3				6.9			
Vehicle Extension (s)		3.0		3.0	3.0				3.0			
Lane Grp Cap (vph)		829	1730	91	1926				282			
v/s Ratio Prot		c0.40	c0.44	c0.08	0.19							
v/s Ratio Perm									0.00			
v/c Ratio		0.86	0.66	1.43	0.33				0.01			
Uniform Delay, d1		30.6	13.7	61.5	14.5				43.2			
Progression Factor		0.78	0.86	1.00	1.00				1.00			
Incremental Delay, d2		8.8	1.6	244.8	0.5				0.0			
Delay (s)		32.6	13.4	306.3	15.0				43.2			
Level of Service		C	B	F	B				D			
Approach Delay (s)		20.7			64.5			43.2			0.0	
Approach LOS		C			E			D			A	

Intersection Summary			
HCM 2000 Control Delay	33.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	27.8
Intersection Capacity Utilization	56.6%	ICU Level of Service	B
Analysis Period (min)	15		

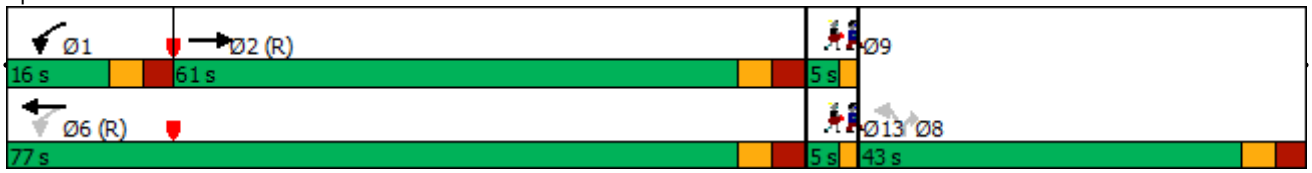
c Critical Lane Group

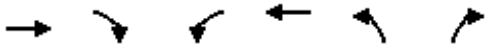
Lane Group	EBT	WBL	WBT	NBL	NBR	Ø9	Ø13
Lane Configurations							
Traffic Volume (vph)	388	300	700	5	8		
Future Volume (vph)	388	300	700	5	8		
Lane Group Flow (vph)	969	333	778	6	9		
Turn Type	NA	pm+pt	NA	Perm	Perm		
Protected Phases	2	1	6			9	13
Permitted Phases		6		8	8		
Detector Phase	2	1	6	8	8		
Switch Phase							
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	1.0	1.0
Minimum Split (s)	31.8	11.4	31.8	29.3	29.3	3.0	3.0
Total Split (s)	61.0	16.0	77.0	43.0	43.0	5.0	5.0
Total Split (%)	48.8%	12.8%	61.6%	34.4%	34.4%	4%	4%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	2.0	2.0
All-Red Time (s)	3.5	2.9	3.5	3.0	3.0	0.0	0.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		
Total Lost Time (s)	6.8	6.2	6.8	6.3	6.3		
Lead/Lag	Lag	Lead					
Lead-Lag Optimize?	Yes	Yes					
Recall Mode	C-Max	None	C-Max	None	None	None	None
Act Effct Green (s)	79.1	113.3	116.8	6.4	6.4		
Actuated g/C Ratio	0.63	0.91	0.93	0.05	0.05		
v/c Ratio	0.47	0.52	0.25	0.07	0.12		
Control Delay	8.6	25.9	0.1	57.6	59.4		
Queue Delay	0.0	0.0	0.0	0.0	0.0		
Total Delay	8.6	25.9	0.1	57.6	59.4		
LOS	A	C	A	E	E		
Approach Delay	8.6		7.8	58.7			
Approach LOS	A		A	E			
Queue Length 50th (m)	31.4	51.5	0.0	1.5	2.3		
Queue Length 95th (m)	63.7	m37.3	m1.3	6.3	8.1		
Internal Link Dist (m)	195.9		296.6	186.4			
Turn Bay Length (m)		115.0					
Base Capacity (vph)	2061	642	3133	492	440		
Starvation Cap Reductn	0	0	0	0	0		
Spillback Cap Reductn	0	0	0	0	0		
Storage Cap Reductn	0	0	0	0	0		
Reduced v/c Ratio	0.47	0.52	0.25	0.01	0.02		

Intersection Summary	
Cycle Length: 125	
Actuated Cycle Length: 125	
Offset: 65 (52%), Referenced to phase 2:EBT and 6:WBTL, Start of Green	
Natural Cycle: 90	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.52	
Intersection Signal Delay: 8.6	Intersection LOS: A
Intersection Capacity Utilization 65.5%	ICU Level of Service C
Analysis Period (min) 15	

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

Splits and Phases: 4: Preston St & Albert St





Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	388	484	300	700	5	8
Future Volume (vph)	388	484	300	700	5	8
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Total Lost time (s)	6.8		6.2	6.8	6.3	6.3
Lane Util. Factor	0.95		1.00	0.95	1.00	1.00
Frt	0.92		1.00	1.00	1.00	0.85
Flt Protected	1.00		0.95	1.00	0.95	1.00
Satd. Flow (prot)	3074		1676	3353	1676	1500
Flt Permitted	1.00		0.23	1.00	0.95	1.00
Satd. Flow (perm)	3074		400	3353	1676	1500
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	431	538	333	778	6	9
RTOR Reduction (vph)	126	0	0	0	0	0
Lane Group Flow (vph)	843	0	333	778	6	9
Turn Type	NA		pm+pt	NA	Perm	Perm
Protected Phases	2		1	6		
Permitted Phases			6		8	8
Actuated Green, G (s)	75.3		109.0	109.0	2.9	2.9
Effective Green, g (s)	75.3		109.0	109.0	2.9	2.9
Actuated g/C Ratio	0.60		0.87	0.87	0.02	0.02
Clearance Time (s)	6.8		6.2	6.8	6.3	6.3
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	1851		629	2923	38	34
v/s Ratio Prot	0.27		c0.12	0.23		
v/s Ratio Perm			c0.35		0.00	c0.01
v/c Ratio	0.46		0.53	0.27	0.16	0.26
Uniform Delay, d1	13.6		5.3	1.3	59.9	60.0
Progression Factor	1.00		8.99	0.09	1.00	1.00
Incremental Delay, d2	0.8		0.2	0.1	1.9	4.1
Delay (s)	14.4		47.8	0.2	61.8	64.1
Level of Service	B		D	A	E	E
Approach Delay (s)	14.4			14.4	63.2	
Approach LOS	B			B	E	

Intersection Summary			
HCM 2000 Control Delay	14.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	125.0	Sum of lost time (s)	21.3
Intersection Capacity Utilization	65.5%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR	Ø9
Lane Configurations												
Traffic Volume (vph)	388	484	22	34	947	107	14	388	36	279	157	
Future Volume (vph)	388	484	22	34	947	107	14	388	36	279	157	
Lane Group Flow (vph)	431	538	24	38	1052	119	0	480	40	310	174	
Turn Type	pm+pt	NA	Perm	Perm	NA	Perm	Perm	NA	pm+pt	NA	Perm	
Protected Phases	5	2			6			8	7	4		9
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	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	1.0
Minimum Split (s)	11.5	36.5	36.5	36.5	36.5	36.5	34.5	34.5	11.5	34.5	34.5	5.0
Total Split (s)	29.0	71.0	71.0	42.0	42.0	42.0	38.0	38.0	11.0	49.0	49.0	5.0
Total Split (%)	23.2%	56.8%	56.8%	33.6%	33.6%	33.6%	30.4%	30.4%	8.8%	39.2%	39.2%	4%
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	2.0
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	0.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.5	6.5	6.5	6.5	6.5	6.5		6.5	6.5	6.5	6.5	
Lead/Lag	Lead			Lag	Lag	Lag			Lead			
Lead-Lag Optimize?	Yes			Yes	Yes	Yes			Yes			
Recall Mode	None	C-Max	C-Max	C-Max	C-Max	C-Max	Max	Max	None	Max	Max	Max
Act Effct Green (s)	64.5	64.5	64.5	35.5	35.5	35.5		31.5	47.0	42.5	42.5	
Actuated g/C Ratio	0.52	0.52	0.52	0.28	0.28	0.28		0.25	0.38	0.34	0.34	
v/c Ratio	1.20	0.59	0.03	0.16	1.11	0.23		0.61	0.19	0.52	0.28	
Control Delay	145.1	27.7	1.3	36.0	104.1	6.7		44.7	26.9	36.8	5.4	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	
Total Delay	145.1	27.7	1.3	36.0	104.1	6.7		44.7	26.9	36.8	5.4	
LOS	F	C	A	D	F	A		D	C	D	A	
Approach Delay		78.0			92.4			44.7		25.6		
Approach LOS		E			F			D		C		
Queue Length 50th (m)	~119.6	107.6	0.0	7.4	~163.0	0.0		57.3	6.5	63.9	0.0	
Queue Length 95th (m)	#186.4	151.4	m1.2	17.1	#206.1	14.1		76.2	14.4	93.5	15.7	
Internal Link Dist (m)		296.6			179.0			146.1		395.0		
Turn Bay Length (m)			45.0								126.0	
Base Capacity (vph)	359	910	805	232	952	513		786	209	600	624	
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	0.59	0.03	0.16	1.11	0.23		0.61	0.19	0.52	0.28	

Intersection Summary	
Cycle Length: 125	
Actuated Cycle Length: 125	
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: 1.20	
Intersection Signal Delay: 69.9	Intersection LOS: E
Intersection Capacity Utilization 98.2%	ICU Level of Service F
Analysis Period (min) 15	

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

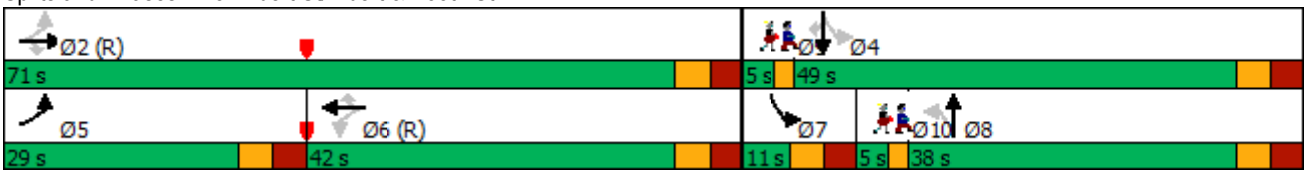
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

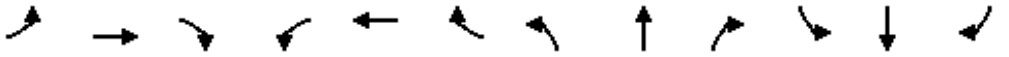
Lane Group	Ø10
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Lane Group Flow (vph)	
Turn Type	
Protected Phases	10
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	1.0
Minimum Split (s)	5.0
Total Split (s)	5.0
Total Split (%)	4%
Yellow Time (s)	2.0
All-Red Time (s)	0.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	Lag
Lead-Lag Optimize?	Yes
Recall Mode	Max
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (m)	
Queue Length 95th (m)	
Internal Link Dist (m)	
Turn Bay Length (m)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	

Intersection Summary

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

Splits and Phases: 5: Albert St/Albert & Booth St





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	388	484	22	34	947	107	14	388	30	36	279	157
Future Volume (vph)	388	484	22	34	947	107	14	388	30	36	279	157
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	6.5	6.5	6.5	6.5	6.5	6.5		6.5		6.5	6.5	6.5
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	1.00		0.95		1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85		0.99		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		1.00		0.95	1.00	1.00
Satd. Flow (prot)	1676	1765	1500	1676	3353	1500		3313		1676	1765	1500
Flt Permitted	0.10	1.00	1.00	0.46	1.00	1.00		0.93		0.25	1.00	1.00
Satd. Flow (perm)	173	1765	1500	818	3353	1500		3102		438	1765	1500
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	431	538	24	38	1052	119	16	431	33	40	310	174
RTOR Reduction (vph)	0	0	12	0	0	86	0	4	0	0	0	113
Lane Group Flow (vph)	431	538	12	38	1052	33	0	476	0	40	310	61
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
Actuated Green, G (s)	63.2	63.2	63.2	34.2	34.2	34.2		31.5		47.4	43.8	43.8
Effective Green, g (s)	63.2	63.2	63.2	34.2	34.2	34.2		31.5		47.4	43.8	43.8
Actuated g/C Ratio	0.51	0.51	0.51	0.27	0.27	0.27		0.25		0.38	0.35	0.35
Clearance Time (s)	6.5	6.5	6.5	6.5	6.5	6.5		6.5		6.5	6.5	6.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	358	892	758	223	917	410		781		201	618	525
v/s Ratio Prot	c0.22	0.30			0.31					c0.01	c0.18	
v/s Ratio Perm	c0.39		0.01	0.05		0.02		c0.15		0.07		0.04
v/c Ratio	1.20	0.60	0.02	0.17	1.15	0.08		0.61		0.20	0.50	0.12
Uniform Delay, d1	39.4	22.0	15.4	34.6	45.4	33.7		41.3		26.5	32.0	27.5
Progression Factor	0.91	1.15	1.00	1.00	1.00	1.00		1.00		1.00	1.00	1.00
Incremental Delay, d2	115.2	3.0	0.0	1.7	79.1	0.4		3.5		0.5	2.9	0.4
Delay (s)	150.9	28.3	15.4	36.2	124.5	34.1		44.8		27.0	34.9	27.9
Level of Service	F	C	B	D	F	C		D		C	C	C
Approach Delay (s)		81.2			112.8			44.8			32.0	
Approach LOS		F			F			D			C	

Intersection Summary			
HCM 2000 Control Delay	79.6	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.99		
Actuated Cycle Length (s)	125.0	Sum of lost time (s)	28.0
Intersection Capacity Utilization	98.2%	ICU Level of Service	F
Analysis Period (min)	15		

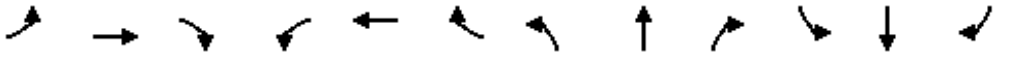
c Critical Lane Group

Lane Group	EBT	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	566	28	5	0	25	951
Future Volume (vph)	566	28	5	0	25	951
Lane Group Flow (vph)	747	31	0	15	546	539
Turn Type	NA	Perm	Perm	NA	NA	Perm
Protected Phases	6!			4	2!	
Permitted Phases		6	4			2
Detector Phase	6	6	4	4	2	2
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	29.1	29.1	39.3	39.3	29.1	29.1
Total Split (s)	81.0	81.0	39.0	39.0	81.0	81.0
Total Split (%)	67.5%	67.5%	32.5%	32.5%	67.5%	67.5%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	3.8	3.8	3.0	3.0	3.8	3.8
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	7.1	7.1		6.3	7.1	7.1
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	Max	Max	Max	Max	Max	Max
Act Effct Green (s)	73.9	73.9		32.7	73.9	73.9
Actuated g/C Ratio	0.62	0.62		0.27	0.62	0.62
v/c Ratio	0.36	0.03		0.04	0.50	0.50
Control Delay	12.0	3.3		2.0	2.9	2.5
Queue Delay	0.0	0.0		0.0	0.0	0.0
Total Delay	12.0	3.3		2.0	2.9	2.5
LOS	B	A		A	A	A
Approach Delay	11.7			2.0	2.7	
Approach LOS	B			A	A	
Queue Length 50th (m)	45.2	0.1		0.0	2.7	0.0
Queue Length 95th (m)	57.3	3.9		1.5	17.2	13.8
Internal Link Dist (m)	179.0			98.2	262.7	
Turn Bay Length (m)		15.0				
Base Capacity (vph)	2048	935		393	1084	1084
Starvation Cap Reductn	0	0		0	0	0
Spillback Cap Reductn	0	0		0	0	0
Storage Cap Reductn	0	0		0	0	0
Reduced v/c Ratio	0.36	0.03		0.04	0.50	0.50

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 87 (73%), Referenced to phase 2:SBT and 6:EBTL, Start of Green	
Natural Cycle: 70	
Control Type: Pretimed	
Maximum v/c Ratio: 0.50	
Intersection Signal Delay: 6.4	Intersection LOS: A
Intersection Capacity Utilization 56.8%	ICU Level of Service B
Analysis Period (min) 15	

! Phase conflict between lane groups.

Splits and Phases: 6: Empress Ave & Albert



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	106	566	28	0	0	0	5	0	8	0	25	951
Future Volume (vph)	106	566	28	0	0	0	5	0	8	0	25	951
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)		7.1	7.1					6.3			7.1	7.1
Lane Util. Factor		0.95	1.00					1.00			0.95	0.95
Frt		1.00	0.85					0.92			0.86	0.85
Flt Protected		0.99	1.00					0.98			1.00	1.00
Satd. Flow (prot)		3327	1500					1590			1438	1425
Flt Permitted		0.99	1.00					0.83			1.00	1.00
Satd. Flow (perm)		3327	1500					1344			1438	1425
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	118	629	31	0	0	0	6	0	9	0	28	1057
RTOR Reduction (vph)	0	0	12	0	0	0	0	11	0	0	199	207
Lane Group Flow (vph)	0	747	19	0	0	0	0	4	0	0	347	332
Turn Type	Perm	NA	Perm				Perm	NA			NA	Perm
Protected Phases		6!						4			2!	
Permitted Phases	6!		6				4					2
Actuated Green, G (s)		73.9	73.9					32.7			73.9	73.9
Effective Green, g (s)		73.9	73.9					32.7			73.9	73.9
Actuated g/C Ratio		0.62	0.62					0.27			0.62	0.62
Clearance Time (s)		7.1	7.1					6.3			7.1	7.1
Lane Grp Cap (vph)		2048	923					366			885	877
v/s Ratio Prot											c0.24	
v/s Ratio Perm		0.22	0.01					c0.00				0.23
v/c Ratio		0.36	0.02					0.01			0.39	0.38
Uniform Delay, d1		11.4	9.0					31.9			11.7	11.5
Progression Factor		1.00	1.00					1.00			1.00	1.00
Incremental Delay, d2		0.5	0.0					0.1			1.3	1.2
Delay (s)		11.9	9.0					31.9			13.0	12.8
Level of Service		B	A					C			B	B
Approach Delay (s)		11.8			0.0			31.9			12.9	
Approach LOS		B			A			C			B	

Intersection Summary			
HCM 2000 Control Delay	12.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.28		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	13.4
Intersection Capacity Utilization	56.8%	ICU Level of Service	B
Analysis Period (min)	15		

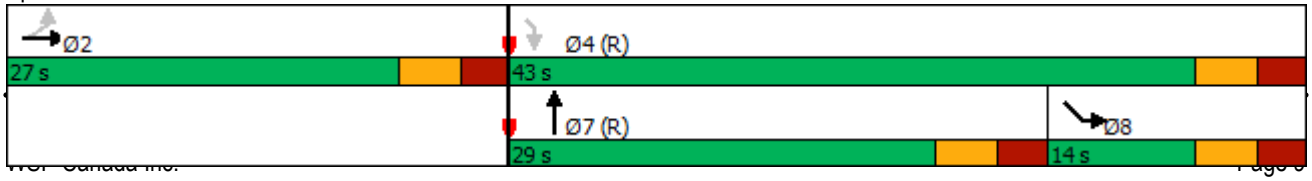
! Phase conflict between lane groups.
c Critical Lane Group

8: Bronson Ave/Bronson & Slater

Lane Group	EBT	NBT	SEL	SER
Lane Configurations				
Traffic Volume (vph)	514	396	53	342
Future Volume (vph)	514	396	53	342
Lane Group Flow (vph)	604	601	59	380
Turn Type	NA	NA	Prot	Perm
Protected Phases	2	7	8	
Permitted Phases				4
Detector Phase	2	7	8	4
Switch Phase				
Minimum Initial (s)	5.0	5.0	5.0	5.0
Minimum Split (s)	12.0	24.2	12.0	12.0
Total Split (s)	27.0	29.0	14.0	43.0
Total Split (%)	38.6%	41.4%	20.0%	61.4%
Yellow Time (s)	3.3	3.3	3.3	3.3
All-Red Time (s)	2.6	2.7	2.7	2.7
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.9	6.0	6.0	6.0
Lead/Lag		Lead	Lag	
Lead-Lag Optimize?		Yes	Yes	
Recall Mode	Max	Max	Max	Max
Act Effct Green (s)	21.1	23.0	8.0	37.0
Actuated g/C Ratio	0.30	0.33	0.11	0.53
v/c Ratio	0.60	0.54	0.31	0.48
Control Delay	23.8	18.6	33.2	13.0
Queue Delay	0.0	0.1	0.9	57.8
Total Delay	23.8	18.8	34.1	70.8
LOS	C	B	C	E
Approach Delay	23.8	18.8	65.9	
Approach LOS	C	B	E	
Queue Length 50th (m)	37.0	30.0	7.6	30.5
Queue Length 95th (m)	53.2	45.3	18.3	52.0
Internal Link Dist (m)	176.3	290.7	27.9	
Turn Bay Length (m)				
Base Capacity (vph)	1007	1111	191	792
Starvation Cap Reductn	0	0	36	451
Spillback Cap Reductn	0	68	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.60	0.58	0.38	1.11

Intersection Summary	
Cycle Length: 70	
Actuated Cycle Length: 70	
Offset: 2 (3%), Referenced to phase 4:SER and 7:NBT, Start of Green	
Natural Cycle: 55	
Control Type: Pretimed	
Maximum v/c Ratio: 0.60	
Intersection Signal Delay: 33.2	Intersection LOS: C
Intersection Capacity Utilization 51.4%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 8: Bronson Ave/Bronson & Slater



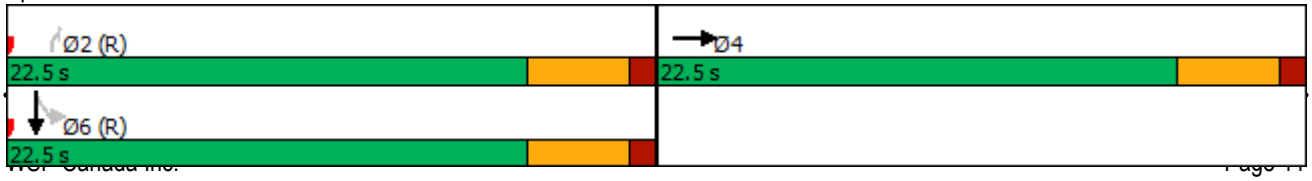
Movement	EBL	EBT	NBT	NBR	SEL	SER
Lane Configurations						
Traffic Volume (vph)	30	514	396	145	53	342
Future Volume (vph)	30	514	396	145	53	342
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Total Lost time (s)		5.9	6.0		6.0	6.0
Lane Util. Factor		0.95	0.95		1.00	1.00
Frt		1.00	0.96		1.00	0.85
Flt Protected		1.00	1.00		0.95	1.00
Satd. Flow (prot)		3344	3218		1676	1500
Flt Permitted		1.00	1.00		0.95	1.00
Satd. Flow (perm)		3344	3218		1676	1500
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	33	571	440	161	59	380
RTOR Reduction (vph)	0	0	54	0	0	0
Lane Group Flow (vph)	0	604	547	0	59	380
Turn Type	Perm	NA	NA		Prot	Perm
Protected Phases		2	7		8	
Permitted Phases	2					4
Actuated Green, G (s)		21.1	23.0		8.0	37.0
Effective Green, g (s)		21.1	23.0		8.0	37.0
Actuated g/C Ratio		0.30	0.33		0.11	0.53
Clearance Time (s)		5.9	6.0		6.0	6.0
Lane Grp Cap (vph)		1007	1057		191	792
v/s Ratio Prot			0.17		0.04	
v/s Ratio Perm		0.18				c0.25
v/c Ratio		0.60	0.52		0.31	0.48
Uniform Delay, d1		20.8	19.0		28.5	10.4
Progression Factor		1.00	1.00		1.00	1.00
Incremental Delay, d2		2.6	1.8		4.2	2.1
Delay (s)		23.5	20.8		32.6	12.5
Level of Service		C	C		C	B
Approach Delay (s)		23.5	20.8		15.2	
Approach LOS		C	C		B	

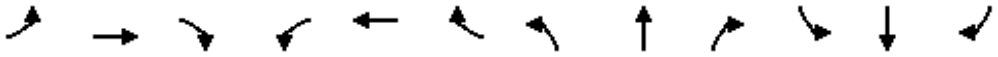
Intersection Summary			
HCM 2000 Control Delay	20.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	17.9
Intersection Capacity Utilization	51.4%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBT	NBR	SBL	SBT
Lane Configurations				
Traffic Volume (vph)	12	107	220	496
Future Volume (vph)	12	107	220	496
Lane Group Flow (vph)	17	119	244	617
Turn Type	NA	Perm	Perm	NA
Protected Phases	4			6
Permitted Phases		2	6	
Detector Phase	4	2	6	6
Switch Phase				
Minimum Initial (s)	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	22.5	22.5	22.5
Total Split (s)	22.5	22.5	22.5	22.5
Total Split (%)	50.0%	50.0%	50.0%	50.0%
Yellow Time (s)	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	Max	Max	Max	Max
Act Effct Green (s)	18.0	18.0	18.0	18.0
Actuated g/C Ratio	0.40	0.40	0.40	0.40
v/c Ratio	0.02	0.10	0.30	0.46
Control Delay	7.5	0.2	2.8	10.7
Queue Delay	0.0	0.0	1.0	6.4
Total Delay	7.5	0.2	3.8	17.2
LOS	A	A	A	B
Approach Delay	7.5			13.4
Approach LOS	A			B
Queue Length 50th (m)	0.6	0.0	0.0	17.4
Queue Length 95th (m)	3.2	0.0	9.6	28.2
Internal Link Dist (m)	74.6			29.8
Turn Bay Length (m)				
Base Capacity (vph)	685	1238	816	1340
Starvation Cap Reductn	0	0	353	661
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.02	0.10	0.53	0.91

Intersection Summary	
Cycle Length: 45	
Actuated Cycle Length: 45	
Offset: 0 (0%), Referenced to phase 2:NBR and 6:SBTL, Start of Green	
Natural Cycle: 45	
Control Type: Pretimed	
Maximum v/c Ratio: 0.46	
Intersection Signal Delay: 11.7	Intersection LOS: B
Intersection Capacity Utilization 35.3%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 10: Commissioner & Albert





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	12	4	0	0	0	0	0	107	220	496	59
Future Volume (vph)	0	12	4	0	0	0	0	0	107	220	496	59
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)		4.5							4.5	4.5	4.5	
Lane Util. Factor		1.00							1.00	1.00	0.95	
Frt		0.97							0.86	1.00	0.98	
Flt Protected		1.00							1.00	0.95	1.00	
Satd. Flow (prot)		1709							1526	1676	3299	
Flt Permitted		1.00							1.00	0.95	1.00	
Satd. Flow (perm)		1709							1526	1676	3299	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	0	13	4	0	0	0	0	0	119	244	551	66
RTOR Reduction (vph)	0	2	0	0	0	0	0	0	71	146	20	0
Lane Group Flow (vph)	0	15	0	0	0	0	0	0	48	98	597	0
Turn Type		NA							Perm	Perm	NA	
Protected Phases		4									6	
Permitted Phases									2	6		
Actuated Green, G (s)		18.0							18.0	18.0	18.0	
Effective Green, g (s)		18.0							18.0	18.0	18.0	
Actuated g/C Ratio		0.40							0.40	0.40	0.40	
Clearance Time (s)		4.5							4.5	4.5	4.5	
Lane Grp Cap (vph)		683							610	670	1319	
v/s Ratio Prot		c0.01									c0.18	
v/s Ratio Perm									0.03	0.06		
v/c Ratio		0.02							0.08	0.15	0.45	
Uniform Delay, d1		8.2							8.4	8.6	9.9	
Progression Factor		1.00							1.00	1.00	1.00	
Incremental Delay, d2		0.1							0.2	0.5	1.1	
Delay (s)		8.2							8.6	9.1	11.0	
Level of Service		A							A	A	B	
Approach Delay (s)		8.2			0.0			8.6			10.5	
Approach LOS		A			A			A			B	

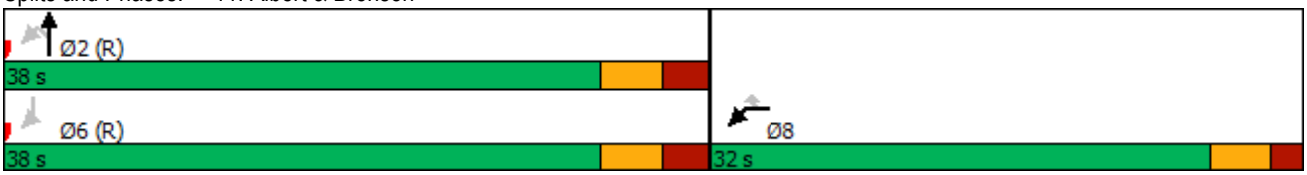
Intersection Summary			
HCM 2000 Control Delay	10.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.24		
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	35.3%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

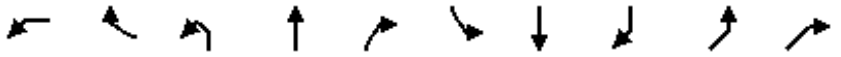
Lane Group	WBL	WBR	NBL	NBT	SBR
Lane Configurations					
Traffic Volume (vph)	1009	3	294	116	137
Future Volume (vph)	1009	3	294	116	137
Lane Group Flow (vph)	1121	3	327	129	152
Turn Type	Prot	Perm	Perm	NA	Perm
Protected Phases	8			2	
Permitted Phases		8	2		6
Detector Phase	8	8	2	2	6
Switch Phase					
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	26.1	26.1	27.9	27.9	23.9
Total Split (s)	32.0	32.0	38.0	38.0	38.0
Total Split (%)	45.7%	45.7%	54.3%	54.3%	54.3%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	1.8	1.8	2.6	2.6	2.6
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.1	5.1	5.9	5.9	5.9
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	Max	Max	Max	Max	Max
Act Effct Green (s)	26.9	26.9	32.1	32.1	32.1
Actuated g/C Ratio	0.38	0.38	0.46	0.46	0.46
v/c Ratio	0.90	0.00	0.42	0.16	0.21
Control Delay	31.8	0.0	9.3	6.2	9.7
Queue Delay	0.0	0.0	4.0	0.0	0.0
Total Delay	31.8	0.0	13.2	6.2	9.7
LOS	C	A	B	A	A
Approach Delay	31.7			11.2	
Approach LOS	C			B	
Queue Length 50th (m)	72.7	0.0	38.5	5.5	9.1
Queue Length 95th (m)	#111.8	0.0	66.8	m10.2	19.6
Internal Link Dist (m)	177.9			50.9	
Turn Bay Length (m)		50.0			
Base Capacity (vph)	1249	604	786	809	717
Starvation Cap Reductn	0	0	368	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.90	0.00	0.78	0.16	0.21

Intersection Summary	
Cycle Length: 70	
Actuated Cycle Length: 70	
Offset: 14 (20%), Referenced to phase 2:NBTL and 6:SBR, Start of Green	
Natural Cycle: 60	
Control Type: Pretimed	
Maximum v/c Ratio: 0.90	
Intersection Signal Delay: 24.4	Intersection LOS: C
Intersection Capacity Utilization 56.7%	ICU Level of Service B
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.

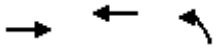
Splits and Phases: 11: Albert & Bronson





Movement	WBL	WBR	NBL	NBT	NBR	SBL	SBT	SBR	NEL	NER
Lane Configurations										
Traffic Volume (vph)	1009	3	294	116	0	0	0	137	0	0
Future Volume (vph)	1009	3	294	116	0	0	0	137	0	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	5.1	5.1	5.9	5.9				5.9		
Lane Util. Factor	0.97	1.00	1.00	1.00				1.00		
Frt	1.00	0.85	1.00	1.00				0.86		
Flt Protected	0.95	1.00	0.95	1.00				1.00		
Satd. Flow (prot)	3252	1500	1676	1765				1526		
Flt Permitted	0.95	1.00	0.95	1.00				1.00		
Satd. Flow (perm)	3252	1500	1676	1765				1526		
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	1121	3	327	129	0	0	0	152	0	0
RTOR Reduction (vph)	0	2	18	0	0	0	0	18	0	0
Lane Group Flow (vph)	1121	1	309	129	0	0	0	134	0	0
Turn Type	Prot	Perm	Perm	NA				Perm		
Protected Phases	8			2						
Permitted Phases		8	2					6		
Actuated Green, G (s)	26.9	26.9	32.1	32.1				32.1		
Effective Green, g (s)	26.9	26.9	32.1	32.1				32.1		
Actuated g/C Ratio	0.38	0.38	0.46	0.46				0.46		
Clearance Time (s)	5.1	5.1	5.9	5.9				5.9		
Lane Grp Cap (vph)	1249	576	768	809				699		
v/s Ratio Prot	c0.34			0.07						
v/s Ratio Perm		0.00	c0.18					0.09		
v/c Ratio	0.90	0.00	0.40	0.16				0.19		
Uniform Delay, d1	20.3	13.3	12.6	11.1				11.3		
Progression Factor	1.00	1.00	0.68	0.52				1.00		
Incremental Delay, d2	10.3	0.0	1.3	0.4				0.6		
Delay (s)	30.6	13.3	9.8	6.1				11.9		
Level of Service	C	B	A	A				B		
Approach Delay (s)	30.5			8.8			11.9		0.0	
Approach LOS	C			A			B		A	

Intersection Summary			
HCM 2000 Control Delay	23.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	56.7%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

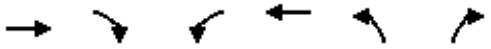


Lane Group	EBT	WBT	NBL
Lane Configurations			
Traffic Volume (vph)	949	1322	868
Future Volume (vph)	949	1322	868
Lane Group Flow (vph)	1054	1469	1008
Turn Type	NA	NA	Prot
Protected Phases	4	8	2
Permitted Phases			
Detector Phase	4	8	2
Switch Phase			
Minimum Initial (s)	5.0	5.0	5.0
Minimum Split (s)	36.7	23.7	26.9
Total Split (s)	80.0	80.0	40.0
Total Split (%)	66.7%	66.7%	33.3%
Yellow Time (s)	3.3	3.3	3.3
All-Red Time (s)	2.4	2.4	2.6
Lost Time Adjust (s)	0.0	0.0	0.0
Total Lost Time (s)	5.7	5.7	5.9
Lead/Lag			
Lead-Lag Optimize?			
Recall Mode	None	None	C-Max
Act Effct Green (s)	67.2	67.2	41.2
Actuated g/C Ratio	0.56	0.56	0.34
v/c Ratio	0.39	0.78	0.90
Control Delay	15.0	46.1	50.9
Queue Delay	0.0	48.7	0.0
Total Delay	15.0	94.8	50.9
LOS	B	F	D
Approach Delay	15.0	94.8	50.9
Approach LOS	B	F	D
Queue Length 50th (m)	50.1	191.1	123.8
Queue Length 95th (m)	52.3	189.6	#187.2
Internal Link Dist (m)	74.9	134.0	213.7
Turn Bay Length (m)			
Base Capacity (vph)	2983	2076	1114
Starvation Cap Reductn	0	815	0
Spillback Cap Reductn	87	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.36	1.16	0.90

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 25 (21%), Referenced to phase 2:NBL and 6:, Start of Green	
Natural Cycle: 65	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.90	
Intersection Signal Delay: 58.4	Intersection LOS: E
Intersection Capacity Utilization 75.7%	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: 13: Bay St & Wellington



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	949	0	0	1322	868	40
Future Volume (vph)	949	0	0	1322	868	40
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Total Lost time (s)	5.7			5.7	5.9	
Lane Util. Factor	0.91			0.95	0.97	
Frt	1.00			1.00	0.99	
Flt Protected	1.00			1.00	0.95	
Satd. Flow (prot)	4818			3353	3246	
Flt Permitted	1.00			1.00	0.95	
Satd. Flow (perm)	4818			3353	3246	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	1054	0	0	1469	964	44
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	1054	0	0	1469	1008	0
Turn Type	NA			NA	Prot	
Protected Phases	4			8	2	
Permitted Phases						
Actuated Green, G (s)	67.2			67.2	41.2	
Effective Green, g (s)	67.2			67.2	41.2	
Actuated g/C Ratio	0.56			0.56	0.34	
Clearance Time (s)	5.7			5.7	5.9	
Vehicle Extension (s)	3.0			3.0	3.0	
Lane Grp Cap (vph)	2698			1877	1114	
v/s Ratio Prot	0.22			c0.44	c0.31	
v/s Ratio Perm						
v/c Ratio	0.39			0.78	0.90	
Uniform Delay, d1	14.9			20.7	37.5	
Progression Factor	1.00			2.12	1.00	
Incremental Delay, d2	0.1			1.9	12.0	
Delay (s)	15.0			45.8	49.5	
Level of Service	B			D	D	
Approach Delay (s)	15.0			45.8	49.5	
Approach LOS	B			D	D	

Intersection Summary			
HCM 2000 Control Delay	37.6	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	11.6
Intersection Capacity Utilization	75.7%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

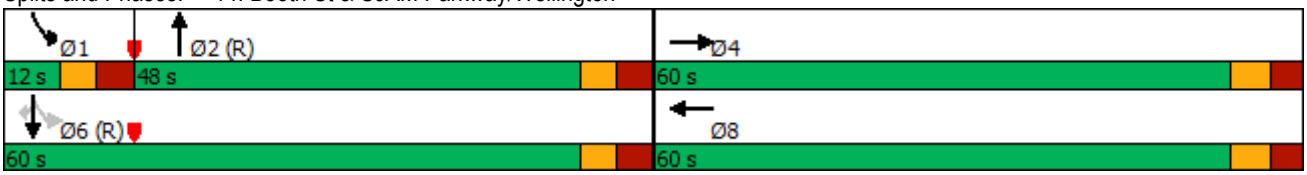
Lane Group	EBT	WBT	NBT	SBL	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	1091	1378	1145	54	750	283
Future Volume (vph)	1091	1378	1145	54	750	283
Lane Group Flow (vph)	1212	1803	1374	60	833	314
Turn Type	NA	NA	NA	pm+pt	NA	Perm
Protected Phases	4	8	2	1	6	
Permitted Phases				6		6
Detector Phase	4	8	2	1	6	6
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	40.8	40.8	37.8	11.8	37.9	37.9
Total Split (s)	60.0	60.0	48.0	12.0	60.0	60.0
Total Split (%)	50.0%	50.0%	40.0%	10.0%	50.0%	50.0%
Yellow Time (s)	3.7	3.7	3.3	3.3	3.3	3.3
All-Red Time (s)	3.1	3.1	3.5	3.5	3.5	3.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.8	6.8	6.8	6.8	6.8	6.8
Lead/Lag			Lag	Lead		
Lead-Lag Optimize?			Yes	Yes		
Recall Mode	None	None	C-Max	None	C-Max	C-Max
Act Effct Green (s)	53.2	53.2	43.6	53.2	53.2	53.2
Actuated g/C Ratio	0.44	0.44	0.36	0.44	0.44	0.44
v/c Ratio	0.82	1.24	1.14	0.46	0.56	0.46
Control Delay	34.7	145.9	107.9	30.9	26.6	23.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	34.7	145.9	107.9	30.9	26.6	23.2
LOS	C	F	F	C	C	C
Approach Delay	34.7	145.9	107.9		25.9	
Approach LOS	C	F	F		C	
Queue Length 50th (m)	135.0	~292.3	~218.1	8.4	78.7	47.1
Queue Length 95th (m)	165.4	#336.8	#263.0	17.0	99.0	73.4
Internal Link Dist (m)	216.1	376.9	395.0		194.6	
Turn Bay Length (m)				150.0		55.0
Base Capacity (vph)	1486	1452	1209	130	1486	684
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	0.82	1.24	1.14	0.46	0.56	0.46

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 3 (3%), Referenced to phase 2:NBT and 6:SBTL, Start of Green	
Natural Cycle: 145	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 1.24	
Intersection Signal Delay: 86.6	Intersection LOS: F
Intersection Capacity Utilization 106.1%	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: 14: Booth St & SJAM Parkway/Wellington



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	1091	0	0	1378	245	0	1145	92	54	750	283
Future Volume (vph)	0	1091	0	0	1378	245	0	1145	92	54	750	283
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)		6.8			6.8			6.8		6.8	6.8	6.8
Lane Util. Factor		0.95			0.95			0.95		1.00	0.95	1.00
Frt		1.00			0.98			0.99		1.00	1.00	0.85
Flt Protected		1.00			1.00			1.00		0.95	1.00	1.00
Satd. Flow (prot)		3353			3277			3316		1676	3353	1500
Flt Permitted		1.00			1.00			1.00		0.08	1.00	1.00
Satd. Flow (perm)		3353			3277			3316		144	3353	1500
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	0	1212	0	0	1531	272	0	1272	102	60	833	314
RTOR Reduction (vph)	0	0	0	0	0	0	0	5	0	0	0	19
Lane Group Flow (vph)	0	1212	0	0	1803	0	0	1369	0	60	833	295
Turn Type		NA			NA			NA		pm+pt	NA	Perm
Protected Phases		4			8			2		1	6	
Permitted Phases										6		6
Actuated Green, G (s)		53.2			53.2			42.2		53.2	53.2	53.2
Effective Green, g (s)		53.2			53.2			42.2		53.2	53.2	53.2
Actuated g/C Ratio		0.44			0.44			0.35		0.44	0.44	0.44
Clearance Time (s)		6.8			6.8			6.8		6.8	6.8	6.8
Vehicle Extension (s)		3.0			3.0			3.0		3.0	3.0	3.0
Lane Grp Cap (vph)		1486			1452			1166		117	1486	665
v/s Ratio Prot		0.36			c0.55			c0.41		0.02	c0.25	
v/s Ratio Perm										0.21		0.20
v/c Ratio		0.82			1.24			1.17		0.51	0.56	0.44
Uniform Delay, d1		29.1			33.4			38.9		28.0	24.7	23.1
Progression Factor		1.00			1.00			1.00		1.00	1.00	1.00
Incremental Delay, d2		3.6			114.8			87.6		3.8	1.5	2.1
Delay (s)		32.7			148.2			126.5		31.8	26.3	25.3
Level of Service		C			F			F		C	C	C
Approach Delay (s)		32.7			148.2			126.5			26.3	
Approach LOS		C			F			F			C	

Intersection Summary			
HCM 2000 Control Delay	91.6	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.21		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	20.4
Intersection Capacity Utilization	106.1%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

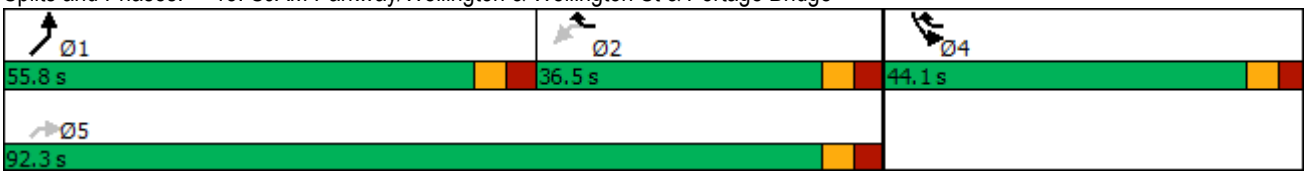
Lane Group	WBL	WBR	SBL	SBR	NEL	NER
Lane Configurations						
Traffic Volume (vph)	1077	250	1060	228	644	1499
Future Volume (vph)	1077	250	1060	228	644	1499
Lane Group Flow (vph)	1197	278	1178	253	716	1666
Turn Type	Perm	pt+ov	Prot	Free	Prot	Perm
Protected Phases		2 4	4		1	
Permitted Phases	2			Free		5
Detector Phase	2	2 4	4		1	5
Switch Phase						
Minimum Initial (s)	5.0		5.0		5.0	5.0
Minimum Split (s)	26.7		44.1		43.5	24.5
Total Split (s)	36.5		44.1		55.8	92.3
Total Split (%)	26.8%		32.3%		40.9%	67.7%
Yellow Time (s)	3.3		3.3		3.3	3.3
All-Red Time (s)	3.2		2.8		3.2	3.2
Lost Time Adjust (s)	0.0		0.0		0.0	0.0
Total Lost Time (s)	6.5		6.1		6.5	6.5
Lead/Lag	Lag				Lead	
Lead-Lag Optimize?	Yes				Yes	
Recall Mode	Max		Max		None	None
Act Effct Green (s)	30.4	74.6	38.1	118.8	31.2	68.1
Actuated g/C Ratio	0.26	0.63	0.32	1.00	0.26	0.57
v/c Ratio	1.43	0.16	1.13	0.17	0.84	0.85
Control Delay	235.6	5.3	108.6	0.2	51.1	26.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	235.6	5.3	108.6	0.2	51.1	26.0
LOS	F	A	F	A	D	C
Approach Delay	192.2		89.4		33.5	
Approach LOS	F		F		C	
Queue Length 50th (m)	~203.6	7.1	~170.4	0.0	85.2	140.5
Queue Length 95th (m)	#273.9	16.3	#246.2	0.0	109.5	167.9
Internal Link Dist (m)	177.8		125.3		376.9	
Turn Bay Length (m)	150.0	150.0		15.0	150.0	150.0
Base Capacity (vph)	836	1709	1043	1500	1353	2479
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	1.43	0.16	1.13	0.17	0.53	0.67

Intersection Summary	
Cycle Length: 136.4	
Actuated Cycle Length: 118.8	
Natural Cycle: 145	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 1.43	
Intersection Signal Delay: 92.9	Intersection LOS: F
Intersection Capacity Utilization 99.7%	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: 15: SJAM Parkway/Wellington & Wellington St & Portage Bridge



Movement	WBL	WBR	SBL	SBR	NEL	NER
Lane Configurations						
Traffic Volume (vph)	1077	250	1060	228	644	1499
Future Volume (vph)	1077	250	1060	228	644	1499
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Total Lost time (s)	6.5	6.5	6.1	4.0	6.5	6.5
Lane Util. Factor	0.97	0.88	0.97	1.00	0.97	0.76
Frt	1.00	0.85	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	3252	2640	3252	1500	3252	3420
Flt Permitted	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	3269	2640	3252	1500	3252	3420
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	1197	278	1178	253	716	1666
RTOR Reduction (vph)	0	51	0	0	0	3
Lane Group Flow (vph)	1197	227	1178	253	716	1663
Turn Type	Perm	pt+ov	Prot	Free	Prot	Perm
Protected Phases		2 4	4		1	
Permitted Phases	2			Free		5
Actuated Green, G (s)	30.4	75.0	38.1	118.8	31.2	68.1
Effective Green, g (s)	30.4	75.0	38.1	118.8	31.2	68.1
Actuated g/C Ratio	0.26	0.63	0.32	1.00	0.26	0.57
Clearance Time (s)	6.5		6.1		6.5	6.5
Vehicle Extension (s)	3.0		3.0		3.0	3.0
Lane Grp Cap (vph)	836	1666	1042	1500	854	1960
v/s Ratio Prot		0.09	c0.36		0.22	
v/s Ratio Perm	c0.37			0.17		c0.49
v/c Ratio	1.43	0.14	1.13	0.17	0.84	0.85
Uniform Delay, d1	44.2	8.8	40.3	0.0	41.4	21.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	201.2	0.2	71.1	0.2	7.2	3.6
Delay (s)	245.4	9.0	111.4	0.2	48.7	24.7
Level of Service	F	A	F	A	D	C
Approach Delay (s)	200.9		91.8		31.9	
Approach LOS	F		F		C	

Intersection Summary			
HCM 2000 Control Delay	95.2	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.17		
Actuated Cycle Length (s)	118.8	Sum of lost time (s)	19.1
Intersection Capacity Utilization	99.7%	ICU Level of Service	F
Analysis Period (min)	15		

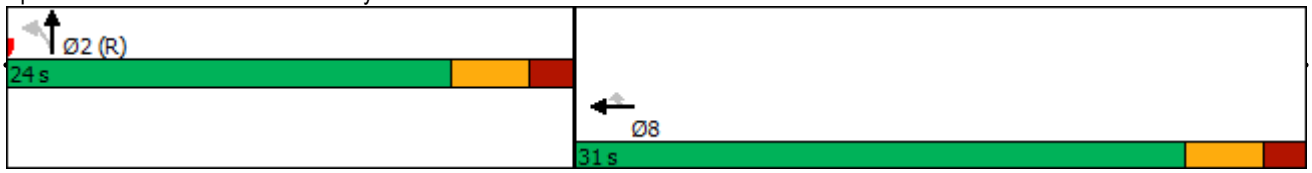
c Critical Lane Group

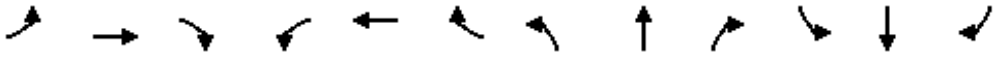
Lane Group	WBT	WBR	NBT
Lane Configurations			
Traffic Volume (vph)	460	472	323
Future Volume (vph)	460	472	323
Lane Group Flow (vph)	511	524	716
Turn Type	NA	Perm	NA
Protected Phases	8		2
Permitted Phases		8	
Detector Phase	8	8	2
Switch Phase			
Minimum Initial (s)	5.0	5.0	5.0
Minimum Split (s)	23.2	23.2	23.2
Total Split (s)	31.0	31.0	24.0
Total Split (%)	56.4%	56.4%	43.6%
Yellow Time (s)	3.3	3.3	3.3
All-Red Time (s)	1.9	1.9	1.9
Lost Time Adjust (s)	0.0	0.0	0.0
Total Lost Time (s)	5.2	5.2	5.2
Lead/Lag			
Lead-Lag Optimize?			
Recall Mode	None	None	C-Max
Act Effct Green (s)	17.9	17.9	26.7
Actuated g/C Ratio	0.33	0.33	0.49
v/c Ratio	0.47	0.78	0.42
Control Delay	15.2	15.1	11.1
Queue Delay	0.0	0.0	0.3
Total Delay	15.2	15.1	11.3
LOS	B	B	B
Approach Delay	15.1		11.3
Approach LOS	B		B
Queue Length 50th (m)	21.7	20.4	14.3
Queue Length 95th (m)	25.4	40.7	m35.1
Internal Link Dist (m)	133.2		48.0
Turn Bay Length (m)		50.0	
Base Capacity (vph)	1572	851	1723
Starvation Cap Reductn	0	0	413
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.33	0.62	0.55

Intersection Summary	
Cycle Length: 55	
Actuated Cycle Length: 55	
Offset: 26 (47%), Referenced to phase 2:NBTL and 6:, Start of Green	
Natural Cycle: 50	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.78	
Intersection Signal Delay: 13.6	Intersection LOS: B
Intersection Capacity Utilization 58.8%	ICU Level of Service B
Analysis Period (min) 15	

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

Splits and Phases: 20: Albert & Bay St





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	0	460	472	321	323	0	0	0	0
Future Volume (vph)	0	0	0	0	460	472	321	323	0	0	0	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)					5.2	5.2		5.2				
Lane Util. Factor					0.95	1.00		0.95				
Frt					1.00	0.85		1.00				
Flt Protected					1.00	1.00		0.98				
Satd. Flow (prot)					3353	1500		3271				
Flt Permitted					1.00	1.00		0.98				
Satd. Flow (perm)					3353	1500		3271				
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	0	0	0	0	511	524	357	359	0	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	188	0	136	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	511	336	0	580	0	0	0	0
Turn Type					NA	Perm	Perm	NA				
Protected Phases					8			2				
Permitted Phases						8	2					
Actuated Green, G (s)					17.9	17.9		26.7				
Effective Green, g (s)					17.9	17.9		26.7				
Actuated g/C Ratio					0.33	0.33		0.49				
Clearance Time (s)					5.2	5.2		5.2				
Vehicle Extension (s)					3.0	3.0		3.0				
Lane Grp Cap (vph)					1091	488		1587				
v/s Ratio Prot					0.15							
v/s Ratio Perm						c0.22		0.18				
v/c Ratio					0.47	0.69		0.37				
Uniform Delay, d1					14.8	16.1		8.9				
Progression Factor					1.00	1.00		1.52				
Incremental Delay, d2					0.3	4.0		0.4				
Delay (s)					15.1	20.2		13.9				
Level of Service					B	C		B				
Approach Delay (s)		0.0			17.7			13.9			0.0	
Approach LOS		A			B			B			A	

Intersection Summary			
HCM 2000 Control Delay	16.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	55.0	Sum of lost time (s)	10.4
Intersection Capacity Utilization	58.8%	ICU Level of Service	B
Analysis Period (min)	15		

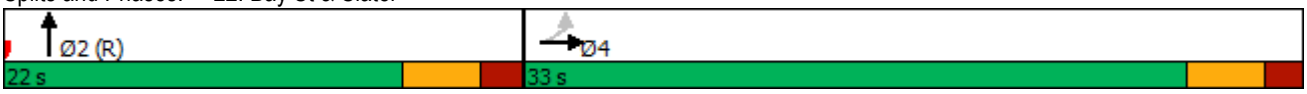
c Critical Lane Group

Lane Group	EBT	NBT
Lane Configurations		
Traffic Volume (vph)	593	556
Future Volume (vph)	593	556
Lane Group Flow (vph)	757	672
Turn Type	NA	NA
Protected Phases	4	2
Permitted Phases		
Detector Phase	4	2
Switch Phase		
Minimum Initial (s)	5.0	5.0
Minimum Split (s)	35.0	19.0
Total Split (s)	33.0	22.0
Total Split (%)	60.0%	40.0%
Yellow Time (s)	3.3	3.3
All-Red Time (s)	1.7	1.9
Lost Time Adjust (s)	0.0	0.0
Total Lost Time (s)	5.0	5.2
Lead/Lag		
Lead-Lag Optimize?		
Recall Mode	None	C-Max
Act Effct Green (s)	18.1	26.7
Actuated g/C Ratio	0.33	0.49
v/c Ratio	0.67	0.79
Control Delay	17.6	23.5
Queue Delay	0.0	0.0
Total Delay	17.6	23.5
LOS	B	C
Approach Delay	17.6	23.5
Approach LOS	B	C
Queue Length 50th (m)	32.7	53.9
Queue Length 95th (m)	40.6	#132.6
Internal Link Dist (m)	195.9	236.7
Turn Bay Length (m)		
Base Capacity (vph)	1718	851
Starvation Cap Reductn	0	0
Spillback Cap Reductn	0	0
Storage Cap Reductn	0	0
Reduced v/c Ratio	0.44	0.79

Intersection Summary	
Cycle Length: 55	
Actuated Cycle Length: 55	
Offset: 39 (71%), Referenced to phase 2:NBT and 6:, Start of Green	
Natural Cycle: 70	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.79	
Intersection Signal Delay: 20.4	Intersection LOS: C
Intersection Capacity Utilization 62.5%	ICU Level of Service B
Analysis Period (min) 15	

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

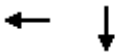
Splits and Phases: 22: Bay St & Slater



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	88	593	0	0	0	0	0	556	49	0	0	0
Future Volume (vph)	88	593	0	0	0	0	0	556	49	0	0	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)		5.0						5.2				
Lane Util. Factor		0.95						1.00				
Frt		1.00						0.99				
Flt Protected		0.99						1.00				
Satd. Flow (prot)		3331						1746				
Flt Permitted		0.99						1.00				
Satd. Flow (perm)		3331						1746				
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	98	659	0	0	0	0	0	618	54	0	0	0
RTOR Reduction (vph)	0	30	0	0	0	0	0	4	0	0	0	0
Lane Group Flow (vph)	0	727	0	0	0	0	0	668	0	0	0	0
Turn Type	Perm	NA						NA				
Protected Phases		4						2				
Permitted Phases	4											
Actuated Green, G (s)		18.1						26.7				
Effective Green, g (s)		18.1						26.7				
Actuated g/C Ratio		0.33						0.49				
Clearance Time (s)		5.0						5.2				
Vehicle Extension (s)		3.0						3.0				
Lane Grp Cap (vph)		1096						847				
v/s Ratio Prot								c0.38				
v/s Ratio Perm		0.22										
v/c Ratio		0.66						0.79				
Uniform Delay, d1		15.8						11.8				
Progression Factor		1.00						1.00				
Incremental Delay, d2		1.5						7.4				
Delay (s)		17.4						19.2				
Level of Service		B						B				
Approach Delay (s)		17.4			0.0			19.2			0.0	
Approach LOS		B			A			B			A	

Intersection Summary			
HCM 2000 Control Delay	18.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	55.0	Sum of lost time (s)	10.2
Intersection Capacity Utilization	62.5%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

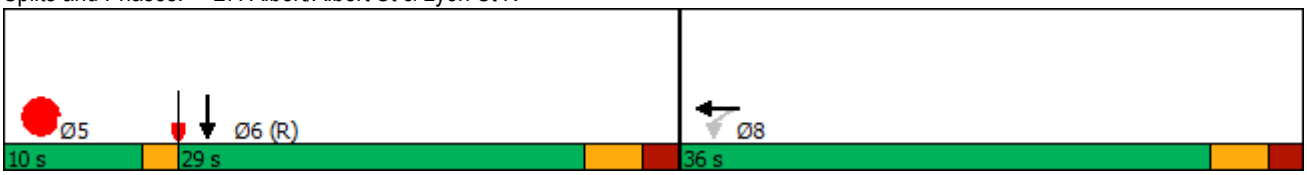


Lane Group	WBT	SBT	Ø5
Lane Configurations			
Traffic Volume (vph)	905	755	
Future Volume (vph)	905	755	
Lane Group Flow (vph)	1276	869	
Turn Type	NA	NA	
Protected Phases	8	6	5
Permitted Phases			
Detector Phase	8	6	
Switch Phase			
Minimum Initial (s)	5.0	5.0	5.0
Minimum Split (s)	23.4	23.5	10.0
Total Split (s)	36.0	29.0	10.0
Total Split (%)	48.0%	38.7%	13%
Yellow Time (s)	3.3	3.3	2.0
All-Red Time (s)	2.1	2.2	0.0
Lost Time Adjust (s)	0.0	0.0	
Total Lost Time (s)	5.4	5.5	
Lead/Lag		Lag	Lead
Lead-Lag Optimize?		Yes	Yes
Recall Mode	None	C-Max	Max
Act Effct Green (s)	30.2	23.5	
Actuated g/C Ratio	0.40	0.31	
v/c Ratio	0.93	0.58	
Control Delay	33.5	23.2	
Queue Delay	0.0	0.0	
Total Delay	33.5	23.2	
LOS	C	C	
Approach Delay	33.5	23.2	
Approach LOS	C	C	
Queue Length 50th (m)	87.7	39.0	
Queue Length 95th (m)	#133.2	51.6	
Internal Link Dist (m)	197.0	214.4	
Turn Bay Length (m)			
Base Capacity (vph)	1392	1506	
Starvation Cap Reductn	0	0	
Spillback Cap Reductn	0	0	
Storage Cap Reductn	0	0	
Reduced v/c Ratio	0.92	0.58	

Intersection Summary	
Cycle Length: 75	
Actuated Cycle Length: 75	
Offset: 0 (0%), Referenced to phase 2: and 6:SBT, Start of Green	
Natural Cycle: 65	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.93	
Intersection Signal Delay: 29.3	Intersection LOS: C
Intersection Capacity Utilization 59.0%	ICU Level of Service B
Analysis Period (min) 15	

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

Splits and Phases: 27: Albert/Albert St & Lyon St N



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	243	905	0	0	0	0	0	755	27
Future Volume (vph)	0	0	0	243	905	0	0	0	0	0	755	27
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)					5.4						5.5	
Lane Util. Factor					0.95						0.91	
Frt					1.00						0.99	
Flt Protected					0.99						1.00	
Satd. Flow (prot)					3318						4793	
Flt Permitted					0.99						1.00	
Satd. Flow (perm)					3318						4793	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	0	0	0	270	1006	0	0	0	0	0	839	30
RTOR Reduction (vph)	0	0	0	0	39	0	0	0	0	0	5	0
Lane Group Flow (vph)	0	0	0	0	1237	0	0	0	0	0	864	0
Turn Type				Perm	NA						NA	
Protected Phases					8						6	
Permitted Phases				8								
Actuated Green, G (s)					30.2						23.5	
Effective Green, g (s)					30.2						23.5	
Actuated g/C Ratio					0.40						0.31	
Clearance Time (s)					5.4						5.5	
Vehicle Extension (s)					3.0						3.0	
Lane Grp Cap (vph)					1336						1501	
v/s Ratio Prot											c0.18	
v/s Ratio Perm					0.37							
v/c Ratio					0.93						0.58	
Uniform Delay, d1					21.3						21.6	
Progression Factor					1.00						1.00	
Incremental Delay, d2					11.0						1.6	
Delay (s)					32.4						23.2	
Level of Service					C						C	
Approach Delay (s)		0.0			32.4			0.0			23.2	
Approach LOS		A			C			A			C	

Intersection Summary			
HCM 2000 Control Delay	28.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	12.9
Intersection Capacity Utilization	59.0%	ICU Level of Service	B
Analysis Period (min)	15		

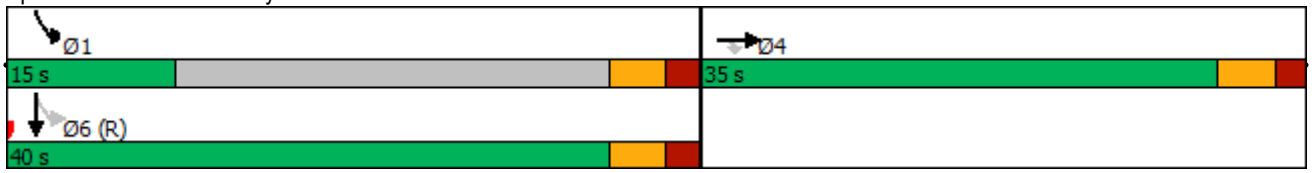
c Critical Lane Group

Lane Group	EBT	EBR	SBL	SBT
Lane Configurations				
Traffic Volume (vph)	486	166	211	814
Future Volume (vph)	486	166	211	814
Lane Group Flow (vph)	540	184	234	904
Turn Type	NA	Perm	pm+pt	NA
Protected Phases	4		1	6
Permitted Phases		4	6	
Detector Phase	4	4	1	6
Switch Phase				
Minimum Initial (s)	5.0	5.0	5.0	5.0
Minimum Split (s)	21.2	21.2	10.3	29.3
Total Split (s)	35.0	35.0	15.0	40.0
Total Split (%)	46.7%	46.7%	20.0%	53.3%
Yellow Time (s)	3.3	3.3	3.3	3.3
All-Red Time (s)	1.9	1.9	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.2	5.2	5.3	5.3
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	None	None	None	C-Max
Act Effct Green (s)	18.1	18.1	46.4	46.4
Actuated g/C Ratio	0.24	0.24	0.62	0.62
v/c Ratio	0.67	0.43	0.21	0.44
Control Delay	29.5	16.0	0.5	4.9
Queue Delay	0.0	0.0	0.3	0.2
Total Delay	29.5	16.0	0.8	5.2
LOS	C	B	A	A
Approach Delay	26.1			4.3
Approach LOS	C			A
Queue Length 50th (m)	38.2	12.5	0.0	16.1
Queue Length 95th (m)	49.1	27.0	m0.9	m20.1
Internal Link Dist (m)	132.9			47.5
Turn Bay Length (m)		50.0		
Base Capacity (vph)	1332	644	1107	2074
Starvation Cap Reductn	0	0	455	468
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.41	0.29	0.36	0.56

Intersection Summary	
Cycle Length: 75	
Actuated Cycle Length: 75	
Offset: 4 (5%), Referenced to phase 2: and 6:SBTL, Start of Green	
Natural Cycle: 55	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.67	
Intersection Signal Delay: 12.8	Intersection LOS: B
Intersection Capacity Utilization 59.0%	ICU Level of Service B
Analysis Period (min) 15	

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

Splits and Phases: 28: Lyon St N & Slater St



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	486	166	0	0	0	0	0	0	211	814	0
Future Volume (vph)	0	486	166	0	0	0	0	0	0	211	814	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)		5.2	5.2							5.3	5.3	
Lane Util. Factor		0.95	1.00							1.00	0.95	
Frt		1.00	0.85							1.00	1.00	
Flt Protected		1.00	1.00							0.95	1.00	
Satd. Flow (prot)		3353	1500							1676	3353	
Flt Permitted		1.00	1.00							0.95	1.00	
Satd. Flow (perm)		3353	1500							1676	3353	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	0	540	184	0	0	0	0	0	0	234	904	0
RTOR Reduction (vph)	0	0	61	0	0	0	0	0	0	70	0	0
Lane Group Flow (vph)	0	540	123	0	0	0	0	0	0	164	904	0
Turn Type		NA	Perm							pm+pt	NA	
Protected Phases		4								1	6	
Permitted Phases			4							6		
Actuated Green, G (s)		18.1	18.1							46.4	46.4	
Effective Green, g (s)		18.1	18.1							46.4	46.4	
Actuated g/C Ratio		0.24	0.24							0.62	0.62	
Clearance Time (s)		5.2	5.2							5.3	5.3	
Vehicle Extension (s)		3.0	3.0							3.0	3.0	
Lane Grp Cap (vph)		809	362							1036	2074	
v/s Ratio Prot		c0.16								0.10	c0.27	
v/s Ratio Perm			0.08									
v/c Ratio		0.67	0.34							0.16	0.44	
Uniform Delay, d1		25.7	23.5							6.0	7.5	
Progression Factor		1.00	1.00							0.07	0.53	
Incremental Delay, d2		2.1	0.6							0.1	0.5	
Delay (s)		27.8	24.1							0.5	4.5	
Level of Service		C	C							A	A	
Approach Delay (s)		26.9			0.0			0.0			3.7	
Approach LOS		C			A			A			A	

Intersection Summary			
HCM 2000 Control Delay	12.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	10.5
Intersection Capacity Utilization	59.0%	ICU Level of Service	B
Analysis Period (min)	15		

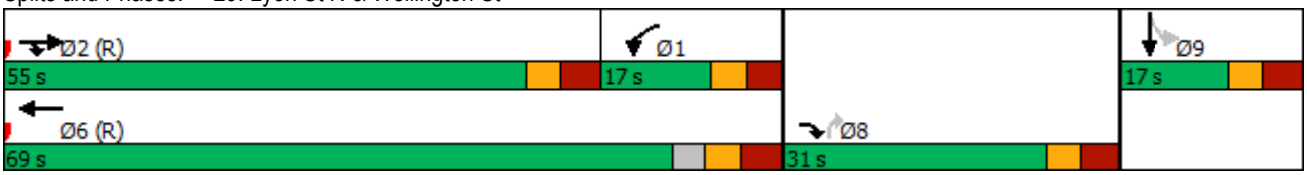
c Critical Lane Group

Lane Group	EBT	EBR	WBL	WBT	NBR	Ø9
Lane Configurations						
Traffic Volume (vph)	390	569	114	1072	19	
Future Volume (vph)	390	569	114	1072	19	
Lane Group Flow (vph)	433	632	127	1191	21	
Turn Type	NA	custom	Prot	NA	Perm	
Protected Phases	2	2 8	1	6		9
Permitted Phases					8	
Detector Phase	2	2 8	1	6	8	
Switch Phase						
Minimum Initial (s)	5.0		5.0	5.0	5.0	5.0
Minimum Split (s)	31.0		11.9	25.3	31.0	25.1
Total Split (s)	55.0		17.0	69.0	31.0	17.0
Total Split (%)	45.8%		14.2%	57.5%	25.8%	14%
Yellow Time (s)	3.3		3.3	3.3	3.3	3.3
All-Red Time (s)	3.6		3.6	4.0	3.6	3.8
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	
Total Lost Time (s)	6.9		6.9	7.3	6.9	
Lead/Lag	Lead		Lag			
Lead-Lag Optimize?	Yes		Yes			
Recall Mode	C-Max		None	C-Max	Max	Max
Act Effct Green (s)	48.1	72.2	10.1	64.7	24.1	
Actuated g/C Ratio	0.40	0.60	0.08	0.54	0.20	
v/c Ratio	0.61	0.40	0.90	0.66	0.03	
Control Delay	39.8	4.2	108.0	22.0	0.1	
Queue Delay	6.5	0.0	0.0	49.4	0.0	
Total Delay	46.3	4.2	108.0	71.4	0.1	
LOS	D	A	F	E	A	
Approach Delay	21.4			74.9		
Approach LOS	C			E		
Queue Length 50th (m)	111.1	17.8	31.8	106.5	0.0	
Queue Length 95th (m)	m146.1	m23.3	#69.9	130.6	0.0	
Internal Link Dist (m)	134.0			168.5		
Turn Bay Length (m)						
Base Capacity (vph)	707	1588	141	1807	710	
Starvation Cap Reductn	220	0	0	0	0	
Spillback Cap Reductn	0	0	0	738	0	
Storage Cap Reductn	0	0	0	0	0	
Reduced v/c Ratio	0.89	0.40	0.90	1.11	0.03	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Green	
Natural Cycle: 100	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.90	
Intersection Signal Delay: 50.5	Intersection LOS: D
Intersection Capacity Utilization 39.8%	ICU Level of Service A
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: 29: Lyon St N & Wellington St



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	390	569	114	1072	0	0	0	19	0	0	0
Future Volume (vph)	0	390	569	114	1072	0	0	0	19	0	0	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)		6.9	6.9	6.9	7.3				6.9			
Lane Util. Factor		1.00	0.88	1.00	0.95				1.00			
Frt		1.00	0.85	1.00	1.00				0.86			
Flt Protected		1.00	1.00	0.95	1.00				1.00			
Satd. Flow (prot)		1765	2640	1676	3353				1526			
Flt Permitted		1.00	1.00	0.95	1.00				1.00			
Satd. Flow (perm)		1765	2640	1676	3353				1526			
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	0	433	632	127	1191	0	0	0	21	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	17	0	0	0
Lane Group Flow (vph)	0	433	632	127	1191	0	0	0	4	0	0	0
Turn Type		NA	custom	Prot	NA				Perm			
Protected Phases		2	2 8	1	6						9	
Permitted Phases									8	9		
Actuated Green, G (s)		48.1	72.2	10.1	64.7				24.1			
Effective Green, g (s)		48.1	72.2	10.1	64.7				24.1			
Actuated g/C Ratio		0.40	0.60	0.08	0.54				0.20			
Clearance Time (s)		6.9		6.9	7.3				6.9			
Vehicle Extension (s)		3.0		3.0	3.0				3.0			
Lane Grp Cap (vph)		707	1588	141	1807				306			
v/s Ratio Prot		0.25	c0.24	c0.08	c0.36							
v/s Ratio Perm									0.00			
v/c Ratio		0.61	0.40	0.90	0.66				0.01			
Uniform Delay, d1		28.5	12.5	54.5	19.8				38.4			
Progression Factor		1.24	0.56	1.00	1.00				1.00			
Incremental Delay, d2		3.7	0.7	47.3	1.9				0.1			
Delay (s)		39.0	7.7	101.7	21.7				38.5			
Level of Service		D	A	F	C				D			
Approach Delay (s)		20.4			29.4			38.5			0.0	
Approach LOS		C			C			D			A	

Intersection Summary			
HCM 2000 Control Delay	25.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	27.8
Intersection Capacity Utilization	39.8%	ICU Level of Service	A
Analysis Period (min)	15		

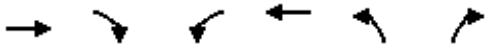
c Critical Lane Group

Lane Group	EBT	WBL	WBT	NBL	NBR	Ø9	Ø13
Lane Configurations							
Traffic Volume (vph)	545	57	209	72	48		
Future Volume (vph)	545	57	209	72	48		
Lane Group Flow (vph)	660	63	232	80	53		
Turn Type	NA	pm+pt	NA	Perm	Perm		
Protected Phases	2	1	6			9	13
Permitted Phases		6		8	8		
Detector Phase	2	1	6	8	8		
Switch Phase							
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	1.0	1.0
Minimum Split (s)	31.8	11.2	31.8	29.3	29.3	3.0	3.0
Total Split (s)	65.0	25.0	90.0	30.0	30.0	5.0	5.0
Total Split (%)	52.0%	20.0%	72.0%	24.0%	24.0%	4%	4%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	2.0	2.0
All-Red Time (s)	3.5	2.9	3.5	3.0	3.0	0.0	0.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		
Total Lost Time (s)	6.8	6.2	6.8	6.3	6.3		
Lead/Lag	Lag	Lead					
Lead-Lag Optimize?	Yes	Yes					
Recall Mode	C-Max	None	C-Max	None	None	None	None
Act Effct Green (s)	90.3	101.2	100.6	11.3	11.3		
Actuated g/C Ratio	0.72	0.81	0.80	0.09	0.09		
v/c Ratio	0.28	0.11	0.09	0.53	0.39		
Control Delay	7.1	5.5	5.5	66.0	60.8		
Queue Delay	0.0	0.0	0.0	0.0	0.0		
Total Delay	7.1	5.5	5.5	66.0	60.8		
LOS	A	A	A	E	E		
Approach Delay	7.1		5.5	63.9			
Approach LOS	A		A	E			
Queue Length 50th (m)	29.3	6.4	17.0	20.1	13.2		
Queue Length 95th (m)	44.6	m18.3	27.8	35.8	25.9		
Internal Link Dist (m)	195.9		296.6	186.4			
Turn Bay Length (m)		115.0					
Base Capacity (vph)	2395	679	2698	317	284		
Starvation Cap Reductn	0	0	0	0	0		
Spillback Cap Reductn	0	0	0	0	0		
Storage Cap Reductn	0	0	0	0	0		
Reduced v/c Ratio	0.28	0.09	0.09	0.25	0.19		

Intersection Summary	
Cycle Length: 125	
Actuated Cycle Length: 125	
Offset: 55 (44%), Referenced to phase 2:EBT and 6:WBTL, Start of Green	
Natural Cycle: 80	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.53	
Intersection Signal Delay: 13.6	Intersection LOS: B
Intersection Capacity Utilization 42.0%	ICU Level of Service A
Analysis Period (min) 15	

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

Splits and Phases: 4: Preston St & Albert St



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	545	49	57	209	72	48
Future Volume (vph)	545	49	57	209	72	48
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Total Lost time (s)	6.8		6.2	6.8	6.3	6.3
Lane Util. Factor	0.95		1.00	0.95	1.00	1.00
Frt	0.99		1.00	1.00	1.00	0.85
Flt Protected	1.00		0.95	1.00	0.95	1.00
Satd. Flow (prot)	3312		1676	3353	1676	1500
Flt Permitted	1.00		0.37	1.00	0.95	1.00
Satd. Flow (perm)	3312		648	3353	1676	1500
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	606	54	63	232	80	53
RTOR Reduction (vph)	3	0	0	0	0	0
Lane Group Flow (vph)	657	0	63	232	80	53
Turn Type	NA		pm+pt	NA	Perm	Perm
Protected Phases	2		1	6		
Permitted Phases			6		8	8
Actuated Green, G (s)	89.0		100.6	100.6	11.3	11.3
Effective Green, g (s)	89.0		100.6	100.6	11.3	11.3
Actuated g/C Ratio	0.71		0.80	0.80	0.09	0.09
Clearance Time (s)	6.8		6.2	6.8	6.3	6.3
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	2358		565	2698	151	135
v/s Ratio Prot	c0.20		0.00	c0.07		
v/s Ratio Perm			0.08		c0.05	0.04
v/c Ratio	0.28		0.11	0.09	0.53	0.39
Uniform Delay, d1	6.5		2.8	2.6	54.3	53.6
Progression Factor	1.00		1.85	1.92	1.00	1.00
Incremental Delay, d2	0.3		0.1	0.1	3.3	1.9
Delay (s)	6.8		5.2	5.0	57.6	55.5
Level of Service	A		A	A	E	E
Approach Delay (s)	6.8			5.0	56.8	
Approach LOS	A			A	E	

Intersection Summary			
HCM 2000 Control Delay	12.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.30		
Actuated Cycle Length (s)	125.0	Sum of lost time (s)	21.3
Intersection Capacity Utilization	42.0%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

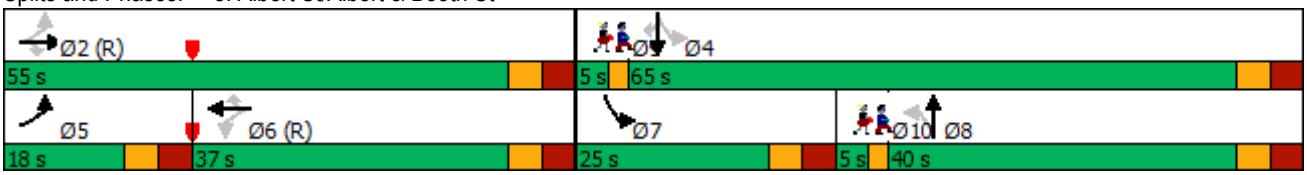
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR	Ø9
Lane Configurations												
Traffic Volume (vph)	301	860	9	18	291	67	10	359	100	334	201	
Future Volume (vph)	301	860	9	18	291	67	10	359	100	334	201	
Lane Group Flow (vph)	334	956	10	20	323	74	0	459	111	371	223	
Turn Type	pm+pt	NA	Perm	Perm	NA	Perm	Perm	NA	pm+pt	NA	Perm	
Protected Phases	5	2			6			8	7	4		9
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	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	1.0
Minimum Split (s)	11.5	36.5	36.5	36.5	36.5	36.5	34.5	34.5	11.5	34.5	34.5	5.0
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	5.0
Total Split (%)	14.4%	44.0%	44.0%	29.6%	29.6%	29.6%	32.0%	32.0%	20.0%	52.0%	52.0%	4%
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	2.0
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	0.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.5	6.5	6.5	6.5	6.5	6.5		6.5	6.5	6.5	6.5	
Lead/Lag	Lead			Lag	Lag	Lag			Lead			
Lead-Lag Optimize?	Yes			Yes	Yes	Yes			Yes			
Recall Mode	None	C-Max	C-Max	C-Max	C-Max	C-Max	Max	Max	None	Max	Max	Max
Act Effct Green (s)	48.5	48.5	48.5	30.5	30.5	30.5		33.5	63.5	58.5	58.5	
Actuated g/C Ratio	0.39	0.39	0.39	0.24	0.24	0.24		0.27	0.51	0.47	0.47	
v/c Ratio	0.91	1.40	0.02	0.36	0.39	0.15		0.55	0.36	0.45	0.27	
Control Delay	61.3	219.2	0.0	59.7	41.3	0.6		41.2	19.6	24.6	3.3	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	
Total Delay	61.3	219.2	0.0	59.7	41.3	0.6		41.2	19.6	24.6	3.3	
LOS	E	F	A	E	D	A		D	B	C	A	
Approach Delay		176.9			34.9			41.2		17.1		
Approach LOS		F			C			D		B		
Queue Length 50th (m)	66.8	~333.0	0.0	4.3	37.0	0.0		52.6	14.7	63.1	0.0	
Queue Length 95th (m)	#126.0	#414.9	0.0	13.5	51.5	0.0		70.4	25.5	90.4	14.0	
Internal Link Dist (m)		296.6			179.0			146.1		395.0		
Turn Bay Length (m)			45.0	75.0		110.0					126.0	
Base Capacity (vph)	367	684	656	56	818	501		839	397	826	820	
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	0.91	1.40	0.02	0.36	0.39	0.15		0.55	0.28	0.45	0.27	

Intersection Summary	
Cycle Length: 125	
Actuated Cycle Length: 125	
Offset: 104 (83%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green	
Natural Cycle: 120	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 1.40	
Intersection Signal Delay: 95.6	Intersection LOS: F
Intersection Capacity Utilization 104.4%	ICU Level of Service G
Analysis Period (min) 15	

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

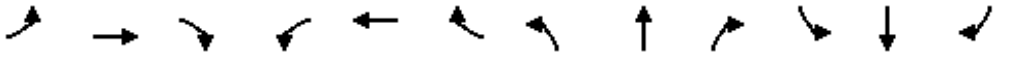
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 5: Albert St/Albert & Booth St



Lane Group	Ø10
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Lane Group Flow (vph)	
Turn Type	
Protected Phases	10
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	1.0
Minimum Split (s)	5.0
Total Split (s)	5.0
Total Split (%)	4%
Yellow Time (s)	2.0
All-Red Time (s)	0.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	Lag
Lead-Lag Optimize?	Yes
Recall Mode	Max
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (m)	
Queue Length 95th (m)	
Internal Link Dist (m)	
Turn Bay Length (m)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	

Intersection Summary



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	301	860	9	18	291	67	10	359	44	100	334	201
Future Volume (vph)	301	860	9	18	291	67	10	359	44	100	334	201
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	6.5	6.5	6.5	6.5	6.5	6.5		6.5		6.5	6.5	6.5
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	1.00		0.95		1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85		0.98		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		1.00		0.95	1.00	1.00
Satd. Flow (prot)	1676	1765	1500	1676	3353	1500		3295		1676	1765	1500
Flt Permitted	0.41	1.00	1.00	0.13	1.00	1.00		0.94		0.23	1.00	1.00
Satd. Flow (perm)	720	1765	1500	231	3353	1500		3105		415	1765	1500
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	334	956	10	20	323	74	11	399	49	111	371	223
RTOR Reduction (vph)	0	0	6	0	0	56	0	7	0	0	0	119
Lane Group Flow (vph)	334	956	4	20	323	18	0	452	0	111	371	104
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
Actuated Green, G (s)	48.5	48.5	48.5	30.5	30.5	30.5		33.5		63.5	58.5	58.5
Effective Green, g (s)	48.5	48.5	48.5	30.5	30.5	30.5		33.5		63.5	58.5	58.5
Actuated g/C Ratio	0.39	0.39	0.39	0.24	0.24	0.24		0.27		0.51	0.47	0.47
Clearance Time (s)	6.5	6.5	6.5	6.5	6.5	6.5		6.5		6.5	6.5	6.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	367	684	582	56	818	366		832		310	826	702
v/s Ratio Prot	0.08	c0.54			0.10					c0.03	c0.21	
v/s Ratio Perm	0.27		0.00	0.09		0.01		c0.15		0.15		0.07
v/c Ratio	0.91	1.40	0.01	0.36	0.39	0.05		0.54		0.36	0.45	0.15
Uniform Delay, d1	34.4	38.2	23.5	39.1	39.5	36.2		39.2		19.7	22.4	19.0
Progression Factor	0.97	0.98	1.00	1.00	1.00	1.00		1.00		1.00	1.00	1.00
Incremental Delay, d2	25.8	187.7	0.0	16.9	1.4	0.3		2.5		0.7	1.8	0.4
Delay (s)	59.2	225.3	23.5	56.0	41.0	36.4		41.7		20.5	24.2	19.5
Level of Service	E	F	C	E	D	D		D		C	C	B
Approach Delay (s)		181.0			40.9			41.7			22.1	
Approach LOS		F			D			D			C	

Intersection Summary			
HCM 2000 Control Delay	99.7	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.00		
Actuated Cycle Length (s)	125.0	Sum of lost time (s)	28.0
Intersection Capacity Utilization	104.4%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	NBL	NBT	SBT	SBR
Lane Configurations					
Traffic Volume (vph)	963	4	5	10	527
Future Volume (vph)	963	4	5	10	527
Lane Group Flow (vph)	1099	0	10	298	299
Turn Type	Perm	Perm	NA	NA	Perm
Protected Phases			4	2!	
Permitted Phases	6!	4			2
Detector Phase	6	4	4	2	2
Switch Phase					
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	29.1	39.0	39.0	29.1	29.1
Total Split (s)	81.3	39.0	39.0	81.3	81.3
Total Split (%)	67.6%	32.4%	32.4%	67.6%	67.6%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	3.8	3.0	3.0	3.8	3.8
Lost Time Adjust (s)	0.0		0.0	0.0	0.0
Total Lost Time (s)	7.1		6.3	7.1	7.1
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	Max	Max	Max	Max	Max
Act Effct Green (s)	74.2		32.7	74.2	74.2
Actuated g/C Ratio	0.62		0.27	0.62	0.62
v/c Ratio	0.55		0.02	0.30	0.30
Control Delay	14.6		32.4	2.1	1.9
Queue Delay	0.5		0.0	0.0	0.0
Total Delay	15.0		32.4	2.1	1.9
LOS	B		C	A	A
Approach Delay	15.0		32.4	2.0	
Approach LOS	B		C	A	
Queue Length 50th (m)	76.0		1.8	1.0	0.0
Queue Length 95th (m)	93.9		6.3	12.4	11.2
Internal Link Dist (m)	179.0		98.2	145.6	
Turn Bay Length (m)					
Base Capacity (vph)	2007		427	995	993
Starvation Cap Reductn	440		0	0	0
Spillback Cap Reductn	0		0	0	0
Storage Cap Reductn	0		0	0	0
Reduced v/c Ratio	0.70		0.02	0.30	0.30

Intersection Summary	
Cycle Length: 120.3	
Actuated Cycle Length: 120.3	
Offset: 87 (72%), Referenced to phase 2:SBT and 6:EBL, Start of Green	
Natural Cycle: 75	
Control Type: Pretimed	
Maximum v/c Ratio: 0.55	
Intersection Signal Delay: 10.6	Intersection LOS: B
Intersection Capacity Utilization 53.7%	ICU Level of Service A
Analysis Period (min) 15	

! Phase conflict between lane groups.

Splits and Phases: 6: Empress Ave & Albert

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	963	26	4	5	10	527
Future Volume (vph)	963	26	4	5	10	527
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Total Lost time (s)	7.1			6.3	7.1	7.1
Lane Util. Factor	0.97			1.00	0.95	0.95
Frt	1.00			1.00	0.86	0.85
Flt Protected	0.95			0.98	1.00	1.00
Satd. Flow (prot)	3252			1730	1434	1425
Flt Permitted	0.95			0.89	1.00	1.00
Satd. Flow (perm)	3252			1573	1434	1425
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	1070	29	4	6	11	586
RTOR Reduction (vph)	2	0	0	0	110	115
Lane Group Flow (vph)	1097	0	0	10	188	184
Turn Type	Perm		Perm	NA	NA	Perm
Protected Phases				4	2!	
Permitted Phases	6!		4			2
Actuated Green, G (s)	74.2			32.7	74.2	74.2
Effective Green, g (s)	74.2			32.7	74.2	74.2
Actuated g/C Ratio	0.62			0.27	0.62	0.62
Clearance Time (s)	7.1			6.3	7.1	7.1
Lane Grp Cap (vph)	2005			427	884	878
v/s Ratio Prot					0.13	
v/s Ratio Perm	c0.34			c0.01		0.13
v/c Ratio	0.55			0.02	0.21	0.21
Uniform Delay, d1	13.3			32.1	10.2	10.1
Progression Factor	1.00			1.00	1.00	1.00
Incremental Delay, d2	1.1			0.1	0.5	0.5
Delay (s)	14.4			32.2	10.7	10.7
Level of Service	B			C	B	B
Approach Delay (s)	14.4			32.2	10.7	
Approach LOS	B			C	B	

Intersection Summary			
HCM 2000 Control Delay	13.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.39		
Actuated Cycle Length (s)	120.3	Sum of lost time (s)	13.4
Intersection Capacity Utilization	53.7%	ICU Level of Service	A
Analysis Period (min)	15		

! Phase conflict between lane groups.
c Critical Lane Group

Lane Group	NBR	SBL	SBT	Ø9
Lane Configurations				
Traffic Volume (vph)	883	12	537	
Future Volume (vph)	883	12	537	
Lane Group Flow (vph)	981	13	597	
Turn Type	Perm	Perm	NA	
Protected Phases			6	9
Permitted Phases	2	6		
Detector Phase	2	6	6	
Switch Phase				
Minimum Initial (s)	5.0	5.0	5.0	5.0
Minimum Split (s)	24.8	24.8	24.8	24.3
Total Split (s)	68.2	68.2	68.2	24.3
Total Split (%)	73.7%	73.7%	73.7%	26%
Yellow Time (s)	3.0	3.0	3.0	3.0
All-Red Time (s)	3.3	3.3	3.3	3.3
Lost Time Adjust (s)	0.0	0.0	0.0	
Total Lost Time (s)	6.3	6.3	6.3	
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	Max	Max	Max	Max
Act Effct Green (s)	61.9	61.9	61.9	
Actuated g/C Ratio	0.67	0.67	0.67	
v/c Ratio	0.41	0.01	0.27	
Control Delay	0.5	2.6	6.5	
Queue Delay	0.0	0.0	0.0	
Total Delay	0.5	2.6	6.5	
LOS	A	A	A	
Approach Delay			6.4	
Approach LOS			A	
Queue Length 50th (m)	0.0	0.0	20.9	
Queue Length 95th (m)	0.0	1.8	28.5	
Internal Link Dist (m)			93.1	
Turn Bay Length (m)		50.0		
Base Capacity (vph)	2401	1125	2243	
Starvation Cap Reductn	0	0	0	
Spillback Cap Reductn	0	0	0	
Storage Cap Reductn	0	0	0	
Reduced v/c Ratio	0.41	0.01	0.27	

Intersection Summary	
Cycle Length: 92.5	
Actuated Cycle Length: 92.5	
Offset: 0 (0%), Referenced to phase 2:NBR and 6:SBTL, Start of Green	
Natural Cycle: 50	
Control Type: Pretimed	
Maximum v/c Ratio: 0.41	
Intersection Signal Delay: 2.8	Intersection LOS: A
Intersection Capacity Utilization 47.3%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 7: ALBERT & SLATER

Movement	NBT	NBR	SBL	SBT	SWL	SWR
Lane Configurations						
Traffic Volume (vph)	0	883	12	537	0	0
Future Volume (vph)	0	883	12	537	0	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Total Lost time (s)		6.3	6.3	6.3		
Lane Util. Factor		0.88	1.00	0.95		
Frt		0.85	1.00	1.00		
Flt Protected		1.00	0.95	1.00		
Satd. Flow (prot)		2640	1676	3353		
Flt Permitted		1.00	0.95	1.00		
Satd. Flow (perm)		2640	1676	3353		
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	0	981	13	597	0	0
RTOR Reduction (vph)	0	325	4	0	0	0
Lane Group Flow (vph)	0	656	9	597	0	0
Turn Type		Perm	Perm	NA		
Protected Phases				6		
Permitted Phases		2	6			
Actuated Green, G (s)		61.9	61.9	61.9		
Effective Green, g (s)		61.9	61.9	61.9		
Actuated g/C Ratio		0.67	0.67	0.67		
Clearance Time (s)		6.3	6.3	6.3		
Lane Grp Cap (vph)		1766	1121	2243		
v/s Ratio Prot				0.18		
v/s Ratio Perm		c0.25	0.01			
v/c Ratio		0.37	0.01	0.27		
Uniform Delay, d1		6.7	5.1	6.2		
Progression Factor		1.00	1.00	1.00		
Incremental Delay, d2		0.6	0.0	0.3		
Delay (s)		7.3	5.1	6.4		
Level of Service		A	A	A		
Approach Delay (s)	7.3			6.4	0.0	
Approach LOS	A			A	A	

Intersection Summary			
HCM 2000 Control Delay	7.0	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.29		
Actuated Cycle Length (s)	92.5	Sum of lost time (s)	12.6
Intersection Capacity Utilization	47.3%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

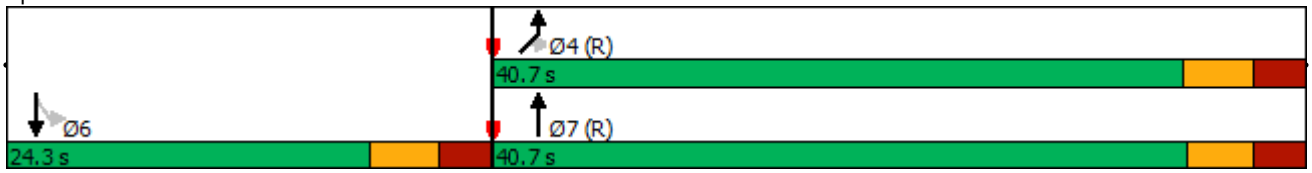
8: SLATER & Bronson Ave/Bronson

Lane Group	NBT	SBL	SBT	NEL	NER
Lane Configurations					
Traffic Volume (vph)	406	29	264	124	753
Future Volume (vph)	406	29	264	124	753
Lane Group Flow (vph)	749	0	325	548	530
Turn Type	NA	Perm	NA	Prot	Perm
Protected Phases	7!		6	4!	
Permitted Phases		6			4!
Detector Phase	7	6	6	4	4
Switch Phase					
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	24.2	24.2	24.2	24.2	24.2
Total Split (s)	40.7	24.3	24.3	40.7	40.7
Total Split (%)	62.6%	37.4%	37.4%	62.6%	62.6%
Yellow Time (s)	3.3	3.5	3.5	3.5	3.5
All-Red Time (s)	2.7	2.7	2.7	2.7	2.7
Lost Time Adjust (s)	0.0		0.0	0.0	0.0
Total Lost Time (s)	6.0		6.2	6.2	6.2
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	Max	Max	Max	Max	Max
Act Effct Green (s)	34.7		18.1	34.5	34.5
Actuated g/C Ratio	0.53		0.28	0.53	0.53
v/c Ratio	0.41		0.62	0.67	0.68
Control Delay	5.9		22.4	16.1	15.4
Queue Delay	0.0		0.0	0.5	0.2
Total Delay	5.9		22.4	16.6	15.6
LOS	A		C	B	B
Approach Delay	5.9		22.4	16.1	
Approach LOS	A		C	B	
Queue Length 50th (m)	14.9		11.1	46.2	42.3
Queue Length 95th (m)	24.8		23.3	79.8	78.3
Internal Link Dist (m)	290.7		50.9	105.6	
Turn Bay Length (m)					
Base Capacity (vph)	1821		521	821	781
Starvation Cap Reductn	0		0	61	21
Spillback Cap Reductn	38		0	19	0
Storage Cap Reductn	0		0	0	0
Reduced v/c Ratio	0.42		0.62	0.72	0.70

Intersection Summary	
Cycle Length: 65	
Actuated Cycle Length: 65	
Offset: 0 (0%), Referenced to phase 4:NEL and 7:NBT, Start of Green	
Natural Cycle: 60	
Control Type: Pretimed	
Maximum v/c Ratio: 0.68	
Intersection Signal Delay: 13.5	Intersection LOS: B
Intersection Capacity Utilization 78.7%	ICU Level of Service D
Analysis Period (min) 15	

! Phase conflict between lane groups.

Splits and Phases: 8: SLATER & Bronson Ave/Bronson



Movement	WBL	WBR	NBL	NBT	NBR	SBL	SBT	SBR	NEL	NER	NER2
Lane Configurations											
Traffic Volume (vph)	0	0	0	406	268	29	264	0	124	753	93
Future Volume (vph)	0	0	0	406	268	29	264	0	124	753	93
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)				6.0			6.2		6.2	6.2	
Lane Util. Factor				0.95			0.95		1.00	0.95	
Frt				0.94			1.00		0.89	0.85	
Flt Protected				1.00			1.00		0.99	1.00	
Satd. Flow (prot)				3153			3337		1547	1425	
Flt Permitted				1.00			0.56		0.99	1.00	
Satd. Flow (perm)				3153			1876		1547	1425	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	0	0	0	451	298	32	293	0	138	837	103
RTOR Reduction (vph)	0	0	0	139	0	0	0	0	0	25	0
Lane Group Flow (vph)	0	0	0	610	0	0	325	0	548	505	0
Turn Type				NA		Perm	NA		Prot	Perm	
Protected Phases				7!			6		4!		
Permitted Phases						6				4!	
Actuated Green, G (s)				34.7			18.1		34.5	34.5	
Effective Green, g (s)				34.7			18.1		34.5	34.5	
Actuated g/C Ratio				0.53			0.28		0.53	0.53	
Clearance Time (s)				6.0			6.2		6.2	6.2	
Lane Grp Cap (vph)				1683			522		821	756	
v/s Ratio Prot				0.19					c0.35		
v/s Ratio Perm							c0.17			0.35	
v/c Ratio				0.36			0.62		0.67	0.67	
Uniform Delay, d1				8.8			20.5		11.1	11.1	
Progression Factor				1.00			0.81		1.00	1.00	
Incremental Delay, d2				0.6			5.3		4.3	4.6	
Delay (s)				9.4			21.9		15.4	15.7	
Level of Service				A			C		B	B	
Approach Delay (s)	0.0			9.4			21.9		15.5		
Approach LOS	A			A			C		B		

Intersection Summary			
HCM 2000 Control Delay	14.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	12.4
Intersection Capacity Utilization	78.7%	ICU Level of Service	D
Analysis Period (min)	15		

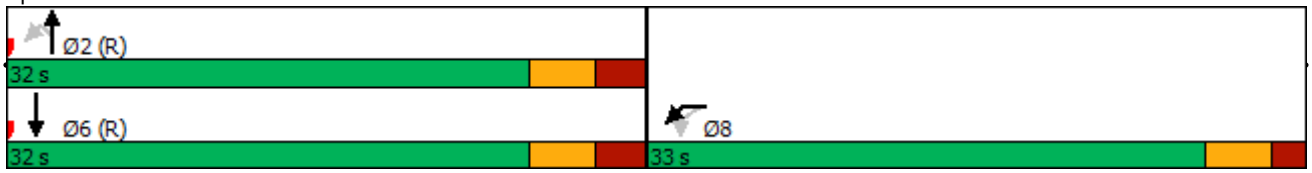
! Phase conflict between lane groups.
c Critical Lane Group

Lane Group	WBL2	WBL	NBL	NBT	SBT
Lane Configurations					
Traffic Volume (vph)	220	394	186	296	73
Future Volume (vph)	220	394	186	296	73
Lane Group Flow (vph)	244	449	207	329	122
Turn Type	Perm	Prot	Perm	NA	NA
Protected Phases		8		2	6
Permitted Phases	8		2		
Detector Phase	8	8	2	2	6
Switch Phase					
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	26.1	26.1	27.9	27.9	23.9
Total Split (s)	33.0	33.0	32.0	32.0	32.0
Total Split (%)	50.8%	50.8%	49.2%	49.2%	49.2%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	1.8	1.8	2.6	2.6	2.6
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.1	5.1	5.9	5.9	5.9
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	Max	Max	Max	Max	Max
Act Effct Green (s)	27.9	27.9	26.1	26.1	26.1
Actuated g/C Ratio	0.43	0.43	0.40	0.40	0.40
v/c Ratio	0.34	0.32	0.43	0.46	0.17
Control Delay	14.1	11.6	10.3	9.9	9.5
Queue Delay	0.0	0.0	0.4	0.6	0.0
Total Delay	14.1	11.6	10.7	10.5	9.5
LOS	B	B	B	B	A
Approach Delay		12.4		10.6	9.5
Approach LOS		B		B	A
Queue Length 50th (m)	19.8	16.2	16.4	26.8	6.3
Queue Length 95th (m)	35.4	25.6	m30.3	m44.6	15.7
Internal Link Dist (m)		177.9		50.9	46.8
Turn Bay Length (m)	50.0	50.0			
Base Capacity (vph)	719	1422	481	708	701
Starvation Cap Reductn	0	0	58	135	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.34	0.32	0.49	0.57	0.17

Intersection Summary	
Cycle Length: 65	
Actuated Cycle Length: 65	
Offset: 14 (22%), Referenced to phase 2:NBTL and 6:SBT, Start of Green	
Natural Cycle: 55	
Control Type: Pretimed	
Maximum v/c Ratio: 0.46	
Intersection Signal Delay: 11.4	Intersection LOS: B
Intersection Capacity Utilization 39.6%	ICU Level of Service A
Analysis Period (min) 15	

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

Splits and Phases: 11: Bronson & Albert



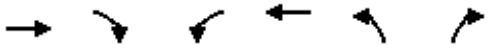
Movement	WBL2	WBL	WBR	NBL	NBT	NBR	SBL	SBT	SBR	NEL	NER
Lane Configurations											
Traffic Volume (vph)	220	394	10	186	296	0	0	73	37	0	0
Future Volume (vph)	220	394	10	186	296	0	0	73	37	0	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	5.1	5.1		5.9	5.9			5.9			
Lane Util. Factor	1.00	0.97		1.00	1.00			1.00			
Frt	1.00	1.00		1.00	1.00			0.95			
Flt Protected	0.95	0.95		0.95	1.00			1.00			
Satd. Flow (prot)	1676	3252		1676	1765			1685			
Flt Permitted	0.95	0.95		0.68	1.00			1.00			
Satd. Flow (perm)	1676	3252		1198	1765			1685			
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	244	438	11	207	329	0	0	81	41	0	0
RTOR Reduction (vph)	0	28	0	0	0	0	0	25	0	0	0
Lane Group Flow (vph)	244	421	0	207	329	0	0	97	0	0	0
Turn Type	Perm	Prot		Perm	NA			NA			
Protected Phases		8			2			6			
Permitted Phases	8			2							
Actuated Green, G (s)	27.9	27.9		26.1	26.1			26.1			
Effective Green, g (s)	27.9	27.9		26.1	26.1			26.1			
Actuated g/C Ratio	0.43	0.43		0.40	0.40			0.40			
Clearance Time (s)	5.1	5.1		5.9	5.9			5.9			
Lane Grp Cap (vph)	719	1395		481	708			676			
v/s Ratio Prot		0.13			c0.19			0.06			
v/s Ratio Perm	c0.15			0.17							
v/c Ratio	0.34	0.30		0.43	0.46			0.14			
Uniform Delay, d1	12.4	12.2		14.1	14.3			12.4			
Progression Factor	1.00	1.00		0.53	0.54			1.00			
Incremental Delay, d2	1.3	0.6		2.5	2.0			0.4			
Delay (s)	13.7	12.7		10.0	9.7			12.8			
Level of Service	B	B		A	A			B			
Approach Delay (s)		13.1			9.8			12.8		0.0	
Approach LOS		B			A			B		A	

Intersection Summary			
HCM 2000 Control Delay	11.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.40		
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	39.6%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBT	WBT	NBL
Lane Configurations			
Traffic Volume (vph)	1930	603	272
Future Volume (vph)	1930	603	272
Lane Group Flow (vph)	2144	670	341
Turn Type	NA	NA	Prot
Protected Phases	4	8	2
Permitted Phases			
Detector Phase	4	8	2
Switch Phase			
Minimum Initial (s)	5.0	5.0	5.0
Minimum Split (s)	36.7	23.7	26.9
Total Split (s)	95.0	95.0	35.0
Total Split (%)	73.1%	73.1%	26.9%
Yellow Time (s)	3.3	3.3	3.3
All-Red Time (s)	2.4	2.4	2.6
Lost Time Adjust (s)	0.0	0.0	0.0
Total Lost Time (s)	5.7	5.7	5.9
Lead/Lag			
Lead-Lag Optimize?			
Recall Mode	None	None	C-Max
Act Effct Green (s)	80.7	80.7	37.7
Actuated g/C Ratio	0.62	0.62	0.29
v/c Ratio	0.72	0.32	0.37
Control Delay	18.2	3.2	39.7
Queue Delay	0.0	0.1	0.1
Total Delay	18.2	3.3	39.8
LOS	B	A	D
Approach Delay	18.2	3.3	39.8
Approach LOS	B	A	D
Queue Length 50th (m)	134.6	0.4	38.1
Queue Length 95th (m)	123.5	0.4	57.0
Internal Link Dist (m)	74.9	134.0	213.7
Turn Bay Length (m)			
Base Capacity (vph)	3309	2303	934
Starvation Cap Reductn	0	649	0
Spillback Cap Reductn	64	0	80
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.66	0.41	0.40

Intersection Summary	
Cycle Length: 130	
Actuated Cycle Length: 130	
Offset: 101 (78%), Referenced to phase 2:NBL and 6:, Start of Green	
Natural Cycle: 65	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.72	
Intersection Signal Delay: 17.4	Intersection LOS: B
Intersection Capacity Utilization 58.4%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 13: Bay St & Wellington



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	1930	0	0	603	272	35
Future Volume (vph)	1930	0	0	603	272	35
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Total Lost time (s)	5.7			5.7	5.9	
Lane Util. Factor	0.91			0.95	0.97	
Frt	1.00			1.00	0.98	
Flt Protected	1.00			1.00	0.96	
Satd. Flow (prot)	4818			3353	3222	
Flt Permitted	1.00			1.00	0.96	
Satd. Flow (perm)	4818			3353	3222	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	2144	0	0	670	302	39
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	2144	0	0	670	341	0
Turn Type	NA			NA	Prot	
Protected Phases	4			8	2	
Permitted Phases						
Actuated Green, G (s)	80.7			80.7	37.7	
Effective Green, g (s)	80.7			80.7	37.7	
Actuated g/C Ratio	0.62			0.62	0.29	
Clearance Time (s)	5.7			5.7	5.9	
Vehicle Extension (s)	3.0			3.0	3.0	
Lane Grp Cap (vph)	2990			2081	934	
v/s Ratio Prot	c0.45			0.20	c0.11	
v/s Ratio Perm						
v/c Ratio	0.72			0.32	0.37	
Uniform Delay, d1	16.8			11.7	36.6	
Progression Factor	1.01			0.25	1.00	
Incremental Delay, d2	0.8			0.1	1.1	
Delay (s)	17.8			2.9	37.8	
Level of Service	B			A	D	
Approach Delay (s)	17.8			2.9	37.8	
Approach LOS	B			A	D	

Intersection Summary			
HCM 2000 Control Delay	16.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	11.6
Intersection Capacity Utilization	58.4%	ICU Level of Service	B
Analysis Period (min)	15		

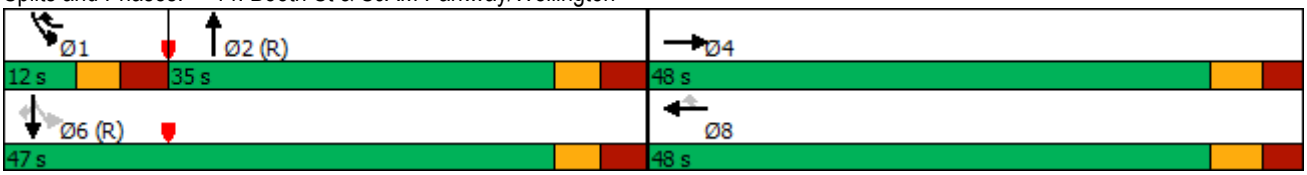
c Critical Lane Group

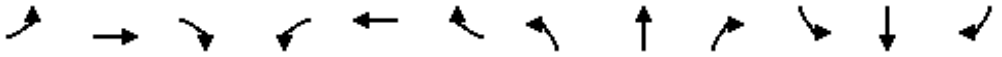
Lane Group	EBT	WBT	WBR	NBT	SBL	SBT	SBR
Lane Configurations							
Traffic Volume (vph)	1234	714	134	690	124	1090	326
Future Volume (vph)	1234	714	134	690	124	1090	326
Lane Group Flow (vph)	1371	793	149	953	138	1211	362
Turn Type	NA	NA	pm+ov	NA	pm+pt	NA	Perm
Protected Phases	4	8	1	2	1	6	
Permitted Phases			8		6		6
Detector Phase	4	8	1	2	1	6	6
Switch Phase							
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	40.8	40.8	11.8	31.8	11.8	37.9	37.9
Total Split (s)	48.0	48.0	12.0	35.0	12.0	47.0	47.0
Total Split (%)	50.5%	50.5%	12.6%	36.8%	12.6%	49.5%	49.5%
Yellow Time (s)	3.7	3.7	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	3.1	3.1	3.5	3.5	3.5	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)	6.8	6.8	6.8	6.8	6.8	6.8	6.8
Lead/Lag			Lead	Lag	Lead		
Lead-Lag Optimize?			Yes	Yes	Yes		
Recall Mode	None	None	None	C-Max	None	C-Max	C-Max
Act Effct Green (s)	40.8	40.8	53.2	28.2	40.6	40.6	40.6
Actuated g/C Ratio	0.43	0.43	0.56	0.30	0.43	0.43	0.43
v/c Ratio	0.95	0.55	0.18	0.96	0.80	0.85	0.52
Control Delay	41.6	21.9	10.9	53.9	54.1	31.5	17.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	41.6	21.9	10.9	53.9	54.1	31.5	17.6
LOS	D	C	B	D	D	C	B
Approach Delay	41.6	20.2		53.9		30.4	
Approach LOS	D	C		D		C	
Queue Length 50th (m)	129.7	58.1	13.2	92.3	16.3	108.2	36.4
Queue Length 95th (m)	#179.7	76.3	23.4	#135.4	#44.9	138.4	63.8
Internal Link Dist (m)	216.1	203.8		395.0		194.6	
Turn Bay Length (m)			70.0		150.0		55.0
Base Capacity (vph)	1454	1454	840	989	172	1431	696
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	0.94	0.55	0.18	0.96	0.80	0.85	0.52

Intersection Summary	
Cycle Length: 95	
Actuated Cycle Length: 95	
Offset: 31 (33%), Referenced to phase 2:NBT and 6:SBTL, Start of Green	
Natural Cycle: 85	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.96	
Intersection Signal Delay: 36.1	Intersection LOS: D
Intersection Capacity Utilization 86.0%	ICU Level of Service E
Analysis Period (min) 15	

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

Splits and Phases: 14: Booth St & SJAM Parkway/Wellington





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	1234	0	0	714	134	0	690	167	124	1090	326
Future Volume (vph)	0	1234	0	0	714	134	0	690	167	124	1090	326
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)		6.8			6.8	6.8		6.8		6.8	6.8	6.8
Lane Util. Factor		0.95			0.95	1.00		0.95		1.00	0.95	1.00
Frt		1.00			1.00	0.85		0.97		1.00	1.00	0.85
Flt Protected		1.00			1.00	1.00		1.00		0.95	1.00	1.00
Satd. Flow (prot)		3353			3353	1500		3255		1676	3353	1500
Flt Permitted		1.00			1.00	1.00		1.00		0.11	1.00	1.00
Satd. Flow (perm)		3353			3353	1500		3255		202	3353	1500
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	0	1371	0	0	793	149	0	767	186	138	1211	362
RTOR Reduction (vph)	0	0	0	0	0	0	0	23	0	0	0	55
Lane Group Flow (vph)	0	1371	0	0	793	149	0	930	0	138	1211	307
Turn Type		NA			NA	pm+ov		NA		pm+pt	NA	Perm
Protected Phases		4			8	1		2		1	6	
Permitted Phases						8				6		6
Actuated Green, G (s)		40.8			40.8	46.4		28.2		40.6	40.6	40.6
Effective Green, g (s)		40.8			40.8	46.4		28.2		40.6	40.6	40.6
Actuated g/C Ratio		0.43			0.43	0.49		0.30		0.43	0.43	0.43
Clearance Time (s)		6.8			6.8	6.8		6.8		6.8	6.8	6.8
Vehicle Extension (s)		3.0			3.0	3.0		3.0		3.0	3.0	3.0
Lane Grp Cap (vph)		1440			1440	840		966		173	1432	641
v/s Ratio Prot		c0.41			0.24	0.01		c0.29		0.05	c0.36	
v/s Ratio Perm						0.09				0.29		0.20
v/c Ratio		0.95			0.55	0.18		0.96		0.80	0.85	0.48
Uniform Delay, d1		26.2			20.3	13.6		32.9		21.2	24.4	19.6
Progression Factor		1.00			1.00	1.00		1.00		1.00	1.00	1.00
Incremental Delay, d2		13.9			0.5	0.1		21.3		22.0	6.3	2.6
Delay (s)		40.1			20.7	13.7		54.2		43.2	30.7	22.1
Level of Service		D			C	B		D		D	C	C
Approach Delay (s)		40.1			19.6			54.2			29.9	
Approach LOS		D			B			D			C	

Intersection Summary			
HCM 2000 Control Delay	35.4	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.00		
Actuated Cycle Length (s)	95.0	Sum of lost time (s)	20.4
Intersection Capacity Utilization	86.0%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

15: SJAM Parkway/Wellington & Wellington St & Portage Bridge

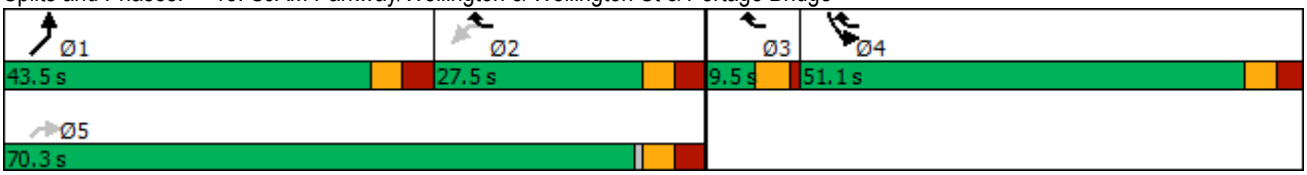
Lane Group	WBL	WBR	SBL	SBR	NEL	NER	Ø3
Lane Configurations							
Traffic Volume (vph)	624	717	897	583	783	836	
Future Volume (vph)	624	717	897	583	783	836	
Lane Group Flow (vph)	693	797	997	648	870	929	
Turn Type	Perm	custom	Prot	Free	Prot	Perm	
Protected Phases		2 3 4	4		1		3
Permitted Phases	2			Free		5	
Detector Phase	2	2 3 4	4		1	5	
Switch Phase							
Minimum Initial (s)	5.0		5.0		5.0	5.0	5.0
Minimum Split (s)	26.5		44.1		43.5	24.5	9.5
Total Split (s)	27.5		51.1		43.5	70.3	9.5
Total Split (%)	20.9%		38.8%		33.1%	53.4%	7%
Yellow Time (s)	3.3		3.3		3.3	3.3	3.5
All-Red Time (s)	3.2		2.8		3.2	3.2	1.0
Lost Time Adjust (s)	0.0		0.0		0.0	0.0	
Total Lost Time (s)	6.5		6.1		6.5	6.5	
Lead/Lag	Lag		Lag		Lead		Lead
Lead-Lag Optimize?	Yes		Yes		Yes		Yes
Recall Mode	None		Max		None	None	None
Act Effct Green (s)	21.0	81.6	45.0	131.1	36.5	64.0	
Actuated g/C Ratio	0.16	0.62	0.34	1.00	0.28	0.49	
v/c Ratio	1.33	0.48	0.89	0.43	0.96	0.51	
Control Delay	201.6	14.1	52.2	0.9	68.6	16.0	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	201.6	14.1	52.2	0.9	68.6	16.0	
LOS	F	B	D	A	E	B	
Approach Delay	101.3		32.0		41.4		
Approach LOS	F		C		D		
Queue Length 50th (m)	~126.3	60.8	132.7	0.0	120.5	49.8	
Queue Length 95th (m)	#165.5	77.8	#171.3	0.0	#162.2	65.3	
Internal Link Dist (m)	177.8		125.3		149.0		
Turn Bay Length (m)	150.0	150.0		15.0	150.0	150.0	
Base Capacity (vph)	523	1653	1116	1500	918	1830	
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	1.33	0.48	0.89	0.43	0.95	0.51	

Intersection Summary	
Cycle Length: 131.6	
Actuated Cycle Length: 131.1	
Natural Cycle: 135	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 1.33	
Intersection Signal Delay: 56.4	Intersection LOS: E
Intersection Capacity Utilization 85.3%	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: 15: SJAM Parkway/Wellington & Wellington St & Portage Bridge



Movement	WBL	WBR	SBL	SBR	NEL	NER
Lane Configurations						
Traffic Volume (vph)	624	717	897	583	783	836
Future Volume (vph)	624	717	897	583	783	836
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Total Lost time (s)	6.5	6.5	6.1	4.0	6.5	6.5
Lane Util. Factor	0.97	0.88	0.97	1.00	0.97	0.76
Frt	1.00	0.85	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	3252	2640	3252	1500	3252	3420
Flt Permitted	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	3269	2640	3252	1500	3252	3420
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	693	797	997	648	870	929
RTOR Reduction (vph)	0	11	0	0	0	149
Lane Group Flow (vph)	693	786	997	648	870	780
Turn Type	Perm	custom	Prot	Free	Prot	Perm
Protected Phases		2 3 4	4		1	
Permitted Phases	2			Free		5
Actuated Green, G (s)	21.0	82.0	45.0	131.1	36.5	64.0
Effective Green, g (s)	21.0	77.5	45.0	131.1	36.5	64.0
Actuated g/C Ratio	0.16	0.59	0.34	1.00	0.28	0.49
Clearance Time (s)	6.5		6.1		6.5	6.5
Vehicle Extension (s)	3.0		3.0		3.0	3.0
Lane Grp Cap (vph)	523	1560	1116	1500	905	1669
v/s Ratio Prot		0.30	c0.31		c0.27	
v/s Ratio Perm	c0.21			c0.43		0.23
v/c Ratio	1.33	0.50	0.89	0.43	0.96	0.47
Uniform Delay, d1	55.0	15.6	40.8	0.0	46.6	22.2
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	159.2	0.3	11.0	0.9	21.0	0.2
Delay (s)	214.2	15.9	51.8	0.9	67.6	22.5
Level of Service	F	B	D	A	E	C
Approach Delay (s)	108.1		31.7		44.3	
Approach LOS	F		C		D	

Intersection Summary			
HCM 2000 Control Delay	59.4	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.00		
Actuated Cycle Length (s)	131.1	Sum of lost time (s)	23.6
Intersection Capacity Utilization	85.3%	ICU Level of Service	E
Analysis Period (min)	15		

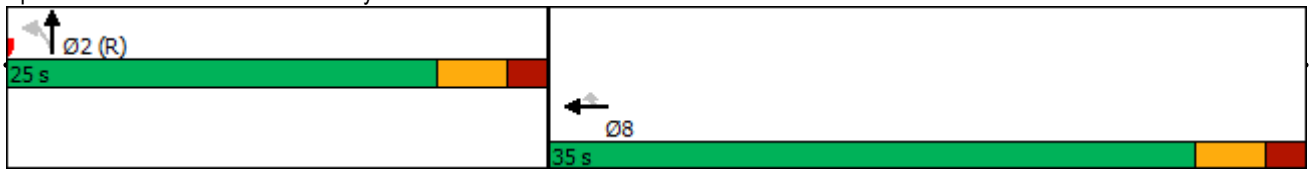
c Critical Lane Group

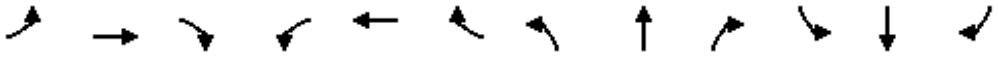
Lane Group	WBT	WBR	NBT
Lane Configurations			
Traffic Volume (vph)	149	158	257
Future Volume (vph)	149	158	257
Lane Group Flow (vph)	166	176	569
Turn Type	NA	Perm	NA
Protected Phases	8		2
Permitted Phases		8	
Detector Phase	8	8	2
Switch Phase			
Minimum Initial (s)	5.0	5.0	5.0
Minimum Split (s)	23.2	23.2	23.2
Total Split (s)	35.0	35.0	25.0
Total Split (%)	58.3%	58.3%	41.7%
Yellow Time (s)	3.3	3.3	3.3
All-Red Time (s)	1.9	1.9	1.9
Lost Time Adjust (s)	0.0	0.0	0.0
Total Lost Time (s)	5.2	5.2	5.2
Lead/Lag			
Lead-Lag Optimize?			
Recall Mode	None	None	C-Max
Act Effct Green (s)	8.5	8.5	41.1
Actuated g/C Ratio	0.14	0.14	0.68
v/c Ratio	0.35	0.48	0.24
Control Delay	24.8	9.2	2.2
Queue Delay	0.0	0.0	0.4
Total Delay	24.8	9.2	2.6
LOS	C	A	A
Approach Delay	16.8		2.6
Approach LOS	B		A
Queue Length 50th (m)	9.3	0.0	1.8
Queue Length 95th (m)	16.2	14.1	m4.0
Internal Link Dist (m)	133.2		48.0
Turn Bay Length (m)		50.0	
Base Capacity (vph)	1665	833	2330
Starvation Cap Reductn	0	0	1165
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.10	0.21	0.49

Intersection Summary	
Cycle Length: 60	
Actuated Cycle Length: 60	
Offset: 58 (97%), Referenced to phase 2:NBTL and 6:, Start of Green	
Natural Cycle: 50	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.48	
Intersection Signal Delay: 7.9	Intersection LOS: A
Intersection Capacity Utilization 34.3%	ICU Level of Service A
Analysis Period (min) 15	

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

Splits and Phases: 20: Albert & Bay St





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	0	149	158	255	257	0	0	0	0
Future Volume (vph)	0	0	0	0	149	158	255	257	0	0	0	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)					5.2	5.2		5.2				
Lane Util. Factor					0.95	1.00		0.95				
Frt					1.00	0.85		1.00				
Flt Protected					1.00	1.00		0.98				
Satd. Flow (prot)					3353	1500		3272				
Flt Permitted					1.00	1.00		0.98				
Satd. Flow (perm)					3353	1500		3272				
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	0	0	0	0	166	176	283	286	0	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	151	0	89	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	166	25	0	480	0	0	0	0
Turn Type					NA	Perm	Perm	NA				
Protected Phases					8			2				
Permitted Phases						8	2					
Actuated Green, G (s)					8.5	8.5		41.1				
Effective Green, g (s)					8.5	8.5		41.1				
Actuated g/C Ratio					0.14	0.14		0.69				
Clearance Time (s)					5.2	5.2		5.2				
Vehicle Extension (s)					3.0	3.0		3.0				
Lane Grp Cap (vph)					475	212		2241				
v/s Ratio Prot					c0.05							
v/s Ratio Perm						0.02		0.15				
v/c Ratio					0.35	0.12		0.21				
Uniform Delay, d1					23.3	22.5		3.5				
Progression Factor					1.00	1.00		1.09				
Incremental Delay, d2					0.4	0.2		0.1				
Delay (s)					23.7	22.7		3.9				
Level of Service					C	C		A				
Approach Delay (s)		0.0			23.2			3.9			0.0	
Approach LOS		A			C			A			A	

Intersection Summary			
HCM 2000 Control Delay	11.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.24		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	10.4
Intersection Capacity Utilization	34.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

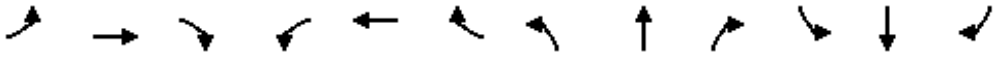
Lane Group	EBT	NBT
Lane Configurations		
Traffic Volume (vph)	962	399
Future Volume (vph)	962	399
Lane Group Flow (vph)	1195	629
Turn Type	NA	NA
Protected Phases	4	2
Permitted Phases		
Detector Phase	4	2
Switch Phase		
Minimum Initial (s)	5.0	5.0
Minimum Split (s)	35.0	19.0
Total Split (s)	41.0	19.0
Total Split (%)	68.3%	31.7%
Yellow Time (s)	3.3	3.3
All-Red Time (s)	1.7	1.9
Lost Time Adjust (s)	0.0	0.0
Total Lost Time (s)	5.0	5.2
Lead/Lag		
Lead-Lag Optimize?		
Recall Mode	None	C-Max
Act Effct Green (s)	29.3	20.5
Actuated g/C Ratio	0.49	0.34
v/c Ratio	0.72	1.05
Control Delay	14.0	76.1
Queue Delay	0.0	0.0
Total Delay	14.0	76.1
LOS	B	E
Approach Delay	14.0	76.1
Approach LOS	B	E
Queue Length 50th (m)	50.3	~81.4
Queue Length 95th (m)	55.2	#159.3
Internal Link Dist (m)	195.9	236.7
Turn Bay Length (m)		
Base Capacity (vph)	2017	599
Starvation Cap Reductn	0	0
Spillback Cap Reductn	0	0
Storage Cap Reductn	0	0
Reduced v/c Ratio	0.59	1.05

Intersection Summary	
Cycle Length: 60	
Actuated Cycle Length: 60	
Offset: 3 (5%), Referenced to phase 2:NBT and 6:, Start of Green	
Natural Cycle: 65	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 1.05	
Intersection Signal Delay: 35.4	Intersection LOS: D
Intersection Capacity Utilization 72.9%	ICU Level of Service C
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: 22: Bay St & Slater



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	113	962	0	0	0	0	0	399	167	0	0	0
Future Volume (vph)	113	962	0	0	0	0	0	399	167	0	0	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)		5.0						5.2				
Lane Util. Factor		0.95						1.00				
Frt		1.00						0.96				
Flt Protected		0.99						1.00				
Satd. Flow (prot)		3335						1694				
Flt Permitted		0.99						1.00				
Satd. Flow (perm)		3335						1694				
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	126	1069	0	0	0	0	0	443	186	0	0	0
RTOR Reduction (vph)	0	20	0	0	0	0	0	22	0	0	0	0
Lane Group Flow (vph)	0	1175	0	0	0	0	0	607	0	0	0	0
Turn Type	Perm	NA						NA				
Protected Phases		4						2				
Permitted Phases	4											
Actuated Green, G (s)		29.3						20.5				
Effective Green, g (s)		29.3						20.5				
Actuated g/C Ratio		0.49						0.34				
Clearance Time (s)		5.0						5.2				
Vehicle Extension (s)		3.0						3.0				
Lane Grp Cap (vph)		1628						578				
v/s Ratio Prot								c0.36				
v/s Ratio Perm		0.35										
v/c Ratio		0.72						1.05				
Uniform Delay, d1		12.1						19.8				
Progression Factor		1.00						1.00				
Incremental Delay, d2		1.6						51.4				
Delay (s)		13.7						71.2				
Level of Service		B						E				
Approach Delay (s)		13.7			0.0			71.2			0.0	
Approach LOS		B			A			E			A	

Intersection Summary			
HCM 2000 Control Delay	33.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	10.2
Intersection Capacity Utilization	72.9%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	WBT	SBT	Ø5
Lane Configurations			
Traffic Volume (vph)	269	883	
Future Volume (vph)	269	883	
Lane Group Flow (vph)	568	1023	
Turn Type	NA	NA	
Protected Phases	8	6	5
Permitted Phases			
Detector Phase	8	6	
Switch Phase			
Minimum Initial (s)	5.0	5.0	5.0
Minimum Split (s)	23.4	23.5	10.0
Total Split (s)	27.0	28.0	10.0
Total Split (%)	41.5%	43.1%	15%
Yellow Time (s)	3.3	3.3	2.0
All-Red Time (s)	2.1	2.2	0.0
Lost Time Adjust (s)	0.0	0.0	
Total Lost Time (s)	5.4	5.5	
Lead/Lag		Lag	Lead
Lead-Lag Optimize?		Yes	Yes
Recall Mode	None	C-Max	Max
Act Effct Green (s)	11.9	22.5	
Actuated g/C Ratio	0.18	0.35	
v/c Ratio	0.69	0.61	
Control Delay	17.0	18.6	
Queue Delay	0.0	0.0	
Total Delay	17.0	18.6	
LOS	B	B	
Approach Delay	17.0	18.6	
Approach LOS	B	B	
Queue Length 50th (m)	18.2	46.7	
Queue Length 95th (m)	29.8	m46.1	
Internal Link Dist (m)	197.0	214.4	
Turn Bay Length (m)			
Base Capacity (vph)	1268	1664	
Starvation Cap Reductn	0	0	
Spillback Cap Reductn	0	0	
Storage Cap Reductn	0	0	
Reduced v/c Ratio	0.45	0.61	

Intersection Summary	
Cycle Length: 65	
Actuated Cycle Length: 65	
Offset: 24 (37%), Referenced to phase 2: and 6:SBT, Start of Green	
Natural Cycle: 60	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.69	
Intersection Signal Delay: 18.0	Intersection LOS: B
Intersection Capacity Utilization 54.0%	ICU Level of Service A
Analysis Period (min) 15	

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

Splits and Phases: 27: Albert St & Lyon St N

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	242	269	0	0	0	0	0	883	38
Future Volume (vph)	0	0	0	242	269	0	0	0	0	0	883	38
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)					5.4						5.5	
Lane Util. Factor					0.95						0.91	
Frt					1.00						0.99	
Flt Protected					0.98						1.00	
Satd. Flow (prot)					3275						4788	
Flt Permitted					0.98						1.00	
Satd. Flow (perm)					3275						4788	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	0	0	0	269	299	0	0	0	0	0	981	42
RTOR Reduction (vph)	0	0	0	0	220	0	0	0	0	0	7	0
Lane Group Flow (vph)	0	0	0	0	348	0	0	0	0	0	1016	0
Turn Type				Perm	NA						NA	
Protected Phases					8						6	
Permitted Phases				8								
Actuated Green, G (s)					11.9						22.5	
Effective Green, g (s)					11.9						22.5	
Actuated g/C Ratio					0.18						0.35	
Clearance Time (s)					5.4						5.5	
Vehicle Extension (s)					3.0						3.0	
Lane Grp Cap (vph)					599						1657	
v/s Ratio Prot											c0.21	
v/s Ratio Perm					0.11							
v/c Ratio					0.58						0.61	
Uniform Delay, d1					24.3						17.6	
Progression Factor					1.00						1.00	
Incremental Delay, d2					1.4						1.1	
Delay (s)					25.7						18.7	
Level of Service					C						B	
Approach Delay (s)		0.0			25.7			0.0			18.7	
Approach LOS		A			C			A			B	

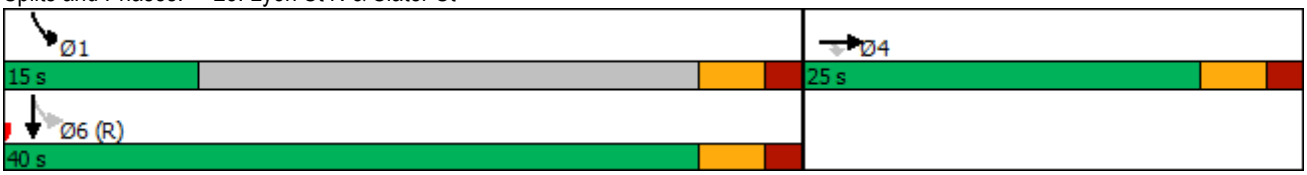
Intersection Summary			
HCM 2000 Control Delay	21.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.40		
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	12.9
Intersection Capacity Utilization	54.0%	ICU Level of Service	A
Analysis Period (min)	15		

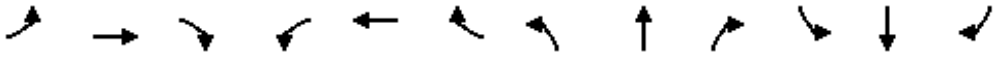
c Critical Lane Group

Lane Group	EBT	EBR	SBL	SBT
Lane Configurations				
Traffic Volume (vph)	781	220	284	771
Future Volume (vph)	781	220	284	771
Lane Group Flow (vph)	868	244	316	857
Turn Type	NA	Perm	pm+pt	NA
Protected Phases	4		1	6
Permitted Phases		4	6	
Detector Phase	4	4	1	6
Switch Phase				
Minimum Initial (s)	5.0	5.0	5.0	5.0
Minimum Split (s)	21.2	21.2	10.3	29.3
Total Split (s)	25.0	25.0	15.0	40.0
Total Split (%)	38.5%	38.5%	23.1%	61.5%
Yellow Time (s)	3.3	3.3	3.3	3.3
All-Red Time (s)	1.9	1.9	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.2	5.2	5.3	5.3
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	None	None	None	C-Max
Act Effct Green (s)	19.4	19.4	35.1	35.1
Actuated g/C Ratio	0.30	0.30	0.54	0.54
v/c Ratio	0.87	0.45	0.34	0.47
Control Delay	32.7	11.7	3.1	3.9
Queue Delay	0.0	0.0	0.5	0.3
Total Delay	32.7	11.7	3.6	4.1
LOS	C	B	A	A
Approach Delay	28.1			4.0
Approach LOS	C			A
Queue Length 50th (m)	53.6	10.7	3.4	8.4
Queue Length 95th (m)	#85.0	28.4	6.9	11.8
Internal Link Dist (m)	132.9			47.5
Turn Bay Length (m)		50.0		
Base Capacity (vph)	1021	548	921	1809
Starvation Cap Reductn	0	0	282	359
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.85	0.45	0.49	0.59

Intersection Summary	
Cycle Length: 65	
Actuated Cycle Length: 65	
Offset: 24 (37%), Referenced to phase 2: and 6:SBTL, Start of Green	
Natural Cycle: 55	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.87	
Intersection Signal Delay: 15.7	Intersection LOS: B
Intersection Capacity Utilization 54.0%	ICU Level of Service A
Analysis Period (min) 15	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	

Splits and Phases: 28: Lyon St N & Slater St





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	781	220	0	0	0	0	0	0	284	771	0
Future Volume (vph)	0	781	220	0	0	0	0	0	0	284	771	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)		5.2	5.2							5.3	5.3	
Lane Util. Factor		0.95	1.00							1.00	0.95	
Frt		1.00	0.85							1.00	1.00	
Flt Protected		1.00	1.00							0.95	1.00	
Satd. Flow (prot)		3353	1500							1676	3353	
Flt Permitted		1.00	1.00							0.95	1.00	
Satd. Flow (perm)		3353	1500							1676	3353	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	0	868	244	0	0	0	0	0	0	316	857	0
RTOR Reduction (vph)	0	0	92	0	0	0	0	0	0	17	0	0
Lane Group Flow (vph)	0	868	152	0	0	0	0	0	0	299	857	0
Turn Type		NA	Perm							pm+pt	NA	
Protected Phases		4								1	6	
Permitted Phases			4							6		
Actuated Green, G (s)		19.4	19.4							35.1	35.1	
Effective Green, g (s)		19.4	19.4							35.1	35.1	
Actuated g/C Ratio		0.30	0.30							0.54	0.54	
Clearance Time (s)		5.2	5.2							5.3	5.3	
Vehicle Extension (s)		3.0	3.0							3.0	3.0	
Lane Grp Cap (vph)		1000	447							905	1810	
v/s Ratio Prot		c0.26								0.18	c0.26	
v/s Ratio Perm			0.10									
v/c Ratio		0.87	0.34							0.33	0.47	
Uniform Delay, d1		21.6	17.8							8.4	9.2	
Progression Factor		1.00	1.00							0.30	0.33	
Incremental Delay, d2		8.1	0.5							0.2	0.7	
Delay (s)		29.7	18.3							2.7	3.8	
Level of Service		C	B							A	A	
Approach Delay (s)		27.2			0.0			0.0			3.5	
Approach LOS		C			A			A			A	

Intersection Summary			
HCM 2000 Control Delay	15.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	10.5
Intersection Capacity Utilization	54.0%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

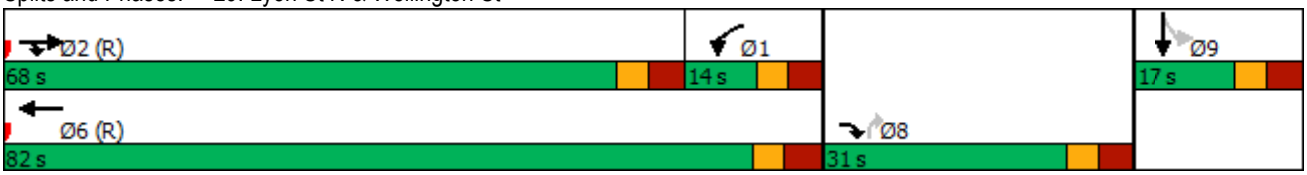
Lane Group	EBT	EBR	WBL	WBT	NBR	Ø9
Lane Configurations						
Traffic Volume (vph)	793	1035	117	595	9	
Future Volume (vph)	793	1035	117	595	9	
Lane Group Flow (vph)	881	1150	130	661	10	
Turn Type	NA	custom	Prot	NA	Perm	
Protected Phases	2	2 8	1	6		9
Permitted Phases					8	
Detector Phase	2	2 8	1	6	8	
Switch Phase						
Minimum Initial (s)	5.0		5.0	5.0	5.0	5.0
Minimum Split (s)	31.0		11.9	25.3	31.0	25.1
Total Split (s)	68.0		14.0	82.0	31.0	17.0
Total Split (%)	52.3%		10.8%	63.1%	23.8%	13%
Yellow Time (s)	3.3		3.3	3.3	3.3	3.3
All-Red Time (s)	3.6		3.6	4.0	3.6	3.8
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	
Total Lost Time (s)	6.9		6.9	7.3	6.9	
Lead/Lag	Lead		Lag			
Lead-Lag Optimize?	Yes		Yes			
Recall Mode	C-Max		None	C-Max	Max	Max
Act Effct Green (s)	61.1	85.2	7.1	74.7	24.1	
Actuated g/C Ratio	0.47	0.66	0.05	0.57	0.19	
v/c Ratio	1.06	0.66	1.43	0.34	0.02	
Control Delay	73.6	7.7	287.4	15.3	0.1	
Queue Delay	0.0	0.0	0.0	0.0	0.0	
Total Delay	73.6	7.8	287.4	15.3	0.1	
LOS	E	A	F	B	A	
Approach Delay	36.3			60.0		
Approach LOS	D			E		
Queue Length 50th (m)	~252.3	53.0	~47.2	47.4	0.0	
Queue Length 95th (m)	#334.9	71.0	#89.8	60.3	0.0	
Internal Link Dist (m)	134.0			168.5		
Turn Bay Length (m)						
Base Capacity (vph)	829	1730	91	1926	530	
Starvation Cap Reductn	0	9	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	
Reduced v/c Ratio	1.06	0.67	1.43	0.34	0.02	

Intersection Summary	
Cycle Length: 130	
Actuated Cycle Length: 130	
Offset: 120 (92%), Referenced to phase 2:EBT and 6:WBT, Start of Green	
Natural Cycle: 150	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 1.43	
Intersection Signal Delay: 42.8	Intersection LOS: D
Intersection Capacity Utilization 62.4%	ICU Level of Service B
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: 29: Lyon St N & Wellington St



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	793	1035	117	595	0	0	0	9	0	0	0
Future Volume (vph)	0	793	1035	117	595	0	0	0	9	0	0	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)		6.9	6.9	6.9	7.3				6.9			
Lane Util. Factor		1.00	0.88	1.00	0.95				1.00			
Frt		1.00	0.85	1.00	1.00				0.86			
Flt Protected		1.00	1.00	0.95	1.00				1.00			
Satd. Flow (prot)		1765	2640	1676	3353				1526			
Flt Permitted		1.00	1.00	0.95	1.00				1.00			
Satd. Flow (perm)		1765	2640	1676	3353				1526			
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	0	881	1150	130	661	0	0	0	10	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	8	0	0	0
Lane Group Flow (vph)	0	881	1150	130	661	0	0	0	2	0	0	0
Turn Type		NA	custom	Prot	NA				Perm			
Protected Phases		2	2 8	1	6						9	
Permitted Phases									8	9		
Actuated Green, G (s)		61.1	85.2	7.1	74.7				24.1			
Effective Green, g (s)		61.1	85.2	7.1	74.7				24.1			
Actuated g/C Ratio		0.47	0.66	0.05	0.57				0.19			
Clearance Time (s)		6.9		6.9	7.3				6.9			
Vehicle Extension (s)		3.0		3.0	3.0				3.0			
Lane Grp Cap (vph)		829	1730	91	1926				282			
v/s Ratio Prot		c0.50	c0.44	c0.08	0.20							
v/s Ratio Perm									0.00			
v/c Ratio		1.06	0.66	1.43	0.34				0.01			
Uniform Delay, d1		34.5	13.7	61.5	14.7				43.2			
Progression Factor		0.79	0.88	1.00	1.00				1.00			
Incremental Delay, d2		45.6	1.6	244.8	0.5				0.0			
Delay (s)		72.8	13.6	306.3	15.1				43.2			
Level of Service		E	B	F	B				D			
Approach Delay (s)		39.3			63.0			43.2			0.0	
Approach LOS		D			E			D			A	

Intersection Summary			
HCM 2000 Control Delay	45.9	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.89		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	27.8
Intersection Capacity Utilization	62.4%	ICU Level of Service	B
Analysis Period (min)	15		

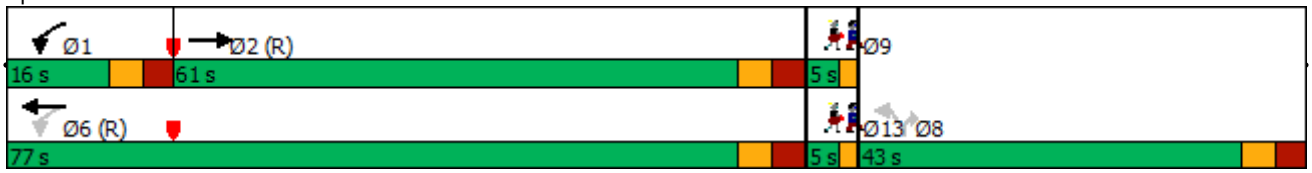
c Critical Lane Group

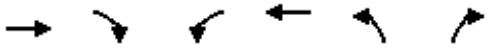
Lane Group	EBT	WBL	WBT	NBL	NBR	Ø9	Ø13
Lane Configurations							
Traffic Volume (vph)	500	300	850	5	8		
Future Volume (vph)	500	300	850	5	8		
Lane Group Flow (vph)	984	300	850	5	8		
Turn Type	NA	pm+pt	NA	Perm	Perm		
Protected Phases	2	1	6			9	13
Permitted Phases		6		8	8		
Detector Phase	2	1	6	8	8		
Switch Phase							
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	1.0	1.0
Minimum Split (s)	31.8	11.2	31.8	29.3	29.3	3.0	3.0
Total Split (s)	61.0	16.0	77.0	43.0	43.0	5.0	5.0
Total Split (%)	48.8%	12.8%	61.6%	34.4%	34.4%	4%	4%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	2.0	2.0
All-Red Time (s)	3.5	2.9	3.5	3.0	3.0	0.0	0.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		
Total Lost Time (s)	6.8	6.2	6.8	6.3	6.3		
Lead/Lag	Lag	Lead					
Lead-Lag Optimize?	Yes	Yes					
Recall Mode	C-Max	None	C-Max	None	None	None	None
Act Effct Green (s)	83.6	113.4	116.9	6.3	6.3		
Actuated g/C Ratio	0.67	0.91	0.94	0.05	0.05		
v/c Ratio	0.46	0.50	0.27	0.06	0.11		
Control Delay	8.3	22.8	0.1	57.4	59.1		
Queue Delay	0.0	0.0	0.0	0.0	0.0		
Total Delay	8.3	22.8	0.1	57.4	59.1		
LOS	A	C	A	E	E		
Approach Delay	8.3		6.0	58.5			
Approach LOS	A		A	E			
Queue Length 50th (m)	32.8	42.6	0.0	1.3	2.0		
Queue Length 95th (m)	69.0	m30.9	m1.4	5.8	7.6		
Internal Link Dist (m)	195.9		296.6	186.4			
Turn Bay Length (m)		115.0					
Base Capacity (vph)	2158	602	3135	492	440		
Starvation Cap Reductn	0	0	0	0	0		
Spillback Cap Reductn	0	0	0	0	0		
Storage Cap Reductn	0	0	0	0	0		
Reduced v/c Ratio	0.46	0.50	0.27	0.01	0.02		

Intersection Summary	
Cycle Length: 125	
Actuated Cycle Length: 125	
Offset: 65 (52%), Referenced to phase 2:EBT and 6:WBTL, Start of Green	
Natural Cycle: 80	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.50	
Intersection Signal Delay: 7.4	Intersection LOS: A
Intersection Capacity Utilization 68.8%	ICU Level of Service C
Analysis Period (min) 15	

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

Splits and Phases: 4: Preston St & Albert St





Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	500	484	300	850	5	8
Future Volume (vph)	500	484	300	850	5	8
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Total Lost time (s)	6.8		6.2	6.8	6.3	6.3
Lane Util. Factor	0.95		1.00	0.95	1.00	1.00
Frt	0.93		1.00	1.00	1.00	0.85
Flt Protected	1.00		0.95	1.00	0.95	1.00
Satd. Flow (prot)	3106		1676	3353	1676	1500
Flt Permitted	1.00		0.23	1.00	0.95	1.00
Satd. Flow (perm)	3106		408	3353	1676	1500
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	500	484	300	850	5	8
RTOR Reduction (vph)	89	0	0	0	0	0
Lane Group Flow (vph)	895	0	300	850	5	8
Turn Type	NA		pm+pt	NA	Perm	Perm
Protected Phases	2		1	6		
Permitted Phases			6		8	8
Actuated Green, G (s)	79.8		109.0	109.0	2.9	2.9
Effective Green, g (s)	79.8		109.0	109.0	2.9	2.9
Actuated g/C Ratio	0.64		0.87	0.87	0.02	0.02
Clearance Time (s)	6.8		6.2	6.8	6.3	6.3
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	1982		589	2923	38	34
v/s Ratio Prot	0.29		c0.09	0.25		
v/s Ratio Perm			c0.35		0.00	c0.01
v/c Ratio	0.45		0.51	0.29	0.13	0.24
Uniform Delay, d1	11.5		4.2	1.4	59.8	60.0
Progression Factor	1.00		15.45	0.08	1.00	1.00
Incremental Delay, d2	0.7		0.1	0.0	1.6	3.5
Delay (s)	12.2		65.6	0.1	61.4	63.5
Level of Service	B		E	A	E	E
Approach Delay (s)	12.2			17.2	62.7	
Approach LOS	B			B	E	

Intersection Summary			
HCM 2000 Control Delay	15.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.53		
Actuated Cycle Length (s)	125.0	Sum of lost time (s)	21.3
Intersection Capacity Utilization	68.8%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR	Ø9
Lane Configurations												
Traffic Volume (vph)	439	548	25	34	1097	107	14	422	36	321	180	
Future Volume (vph)	439	548	25	34	1097	107	14	422	36	321	180	
Lane Group Flow (vph)	439	548	25	34	1097	107	0	466	36	321	180	
Turn Type	pm+pt	NA	Perm	Perm	NA	Perm	Perm	NA	pm+pt	NA	Perm	
Protected Phases	5	2			6			8	7	4		9
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	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	1.0
Minimum Split (s)	11.5	36.5	36.5	36.5	36.5	36.5	34.5	34.5	11.5	34.5	34.5	5.0
Total Split (s)	29.0	71.0	71.0	42.0	42.0	42.0	38.0	38.0	11.0	49.0	49.0	5.0
Total Split (%)	23.2%	56.8%	56.8%	33.6%	33.6%	33.6%	30.4%	30.4%	8.8%	39.2%	39.2%	4%
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	2.0
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	0.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.5	6.5	6.5	6.5	6.5	6.5		6.5	6.5	6.5	6.5	
Lead/Lag	Lead			Lag	Lag	Lag			Lead			
Lead-Lag Optimize?	Yes			Yes	Yes	Yes			Yes			
Recall Mode	None	C-Max	C-Max	C-Max	C-Max	C-Max	Max	Max	None	Max	Max	Max
Act Effct Green (s)	64.5	64.5	64.5	35.5	35.5	35.5		31.5	47.0	42.5	42.5	
Actuated g/C Ratio	0.52	0.52	0.52	0.28	0.28	0.28		0.25	0.38	0.34	0.34	
v/c Ratio	1.21	0.60	0.03	0.15	1.15	0.21		0.59	0.17	0.54	0.29	
Control Delay	149.0	29.5	1.8	35.7	121.2	5.3		44.3	26.6	37.3	5.3	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	
Total Delay	149.0	29.5	1.8	35.7	121.2	5.3		44.3	26.6	37.3	5.3	
LOS	F	C	A	D	F	A		D	C	D	A	
Approach Delay		80.6			108.9			44.3		25.9		
Approach LOS		F			F			D		C		
Queue Length 50th (m)	~122.6	114.0	0.0	6.6	~175.7	0.0		55.5	5.9	66.7	0.0	
Queue Length 95th (m)	#189.8	160.5	m1.6	15.8	#219.1	10.8		74.0	13.3	97.0	15.9	
Internal Link Dist (m)		296.6			179.0			146.1		395.0		
Turn Bay Length (m)			45.0	75.0		110.0					126.0	
Base Capacity (vph)	362	910	805	230	952	513		787	210	600	628	
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	1.21	0.60	0.03	0.15	1.15	0.21		0.59	0.17	0.54	0.29	

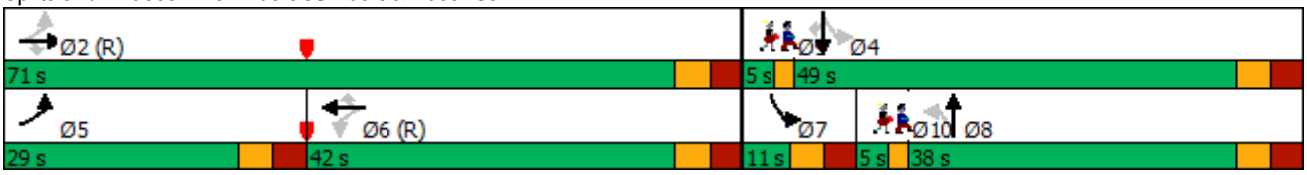
Intersection Summary		
Cycle Length: 125		
Actuated Cycle Length: 125		
Offset: 9 (7%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green		
Natural Cycle: 140		
Control Type: Actuated-Coordinated		
Maximum v/c Ratio: 1.21		
Intersection Signal Delay: 77.1	Intersection LOS: E	
Intersection Capacity Utilization 105.5%	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.		

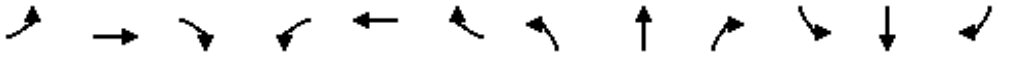
Lane Group	Ø10
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Lane Group Flow (vph)	
Turn Type	
Protected Phases	10
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	1.0
Minimum Split (s)	5.0
Total Split (s)	5.0
Total Split (%)	4%
Yellow Time (s)	2.0
All-Red Time (s)	0.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	Lag
Lead-Lag Optimize?	Yes
Recall Mode	Max
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (m)	
Queue Length 95th (m)	
Internal Link Dist (m)	
Turn Bay Length (m)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	

Intersection Summary

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

Splits and Phases: 5: Albert St/Albert & Booth St





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	439	548	25	34	1097	107	14	422	30	36	321	180
Future Volume (vph)	439	548	25	34	1097	107	14	422	30	36	321	180
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	6.5	6.5	6.5	6.5	6.5	6.5		6.5		6.5	6.5	6.5
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	1.00		0.95		1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85		0.99		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		1.00		0.95	1.00	1.00
Satd. Flow (prot)	1676	1765	1500	1676	3353	1500		3316		1676	1765	1500
Flt Permitted	0.10	1.00	1.00	0.46	1.00	1.00		0.94		0.25	1.00	1.00
Satd. Flow (perm)	179	1765	1500	811	3353	1500		3113		441	1765	1500
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	439	548	25	34	1097	107	14	422	30	36	321	180
RTOR Reduction (vph)	0	0	13	0	0	79	0	4	0	0	0	115
Lane Group Flow (vph)	439	548	12	34	1097	28	0	462	0	36	321	65
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
Actuated Green, G (s)	61.9	61.9	61.9	32.9	32.9	32.9		31.5		47.8	45.1	45.1
Effective Green, g (s)	61.9	61.9	61.9	32.9	32.9	32.9		31.5		47.8	45.1	45.1
Actuated g/C Ratio	0.50	0.50	0.50	0.26	0.26	0.26		0.25		0.38	0.36	0.36
Clearance Time (s)	6.5	6.5	6.5	6.5	6.5	6.5		6.5		6.5	6.5	6.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	358	874	742	213	882	394		784		195	636	541
v/s Ratio Prot	c0.22	0.31			0.33					c0.00	c0.18	
v/s Ratio Perm	c0.39		0.01	0.04		0.02		c0.15		0.07		0.04
v/c Ratio	1.23	0.63	0.02	0.16	1.24	0.07		0.59		0.18	0.50	0.12
Uniform Delay, d1	39.2	23.1	16.1	35.4	46.0	34.6		41.1		26.4	31.2	26.7
Progression Factor	0.90	1.22	1.00	1.00	1.00	1.00		1.00		1.00	1.00	1.00
Incremental Delay, d2	123.9	3.3	0.0	1.6	119.3	0.4		3.2		0.5	2.8	0.5
Delay (s)	159.1	31.5	16.1	37.0	165.3	34.9		44.3		26.8	34.1	27.1
Level of Service	F	C	B	D	F	C		D		C	C	C
Approach Delay (s)		86.5			150.5			44.3			31.3	
Approach LOS		F			F			D			C	

Intersection Summary			
HCM 2000 Control Delay	95.7	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	0.99		
Actuated Cycle Length (s)	125.0	Sum of lost time (s)	28.0
Intersection Capacity Utilization	105.5%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	NBL	NBT	SBT	SBR
Lane Configurations					
Traffic Volume (vph)	735	5	8	25	1275
Future Volume (vph)	735	5	8	25	1275
Lane Group Flow (vph)	763	0	13	650	650
Turn Type	Perm	Perm	NA	NA	Perm
Protected Phases			4	2!	
Permitted Phases	6!	4			2
Detector Phase	6	4	4	2	2
Switch Phase					
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	29.1	39.3	39.3	29.1	29.1
Total Split (s)	80.6	39.4	39.4	80.6	80.6
Total Split (%)	67.2%	32.8%	32.8%	67.2%	67.2%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	3.8	3.0	3.0	3.8	3.8
Lost Time Adjust (s)	0.0		0.0	0.0	0.0
Total Lost Time (s)	7.1		6.3	7.1	7.1
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	Max	Max	Max	Max	Max
Act Effct Green (s)	73.5		33.1	73.5	73.5
Actuated g/C Ratio	0.61		0.28	0.61	0.61
v/c Ratio	0.38		0.03	0.58	0.58
Control Delay	12.4		32.2	3.3	3.0
Queue Delay	0.0		0.0	0.6	0.5
Total Delay	12.4		32.2	3.9	3.6
LOS	B		C	A	A
Approach Delay	12.4		32.2	3.7	
Approach LOS	B		C	A	
Queue Length 50th (m)	45.8		2.4	2.4	0.0
Queue Length 95th (m)	58.4		7.6	17.8	14.9
Internal Link Dist (m)	179.0		98.2	145.6	
Turn Bay Length (m)					
Base Capacity (vph)	1990		401	1121	1124
Starvation Cap Reductn	0		0	171	167
Spillback Cap Reductn	0		0	0	0
Storage Cap Reductn	0		0	0	0
Reduced v/c Ratio	0.38		0.03	0.68	0.68

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 87 (73%), Referenced to phase 2:SBT and 6:EBL, Start of Green	
Natural Cycle: 70	
Control Type: Pretimed	
Maximum v/c Ratio: 0.58	
Intersection Signal Delay: 7.1	Intersection LOS: A
Intersection Capacity Utilization 70.9%	ICU Level of Service C
Analysis Period (min) 15	

! Phase conflict between lane groups.

Splits and Phases: 6: Empress Ave & Albert

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	735	28	5	8	25	1275
Future Volume (vph)	735	28	5	8	25	1275
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Total Lost time (s)	7.1			6.3	7.1	7.1
Lane Util. Factor	0.97			1.00	0.95	0.95
Frt	0.99			1.00	0.86	0.85
Flt Protected	0.95			0.98	1.00	1.00
Satd. Flow (prot)	3248			1731	1435	1425
Flt Permitted	0.95			0.83	1.00	1.00
Satd. Flow (perm)	3248			1456	1435	1425
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	735	28	5	8	25	1275
RTOR Reduction (vph)	2	0	0	0	242	252
Lane Group Flow (vph)	761	0	0	13	408	398
Turn Type	Perm		Perm	NA	NA	Perm
Protected Phases				4	2!	
Permitted Phases	6!		4			2
Actuated Green, G (s)	73.5			33.1	73.5	73.5
Effective Green, g (s)	73.5			33.1	73.5	73.5
Actuated g/C Ratio	0.61			0.28	0.61	0.61
Clearance Time (s)	7.1			6.3	7.1	7.1
Lane Grp Cap (vph)	1989			401	878	872
v/s Ratio Prot					c0.28	
v/s Ratio Perm	0.23			c0.01		0.28
v/c Ratio	0.38			0.03	0.46	0.46
Uniform Delay, d1	11.8			31.7	12.6	12.5
Progression Factor	1.00			1.00	1.00	1.00
Incremental Delay, d2	0.6			0.2	1.8	1.7
Delay (s)	12.3			31.9	14.4	14.2
Level of Service	B			C	B	B
Approach Delay (s)	12.3			31.9	14.3	
Approach LOS	B			C	B	

Intersection Summary			
HCM 2000 Control Delay	13.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.33		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	13.4
Intersection Capacity Utilization	70.9%	ICU Level of Service	C
Analysis Period (min)	15		

! Phase conflict between lane groups.
c Critical Lane Group

Lane Group	NBR	SBL	SBT	Ø9
Lane Configurations				
Traffic Volume (vph)	744	167	1299	
Future Volume (vph)	744	167	1299	
Lane Group Flow (vph)	744	167	1299	
Turn Type	Perm	Perm	NA	
Protected Phases			6	9
Permitted Phases	2	6		
Detector Phase	2	6	6	
Switch Phase				
Minimum Initial (s)	5.0	5.0	5.0	5.0
Minimum Split (s)	24.3	29.0	29.0	11.3
Total Split (s)	53.7	53.7	53.7	11.3
Total Split (%)	82.6%	82.6%	82.6%	17%
Yellow Time (s)	3.3	3.3	3.3	3.3
All-Red Time (s)	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0	0.0	
Total Lost Time (s)	6.3	6.3	6.3	
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	Max	Max	Max	Max
Act Effct Green (s)	47.4	47.4	47.4	
Actuated g/C Ratio	0.73	0.73	0.73	
v/c Ratio	0.30	0.13	0.53	
Control Delay	0.3	0.7	4.9	
Queue Delay	0.0	0.0	0.0	
Total Delay	0.3	0.7	4.9	
LOS	A	A	A	
Approach Delay			4.4	
Approach LOS			A	
Queue Length 50th (m)	0.0	0.0	28.7	
Queue Length 95th (m)	0.0	3.5	40.0	
Internal Link Dist (m)			93.1	
Turn Bay Length (m)		50.0		
Base Capacity (vph)	2445	1267	2445	
Starvation Cap Reductn	0	0	0	
Spillback Cap Reductn	0	0	0	
Storage Cap Reductn	0	0	0	
Reduced v/c Ratio	0.30	0.13	0.53	

Intersection Summary	
Cycle Length: 65	
Actuated Cycle Length: 65	
Offset: 0 (0%), Referenced to phase 2:NBR and 6:SBTL, Start of Green	
Natural Cycle: 45	
Control Type: Pretimed	
Maximum v/c Ratio: 0.53	
Intersection Signal Delay: 3.0	Intersection LOS: A
Intersection Capacity Utilization 47.7%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 7: ALBERT & SLATER

Movement	NBT	NBR	SBL	SBT	SWL	SWR
Lane Configurations						
Traffic Volume (vph)	0	744	167	1299	0	0
Future Volume (vph)	0	744	167	1299	0	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Total Lost time (s)		6.3	6.3	6.3		
Lane Util. Factor		0.88	1.00	0.95		
Frt		0.85	1.00	1.00		
Flt Protected		1.00	0.95	1.00		
Satd. Flow (prot)		2640	1676	3353		
Flt Permitted		1.00	0.95	1.00		
Satd. Flow (perm)		2640	1676	3353		
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	744	167	1299	0	0
RTOR Reduction (vph)	0	201	45	0	0	0
Lane Group Flow (vph)	0	543	122	1299	0	0
Turn Type		Perm	Perm	NA		
Protected Phases				6		
Permitted Phases		2	6			
Actuated Green, G (s)		47.4	47.4	47.4		
Effective Green, g (s)		47.4	47.4	47.4		
Actuated g/C Ratio		0.73	0.73	0.73		
Clearance Time (s)		6.3	6.3	6.3		
Lane Grp Cap (vph)		1925	1222	2445		
v/s Ratio Prot				c0.39		
v/s Ratio Perm		0.21	0.07			
v/c Ratio		0.28	0.10	0.53		
Uniform Delay, d1		3.0	2.6	3.9		
Progression Factor		1.00	1.00	1.00		
Incremental Delay, d2		0.4	0.2	0.8		
Delay (s)		3.4	2.7	4.7		
Level of Service		A	A	A		
Approach Delay (s)	3.4			4.5	0.0	
Approach LOS	A			A	A	

Intersection Summary			
HCM 2000 Control Delay	4.1	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	12.6
Intersection Capacity Utilization	47.7%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

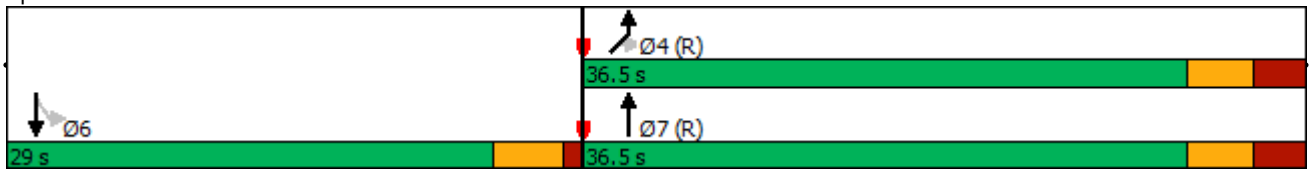
8: SLATER & Bronson Ave/Bronson

Lane Group	NBT	SBL	SBT	NEL	NER
Lane Configurations					
Traffic Volume (vph)	416	41	370	97	604
Future Volume (vph)	416	41	370	97	604
Lane Group Flow (vph)	561	0	411	387	382
Turn Type	NA	Perm	NA	Prot	Perm
Protected Phases	7!		6	4!	
Permitted Phases		6			4!
Detector Phase	7	6	6	4	4
Switch Phase					
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	24.2	22.5	22.5	12.0	12.0
Total Split (s)	36.5	29.0	29.0	36.5	36.5
Total Split (%)	55.7%	44.3%	44.3%	55.7%	55.7%
Yellow Time (s)	3.3	3.5	3.5	3.3	3.3
All-Red Time (s)	2.7	1.0	1.0	2.7	2.7
Lost Time Adjust (s)	0.0		0.0	0.0	0.0
Total Lost Time (s)	6.0		4.5	6.0	6.0
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	Max	Max	Max	Max	Max
Act Effct Green (s)	30.5		24.5	30.5	30.5
Actuated g/C Ratio	0.47		0.37	0.47	0.47
v/c Ratio	0.36		0.54	0.54	0.57
Control Delay	9.9		19.3	15.9	15.8
Queue Delay	0.0		0.4	0.0	0.0
Total Delay	9.9		19.7	15.9	15.8
LOS	A		B	B	B
Approach Delay	9.9		19.7	15.9	
Approach LOS	A		B	B	
Queue Length 50th (m)	18.3		21.1	33.3	32.6
Queue Length 95th (m)	28.7		34.1	57.2	58.9
Internal Link Dist (m)	290.7		50.9	105.6	
Turn Bay Length (m)					
Base Capacity (vph)	1553		762	720	676
Starvation Cap Reductn	0		78	0	0
Spillback Cap Reductn	0		0	0	0
Storage Cap Reductn	0		0	0	0
Reduced v/c Ratio	0.36		0.60	0.54	0.57

Intersection Summary	
Cycle Length: 65.5	
Actuated Cycle Length: 65.5	
Offset: 2 (3%), Referenced to phase 4:NEL and 7:NBT, Start of Green	
Natural Cycle: 50	
Control Type: Pretimed	
Maximum v/c Ratio: 0.57	
Intersection Signal Delay: 14.8	Intersection LOS: B
Intersection Capacity Utilization 72.1%	ICU Level of Service C
Analysis Period (min) 15	

! Phase conflict between lane groups.

Splits and Phases: 8: SLATER & Bronson Ave/Bronson



Movement	WBL	WBR	NBL	NBT	NBR	SBL	SBT	SBR	NEL	NER	NER2
Lane Configurations											
Traffic Volume (vph)	0	0	0	416	145	41	370	0	97	604	68
Future Volume (vph)	0	0	0	416	145	41	370	0	97	604	68
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)				6.0			4.5		6.0	6.0	
Lane Util. Factor				0.95			0.95		1.00	0.95	
Frt				0.96			1.00		0.89	0.85	
Flt Protected				1.00			1.00		0.99	1.00	
Satd. Flow (prot)				3223			3336		1547	1425	
Flt Permitted				1.00			0.61		0.99	1.00	
Satd. Flow (perm)				3223			2038		1547	1425	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	0	0	416	145	41	370	0	97	604	68
RTOR Reduction (vph)	0	0	0	53	0	0	0	0	0	13	0
Lane Group Flow (vph)	0	0	0	508	0	0	411	0	387	369	0
Turn Type				NA		Perm	NA		Prot	Perm	
Protected Phases				7!			6		4!		
Permitted Phases						6				4!	
Actuated Green, G (s)				30.5			24.5		30.5	30.5	
Effective Green, g (s)				30.5			24.5		30.5	30.5	
Actuated g/C Ratio				0.47			0.37		0.47	0.47	
Clearance Time (s)				6.0			4.5		6.0	6.0	
Lane Grp Cap (vph)				1500			762		720	663	
v/s Ratio Prot				0.16					0.25		
v/s Ratio Perm							c0.20			c0.26	
v/c Ratio				0.34			0.54		0.54	0.56	
Uniform Delay, d1				11.1			16.1		12.5	12.6	
Progression Factor				1.00			1.00		1.00	1.00	
Incremental Delay, d2				0.6			2.7		2.9	3.3	
Delay (s)				11.7			18.8		15.3	16.0	
Level of Service				B			B		B	B	
Approach Delay (s)	0.0			11.7			18.8		15.6		
Approach LOS	A			B			B		B		

Intersection Summary			
HCM 2000 Control Delay	15.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	65.5	Sum of lost time (s)	10.5
Intersection Capacity Utilization	72.1%	ICU Level of Service	C
Analysis Period (min)	15		

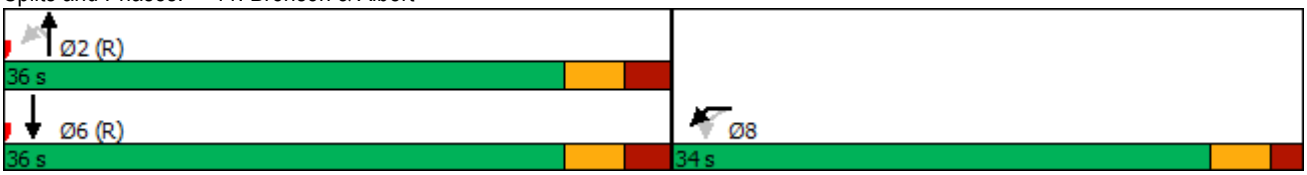
! Phase conflict between lane groups.
c Critical Lane Group

Lane Group	WBL2	WBL	NBL	NBT	SBT
Lane Configurations					
Traffic Volume (vph)	321	1139	314	130	90
Future Volume (vph)	321	1139	314	130	90
Lane Group Flow (vph)	321	1142	314	130	135
Turn Type	Perm	Prot	Perm	NA	NA
Protected Phases		8		2	6
Permitted Phases	8		2		
Detector Phase	8	8	2	2	6
Switch Phase					
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	26.1	26.1	27.9	27.9	23.9
Total Split (s)	34.0	34.0	36.0	36.0	36.0
Total Split (%)	48.6%	48.6%	51.4%	51.4%	51.4%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	1.8	1.8	2.6	2.6	2.6
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.1	5.1	5.9	5.9	5.9
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	Max	Max	Max	Max	Max
Act Effct Green (s)	28.9	28.9	30.1	30.1	30.1
Actuated g/C Ratio	0.41	0.41	0.43	0.43	0.43
v/c Ratio	0.46	0.83	0.62	0.17	0.18
Control Delay	17.7	24.4	22.0	13.1	10.7
Queue Delay	0.0	0.0	5.6	0.0	0.0
Total Delay	17.7	24.4	27.5	13.1	10.7
LOS	B	C	C	B	B
Approach Delay		23.0		23.3	10.7
Approach LOS		C		C	B
Queue Length 50th (m)	31.0	67.4	32.2	10.6	8.8
Queue Length 95th (m)	52.3	#95.3	59.0	20.9	19.0
Internal Link Dist (m)		177.9		50.9	46.8
Turn Bay Length (m)	50.0	50.0			
Base Capacity (vph)	691	1373	509	758	739
Starvation Cap Reductn	0	0	138	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.46	0.83	0.85	0.17	0.18

Intersection Summary	
Cycle Length: 70	
Actuated Cycle Length: 70	
Offset: 14 (20%), Referenced to phase 2:NBTL and 6:SBT, Start of Green	
Natural Cycle: 60	
Control Type: Pretimed	
Maximum v/c Ratio: 0.83	
Intersection Signal Delay: 22.2	Intersection LOS: C
Intersection Capacity Utilization 74.7%	ICU Level of Service D
Analysis Period (min) 15	

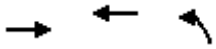
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 11: Bronson & Albert



Movement	WBL2	WBL	WBR	NBL	NBT	NBR	SBL	SBT	SBR	NEL	NER
Lane Configurations											
Traffic Volume (vph)	321	1139	3	314	130	0	0	90	45	0	0
Future Volume (vph)	321	1139	3	314	130	0	0	90	45	0	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	5.1	5.1		5.9	5.9			5.9			
Lane Util. Factor	1.00	0.97		1.00	1.00			1.00			
Frt	1.00	1.00		1.00	1.00			0.95			
Flt Protected	0.95	0.95		0.95	1.00			1.00			
Satd. Flow (prot)	1676	3260		1676	1765			1685			
Flt Permitted	0.95	0.95		0.67	1.00			1.00			
Satd. Flow (perm)	1676	3260		1184	1765			1685			
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	321	1139	3	314	130	0	0	90	45	0	0
RTOR Reduction (vph)	0	26	0	0	0	0	0	15	0	0	0
Lane Group Flow (vph)	321	1116	0	314	130	0	0	120	0	0	0
Turn Type	Perm	Prot		Perm	NA			NA			
Protected Phases		8			2			6			
Permitted Phases	8			2							
Actuated Green, G (s)	28.9	28.9		30.1	30.1			30.1			
Effective Green, g (s)	28.9	28.9		30.1	30.1			30.1			
Actuated g/C Ratio	0.41	0.41		0.43	0.43			0.43			
Clearance Time (s)	5.1	5.1		5.9	5.9			5.9			
Lane Grp Cap (vph)	691	1345		509	758			724			
v/s Ratio Prot		c0.34			0.07			0.07			
v/s Ratio Perm	0.19			c0.27							
v/c Ratio	0.46	0.83		0.62	0.17			0.17			
Uniform Delay, d1	14.9	18.3		15.5	12.3			12.2			
Progression Factor	1.00	1.00		1.00	1.00			1.00			
Incremental Delay, d2	2.2	6.0		5.5	0.5			0.5			
Delay (s)	17.2	24.4		21.0	12.8			12.7			
Level of Service	B	C		C	B			B			
Approach Delay (s)		22.8			18.6			12.7		0.0	
Approach LOS		C			B			B		A	

Intersection Summary			
HCM 2000 Control Delay	21.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	74.7%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

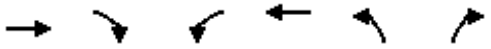


Lane Group	EBT	WBT	NBL
Lane Configurations			
Traffic Volume (vph)	976	1364	868
Future Volume (vph)	976	1364	868
Lane Group Flow (vph)	976	1364	908
Turn Type	NA	NA	Prot
Protected Phases	4	8	2
Permitted Phases			
Detector Phase	4	8	2
Switch Phase			
Minimum Initial (s)	5.0	5.0	5.0
Minimum Split (s)	36.7	23.7	26.9
Total Split (s)	80.0	80.0	40.0
Total Split (%)	66.7%	66.7%	33.3%
Yellow Time (s)	3.3	3.3	3.3
All-Red Time (s)	2.4	2.4	2.6
Lost Time Adjust (s)	0.0	0.0	0.0
Total Lost Time (s)	5.7	5.7	5.9
Lead/Lag			
Lead-Lag Optimize?			
Recall Mode	None	None	C-Max
Act Effct Green (s)	63.6	63.6	44.8
Actuated g/C Ratio	0.53	0.53	0.37
v/c Ratio	0.38	0.77	0.75
Control Delay	16.7	47.8	38.9
Queue Delay	0.0	31.9	0.0
Total Delay	16.7	79.7	38.9
LOS	B	E	D
Approach Delay	16.7	79.7	38.9
Approach LOS	B	E	D
Queue Length 50th (m)	49.5	184.7	101.0
Queue Length 95th (m)	49.1	179.0	#155.6
Internal Link Dist (m)	74.9	134.0	213.7
Turn Bay Length (m)			
Base Capacity (vph)	2983	2076	1211
Starvation Cap Reductn	0	787	0
Spillback Cap Reductn	76	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.34	1.06	0.75

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 25 (21%), Referenced to phase 2:NBL and 6:, Start of Green	
Natural Cycle: 65	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.77	
Intersection Signal Delay: 49.3	Intersection LOS: D
Intersection Capacity Utilization 76.9%	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: 13: Bay St & Wellington



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	976	0	0	1364	868	40
Future Volume (vph)	976	0	0	1364	868	40
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Total Lost time (s)	5.7			5.7	5.9	
Lane Util. Factor	0.91			0.95	0.97	
Frt	1.00			1.00	0.99	
Flt Protected	1.00			1.00	0.95	
Satd. Flow (prot)	4818			3353	3246	
Flt Permitted	1.00			1.00	0.95	
Satd. Flow (perm)	4818			3353	3246	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	976	0	0	1364	868	40
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	976	0	0	1364	908	0
Turn Type	NA			NA	Prot	
Protected Phases	4			8	2	
Permitted Phases						
Actuated Green, G (s)	63.6			63.6	44.8	
Effective Green, g (s)	63.6			63.6	44.8	
Actuated g/C Ratio	0.53			0.53	0.37	
Clearance Time (s)	5.7			5.7	5.9	
Vehicle Extension (s)	3.0			3.0	3.0	
Lane Grp Cap (vph)	2553			1777	1211	
v/s Ratio Prot	0.20			c0.41	c0.28	
v/s Ratio Perm						
v/c Ratio	0.38			0.77	0.75	
Uniform Delay, d1	16.6			22.3	32.7	
Progression Factor	1.00			2.05	1.00	
Incremental Delay, d2	0.1			1.8	4.3	
Delay (s)	16.7			47.6	37.0	
Level of Service	B			D	D	
Approach Delay (s)	16.7			47.6	37.0	
Approach LOS	B			D	D	

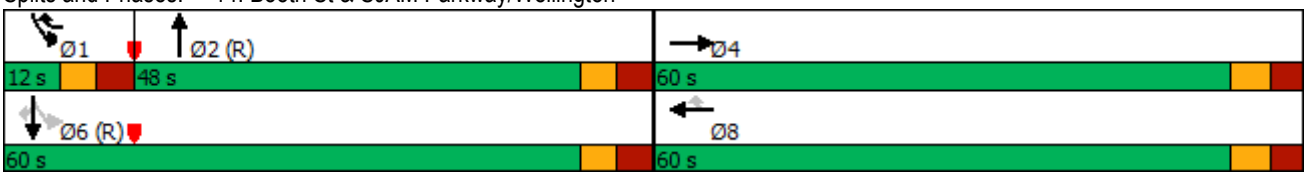
Intersection Summary			
HCM 2000 Control Delay	35.4	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	11.6
Intersection Capacity Utilization	76.9%	ICU Level of Service	D
Analysis Period (min)	15		

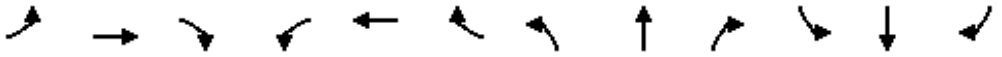
c Critical Lane Group

Lane Group	EBT	WBT	WBR	NBT	SBL	SBT	SBR
Lane Configurations							
Traffic Volume (vph)	1095	1385	259	1159	63	792	291
Future Volume (vph)	1095	1385	259	1159	63	792	291
Turn Type	NA	NA	pm+ov	NA	pm+pt	NA	Perm
Protected Phases	4	8	1	2	1	6	
Permitted Phases			8		6		6
Detector Phase	4	8	1	2	1	6	6
Switch Phase							
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	40.8	40.8	12.0	37.8	12.0	37.9	37.9
Total Split (s)	60.0	60.0	12.0	48.0	12.0	60.0	60.0
Total Split (%)	50.0%	50.0%	10.0%	40.0%	10.0%	50.0%	50.0%
Yellow Time (s)	3.7	3.7	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	3.1	3.1	3.5	3.5	3.5	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)	6.8	6.8	6.8	6.8	6.8	6.8	6.8
Lead/Lag			Lead	Lag	Lead		
Lead-Lag Optimize?			Yes	Yes	Yes		
Recall Mode	None	None	None	C-Max	None	C-Max	C-Max
Act Effct Green (s)	52.4	52.4	64.6	41.8	54.0	54.0	54.0
Actuated g/C Ratio	0.44	0.44	0.54	0.35	0.45	0.45	0.45
v/c Ratio	0.75	0.95	0.32	1.09	0.47	0.53	0.42
Control Delay	32.0	46.5	16.7	90.9	31.0	25.5	22.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	32.0	46.5	16.7	90.9	31.0	25.5	22.0
LOS	C	D	B	F	C	C	C
Approach Delay	32.0	41.8		90.9		24.9	
Approach LOS	C	D		F		C	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 3 (3%), Referenced to phase 2:NBT and 6:SBTL, Start of Green	
Natural Cycle: 125	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 1.09	
Intersection Signal Delay: 48.0	Intersection LOS: D
Intersection Capacity Utilization 98.8%	ICU Level of Service F
Analysis Period (min) 15	

Splits and Phases: 14: Booth St & SJAM Parkway/Wellington





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	1095	0	0	1385	259	0	1159	100	63	792	291
Future Volume (vph)	0	1095	0	0	1385	259	0	1159	100	63	792	291
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)		6.8			6.8	6.8		6.8		6.8	6.8	6.8
Lane Util. Factor		0.95			0.95	1.00		0.95		1.00	0.95	1.00
Frt		1.00			1.00	0.85		0.99		1.00	1.00	0.85
Flt Protected		1.00			1.00	1.00		1.00		0.95	1.00	1.00
Satd. Flow (prot)		3353			3353	1500		3313		1676	3353	1500
Flt Permitted		1.00			1.00	1.00		1.00		0.08	1.00	1.00
Satd. Flow (perm)		3353			3353	1500		3313		145	3353	1500
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	1095	0	0	1385	259	0	1159	100	63	792	291
RTOR Reduction (vph)	0	0	0	0	0	0	0	5	0	0	0	19
Lane Group Flow (vph)	0	1095	0	0	1385	259	0	1254	0	63	792	272
Turn Type		NA			NA	pm+ov		NA		pm+pt	NA	Perm
Protected Phases		4			8	1		2		1	6	
Permitted Phases						8				6		6
Actuated Green, G (s)		52.4			52.4	57.8		41.8		54.0	54.0	54.0
Effective Green, g (s)		52.4			52.4	57.8		41.8		54.0	54.0	54.0
Actuated g/C Ratio		0.44			0.44	0.48		0.35		0.45	0.45	0.45
Clearance Time (s)		6.8			6.8	6.8		6.8		6.8	6.8	6.8
Vehicle Extension (s)		3.0			3.0	3.0		3.0		3.0	3.0	3.0
Lane Grp Cap (vph)		1464			1464	807		1154		134	1508	675
v/s Ratio Prot		0.33			c0.41	0.01		c0.38		0.02	c0.24	
v/s Ratio Perm						0.16				0.19		0.18
v/c Ratio		0.75			0.95	0.32		1.09		0.47	0.53	0.40
Uniform Delay, d1		28.3			32.4	19.1		39.1		27.5	23.8	22.2
Progression Factor		1.00			1.00	1.00		1.00		1.00	1.00	1.00
Incremental Delay, d2		2.1			12.8	0.2		53.2		2.6	1.3	1.8
Delay (s)		30.4			45.2	19.3		92.3		30.0	25.1	24.0
Level of Service		C			D	B		F		C	C	C
Approach Delay (s)		30.4			41.1			92.3			25.1	
Approach LOS		C			D			F			C	

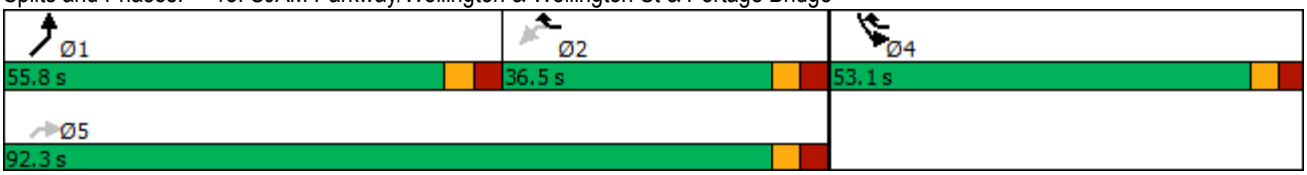
Intersection Summary			
HCM 2000 Control Delay	47.8	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.00		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	20.4
Intersection Capacity Utilization	98.8%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	WBL	WBR	SBL	SBR	NEL	NER
Lane Configurations						
Traffic Volume (vph)	969	250	1060	230	645	1526
Future Volume (vph)	969	250	1060	230	645	1526
Turn Type	Perm	pt+ov	Prot	Free	Prot	Perm
Protected Phases		2 4	4		1	
Permitted Phases	2			Free		5
Detector Phase	2	2 4	4		1	5
Switch Phase						
Minimum Initial (s)	5.0		5.0		5.0	5.0
Minimum Split (s)	26.5		44.1		43.5	24.5
Total Split (s)	36.5		53.1		55.8	92.3
Total Split (%)	25.1%		36.5%		38.4%	63.5%
Yellow Time (s)	3.3		3.3		3.3	3.3
All-Red Time (s)	3.2		2.8		3.2	3.2
Lost Time Adjust (s)	0.0		0.0		0.0	0.0
Total Lost Time (s)	6.5		6.1		6.5	6.5
Lead/Lag	Lag				Lead	
Lead-Lag Optimize?	Yes				Yes	
Recall Mode	None		Max		None	None
Act Effct Green (s)	30.0	83.2	47.1	126.3	30.0	66.6
Actuated g/C Ratio	0.24	0.66	0.37	1.00	0.24	0.53
v/c Ratio	1.25	0.14	0.87	0.15	0.83	0.84
Control Delay	162.3	3.8	46.8	0.2	55.9	29.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	162.3	3.8	46.8	0.2	55.9	29.9
LOS	F	A	D	A	E	C
Approach Delay	129.8		38.5		37.6	
Approach LOS	F		D		D	

Intersection Summary	
Cycle Length: 145.4	
Actuated Cycle Length: 126.3	
Natural Cycle: 145	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 1.25	
Intersection Signal Delay: 61.9	Intersection LOS: E
Intersection Capacity Utilization 96.4%	ICU Level of Service F
Analysis Period (min) 15	

Splits and Phases: 15: SJAM Parkway/Wellington & Wellington St & Portage Bridge



Movement	WBL	WBR	SBL	SBR	NEL	NER
Lane Configurations						
Traffic Volume (vph)	969	250	1060	230	645	1526
Future Volume (vph)	969	250	1060	230	645	1526
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Total Lost time (s)	6.5	6.5	6.1	4.0	6.5	6.5
Lane Util. Factor	0.97	0.88	0.97	1.00	0.97	0.76
Frt	1.00	0.85	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	3252	2640	3252	1500	3252	3420
Flt Permitted	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	3269	2640	3252	1500	3252	3420
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	969	250	1060	230	645	1526
RTOR Reduction (vph)	0	52	0	0	0	13
Lane Group Flow (vph)	969	198	1060	230	645	1513
Turn Type	Perm	pt+ov	Prot	Free	Prot	Perm
Protected Phases		2 4	4		1	
Permitted Phases	2			Free		5
Actuated Green, G (s)	30.1	83.7	47.1	126.4	30.1	66.7
Effective Green, g (s)	30.1	83.7	47.1	126.4	30.1	66.7
Actuated g/C Ratio	0.24	0.66	0.37	1.00	0.24	0.53
Clearance Time (s)	6.5		6.1		6.5	6.5
Vehicle Extension (s)	3.0		3.0		3.0	3.0
Lane Grp Cap (vph)	778	1748	1211	1500	774	1804
v/s Ratio Prot		0.08	c0.33		0.20	
v/s Ratio Perm	c0.30			0.15		c0.44
v/c Ratio	1.25	0.11	0.88	0.15	0.83	0.84
Uniform Delay, d1	48.2	7.8	36.9	0.0	45.8	25.3
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	121.2	0.0	9.0	0.2	7.7	3.6
Delay (s)	169.3	7.8	45.9	0.2	53.4	28.9
Level of Service	F	A	D	A	D	C
Approach Delay (s)	136.2		37.8		36.2	
Approach LOS	F		D		D	

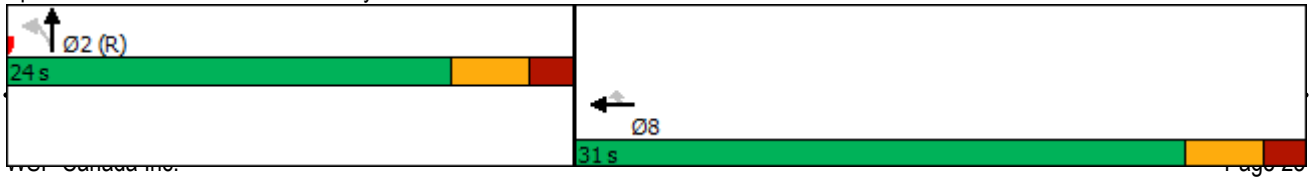
Intersection Summary			
HCM 2000 Control Delay	62.7	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.00		
Actuated Cycle Length (s)	126.4	Sum of lost time (s)	19.1
Intersection Capacity Utilization	96.4%	ICU Level of Service	F
Analysis Period (min)	15		

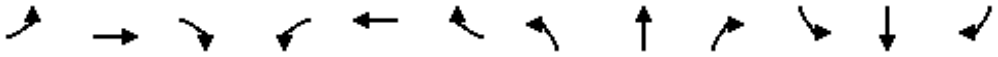
c Critical Lane Group

Lane Group	WBT	WBR	NBT
Lane Configurations			
Traffic Volume (vph)	590	472	323
Future Volume (vph)	590	472	323
Lane Group Flow (vph)	590	472	644
Turn Type	NA	Perm	NA
Protected Phases	8		2
Permitted Phases		8	
Detector Phase	8	8	2
Switch Phase			
Minimum Initial (s)	5.0	5.0	5.0
Minimum Split (s)	23.2	23.2	23.2
Total Split (s)	31.0	31.0	24.0
Total Split (%)	56.4%	56.4%	43.6%
Yellow Time (s)	3.3	3.3	3.3
All-Red Time (s)	1.9	1.9	1.9
Lost Time Adjust (s)	0.0	0.0	0.0
Total Lost Time (s)	5.2	5.2	5.2
Lead/Lag			
Lead-Lag Optimize?			
Recall Mode	None	None	C-Max
Act Effct Green (s)	17.3	17.3	27.3
Actuated g/C Ratio	0.31	0.31	0.50
v/c Ratio	0.56	0.68	0.37
Control Delay	17.0	10.2	10.3
Queue Delay	0.0	0.0	0.2
Total Delay	17.0	10.2	10.5
LOS	B	B	B
Approach Delay	14.0		10.5
Approach LOS	B		B
Queue Length 50th (m)	27.0	12.1	10.2
Queue Length 95th (m)	29.8	27.1	35.0
Internal Link Dist (m)	133.2		48.0
Turn Bay Length (m)		50.0	
Base Capacity (vph)	1572	873	1730
Starvation Cap Reductn	0	0	455
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.38	0.54	0.51

Intersection Summary	
Cycle Length: 55	
Actuated Cycle Length: 55	
Offset: 26 (47%), Referenced to phase 2:NBTL and 6:, Start of Green	
Natural Cycle: 50	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.68	
Intersection Signal Delay: 12.7	Intersection LOS: B
Intersection Capacity Utilization 58.8%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 20: Albert & Bay St





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	0	590	472	321	323	0	0	0	0
Future Volume (vph)	0	0	0	0	590	472	321	323	0	0	0	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)					5.2	5.2		5.2				
Lane Util. Factor					0.95	1.00		0.95				
Frt					1.00	0.85		1.00				
Flt Protected					1.00	1.00		0.98				
Satd. Flow (prot)					3353	1500		3271				
Flt Permitted					1.00	1.00		0.98				
Satd. Flow (perm)					3353	1500		3271				
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	0	0	0	590	472	321	323	0	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	219	0	106	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	590	253	0	538	0	0	0	0
Turn Type					NA	Perm	Perm	NA				
Protected Phases					8			2				
Permitted Phases						8	2					
Actuated Green, G (s)					17.3	17.3		27.3				
Effective Green, g (s)					17.3	17.3		27.3				
Actuated g/C Ratio					0.31	0.31		0.50				
Clearance Time (s)					5.2	5.2		5.2				
Vehicle Extension (s)					3.0	3.0		3.0				
Lane Grp Cap (vph)					1054	471		1623				
v/s Ratio Prot					c0.18							
v/s Ratio Perm						0.17		0.16				
v/c Ratio					0.56	0.54		0.33				
Uniform Delay, d1					15.7	15.5		8.3				
Progression Factor					1.00	1.00		1.44				
Incremental Delay, d2					0.6	1.2		0.4				
Delay (s)					16.3	16.7		12.5				
Level of Service					B	B		B				
Approach Delay (s)		0.0			16.5			12.5			0.0	
Approach LOS		A			B			B			A	

Intersection Summary			
HCM 2000 Control Delay	15.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.42		
Actuated Cycle Length (s)	55.0	Sum of lost time (s)	10.4
Intersection Capacity Utilization	58.8%	ICU Level of Service	B
Analysis Period (min)	15		

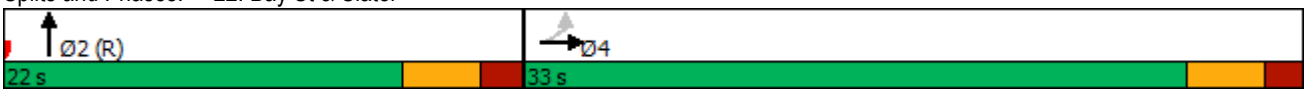
c Critical Lane Group

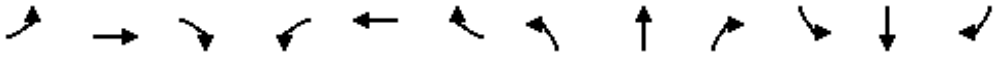
Lane Group	EBT	NBT
Lane Configurations		
Traffic Volume (vph)	643	556
Future Volume (vph)	643	556
Lane Group Flow (vph)	731	605
Turn Type	NA	NA
Protected Phases	4	2
Permitted Phases		
Detector Phase	4	2
Switch Phase		
Minimum Initial (s)	5.0	5.0
Minimum Split (s)	35.0	19.0
Total Split (s)	33.0	22.0
Total Split (%)	60.0%	40.0%
Yellow Time (s)	3.3	3.3
All-Red Time (s)	1.7	1.9
Lost Time Adjust (s)	0.0	0.0
Total Lost Time (s)	5.0	5.2
Lead/Lag		
Lead-Lag Optimize?		
Recall Mode	None	C-Max
Act Effct Green (s)	17.6	27.2
Actuated g/C Ratio	0.32	0.49
v/c Ratio	0.67	0.70
Control Delay	17.7	19.1
Queue Delay	0.0	0.0
Total Delay	17.7	19.1
LOS	B	B
Approach Delay	17.7	19.1
Approach LOS	B	B
Queue Length 50th (m)	31.5	44.9
Queue Length 95th (m)	39.7	#112.8
Internal Link Dist (m)	195.9	236.7
Turn Bay Length (m)		
Base Capacity (vph)	1718	865
Starvation Cap Reductn	0	0
Spillback Cap Reductn	0	0
Storage Cap Reductn	0	0
Reduced v/c Ratio	0.43	0.70

Intersection Summary	
Cycle Length: 55	
Actuated Cycle Length: 55	
Offset: 39 (71%), Referenced to phase 2:NBT and 6:, Start of Green	
Natural Cycle: 65	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.70	
Intersection Signal Delay: 18.3	Intersection LOS: B
Intersection Capacity Utilization 64.0%	ICU Level of Service B
Analysis Period (min) 15	

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

Splits and Phases: 22: Bay St & Slater

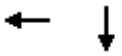




Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	88	643	0	0	0	0	0	556	49	0	0	0
Future Volume (vph)	88	643	0	0	0	0	0	556	49	0	0	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)		5.0						5.2				
Lane Util. Factor		0.95						1.00				
Frt		1.00						0.99				
Flt Protected		0.99						1.00				
Satd. Flow (prot)		3333						1745				
Flt Permitted		0.99						1.00				
Satd. Flow (perm)		3333						1745				
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	88	643	0	0	0	0	0	556	49	0	0	0
RTOR Reduction (vph)	0	30	0	0	0	0	0	4	0	0	0	0
Lane Group Flow (vph)	0	701	0	0	0	0	0	601	0	0	0	0
Turn Type	Perm	NA						NA				
Protected Phases		4						2				
Permitted Phases	4											
Actuated Green, G (s)		17.6						27.2				
Effective Green, g (s)		17.6						27.2				
Actuated g/C Ratio		0.32						0.49				
Clearance Time (s)		5.0						5.2				
Vehicle Extension (s)		3.0						3.0				
Lane Grp Cap (vph)		1066						862				
v/s Ratio Prot								c0.34				
v/s Ratio Perm		0.21										
v/c Ratio		0.66						0.70				
Uniform Delay, d1		16.1						10.7				
Progression Factor		1.00						1.00				
Incremental Delay, d2		1.5						4.6				
Delay (s)		17.6						15.4				
Level of Service		B						B				
Approach Delay (s)		17.6			0.0			15.4			0.0	
Approach LOS		B			A			B			A	

Intersection Summary			
HCM 2000 Control Delay	16.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	55.0	Sum of lost time (s)	10.2
Intersection Capacity Utilization	64.0%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

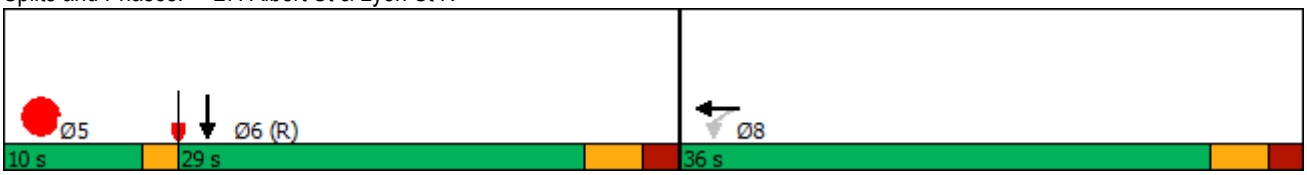


Lane Group	WBT	SBT	Ø5
Lane Configurations			
Traffic Volume (vph)	1035	755	
Future Volume (vph)	1035	755	
Lane Group Flow (vph)	1278	782	
Turn Type	NA	NA	
Protected Phases	8	6	5
Permitted Phases			
Detector Phase	8	6	
Switch Phase			
Minimum Initial (s)	5.0	5.0	5.0
Minimum Split (s)	23.4	23.5	10.0
Total Split (s)	36.0	29.0	10.0
Total Split (%)	48.0%	38.7%	13%
Yellow Time (s)	3.3	3.3	2.0
All-Red Time (s)	2.1	2.2	0.0
Lost Time Adjust (s)	0.0	0.0	
Total Lost Time (s)	5.4	5.5	
Lead/Lag		Lag	Lead
Lead-Lag Optimize?		Yes	Yes
Recall Mode	None	C-Max	Max
Act Effct Green (s)	30.2	23.5	
Actuated g/C Ratio	0.40	0.31	
v/c Ratio	0.93	0.52	
Control Delay	33.5	22.4	
Queue Delay	0.0	0.0	
Total Delay	33.5	22.4	
LOS	C	C	
Approach Delay	33.5	22.4	
Approach LOS	C	C	
Queue Length 50th (m)	87.8	34.2	
Queue Length 95th (m)	#133.4	45.9	
Internal Link Dist (m)	197.0	214.4	
Turn Bay Length (m)			
Base Capacity (vph)	1394	1506	
Starvation Cap Reductn	0	0	
Spillback Cap Reductn	0	0	
Storage Cap Reductn	0	0	
Reduced v/c Ratio	0.92	0.52	

Intersection Summary	
Cycle Length: 75	
Actuated Cycle Length: 75	
Offset: 0 (0%), Referenced to phase 2: and 6:SBT, Start of Green	
Natural Cycle: 65	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.93	
Intersection Signal Delay: 29.3	Intersection LOS: C
Intersection Capacity Utilization 62.8%	ICU Level of Service B
Analysis Period (min) 15	

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

Splits and Phases: 27: Albert St & Lyon St N



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	243	1035	0	0	0	0	0	755	27
Future Volume (vph)	0	0	0	243	1035	0	0	0	0	0	755	27
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)					5.4						5.5	
Lane Util. Factor					0.95						0.91	
Frt					1.00						0.99	
Flt Protected					0.99						1.00	
Satd. Flow (prot)					3321						4793	
Flt Permitted					0.99						1.00	
Satd. Flow (perm)					3321						4793	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	0	0	243	1035	0	0	0	0	0	755	27
RTOR Reduction (vph)	0	0	0	0	39	0	0	0	0	0	5	0
Lane Group Flow (vph)	0	0	0	0	1239	0	0	0	0	0	777	0
Turn Type				Perm	NA						NA	
Protected Phases					8						6	
Permitted Phases				8								
Actuated Green, G (s)					30.2						23.5	
Effective Green, g (s)					30.2						23.5	
Actuated g/C Ratio					0.40						0.31	
Clearance Time (s)					5.4						5.5	
Vehicle Extension (s)					3.0						3.0	
Lane Grp Cap (vph)					1337						1501	
v/s Ratio Prot											c0.16	
v/s Ratio Perm					0.37							
v/c Ratio					0.93						0.52	
Uniform Delay, d1					21.3						21.1	
Progression Factor					1.00						1.00	
Incremental Delay, d2					11.1						1.3	
Delay (s)					32.5						22.4	
Level of Service					C						C	
Approach Delay (s)		0.0			32.5			0.0			22.4	
Approach LOS		A			C			A			C	

Intersection Summary			
HCM 2000 Control Delay	28.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	12.9
Intersection Capacity Utilization	62.8%	ICU Level of Service	B
Analysis Period (min)	15		

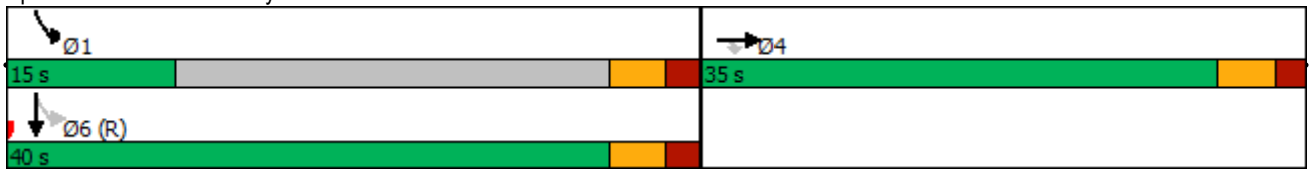
c Critical Lane Group

Lane Group	EBT	EBR	SBL	SBT
Lane Configurations				
Traffic Volume (vph)	526	176	211	814
Future Volume (vph)	526	176	211	814
Lane Group Flow (vph)	526	176	211	814
Turn Type	NA	Perm	pm+pt	NA
Protected Phases	4		1	6
Permitted Phases		4	6	
Detector Phase	4	4	1	6
Switch Phase				
Minimum Initial (s)	5.0	5.0	5.0	5.0
Minimum Split (s)	21.2	21.2	10.3	29.3
Total Split (s)	35.0	35.0	15.0	40.0
Total Split (%)	46.7%	46.7%	20.0%	53.3%
Yellow Time (s)	3.3	3.3	3.3	3.3
All-Red Time (s)	1.9	1.9	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.2	5.2	5.3	5.3
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	None	None	None	C-Max
Act Effct Green (s)	17.8	17.8	46.7	46.7
Actuated g/C Ratio	0.24	0.24	0.62	0.62
v/c Ratio	0.66	0.40	0.19	0.39
Control Delay	29.6	12.5	0.4	4.7
Queue Delay	0.0	0.0	0.3	0.2
Total Delay	29.6	12.5	0.6	4.9
LOS	C	B	A	A
Approach Delay	25.3			4.0
Approach LOS	C			A
Queue Length 50th (m)	37.2	8.4	0.0	14.5
Queue Length 95th (m)	48.0	22.0	m0.0	m18.3
Internal Link Dist (m)	132.9			47.5
Turn Bay Length (m)		50.0		
Base Capacity (vph)	1332	659	1115	2086
Starvation Cap Reductn	0	0	467	480
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.39	0.27	0.33	0.51

Intersection Summary	
Cycle Length: 75	
Actuated Cycle Length: 75	
Offset: 4 (5%), Referenced to phase 2: and 6:SBTL, Start of Green	
Natural Cycle: 55	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.66	
Intersection Signal Delay: 12.7	Intersection LOS: B
Intersection Capacity Utilization 62.8%	ICU Level of Service B
Analysis Period (min) 15	

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

Splits and Phases: 28: Lyon St N & Slater St



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	526	176	0	0	0	0	0	0	211	814	0
Future Volume (vph)	0	526	176	0	0	0	0	0	0	211	814	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)		5.2	5.2							5.3	5.3	
Lane Util. Factor		0.95	1.00							1.00	0.95	
Frt		1.00	0.85							1.00	1.00	
Flt Protected		1.00	1.00							0.95	1.00	
Satd. Flow (prot)		3353	1500							1676	3353	
Flt Permitted		1.00	1.00							0.95	1.00	
Satd. Flow (perm)		3353	1500							1676	3353	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	526	176	0	0	0	0	0	0	211	814	0
RTOR Reduction (vph)	0	0	81	0	0	0	0	0	0	73	0	0
Lane Group Flow (vph)	0	526	95	0	0	0	0	0	0	138	814	0
Turn Type		NA	Perm							pm+pt	NA	
Protected Phases		4								1	6	
Permitted Phases			4							6		
Actuated Green, G (s)		17.8	17.8							46.7	46.7	
Effective Green, g (s)		17.8	17.8							46.7	46.7	
Actuated g/C Ratio		0.24	0.24							0.62	0.62	
Clearance Time (s)		5.2	5.2							5.3	5.3	
Vehicle Extension (s)		3.0	3.0							3.0	3.0	
Lane Grp Cap (vph)		795	356							1043	2087	
v/s Ratio Prot		c0.16								0.08	c0.24	
v/s Ratio Perm			0.06									
v/c Ratio		0.66	0.27							0.13	0.39	
Uniform Delay, d1		25.9	23.3							5.8	7.1	
Progression Factor		1.00	1.00							0.03	0.55	
Incremental Delay, d2		2.1	0.4							0.0	0.4	
Delay (s)		28.0	23.7							0.2	4.3	
Level of Service		C	C							A	A	
Approach Delay (s)		26.9			0.0			0.0			3.5	
Approach LOS		C			A			A			A	

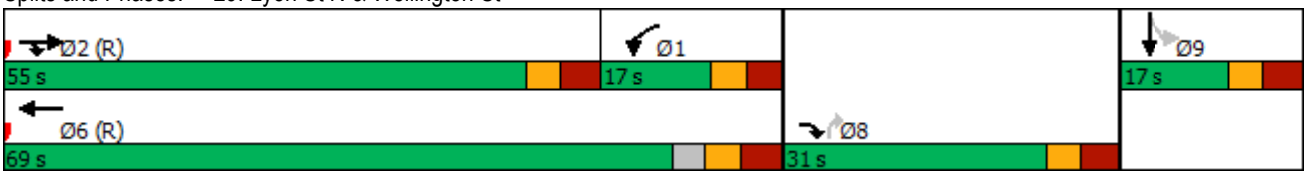
Intersection Summary			
HCM 2000 Control Delay	13.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.46		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	10.5
Intersection Capacity Utilization	62.8%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBT	EBR	WBL	WBT	NBR	Ø9
Lane Configurations						
Traffic Volume (vph)	417	569	114	1114	19	
Future Volume (vph)	417	569	114	1114	19	
Lane Group Flow (vph)	417	569	114	1114	19	
Turn Type	NA	custom	Prot	NA	Perm	
Protected Phases	2	2 8	1	6		9
Permitted Phases					8	
Detector Phase	2	2 8	1	6	8	
Switch Phase						
Minimum Initial (s)	5.0		5.0	5.0	5.0	5.0
Minimum Split (s)	31.0		11.9	25.3	31.0	25.1
Total Split (s)	55.0		17.0	69.0	31.0	17.0
Total Split (%)	45.8%		14.2%	57.5%	25.8%	14%
Yellow Time (s)	3.3		3.3	3.3	3.3	3.3
All-Red Time (s)	3.6		3.6	4.0	3.6	3.8
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	
Total Lost Time (s)	6.9		6.9	7.3	6.9	
Lead/Lag	Lead		Lag			
Lead-Lag Optimize?	Yes		Yes			
Recall Mode	C-Max		None	C-Max	Max	Max
Act Effct Green (s)	48.1	72.2	10.1	64.7	24.1	
Actuated g/C Ratio	0.40	0.60	0.08	0.54	0.20	
v/c Ratio	0.59	0.36	0.81	0.62	0.03	
Control Delay	40.3	3.9	92.2	21.0	0.1	
Queue Delay	4.9	0.0	0.0	18.4	0.0	
Total Delay	45.3	3.9	92.2	39.4	0.1	
LOS	D	A	F	D	A	
Approach Delay	21.4			44.3		
Approach LOS	C			D		
Queue Length 50th (m)	108.4	15.6	28.3	96.2	0.0	
Queue Length 95th (m)	142.4	20.7	#61.1	118.5	0.0	
Internal Link Dist (m)	134.0			168.5		
Turn Bay Length (m)						
Base Capacity (vph)	707	1588	141	1807	718	
Starvation Cap Reductn	220	0	0	0	0	
Spillback Cap Reductn	0	0	0	710	0	
Storage Cap Reductn	0	0	0	0	0	
Reduced v/c Ratio	0.86	0.36	0.81	1.02	0.03	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Green	
Natural Cycle: 100	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.81	
Intersection Signal Delay: 33.8	Intersection LOS: C
Intersection Capacity Utilization 41.3%	ICU Level of Service A
Analysis Period (min) 15	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	

Splits and Phases: 29: Lyon St N & Wellington St



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	417	569	114	1114	0	0	0	19	0	0	0
Future Volume (vph)	0	417	569	114	1114	0	0	0	19	0	0	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)		6.9	6.9	6.9	7.3				6.9			
Lane Util. Factor		1.00	0.88	1.00	0.95				1.00			
Frt		1.00	0.85	1.00	1.00				0.86			
Flt Protected		1.00	1.00	0.95	1.00				1.00			
Satd. Flow (prot)		1765	2640	1676	3353				1526			
Flt Permitted		1.00	1.00	0.95	1.00				1.00			
Satd. Flow (perm)		1765	2640	1676	3353				1526			
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	417	569	114	1114	0	0	0	19	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	15	0	0	0
Lane Group Flow (vph)	0	417	569	114	1114	0	0	0	4	0	0	0
Turn Type		NA	custom	Prot	NA				Perm			
Protected Phases		2	2 8	1	6						9	
Permitted Phases									8	9		
Actuated Green, G (s)		48.1	72.2	10.1	64.7				24.1			
Effective Green, g (s)		48.1	72.2	10.1	64.7				24.1			
Actuated g/C Ratio		0.40	0.60	0.08	0.54				0.20			
Clearance Time (s)		6.9		6.9	7.3				6.9			
Vehicle Extension (s)		3.0		3.0	3.0				3.0			
Lane Grp Cap (vph)		707	1588	141	1807				306			
v/s Ratio Prot		0.24	c0.22	c0.07	c0.33							
v/s Ratio Perm									0.00			
v/c Ratio		0.59	0.36	0.81	0.62				0.01			
Uniform Delay, d1		28.2	12.1	54.0	19.1				38.4			
Progression Factor		1.28	0.54	1.00	1.00				1.00			
Incremental Delay, d2		3.4	0.6	27.7	1.6				0.1			
Delay (s)		39.6	7.1	81.7	20.7				38.5			
Level of Service		D	A	F	C				D			
Approach Delay (s)		20.8			26.3			38.5			0.0	
Approach LOS		C			C			D			A	

Intersection Summary			
HCM 2000 Control Delay	24.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.53		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	27.8
Intersection Capacity Utilization	41.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBT	WBL	WBT	NBL	NBR	Ø9	Ø13
Lane Configurations							
Traffic Volume (vph)	662	57	258	72	48		
Future Volume (vph)	662	57	258	72	48		
Lane Group Flow (vph)	790	63	287	80	53		
Turn Type	NA	pm+pt	NA	Perm	Perm		
Protected Phases	2	1	6			9	13
Permitted Phases		6		8	8		
Detector Phase	2	1	6	8	8		
Switch Phase							
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	1.0	1.0
Minimum Split (s)	31.8	11.2	31.8	29.3	29.3	3.0	3.0
Total Split (s)	65.0	25.0	90.0	30.0	30.0	5.0	5.0
Total Split (%)	52.0%	20.0%	72.0%	24.0%	24.0%	4%	4%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	2.0	2.0
All-Red Time (s)	3.5	2.9	3.5	3.0	3.0	0.0	0.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		
Total Lost Time (s)	6.8	6.2	6.8	6.3	6.3		
Lead/Lag	Lag	Lead					
Lead-Lag Optimize?	Yes	Yes					
Recall Mode	C-Max	None	C-Max	None	None	None	None
Act Effct Green (s)	90.3	101.2	100.6	11.3	11.3		
Actuated g/C Ratio	0.72	0.81	0.80	0.09	0.09		
v/c Ratio	0.33	0.12	0.11	0.53	0.39		
Control Delay	7.5	5.7	5.9	66.0	60.8		
Queue Delay	0.0	0.0	0.0	0.0	0.0		
Total Delay	7.5	5.7	5.9	66.0	60.8		
LOS	A	A	A	E	E		
Approach Delay	7.5		5.8	63.9			
Approach LOS	A		A	E			
Queue Length 50th (m)	37.1	6.4	23.7	20.1	13.2		
Queue Length 95th (m)	55.4	m18.3	33.8	35.8	25.9		
Internal Link Dist (m)	195.9		296.6	186.4			
Turn Bay Length (m)		115.0					
Base Capacity (vph)	2398	618	2698	317	284		
Starvation Cap Reductn	0	0	0	0	0		
Spillback Cap Reductn	0	0	0	0	0		
Storage Cap Reductn	0	0	0	0	0		
Reduced v/c Ratio	0.33	0.10	0.11	0.25	0.19		

Intersection Summary	
Cycle Length: 125	
Actuated Cycle Length: 125	
Offset: 55 (44%), Referenced to phase 2:EBT and 6:WBTL, Start of Green	
Natural Cycle: 80	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.53	
Intersection Signal Delay: 13.0	Intersection LOS: B
Intersection Capacity Utilization 45.4%	ICU Level of Service A
Analysis Period (min) 15	

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

Splits and Phases: 4: Preston St & Albert St

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	662	49	57	258	72	48
Future Volume (vph)	662	49	57	258	72	48
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Total Lost time (s)	6.8		6.2	6.8	6.3	6.3
Lane Util. Factor	0.95		1.00	0.95	1.00	1.00
Frt	0.99		1.00	1.00	1.00	0.85
Flt Protected	1.00		0.95	1.00	0.95	1.00
Satd. Flow (prot)	3319		1676	3353	1676	1500
Flt Permitted	1.00		0.31	1.00	0.95	1.00
Satd. Flow (perm)	3319		556	3353	1676	1500
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	736	54	63	287	80	53
RTOR Reduction (vph)	2	0	0	0	0	0
Lane Group Flow (vph)	788	0	63	287	80	53
Turn Type	NA		pm+pt	NA	Perm	Perm
Protected Phases	2		1	6		
Permitted Phases			6		8	8
Actuated Green, G (s)	89.0		100.6	100.6	11.3	11.3
Effective Green, g (s)	89.0		100.6	100.6	11.3	11.3
Actuated g/C Ratio	0.71		0.80	0.80	0.09	0.09
Clearance Time (s)	6.8		6.2	6.8	6.3	6.3
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	2363		495	2698	151	135
v/s Ratio Prot	c0.24		0.01	c0.09		
v/s Ratio Perm			0.10		c0.05	0.04
v/c Ratio	0.33		0.13	0.11	0.53	0.39
Uniform Delay, d1	6.8		2.9	2.6	54.3	53.6
Progression Factor	1.00		1.85	2.02	1.00	1.00
Incremental Delay, d2	0.4		0.1	0.1	3.3	1.9
Delay (s)	7.2		5.5	5.3	57.6	55.5
Level of Service	A		A	A	E	E
Approach Delay (s)	7.2			5.4	56.8	
Approach LOS	A			A	E	

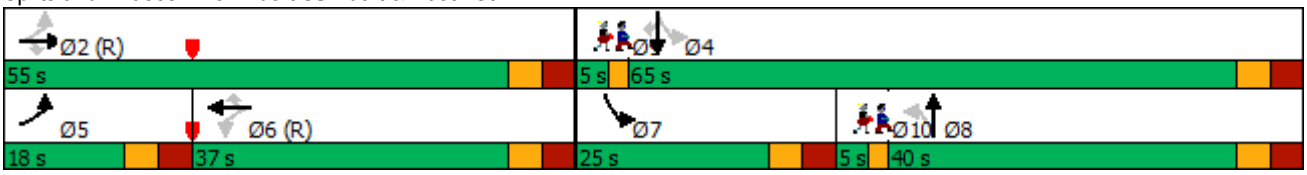
Intersection Summary			
HCM 2000 Control Delay	11.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.35		
Actuated Cycle Length (s)	125.0	Sum of lost time (s)	21.3
Intersection Capacity Utilization	45.4%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR	Ø9
Lane Configurations												
Traffic Volume (vph)	332	861	9	18	291	67	10	359	102	334	201	
Future Volume (vph)	332	861	9	18	291	67	10	359	102	334	201	
Turn Type	pm+pt	NA	Perm	Perm	NA	Perm	Perm	NA	pm+pt	NA	Perm	
Protected Phases	5	2			6			8	7	4		9
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	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	1.0
Minimum Split (s)	11.5	36.5	36.5	36.5	36.5	36.5	34.5	34.5	11.5	34.5	34.5	5.0
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	5.0
Total Split (%)	14.4%	44.0%	44.0%	29.6%	29.6%	29.6%	32.0%	32.0%	20.0%	52.0%	52.0%	4%
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	2.0
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	0.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.5	6.5	6.5	6.5	6.5	6.5		6.5	6.5	6.5	6.5	
Lead/Lag	Lead			Lag	Lag	Lag			Lead			
Lead-Lag Optimize?	Yes			Yes	Yes	Yes			Yes			
Recall Mode	None	C-Max	C-Max	C-Max	C-Max	C-Max	Max	Max	None	Max	Max	Max
Act Effct Green (s)	48.5	48.5	48.5	30.5	30.5	30.5		33.5	63.5	58.5	58.5	
Actuated g/C Ratio	0.39	0.39	0.39	0.24	0.24	0.24		0.27	0.51	0.47	0.47	
v/c Ratio	1.01	1.40	0.02	0.36	0.39	0.15		0.55	0.36	0.45	0.27	
Control Delay	81.5	219.3	0.0	59.7	41.3	0.6		41.3	19.7	24.6	3.3	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	
Total Delay	81.5	219.3	0.0	59.7	41.3	0.6		41.3	19.7	24.6	3.3	
LOS	F	F	A	E	D	A		D	B	C	A	
Approach Delay		179.6			34.9			41.3		17.1		
Approach LOS		F			C			D		B		

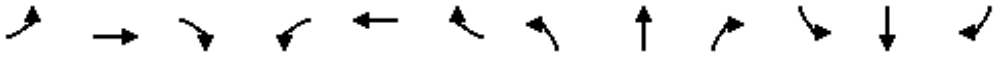
Intersection Summary	
Cycle Length: 125	
Actuated Cycle Length: 125	
Offset: 104 (83%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green	
Natural Cycle: 120	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 1.40	
Intersection Signal Delay: 97.8	Intersection LOS: F
Intersection Capacity Utilization 104.5%	ICU Level of Service G
Analysis Period (min) 15	

Splits and Phases: 5: Albert St/Albert & Booth St



Lane Group	Ø10
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Turn Type	
Protected Phases	10
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	1.0
Minimum Split (s)	5.0
Total Split (s)	5.0
Total Split (%)	4%
Yellow Time (s)	2.0
All-Red Time (s)	0.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	Lag
Lead-Lag Optimize?	Yes
Recall Mode	Max
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	

Intersection Summary



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	332	861	9	18	291	67	10	359	45	102	334	201
Future Volume (vph)	332	861	9	18	291	67	10	359	45	102	334	201
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	6.5	6.5	6.5	6.5	6.5	6.5		6.5		6.5	6.5	6.5
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	1.00		0.95		1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85		0.98		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		1.00		0.95	1.00	1.00
Satd. Flow (prot)	1676	1765	1500	1676	3353	1500		3294		1676	1765	1500
Flt Permitted	0.41	1.00	1.00	0.13	1.00	1.00		0.94		0.23	1.00	1.00
Satd. Flow (perm)	720	1765	1500	231	3353	1500		3104		414	1765	1500
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	369	957	10	20	323	74	11	399	50	113	371	223
RTOR Reduction (vph)	0	0	6	0	0	56	0	7	0	0	0	119
Lane Group Flow (vph)	369	957	4	20	323	18	0	453	0	113	371	104
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
Actuated Green, G (s)	48.5	48.5	48.5	30.5	30.5	30.5		33.5		63.5	58.5	58.5
Effective Green, g (s)	48.5	48.5	48.5	30.5	30.5	30.5		33.5		63.5	58.5	58.5
Actuated g/C Ratio	0.39	0.39	0.39	0.24	0.24	0.24		0.27		0.51	0.47	0.47
Clearance Time (s)	6.5	6.5	6.5	6.5	6.5	6.5		6.5		6.5	6.5	6.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	367	684	582	56	818	366		831		311	826	702
v/s Ratio Prot	0.09	c0.54			0.10					c0.03	c0.21	
v/s Ratio Perm	0.30		0.00	0.09		0.01		c0.15		0.16		0.07
v/c Ratio	1.01	1.40	0.01	0.36	0.39	0.05		0.54		0.36	0.45	0.15
Uniform Delay, d1	36.7	38.2	23.5	39.1	39.5	36.2		39.2		19.8	22.4	19.0
Progression Factor	0.94	0.96	1.00	1.00	1.00	1.00		1.00		1.00	1.00	1.00
Incremental Delay, d2	48.1	188.3	0.0	16.9	1.4	0.3		2.6		0.7	1.8	0.4
Delay (s)	82.8	225.0	23.5	56.0	41.0	36.4		41.8		20.5	24.2	19.5
Level of Service	F	F	C	E	D	D		D		C	C	B
Approach Delay (s)		184.2			40.9			41.8			22.1	
Approach LOS		F			D			D			C	

Intersection Summary			
HCM 2000 Control Delay	102.1	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.00		
Actuated Cycle Length (s)	125.0	Sum of lost time (s)	28.0
Intersection Capacity Utilization	104.5%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

6: Empress Ave & Albert

Lane Group	EBL	NBL	NBT	SBT	SBR
Lane Configurations					
Traffic Volume (vph)	967	4	5	10	527
Future Volume (vph)	967	4	5	10	527
Lane Group Flow (vph)	1103	0	10	298	299
Turn Type	Perm	Perm	NA	NA	Perm
Protected Phases			4	2!	
Permitted Phases	6!	4			2
Detector Phase	6	4	4	2	2
Switch Phase					
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	29.1	39.0	39.0	29.1	29.1
Total Split (s)	81.3	39.0	39.0	81.3	81.3
Total Split (%)	67.6%	32.4%	32.4%	67.6%	67.6%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	3.8	3.0	3.0	3.8	3.8
Lost Time Adjust (s)	0.0		0.0	0.0	0.0
Total Lost Time (s)	7.1		6.3	7.1	7.1
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	Max	Max	Max	Max	Max
Act Effct Green (s)	74.2		32.7	74.2	74.2
Actuated g/C Ratio	0.62		0.27	0.62	0.62
v/c Ratio	0.55		0.02	0.30	0.30
Control Delay	14.6		32.4	2.1	1.9
Queue Delay	0.5		0.0	0.0	0.0
Total Delay	15.1		32.4	2.1	1.9
LOS	B		C	A	A
Approach Delay	15.1		32.4	2.0	
Approach LOS	B		C	A	
Queue Length 50th (m)	76.4		1.8	1.0	0.0
Queue Length 95th (m)	94.5		6.3	12.4	11.2
Internal Link Dist (m)	179.0		98.2	145.6	
Turn Bay Length (m)					
Base Capacity (vph)	2007		427	995	993
Starvation Cap Reductn	439		0	0	0
Spillback Cap Reductn	0		0	0	0
Storage Cap Reductn	0		0	0	0
Reduced v/c Ratio	0.70		0.02	0.30	0.30

Intersection Summary	
Cycle Length: 120.3	
Actuated Cycle Length: 120.3	
Offset: 87 (72%), Referenced to phase 2:SBT and 6:EBL, Start of Green	
Natural Cycle: 75	
Control Type: Pretimed	
Maximum v/c Ratio: 0.55	
Intersection Signal Delay: 10.6	Intersection LOS: B
Intersection Capacity Utilization 53.8%	ICU Level of Service A
Analysis Period (min) 15	

! Phase conflict between lane groups.

Splits and Phases: 6: Empress Ave & Albert

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	967	26	4	5	10	527
Future Volume (vph)	967	26	4	5	10	527
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Total Lost time (s)	7.1			6.3	7.1	7.1
Lane Util. Factor	0.97			1.00	0.95	0.95
Frt	1.00			1.00	0.86	0.85
Flt Protected	0.95			0.98	1.00	1.00
Satd. Flow (prot)	3252			1730	1434	1425
Flt Permitted	0.95			0.89	1.00	1.00
Satd. Flow (perm)	3252			1573	1434	1425
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	1074	29	4	6	11	586
RTOR Reduction (vph)	2	0	0	0	110	115
Lane Group Flow (vph)	1101	0	0	10	188	184
Turn Type	Perm		Perm	NA	NA	Perm
Protected Phases				4	2!	
Permitted Phases	6!		4			2
Actuated Green, G (s)	74.2			32.7	74.2	74.2
Effective Green, g (s)	74.2			32.7	74.2	74.2
Actuated g/C Ratio	0.62			0.27	0.62	0.62
Clearance Time (s)	7.1			6.3	7.1	7.1
Lane Grp Cap (vph)	2005			427	884	878
v/s Ratio Prot					0.13	
v/s Ratio Perm	c0.34			c0.01		0.13
v/c Ratio	0.55			0.02	0.21	0.21
Uniform Delay, d1	13.4			32.1	10.2	10.1
Progression Factor	1.00			1.00	1.00	1.00
Incremental Delay, d2	1.1			0.1	0.5	0.5
Delay (s)	14.4			32.2	10.7	10.7
Level of Service	B			C	B	B
Approach Delay (s)	14.4			32.2	10.7	
Approach LOS	B			C	B	

Intersection Summary			
HCM 2000 Control Delay	13.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.39		
Actuated Cycle Length (s)	120.3	Sum of lost time (s)	13.4
Intersection Capacity Utilization	53.8%	ICU Level of Service	A
Analysis Period (min)	15		

! Phase conflict between lane groups.
c Critical Lane Group

Lane Group	NBR	SBL	SBT	Ø9
Lane Configurations				
Traffic Volume (vph)	883	13	537	
Future Volume (vph)	883	13	537	
Lane Group Flow (vph)	981	14	597	
Turn Type	Perm	Perm	NA	
Protected Phases			6	9
Permitted Phases	2	6		
Detector Phase	2	6	6	
Switch Phase				
Minimum Initial (s)	5.0	5.0	5.0	5.0
Minimum Split (s)	24.8	24.8	24.8	24.3
Total Split (s)	68.2	68.2	68.2	24.3
Total Split (%)	73.7%	73.7%	73.7%	26%
Yellow Time (s)	3.0	3.0	3.0	3.0
All-Red Time (s)	3.3	3.3	3.3	3.3
Lost Time Adjust (s)	0.0	0.0	0.0	
Total Lost Time (s)	6.3	6.3	6.3	
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	Max	Max	Max	Max
Act Effct Green (s)	61.9	61.9	61.9	
Actuated g/C Ratio	0.67	0.67	0.67	
v/c Ratio	0.41	0.01	0.27	
Control Delay	0.5	2.5	6.5	
Queue Delay	0.0	0.0	0.0	
Total Delay	0.5	2.5	6.5	
LOS	A	A	A	
Approach Delay			6.4	
Approach LOS			A	
Queue Length 50th (m)	0.0	0.0	20.9	
Queue Length 95th (m)	0.0	1.9	28.5	
Internal Link Dist (m)			93.1	
Turn Bay Length (m)		50.0		
Base Capacity (vph)	2401	1126	2243	
Starvation Cap Reductn	0	0	0	
Spillback Cap Reductn	0	0	0	
Storage Cap Reductn	0	0	0	
Reduced v/c Ratio	0.41	0.01	0.27	

Intersection Summary	
Cycle Length: 92.5	
Actuated Cycle Length: 92.5	
Offset: 0 (0%), Referenced to phase 2:NBR and 6:SBTL, Start of Green	
Natural Cycle: 50	
Control Type: Pretimed	
Maximum v/c Ratio: 0.41	
Intersection Signal Delay: 2.8	Intersection LOS: A
Intersection Capacity Utilization 47.3%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 7: ALBERT & SLATER

Movement	NBT	NBR	SBL	SBT	SWL	SWR
Lane Configurations						
Traffic Volume (vph)	0	883	13	537	0	0
Future Volume (vph)	0	883	13	537	0	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Total Lost time (s)		6.3	6.3	6.3		
Lane Util. Factor		0.88	1.00	0.95		
Frt		0.85	1.00	1.00		
Flt Protected		1.00	0.95	1.00		
Satd. Flow (prot)		2640	1676	3353		
Flt Permitted		1.00	0.95	1.00		
Satd. Flow (perm)		2640	1676	3353		
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	0	981	14	597	0	0
RTOR Reduction (vph)	0	325	5	0	0	0
Lane Group Flow (vph)	0	656	9	597	0	0
Turn Type		Perm	Perm	NA		
Protected Phases				6		
Permitted Phases		2	6			
Actuated Green, G (s)		61.9	61.9	61.9		
Effective Green, g (s)		61.9	61.9	61.9		
Actuated g/C Ratio		0.67	0.67	0.67		
Clearance Time (s)		6.3	6.3	6.3		
Lane Grp Cap (vph)		1766	1121	2243		
v/s Ratio Prot				0.18		
v/s Ratio Perm		c0.25	0.01			
v/c Ratio		0.37	0.01	0.27		
Uniform Delay, d1		6.7	5.1	6.2		
Progression Factor		1.00	1.00	1.00		
Incremental Delay, d2		0.6	0.0	0.3		
Delay (s)		7.3	5.1	6.4		
Level of Service		A	A	A		
Approach Delay (s)	7.3			6.4	0.0	
Approach LOS	A			A	A	

Intersection Summary			
HCM 2000 Control Delay	7.0	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.29		
Actuated Cycle Length (s)	92.5	Sum of lost time (s)	12.6
Intersection Capacity Utilization	47.3%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

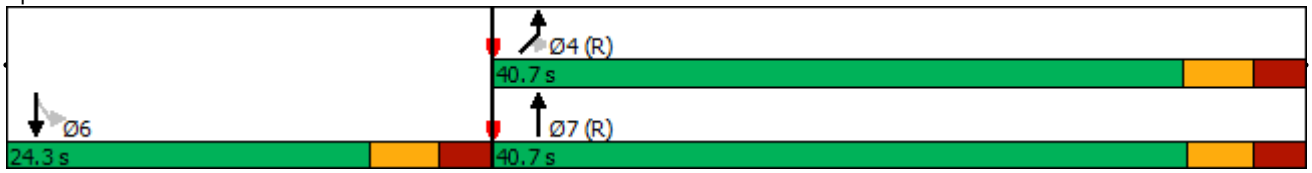
8: SLATER & Bronson Ave/Bronson

Lane Group	NBT	SBL	SBT	NEL	NER
Lane Configurations					
Traffic Volume (vph)	421	29	264	124	753
Future Volume (vph)	421	29	264	124	753
Lane Group Flow (vph)	766	0	325	548	530
Turn Type	NA	Perm	NA	Prot	Perm
Protected Phases	7!		6	4!	
Permitted Phases		6			4!
Detector Phase	7	6	6	4	4
Switch Phase					
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	24.2	24.2	24.2	24.2	24.2
Total Split (s)	40.7	24.3	24.3	40.7	40.7
Total Split (%)	62.6%	37.4%	37.4%	62.6%	62.6%
Yellow Time (s)	3.3	3.5	3.5	3.5	3.5
All-Red Time (s)	2.7	2.7	2.7	2.7	2.7
Lost Time Adjust (s)	0.0		0.0	0.0	0.0
Total Lost Time (s)	6.0		6.2	6.2	6.2
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	Max	Max	Max	Max	Max
Act Effct Green (s)	34.7		18.1	34.5	34.5
Actuated g/C Ratio	0.53		0.28	0.53	0.53
v/c Ratio	0.42		0.62	0.67	0.68
Control Delay	6.0		22.4	16.1	15.4
Queue Delay	0.0		0.0	0.5	0.2
Total Delay	6.1		22.4	16.6	15.6
LOS	A		C	B	B
Approach Delay	6.1		22.4	16.1	
Approach LOS	A		C	B	
Queue Length 50th (m)	15.6		11.1	46.2	42.3
Queue Length 95th (m)	25.9		23.3	79.8	78.3
Internal Link Dist (m)	290.7		50.9	105.6	
Turn Bay Length (m)					
Base Capacity (vph)	1824		521	821	781
Starvation Cap Reductn	0		0	61	21
Spillback Cap Reductn	38		0	19	0
Storage Cap Reductn	0		0	0	0
Reduced v/c Ratio	0.43		0.62	0.72	0.70

Intersection Summary	
Cycle Length: 65	
Actuated Cycle Length: 65	
Offset: 0 (0%), Referenced to phase 4:NEL and 7:NBT, Start of Green	
Natural Cycle: 60	
Control Type: Pretimed	
Maximum v/c Ratio: 0.68	
Intersection Signal Delay: 13.5	Intersection LOS: B
Intersection Capacity Utilization 78.7%	ICU Level of Service D
Analysis Period (min) 15	

! Phase conflict between lane groups.

Splits and Phases: 8: SLATER & Bronson Ave/Bronson



Movement	WBL	WBR	NBL	NBT	NBR	SBL	SBT	SBR	NEL	NER	NER2
Lane Configurations											
Traffic Volume (vph)	0	0	0	421	268	29	264	0	124	753	93
Future Volume (vph)	0	0	0	421	268	29	264	0	124	753	93
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)				6.0			6.2		6.2	6.2	
Lane Util. Factor				0.95			0.95		1.00	0.95	
Frt				0.94			1.00		0.89	0.85	
Flt Protected				1.00			1.00		0.99	1.00	
Satd. Flow (prot)				3157			3337		1547	1425	
Flt Permitted				1.00			0.56		0.99	1.00	
Satd. Flow (perm)				3157			1876		1547	1425	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	0	0	0	468	298	32	293	0	138	837	103
RTOR Reduction (vph)	0	0	0	139	0	0	0	0	0	25	0
Lane Group Flow (vph)	0	0	0	627	0	0	325	0	548	505	0
Turn Type				NA		Perm	NA		Prot	Perm	
Protected Phases				7!			6		4!		
Permitted Phases						6				4!	
Actuated Green, G (s)				34.7			18.1		34.5	34.5	
Effective Green, g (s)				34.7			18.1		34.5	34.5	
Actuated g/C Ratio				0.53			0.28		0.53	0.53	
Clearance Time (s)				6.0			6.2		6.2	6.2	
Lane Grp Cap (vph)				1685			522		821	756	
v/s Ratio Prot				0.20					c0.35		
v/s Ratio Perm							c0.17			0.35	
v/c Ratio				0.37			0.62		0.67	0.67	
Uniform Delay, d1				8.8			20.5		11.1	11.1	
Progression Factor				1.00			0.81		1.00	1.00	
Incremental Delay, d2				0.6			5.3		4.3	4.6	
Delay (s)				9.4			21.9		15.4	15.7	
Level of Service				A			C		B	B	
Approach Delay (s)	0.0			9.4			21.9		15.5		
Approach LOS	A			A			C		B		

Intersection Summary			
HCM 2000 Control Delay	14.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	12.4
Intersection Capacity Utilization	78.7%	ICU Level of Service	D
Analysis Period (min)	15		

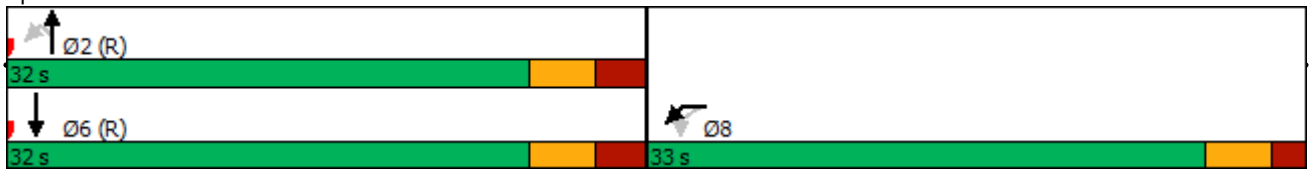
! Phase conflict between lane groups.
c Critical Lane Group

Lane Group	WBL2	WBL	NBL	NBT	SBT
Lane Configurations					
Traffic Volume (vph)	220	404	201	296	73
Future Volume (vph)	220	404	201	296	73
Lane Group Flow (vph)	244	460	223	329	122
Turn Type	Perm	Prot	Perm	NA	NA
Protected Phases		8		2	6
Permitted Phases	8		2		
Detector Phase	8	8	2	2	6
Switch Phase					
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	26.1	26.1	27.9	27.9	23.9
Total Split (s)	33.0	33.0	32.0	32.0	32.0
Total Split (%)	50.8%	50.8%	49.2%	49.2%	49.2%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	1.8	1.8	2.6	2.6	2.6
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.1	5.1	5.9	5.9	5.9
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	Max	Max	Max	Max	Max
Act Effct Green (s)	27.9	27.9	26.1	26.1	26.1
Actuated g/C Ratio	0.43	0.43	0.40	0.40	0.40
v/c Ratio	0.34	0.32	0.46	0.46	0.17
Control Delay	14.1	11.7	10.9	9.9	9.5
Queue Delay	0.0	0.0	0.4	0.6	0.0
Total Delay	14.1	11.7	11.3	10.5	9.5
LOS	B	B	B	B	A
Approach Delay		12.5		10.8	9.5
Approach LOS		B		B	A
Queue Length 50th (m)	19.8	16.8	18.3	27.0	6.3
Queue Length 95th (m)	35.4	26.3	m33.5	m44.8	15.7
Internal Link Dist (m)		177.9		50.9	46.8
Turn Bay Length (m)	50.0	50.0			
Base Capacity (vph)	719	1422	481	708	701
Starvation Cap Reductn	0	0	51	135	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.34	0.32	0.52	0.57	0.17

Intersection Summary	
Cycle Length: 65	
Actuated Cycle Length: 65	
Offset: 14 (22%), Referenced to phase 2:NBTL and 6:SBT, Start of Green	
Natural Cycle: 55	
Control Type: Pretimed	
Maximum v/c Ratio: 0.46	
Intersection Signal Delay: 11.6	Intersection LOS: B
Intersection Capacity Utilization 40.5%	ICU Level of Service A
Analysis Period (min) 15	

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

Splits and Phases: 11: Bronson & Albert



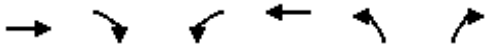
Movement	WBL2	WBL	WBR	NBL	NBT	NBR	SBL	SBT	SBR	NEL	NER
Lane Configurations											
Traffic Volume (vph)	220	404	10	201	296	0	0	73	37	0	0
Future Volume (vph)	220	404	10	201	296	0	0	73	37	0	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	5.1	5.1		5.9	5.9			5.9			
Lane Util. Factor	1.00	0.97		1.00	1.00			1.00			
Frt	1.00	1.00		1.00	1.00			0.95			
Flt Protected	0.95	0.95		0.95	1.00			1.00			
Satd. Flow (prot)	1676	3253		1676	1765			1685			
Flt Permitted	0.95	0.95		0.68	1.00			1.00			
Satd. Flow (perm)	1676	3253		1198	1765			1685			
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	244	449	11	223	329	0	0	81	41	0	0
RTOR Reduction (vph)	0	28	0	0	0	0	0	25	0	0	0
Lane Group Flow (vph)	244	432	0	223	329	0	0	97	0	0	0
Turn Type	Perm	Prot		Perm	NA			NA			
Protected Phases		8			2			6			
Permitted Phases	8			2							
Actuated Green, G (s)	27.9	27.9		26.1	26.1			26.1			
Effective Green, g (s)	27.9	27.9		26.1	26.1			26.1			
Actuated g/C Ratio	0.43	0.43		0.40	0.40			0.40			
Clearance Time (s)	5.1	5.1		5.9	5.9			5.9			
Lane Grp Cap (vph)	719	1396		481	708			676			
v/s Ratio Prot		0.13			c0.19			0.06			
v/s Ratio Perm	c0.15			0.19							
v/c Ratio	0.34	0.31		0.46	0.46			0.14			
Uniform Delay, d1	12.4	12.2		14.3	14.3			12.4			
Progression Factor	1.00	1.00		0.53	0.53			1.00			
Incremental Delay, d2	1.3	0.6		2.9	2.0			0.4			
Delay (s)	13.7	12.8		10.5	9.6			12.8			
Level of Service	B	B		B	A			B			
Approach Delay (s)		13.1			10.0			12.8		0.0	
Approach LOS		B			A			B		A	

Intersection Summary			
HCM 2000 Control Delay	11.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.40		
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	40.5%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBT	WBT	NBL
Lane Configurations			
Traffic Volume (vph)	1930	603	272
Future Volume (vph)	1930	603	272
Lane Group Flow (vph)	2144	670	341
Turn Type	NA	NA	Prot
Protected Phases	4	8	2
Permitted Phases			
Detector Phase	4	8	2
Switch Phase			
Minimum Initial (s)	5.0	5.0	5.0
Minimum Split (s)	36.7	23.7	26.9
Total Split (s)	95.0	95.0	35.0
Total Split (%)	73.1%	73.1%	26.9%
Yellow Time (s)	3.3	3.3	3.3
All-Red Time (s)	2.4	2.4	2.6
Lost Time Adjust (s)	0.0	0.0	0.0
Total Lost Time (s)	5.7	5.7	5.9
Lead/Lag			
Lead-Lag Optimize?			
Recall Mode	None	None	C-Max
Act Effct Green (s)	80.7	80.7	37.7
Actuated g/C Ratio	0.62	0.62	0.29
v/c Ratio	0.72	0.32	0.37
Control Delay	18.2	3.2	39.7
Queue Delay	0.0	0.1	0.1
Total Delay	18.2	3.3	39.8
LOS	B	A	D
Approach Delay	18.2	3.3	39.8
Approach LOS	B	A	D
Queue Length 50th (m)	134.6	0.4	38.1
Queue Length 95th (m)	123.5	0.4	57.0
Internal Link Dist (m)	74.9	134.0	213.7
Turn Bay Length (m)			
Base Capacity (vph)	3309	2303	934
Starvation Cap Reductn	0	649	0
Spillback Cap Reductn	64	0	80
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.66	0.41	0.40

Intersection Summary	
Cycle Length: 130	
Actuated Cycle Length: 130	
Offset: 101 (78%), Referenced to phase 2:NBL and 6:, Start of Green	
Natural Cycle: 65	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.72	
Intersection Signal Delay: 17.4	Intersection LOS: B
Intersection Capacity Utilization 58.4%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 13: Bay St & Wellington



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	1930	0	0	603	272	35
Future Volume (vph)	1930	0	0	603	272	35
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Total Lost time (s)	5.7			5.7	5.9	
Lane Util. Factor	0.91			0.95	0.97	
Frt	1.00			1.00	0.98	
Flt Protected	1.00			1.00	0.96	
Satd. Flow (prot)	4818			3353	3222	
Flt Permitted	1.00			1.00	0.96	
Satd. Flow (perm)	4818			3353	3222	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	2144	0	0	670	302	39
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	2144	0	0	670	341	0
Turn Type	NA			NA	Prot	
Protected Phases	4			8	2	
Permitted Phases						
Actuated Green, G (s)	80.7			80.7	37.7	
Effective Green, g (s)	80.7			80.7	37.7	
Actuated g/C Ratio	0.62			0.62	0.29	
Clearance Time (s)	5.7			5.7	5.9	
Vehicle Extension (s)	3.0			3.0	3.0	
Lane Grp Cap (vph)	2990			2081	934	
v/s Ratio Prot	c0.45			0.20	c0.11	
v/s Ratio Perm						
v/c Ratio	0.72			0.32	0.37	
Uniform Delay, d1	16.8			11.7	36.6	
Progression Factor	1.01			0.25	1.00	
Incremental Delay, d2	0.8			0.1	1.1	
Delay (s)	17.8			2.9	37.8	
Level of Service	B			A	D	
Approach Delay (s)	17.8			2.9	37.8	
Approach LOS	B			A	D	

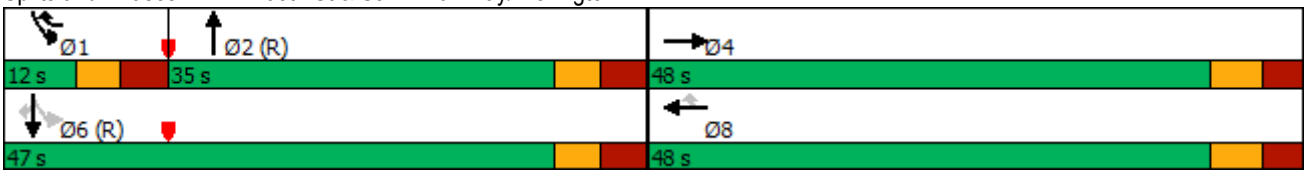
Intersection Summary			
HCM 2000 Control Delay	16.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	11.6
Intersection Capacity Utilization	58.4%	ICU Level of Service	B
Analysis Period (min)	15		

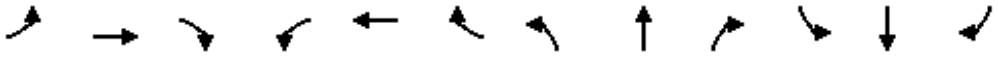
c Critical Lane Group

Lane Group	EBT	WBT	WBR	NBT	SBL	SBT	SBR
Lane Configurations							
Traffic Volume (vph)	1231	714	134	690	124	1090	320
Future Volume (vph)	1231	714	134	690	124	1090	320
Turn Type	NA	NA	pm+ov	NA	pm+pt	NA	Perm
Protected Phases	4	8	1	2	1	6	
Permitted Phases			8		6		6
Detector Phase	4	8	1	2	1	6	6
Switch Phase							
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	40.4	40.4	12.0	31.8	12.0	37.9	37.9
Total Split (s)	48.0	48.0	12.0	35.0	12.0	47.0	47.0
Total Split (%)	50.5%	50.5%	12.6%	36.8%	12.6%	49.5%	49.5%
Yellow Time (s)	3.7	3.7	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	3.1	3.1	3.5	3.5	3.5	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)	6.8	6.8	6.8	6.8	6.8	6.8	6.8
Lead/Lag			Lead	Lag	Lead		
Lead-Lag Optimize?			Yes	Yes	Yes		
Recall Mode	None	None	None	C-Max	None	C-Max	C-Max
Act Effct Green (s)	40.8	40.8	53.2	28.2	40.6	40.6	40.6
Actuated g/C Ratio	0.43	0.43	0.56	0.30	0.43	0.43	0.43
v/c Ratio	0.95	0.55	0.18	0.96	0.80	0.85	0.51
Control Delay	41.4	22.0	10.9	53.9	53.8	31.4	17.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	41.4	22.0	10.9	53.9	53.8	31.4	17.4
LOS	D	C	B	D	D	C	B
Approach Delay	41.4	20.2		53.9		30.3	
Approach LOS	D	C		D		C	

Intersection Summary	
Cycle Length: 95	
Actuated Cycle Length: 95	
Offset: 31 (33%), Referenced to phase 2:NBT and 6:SBTL, Start of Green	
Natural Cycle: 85	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.96	
Intersection Signal Delay: 36.0	Intersection LOS: D
Intersection Capacity Utilization 85.9%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 14: Booth St & SJAM Parkway/Wellington





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	1231	0	0	714	134	0	690	167	124	1090	320
Future Volume (vph)	0	1231	0	0	714	134	0	690	167	124	1090	320
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)		6.8			6.8	6.8		6.8		6.8	6.8	6.8
Lane Util. Factor		0.95			0.95	1.00		0.95		1.00	0.95	1.00
Frt		1.00			1.00	0.85		0.97		1.00	1.00	0.85
Flt Protected		1.00			1.00	1.00		1.00		0.95	1.00	1.00
Satd. Flow (prot)		3353			3353	1500		3255		1676	3353	1500
Flt Permitted		1.00			1.00	1.00		1.00		0.11	1.00	1.00
Satd. Flow (perm)		3353			3353	1500		3255		202	3353	1500
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	0	1368	0	0	793	149	0	767	186	138	1211	356
RTOR Reduction (vph)	0	0	0	0	0	0	0	23	0	0	0	55
Lane Group Flow (vph)	0	1368	0	0	793	149	0	930	0	138	1211	301
Turn Type		NA			NA	pm+ov		NA		pm+pt	NA	Perm
Protected Phases		4			8	1		2		1	6	
Permitted Phases						8				6		6
Actuated Green, G (s)		40.8			40.8	46.4		28.2		40.6	40.6	40.6
Effective Green, g (s)		40.8			40.8	46.4		28.2		40.6	40.6	40.6
Actuated g/C Ratio		0.43			0.43	0.49		0.30		0.43	0.43	0.43
Clearance Time (s)		6.8			6.8	6.8		6.8		6.8	6.8	6.8
Vehicle Extension (s)		3.0			3.0	3.0		3.0		3.0	3.0	3.0
Lane Grp Cap (vph)		1440			1440	840		966		173	1432	641
v/s Ratio Prot		c0.41			0.24	0.01		c0.29		0.05	c0.36	
v/s Ratio Perm						0.09				0.29		0.20
v/c Ratio		0.95			0.55	0.18		0.96		0.80	0.85	0.47
Uniform Delay, d1		26.1			20.3	13.6		32.9		21.2	24.4	19.5
Progression Factor		1.00			1.00	1.00		1.00		1.00	1.00	1.00
Incremental Delay, d2		13.4			0.5	0.1		21.3		22.0	6.3	2.5
Delay (s)		39.6			20.7	13.7		54.2		43.2	30.7	21.9
Level of Service		D			C	B		D		D	C	C
Approach Delay (s)		39.6			19.6			54.2			29.9	
Approach LOS		D			B			D			C	

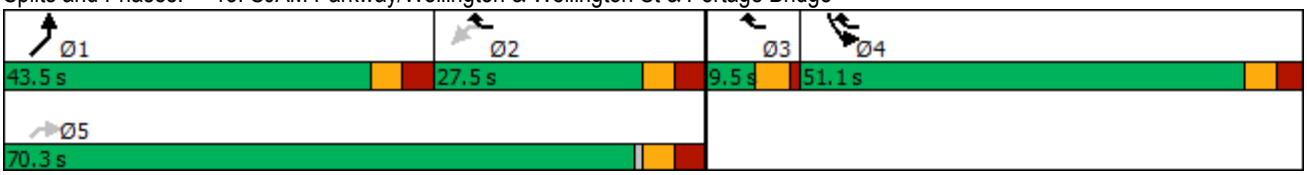
Intersection Summary			
HCM 2000 Control Delay	35.3	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.00		
Actuated Cycle Length (s)	95.0	Sum of lost time (s)	20.4
Intersection Capacity Utilization	85.9%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	WBL	WBR	SBL	SBR	NEL	NER	Ø3
Lane Configurations							
Traffic Volume (vph)	649	717	897	583	758	836	
Future Volume (vph)	649	717	897	583	758	836	
Turn Type	Perm	custom	Prot	Free	Prot	Perm	
Protected Phases		2 3 4	4		1		3
Permitted Phases	2			Free		5	
Detector Phase	2	2 3 4	4		1	5	
Switch Phase							
Minimum Initial (s)	5.0		5.0		5.0	5.0	5.0
Minimum Split (s)	26.5		44.1		43.5	24.5	9.5
Total Split (s)	27.5		51.1		43.5	70.3	9.5
Total Split (%)	20.9%		38.8%		33.1%	53.4%	7%
Yellow Time (s)	3.3		3.3		3.3	3.3	3.5
All-Red Time (s)	3.2		2.8		3.2	3.2	1.0
Lost Time Adjust (s)	0.0		0.0		0.0	0.0	
Total Lost Time (s)	6.5		6.1		6.5	6.5	
Lead/Lag	Lag		Lag		Lead		Lead
Lead-Lag Optimize?	Yes		Yes		Yes		Yes
Recall Mode	None		Max		None	None	None
Act Effct Green (s)	21.0	81.6	45.0	130.6	35.9	63.5	
Actuated g/C Ratio	0.16	0.62	0.34	1.00	0.27	0.49	
v/c Ratio	1.37	0.48	0.89	0.43	0.94	0.51	
Control Delay	220.2	13.8	51.6	0.9	65.2	16.1	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	220.2	13.8	51.6	0.9	65.2	16.1	
LOS	F	B	D	A	E	B	
Approach Delay	111.9		31.6		39.4		
Approach LOS	F		C		D		

Intersection Summary	
Cycle Length: 131.6	
Actuated Cycle Length: 130.6	
Natural Cycle: 145	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 1.37	
Intersection Signal Delay: 59.1	Intersection LOS: E
Intersection Capacity Utilization 85.3%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 15: SJAM Parkway/Wellington & Wellington St & Portage Bridge



Movement	WBL	WBR	SBL	SBR	NEL	NER
Lane Configurations						
Traffic Volume (vph)	649	717	897	583	758	836
Future Volume (vph)	649	717	897	583	758	836
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Total Lost time (s)	6.5	6.5	6.1	4.0	6.5	6.5
Lane Util. Factor	0.97	0.88	0.97	1.00	0.97	0.76
Frt	1.00	0.85	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	3252	2640	3252	1500	3252	3420
Flt Permitted	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	3269	2640	3252	1500	3252	3420
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	721	797	997	648	842	929
RTOR Reduction (vph)	0	13	0	0	0	150
Lane Group Flow (vph)	721	784	997	648	842	779
Turn Type	Perm	custom	Prot	Free	Prot	Perm
Protected Phases		2 3 4	4		1	
Permitted Phases	2			Free		5
Actuated Green, G (s)	21.0	82.0	45.0	130.5	35.9	63.4
Effective Green, g (s)	21.0	77.5	45.0	130.5	35.9	63.4
Actuated g/C Ratio	0.16	0.59	0.34	1.00	0.28	0.49
Clearance Time (s)	6.5		6.1		6.5	6.5
Vehicle Extension (s)	3.0		3.0		3.0	3.0
Lane Grp Cap (vph)	526	1567	1121	1500	894	1661
v/s Ratio Prot		0.30	c0.31		c0.26	
v/s Ratio Perm	c0.22			c0.43		0.23
v/c Ratio	1.37	0.50	0.89	0.43	0.94	0.47
Uniform Delay, d1	54.8	15.3	40.4	0.0	46.3	22.3
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	178.6	0.3	10.6	0.9	17.6	0.2
Delay (s)	233.4	15.6	51.0	0.9	63.9	22.6
Level of Service	F	B	D	A	E	C
Approach Delay (s)	119.0		31.3		42.2	
Approach LOS	F		C		D	

Intersection Summary			
HCM 2000 Control Delay	62.2	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.00		
Actuated Cycle Length (s)	130.5	Sum of lost time (s)	23.6
Intersection Capacity Utilization	85.3%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	0	159	158	255	257	0	0	0	0
Future Volume (vph)	0	0	0	0	159	158	255	257	0	0	0	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)					5.2	5.2		5.2				
Lane Util. Factor					0.95	1.00		0.95				
Frt					1.00	0.85		1.00				
Flt Protected					1.00	1.00		0.98				
Satd. Flow (prot)					3353	1500		3272				
Flt Permitted					1.00	1.00		0.98				
Satd. Flow (perm)					3353	1500		3272				
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	0	0	0	0	177	176	283	286	0	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	151	0	90	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	177	25	0	479	0	0	0	0
Turn Type					NA	Perm	Perm	NA				
Protected Phases					8			2				
Permitted Phases						8	2					
Actuated Green, G (s)					8.6	8.6		41.0				
Effective Green, g (s)					8.6	8.6		41.0				
Actuated g/C Ratio					0.14	0.14		0.68				
Clearance Time (s)					5.2	5.2		5.2				
Vehicle Extension (s)					3.0	3.0		3.0				
Lane Grp Cap (vph)					480	215		2235				
v/s Ratio Prot					c0.05							
v/s Ratio Perm						0.02		0.15				
v/c Ratio					0.37	0.12		0.21				
Uniform Delay, d1					23.2	22.4		3.5				
Progression Factor					1.00	1.00		1.08				
Incremental Delay, d2					0.5	0.2		0.1				
Delay (s)					23.7	22.6		3.9				
Level of Service					C	C		A				
Approach Delay (s)		0.0			23.2			3.9			0.0	
Approach LOS		A			C			A			A	

Intersection Summary			
HCM 2000 Control Delay	11.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.24		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	10.4
Intersection Capacity Utilization	34.3%	ICU Level of Service	A
Analysis Period (min)	15		

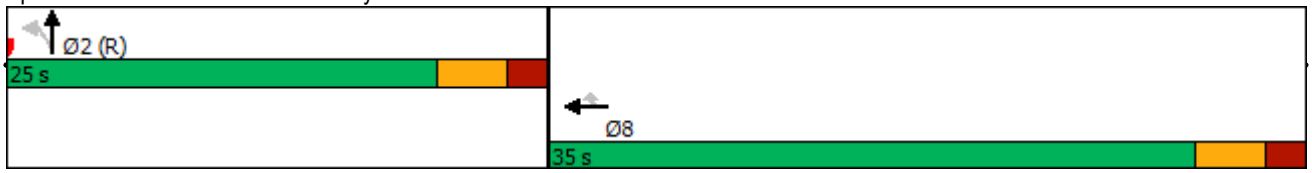
c Critical Lane Group

Lane Group	WBT	WBR	NBT
Lane Configurations			
Traffic Volume (vph)	159	158	257
Future Volume (vph)	159	158	257
Lane Group Flow (vph)	177	176	569
Turn Type	NA	Perm	NA
Protected Phases	8		2
Permitted Phases		8	
Detector Phase	8	8	2
Switch Phase			
Minimum Initial (s)	5.0	5.0	5.0
Minimum Split (s)	23.2	23.2	23.2
Total Split (s)	35.0	35.0	25.0
Total Split (%)	58.3%	58.3%	41.7%
Yellow Time (s)	3.3	3.3	3.3
All-Red Time (s)	1.9	1.9	1.9
Lost Time Adjust (s)	0.0	0.0	0.0
Total Lost Time (s)	5.2	5.2	5.2
Lead/Lag			
Lead-Lag Optimize?			
Recall Mode	None	None	C-Max
Act Effct Green (s)	8.6	8.6	41.0
Actuated g/C Ratio	0.14	0.14	0.68
v/c Ratio	0.37	0.48	0.24
Control Delay	24.9	9.1	2.2
Queue Delay	0.0	0.0	0.4
Total Delay	24.9	9.1	2.6
LOS	C	A	A
Approach Delay	17.0		2.6
Approach LOS	B		A
Queue Length 50th (m)	9.9	0.0	1.8
Queue Length 95th (m)	17.1	14.1	m4.0
Internal Link Dist (m)	133.2		48.0
Turn Bay Length (m)		50.0	
Base Capacity (vph)	1665	833	2323
Starvation Cap Reductn	0	0	1158
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.11	0.21	0.49

Intersection Summary	
Cycle Length: 60	
Actuated Cycle Length: 60	
Offset: 58 (97%), Referenced to phase 2:NBTL and 6:, Start of Green	
Natural Cycle: 50	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.48	
Intersection Signal Delay: 8.1	Intersection LOS: A
Intersection Capacity Utilization 34.3%	ICU Level of Service A
Analysis Period (min) 15	

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

Splits and Phases: 20: Albert & Bay St



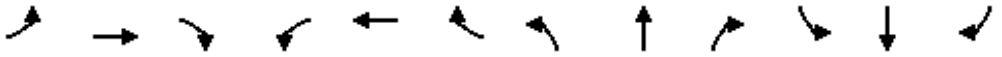
Lane Group	EBT	NBT
Lane Configurations		
Traffic Volume (vph)	963	399
Future Volume (vph)	963	399
Lane Group Flow (vph)	1196	629
Turn Type	NA	NA
Protected Phases	4	2
Permitted Phases		
Detector Phase	4	2
Switch Phase		
Minimum Initial (s)	5.0	5.0
Minimum Split (s)	35.0	19.0
Total Split (s)	41.0	19.0
Total Split (%)	68.3%	31.7%
Yellow Time (s)	3.3	3.3
All-Red Time (s)	1.7	1.9
Lost Time Adjust (s)	0.0	0.0
Total Lost Time (s)	5.0	5.2
Lead/Lag		
Lead-Lag Optimize?		
Recall Mode	None	C-Max
Act Effct Green (s)	29.3	20.5
Actuated g/C Ratio	0.49	0.34
v/c Ratio	0.72	1.05
Control Delay	14.0	76.5
Queue Delay	0.0	0.0
Total Delay	14.0	76.5
LOS	B	E
Approach Delay	14.0	76.5
Approach LOS	B	E
Queue Length 50th (m)	50.4	~81.4
Queue Length 95th (m)	55.4	#159.3
Internal Link Dist (m)	195.9	236.7
Turn Bay Length (m)		
Base Capacity (vph)	2017	599
Starvation Cap Reductn	0	0
Spillback Cap Reductn	0	0
Storage Cap Reductn	0	0
Reduced v/c Ratio	0.59	1.05

Intersection Summary	
Cycle Length: 60	
Actuated Cycle Length: 60	
Offset: 3 (5%), Referenced to phase 2:NBT and 6:, Start of Green	
Natural Cycle: 65	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 1.05	
Intersection Signal Delay: 35.5	Intersection LOS: D
Intersection Capacity Utilization 73.0%	ICU Level of Service C
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: 22: Bay St & Slater



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	113	963	0	0	0	0	0	399	167	0	0	0
Future Volume (vph)	113	963	0	0	0	0	0	399	167	0	0	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)		5.0						5.2				
Lane Util. Factor		0.95						1.00				
Frt		1.00						0.96				
Flt Protected		0.99						1.00				
Satd. Flow (prot)		3335						1694				
Flt Permitted		0.99						1.00				
Satd. Flow (perm)		3335						1694				
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	126	1070	0	0	0	0	0	443	186	0	0	0
RTOR Reduction (vph)	0	20	0	0	0	0	0	22	0	0	0	0
Lane Group Flow (vph)	0	1176	0	0	0	0	0	607	0	0	0	0
Turn Type	Perm	NA						NA				
Protected Phases		4						2				
Permitted Phases	4											
Actuated Green, G (s)		29.3						20.5				
Effective Green, g (s)		29.3						20.5				
Actuated g/C Ratio		0.49						0.34				
Clearance Time (s)		5.0						5.2				
Vehicle Extension (s)		3.0						3.0				
Lane Grp Cap (vph)		1628						578				
v/s Ratio Prot								c0.36				
v/s Ratio Perm		0.35										
v/c Ratio		0.72						1.05				
Uniform Delay, d1		12.1						19.8				
Progression Factor		1.00						1.00				
Incremental Delay, d2		1.6						51.4				
Delay (s)		13.7						71.2				
Level of Service		B						E				
Approach Delay (s)		13.7			0.0			71.2			0.0	
Approach LOS		B			A			E			A	

Intersection Summary			
HCM 2000 Control Delay	33.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	10.2
Intersection Capacity Utilization	73.0%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	WBT	SBT	Ø5
Lane Configurations			
Traffic Volume (vph)	278	833	
Future Volume (vph)	278	833	
Lane Group Flow (vph)	578	969	
Turn Type	NA	NA	
Protected Phases	8	6	5
Permitted Phases			
Detector Phase	8	6	
Switch Phase			
Minimum Initial (s)	5.0	5.0	5.0
Minimum Split (s)	23.4	23.5	10.0
Total Split (s)	27.0	28.0	10.0
Total Split (%)	41.5%	43.1%	15%
Yellow Time (s)	3.3	3.3	2.0
All-Red Time (s)	2.1	2.2	0.0
Lost Time Adjust (s)	0.0	0.0	
Total Lost Time (s)	5.4	5.5	
Lead/Lag		Lag	Lead
Lead-Lag Optimize?		Yes	Yes
Recall Mode	None	C-Max	Max
Act Effct Green (s)	12.3	22.5	
Actuated g/C Ratio	0.19	0.35	
v/c Ratio	0.69	0.58	
Control Delay	16.8	17.9	
Queue Delay	0.0	0.0	
Total Delay	16.8	17.9	
LOS	B	B	
Approach Delay	16.8	17.9	
Approach LOS	B	B	
Queue Length 50th (m)	18.7	44.2	
Queue Length 95th (m)	30.4	m43.9	
Internal Link Dist (m)	197.0	214.4	
Turn Bay Length (m)			
Base Capacity (vph)	1268	1663	
Starvation Cap Reductn	0	0	
Spillback Cap Reductn	0	0	
Storage Cap Reductn	0	0	
Reduced v/c Ratio	0.46	0.58	

Intersection Summary	
Cycle Length: 65	
Actuated Cycle Length: 65	
Offset: 24 (37%), Referenced to phase 2: and 6:SBT, Start of Green	
Natural Cycle: 60	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.69	
Intersection Signal Delay: 17.5	Intersection LOS: B
Intersection Capacity Utilization 52.9%	ICU Level of Service A
Analysis Period (min) 15	

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

Splits and Phases: 27: Albert St & Lyon St N

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	242	278	0	0	0	0	0	833	39
Future Volume (vph)	0	0	0	242	278	0	0	0	0	0	833	39
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)					5.4						5.5	
Lane Util. Factor					0.95						0.91	
Frt					1.00						0.99	
Flt Protected					0.98						1.00	
Satd. Flow (prot)					3277						4786	
Flt Permitted					0.98						1.00	
Satd. Flow (perm)					3277						4786	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	0	0	0	269	309	0	0	0	0	0	926	43
RTOR Reduction (vph)	0	0	0	0	218	0	0	0	0	0	8	0
Lane Group Flow (vph)	0	0	0	0	360	0	0	0	0	0	961	0
Turn Type				Perm	NA						NA	
Protected Phases					8						6	
Permitted Phases				8								
Actuated Green, G (s)					12.3						22.5	
Effective Green, g (s)					12.3						22.5	
Actuated g/C Ratio					0.19						0.35	
Clearance Time (s)					5.4						5.5	
Vehicle Extension (s)					3.0						3.0	
Lane Grp Cap (vph)					620						1656	
v/s Ratio Prot											c0.20	
v/s Ratio Perm					0.11							
v/c Ratio					0.58						0.58	
Uniform Delay, d1					24.0						17.4	
Progression Factor					1.00						0.98	
Incremental Delay, d2					1.4						1.0	
Delay (s)					25.4						18.0	
Level of Service					C						B	
Approach Delay (s)		0.0			25.4			0.0			18.0	
Approach LOS		A			C			A			B	

Intersection Summary			
HCM 2000 Control Delay	20.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.39		
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	12.9
Intersection Capacity Utilization	52.9%	ICU Level of Service	A
Analysis Period (min)	15		

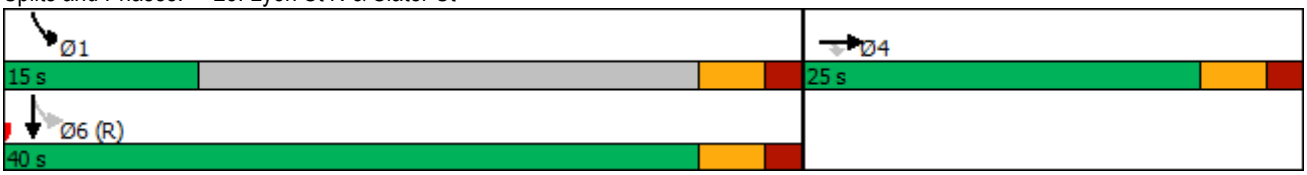
c Critical Lane Group

Lane Group	EBT	EBR	SBL	SBT
Lane Configurations				
Traffic Volume (vph)	742	220	284	771
Future Volume (vph)	742	220	284	771
Lane Group Flow (vph)	824	244	316	857
Turn Type	NA	Perm	pm+pt	NA
Protected Phases	4		1	6
Permitted Phases		4	6	
Detector Phase	4	4	1	6
Switch Phase				
Minimum Initial (s)	5.0	5.0	5.0	5.0
Minimum Split (s)	21.2	21.2	10.3	29.3
Total Split (s)	25.0	25.0	15.0	40.0
Total Split (%)	38.5%	38.5%	23.1%	61.5%
Yellow Time (s)	3.3	3.3	3.3	3.3
All-Red Time (s)	1.9	1.9	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.2	5.2	5.3	5.3
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	None	None	None	C-Max
Act Effct Green (s)	19.1	19.1	35.4	35.4
Actuated g/C Ratio	0.29	0.29	0.54	0.54
v/c Ratio	0.84	0.46	0.34	0.47
Control Delay	30.7	11.8	3.3	4.1
Queue Delay	0.0	0.0	0.4	0.2
Total Delay	30.7	11.8	3.7	4.3
LOS	C	B	A	A
Approach Delay	26.4			4.2
Approach LOS	C			A
Queue Length 50th (m)	50.1	10.7	3.7	8.9
Queue Length 95th (m)	#78.1	28.4	7.3	12.4
Internal Link Dist (m)	132.9			47.5
Turn Bay Length (m)		50.0		
Base Capacity (vph)	1021	548	930	1827
Starvation Cap Reductn	0	0	269	331
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.81	0.45	0.48	0.57

Intersection Summary	
Cycle Length: 65	
Actuated Cycle Length: 65	
Offset: 24 (37%), Referenced to phase 2: and 6:SBTL, Start of Green	
Natural Cycle: 55	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.84	
Intersection Signal Delay: 14.8	Intersection LOS: B
Intersection Capacity Utilization 52.9%	ICU Level of Service A
Analysis Period (min) 15	

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

Splits and Phases: 28: Lyon St N & Slater St



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	742	220	0	0	0	0	0	0	284	771	0
Future Volume (vph)	0	742	220	0	0	0	0	0	0	284	771	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)		5.2	5.2							5.3	5.3	
Lane Util. Factor		0.95	1.00							1.00	0.95	
Frt		1.00	0.85							1.00	1.00	
Flt Protected		1.00	1.00							0.95	1.00	
Satd. Flow (prot)		3353	1500							1676	3353	
Flt Permitted		1.00	1.00							0.95	1.00	
Satd. Flow (perm)		3353	1500							1676	3353	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	0	824	244	0	0	0	0	0	0	316	857	0
RTOR Reduction (vph)	0	0	93	0	0	0	0	0	0	17	0	0
Lane Group Flow (vph)	0	824	151	0	0	0	0	0	0	299	857	0
Turn Type		NA	Perm							pm+pt	NA	
Protected Phases		4								1	6	
Permitted Phases			4							6		
Actuated Green, G (s)		19.1	19.1							35.4	35.4	
Effective Green, g (s)		19.1	19.1							35.4	35.4	
Actuated g/C Ratio		0.29	0.29							0.54	0.54	
Clearance Time (s)		5.2	5.2							5.3	5.3	
Vehicle Extension (s)		3.0	3.0							3.0	3.0	
Lane Grp Cap (vph)		985	440							912	1826	
v/s Ratio Prot		c0.25								0.18	c0.26	
v/s Ratio Perm			0.10									
v/c Ratio		0.84	0.34							0.33	0.47	
Uniform Delay, d1		21.5	18.0							8.2	9.1	
Progression Factor		1.00	1.00							0.33	0.37	
Incremental Delay, d2		6.3	0.5							0.2	0.7	
Delay (s)		27.8	18.5							2.8	4.0	
Level of Service		C	B							A	A	
Approach Delay (s)		25.6			0.0			0.0			3.7	
Approach LOS		C			A			A			A	

Intersection Summary			
HCM 2000 Control Delay	14.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	10.5
Intersection Capacity Utilization	52.9%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

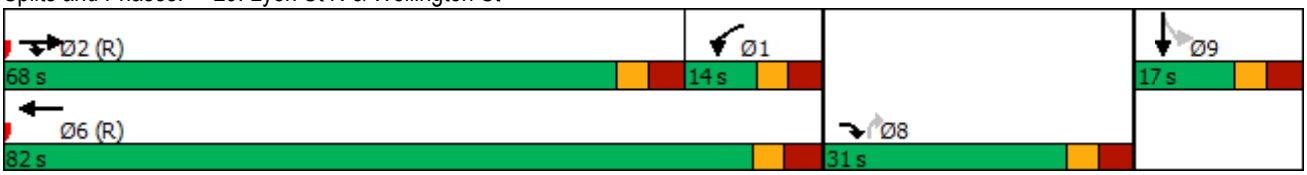
Lane Group	EBT	EBR	WBL	WBT	NBR	Ø9
Lane Configurations						
Traffic Volume (vph)	793	1035	117	595	9	
Future Volume (vph)	793	1035	117	595	9	
Lane Group Flow (vph)	881	1150	130	661	10	
Turn Type	NA	custom	Prot	NA	Perm	
Protected Phases	2	2 8	1	6		9
Permitted Phases					8	
Detector Phase	2	2 8	1	6	8	
Switch Phase						
Minimum Initial (s)	5.0		5.0	5.0	5.0	5.0
Minimum Split (s)	31.0		11.9	25.3	31.0	25.1
Total Split (s)	68.0		14.0	82.0	31.0	17.0
Total Split (%)	52.3%		10.8%	63.1%	23.8%	13%
Yellow Time (s)	3.3		3.3	3.3	3.3	3.3
All-Red Time (s)	3.6		3.6	4.0	3.6	3.8
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	
Total Lost Time (s)	6.9		6.9	7.3	6.9	
Lead/Lag	Lead		Lag			
Lead-Lag Optimize?	Yes		Yes			
Recall Mode	C-Max		None	C-Max	Max	Max
Act Effct Green (s)	61.1	85.2	7.1	74.7	24.1	
Actuated g/C Ratio	0.47	0.66	0.05	0.57	0.19	
v/c Ratio	1.06	0.66	1.43	0.34	0.02	
Control Delay	73.6	7.7	287.4	15.3	0.1	
Queue Delay	0.0	0.0	0.0	0.0	0.0	
Total Delay	73.6	7.8	287.4	15.3	0.1	
LOS	E	A	F	B	A	
Approach Delay	36.3			60.0		
Approach LOS	D			E		
Queue Length 50th (m)	~252.6	53.0	~47.2	47.4	0.0	
Queue Length 95th (m)	#334.9	71.0	#89.8	60.3	0.0	
Internal Link Dist (m)	134.0			168.5		
Turn Bay Length (m)						
Base Capacity (vph)	829	1730	91	1926	530	
Starvation Cap Reductn	0	9	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	
Reduced v/c Ratio	1.06	0.67	1.43	0.34	0.02	

Intersection Summary	
Cycle Length: 130	
Actuated Cycle Length: 130	
Offset: 120 (92%), Referenced to phase 2:EBT and 6:WBT, Start of Green	
Natural Cycle: 150	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 1.43	
Intersection Signal Delay: 42.8	Intersection LOS: D
Intersection Capacity Utilization 62.4%	ICU Level of Service B
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: 29: Lyon St N & Wellington St



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	793	1035	117	595	0	0	0	9	0	0	0
Future Volume (vph)	0	793	1035	117	595	0	0	0	9	0	0	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)		6.9	6.9	6.9	7.3				6.9			
Lane Util. Factor		1.00	0.88	1.00	0.95				1.00			
Frt		1.00	0.85	1.00	1.00				0.86			
Flt Protected		1.00	1.00	0.95	1.00				1.00			
Satd. Flow (prot)		1765	2640	1676	3353				1526			
Flt Permitted		1.00	1.00	0.95	1.00				1.00			
Satd. Flow (perm)		1765	2640	1676	3353				1526			
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	0	881	1150	130	661	0	0	0	10	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	8	0	0	0
Lane Group Flow (vph)	0	881	1150	130	661	0	0	0	2	0	0	0
Turn Type		NA	custom	Prot	NA				Perm			
Protected Phases		2	2 8	1	6						9	
Permitted Phases									8	9		
Actuated Green, G (s)		61.1	85.2	7.1	74.7				24.1			
Effective Green, g (s)		61.1	85.2	7.1	74.7				24.1			
Actuated g/C Ratio		0.47	0.66	0.05	0.57				0.19			
Clearance Time (s)		6.9		6.9	7.3				6.9			
Vehicle Extension (s)		3.0		3.0	3.0				3.0			
Lane Grp Cap (vph)		829	1730	91	1926				282			
v/s Ratio Prot		c0.50	c0.44	c0.08	0.20							
v/s Ratio Perm									0.00			
v/c Ratio		1.06	0.66	1.43	0.34				0.01			
Uniform Delay, d1		34.5	13.7	61.5	14.7				43.2			
Progression Factor		0.79	0.88	1.00	1.00				1.00			
Incremental Delay, d2		45.6	1.6	244.8	0.5				0.0			
Delay (s)		72.8	13.6	306.3	15.1				43.2			
Level of Service		E	B	F	B				D			
Approach Delay (s)		39.3			63.0			43.2			0.0	
Approach LOS		D			E			D			A	

Intersection Summary			
HCM 2000 Control Delay	45.9	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.89		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	27.8
Intersection Capacity Utilization	62.4%	ICU Level of Service	B
Analysis Period (min)	15		

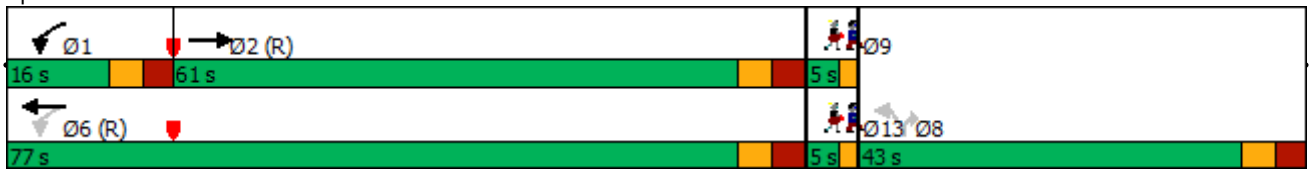
c Critical Lane Group

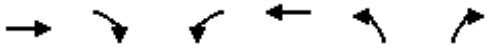
Lane Group	EBT	WBL	WBT	NBL	NBR	Ø9	Ø13
Lane Configurations							
Traffic Volume (vph)	506	300	873	5	8		
Future Volume (vph)	506	300	873	5	8		
Lane Group Flow (vph)	1100	333	970	6	9		
Turn Type	NA	pm+pt	NA	Perm	Perm		
Protected Phases	2	1	6			9	13
Permitted Phases		6		8	8		
Detector Phase	2	1	6	8	8		
Switch Phase							
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	1.0	1.0
Minimum Split (s)	31.8	11.2	31.8	29.3	29.3	3.0	3.0
Total Split (s)	61.0	16.0	77.0	43.0	43.0	5.0	5.0
Total Split (%)	48.8%	12.8%	61.6%	34.4%	34.4%	4%	4%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	2.0	2.0
All-Red Time (s)	3.5	2.9	3.5	3.0	3.0	0.0	0.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		
Total Lost Time (s)	6.8	6.2	6.8	6.3	6.3		
Lead/Lag	Lag	Lead					
Lead-Lag Optimize?	Yes	Yes					
Recall Mode	C-Max	None	C-Max	None	None	None	None
Act Effct Green (s)	72.7	113.3	116.8	6.4	6.4		
Actuated g/C Ratio	0.58	0.91	0.93	0.05	0.05		
v/c Ratio	0.58	0.52	0.31	0.07	0.12		
Control Delay	13.7	18.2	0.1	57.6	59.4		
Queue Delay	0.0	0.0	0.0	0.0	0.0		
Total Delay	13.7	18.2	0.1	57.6	59.4		
LOS	B	B	A	E	E		
Approach Delay	13.7		4.8	58.7			
Approach LOS	B		A	E			
Queue Length 50th (m)	53.4	47.4	0.0	1.5	2.3		
Queue Length 95th (m)	93.5	m23.8	m1.4	6.3	8.1		
Internal Link Dist (m)	195.9		296.6	186.4			
Turn Bay Length (m)		115.0					
Base Capacity (vph)	1909	644	3133	492	440		
Starvation Cap Reductn	0	0	0	0	0		
Spillback Cap Reductn	0	0	0	0	0		
Storage Cap Reductn	0	0	0	0	0		
Reduced v/c Ratio	0.58	0.52	0.31	0.01	0.02		

Intersection Summary	
Cycle Length: 125	
Actuated Cycle Length: 125	
Offset: 65 (52%), Referenced to phase 2:EBT and 6:WBTL, Start of Green	
Natural Cycle: 90	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.58	
Intersection Signal Delay: 9.2	Intersection LOS: A
Intersection Capacity Utilization 69.0%	ICU Level of Service C
Analysis Period (min) 15	

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

Splits and Phases: 4: Preston St & Albert St





Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	506	484	300	873	5	8
Future Volume (vph)	506	484	300	873	5	8
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Total Lost time (s)	6.8		6.2	6.8	6.3	6.3
Lane Util. Factor	0.95		1.00	0.95	1.00	1.00
Frt	0.93		1.00	1.00	1.00	0.85
Flt Protected	1.00		0.95	1.00	0.95	1.00
Satd. Flow (prot)	3107		1676	3353	1676	1500
Flt Permitted	1.00		0.17	1.00	0.95	1.00
Satd. Flow (perm)	3107		299	3353	1676	1500
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	562	538	333	970	6	9
RTOR Reduction (vph)	110	0	0	0	0	0
Lane Group Flow (vph)	990	0	333	970	6	9
Turn Type	NA		pm+pt	NA	Perm	Perm
Protected Phases	2		1	6		
Permitted Phases			6		8	8
Actuated Green, G (s)	68.9		109.0	109.0	2.9	2.9
Effective Green, g (s)	68.9		109.0	109.0	2.9	2.9
Actuated g/C Ratio	0.55		0.87	0.87	0.02	0.02
Clearance Time (s)	6.8		6.2	6.8	6.3	6.3
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	1712		634	2923	38	34
v/s Ratio Prot	c0.32		c0.14	0.29		
v/s Ratio Perm			0.32		0.00	c0.01
v/c Ratio	0.58		0.53	0.33	0.16	0.26
Uniform Delay, d1	18.5		11.9	1.4	59.9	60.0
Progression Factor	1.00		2.17	0.10	1.00	1.00
Incremental Delay, d2	1.4		0.1	0.0	1.9	4.1
Delay (s)	19.9		25.8	0.2	61.8	64.1
Level of Service	B		C	A	E	E
Approach Delay (s)	19.9			6.7	63.2	
Approach LOS	B			A	E	

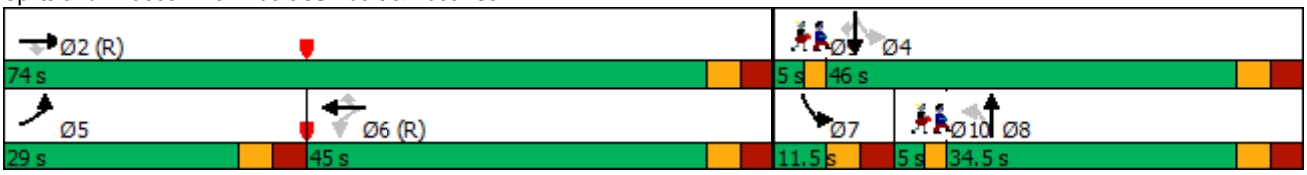
Intersection Summary			
HCM 2000 Control Delay	13.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	125.0	Sum of lost time (s)	21.3
Intersection Capacity Utilization	69.0%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR	Ø9
Lane Configurations												
Traffic Volume (vph)	379	553	25	35	963	109	14	359	43	321	180	
Future Volume (vph)	379	553	25	35	963	109	14	359	43	321	180	
Turn Type	Prot	NA	Perm	Perm	NA	Perm	Perm	NA	pm+pt	NA	Perm	
Protected Phases	5	2			6			8	7	4		9
Permitted Phases			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	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	1.0
Minimum Split (s)	11.5	36.5	36.5	36.5	36.5	36.5	34.5	34.5	11.5	34.5	34.5	5.0
Total Split (s)	29.0	74.0	74.0	45.0	45.0	45.0	34.5	34.5	11.5	46.0	46.0	5.0
Total Split (%)	23.2%	59.2%	59.2%	36.0%	36.0%	36.0%	27.6%	27.6%	9.2%	36.8%	36.8%	4%
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	2.0
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	0.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.5	6.5	6.5	6.5	6.5	6.5		6.5	6.5	6.5	6.5	
Lead/Lag	Lead			Lag	Lag	Lag			Lead			
Lead-Lag Optimize?	Yes			Yes	Yes	Yes			Yes			
Recall Mode	None	C-Max	C-Max	C-Max	C-Max	C-Max	Max	Max	None	Max	Max	Max
Act Effct Green (s)	22.5	67.5	67.5	38.5	38.5	38.5		28.0	44.5	39.5	39.5	
Actuated g/C Ratio	0.18	0.54	0.54	0.31	0.31	0.31		0.22	0.36	0.32	0.32	
v/c Ratio	1.40	0.64	0.03	0.17	1.04	0.22		0.65	0.24	0.64	0.33	
Control Delay	233.0	24.9	1.0	34.0	80.3	6.4		48.4	29.9	42.9	5.7	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	
Total Delay	233.0	24.9	1.0	34.0	80.3	6.4		48.4	29.9	42.9	5.7	
LOS	F	C	A	C	F	A		D	C	D	A	
Approach Delay		106.6			71.6			48.4		29.6		
Approach LOS		F			E			D		C		

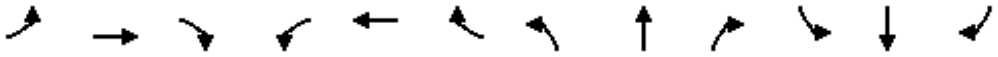
Intersection Summary	
Cycle Length: 125	
Actuated Cycle Length: 125	
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBTL, Start of Green	
Natural Cycle: 150	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 1.40	
Intersection Signal Delay: 72.0	Intersection LOS: E
Intersection Capacity Utilization 101.8%	ICU Level of Service G
Analysis Period (min) 15	

Splits and Phases: 5: Albert St/Albert & Booth St



Lane Group	Ø10
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Turn Type	
Protected Phases	10
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	1.0
Minimum Split (s)	5.0
Total Split (s)	5.0
Total Split (%)	4%
Yellow Time (s)	2.0
All-Red Time (s)	0.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	Lag
Lead-Lag Optimize?	Yes
Recall Mode	Max
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	

Intersection Summary



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	379	553	25	35	963	109	14	359	33	43	321	180
Future Volume (vph)	379	553	25	35	963	109	14	359	33	43	321	180
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	6.5	6.5	6.5	6.5	6.5	6.5		6.5		6.5	6.5	6.5
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	1.00		0.95		1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85		0.99		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		1.00		0.95	1.00	1.00
Satd. Flow (prot)	1676	1765	1500	1676	3353	1500		3306		1676	1765	1500
Flt Permitted	0.95	1.00	1.00	0.43	1.00	1.00		0.93		0.24	1.00	1.00
Satd. Flow (perm)	1676	1765	1500	763	3353	1500		3082		419	1765	1500
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	421	614	28	39	1070	121	16	399	37	48	357	200
RTOR Reduction (vph)	0	0	13	0	0	85	0	5	0	0	0	135
Lane Group Flow (vph)	421	614	15	39	1070	36	0	447	0	48	357	65
Turn Type	Prot	NA	Perm	Perm	NA	Perm	Perm	NA		pm+pt	NA	Perm
Protected Phases	5	2			6			8		7	4	
Permitted Phases			2	6		6	8			4		4
Actuated Green, G (s)	22.5	66.2	66.2	37.2	37.2	37.2		28.0		44.8	40.8	40.8
Effective Green, g (s)	22.5	66.2	66.2	37.2	37.2	37.2		28.0		44.8	40.8	40.8
Actuated g/C Ratio	0.18	0.53	0.53	0.30	0.30	0.30		0.22		0.36	0.33	0.33
Clearance Time (s)	6.5	6.5	6.5	6.5	6.5	6.5		6.5		6.5	6.5	6.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	301	934	794	227	997	446		690		190	576	489
v/s Ratio Prot	c0.25	0.35			c0.32					c0.01	c0.20	
v/s Ratio Perm			0.01	0.05		0.02		0.14		0.08		0.04
v/c Ratio	1.40	0.66	0.02	0.17	1.07	0.08		0.65		0.25	0.62	0.13
Uniform Delay, d1	51.2	21.2	14.0	32.5	43.9	31.6		44.0		28.4	35.6	29.7
Progression Factor	0.87	1.04	1.00	1.00	1.00	1.00		1.00		1.00	1.00	1.00
Incremental Delay, d2	197.8	3.5	0.0	1.6	50.3	0.4		4.6		0.7	5.0	0.6
Delay (s)	242.6	25.5	14.0	34.1	94.2	31.9		48.7		29.1	40.5	30.2
Level of Service	F	C	B	C	F	C		D		C	D	C
Approach Delay (s)		111.2			86.2			48.7			36.2	
Approach LOS		F			F			D			D	

Intersection Summary			
HCM 2000 Control Delay	80.0	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.00		
Actuated Cycle Length (s)	125.0	Sum of lost time (s)	28.0
Intersection Capacity Utilization	101.8%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	NBL	NBT	SBT	SBR
Lane Configurations					
Traffic Volume (vph)	750	5	8	25	1275
Future Volume (vph)	750	5	8	25	1275
Lane Group Flow (vph)	864	0	15	722	723
Turn Type	Perm	Perm	NA	NA	Perm
Protected Phases			4	2!	
Permitted Phases	6!	4			2
Detector Phase	6	4	4	2	2
Switch Phase					
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	29.1	39.3	39.3	29.1	29.1
Total Split (s)	80.6	39.4	39.4	80.6	80.6
Total Split (%)	67.2%	32.8%	32.8%	67.2%	67.2%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	3.8	3.0	3.0	3.8	3.8
Lost Time Adjust (s)	0.0		0.0	0.0	0.0
Total Lost Time (s)	7.1		6.3	7.1	7.1
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	Max	Max	Max	Max	Max
Act Effct Green (s)	73.5		33.1	73.5	73.5
Actuated g/C Ratio	0.61		0.28	0.61	0.61
v/c Ratio	0.43		0.04	0.63	0.63
Control Delay	13.0		32.4	3.8	3.5
Queue Delay	0.0		0.0	0.6	0.6
Total Delay	13.0		32.4	4.4	4.0
LOS	B		C	A	A
Approach Delay	13.0		32.4	4.2	
Approach LOS	B		C	A	
Queue Length 50th (m)	54.1		2.7	2.7	0.0
Queue Length 95th (m)	68.1		8.4	18.8	15.4
Internal Link Dist (m)	179.0		98.2	145.6	
Turn Bay Length (m)					
Base Capacity (vph)	1992		388	1147	1152
Starvation Cap Reductn	0		0	153	149
Spillback Cap Reductn	0		0	0	0
Storage Cap Reductn	0		0	0	0
Reduced v/c Ratio	0.43		0.04	0.73	0.72

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 87 (73%), Referenced to phase 2:SBT and 6:EBL, Start of Green	
Natural Cycle: 70	
Control Type: Pretimed	
Maximum v/c Ratio: 0.63	
Intersection Signal Delay: 7.7	Intersection LOS: A
Intersection Capacity Utilization 70.9%	ICU Level of Service C
Analysis Period (min) 15	

! Phase conflict between lane groups.

Splits and Phases: 6: Empress Ave & Albert

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	750	28	5	8	25	1275
Future Volume (vph)	750	28	5	8	25	1275
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Total Lost time (s)	7.1			6.3	7.1	7.1
Lane Util. Factor	0.97			1.00	0.95	0.95
Frt	0.99			1.00	0.86	0.85
Flt Protected	0.95			0.98	1.00	1.00
Satd. Flow (prot)	3249			1730	1435	1425
Flt Permitted	0.95			0.80	1.00	1.00
Satd. Flow (perm)	3249			1409	1435	1425
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	833	31	6	9	28	1417
RTOR Reduction (vph)	2	0	0	0	269	280
Lane Group Flow (vph)	862	0	0	15	453	443
Turn Type	Perm		Perm	NA	NA	Perm
Protected Phases				4	2!	
Permitted Phases	6!		4			2
Actuated Green, G (s)	73.5			33.1	73.5	73.5
Effective Green, g (s)	73.5			33.1	73.5	73.5
Actuated g/C Ratio	0.61			0.28	0.61	0.61
Clearance Time (s)	7.1			6.3	7.1	7.1
Lane Grp Cap (vph)	1990			388	878	872
v/s Ratio Prot					c0.32	
v/s Ratio Perm	0.27			c0.01		0.31
v/c Ratio	0.43			0.04	0.52	0.51
Uniform Delay, d1	12.3			31.8	13.2	13.1
Progression Factor	1.00			1.00	1.00	1.00
Incremental Delay, d2	0.7			0.2	2.2	2.1
Delay (s)	13.0			32.0	15.3	15.2
Level of Service	B			C	B	B
Approach Delay (s)	13.0			32.0	15.3	
Approach LOS	B			C	B	

Intersection Summary			
HCM 2000 Control Delay	14.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.37		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	13.4
Intersection Capacity Utilization	70.9%	ICU Level of Service	C
Analysis Period (min)	15		

! Phase conflict between lane groups.
c Critical Lane Group

Lane Group	NBR	SBL	SBT	Ø9
Lane Configurations				
Traffic Volume (vph)	744	167	1299	
Future Volume (vph)	744	167	1299	
Lane Group Flow (vph)	827	186	1443	
Turn Type	Perm	Perm	NA	
Protected Phases			6	9
Permitted Phases	2	6		
Detector Phase	2	6	6	
Switch Phase				
Minimum Initial (s)	5.0	5.0	5.0	5.0
Minimum Split (s)	24.3	29.0	29.0	11.3
Total Split (s)	53.7	53.7	53.7	11.3
Total Split (%)	82.6%	82.6%	82.6%	17%
Yellow Time (s)	3.3	3.3	3.3	3.3
All-Red Time (s)	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0	0.0	
Total Lost Time (s)	6.3	6.3	6.3	
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	Max	Max	Max	Max
Act Effct Green (s)	47.4	47.4	47.4	
Actuated g/C Ratio	0.73	0.73	0.73	
v/c Ratio	0.34	0.15	0.59	
Control Delay	0.4	0.7	5.4	
Queue Delay	0.0	0.0	0.0	
Total Delay	0.4	0.7	5.4	
LOS	A	A	A	
Approach Delay			4.9	
Approach LOS			A	
Queue Length 50th (m)	0.0	0.0	34.3	
Queue Length 95th (m)	0.0	3.7	47.6	
Internal Link Dist (m)			93.1	
Turn Bay Length (m)		50.0		
Base Capacity (vph)	2445	1272	2445	
Starvation Cap Reductn	0	0	0	
Spillback Cap Reductn	0	0	0	
Storage Cap Reductn	0	0	0	
Reduced v/c Ratio	0.34	0.15	0.59	

Intersection Summary	
Cycle Length: 65	
Actuated Cycle Length: 65	
Offset: 0 (0%), Referenced to phase 2:NBR and 6:SBTL, Start of Green	
Natural Cycle: 45	
Control Type: Pretimed	
Maximum v/c Ratio: 0.59	
Intersection Signal Delay: 3.4	Intersection LOS: A
Intersection Capacity Utilization 47.7%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 7: ALBERT & SLATER

Movement	NBT	NBR	SBL	SBT	SWL	SWR
Lane Configurations						
Traffic Volume (vph)	0	744	167	1299	0	0
Future Volume (vph)	0	744	167	1299	0	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Total Lost time (s)		6.3	6.3	6.3		
Lane Util. Factor		0.88	1.00	0.95		
Frt		0.85	1.00	1.00		
Flt Protected		1.00	0.95	1.00		
Satd. Flow (prot)		2640	1676	3353		
Flt Permitted		1.00	0.95	1.00		
Satd. Flow (perm)		2640	1676	3353		
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	0	827	186	1443	0	0
RTOR Reduction (vph)	0	224	50	0	0	0
Lane Group Flow (vph)	0	603	136	1443	0	0
Turn Type		Perm	Perm	NA		
Protected Phases				6		
Permitted Phases		2	6			
Actuated Green, G (s)		47.4	47.4	47.4		
Effective Green, g (s)		47.4	47.4	47.4		
Actuated g/C Ratio		0.73	0.73	0.73		
Clearance Time (s)		6.3	6.3	6.3		
Lane Grp Cap (vph)		1925	1222	2445		
v/s Ratio Prot				c0.43		
v/s Ratio Perm		0.23	0.08			
v/c Ratio		0.31	0.11	0.59		
Uniform Delay, d1		3.1	2.6	4.2		
Progression Factor		1.00	1.00	1.00		
Incremental Delay, d2		0.4	0.2	1.1		
Delay (s)		3.5	2.8	5.2		
Level of Service		A	A	A		
Approach Delay (s)	3.5			5.0	0.0	
Approach LOS	A			A	A	

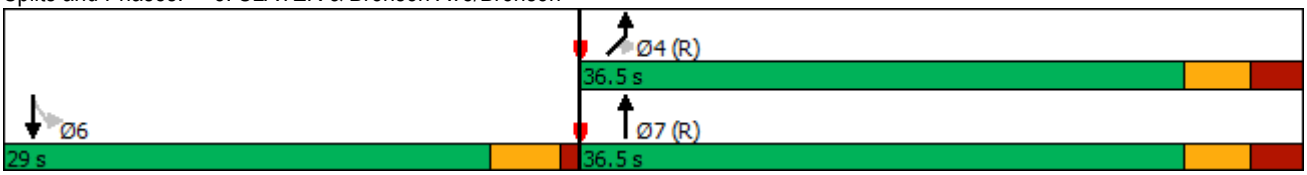
Intersection Summary			
HCM 2000 Control Delay	4.5	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.53		
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	12.6
Intersection Capacity Utilization	47.7%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	NBT	SBL	SBT	NEL	NER
Lane Configurations					
Traffic Volume (vph)	421	41	370	112	657
Future Volume (vph)	421	41	370	112	657
Lane Group Flow (vph)	629	0	457	518	510
Turn Type	NA	Perm	NA	Prot	Perm
Protected Phases	7!		6	4!	
Permitted Phases		6			4!
Detector Phase	7	6	6	4	4
Switch Phase					
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	24.2	22.5	22.5	12.0	12.0
Total Split (s)	36.5	29.0	29.0	36.5	36.5
Total Split (%)	55.7%	44.3%	44.3%	55.7%	55.7%
Yellow Time (s)	3.3	3.5	3.5	3.3	3.3
All-Red Time (s)	2.7	1.0	1.0	2.7	2.7
Lost Time Adjust (s)	0.0		0.0	0.0	0.0
Total Lost Time (s)	6.0		4.5	6.0	6.0
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	Max	Max	Max	Max	Max
Act Effct Green (s)	30.5		24.5	30.5	30.5
Actuated g/C Ratio	0.47		0.37	0.47	0.47
v/c Ratio	0.40		0.62	0.72	0.74
Control Delay	10.5		21.0	21.3	20.8
Queue Delay	0.0		0.4	0.0	0.0
Total Delay	10.5		21.5	21.3	20.8
LOS	B		C	C	C
Approach Delay	10.5		21.5	21.1	
Approach LOS	B		C	C	
Queue Length 50th (m)	21.6		24.3	50.3	47.1
Queue Length 95th (m)	33.3		39.1	86.2	#91.3
Internal Link Dist (m)	290.7		50.9	105.6	
Turn Bay Length (m)					
Base Capacity (vph)	1554		743	719	691
Starvation Cap Reductn	0		62	2	0
Spillback Cap Reductn	0		0	0	0
Storage Cap Reductn	0		0	0	0
Reduced v/c Ratio	0.40		0.67	0.72	0.74

Intersection Summary	
Cycle Length: 65.5	
Actuated Cycle Length: 65.5	
Offset: 2 (3%), Referenced to phase 4:NEL and 7:NBT, Start of Green	
Natural Cycle: 55	
Control Type: Pretimed	
Maximum v/c Ratio: 0.74	
Intersection Signal Delay: 18.0	Intersection LOS: B
Intersection Capacity Utilization 78.4%	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.
! Phase conflict between lane groups.

Splits and Phases: 8: SLATER & Bronson Ave/Bronson



Movement	WBL	WBR	NBL	NBT	NBR	SBL	SBT	SBR	NEL	NER	NER2
Lane Configurations											
Traffic Volume (vph)	0	0	0	421	145	41	370	0	112	657	157
Future Volume (vph)	0	0	0	421	145	41	370	0	112	657	157
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)				6.0			4.5		6.0	6.0	
Lane Util. Factor				0.95			0.95		1.00	0.95	
Frt				0.96			1.00		0.89	0.85	
Flt Protected				1.00			0.99		0.99	1.00	
Satd. Flow (prot)				3224			3336		1545	1425	
Flt Permitted				1.00			0.59		0.99	1.00	
Satd. Flow (perm)				3224			1989		1545	1425	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	0	0	0	468	161	46	411	0	124	730	174
RTOR Reduction (vph)	0	0	0	52	0	0	0	0	0	28	0
Lane Group Flow (vph)	0	0	0	577	0	0	457	0	518	482	0
Turn Type				NA		Perm	NA		Prot	Perm	
Protected Phases				7!			6		4!		
Permitted Phases						6				4!	
Actuated Green, G (s)				30.5			24.5		30.5	30.5	
Effective Green, g (s)				30.5			24.5		30.5	30.5	
Actuated g/C Ratio				0.47			0.37		0.47	0.47	
Clearance Time (s)				6.0			4.5		6.0	6.0	
Lane Grp Cap (vph)				1501			743		719	663	
v/s Ratio Prot				0.18					0.34		
v/s Ratio Perm							c0.23			c0.34	
v/c Ratio				0.38			0.62		0.72	0.73	
Uniform Delay, d1				11.4			16.7		14.1	14.1	
Progression Factor				1.00			1.00		1.00	1.00	
Incremental Delay, d2				0.7			3.8		6.2	6.8	
Delay (s)				12.1			20.5		20.2	21.0	
Level of Service				B			C		C	C	
Approach Delay (s)	0.0			12.1			20.5		20.6		
Approach LOS	A			B			C		C		

Intersection Summary			
HCM 2000 Control Delay	18.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	65.5	Sum of lost time (s)	10.5
Intersection Capacity Utilization	78.4%	ICU Level of Service	D
Analysis Period (min)	15		

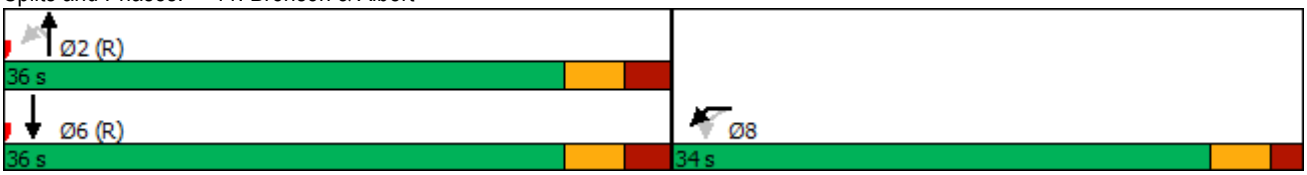
! Phase conflict between lane groups.
c Critical Lane Group

Lane Group	WBL2	WBL	NBL	NBT	SBT
Lane Configurations					
Traffic Volume (vph)	321	1185	393	130	90
Future Volume (vph)	321	1185	393	130	90
Lane Group Flow (vph)	357	1320	437	144	150
Turn Type	Perm	Prot	Perm	NA	NA
Protected Phases		8		2	6
Permitted Phases	8		2		
Detector Phase	8	8	2	2	6
Switch Phase					
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	26.1	26.1	27.9	27.9	23.9
Total Split (s)	34.0	34.0	36.0	36.0	36.0
Total Split (%)	48.6%	48.6%	51.4%	51.4%	51.4%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	1.8	1.8	2.6	2.6	2.6
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.1	5.1	5.9	5.9	5.9
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	Max	Max	Max	Max	Max
Act Effct Green (s)	28.9	28.9	30.1	30.1	30.1
Actuated g/C Ratio	0.41	0.41	0.43	0.43	0.43
v/c Ratio	0.52	0.96	0.87	0.19	0.20
Control Delay	18.7	38.0	39.3	13.3	12.2
Queue Delay	0.0	0.0	50.5	0.0	0.0
Total Delay	18.7	38.0	89.8	13.3	12.2
LOS	B	D	F	B	B
Approach Delay		33.9		70.8	12.2
Approach LOS		C		E	B
Queue Length 50th (m)	35.4	85.8	52.7	11.8	11.2
Queue Length 95th (m)	59.1	#133.1	#107.1	22.7	22.2
Internal Link Dist (m)		177.9		50.9	46.8
Turn Bay Length (m)	50.0	50.0			
Base Capacity (vph)	691	1371	502	758	732
Starvation Cap Reductn	0	0	110	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.52	0.96	1.11	0.19	0.20

Intersection Summary	
Cycle Length: 70	
Actuated Cycle Length: 70	
Offset: 14 (20%), Referenced to phase 2:NBTL and 6:SBT, Start of Green	
Natural Cycle: 70	
Control Type: Pretimed	
Maximum v/c Ratio: 0.96	
Intersection Signal Delay: 41.4	Intersection LOS: D
Intersection Capacity Utilization 80.7%	ICU Level of Service D
Analysis Period (min) 15	

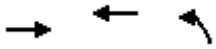
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 11: Bronson & Albert



Movement	WBL2	WBL	WBR	NBL	NBT	NBR	SBL	SBT	SBR	NEL	NER
Lane Configurations											
Traffic Volume (vph)	321	1185	3	393	130	0	0	90	45	0	0
Future Volume (vph)	321	1185	3	393	130	0	0	90	45	0	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	5.1	5.1		5.9	5.9			5.9			
Lane Util. Factor	1.00	0.97		1.00	1.00			1.00			
Frt	1.00	1.00		1.00	1.00			0.95			
Flt Protected	0.95	0.95		0.95	1.00			1.00			
Satd. Flow (prot)	1676	3260		1676	1765			1685			
Flt Permitted	0.95	0.95		0.66	1.00			1.00			
Satd. Flow (perm)	1676	3260		1168	1765			1685			
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	357	1317	3	437	144	0	0	100	50	0	0
RTOR Reduction (vph)	0	26	0	0	0	0	0	8	0	0	0
Lane Group Flow (vph)	357	1294	0	437	144	0	0	142	0	0	0
Turn Type	Perm	Prot		Perm	NA			NA			
Protected Phases		8			2			6			
Permitted Phases	8			2							
Actuated Green, G (s)	28.9	28.9		30.1	30.1			30.1			
Effective Green, g (s)	28.9	28.9		30.1	30.1			30.1			
Actuated g/C Ratio	0.41	0.41		0.43	0.43			0.43			
Clearance Time (s)	5.1	5.1		5.9	5.9			5.9			
Lane Grp Cap (vph)	691	1345		502	758			724			
v/s Ratio Prot		c0.40			0.08			0.08			
v/s Ratio Perm	0.21			c0.37							
v/c Ratio	0.52	0.96		0.87	0.19			0.20			
Uniform Delay, d1	15.3	20.0		18.2	12.4			12.4			
Progression Factor	1.00	1.00		1.00	1.00			1.00			
Incremental Delay, d2	2.7	17.0		18.3	0.6			0.6			
Delay (s)	18.1	37.0		36.5	12.9			13.0			
Level of Service	B	D		D	B			B			
Approach Delay (s)		32.9			30.7			13.0		0.0	
Approach LOS		C			C			B		A	

Intersection Summary			
HCM 2000 Control Delay	31.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.91		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	80.7%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

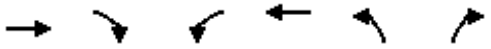


Lane Group	EBT	WBT	NBL
Lane Configurations			
Traffic Volume (vph)	976	1364	868
Future Volume (vph)	976	1364	868
Lane Group Flow (vph)	1084	1516	1008
Turn Type	NA	NA	Prot
Protected Phases	4	8	2
Permitted Phases			
Detector Phase	4	8	2
Switch Phase			
Minimum Initial (s)	5.0	5.0	5.0
Minimum Split (s)	36.7	23.7	26.9
Total Split (s)	80.0	80.0	40.0
Total Split (%)	66.7%	66.7%	33.3%
Yellow Time (s)	3.3	3.3	3.3
All-Red Time (s)	2.4	2.4	2.6
Lost Time Adjust (s)	0.0	0.0	0.0
Total Lost Time (s)	5.7	5.7	5.9
Lead/Lag			
Lead-Lag Optimize?			
Recall Mode	None	None	C-Max
Act Effct Green (s)	68.5	68.5	39.9
Actuated g/C Ratio	0.57	0.57	0.33
v/c Ratio	0.39	0.79	0.94
Control Delay	14.4	45.5	55.8
Queue Delay	0.0	48.6	0.0
Total Delay	14.4	94.1	55.8
LOS	B	F	E
Approach Delay	14.4	94.1	55.8
Approach LOS	B	F	E
Queue Length 50th (m)	50.0	190.6	126.8
Queue Length 95th (m)	54.1	196.7	#187.2
Internal Link Dist (m)	74.9	134.0	213.7
Turn Bay Length (m)			
Base Capacity (vph)	2983	2076	1077
Starvation Cap Reductn	0	815	0
Spillback Cap Reductn	114	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.38	1.20	0.94

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 25 (21%), Referenced to phase 2:NBL and 6:, Start of Green	
Natural Cycle: 80	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.94	
Intersection Signal Delay: 59.5	Intersection LOS: E
Intersection Capacity Utilization 76.9%	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: 13: Bay St & Wellington



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	976	0	0	1364	868	40
Future Volume (vph)	976	0	0	1364	868	40
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Total Lost time (s)	5.7			5.7	5.9	
Lane Util. Factor	0.91			0.95	0.97	
Frt	1.00			1.00	0.99	
Flt Protected	1.00			1.00	0.95	
Satd. Flow (prot)	4818			3353	3246	
Flt Permitted	1.00			1.00	0.95	
Satd. Flow (perm)	4818			3353	3246	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	1084	0	0	1516	964	44
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	1084	0	0	1516	1008	0
Turn Type	NA			NA	Prot	
Protected Phases	4			8	2	
Permitted Phases						
Actuated Green, G (s)	68.5			68.5	39.9	
Effective Green, g (s)	68.5			68.5	39.9	
Actuated g/C Ratio	0.57			0.57	0.33	
Clearance Time (s)	5.7			5.7	5.9	
Vehicle Extension (s)	3.0			3.0	3.0	
Lane Grp Cap (vph)	2750			1914	1079	
v/s Ratio Prot	0.23			c0.45	c0.31	
v/s Ratio Perm						
v/c Ratio	0.39			0.79	0.93	
Uniform Delay, d1	14.3			20.2	38.8	
Progression Factor	1.00			2.14	1.00	
Incremental Delay, d2	0.1			2.0	15.5	
Delay (s)	14.4			45.2	54.3	
Level of Service	B			D	D	
Approach Delay (s)	14.4			45.2	54.3	
Approach LOS	B			D	D	

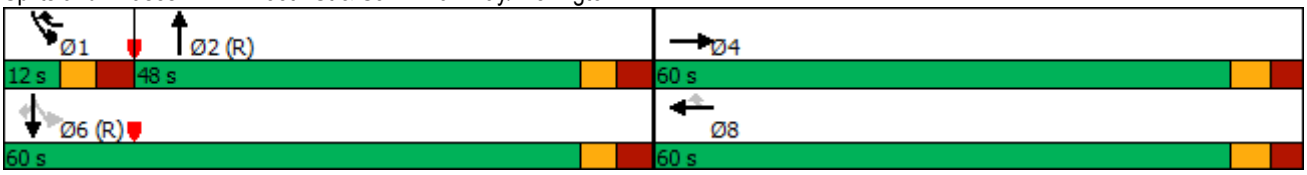
Intersection Summary			
HCM 2000 Control Delay	38.5	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	11.6
Intersection Capacity Utilization	76.9%	ICU Level of Service	D
Analysis Period (min)	15		

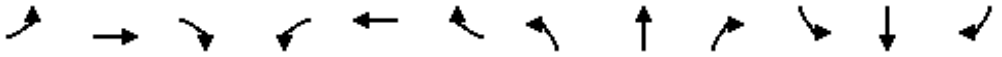
c Critical Lane Group

Lane Group	EBT	WBT	WBR	NBT	SBL	SBT	SBR
Lane Configurations							
Traffic Volume (vph)	1091	1230	259	1019	63	792	291
Future Volume (vph)	1091	1230	259	1019	63	792	291
Turn Type	NA	NA	pm+ov	NA	pm+pt	NA	Perm
Protected Phases	4	8	1	2	1	6	
Permitted Phases			8		6		6
Detector Phase	4	8	1	2	1	6	6
Switch Phase							
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	40.8	40.8	11.8	37.8	11.8	37.9	37.9
Total Split (s)	60.0	60.0	12.0	48.0	12.0	60.0	60.0
Total Split (%)	50.0%	50.0%	10.0%	40.0%	10.0%	50.0%	50.0%
Yellow Time (s)	3.7	3.7	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	3.1	3.1	3.5	3.5	3.5	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)	6.8	6.8	6.8	6.8	6.8	6.8	6.8
Lead/Lag			Lead	Lag	Lead		
Lead-Lag Optimize?			Yes	Yes	Yes		
Recall Mode	None	None	None	C-Max	None	C-Max	C-Max
Act Effct Green (s)	52.2	52.2	64.5	41.9	54.2	54.2	54.2
Actuated g/C Ratio	0.44	0.44	0.54	0.35	0.45	0.45	0.45
v/c Ratio	0.83	0.94	0.36	1.07	0.52	0.58	0.46
Control Delay	35.9	45.3	17.3	85.0	33.5	26.6	23.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	35.9	45.3	17.3	85.0	33.5	26.6	23.1
LOS	D	D	B	F	C	C	C
Approach Delay	35.9	40.4		85.0		26.1	
Approach LOS	D	D		F		C	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 3 (3%), Referenced to phase 2:NBT and 6:SBTL, Start of Green	
Natural Cycle: 115	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 1.07	
Intersection Signal Delay: 46.3	Intersection LOS: D
Intersection Capacity Utilization 90.2%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 14: Booth St & SJAM Parkway/Wellington





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	1091	0	0	1230	259	0	1019	100	63	792	291
Future Volume (vph)	0	1091	0	0	1230	259	0	1019	100	63	792	291
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)		6.8			6.8	6.8		6.8		6.8	6.8	6.8
Lane Util. Factor		0.95			0.95	1.00		0.95		1.00	0.95	1.00
Frt		1.00			1.00	0.85		0.99		1.00	1.00	0.85
Flt Protected		1.00			1.00	1.00		1.00		0.95	1.00	1.00
Satd. Flow (prot)		3353			3353	1500		3308		1676	3353	1500
Flt Permitted		1.00			1.00	1.00		1.00		0.08	1.00	1.00
Satd. Flow (perm)		3353			3353	1500		3308		145	3353	1500
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	0	1212	0	0	1367	288	0	1132	111	70	880	323
RTOR Reduction (vph)	0	0	0	0	0	0	0	6	0	0	0	19
Lane Group Flow (vph)	0	1212	0	0	1367	288	0	1237	0	70	880	304
Turn Type		NA			NA	pm+ov		NA		pm+pt	NA	Perm
Protected Phases		4			8	1		2		1	6	
Permitted Phases						8				6		6
Actuated Green, G (s)		52.2			52.2	57.7		41.9		54.2	54.2	54.2
Effective Green, g (s)		52.2			52.2	57.7		41.9		54.2	54.2	54.2
Actuated g/C Ratio		0.44			0.44	0.48		0.35		0.45	0.45	0.45
Clearance Time (s)		6.8			6.8	6.8		6.8		6.8	6.8	6.8
Vehicle Extension (s)		3.0			3.0	3.0		3.0		3.0	3.0	3.0
Lane Grp Cap (vph)		1458			1458	806		1155		135	1514	677
v/s Ratio Prot		0.36			c0.41	0.02		c0.37		0.02	c0.26	
v/s Ratio Perm						0.18				0.21		0.20
v/c Ratio		0.83			0.94	0.36		1.07		0.52	0.58	0.45
Uniform Delay, d1		30.0			32.3	19.5		39.0		27.5	24.5	22.6
Progression Factor		1.00			1.00	1.00		1.00		1.00	1.00	1.00
Incremental Delay, d2		4.2			11.6	0.3		47.7		3.3	1.6	2.1
Delay (s)		34.2			44.0	19.8		86.8		30.8	26.1	24.8
Level of Service		C			D	B		F		C	C	C
Approach Delay (s)		34.2			39.8			86.8			26.0	
Approach LOS		C			D			F			C	

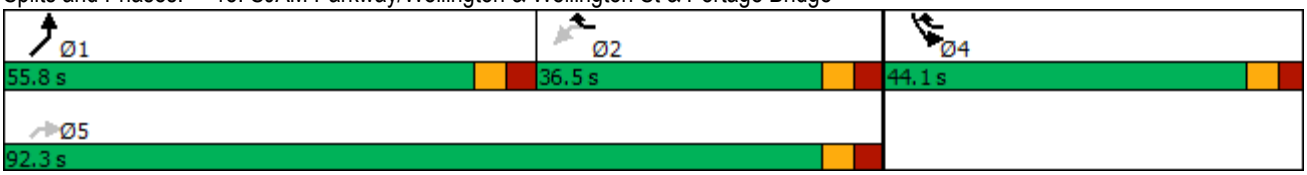
Intersection Summary			
HCM 2000 Control Delay	46.1	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.00		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	20.4
Intersection Capacity Utilization	90.2%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	WBL	WBR	SBL	SBR	NEL	NER
Lane Configurations						
Traffic Volume (vph)	869	250	860	230	644	1526
Future Volume (vph)	869	250	860	230	644	1526
Turn Type	Perm	pt+ov	Prot	Free	Prot	Perm
Protected Phases		2 4	4		1	
Permitted Phases	2			Free		5
Detector Phase	2	2 4	4		1	5
Switch Phase						
Minimum Initial (s)	5.0		5.0		5.0	5.0
Minimum Split (s)	26.5		44.1		43.5	24.5
Total Split (s)	36.5		44.1		55.8	92.3
Total Split (%)	26.8%		32.3%		40.9%	67.7%
Yellow Time (s)	3.3		3.3		3.3	3.3
All-Red Time (s)	3.2		2.8		3.2	3.2
Lost Time Adjust (s)	0.0		0.0		0.0	0.0
Total Lost Time (s)	6.5		6.1		6.5	6.5
Lead/Lag	Lag				Lead	
Lead-Lag Optimize?	Yes				Yes	
Recall Mode	None		Max		None	None
Act Effct Green (s)	30.6	74.9	38.1	119.2	31.3	68.4
Actuated g/C Ratio	0.26	0.63	0.32	1.00	0.26	0.57
v/c Ratio	1.15	0.16	0.92	0.17	0.84	0.86
Control Delay	121.8	5.4	54.3	0.2	51.2	26.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	121.8	5.4	54.3	0.2	51.2	26.3
LOS	F	A	D	A	D	C
Approach Delay	95.8		42.8		33.7	
Approach LOS	F		D		C	

Intersection Summary	
Cycle Length: 136.4	
Actuated Cycle Length: 119.2	
Natural Cycle: 135	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 1.15	
Intersection Signal Delay: 51.8	Intersection LOS: D
Intersection Capacity Utilization 87.4%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 15: SJAM Parkway/Wellington & Wellington St & Portage Bridge



Movement	WBL	WBR	SBL	SBR	NEL	NER
Lane Configurations						
Traffic Volume (vph)	869	250	860	230	644	1526
Future Volume (vph)	869	250	860	230	644	1526
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Total Lost time (s)	6.5	6.5	6.1	4.0	6.5	6.5
Lane Util. Factor	0.97	0.88	0.97	1.00	0.97	0.76
Frt	1.00	0.85	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	3252	2640	3252	1500	3252	3420
Flt Permitted	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	3269	2640	3252	1500	3252	3420
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	966	278	956	256	716	1696
RTOR Reduction (vph)	0	50	0	0	0	9
Lane Group Flow (vph)	966	228	956	256	716	1687
Turn Type	Perm	pt+ov	Prot	Free	Prot	Perm
Protected Phases		2 4	4		1	
Permitted Phases	2			Free		5
Actuated Green, G (s)	30.7	75.3	38.1	119.2	31.3	68.5
Effective Green, g (s)	30.7	75.3	38.1	119.2	31.3	68.5
Actuated g/C Ratio	0.26	0.63	0.32	1.00	0.26	0.57
Clearance Time (s)	6.5		6.1		6.5	6.5
Vehicle Extension (s)	3.0		3.0		3.0	3.0
Lane Grp Cap (vph)	841	1667	1039	1500	853	1965
v/s Ratio Prot		0.09	c0.29		0.22	
v/s Ratio Perm	c0.30			0.17		c0.49
v/c Ratio	1.15	0.14	0.92	0.17	0.84	0.86
Uniform Delay, d1	44.2	8.8	39.1	0.0	41.6	21.3
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	80.6	0.0	14.3	0.2	7.3	4.0
Delay (s)	124.9	8.9	53.4	0.2	48.9	25.2
Level of Service	F	A	D	A	D	C
Approach Delay (s)	98.9		42.1		32.3	
Approach LOS	F		D		C	

Intersection Summary			
HCM 2000 Control Delay	51.8	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.00		
Actuated Cycle Length (s)	119.2	Sum of lost time (s)	19.1
Intersection Capacity Utilization	87.4%	ICU Level of Service	E
Analysis Period (min)	15		

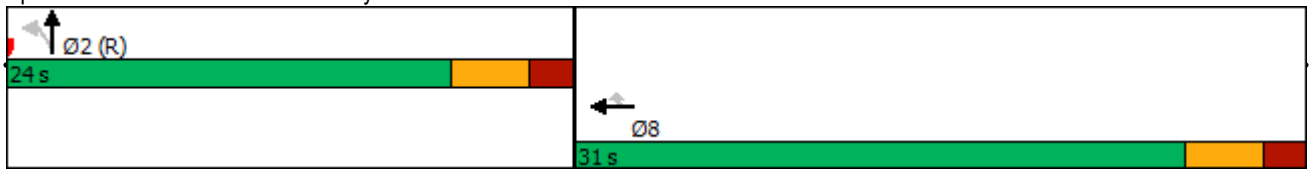
c Critical Lane Group

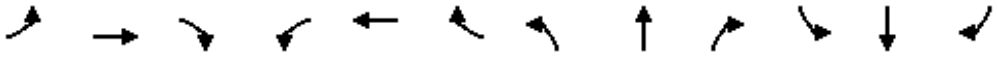
Lane Group	WBT	WBR	NBT
Lane Configurations			
Traffic Volume (vph)	636	472	369
Future Volume (vph)	636	472	369
Lane Group Flow (vph)	707	524	767
Turn Type	NA	Perm	NA
Protected Phases	8		2
Permitted Phases		8	
Detector Phase	8	8	2
Switch Phase			
Minimum Initial (s)	5.0	5.0	5.0
Minimum Split (s)	23.2	23.2	23.2
Total Split (s)	31.0	31.0	24.0
Total Split (%)	56.4%	56.4%	43.6%
Yellow Time (s)	3.3	3.3	3.3
All-Red Time (s)	1.9	1.9	1.9
Lost Time Adjust (s)	0.0	0.0	0.0
Total Lost Time (s)	5.2	5.2	5.2
Lead/Lag			
Lead-Lag Optimize?			
Recall Mode	None	None	C-Max
Act Effct Green (s)	20.2	20.2	24.4
Actuated g/C Ratio	0.37	0.37	0.44
v/c Ratio	0.57	0.76	0.50
Control Delay	15.3	15.2	15.4
Queue Delay	0.0	0.0	0.5
Total Delay	15.3	15.2	15.9
LOS	B	B	B
Approach Delay	15.2		15.9
Approach LOS	B		B
Queue Length 50th (m)	30.0	24.3	25.1
Queue Length 95th (m)	36.2	47.1	m45.2
Internal Link Dist (m)	133.2		48.0
Turn Bay Length (m)		50.0	
Base Capacity (vph)	1572	824	1537
Starvation Cap Reductn	0	0	368
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.45	0.64	0.66

Intersection Summary	
Cycle Length: 55	
Actuated Cycle Length: 55	
Offset: 26 (47%), Referenced to phase 2:NBTL and 6:, Start of Green	
Natural Cycle: 55	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.76	
Intersection Signal Delay: 15.5	Intersection LOS: B
Intersection Capacity Utilization 60.1%	ICU Level of Service B
Analysis Period (min) 15	

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

Splits and Phases: 20: Albert & Bay St





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	0	636	472	321	369	0	0	0	0
Future Volume (vph)	0	0	0	0	636	472	321	369	0	0	0	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)					5.2	5.2		5.2				
Lane Util. Factor					0.95	1.00		0.95				
Frt					1.00	0.85		1.00				
Flt Protected					1.00	1.00		0.98				
Satd. Flow (prot)					3353	1500		3277				
Flt Permitted					1.00	1.00		0.98				
Satd. Flow (perm)					3353	1500		3277				
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	0	0	0	0	707	524	357	410	0	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	144	0	83	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	707	380	0	684	0	0	0	0
Turn Type					NA	Perm	Perm	NA				
Protected Phases					8			2				
Permitted Phases						8	2					
Actuated Green, G (s)					20.2	20.2		24.4				
Effective Green, g (s)					20.2	20.2		24.4				
Actuated g/C Ratio					0.37	0.37		0.44				
Clearance Time (s)					5.2	5.2		5.2				
Vehicle Extension (s)					3.0	3.0		3.0				
Lane Grp Cap (vph)					1231	550		1453				
v/s Ratio Prot					0.21							
v/s Ratio Perm						c0.25		0.21				
v/c Ratio					0.57	0.69		0.47				
Uniform Delay, d1					14.0	14.7		10.8				
Progression Factor					1.00	1.00		1.47				
Incremental Delay, d2					0.7	3.7		0.7				
Delay (s)					14.6	18.5		16.5				
Level of Service					B	B		B				
Approach Delay (s)		0.0			16.3			16.5			0.0	
Approach LOS		A			B			B			A	

Intersection Summary			
HCM 2000 Control Delay	16.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	55.0	Sum of lost time (s)	10.4
Intersection Capacity Utilization	60.1%	ICU Level of Service	B
Analysis Period (min)	15		

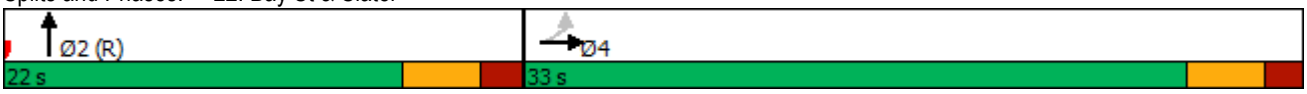
c Critical Lane Group

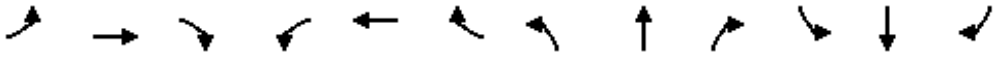
Lane Group	EBT	NBT
Lane Configurations		
Traffic Volume (vph)	650	556
Future Volume (vph)	650	556
Lane Group Flow (vph)	871	672
Turn Type	NA	NA
Protected Phases	4	2
Permitted Phases		
Detector Phase	4	2
Switch Phase		
Minimum Initial (s)	5.0	5.0
Minimum Split (s)	35.0	19.0
Total Split (s)	33.0	22.0
Total Split (%)	60.0%	40.0%
Yellow Time (s)	3.3	3.3
All-Red Time (s)	1.7	1.9
Lost Time Adjust (s)	0.0	0.0
Total Lost Time (s)	5.0	5.2
Lead/Lag		
Lead-Lag Optimize?		
Recall Mode	None	C-Max
Act Effct Green (s)	20.1	24.7
Actuated g/C Ratio	0.37	0.45
v/c Ratio	0.69	0.85
Control Delay	16.2	30.7
Queue Delay	0.1	0.0
Total Delay	16.3	30.7
LOS	B	C
Approach Delay	16.3	30.7
Approach LOS	B	C
Queue Length 50th (m)	36.3	58.2
Queue Length 95th (m)	43.3	#141.5
Internal Link Dist (m)	195.9	236.7
Turn Bay Length (m)		
Base Capacity (vph)	1724	787
Starvation Cap Reductn	0	0
Spillback Cap Reductn	132	0
Storage Cap Reductn	0	0
Reduced v/c Ratio	0.55	0.85

Intersection Summary	
Cycle Length: 55	
Actuated Cycle Length: 55	
Offset: 39 (71%), Referenced to phase 2:NBT and 6:, Start of Green	
Natural Cycle: 70	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.85	
Intersection Signal Delay: 22.6	Intersection LOS: C
Intersection Capacity Utilization 65.6%	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: 22: Bay St & Slater

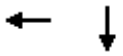




Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	134	650	0	0	0	0	0	556	49	0	0	0
Future Volume (vph)	134	650	0	0	0	0	0	556	49	0	0	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)		5.0						5.2				
Lane Util. Factor		0.95						1.00				
Frt		1.00						0.99				
Flt Protected		0.99						1.00				
Satd. Flow (prot)		3325						1746				
Flt Permitted		0.99						1.00				
Satd. Flow (perm)		3325						1746				
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	149	722	0	0	0	0	0	618	54	0	0	0
RTOR Reduction (vph)	0	41	0	0	0	0	0	4	0	0	0	0
Lane Group Flow (vph)	0	830	0	0	0	0	0	668	0	0	0	0
Turn Type	Perm	NA						NA				
Protected Phases		4						2				
Permitted Phases	4											
Actuated Green, G (s)		20.1						24.7				
Effective Green, g (s)		20.1						24.7				
Actuated g/C Ratio		0.37						0.45				
Clearance Time (s)		5.0						5.2				
Vehicle Extension (s)		3.0						3.0				
Lane Grp Cap (vph)		1215						784				
v/s Ratio Prot								c0.38				
v/s Ratio Perm		0.25										
v/c Ratio		0.68						0.85				
Uniform Delay, d1		14.8						13.5				
Progression Factor		1.00						1.00				
Incremental Delay, d2		1.6						11.3				
Delay (s)		16.4						24.8				
Level of Service		B						C				
Approach Delay (s)		16.4			0.0			24.8			0.0	
Approach LOS		B			A			C			A	

Intersection Summary			
HCM 2000 Control Delay	20.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	55.0	Sum of lost time (s)	10.2
Intersection Capacity Utilization	65.6%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group



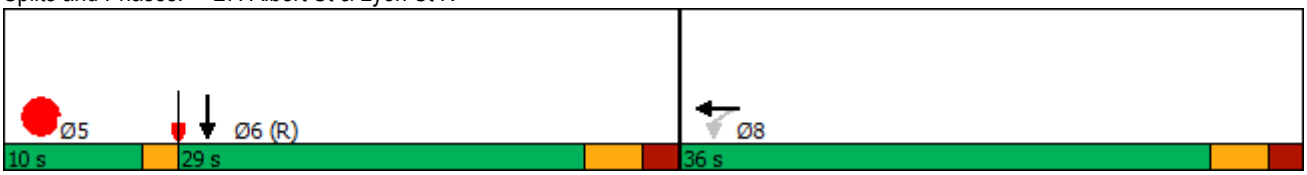
Lane Group	WBT	SBT	Ø5
Lane Configurations			
Traffic Volume (vph)	1073	755	
Future Volume (vph)	1073	755	
Lane Group Flow (vph)	1462	878	
Turn Type	NA	NA	
Protected Phases	8	6	5
Permitted Phases			
Detector Phase	8	6	
Switch Phase			
Minimum Initial (s)	5.0	5.0	5.0
Minimum Split (s)	23.4	23.5	10.0
Total Split (s)	36.0	29.0	10.0
Total Split (%)	48.0%	38.7%	13%
Yellow Time (s)	3.3	3.3	2.0
All-Red Time (s)	2.1	2.2	0.0
Lost Time Adjust (s)	0.0	0.0	
Total Lost Time (s)	5.4	5.5	
Lead/Lag		Lag	Lead
Lead-Lag Optimize?		Yes	Yes
Recall Mode	None	C-Max	Max
Act Effct Green (s)	30.6	23.5	
Actuated g/C Ratio	0.41	0.31	
v/c Ratio	1.05	0.58	
Control Delay	61.1	23.3	
Queue Delay	0.0	0.0	
Total Delay	61.1	23.3	
LOS	E	C	
Approach Delay	61.1	23.3	
Approach LOS	E	C	
Queue Length 50th (m)	~124.0	39.3	
Queue Length 95th (m)	#166.1	51.9	
Internal Link Dist (m)	197.0	214.4	
Turn Bay Length (m)			
Base Capacity (vph)	1394	1505	
Starvation Cap Reductn	0	0	
Spillback Cap Reductn	0	0	
Storage Cap Reductn	0	0	
Reduced v/c Ratio	1.05	0.58	

Intersection Summary	
Cycle Length: 75	
Actuated Cycle Length: 75	
Offset: 0 (0%), Referenced to phase 2: and 6:SBT, Start of Green	
Natural Cycle: 75	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 1.05	
Intersection Signal Delay: 46.9	Intersection LOS: D
Intersection Capacity Utilization 64.1%	ICU Level of Service C
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: 27: Albert St & Lyon St N



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	243	1073	0	0	0	0	0	755	35
Future Volume (vph)	0	0	0	243	1073	0	0	0	0	0	755	35
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)					5.4						5.5	
Lane Util. Factor					0.95						0.91	
Frt					1.00						0.99	
Flt Protected					0.99						1.00	
Satd. Flow (prot)					3322						4786	
Flt Permitted					0.99						1.00	
Satd. Flow (perm)					3322						4786	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	0	0	0	270	1192	0	0	0	0	0	839	39
RTOR Reduction (vph)	0	0	0	0	38	0	0	0	0	0	7	0
Lane Group Flow (vph)	0	0	0	0	1424	0	0	0	0	0	871	0
Turn Type				Perm	NA						NA	
Protected Phases					8						6	
Permitted Phases				8								
Actuated Green, G (s)					30.6						23.5	
Effective Green, g (s)					30.6						23.5	
Actuated g/C Ratio					0.41						0.31	
Clearance Time (s)					5.4						5.5	
Vehicle Extension (s)					3.0						3.0	
Lane Grp Cap (vph)					1355						1499	
v/s Ratio Prot											c0.18	
v/s Ratio Perm					0.43							
v/c Ratio					1.05						0.58	
Uniform Delay, d1					22.2						21.6	
Progression Factor					1.00						1.00	
Incremental Delay, d2					38.9						1.7	
Delay (s)					61.1						23.3	
Level of Service					E						C	
Approach Delay (s)		0.0			61.1			0.0			23.3	
Approach LOS		A			E			A			C	

Intersection Summary			
HCM 2000 Control Delay	46.9	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	12.9
Intersection Capacity Utilization	64.1%	ICU Level of Service	C
Analysis Period (min)	15		

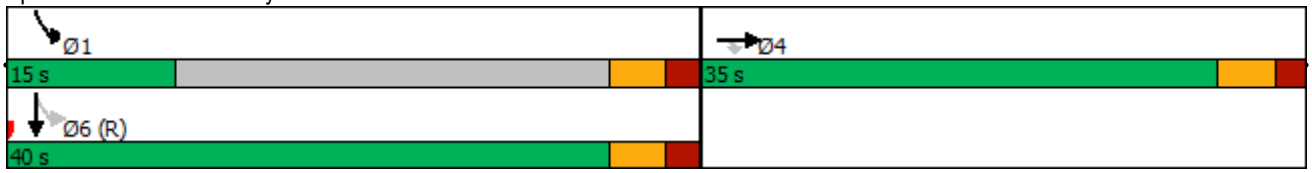
c Critical Lane Group

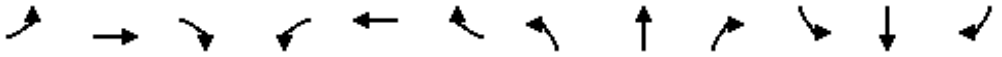
Lane Group	EBT	EBR	SBL	SBT
Lane Configurations				
Traffic Volume (vph)	531	178	211	814
Future Volume (vph)	531	178	211	814
Lane Group Flow (vph)	590	198	234	904
Turn Type	NA	Perm	pm+pt	NA
Protected Phases	4		1	6
Permitted Phases		4	6	
Detector Phase	4	4	1	6
Switch Phase				
Minimum Initial (s)	5.0	5.0	5.0	5.0
Minimum Split (s)	21.2	21.2	10.3	29.3
Total Split (s)	35.0	35.0	15.0	40.0
Total Split (%)	46.7%	46.7%	20.0%	53.3%
Yellow Time (s)	3.3	3.3	3.3	3.3
All-Red Time (s)	1.9	1.9	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.2	5.2	5.3	5.3
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	None	None	None	C-Max
Act Effct Green (s)	19.4	19.4	45.1	45.1
Actuated g/C Ratio	0.26	0.26	0.60	0.60
v/c Ratio	0.68	0.44	0.22	0.45
Control Delay	28.7	15.9	0.8	5.1
Queue Delay	0.0	0.0	0.4	0.2
Total Delay	28.7	15.9	1.1	5.4
LOS	C	B	A	A
Approach Delay	25.5			4.5
Approach LOS	C			A
Queue Length 50th (m)	41.4	14.0	0.0	16.5
Queue Length 95th (m)	52.4	28.7	m2.0	m19.7
Internal Link Dist (m)	132.9			47.5
Turn Bay Length (m)		50.0		
Base Capacity (vph)	1332	644	1069	2016
Starvation Cap Reductn	0	0	437	437
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.44	0.31	0.37	0.57

Intersection Summary	
Cycle Length: 75	
Actuated Cycle Length: 75	
Offset: 4 (5%), Referenced to phase 2: and 6:SBTL, Start of Green	
Natural Cycle: 55	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.68	
Intersection Signal Delay: 13.1	Intersection LOS: B
Intersection Capacity Utilization 64.1%	ICU Level of Service C
Analysis Period (min) 15	

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

Splits and Phases: 28: Lyon St N & Slater St





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	531	178	0	0	0	0	0	0	211	814	0
Future Volume (vph)	0	531	178	0	0	0	0	0	0	211	814	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)		5.2	5.2							5.3	5.3	
Lane Util. Factor		0.95	1.00							1.00	0.95	
Frt		1.00	0.85							1.00	1.00	
Flt Protected		1.00	1.00							0.95	1.00	
Satd. Flow (prot)		3353	1500							1676	3353	
Flt Permitted		1.00	1.00							0.95	1.00	
Satd. Flow (perm)		3353	1500							1676	3353	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	0	590	198	0	0	0	0	0	0	234	904	0
RTOR Reduction (vph)	0	0	60	0	0	0	0	0	0	62	0	0
Lane Group Flow (vph)	0	590	138	0	0	0	0	0	0	172	904	0
Turn Type		NA	Perm							pm+pt	NA	
Protected Phases		4								1	6	
Permitted Phases			4							6		
Actuated Green, G (s)		19.4	19.4							45.1	45.1	
Effective Green, g (s)		19.4	19.4							45.1	45.1	
Actuated g/C Ratio		0.26	0.26							0.60	0.60	
Clearance Time (s)		5.2	5.2							5.3	5.3	
Vehicle Extension (s)		3.0	3.0							3.0	3.0	
Lane Grp Cap (vph)		867	388							1007	2016	
v/s Ratio Prot		c0.18								0.10	c0.27	
v/s Ratio Perm			0.09									
v/c Ratio		0.68	0.36							0.17	0.45	
Uniform Delay, d1		25.0	22.7							6.6	8.2	
Progression Factor		1.00	1.00							0.14	0.51	
Incremental Delay, d2		2.2	0.6							0.1	0.5	
Delay (s)		27.2	23.3							1.0	4.7	
Level of Service		C	C							A	A	
Approach Delay (s)		26.2			0.0			0.0			3.9	
Approach LOS		C			A			A			A	

Intersection Summary			
HCM 2000 Control Delay	13.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	10.5
Intersection Capacity Utilization	64.1%	ICU Level of Service	C
Analysis Period (min)	15		

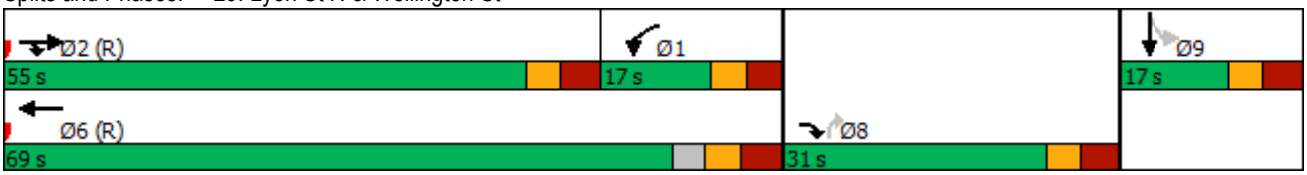
c Critical Lane Group

Lane Group	EBT	EBR	WBL	WBT	NBR	Ø9
Lane Configurations						
Traffic Volume (vph)	417	569	114	1114	19	
Future Volume (vph)	417	569	114	1114	19	
Lane Group Flow (vph)	463	632	127	1238	21	
Turn Type	NA	custom	Prot	NA	Perm	
Protected Phases	2	2 8	1	6		9
Permitted Phases					8	
Detector Phase	2	2 8	1	6	8	
Switch Phase						
Minimum Initial (s)	5.0		5.0	5.0	5.0	5.0
Minimum Split (s)	31.0		11.9	25.3	31.0	25.1
Total Split (s)	55.0		17.0	69.0	31.0	17.0
Total Split (%)	45.8%		14.2%	57.5%	25.8%	14%
Yellow Time (s)	3.3		3.3	3.3	3.3	3.3
All-Red Time (s)	3.6		3.6	4.0	3.6	3.8
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	
Total Lost Time (s)	6.9		6.9	7.3	6.9	
Lead/Lag	Lead		Lag			
Lead-Lag Optimize?	Yes		Yes			
Recall Mode	C-Max		None	C-Max	Max	Max
Act Effct Green (s)	48.1	72.2	10.1	64.7	24.1	
Actuated g/C Ratio	0.40	0.60	0.08	0.54	0.20	
v/c Ratio	0.65	0.40	0.90	0.69	0.03	
Control Delay	41.0	4.2	108.0	22.7	0.1	
Queue Delay	11.9	0.0	0.0	49.3	0.0	
Total Delay	52.9	4.2	108.0	71.9	0.1	
LOS	D	A	F	E	A	
Approach Delay	24.8			75.3		
Approach LOS	C			E		
Queue Length 50th (m)	119.4	17.8	31.8	113.1	0.0	
Queue Length 95th (m)	m154.5	m23.2	#69.9	138.7	0.0	
Internal Link Dist (m)	134.0			168.5		
Turn Bay Length (m)						
Base Capacity (vph)	707	1588	141	1807	695	
Starvation Cap Reductn	220	0	0	0	0	
Spillback Cap Reductn	0	0	0	718	0	
Storage Cap Reductn	0	0	0	0	0	
Reduced v/c Ratio	0.95	0.40	0.90	1.14	0.03	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Green	
Natural Cycle: 100	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.90	
Intersection Signal Delay: 52.4	Intersection LOS: D
Intersection Capacity Utilization 41.3%	ICU Level of Service A
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: 29: Lyon St N & Wellington St



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	417	569	114	1114	0	0	0	19	0	0	0
Future Volume (vph)	0	417	569	114	1114	0	0	0	19	0	0	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)		6.9	6.9	6.9	7.3				6.9			
Lane Util. Factor		1.00	0.88	1.00	0.95				1.00			
Frt		1.00	0.85	1.00	1.00				0.86			
Flt Protected		1.00	1.00	0.95	1.00				1.00			
Satd. Flow (prot)		1765	2640	1676	3353				1526			
Flt Permitted		1.00	1.00	0.95	1.00				1.00			
Satd. Flow (perm)		1765	2640	1676	3353				1526			
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	0	463	632	127	1238	0	0	0	21	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	17	0	0	0
Lane Group Flow (vph)	0	463	632	127	1238	0	0	0	4	0	0	0
Turn Type		NA	custom	Prot	NA				Perm			
Protected Phases		2	2 8	1	6						9	
Permitted Phases									8	9		
Actuated Green, G (s)		48.1	72.2	10.1	64.7				24.1			
Effective Green, g (s)		48.1	72.2	10.1	64.7				24.1			
Actuated g/C Ratio		0.40	0.60	0.08	0.54				0.20			
Clearance Time (s)		6.9		6.9	7.3				6.9			
Vehicle Extension (s)		3.0		3.0	3.0				3.0			
Lane Grp Cap (vph)		707	1588	141	1807				306			
v/s Ratio Prot		0.26	c0.24	c0.08	c0.37							
v/s Ratio Perm									0.00			
v/c Ratio		0.65	0.40	0.90	0.69				0.01			
Uniform Delay, d1		29.2	12.5	54.5	20.2				38.4			
Progression Factor		1.22	0.54	1.00	1.00				1.00			
Incremental Delay, d2		4.4	0.7	47.3	2.1				0.1			
Delay (s)		40.1	7.5	101.7	22.3				38.5			
Level of Service		D	A	F	C				D			
Approach Delay (s)		21.3			29.7			38.5			0.0	
Approach LOS		C			C			D			A	

Intersection Summary			
HCM 2000 Control Delay	26.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	27.8
Intersection Capacity Utilization	41.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group