TYLin

To:	**Mike Giampa, City of Ottawa**	**From:**	**Amar Lad, TYLin**
		Date:	**October 18, 2022**
Address:	**110 Laurier Avenue West, Ottawa, ON, K1P 1J1**	**CC:**	**Dream Asset Management**
Re:	**TIA Step 5 - Transportation Impact Assessment Submission LeBreton Flats Library Parcel, City of Ottawa TYLin Ref. 10399**		

MEMORANDUM

TYLin International Canada Inc. was retained by Dream Asset Management for transportation planning and engineering services with regards to the Official Plan and Zoning By-law Amendment and Site Plan Control Application for the development of the LeBreton Flats Library Parcel in the City of Ottawa.

Following the City of Ottawa's Transportation Impact Assessment (TIA) Guidelines, dated June 2017, a TIA Screening & Scoping Report was submitted to the city on March 21, 2022, and two weeks later direction was received to proceed to Step 3 of the TIA process. Subsequently, a TIA Forecasting Report was submitted to the city on May 9th, 2022, and comments were received to proceed to Step 4: Analysis of the study, which was submitted to the city on July 22nd, 2022. Following direction to proceed to Step 5, this memorandum presents the complete TIA Final Report, inclusive of the following modules:

1. TIA Report
    a. Screening & Scoping Report
    b. Forecasting Report
    c. Analysis Report
2. Drawings
3. Monitoring Plan

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Steps 1 & 2: Screening and Scoping Report

1. Screening Form

The following section is based upon Appendix B: TIA Screening Form, extracted from the city's Transportation Impact Assessment (TIA) Guidelines.

1.1. Description of the Proposed Development

A summary of the proposed development is provided in **Table 1-1**, below.

Table 1-1 Description of Proposed Development

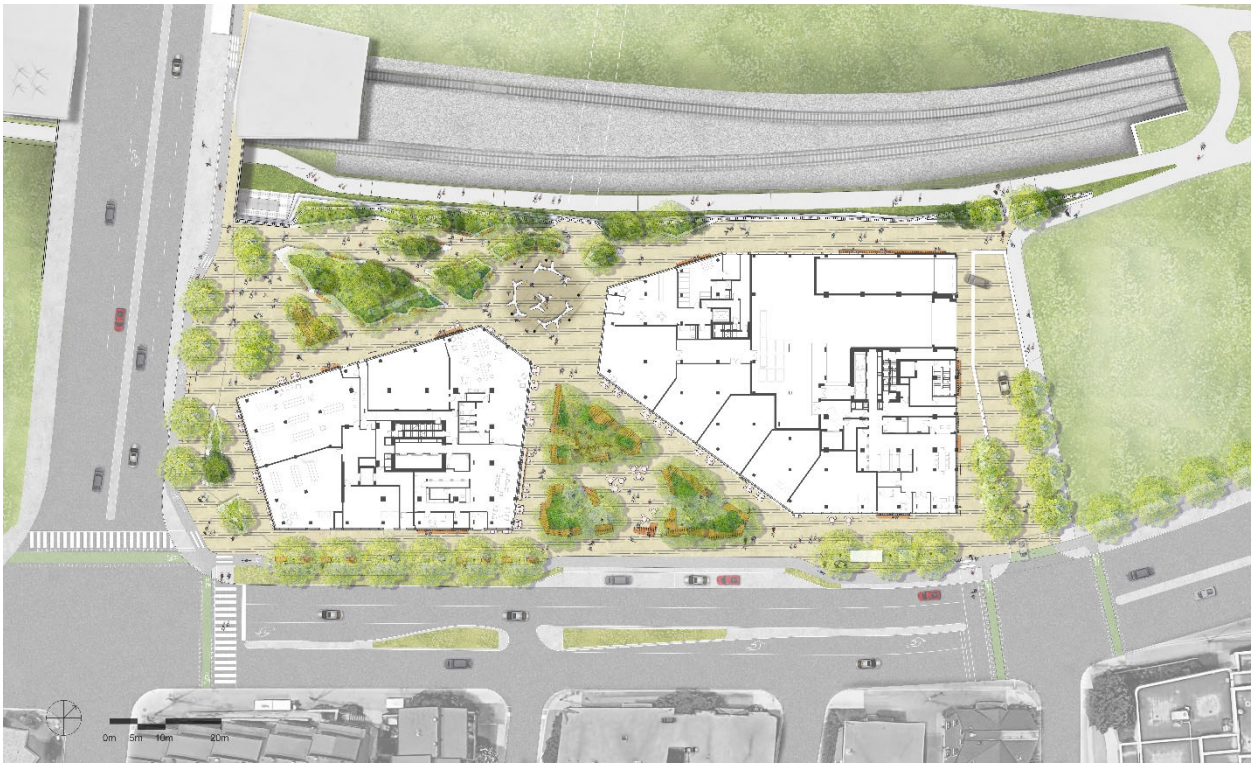
Municipal Address	665 Albert Street, Ottawa, ON
Description of Location	The Library Parcel at 665 Albert Street is within the Albert Street Character Area within the Pimisi Station and LeBreton Flats District of the West Downtown Core Secondary Plan. The subject site, situated at the north-east corner of the intersection of Albert Street and Booth Street is currently undeveloped and positioned adjacent to the Pimisi O-Train station.
Land Use Classification	665 Albert Street is classified as part of the "Mixed-Use Downtown Zone" by zoning code MD[2509] H(83)-h.
Development Size (units)	608 residential units are proposed, inclusive of: - 133 multifaith housing initiative units, - 118 Dream affordable housing units, and - 357 Dream market housing units The West Building is proposed to be 36 storeys housing 335 residential units, and the East Building is proposed to be 31 storeys housing 273 residential units.
Development Size (m2)	The Gross Building Area is proposed to be 64,595.92 m^2.
Number of Accesses and Locations	The development is proposed to include one (1) full-moves vehicular access from the southeast corner of the subject site at the intersection of Albert Street and Empress Avenue North. The proposed access leads to the loading area and underground parking entrance located at the northeast corner of the East Podium.
Phase of Development	To expedite the availability of affordable housing to the Ottawa community, Dream intends to construct the full development all at once – two towers with a shared underground parking structure. Moreover, Dream will work closely with EllisDon to implement a phased occupancy program for the residential

	units to further accelerate the availability of affordable and market residential units. Accordingly, the West Tower is planned to be completed in September 2025 and the East Tower in January 2026.
Buildout Year	The TIA will assume build-out and full occupancy of the development by 2027.

A rendering of the proposed development is illustrated in Figure 1-1 and a ground floor plan extracted from the development's NCC Application is provided in Figure 1-2 below.

Figure 1-1 LeBreton Flats Library Development Rendering

Figure 1-2 Ground Floor Plan



1.2. Trip Generation Triggers

Table 1-2 presents the TIA Guideline's Trip Generation Trigger checks, based on the development type and size.

Table 1-2 Trip Generation Triggers

Land Use Type	Minimum Development Size
Single-family homes	40 units
Townhomes or apartments	90 units
Office	3,500 m2
Industrial	5,000 m2
Fast-food restaurant or coffee shop	100 m2
Destination retail	1,000 m2
Gas station or convenience market	75 m2

Based on the proposed development's type and size, as detailed in the previous section, the Trip Generation Trigger is satisfied.

1.3. Location Triggers

Table 1-3 presents the TIA Guideline's Location Trigger chart, based on the development location.

Table 1-3 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	

Based on the above, the Location Trigger is satisfied.

1.4. Safety Triggers

Table 1-4 presents the TIA Guideline's Safety Trigger chart, based on the development location.

Table 1-4 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

Based on the above, the Safety Trigger is satisfied.

1.5. Summary

As detailed above, all three (3) triggers are satisfied, confirming that the TIA Study must include the next stage, namely the Scoping Report.

2. Scoping Report

The following section details the proposed development context, existing and planned transportation network conditions, study area and time periods, and possible study exemptions, in compliance with "Step 2: Scoping" of the City of Ottawa's TIA Guidelines.

2.1. Existing and Planned Conditions

Proposed Development

Permitted Land Use Provisions

665 Albert Street is classified under the zoning by-law as part of the "Mixed-Use Downtown Zone" by zoning code MD[2509] H(83)-h (Mixed-Use Downtown Zone, Urban Exception 2509, maximum height of 83 metres, subject to holding symbol (-h) as per conditions in exception 2509). Residential uses are not currently permitted on the lot under the MD Zone, as stated in Section 193 (8), as follows:

Section 193 (8) (a) Despite the list of permitted residential uses, where the zoning on a lot is accompanied by an H suffix, schedule or exception that restricts building height to less than 30m or to fewer than ten storeys on the entire lot, the use Apartment Dwelling, High Rise is a prohibited use on that lot. (By-law 2015-192)

Accordingly, the developer is seeking a Zoning By-law Amendment to permit the proposed mixed-use high-rise development. It is noted that in the "Meeting Minutes and Comments" from the December 17, 2021, confidential pre-consultation meeting with the City of Ottawa and Dream, it is stated that the proposed mixed-use development is generally in accordance with the city's policy and zoning.

Relevant planning regulations

The following policies are deemed to be relevant for the proposed development. The OP regulations are extracted from the City of Ottawa's New Official Plan (Council approved) based on the anticipated timing of the development.

- The Plan for Canada's Capital 2017-2067 (2017)
- Canada's Capital Core Area Sector Plan (2005)
- LeBreton Flats Master Concept Plan (2021)
- Capital Illumination Plan 2017-2027 (2017)
- Capital Pathway Strategic Plan (2020)
- City of Ottawa Official Plan
    - Schedule A – Transect Policy Areas
        - Downtown Core Transect
        - Pimisi Station and Rapid Transit Corridor
    - Schedule B1 – Downtown Core Transect

        - Albert Street is a Major Corridor
        - Booth Street is a Minor Corridor
        - LeBreton is within the "HUB" and an evolving neighbourhood overlay.
    - Schedule C1 – Protected Major Transit Station Area
    - Schedule C3
        - Albert Street active transportation pathways adjacent to the site
    - Schedule C6-A – subject site is within the designated area for foreground height control. View analysis is required.
- Secondary Plan – LeBreton Flats Character Area
    - Library District / LeBreton Flats – clear wayfinding and pedestrian connections will be required to link spaces between anchor points.
    - The Library Parcel at 665 Albert Street is within the Albert Street Character Area (shown in Schedule J of the Secondary Plan) within the Pimisi Station and LeBreton Flats District of the West Downtown Core Secondary Plan.
    - The following Albert Corridor Character Area policies are relevant to the site:
        - The east end of the Albert Corridor Character Area will stitch together the historic downtown core with the expanded core that will develop westwards into the remainder of LeBreton Flats.
        - The Albert Corridor is characterized by a mix of forms and uses, and may include a mix of residential, commercial, and institutional buildings, with a focus on retail and commercial uses at grade.
    - Schedule P – Pimisi Station and LeBreton Flats District – Mobility Network.

Development size and location on site

The proposed development will consist of two towers sitting atop stepped four storey podiums surrounded by public plazas with seating, shade, and open space. The west building is situated towards the southwest corner of the site, creating a public plaza between the building and the Pimisi O-Train Station. The east building is aligned with Empress Avenue and the east side fronts a proposed driveway to service the underground parking and loading areas.

The Gross Building Area will be approximately 64,595.92 m^2, inclusive of both towers, podiums, and shared underground parking space.

Figure 2-1, below, illustrates the proposed development plan. The development proposes a total of 608 residential units across both buildings. The West Building is proposed to be 36 storeys housing 335 residential units, and the East Building is proposed to be 31 storeys housing 273 residential units.

The 608 units are proposed to come in a diverse range of unit types, including 133 multifaith housing initiative units (69 1-bed, 54 2-bed, and 10 3-bed), 118 Dream affordable housing units (44 1-bed, 70 2-bed, and 4 3-bed), and 357 Dream market housing units (15 studio, 218 1-bed, 122 2-bed, and 2 3-bed).

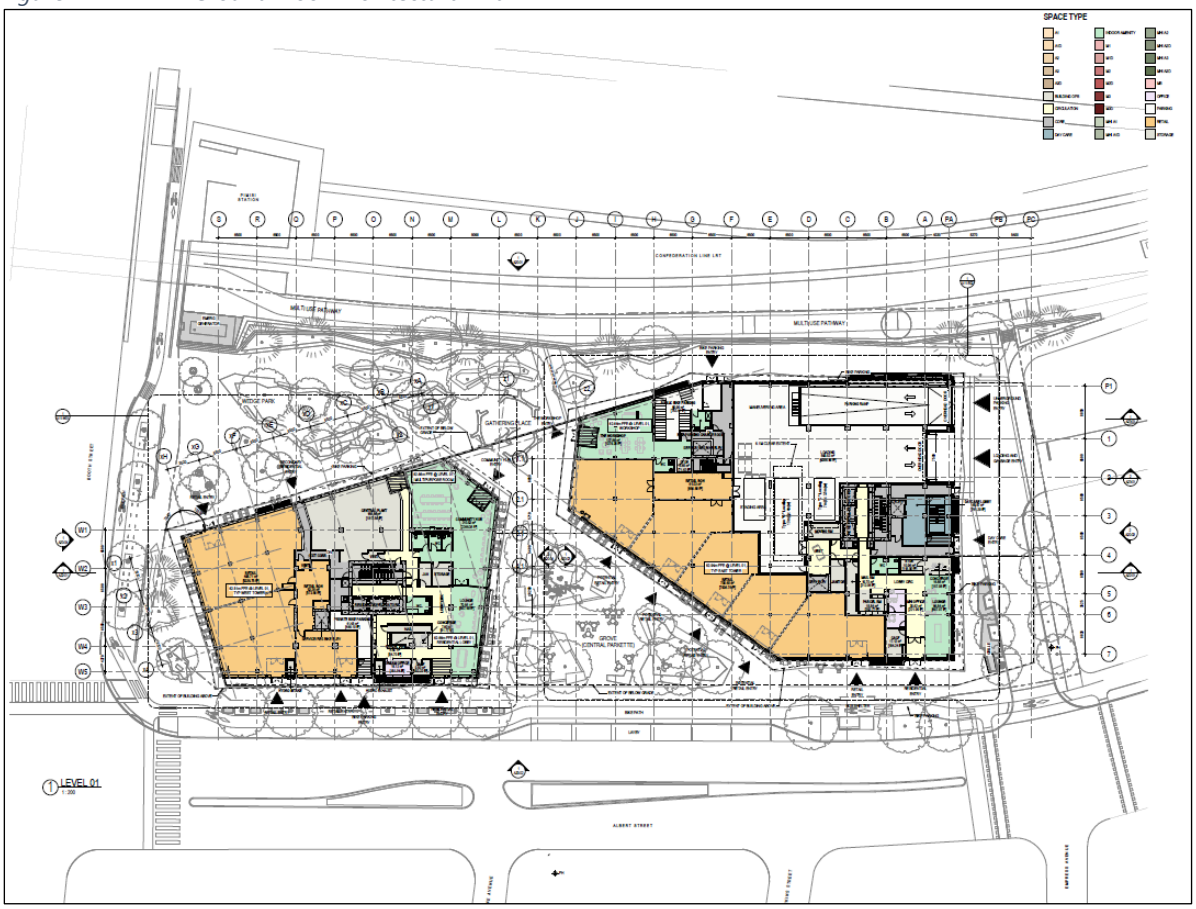
Estimated date of occupancy
The construction of both proposed towers is anticipated to be completed by Q1 2026. Accordingly, full development occupancy is anticipated by 2027.

Planned phasing of development
As stated above, to expedite the availability of affordable housing to the Ottawa community, Dream intends to construct the full development all at once – two towers with a shared underground parking structure. Moreover, Dream will work closely with EllisDon to implement a phased occupancy program for the residential units to further accelerate the availability of affordable and market residential units. Accordingly, the West Tower is planned to be completed in September 2025 and the East Tower in January 2026.

Number of parking spaces
206 vehicle parking spaces will be provided for future residents, visitors, and commercial patrons to the site. In addition, 756 bicycle parking spaces will be provided within the underground parking level and multiple podium levels for residents, and within the east and west public spaces for visitors.

Access points for all modes
The development is proposed to include one (1) full-moves vehicular access from the southeast corner of the subject site at the *signalized* intersection of Albert Street and Empress Avenue North. As the entrance is currently signalized, turns and access will be restricted to the appropriate signal phases, ensuring safety for all road users. The proposed access leads to the loading area and underground parking entrance located at the northeast corner of the East Podium. The driveway and associated facilities are illustrated on the right side of the ground floor architectural plan below.

Figure 2-1 Ground Floor Architectural Plan



Existing Conditions

Existing Study Area Roads

The study area boundary roadways are described as follows:

Albert Street is an east-west arterial roadway with a 7-lane multi-modal urban cross-section in front of the subject site, inclusive of dedicated eastbound/westbound left turn lanes, westbound right turn lane, westbound bus lane, and two general purpose travel lanes in each direction. A multi-use pathway is provided along the north side of the road for cyclists and an additional sidewalk on the south side for pedestrians. Directly east of Empress Avenue North, Albert Street splits into two eastbound roads; Albert Street and Slater Street. Albert Street has a posted speed limit of 50 km/hr in the study area and is under the jurisdiction of the City of Ottawa.

Booth Street is a north-south arterial roadway, from Albert Street to the provincial boundary, and a Major Collector Road south of Albert Street. Booth Street has a four-lane urban cross-section north of Albert Street, with a centre median and additional left and right turn lanes at the intersection with Albert Street. Wide boulevards are provided on each side to support active

transportation to the rapid transit station, with distinct materials for pedestrian and cyclist pathways. Booth Street is a two-lane collector road south of Albert Street, with an additional left turn lane provided at the intersection. Booth Street has a posted speed limit of 50 km/hr in the study area and is under the jurisdiction of the City of Ottawa.

Slater Street is an east-west arterial roadway with two eastbound lanes between Empress Avenue and Bronson Avenue, within the study area. Slater Street does not have a posted speed limit within the study area; however, it is presumed to maintain the 50 km/hr limit set on Albert Street. Slater Street is under the jurisdiction of the City of Ottawa.

Bronson Avenue is a north-south arterial roadway with several lane configurations within the study area. Bronson Avenue begins as an extension of Sparks Street, as a single southbound lane to Queen Street. From Queen Street to Albert Street, there is one lane in each direction; southbound travel is forced to turn right onto Albert Street (which is one way westbound) or right onto Queen Street if travelling northbound. Bronson Avenue is converted into two northbound lanes between Slater Street and Albert Street, before evolving into a four-lane urban cross-section south of Slater Street, which it maintains through the city. Bronson Avenue does not have a posted speed limit within the study area; however, it is presumed to maintain the 50 km/hr limit set on surrounding roadways. Bronson Avenue is under the jurisdiction of the City of Ottawa.

Sir John A. Macdonald Parkway/Wellington Street is a Federally owned road west of Booth Street, and a municipal arterial road east of Booth Street. Sir John A. Macdonald Parkway (west of Booth) has a four-lane urban cross section, with a centre median, two travel lanes in each direction, and bike lanes. Side sidewalks are provided on both sides within the study area to support pedestrian travel. On-street parking is also permitted on both sides of the road in designated areas. Sir John A. Macdonald Parkway has a posted speed limit of 60 km/h and is under the jurisdiction of the Government of Canada. Wellington Street (east of Booth) maintains the same lane configuration and speed limit within the study area and provides designated tour bus parking lane on both sides of the street.

Empress Avenue North is a local road with a two-lane urban cross section and sidewalks on both sides of the street. Empress Avenue terminates for vehicles as a dead end 95 metres south of Albert Street, however pedestrians can continue up a flight of stairs to connect with the southern portion of the roadway at a higher elevation. Empress Avenue does not have a posted speed limit and is under the jurisdiction of the City of Ottawa.

Existing Intersections

Albert Street at Booth Street is an existing signalized intersection with dedicated left-turn lanes for all directions and dedicated westbound and southbound right turn lanes.

Slater Street at Bronson Avenue is an existing signalized intersection with five roadways converging together. Commissioner Street merges into Bronson Avenue south of Slater Street, while Bronson maintains only northbound lanes north of Slater. Slater Street is a one-way eastbound road, requiring westbound turning restrictions at the intersection. Cyclists have dedicated crossing paths from pedestrians along the south and west sides of this intersection.

Booth Street at Sir John A. Macdonald Parkway is a large suburban-style signalized intersection with dedicated northbound, southbound, and westbound left-turn lanes and a southbound right turn lane. All four directions have centre medians and an offset setback due to the diamond shape of the intersection. Wide pedestrian crossings and separate painted inner bike lanes are provided on all four sides to assist with active crossings. Turning restrictions apply for non-authorized vehicles and U-turns are not permitted at this intersection.

Proposed site access/Empress Avenue at Albert Street is currently a 3-leg existing signalized intersection with the north leg into the subject site not currently available, restricting movements in that direction. Pedestrian crosswalks are provided at this intersection.

Existing Driveways to Adjacent Developments *(both sides of all roads bordering the site) within 200 m of proposed site driveway, indicating the land use associated with the driveway*

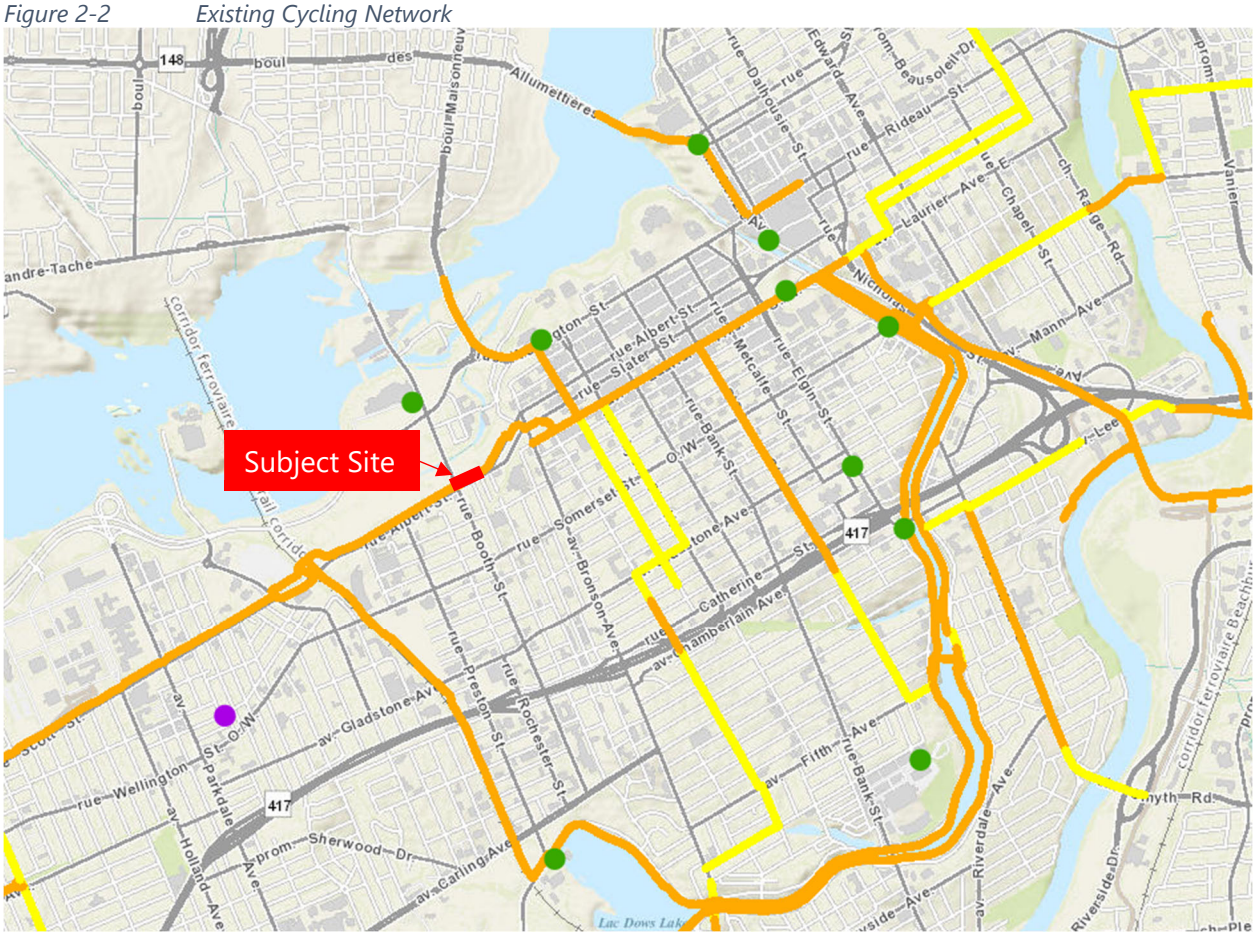
Following a cursory review of the City of Ottawa's GeoOttawa mapping tool and Google Maps, one (1) driveway has been identified along the north side of Albert Street, approximately 70m east of the proposed development's access driveway at Empress Avenue North. As the adjacent site appears to be set for construction staging, it is not presently clear what the ultimate configuration of the driveway will be.

It is noted that three (3) residential streets connect to Albert Street across from the proposed development. While Lorna Avenue, Perkins Street and Empress Avenue North are not specifically development driveways, they do generate turning movements on Albert Street between the intersections with Booth Street and Empress Avenue.

Existing on- and off-road bicycle facilities and pedestrian sidewalks and multi-use pathway networks

As shown in Figure 2-2, extracted from the GeoOttawa mapping platform, multi-use pathways (illustrated in orange) are currently provided along the length of Albert Street through the study area, east to Bronston Avenue before continuing along Laurier Avenue West. North-south connections are enabled via cycle tracks and bike lanes along Bay Street to the east and via off-road multi-use paths south of Albert Street along the Trillium rail corridor to the west. Pedestrian facilities are well connected in the study area, with sidewalks or multi-use paths provided on most portions of arterial and local roadways around the proposed development.

Figure 2-2 Existing Cycling Network



Source: GeoOttawa

Existing Transit System, including location of stations and stops

The subject site is well-served by Ottawa Transit, due to its adjacency with the O-Train Line 1's Pimisi Station, providing rapid transit east-west across the city. The development is also located just one stop east of Bayview Station which is an interchange station with O-Train's Line 2, which is currently closed for expansion but providing rapid bus service in the interim.

In addition, the subject site is situated adjacent to multiple bus routes connecting various parts of the city to/from destinations across the Ottawa River. Route 85 provides frequent service every 15-minutes or less on weekdays, operating all day long, 7 days a week, connecting the west end from Bayshore into Quebec, terminating across the Ottawa River. In addition, Route 66 provides local service from Tunney's Pasture to Jacques-Cartier Park, passing by the subject site and Pimisi Station. Finally, Routes 61, 63 and 75 provide limited bus service from throughout the week. The existing transit network is illustrated in Figure 2-3 below.

Figure 2-3 Existing Transit Network

Source: OC Transpo, Bus and O-Train Network Map

Existing Area Traffic Management Measures

Albert Street, from City Centre Avenue to Bronson Avenue, is a designated "Traffic Management Parking Zone", as per overlays indicated on the GeoOttawa mapping platform.

Existing Peak Hour Travel Demands by Mode

Peak hour multi-modal travel demand for the proposed development study area may be derived from a variety of sources.

Ottawa Municipal Intersection Surveys: The City of Ottawa conducts yearly surveys of vehicular, pedestrian, and cyclist volume at selected intersections within the City's transportation network. Data collected includes 24-hour AADT volumes, heavy vehicle/truck percentages, pedestrian volumes, and bicycle volumes. This data is not sufficient to establish a full turning movement count for intersection analysis but can be compared across survey years to determined multi-modal volume travel demand growth rates or factors.

Although the specific intersections surveyed by the City vary each year, and therefore the four intersections to be analyzed by TYLin within the study area may not be surveyed each year, it may be difficult to directly compare the same intersection across survey years to calculate growth rates or factors. However, certain intersections near the study area have been surveyed

in multiple consecutive years, and growth rates from those intersections could be averaged or otherwise leveraged for this purpose. The following intersections within or near the study area have been surveyed in each of the last five calendar years:

- 2021: Wellington St/Lyon St (not in study area);
- 2020: None (due to COVID-19 pandemic);
- 2019: Booth St/Albert St (in study area); Booth St/Vimy Pl, Bronson Ave/Queen St, Wellington St/Bay St, Wellington St/Lyon St (not in study area);
- 2018: Wellington St/Bank St (not in study area);
- 2017: Wellington St/Booth St, Albert St/Booth St, Albert St/Empress Ave, Slater St/Albert St/Bronson Ave (in study area).

Bicycle Counting Stations: The City of Ottawa also operates automated bicycle counting stations at selected locations on the City's on- and off-street active transportation network. Although no such counting stations are within the study area boundaries, three such stations are located close to the study area and could be used to estimate volumes or travel demand growth and distribution trends for active transportation modes:

- National Capital Commission Ottawa River Pathway, approximately 100m east of the Prince of Wales Bridge (north of the study area):
- Laurier Avenue segregated bike lane, just west of Bay Street (east of the study area);
- O-Train Pathway, just north of Bayview Station (west of the study area).

Turning Movement Count Surveys and Multi-Modal Count Surveys: Where multi-modal travel demand data is not available from City of Ottawa municipal sources, TYLin proposes to conduct multi-modal turning movement count and hourly multi-modal trail count surveys, including at the four intersections identified within the study area for analysis, as necessary to establish a full picture of existing transportation network conditions.

Trip Generation: Future travel demand for the proposed development, under background conditions in the proposed time periods and horizon years, will be estimated in accordance with the Institute of Transportation Engineers Trip Generation Manual (11th Edition).

Trip Assignment and Distribution: To determine trip assignment and distribution for site-generated traffic in this study, TYLin proposes to gather origin-destination data from the National Capital Commission 2011 Origin-Destination Survey. Where such data is not available or is considered outdated, TYLin will supplement trip distribution trends using customized origin-destination data surveys, including average trip duration and distribution, from our big data partner, Urban SDK.

Five-Year Collision History

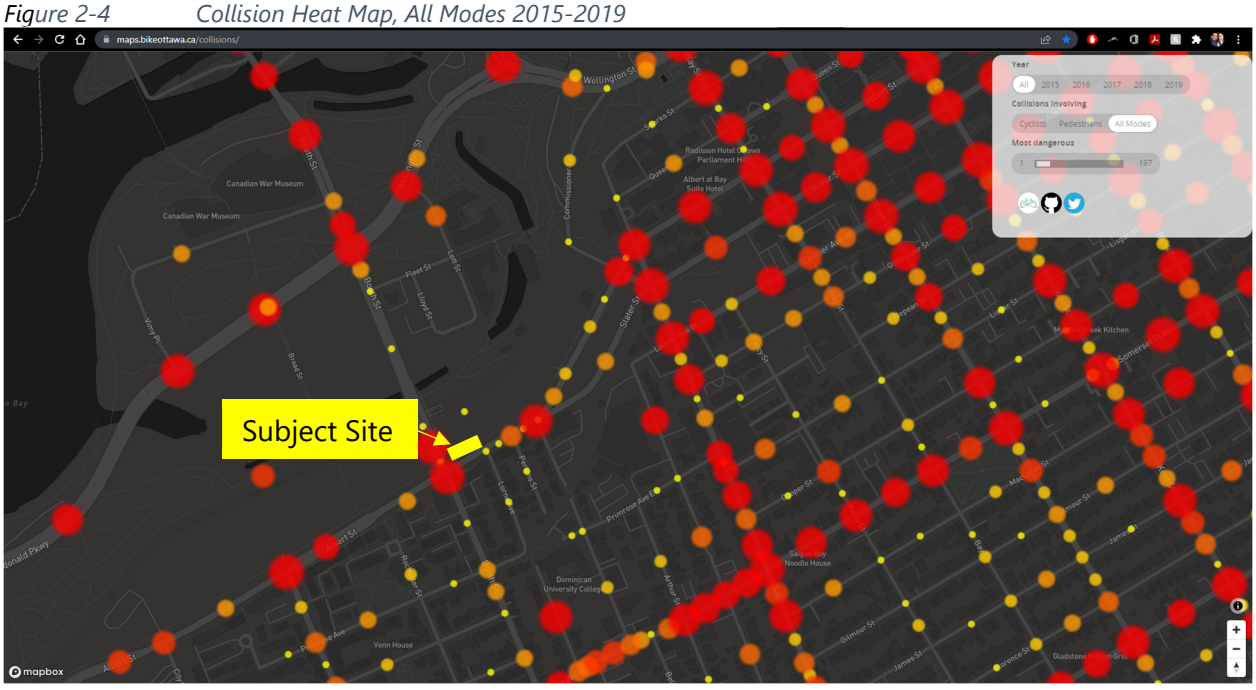
A review of the City of Ottawa's collision history along the boundary road network illustrates several "hot spots" of concern around the proposed development. Figure 2-4 shows an excerpt

from the city's Collision map (available at maps.bikeottawa.ca/collisions/) for all modes (driver, cyclist, and pedestrian) from 2015 to 2019.

The intersection of Albert Street and Booth Street has recorded a total of 61 collisions in that five-year period, including 5 cyclist and 3 pedestrian collisions. Further north, the intersection of Sir John A. Macdonald Parkway/Wellington Street and Booth Street has the highest total along the study area roadways with 67 collisions, inclusive of 1 cyclist accident, within that timeframe. Notably, the three intersections meeting in a tight triangle at Albert Street, Bronson Avenue, Slater Street, and Commissioner Street. Figure 2-4 has recorded a high volume of vehicle collisions. Based on the review included within this scoping report, it can be thought that the rapid changes in the roadway configuration along Bronson Avenue, and the convergence of various one-way roads may play a leading role in the concentration of collisions in this area.

Finally, there have also been a relatively high concentration of accidents (total of 13 including 1 pedestrian) at the intersection of Albert Street and Empress Avenue North. This red spot stands out due to the extremely low volume nature of Empress Ave as it results in a dead end just south of Albert Street. It is believed that the eastbound split of Albert Street into Albert and Slater Street immediately after the intersection may play a determining factor in this pattern.

Figure 2-4 Collision Heat Map, All Modes 2015-2019



Source: maps.bikeottawa.ca/collisions/

Planned Conditions

Changes to the study area transportation network

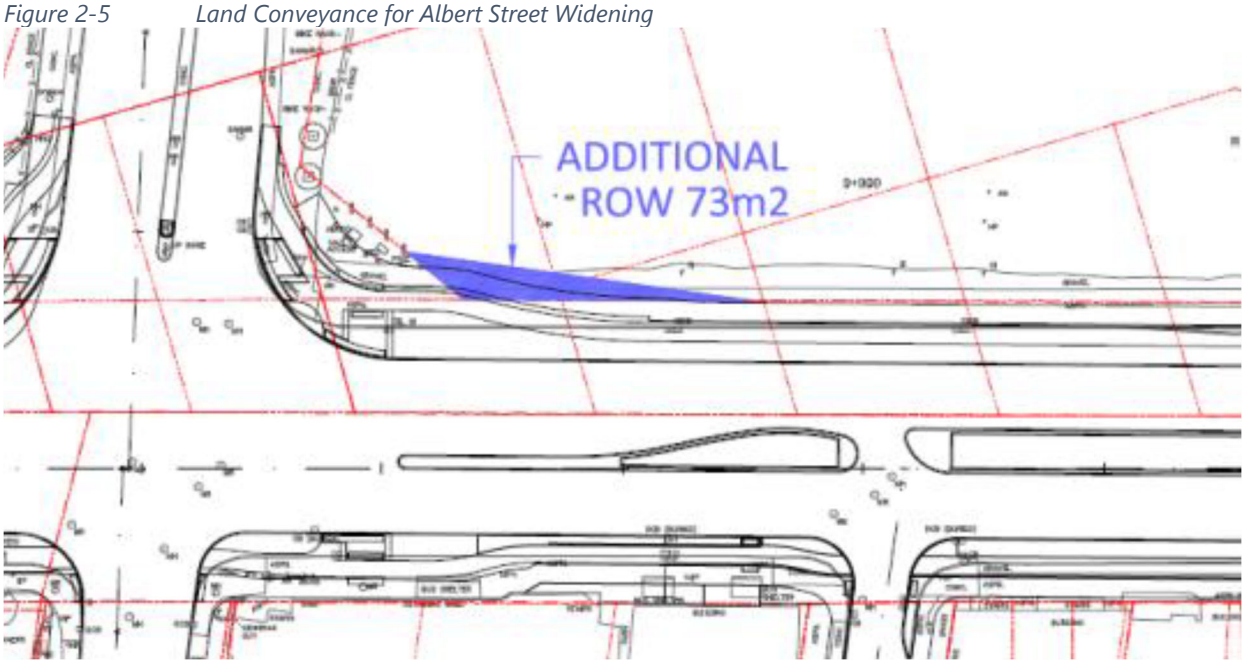
Albert and Slater Streets Post Light Rail Transit (LRT) Repurposing Functional Design Study, 2018: Slater Street is planned to be realigned and Commissioner Street from Albert Street to Slater Street will be decommissioned. A turning lane from Albert Street westbound to Slater Street eastbound will be added to provide improved road network connectivity. It is also to be realigned to connect with Albert Street as a two-way street in front of the Ottawa Public Library- Library and Archives Canada Joint Facility site at municipal address of 555 Albert Street.

We will consult the Albert-Slater realignment project and Albert Streetscaping projects for timing and coordination. Works between City Centre and Empress are planned for 2024. More details can be provided with specific proposals through City consultation. Improvements are planned for Empress intersections, which shall be reflected in the TIA.

Development of the Library Parcel shall include a pedestrian connection integrated into proposed development and connecting along the north side between Pimisi Station and the new OPL-LAC Facility.

Reconstruction of Albert Street, Queen Street, Slater Street and Bronson Avenue – Preliminary Design, Detail Design & Construction, on-going: The city is planning a widening of Albert Street. It is anticipated that additional land at the corner of Albert and Booth will be required, and depending on timing, this may be a condition of Site Plan Approval. The roadway design approaching the intersection is subject to change, but Figure 2-5 illustrates the potential land conveyance required by the site, with no impact to the proposed building footprint.

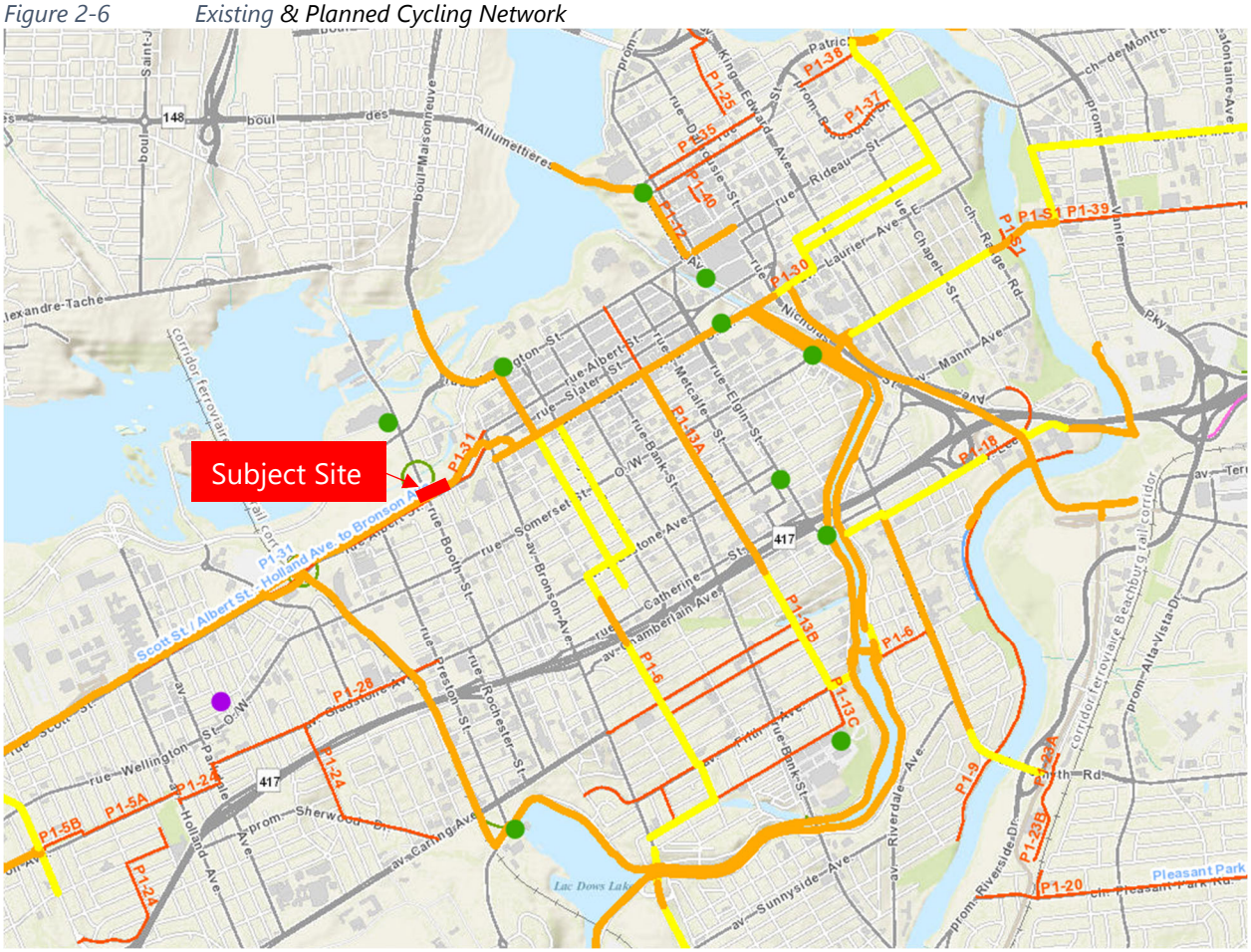
Figure 2-5 Land Conveyance for Albert Street Widening



Source: City of Ottawa

Municipal Cycling Network: Expansions to the municipal cycling network are illustrated in red in below. As shown, improvements are largely away from the study area boundaries, however, future residents will benefit from the improved connections across the city linking existing cycling facilities.

Figure 2-6 Existing & Planned Cycling Network



Source: GeoOttawa

Stage 2 Light Rail Transit Project: The subject site is located within walking distance of Pimisi LRT Station and Bayview LRT station. There are three major extensions planned to the Ottawa's light rail transit system. The Confederation Line West will extend the LRT line 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.

Other study area developments

The following developments have been identified from the City's online Development Application Status Search tool that are likely to occur prior the proposed horizon year of 2027 (full development occupancy) well as 2032 (5-years past build-out):

Nine-storey Addition to Existing Residential Building - 593 Laurier Avenue West

Municipal Address	593 Laurier Avenue West, Ottawa, ON
Proposed Use	Residential Building
Total Residential GFA	2,879.9 m^2
Lot Area	1,401 m^2 (57 tower + 6 Existing Dwelling)
Entrance	Laurier Avenue
Approval Status	Active – Site Plan Control Application
Buildout Year	To be completed in one phase with a target build-out year of 2021

East LeBreton Flats - Mixed-Use Development - 301 Lett Street

Municipal Address	301 Lett Street, Ottawa, ON
Proposed Use	Mixed-Use Development
Development size	273 condominium units and a 5,190 ft^2 daycare in Building C and 319 rental apartments and a 3,265 ft^2 ground floor commercial unit in Building D
Entrance / Parking	Lloyd Street for surface parking Lett Street for accessing underground parking
Approval Status	Active – Site Plan Control Application
Buildout Year	Estimated completion date of proposal development is 2023

Ottawa Public Library & Library and Archives Joint Facility - 555 Albert Street

Municipal Address	555 Albert Street, Ottawa, ON
Proposed Use	Library / Parking Facility
Development Size	13,636n m^2, 5-storey (24.5 m)
Lot Area	9,543 m^2
Entrance	Commissioner Street
Parking	Two levels of underground parking and on-street parking on Albert Street
Approval Status	Post Approval – Site Plan Control Application
Buildout Year	To be completed in one phase with a target build-out year of 2024

2.2. Study Area and Time Periods

Study Area

Based on the development's location within the transportation network, the TIS is proposed to consist of the following intersections:

1. Albert Street at Booth Street
2. Slater Street at Bronson Avenue
3. Booth Street at Sir John A. Macdonald Parkway
4. Proposed site access/Empress Avenue at Albert Street

TYLin requests the municipality confirm the study area intersections to be reviewed within the TIA.

Time Periods

TYLin proposes to complete the TIA during the weekday AM and PM peak hours. A Saturday peak hour is not proposed for review as the retail component of the site is proposed to be ancillary in nature and would accommodate demand for the adjacent lands as opposed to generating traffic from external zones.

Horizon Years

As per the TIA guidelines, TYLin proposes to assess horizon years to 2027 (assuming build-out and full-occupancy of the development) as well as 2032 (5-years past build-out).

It is noted that the development is proposed to be constructed all at once to expedite the availability of affordable housing to the Ottawa community. Consequently, no phases are planned, and the TIA analysis does not require interim horizon years.

2.3. Exemptions Review

A review of the city's TIA guidelines and the development and network conditions suggests that the following elements may be exempted from the TIA study:

- 4.1.3 New Street Networks – new streets are not proposed within the scope of the proposed development.
- 4.2.2 Spillover Parking – the parking demand for the subject site is not anticipated to exceed the parking supply provided by the proposed development.
- 4.6.1 Adjacent Neighbourhoods – the proposed development does not reply on local or collector streets for site access, which may trigger local capacity thresholds. Accordingly, a Neighbourhood Traffic Management plan is not required.
- 4.8 Network Concept – it is not yet certain if the proposed development will generate more than 200 person-trips during the peak hour in excess of the equivalent volume permitted by established zoning.

TYLin

Step 3: Forecasting Report

3. Development Generated Travel Demand

3.1. Mode Share

Existing

The LeBreton Flats Library Parcel (the study area) is located within the "Ottawa Inner Area" district of the most recent National Capital Region TRANS Origin-Destination Survey, which was held in 2011. The results of this survey provide existing mode shares for AM and PM peak periods, as shown below in **Table 3-1** below.

Table 3-1 Existing Mode Shares from 2011 TRANS O-D Survey

Mode	AM Peak (06:30 – 08:59)			PM Peak (15:30 – 17:59)		
	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%

However, significant changes in both land use and the transportation network in the vicinity of the study area have taken place since the data summarized in the TRANS survey was collected in 2011. Development of the LeBreton Flats area has proceeded in the time since the survey's collection and, importantly, the Confederation Line LRT has opened, including Pimisi Station on Booth Street just north of Albert Street.

Additionally, the geographic area over which the data shown above in **Table 3-1** was collected, i.e. the Ottawa Inner Area district, is quite large and contains numerous neighbourhoods of remarkably differing built form compared to LeBreton Flats, including the lower-density and presumably more auto-oriented neighbourhoods in Chinatown, Centretown, Lower Town, The Glebe, and Old Ottawa South and East. This may make the aggregated mode shares across the entirety of the Ottawa Inner Area district unrepresentative of mode choice decisions the LeBreton Flats study area.

Consequently, it was decided that mode shares drawn from the 2011 TRANS survey would not be used in this assessment, in favour of a more appropriate set of mode share targets representative of the land uses to be expected in the study area.

Future
The LeBreton Flats Master Concept Plan identifies mode share targets for all phases of the area development. Accordingly, a 60% transit, 20% active transportation (walk and cycle) and 20% auto modal splits were adopted for the future conditions analysis of the proposed development.

3.2. Trip Generation

The latest site plan consists of 608 dwelling units, 1324 m^2 of retail GFA, and 1230 m^2 of day care facility GFA on the 3rd floor of the proposed mixed-use development. Note that the trip generation and subsequent derived traffic volumes below were based on a previous site plan involving 601 dwelling units, 968 m^2 of retail GFA, and 1102 m^2 of day care GFA. This minor adjustment in site statistics would result only in a negligible change to the results of the subsequent traffic analysis.

Site auto traffic generated by the proposed residential development for the weekday AM and PM peak hours was estimated by applying the trip rates published by the TRANS Trip Generation Manual, prepared in 2009 by McCormick Rankin Corporation. Trip generation rates for residential land uses with transit bonus were used for this study as the location of the proposed development is located within the 600 metres proximity to a rapid transit station (LRT station). The TRANS trip generation rates correspond to ITE Land Use Code (LUC) 222, High-rise apartments (10+ floors) in the Core Area. Considering these adjusted rates reflect the increased transit usage for developments proximate to rapid transit stations, no additional steps were taken for trip reductions in the study. The trip directional split rates are based on blended rates from Table 6.2 of the TRANS Trip Generation study.

The site auto traffic generated by the retail development and daycare facility for the weekday AM and PM peak hours was estimated by applying the trip rates by Institute of Transportation Engineers (ITE) 10th Edition, for Land Use Code (LUC) 820 Shopping Centre and LUC 565 Daycare Centre. A pass-by rate for LUC 820 of 34% during the PM peak hour was applied for trip reduction. Based on the aggressive modal split approved by the City of Ottawa for the proposed development area, TYLin did not add an additional internal trip capture for the on-site retail use, to support a more conservative traffic analysis. In line with the modal splits described above, a non-auto modal reduction of 80% was applied to the retail and daycare land uses.

It should be noted that no additional multi-use trip reduction was applied to the subject site residential and non-residential uses, due to the high targeted modal split, to ensure a more conservative traffic analysis within this TIA. However, the presence of multi-use trips (i.e., residential visitor also stopping in the retail space) will be examined as a factor within the Transportation Demand Management Plan, to be completed in the following submission.

Table 3-2 summarizes the estimated total trip generation of the development.

Table 3-2 Site Trip Generation

Land Use	Parameters	Peak Hour Trip Generation					
		Weekday AM			Weekday PM		
		In	Out	Total	In	Out	Total
Residential (LUC: 222 – High-rise apartments)	TRANS Rate	0.17			0.16		
	Trip Distribution	24%	77%	-	62%	39%	-
	Trip Rate	0.04	0.13	0.17	0.10	0.06	0.16
	Gross Trips	24	78	102	60	36	96
Retail (LUC: 820 – Shopping Centre)	Average Rate	0.94			3.81		
	Trip Distribution	62%	38%	-	48%	52%	-
	Trip Rate	0.58	0.36	0.94	1.83	1.98	3.81
	Non-Automobile Trip Reduction	5	3	8	15	17	32
	Pass-by Trip Reduction	-	-	-	1	1	2
	Net Trips	1	1	2	3	3	6
Daycare Centre (LUC: 565 – Daycare Centre)	Average Rate	11.0			11.12		
	Trip Distribution	53%	47%	-	47$	53%	-
	Trip Rate	5.83	5.17	11.0	5.23	5.89	11.12
	Non-Automobile Trip Reduction	55	49	104	50	56	106
	Net Trips	14	12	26	12	14	26
Total Net Site Trips		**39**	**91**	**130**	**75**	**53**	**128**

As seen in **Table 3-2** above, the proposed development generates a total of 130 new two-way vehicle trips during the weekday AM peak hour consisting of 39 inbound and 91 outbound trips. During the PM peak hour, a total of 128 new two-way vehicle trips are generated by both buildings consisting of 75 inbound and 53 outbound trips.

3.3. Trip Distribution

Distribution of trips generated by the proposed development to and from gateways to the study area proceeded using origin-destination data drawn from the 2011 National Capital Region TRANS Origin-Destination Survey. Eight (8) gateways into and out of the study area were identified:

1) Sir John A MacDonald Parkway, west of Booth Street;
2) Wellington Street, east of Booth Street;
3) Booth Street, north of Sir John A MacDonald Parkway;
4) Albert Street, west of Booth Street;
5) Booth Street, south of Albert Street;
6) Bronson Avenue, south of Slater Street;
7) Bronson Avenue and Commissioner Street, north of Albert Street;
8) Slater Street and Albert Street, east of Bronson Avenue.

Trips to or from the study area, originating from or destinating in (respectively) each of the twenty-seven (27) TRANS survey districts, including internal trips within the "Ottawa Inner Area" district in which the study area is located as well as trips to/from external areas, were assigned in proportions to each of the gateways listed above, with the precise proportions determined on the basis of engineering judgment. This data is summarized in **Table 3-3** below.

Table 3-3 Trip Distribution: Trip Proportions assigned to Study Area Gateways (source: engineering judgment)

Gateway → TRANS District ↓	1	2	3	4	5	6	7	8	Sum
001 - Ottawa Centre		60%					10%	30%	100%
050 - Ottawa Inner Area				15%	35%	35%		15%	100%
100 - Ottawa East		40%			10%	20%	10%	20%	100%
120 - Beacon Hill		60%					10%	30%	100%
140 - Alta Vista					20%	70%		10%	100%
180 - Hunt Club					20%	70%		10%	100%
200 - Merivale	30%			25%	35%	10%			100%
240 - Ottawa West	40%			40%	20%				100%
260 - Bayshore / Cedarview	20%			10%	35%	35%			100%
300 - Orléans		5%			25%	70%			100%
350 - Rural East		5%			25%	70%			100%
360 - Rural Southeast		5%			10%	85%			100%
400 - South Gloucester / Leitrim					5%	95%			100%
425 - South Nepean	10%				40%	50%			100%
450 - Rural Southwest	10%				40%	50%			100%
500 - Kanata / Stittsville	10%				40%	50%			100%
560 - Rural West	20%				35%	45%			100%
600 - Île de Hull		40%	50%					10%	100%
625 - Hull Périphérie	40%	20%	40%						100%
650 - Plateau	80%		20%						100%
700 - Aylmer	90%		10%						100%
750 - Rural Northwest	70%	20%	10%						100%
800 - Pointe Gatineau		40%	50%					10%	100%
820 - Gatineau Est		45%	50%					5%	100%
840 - Rural Northeast		45%	50%					5%	100%
845 - Buckingham / Masson-Angers		45%	50%					5%	100%
900 - External		5%	10%		35%	50%			100%

The TRANS survey also provided proportions for travel demand to and from the Ottawa Inner Area district from each of the twenty-seven (27) districts referred to above, both in the AM and PM peak periods. This data is summarized in **Table 3-4** below.

Table 3-4 Trip Distribution: Travel Demand to/from Study Area (source: TRANS O-D Survey, 2011)

Analysis Period → **TRANS District ↓**	**AM Peak** *Into* Study Area	**PM Peak** *Into* Study Area	**AM Peak** *Out of* Study Area	**PM Peak** *Out of* Study Area	**Sum**
001 - Ottawa Centre			10%	30%	100%
050 - Ottawa Inner Area	35%	35%		15%	100%
100 - Ottawa East	10%	20%	10%	20%	100%
120 - Beacon Hill			10%	30%	100%
140 - Alta Vista	20%	70%		10%	100%
180 - Hunt Club	20%	70%		10%	100%
200 - Merivale	35%	10%			100%
240 - Ottawa West	20%				100%
260 - Bayshore / Cedarview	35%	35%			100%
300 - Orléans	25%	70%			100%
350 - Rural East	25%	70%			100%
360 - Rural Southeast	10%	85%			100%
400 - South Gloucester / Leitrim	5%	95%			100%
425 - South Nepean	40%	50%			100%
450 - Rural Southwest	40%	50%			100%
500 - Kanata / Stittsville	40%	50%			100%
560 - Rural West	35%	45%			100%
600 - Île de Hull				10%	100%
625 - Hull Périphérie					100%
650 - Plateau					100%
700 - Aylmer					100%
750 - Rural Northwest					100%
800 - Pointe Gatineau				10%	100%
820 - Gatineau Est				5%	100%
840 - Rural Northeast				5%	100%
845 - Buckingham / Masson-Angers				5%	100%
900 - External	35%	50%			100%

Multiplying and summing the data summarized in **Table 3-3** and **Table 3-4** allows produces a measure of total travel demand for site-generated trips, in and out of the study area, for each analysis period, as distributed to each of the eight (8) gateways. This data, summarized in **Table 3-5**, forms the basis of the subsequent assignment of site-generated trips to the road network.

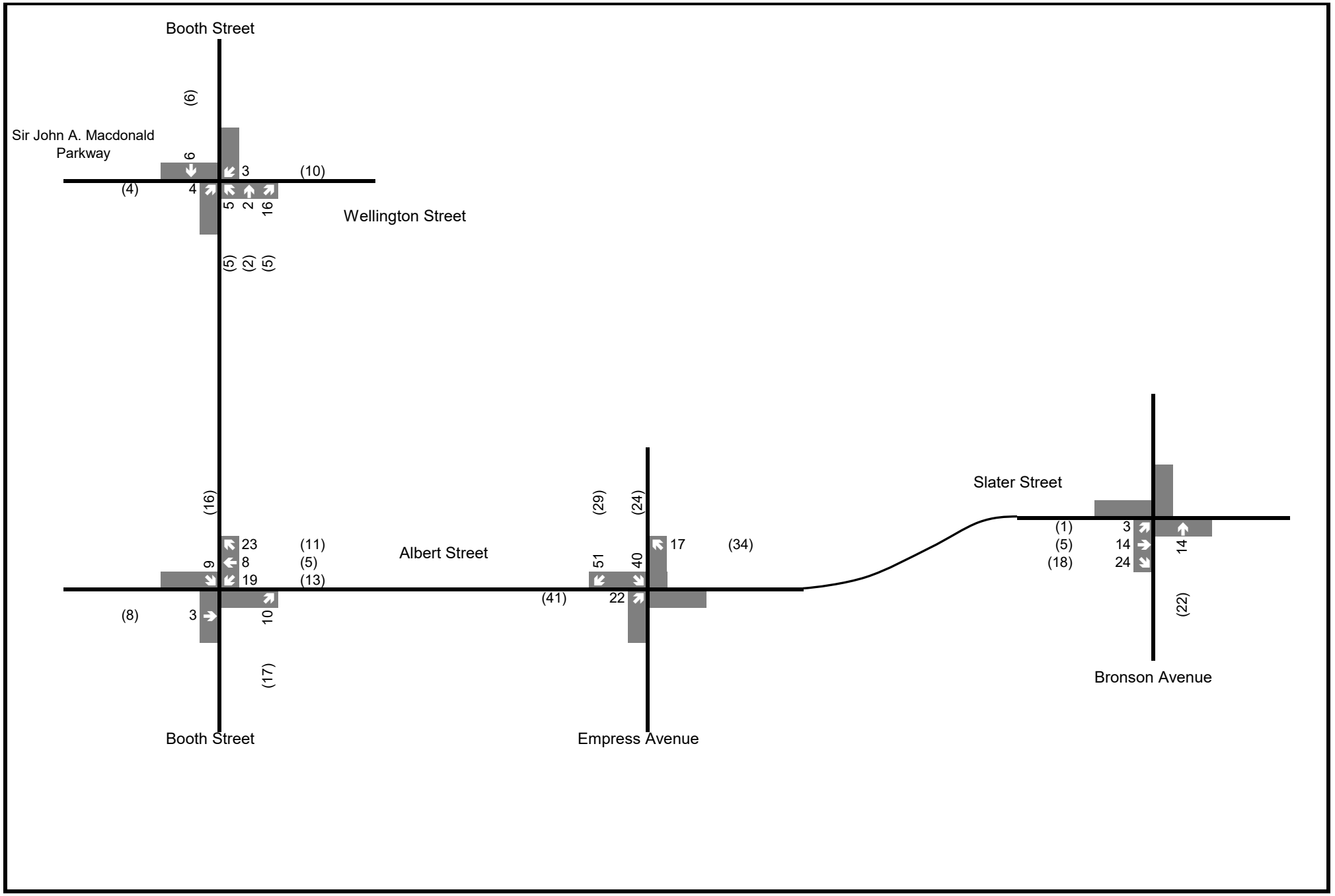
Table 3-5 Travel Demand for Site-Generated Trips by Gateway

Gateway → TRANS District ↓	1	2	3	4	5	6	7	8	Sum
AM Peak | Total Travel Demand *Into* Study Area	10%	8%	4%	9%	25%	35%	1%	8%	100%
PM Peak | Total Travel Demand *Into* Study Area	6%	14%	2%	10%	23%	29%	2%	14%	100%
AM Peak | Total Travel Demand *Out of* Study Area	5%	18%	2%	9%	21%	27%	3%	15%	100%
AM Peak | Total Travel Demand *Out of* Study Area	9%	9%	3%	9%	25%	34%	1%	10%	100%

3.4. Trip Assignment

Assignment of trips generated by the proposed development to and from gateways to the road network within the study area involved the assumption of paths through the road network between each gateway and the site access, which consists of the northern leg of the intersection of Albert Street with Empress Avenue North (one path was assumed for inbound traffic and a separate path for outbound traffic for each gateway, paying heed to turn restrictions on the road network).

Multiplying the travel demand proportions shown in **Table 3-5** by the site-generated trip volumes shown in **Table 3-2** produces the volumes of traffic to be assigned to each turning movement in a given path between gateway and site access. Final site-generated traffic volumes, as assigned to the study area road network, are given shown in Figure 3-1.



Legend

xx A.M. Peak Hour Traffic
(xx) P.M. Peak Hour Traffic

TYLin

Figure 3-1

Site Traffic Volumes

4. Background Network Travel Demands

4.1. Transportation Network Plans

The extent of potential and planned changes to the study area's transportation network were identified in the previously submitted Scoping and Screening Report, as the first stage of this Transportation Impact Assessment study and were confirmed to be a complete list by city staff.

As previously noted, Empress Avenue will be extended north into the subject site, serving as the development's driveway, and the north leg of the intersection with Albert Street. This roadway is proposed to be a traffic-calmed shared lane providing vehicular access to the underground parking levels, loading and waste collection area, and to a possible driveway connecting to the municipal development situated east of the subject lands. The new roadway is proposed to be designed to include a wide pedestrian sidewalk on the west side and a multi-use path on the east side, providing a direct link between the new cycling facilities along Albert Street and the pathway north of the development connecting to the Pimisi LRT station.

Additional changes to the road network include the realignment of Slater Street and the decommissioning of Commissioner Street from Albert Street to Slater Street, as per the *Albert and Slater Streets Post Light Rail Transit (LRT) Repurposing Functional Design Study* from 2018. As part of the re-configuration of the road network, a turning lane from Albert Street westbound to Slater Street eastbound will be added. Slater Street will be realigned to connect with Albert Street as a two-way street in front of the future Ottawa Public Library and Archives building at 555 Albert Street, by 2024, and the alignment has been considered for future analysis in this study. Finally, it is noted that Albert Street is currently undergoing improvements including a widening adjacent to the subject site; the appropriate lane configurations have been considered within the traffic analysis.

Finally, with regards to transit network improvements, three major extensions are planned to extend Ottawa's light rail transit system. Confederation Line West will extend the LRT line from Tunney's Pasture to Moodie and Baseline Stations. This extension will increase transit ridership through Pimisi Station, situated behind the proposed development. Revenue service for this extension is planned for 2025.

4.2. Background Traffic Growth

Background traffic corridor growth rates were determined based on 2011 and 2031 EMME model outputs obtained from the traffic modelling group within the City of Ottawa's transportation team. It is noted that the traffic forecasts were based on the anticipated growth in population and employment over time and the inclusion of additional site traffic from nearby background developments to the traffic model may result in double-counting of some trips.

In correspondence with city staff, it was stated that: *"… traffic volumes have been declining in downtown Ottawa, and therefore a background traffic growth rate of 0% (or less) should generally*

be applied. Major projects such as the STO's tram connection to Ottawa will further reduce traffic volumes, helping to offset growth from future downtown development. While a 0% (or even declining) background traffic growth rate is appropriate for the downtown, there are several developments planned for this specific area which may result in localized traffic growth."

Despite the 0% background traffic growth rate recommended by the city, and noting the possibility of double counting some trips, a corridor growth rate of 1% per annum was applied to all through movements within the study area traffic network. This was implemented to ensure the TIA represented a conservative assessment of traffic growth over time and accounted for localized future development which may not yet be quantified within the city-wide model.

4.3. Other Developments

Based on our review of available development applications within the study area, three background developments were confirmed with city staff for inclusion within the TIA's study horizon years. Site-generated traffic from the following background developments were incorporated into the traffic model for the proposed development.

- **593 Laurier Avenue West** – Nine-storey addition to an existing residential building. The *593 Laurier Avenue West Transportation Impact Assessment Report*, prepared by Novatech and dated December 14th, 2020, indicated that the development does not meet the 60-person trip generation trigger, and as such, trip distribution and trip assignments were not included within the study. Accordingly, this background development is not included within this analysis.

- **301 Lett Street** – East LeBreton Flats, Mixed-Use Development with 273 condominium units, 319 rental apartments, a daycare and ground-floor commercial uses. The *East LeBreton Flats 301 Lett Street Transportation Impact Study Report*, prepared by Novatech and dated April 2021, indicated that the proposed development is projected to generate approximately 85 vehicles/hour and 94 vehicles/hour during the morning and afternoon peak periods, respectively.

- **555 Albert Street** – Ottawa Public Library & Library and Archives Joint Facility. The *555 Albert Street Transportation Impact Assessment Forecasting Report*, prepared by WSP and dated November 12, 2020, indicated that the proposed development is projected to generate approximately 31 vehicles/hour and 294 vehicles/hour during the morning and afternoon peak periods, respectively.

  It should be noted that the Site Generated Vehicle Trips on Figure 3.1 from the 555 Albert Street TIA (November 2020) were unclear, with total background traffic volumes not in alignment with the site trip generated projections in the tables above. In addition, labels were not provided on figures to distinguish AM and PM trips, or 2024 versus 2029 horizon volumes.

Due to the discrepancy and ambiguity in volumes, additional steps were taken to reassign the trips generated from the 555 Albert Street development using the trip distribution and assignment method mentioned in **Sections 1.3 and 1.4** for the proposed development. The auto-driver trips were based on *Table 3-5* of the 555 Albert Street TIA, while the inbound and outbound split percentages were referred from ITE Land Use Code: 590-Library as the TIA document did not have any information on the split percentages. A total of 31 AM trips and 294 PM trips were included in the background development traffic analysis.

Table 4-1 summarizes the auto-driver trips generated by each of the background developments for AM and PM peak periods, for inclusion within the traffic analysis.

Table 4-1 Background Development Auto-Driver Trips

Background Development	**Use**	**Auto-Driver Peak Hour Trips**	
		AM	**PM**
593 Laurier Avenue West	Mid-Rise Apartments	2	2
	Subtotal (for inclusion)	***0***	***0***
301 Lett Street	Residential	69	68
	Retail / Day Care	16	26
	Subtotal	***85***	***94***
555 Albert Street	Employees and LAC Visitors	28	48
	OPL Visitors	3	246
	Subtotal	***31***	***294***
Total Auto-Driver Trips per period		**116**	**388**

Site distribution figures for all applicable background developments are found in **Appendix B.**

5. Demand Rationalization

The initial projections of development-generated and background auto travel demand at study area intersections were combined and modelled for 2022 Existing, 2027 and 2032 Future Background and Future Total conditions.

As detailed below, no additional auto reductions are required to accommodate the projected total auto demand along the study area roadways. Notwithstanding, a comprehensive Transportation Demand Management Plan, Parking Study, and Development Design review will be completed within the "Step 4 – Analysis" stage of this TIA, to outline the measures taken to support the high non-auto sustainable mode share detailed within this report.

The capacity analysis identifies how well the intersections and access driveways are operating and how they are expected to operate in the future. The analysis contained in this report utilized the Highway Capacity Manual (HCM) 2000 techniques within the Synchro Version 11 Software package. The reported intersection volume-to-capacity ratios (v/c) are a measure of the saturation volume for each turning movement, while the levels-of-service (LOS) are a measure of the average delay for each turning movement. Critical movements are defined where the v/c ratio exceeds 0.85. Note that TYLin has identified all movements with LOS 'E' or worse in this review to mark potentially significant delays and locations where improvements may be considered.

Traffic data including Turning Movement Counts (TMCs) and Signal Timing Plans (STPs) utilized for this analysis are included in **Appendix A**. Detailed Synchro reports for all traffic scenarios are attached in **Appendix C**.

Note that traffic capacity analysis results for the intersections in the study area, in the AM and PM peak hours for Existing (Baseline 2022), Future Background (2027 and 2032), and Future Total (2027 and 2032) conditions can be found in **Section 8 Traffic Capacity Analysis** below. These results have been omitted from this submission of the Forecasting Report to avoid duplication.

TYLin

Step 4: Analysis Report

6. Design Review Component

6.1. Development Design

The development is proposed to include one (1) full-moves vehicular access on the north leg of the Empress Avenue and Albert Street intersection. The subject property is located at the northeast corner of Booth Street and Albert Street at municipal address 665 Albert Street in the City of Ottawa. The intersection currently has the north leg closed-off which will be utilized as the future site connection.

Pedestrian facilities are provided around all building entrances, with pedestrian access to retail and residential uses, and a public bicycle parking entrance accessible from Albert Street. There is a proposed cycle track and a lay-by on the north side of Albert Street which provides a buffer and landscape space between both vehicular and pedestrian travel paths. According to the detailed design drawings in the *Albert Street – Cycling and Pedestrian Facilities* report issued from Robinson Consultants in May 2019; a 2.0 m wide concrete sidewalk is proposed with a 2.0 m wide asphalt bike track directly between the sidewalk and the westbound lanes on Albert Street. The proposed sidewalk and the bike lane are proposed to merge into a 3.8m wide multi-use pathway that currently exists on the southeast corner of the subject property around the intersection of Albert Street and Empress Avenue.

With regards to transit connectivity, the Pimisi LRT station entrance and nearest bus stops are approximately within a 200m walking distance from all entrances of the proposed development. The site is well-served by the local transit due to its proximity to O-Train Line 1 that serves Pimisi Station, providing east-west rapid transit access across Ottawa.

Municipal waste collection trucks will access the site through the access at Albert Street and Empress Avenue. The enclosed loading area consists of two (2) loading spaces for short-stay delivery and one (1) loading space designated for garbage collection. The project team was notified to design the staging area and storage room as per the City of Ottawa's Solid Waste Collection Guidelines for Multi-Unit Residential Development (2012) and a swept path analysis has confirmed that all truck movements can be accommodated within the indoor loading area. Vehicle movement diagrams for the ground floor are collated and included in **Appendix D.**

The assessment for new street networks (Element 4.1.3 from Stage 4 TIA guidelines) was deemed to be exempt from the report (see the Exemptions Review within the Transportation Impact Assessment Scoping and Screening Report, submitted to the city on March 21, 2022) as this is not required for an application involving site plans.

6.2. Parking

Vehicle Parking

The subject site is located within Area Z "Near Major LRT Station" as per Schedule 1A of the City of Ottawa's Zoning By-law 2008-250 Consolidation. As detailed in Part 4, Sections 100-103 of the Zoning By-law, the proposed development is subject to minimum parking space requirements for visitors, however, off-street motor vehicle parking is not required to be provided for residential uses in Area Z (By-law 2016-249).

Despite the absence of minimum parking requirements for residents, retail and day care spaces, Dream Asset Management proposes to provide vehicle parking for residents and visitors within two underground parking levels, to meet the anticipated parking demand generated by the site. The projected demand is based upon the forecasted 20% auto modal split (as detailed in the TIA Forecasting Report submitted to the city on May 9th, 2022) which is deemed to be conservative for this transit-oriented development. Accordingly, 121 spaces would be utilized at a rate of 0.20 spaces per dwelling unit. To provide a buffer and utilize remaining available floor area within the underground levels, 130 residential parking spaces are provided.

Furthermore, residential visitor spaces are provided at the minimum rate of 0.1 spaces per unit, and additional visitor spaces for retail and day care are provided in anticipation of minor auto demand from future employees and pick-up/drop-off activities at these uses.

Minimum parking rate requirements and the proposed vehicular parking supply for all 608 residential units, residential visitors, and ancillary retail uses are summarized in **Table 6-1** below.

Table 6-1 Vehicle Parking Requirements and Proposed Parking Supply

Type	Required Rate	Required Supply	Proposed Supply
Residential Units	No minimum requirement. Maximum of 1.5 spaces per dwelling unit permitted.	Minimum: 0 spaces Maximum: 910 spaces	127 spaces
Residential Barrier-Free	No minimum requirement.	Minimum: 0 spaces	3 spaces
Total Residential		*0 spaces*	*130 spaces*
Visitor Residential	0.1 spaces per unit	Minimum: 61 spaces	65 spaces (+1 Barrier-Free)
Visitor Retail	No minimum required. Maximum of 10 spaces	Minimum: 0 spaces Maximum: 10 spaces	7 spaces
Visitor Day Care	No minimum required.	Minimum: 0 spaces	3 spaces
Visitor Barrier-Free	22-99 spaces required = min. 1 B-F space required	Minimum: 1 space (of the 61 required)	1 space
Total Visitor		*61 spaces*	*76 spaces*
Grand Total		**61 spaces**	**206 spaces**

A total of 206 vehicle parking spaces (130 resident and 76 visitor) are proposed to be provided for future residents, visitors, and commercial patrons of the proposed 608-unit mixed-use development. The proposed parking supply exceeds the minimum parking requirements under Zoning By-law 2008-250 Consolidation and does not exceed the maximum permitted for residential units, as per the By-law.

Vehicle parking will be provided across two underground parking levels, with varying parking stall sizes, as detailed in **Table 6-2** below.

Table 6-2 Vehicle Parking Supply

Type	**P1**	**P2**	**Total**
Residents Small Car (2.6m x 4.6m)	1	2	3
Residents (2.4m)		1	1
Residents (2.6m)	27	106	133
Residents Barrier-Free	1	2	3
Visitor (2.6m)	65		65
Visitor Barrier-Free	1		1
Total	**95**	**111**	**206**

The planned vehicle parking supply is acceptable for the proposed 608-unit development due to the inherent Transportation Demand Management (TDM) measures integrated within the plan, which will help the community achieve the desired 80% sustainable transportation modal split and bring into context the relatively low auto mode share of 20%. Specifically, the adjacency to Pimisi Station and the significant supply of bicycle parking on-site (as detailed below) help provide viable alternatives to auto-ownership and driving to/from the subject site.

A comprehensive TDM Plan has been prepared by *Mobycon* and is provided in **Appendix E**.

Bicycle Parking

The subject site is required to provide a minimum number of bicycle parking spaces, as per Section 111, Part 4, of the City of Ottawa's Zoning By-law 2008-250 Consolidation. In addition, limits are placed with regards to the provided supply's allocation between indoor (and secured) and outdoor bicycle parking spaces, as well as the availability of horizonal bicycle parking at the ground-level, which are deemed to be more accessible than vertical bicycle parking racks.

To reinforce the proposed development's commitment to sustainable travel and help meet or even exceed the desired 80% sustainable (20% active transportation, 60% transit) modal split outlined by the LeBreton Flats Master Concept Plan and endorsed by city staff, the supply of bicycle parking spaces is maximized within all available areas of the site plan, as evident in the substantial supply of bicycle parking over the minimum requirement, detailed below.

Table 6-3 summarizes the bicycle parking requirement and **Table 6-4** breaks down the location and style of the proposed bicycle parking supply in conformity with the standards.

Table 6-3 Bicycle Parking Requirement

Type	Required Rate	Required Supply
Residential	0.5 spaces per dwelling unit	304 spaces
Retail	1 space per 250 m^2 GFA	5 spaces
Day Care	1 space per 250 m^2 GFA	5 spaces
Total		**314 spaces**

Table 6-4 Bicycle Parking Supply

Type	Required Rate	Required Supply	Proposed Supply
Interior Secure Spaces	Minimum of 25% of total spaces required	Minimum: 79 spaces	638 spaces
Exterior Spaces	Maximum of 50% of total spaces required	Maximum: 157 spaces	118 spaces
Total Provided			**756 spaces**
Horizontal at Ground-Level	50% of the total required	157 spaces	170 spaces

As per site plan (dated September 30, 2022) A total of 756 bicycle parking spaces will be provided within the underground parking level and multiple podium levels for residents, and within the east and west public spaces for visitors. The proposed supply far exceeds the minimum bicycle parking supply requirement of 314 spaces and meets the minimum requirements for secure indoor and ground-floor horizonal bicycle parking spaces and is within the maximum supply permitted for exterior spaces.

Spillover Parking

This section was deemed to be exempt from the report based on the proposed development's modal split forecasts and associated vehicle trip generation, as indicated in the Exemptions Review within the Transportation Impact Assessment Scoping and Screening Report, submitted to the city on March 21, 2022, and subsequently approved by city staff on April 2, 2022.

6.3. Boundary Street Design

Mobility

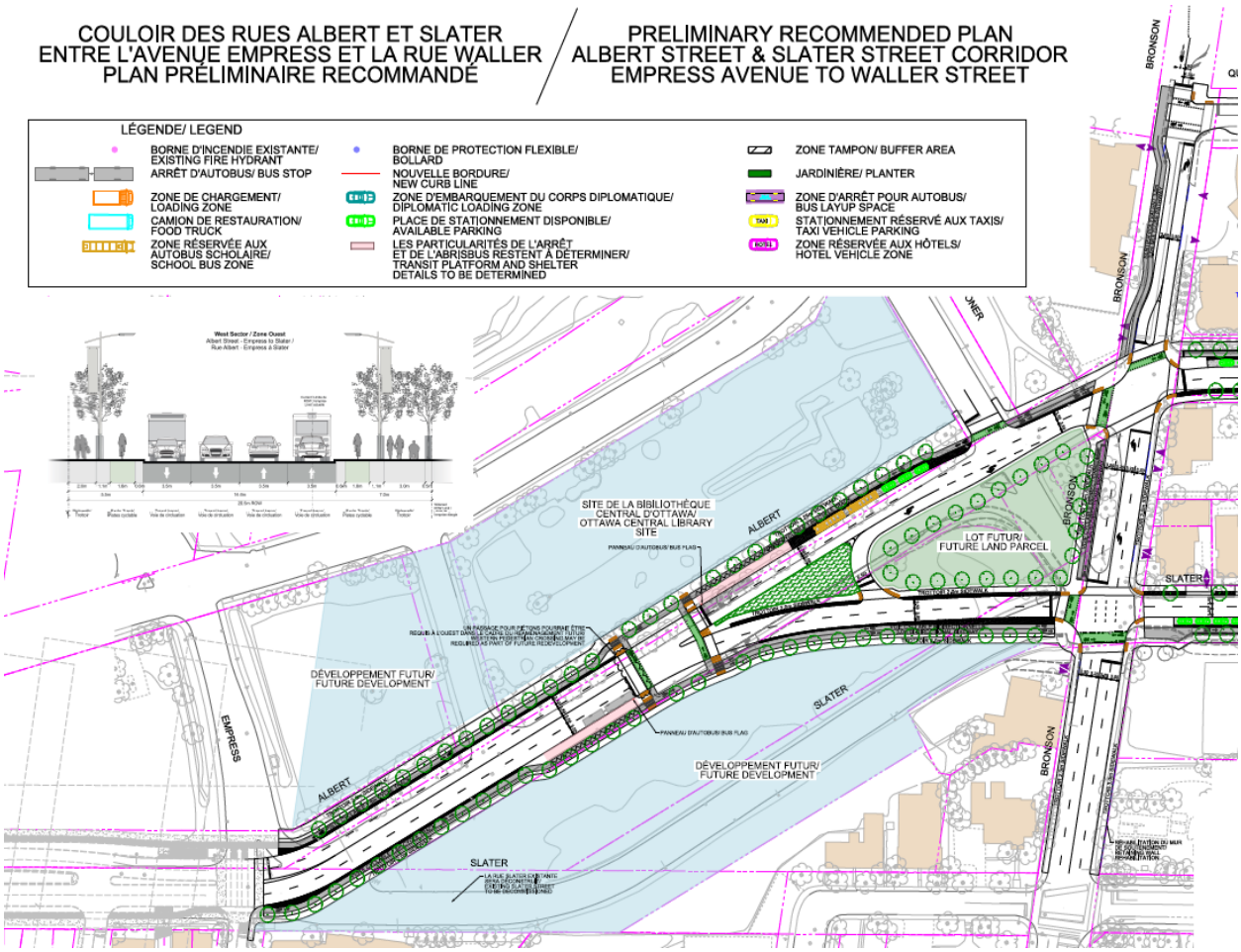
Boundary streets for the proposed development, as per the identified study area, include the following roadways:

- Albert Street/Slater Street, between Booth Street and Bronson Avenue;
- Booth Street, between Albert Street and Wellington Street;
- Wellington Street, east of Booth Street; and
- Bronson Avenue, north of Slater Street.

A review of the existing and planned road configurations in the study area revealed that the boundary segments of Booth and Wellington Streets feature existing "complete streets" designs, including wide sidewalks, boulevards, and dedicated cycling infrastructure. As per the City of Ottawa's TIA guidelines, this analysis therefore does not require the development of a design concept for these boundary streets. Since the proposed development does not feature a site access on these streets, and additionally given that traffic operations at all intersections in the study area are acceptable under Future Total conditions, no changes to these streets' design are required because of the proposed development.

While boundary segments of Albert Street/Slater Street and Bronson Avenue do not currently feature complete streets designs, they are planned to be reconstructed as complete streets under the City of Ottawa's *Albert and Slater Streets Improvement Project*, including planned wide sidewalks, boulevards, and dedicated cycling infrastructure, as well as a realignment of Slater Street between Empress and Bronson Avenues. Consequently, this analysis also does not require the development of a design concept for these boundary streets. Access to the proposed development will be served via the existing Albert Street/Empress Avenue North intersection, and therefore is already considered in the planned design of Albert Street. The planned configuration of Albert Street, Slater Street, and Bronson Avenue in the vicinity of the proposed development is shown in Figure 6-1.

Figure 6-1 Planned Configuration of Albert/Slater Streets and Bronson Avenue



Source: Albert Street & Slater Street Corridor Preliminary Recommended Plan, 2018

It should also be noted that the proposed development will be located directly adjacent to the Pimisi LRT Station, which is expected to interface well with the complete streets designs of the development's boundary streets and improve multi-modal levels of service for active transportation and transit users in the vicinity of the development.

Road Safety

Historical collision data for the most recently available five years (January 1st, 2016, through December 31st, 2020) was obtained from the City of Ottawa's Open Data Portal in the form of Tabular Transportation Collision Data.

Table 6-5 summarizes the number of collisions reported along boundary streets for the study area, both at intersections and midblock segments.

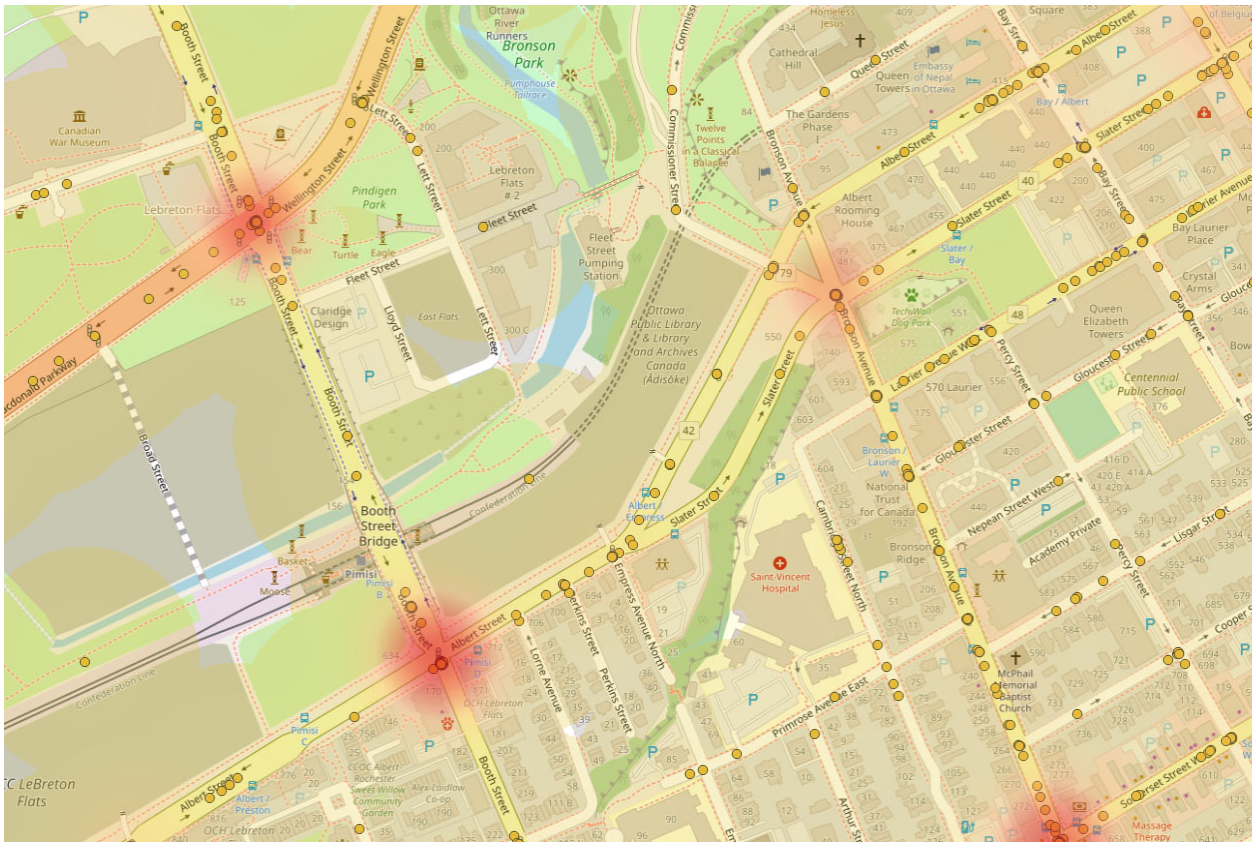
Table 6-5 Study Area Boundary Street Collision Records, 2016-2020

Boundary Street Location	Number of Collisions
Albert and Slater Streets, from Booth Street to Bronson Avenue (Excluding the Booth/Albert intersection)	97
Booth Street, from Albert Street to Wellington Street/Sir John A MacDonald Parkway (Excluding the Booth/Albert intersection)	83
Albert Street/Booth Street intersection	70

Three boundary street locations for collision analysis have been identified in **Table 6-5**, with the intersection of Albert Street and Booth Street listed separately due to its commonality between the two segments otherwise listed.

A heatmap of this collision data between 2016 and 2020, in the context of the location of the study area within Ottawa, is shown below in Figure 6-2. Red tones represent collision hotspots, while the underlying orange dots represent individual collisions.

Figure 6-2 Study Area 2016-2020 Collisions Heatmap



It is clear from the data presented in Figure 6-2 that three of the intersections within the study area represent hotspots for collisions:

- **Albert Street/Booth Street:** 70 intersections took place at this intersection over the 2016-2020 period:
    - 53 of 70 collisions recorded property damage only, while 17 of 70 (approx. 24%) recorded non-fatal injuries, for a total of 22 injuries. There were no fatal injuries recorded, but 3 of the 22 non-fatal injuries were classified as major. Of the 3 major injuries, 1 took place in a single-vehicle collision involving a pedestrian; 2 took place in an angle-impact involving vehicles only.
    - The slightly higher frequency and severity of injuries reported at this intersection may be partially attributed to greater pedestrian, cyclist, and transit volumes when compared to other locations along boundary streets.
- **Bronson Avenue/Slater Street/Commissioner Street:** 48 intersections took place at this intersection over the 2016-2020 period:
    - 43 of 48 collisions recorded property damage only, while 5 of 48 (approx. 10%) recorded non-fatal injuries, for a total of 7 injuries. There were no fatal or major injuries recorded.
    - The frequency of collisions at this intersection could be partially attributed to its unusual geometry and poor sightlines. It should be noted that the Bronson/Slater/Commissioner intersection will be reconfigured as part of the Albert and Slater Streets Improvement Project, which may reduce the frequency of collisions witnessed at this location.
- **Booth Street/Wellington Street/Sir John A MacDonald Parkway:** 59 intersections took place at this intersection over the 2016-2020 period:
    - 49 of 59 collisions recorded property damage only, while 10 of 59 (approx. 17%) recorded non-fatal injuries, for a total of 13 injuries. There were no fatal or major injuries recorded.
    - The frequency of collisions at this intersection could be partially attributed to its size and high traffic volumes, as well as the frequency of illegal turns being performed, as was noted during turning movement count collection.

Neighbourhood Traffic Management

The proposed development is not expected to exacerbate existing operational concerns on boundary streets as all intersections in the study area perform well under Future Total conditions. Additionally, the site access will be located at an existing signalized intersection. The planned re-configuration of Albert and Slater Streets in the vicinity of the site access may also assist in resolving operational concerns.

6.4. Access Intersection Design

As previously detailed, the north leg of the Empress Avenue and Albert Street intersection will be utilized as the site access for the subject site. The City of Ottawa's Private Approach By-law states *"no private approach intended for two-way vehicular traffic shall exceed 9 metres in width at the street line, and at the curb line or roadway edge"*. Also, City of Ottawa's Zoning By-law 2008-250 Section 107 states that a double traffic driveway lane providing access to a parking lot or parking garage must have a minimum width of 6.0 metres.

The site access has a width of 7.3 metres and the ramp entrance width is marked as 6.2 metres from the most recent site plan received, which complies with the minimum width standards. The site driveway also meets the minimum residential/commercial driveway width as per Table 8.9.1 in the Transportation Association of Canada (TAC) guidelines. The site driveway curb radii are measured at R5.0, which also meet the minimum TAC requirement. Lower curb radii reduce the crossing distances for active modes of transportation and reduce vehicle turning speed at the site driveway, to enhance safety for all users.

With respect to TAC's intersection design parameter, Table 8.9.3 from the guideline identifies a clear throat length minimum of 25 metres for collector and 40 metres for an arterial road. The clear throat distance is for the provision of unobstructed on-site driveway length to prevent stopped vehicles from blocking the path of entering vehicles or vehicles travelling along the circulation roadways on site. The proposed driveway exceeds the minimum clear throat length, measured from the curb return of the site driveway radius to the passenger vehicle ramp entry. For corner clearance, TAC identifies a minimum of 70 metres between driveway to a public intersection on the same travelling direction. The corner clearance from the site driveway to the Albert Street and Booth Street intersection, which is the nearest intersecting leg to the north segment of Empress Avenue, is approximately 150 metres, which exceeds the minimum distance.

No signal warrant analysis was considered for this study, as the Empress Avenue and Albert Street currently operates as a signalized intersection.

As the Empress Avenue and Albert Street intersection is also the site access intersection, the MMLOS evaluation of the intersection is combined later in this report.

7. Network Impact Component

7.1. Transportation Demand Management

Mobycon was retained by Dream Asset Management to prepare a Transportation Demand Management (TDM) Plan for the development of the LeBreton Flats Library Parcel in the City of Ottawa. A comprehensive memorandum detailing recommended TDM measures, and associated TDM Measures Checklist and TDM-Supportive Development Design and Infrastructure Checklist have been collated and included in **Appendix E**.

7.2. Neighbourhood Traffic Management

Per the City of Ottawa's TIA guidelines, any collector, or local roads (as designated by the City's existing road classifications) which form portions of a significant access route for site traffic to/from the proposed development must be reviewed in the context of road classifications, potential alternatives to development access routes, and the possibility for neighbourhood traffic management measures to mitigate the impacts of such traffic.

Within the study area, Booth Street (south of Albert Street) and Empress Avenue North (south of Albert Street) are the only roads presently designated as collector or local roads. Of these, only Booth has been assigned site traffic as per the trip distribution and assignment discussed in the *Forecasting Report*, as Empress terminates in a cul-de-sac immediately south of Albert. Some neighbourhood traffic management principles are already in place for Booth Street south of Albert Street, including a prohibition on heavy vehicles and transit vehicles on this segment, as well as prohibitions on southbound through traffic (from 11 p.m. to 6 a.m. daily) and westbound left traffic (from 7 a.m. to 9 a.m. and 3:30 p.m. to 5:30 p.m., Monday through Friday) at the Booth/Albert intersection.

The segment of Booth Street immediately south of Albert Street is designated as a Major Collector Road; therefore, its acceptable volume threshold would be 600 vehicles during the Peak Hour as per the City's TIA guidelines. The volumes assigned to this road segment under this assessment are shown in **Table 7-1**:

Table 7-1 Traffic Volumes assigned to Booth Street south of Albert Street

Horizon	AM Peak Volumes			PM Peak Volumes		
	NB	SB	Total	NB	SB	Total
Site Traffic Only	10	19	29	17	13	30
Baseline 2022	270	408	678	406	410	816
Future Background 2027	294	430	724	472	468	940
Future Background 2032	307	451	758	492	488	980
Future Total 2027	304	450	754	490	482	972
Future Total 2032	317	471	788	510	502	1,012

Note: The sum of Site Traffic and Future Background may not equal Future Total due to rounding.

Two-way traffic volumes on this segment of Booth Street exceed the City's neighbourhood traffic management plan threshold of 600 vehicles during both the AM and PM Peak Hours in each horizon. This was seen in existing 2022 baseline volumes obtained through Turning Movement Counts conducted on April 19th, 2022. The site traffic volumes assigned to this road segment are minor, totalling approximately only 30 vehicles in each of the two peak hours.

Additionally, Booth Street serves as a direct north-south connection between the study area and the Highway 417 interchange at Rochester Street within the context of a fine-grained local and collector road network, so it will not be possible to eliminate its use by some site traffic.

As this segment of Booth Street exceeds the applicable threshold irrespective of site traffic, as well as under existing baseline conditions, the development cannot be marked responsible for changing its existing role and function. Further neighbourhood traffic management measures may be considered by the City of Ottawa but are therefore not detailed further herein.

7.3. Transit

Route Capacity

This review of the proposed development's impact to the study area's transit capacity focuses on the Pimisi LRT Station, which is anticipated to see increased service along an extended route, prior to the proposed development's horizon year of 2027, and likely leading to the elimination of bus service along Albert Street under future conditions.

Pre-pandemic transit passenger data was extracted from the Transportation Impact Assessment Report prepared by WSP and dated February 2022, for the proposed library development at 555 Albert Street, located adjacent to the proposed development at 665 Albert Street. Ridership data, provided in **Table 7-2**, was obtained from OC Transpo for the study area from January 2020 to March 2020 for the Pimisi LRT Station and Bus Stops located in front of the proposed development on Albert Street.

Table 7-2 Existing Transit Passenger Data

Location	Action	AM Peak Period	PM Peak Period
Pimisi LRT Station *Stop 3010*	Boarding	715	1,379
	Alighting	1,222	805
Albert Street west of Empress *Stop 2392*	Boarding	0	2
	Alighting	0	5
Slater Street east of Empress *Stop 2396*	Boarding	2	0
	Alighting	4	3

Each light rail transit (LRT) vehicle has a capacity to carry 600 passengers, and with a planned operational frequency of every 5-minutes in each direction for most of the day, the LRT line has a peak capacity of approximately 10,000 passengers per hour in each direction. With the potential for service frequency increases along the route, the LRT passenger capacity has the

potential to grow to approximately 18,000 passengers per hour per direction by 2031, and 24,000 passengers per hour per direction.

The LeBreton Flats Master Concept Plan identifies a 60% transit mode share targets for all phases of the area development. This target was adopted for the future conditions analysis of the proposed development in the Transportation Impact Assessment Forecasting Report submitted to the city on May 9, 2022, and subsequently approved by city staff on June 2, 2022. Based on the trip generation prepared in that report, the proposed development is anticipated to generate approximately 390 transit passengers in the AM peak hour, consisting of 273 boardings and 117 alighting trips. During the PM peak hour, the development is anticipated to generate approximately 384 transit passengers, consisting of 159 boardings and 225 alighting trips at Pimisi LRT Station.

Based upon the existing (pre-pandemic) Pimisi Station passenger counts and the capacity of the O-Train LRT network, it is concluded that the LRT system can accommodate the additional anticipated peak hour transit riders generated by the proposed development under future conditions.

Accordingly, since there are no additional costs associated with any required transit capacity changes, capital and operational cost implications are not required to be examined further in this study.

Transit Priority

The subject site is located immediately adjacent to the Pimisi LRT Station, which benefits from a dedicated right-of-way and requires no additional transit priority measures. Considering the surrounding transit system and the location of the site access at an existing intersection, no additional transit priority is required along the boundary street network.

7.4. Network Concept

Per the City of Ottawa's TIA guidelines, a review of how the proposed development merits changes to Transportation Master Plan concepts for auto or transit networks is required if the development generates more than 200 peak-hour person-trips more than the equivalent volume permitted by established zoning.

As detailed in the TIA Forecasting Report, the proposed development generates a total of 130 trips in the AM peak hour (39 inbound, 91 outbound) and 128 trips in the PM peak hour (75 inbound, 53 outbound). Therefore, this Transportation Impact Assessment study is exempted from this module.

7.5. Network Intersection Design

The Multi-Modal Level of Service (MMLOS) evaluation establishes performance measures for all modes such as cycling, walking, transit, trucks and vehicular. The City of Ottawa's MMLOS Guidelines (IBI Group, 2015) was used to evaluate the MMLOS for all four (4) intersection in the study area.

Exhibit 5 from the MMLOS guidelines was used to evaluate Pedestrian Level of Service (PLOS) with the worst LOS reported for each intersection based on a review of all approaches. All intersections currently do not meet the desirable MMLOS target of PLOS 'A' in a Central Area, as per the City of Ottawa's MMLOS Guidelines which outline desirable targets. Detailed evaluation of PLOS is summarized in **Appendix F**.

The Bicycle Level of Service (BLOS) was evaluated for each intersection based on the Exhibit 12 from the MMLOS guideline. The BLOS first investigates two criteria: Right-turning case and Left-turning case. The Sir John A. Macdonald Parkway and Booth Street intersection resulted in a BLOS of 'A' and met the MMLOS target in a Central Area. Conversely, the intersections of Albert Street / Slater Street at Empress Avenue, and Slater Street at Bronson Avenue had a BLOS of 'D'. Some intersections had separated two-directional bike lanes on some segments, such as the northerly leg of Albert Street, however, if one of the approaches pose conflicts during the Right turn or Left turn movement, it was evaluated lower than BLOS of 'A'. The detailed evaluation of BLOS is summarized in **Appendix F**.

Exhibit 16 evaluation table within the City's MMLOS guideline was used to evaluate Transit Level of Service (TLOS) with intersection movement delays obtained from the complete Synchro traffic analysis. Streets that have existing transit routes were only considered for this evaluation. Busy intersections along Booth Street resulted in TLOS of 'F' due to longer movement delays, however, Albert Street, which has as a HOV Lane in the Westbound direction, resulted in TLOS of 'B' at the site access intersection.

The Truck Level of Service (TkLOS) investigates motor vehicle LOS by considering the geometric design of the intersection where physical space is available for truck turns is a determining factor. Exhibit 21 of the MMLOS guideline was referred to evaluate the TkLOS. Since the study intersection is within the city core area and will attract more active transportation users, there has been geometric modifications to intersection such as Sir John A. MacDonald Parkway at Booth Street, where intersection corner radii are reduced to shorten crossing distances for pedestrian and to add bike lanes. This results in less space for truck turns, but still allows all intersections to achieve a TkLOS of 'D' which meets the MMLOS Target and balances the need to accommodate commercial turns with active safety.

The summary of the MMLOS Evaluation table can also be found in **Appendix F**.

8. Traffic Capacity Analysis

8.1. Existing (Baseline 2022) Traffic

The traffic capacity analysis results for the intersections in the study area are summarized in **Table 8-1** for both the weekday AM and PM peak hours under existing 2022 traffic conditions.

It should be noted that restricted turning movements were captured during collection of Turning Movement Counts on April 19th, 2022, at the intersection of Sir John A. Macdonald Parkway / Wellington Street and Booth Street. These restricted movements were replicated in the Synchro model to illustrate the actual existing conditions during both AM and PM peak hours. An illegal turn reassignment will be conducted to manage these volumes under future conditions.

Table 8-1 Baseline 2022 Traffic Analysis

Intersection	Movement	Weekday AM Peak Hour			Weekday PM Peak Hour		
		v/c	Delay (s)	LOS	v/c	Delay (s)	LOS
Sir John A. Macdonald Parkway / Wellington Street and Booth Street (Signalized)	*Overall*	*0.62*	21	C	*0.65*	24	C
	EBTR	0.72	41	D	0.24	43	D
	WBTL	0.14	35	C	0.73	51	D
	WBR	0.00	13	B	**0.85**	37	D
	NBTR	0.52	29	C	0.49	19	B
	SBL	0.58	9	A	0.36	8	A
	SBT	0.23	5	A	0.31	7	A
	SBR	0.04	4	A	0.01	5	A
Albert Street and Booth Street (Signalized)	*Overall*	*0.57*	*27*	*C*	*0.75*	*33*	*C*
	EBL	0.35	19	B	0.72	24	C
	EBT	0.40	21	C	0.28	17	B
	EBR	0.01	16	B	0.02	14	B
	WBL	0.03	22	C	0.07	21	C
	WBT	0.20	22	C	0.45	25	C
	WBR	0.16	22	C	0.34	24	C
	NBLTR	0.34	34	C	0.54	39	D
	SBL	0.18	23	C	0.40	37	D
	SBT	0.64	32	C	0.63	47	D
	SBR	0.43	28	C	0.54	45	D
Albert Street/Slater Street and Empress Avenue (Signalized)	*Overall*	*0.15*	*7*	*A*	*0.22*	*11*	*B*
	EBTL	0.21	4	A	0.15	10	A
	EBR	0.01	0	A	0.00	9	A
	WBLTR	0.16	10	B	0.31	11	B
	NBLTR	0.02	32	C	0.04	32	C

Intersection	Movement	Weekday AM Peak Hour			Weekday PM Peak Hour		
		v/c	Delay (s)	LOS	v/c	Delay (s)	LOS
	SBLTR	0.00	0	0	0.00	0	0
Slater Street and Bronson Avenue (Signalized)	*Overall*	*0.34*	*18*	*B*	*0.34*	*14*	*B*
	EBTL	0.29	17	B	0.52	30	C
	NBTR	0.40	22	C	0.29	12	B
	SBL	0.10	12	B	0.05	4	A
	SBT	0.23	13	B	0.22	5	A

Under existing AM and PM conditions, all study intersections operate within capacity and at a reasonable level of service. All turning movements operate with LOS D or better.

It is recommended that the city investigate mitigation measures to manage illegal eastbound turns at the intersection of Sir John A. Macdonald Parkway / Wellington Street and Booth Street in the future. Alternatively, these turns could be studied and legalized for specific time periods, to maintain acceptable traffic operations in the study area. The existing lane configuration for the study network and the baseline 2022 volumes are shown in **Appendix G**.

8.2. Future (2027) Background Traffic

The traffic capacity analysis results for the intersections in the study area are summarized in **Table 8-2** for both weekday AM and PM peak hours under 2027 future background traffic conditions. The 2022 baseline traffic, plus the 5 year of corridor growth rate, plus the specified future background development traffic were combined to produce the 2027 future background weekday AM and PM peak hour traffic volumes.

Table 8-2 Future (2027) Background Traffic Analysis

Intersection	Movement	Weekday AM Peak Hour			Weekday PM Peak Hour		
		v/c	Delay (s)	LOS	v/c	Delay (s)	LOS
Sir John A. Macdonald Parkway / Wellington Street and Booth Street (Signalized)	*Overall*	*0.66*	22	C	*0.70*	25	C
	EBTR	0.75	41	D	0.26	41	D
	WBTL	0.16	33	C	0.76	51	D
	WBR	0.00	13	B	**0.85**	37	D
	NBTR	0.58	31	C	0.58	22	C
	SBL	0.61	10	B	0.41	10	A
	SBT	0.25	6	A	0.35	8	A
	SBR	0.04	5	A	0.01	6	A
Albert Street and Booth Street (Signalized)	*Overall*	*0.61*	*27*	*C*	*0.78*	*33*	*C*
	EBL	0.35	19	B	0.74	26	C
	EBT	0.42	22	C	0.31	18	B
	EBR	0.01	16	B	0.02	14	B

Intersection	Movement	Weekday AM Peak Hour			Weekday PM Peak Hour		
		v/c	Delay (s)	LOS	v/c	Delay (s)	LOS
	WBL	0.04	22	C	0.22	22	C
	WBT	0.21	22	C	0.49	25	C
	WBR	0.16	22	C	0.42	25	C
	NBLTR	0.37	34	C	0.63	41	D
	SBL	0.21	23	C	0.60	43	D
	SBT	0.67	34	C	0.66	46	D
	SBR	0.43	28	C	0.54	42	D
Albert Street/Slater Street and Empress Avenue/Site Access (Signalized)	*Overall*	*0.16*	*7*	*A*	*0.27*	*12*	*B*
	EBTL	0.23	4	A	0.20	9	A
	EBR	0.01	0	A	0.00	9	A
	WBLTR	0.17	10	B	0.38	12	B
	NBLTR	0.02	32	C	0.04	32	C
	SBLTR	0.00	0	0	0.00	0	0
Slater Street and Bronson Avenue (Signalized)	*Overall*	*0.36*	*18*	*B*	*0.38*	*14*	*B*
	EBTL	0.31	17	B	0.53	30	C
	NBTR	0.42	22	C	0.33	12	B
	SBL	0.10	13	B	0.05	4	A
	SBT	0.24	13	B	0.28	5	A

Under future background 2027 AM and PM conditions, all study intersections operate within capacity and at a reasonable level of service. The future background 2027 volumes are shown in **Appendix G**.

8.3. Future (2032) Background Traffic

The traffic capacity analysis results for the intersections in the study area are summarized in **Table 8-3** for both weekday AM and PM peak hours under 2027 future background traffic conditions. The 2022 baseline traffic, plus the 10 year of corridor growth rate, plus the specified future background development traffic were combined to produce the 2032 future background weekday AM and PM peak hour traffic volumes.

Table 8-3 Future (2032) Background Traffic Analysis

Intersection	Movement	Weekday AM Peak Hour			Weekday PM Peak Hour		
		v/c	Delay (s)	LOS	v/c	Delay (s)	LOS
Sir John A. Macdonald Parkway / Wellington Street and Booth Street	*Overall*	*0.68*	23	C	*0.72*	25	C
	EBTR	0.75	40	D	0.25	40	D
	WBTL	0.16	33	C	0.76	50	D
	WBR	0.00	13	B	0.84	36	D
	NBTR	0.62	32	C	0.62	23	C

Intersection	Movement	Weekday AM Peak Hour			Weekday PM Peak Hour		
		v/c	Delay (s)	LOS	v/c	Delay (s)	LOS
(Signalized)	SBL	0.63	12	B	0.43	11	B
	SBT	0.26	7	A	0.37	9	A
	SBR	0.04	5	A	0.01	6	A
Albert Street and Booth Street (Signalized)	*Overall*	*0.64*	*28*	*C*	*0.81*	*34*	*C*
	EBL	0.36	19	B	0.75	27	C
	EBT	0.45	22	C	0.32	18	B
	EBR	0.01	16	B	0.02	14	B
	WBL	0.04	21	C	0.22	22	C
	WBT	0.22	22	C	0.51	25	C
	WBR	0.16	22	C	0.42	25	C
	NBLTR	0.38	34	C	0.66	42	D
	SBL	0.21	23	C	0.63	44	D
	SBT	0.71	35	C	0.70	47	D
	SBR	0.43	28	C	0.54	42	D
Albert Street/Slater Street and Empress Avenue/Site Access (Signalized)	*Overall*	*0.17*	*7*	*A*	*0.28*	*12*	*B*
	EBTL	0.24	4	A	0.20	9	A
	EBR	0.01	0	A	0.00	9	A
	WBLTR	0.18	10	B	0.40	12	B
	NBLTR	0.02	32	C	0.04	32	C
	SBLTR	0.00	0	0	0.00	0	0
Slater Street and Bronson Avenue (Signalized)	*Overall*	*0.37*	*18*	*B*	*0.39*	*14*	*B*
	EBTL	0.32	17	B	0.54	30	C
	NBTR	0.43	22	C	0.34	12	B
	SBL	0.10	13	B	0.05	5	A
	SBT	0.25	14	B	0.29	6	A

Under future background 2032 AM and PM conditions, all study intersections operate within capacity and at a reasonable level of service.

8.4. Future (2027) Total Traffic

The future total road network is largely consistent with the baseline and future background, with a new site access at the intersection of Albert Street/Slater Street and Empress Avenue. The Empress Avenue will extend towards north and the northern leg of the intersection act as the new site access of the proposed development. The traffic capacity analysis results for the intersections in the study area are summarized in **Table 8-4** for both weekday AM and PM peak hours under 2027 future total traffic conditions.

The 2022 baseline traffic, 5 years of corridor growth rate, specified future background development traffic, and the site generated trips were combined to produce the 2027 future

total weekday AM and PM peak hour traffic volumes. It is noted that illegal trip reassignment was conducted for the future total traffic analysis for both the 2027 and 2032 horizons. Illegal eastbound right turns captured during existing conditions were re-assigned to eastbound through movements to ensure compliant operations under future.

Table 8-4 Future (2027) Total Traffic Analysis

Intersection	Movement	Weekday AM Peak Hour			Weekday PM Peak Hour		
		v/c	Delay (s)	LOS	v/c	Delay (s)	LOS
Sir John A. Macdonald Parkway / Wellington Street and Booth Street (Signalized)	*Overall*	*0.73*	23	C	*0.71*	25	C
	EBTR	0.73	39	D	0.28	40	D
	WBTL	0.14	30	C	0.76	51	D
	WBR	0.00	13	B	0.84	37	D
	NBTR	0.65	33	C	0.60	23	C
	SBL	0.69	14	B	0.42	10	B
	SBT	0.27	8	A	0.35	9	A
	SBR	0.04	6	A	0.01	6	A
Albert Street and Booth Street (Signalized)	*Overall*	*0.61*	*28*	*C*	*0.80*	*34*	*C*
	EBL	0.36	19	B	0.74	26	C
	EBT	0.43	22	C	0.32	18	B
	EBR	0.01	16	B	0.02	14	B
	WBL	0.11	23	C	0.27	24	C
	WBT	0.22	24	C	0.49	26	C
	WBR	0.23	25	C	0.45	27	C
	NBLTR	0.38	34	C	0.66	42	D
	SBL	0.24	23	C	0.71	51	D
	SBT	0.67	34	C	0.66	46	D
	SBR	0.43	28	C	0.54	42	D
Albert Street/Slater Street and Empress Avenue (Signalized)	*Overall*	*0.23*	*11*	*B*	*0.31*	*13*	*B*
	EBTL	0.26	5	A	0.28	10	B
	EBR	0.01	0	A	0.00	9	A
	WBLTR	0.19	10	B	0.40	12	B
	NBLTR	0.02	32	C	0.04	32	C
	SBLTR	0.25	34	C	0.15	33	C
Slater Street and Bronson Avenue (Signalized)	*Overall*	*0.38*	*18*	*B*	*0.40*	*15*	*B*
	EBLTR	0.35	17	B	0.56	30	C
	NBTR	0.43	22	C	0.35	13	B
	SBL	0.11	13	B	0.05	5	A
	SBT	0.24	13	B	0.28	6	A

Overall, under future total 2027 conditions, all intersections in the study area are shown to operate well with the addition of site accesses to/from the proposed development. All turning movements operate with LOS D or better. Future total 2027 volumes are shown in **Appendix G**.

8.5. Future (2032) Total Traffic

The future total road network is largely consistent with the baseline and future background, with a new site access at the intersection of Albert Street/Slater Street and Empress Avenue. The Empress Avenue will extend towards north and the northern leg of the intersection act as the new site access of the proposed development. The traffic capacity analysis results for the intersections in the study area are summarized in **Table 8-5** for both weekday AM and PM peak hours under 2032 future total traffic conditions.

The 2022 baseline traffic, 10 years of corridor growth rate, specified future background development traffic, and the site generated trips were combined to produce the 2032 future total weekday AM and PM peak hour traffic volumes.

Table 8-5 Future (2032) Total Traffic Analysis

Intersection	Movement	Weekday AM Peak Hour			Weekday PM Peak Hour		
		v/c	Delay (s)	LOS	v/c	Delay (s)	LOS
Sir John A. Macdonald Parkway / Wellington Street and Booth Street (Signalized)	*Overall*	*0.75*	24	C	*0.73*	25	C
	EBTR	0.73	39	D	0.28	40	D
	WBTL	0.14	30	C	0.77	50	D
	WBR	0.00	13	B	0.83	36	D
	NBTR	0.68	33	C	0.64	24	C
	SBL	0.71	17	B	0.44	11	B
	SBT	0.28	8	A	0.37	9	A
	SBR	0.04	7	A	0.01	7	A
Albert Street and Booth Street (Signalized)	*Overall*	*0.64*	*28*	*C*	*0.82*	*35*	*C*
	EBL	0.36	19	B	0.76	27	C
	EBT	0.45	22	C	0.33	18	B
	EBR	0.01	16	B	0.02	14	B
	WBL	0.12	23	C	0.28	24	C
	WBT	0.23	24	C	0.52	26	C
	WBR	0.23	25	C	0.45	27	C
	NBLTR	0.40	34	C	0.68	43	D
	SBL	0.25	23	C	0.73	53	D
	SBT	0.71	35	C	0.70	47	D
	SBR	0.43	28	C	0.54	42	D
Albert Street/Slater Street and Empress Avenue	*Overall*	*0.24*	*10*	*B*	*0.32*	*13*	*B*
	EBTL	0.27	5	A	0.29	10	A
	EBR	0.01	0	A	0.00	9	A

Intersection	Movement	Weekday AM Peak Hour			Weekday PM Peak Hour		
		v/c	Delay (s)	LOS	v/c	Delay (s)	LOS
(Signalized)	WBLTR	0.20	10	B	0.42	13	B
	NBLTR	0.02	32	C	0.04	32	C
	SBLTR	0.25	34	C	0.15	33	C
Slater Street and Bronson Avenue (Signalized)	*Overall*	*0.40*	*18*	*B*	*0.41*	*15*	*B*
	EBLTR	0.36	17	B	0.57	30	C
	NBTR	0.45	23	C	0.36	13	B
	SBL	0.11	13	B	0.05	5	A
	SBT	0.25	14	B	0.29	6	A

Overall, under future total 2032 conditions, all intersections in the study area are shown to operate well with the addition of site accesses to/from the proposed development. All turning movements operate with LOS D or better. The future total 2032 volumes are shown in **Appendix G**.

9. Drawings

In accordance with Step 5 of the City of Ottawa's Transportation Impact Assessment Submission guidelines, several reference drawings have been compiled and attached to this report within **Appendix H.**

It should be noted that the project team has been engaged in coordination with the relevant municipal teams to integrate the Empress site access to municipal plans to ensure that minimal site work is required when the Albert Street reconstruction project occurs. It is the project team's understanding that road design drawing packages along Albert Street and at the Empress Lane intersection are currently in progress and will continue to have various revisions until all parties involved come to a final agreement. Several draft figures have been provided in **Appendix H**, however these are subject to change based on coordination with city staff. Accordingly, Road Modification Approval (RMA) figures will require approval from Transportation Services following the ongoing coordination process, separate from the final submission of the Transportation Impact Assessment.

The functional design plan and detailed design drawings received from the Reconstruction of Albert Street project team can be found in **Appendix H**.

10. Monitoring Plan

The elements of the proposed development subject to the City of Ottawa's Monitoring Plan requirements are given as follows.

9.1. Albert Street/Empress Avenue North Intersection Performance

The proposed site access at the signalized intersection of Albert Street and Empress Avenue North is recommended to be the subject of continued monitoring with respect to traffic volumes and signalized intersection performance. A comment received from City staff on the Step 4 Analysis Report for this submission indicated that the City's Traffic Signals group would require an exclusive left-turn lane with appropriate storage and taper lengths (eastbound left-turn from Albert Street to the site access).

TYLin will provide storage and taper lengths for this design. Under the most conservative modelled conditions (Future Total 2032), 22 vehicles are modelled as making this eastbound left turn in the AM peak hour and 42 vehicles in the PM peak hour. This lane group experiences LOS A in both AM and PM peak hours and experiences 95th percentile queue lengths of 13 metres and 29 metres, respectively. These queue lengths can be easily managed within a left-turn lane of a length that does not impact the westbound left turn lane at the Albert Street/Booth Street intersection. However, TYLin recommends that the City of Ottawa monitor volumes and queues at the Albert/Empress intersection on a yearly basis at minimum, for the dual purposes of assessing the sufficiency of the provided storage and taper lengths for the exclusive eastbound left-turn lane, as well as for the City to perform periodic optimizations of traffic signal timing at the intersection.

9.2. Transportation Demand Management (TDM) Measures

To assess the validity of the assumptions underlying proposed TDM measures as well as the success of and opportunities to improve these measures, the City of Ottawa monitoring their effectiveness is recommended.

The City of Ottawa should conduct a confidential transportation survey at the full build-out of the development to identify residential and staff travel behaviours. The comprehensive survey will provide a measure of current commuter traffic patterns, modes of transportation, behaviours, and perceptions. Results will also assist in identifying the demand for sustainable transportation options and opportunities to provide better site access and reduce auto trips.

The City of Ottawa should conduct a follow-up TDM survey two years after the baseline commuter survey. Results will identify areas of success and improvement for sustainable options for the development and surrounding area. A revised work plan should then be developed with strategies to improve sustainable transportation that meet the needs of the residents.

The provision of any monitoring surveys should be considered as need be and completed at the discretion of the City.

11. Conclusions

A summary of key takeaways from the Design Review and Network Impact modules as part of this Transportation Impact Assessment for the proposed development are presented as follows:

1. Development Design
    a. The proposed development includes design elements which promote the adoption of sustainable modes, with safe and efficient access for all users.
    b. The site accommodates the access and circulation requirements of all municipal design vehicles, including truck movements within the indoor loading area.
2. Parking
    a. The proposed supply of 206 vehicle parking spaces (130 resident and 76 visitor), and 756 bicycle parking spaces (638 interior secured and 118 exterior) exceeds the minimum requirements and is within the maximum limits permitted under the City of Ottawa's Zoning By-law 2008-250 Consolidation.
3. Boundary Street Design
    a. All the boundary streets in the study area feature existing "complete streets" designs or will be reconstructed within the study horizon with wide sidewalks, boulevards, and dedicated cycling infrastructure.
4. Access Intersection Design
    a. Access to the proposed development will be served via the existing Albert Street/Empress Avenue North intersection and the design has been considered in the planned reconstruction of Albert Street.
5. Transportation Demand Management
    a. In addition to what is outlined in the site plan in terms of development design and infrastructure features to support the TDM, additional measures are detailed in the cover memorandum within **Appendix E**, prepared by *Mobycon*, for consideration and implementation.
6. Neighbourhood Traffic Management
    a. NTM principles are already in place for Booth Street south of Albert Street, including a prohibition on heavy vehicles and transit, and on southbound through traffic and westbound left traffic at the Booth/Albert intersection.
    b. Two-way traffic volumes on the segment of Booth Street south of Albert exceed the City's neighbourhood traffic management plan threshold of 600 vehicles during both the AM and PM Peak Hours in each horizon. However, this is applicable to existing conditions and not due to the proposed development.
7. Transit
    a. The proposed development is situated adjacent to the Pimisi LRT Station and is anticipated to generate 390 transit passengers in the AM peak hour and 384 transit passengers in the PM peak hour.

b. Based on the existing and planned capacity of the O-Train network, the LRT system can accommodate the additional anticipated peak hour transit riders generated by the proposed development under future conditions.

8. Network Concept
    a. The proposed development generates a total of 130 trips in the AM peak hour (39 inbound, 91 outbound) and 128 trips in the PM peak hour (75 inbound, 53 outbound), and is therefore exempt from this module.
9. Network Intersection Design
    a. *Pedestrian:* None of the study intersections currently meet the desired MMLOS target of PLOS 'A' in a Central Area, due to the roadway width and number of vehicle travel lanes at intersections along the boundary road network.
    b. *Bicycle:* The intersection of Sir John A. Macdonald Parkway and Booth Street intersection resulted in a BLOS of 'A' and met the MMLOS target in a Central Area. Conversely, the intersections of Albert Street / Slater Street at Empress Avenue, and Slater Street at Bronson Avenue had a BLOS of 'D'.
    c. *Transit:* Intersections along Booth Street resulted in TLOS of 'F' due to longer movement delays, however, Albert Street, which has as a HOV Lane in the Westbound direction, resulted in TLOS of 'B' at the site access intersection.
    d. *Truck:* Intersections achieve a TkLOS of 'D' which meets the MMLOS Target and balances the need to accommodate commercial turns with active safety.

Based on the above, the development of 665 Albert Street is appropriately designed for sustainable transportation, meets City of Ottawa design objectives, and can be accommodated without undue impact to the area transportation network within the 2027 study horizon.

TYLin

APPENDIX A

Signal Timing Plan and Turning Movement Counts

Traffic Signal Timing

City of Ottawa, Public Works Department

Traffic Signal Operations Unit

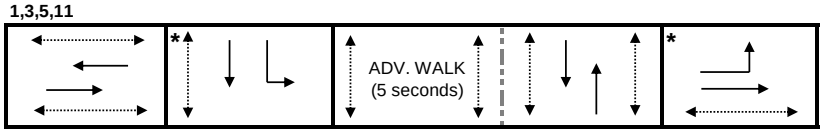
Intersection:	***Main:*** Albert	***Side:***	Booth
Controller:	**ATC3**	**TSD:**	**5465**
Author:	Bianca Amaral-Stewart	**Date:**	20-Apr-2022

Existing Timing Plans†

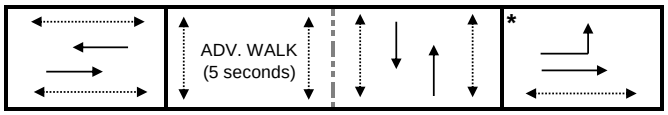
	Plan						**Ped Minimum Time**		
	AM Peak	**Off Peak**	**PM Peak**	**Night**	**Weekend**	**AM Heavy**	***Walk***	***DW***	***A+R***
	1	2	3	4	5	11			
Cycle	120	90	120	90	100	120			
Offset	104	38	9	3	38	104			
EB Thru	55	53	68	40	49	66	7	23	3.3+3.2
WB Thru	37	40	40	40	36	36	7	23	3.3+3.2
SB Left	25	-	12	13	13	14	-	-	3.3+3.2
NB Thru	40	37	40	37	38	40	7	23	3.3+3.2
SB Thru	65	37	52	50	51	54	7	23	3.3+3.2
EB Left	18	13	28	-	13	30	-	-	3.3+3.2

Phasing Sequence‡

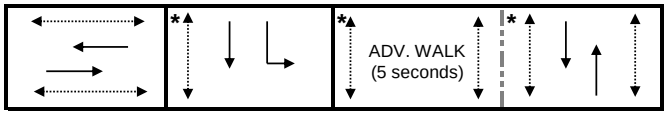
Plan: 1,3,5,11



Plan: 2



Plan: 4



Notes: 1) The SB & WB right turns are prohibited on red weekdays between 7:00-21:00
2) The WB left turn is prohibited weekdays between 7:00-9:00 & 15:30-17:30 with bicycles excepted
3) The SB thru is prohibited between 23:00-6:00

Schedule

Weekday

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

Saturday

Time	Plan
0:15	4
6:00	2
12:00	5
18:00	2
23:00	4

Sunday

Time	Plan
0:15	4
8:00	2
12:00	5
18:00	2
23:00	4

Notes

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

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

Asterisk (*) Indicates actuated phase

(fp): Fully Protected Left Turn

◄·····► Pedestrian signal

Cost is $61.16 ($54.12 + HST)

Traffic Signal Timing

City of Ottawa, Transportation Services Department

Traffic Signal Operations Unit

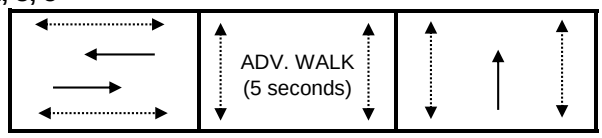
Intersection:	**Main:**	Albert / Slater	**Side:**	Empress	
Controller:	**ATC3**			**TSD:**	**5658**
Author:	Bianca Amaral-Stewart			**Date:**	20-Apr-2022

Existing Timing Plans†

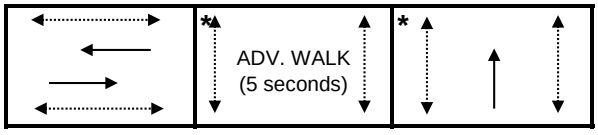
	Plan					**Ped Minimum Time**		
	AM Peak 1	**Off Peak** 2	**PM Peak** 3	**Night** 4	**Weekend** 5	***Walk***	***DW***	***A+R***
Cycle	120	75	120	70	75			
Offset	87	25	87	X	6			
EB Thru	81	36	81	31	36	7	15	3.3+3.8
WB Thru	81	36	81	31	36	7	15	3.3+3.8
NB Thru	39	39	39	39	39	10	23	3.3+3.0
SB Thru	39	39	39	39	39	10	23	3.3+3.0

Phasing Sequence‡

Plan: 1, 2, 3, 5



Plan: 4



Schedule

Weekday

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

Weekend

Time	Plan
0:15	4
8:00	2
18:30	4

Notes

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

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

Asterisk (*) Indicates actuated phase

(fp): Fully Protected Left Turn

◄·····► Pedestrian signal

Cost is $61.16 ($54.12 + HST)

Traffic Signal Timing

City of Ottawa, Transportation Services Department

Traffic Signal Operations Unit

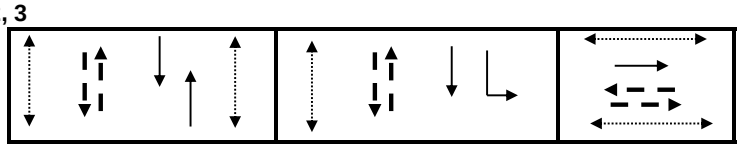
Intersection:	**Main:** Bronson	**Side:** Slater		
Controller:	**ATC3**		**TSD:**	**5760**
Author:	Bianca Amaral-Stewart		**Date:**	2022-Apr-20

Existing Timing Plans†

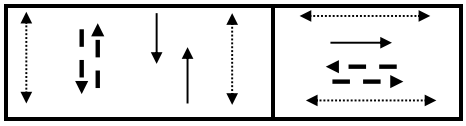
	Plan				**Ped Minimum Time**		
	AM Peak 1	**Off Peak** 2	**PM Peak** 3	**Night** 4	***Walk***	***DW***	***A+R***
Cycle	75	75	75	55			
Offset	16	65	38	20			
NB Thru	29	30	29	28	13	7	3.3+2.7
SB Thru	40	42	43	28	13	7	3.3+2.7
SB Left	11	12	14	-	-	-	3.3+2.7
EB Thru	35	33	32	27	7	7	3.3+2.6

Phasing Sequence‡

Plan: 1, 2, 3



Plan: 4



Notes:
1) The EB right turn is prohibited.
2) The NB right turn is prohibited on red.
3) Plans 1, 2, and 3 have a maximum recall on the SB left turn.

Schedule

Weekday

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

Weekend

Time	Plan
0:15	4
8:00	2
22:00	4

Notes

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

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

Asterisk (*) Indicates actuated phase

(fp): Fully Protected Left Turn

Pedestrian signal

Bike signal

Cost is $61.16 ($54.12 + HST)

Traffic Signal Timing

City of Ottawa, Public Works Department

Traffic Signal Operations Unit

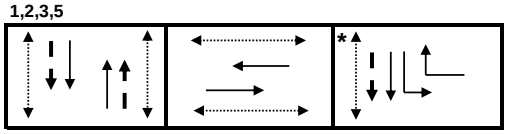
Intersection:	***Main:*** Booth	***Side:***	SJAM/Wellington
Controller:	**MS3200+**	**TSD:**	**6567**
Author:	Bianca Amaral-Stewart	**Date:**	20-Apr-2022

Existing Timing Plans†

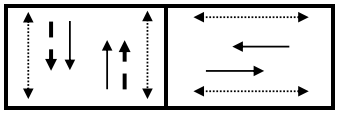
	Plan					**Ped Minimum Time**		
	AM Peak 1	**Off Peak** 2	**PM Peak** 3	**Night** 4	**Weekend** 5	***Walk***	***DW***	***A+R***
Cycle	95	90	120	75	85			
Offset	31	58	3	23	58			
NB Thru	35	38	48	35	35	10	15	3.3+3.5
SB Thru	47	51	60	35	47	10	15	3.3+3.5
EB Thru	48	39	60	40	38	10	19	3.7+3.1
WB Thru	48	39	60	40	38	10	19	3.7+3.1
SB Left	12	13	12	-	12	-	-	3.3+3.5
WB Right	12	13	12	-	12	-	-	3.3+3.5

Phasing Sequence‡

Plan: 1,2,3,5



Plan: 4



Notes:
1) The NB left turn is prohibted except for authorized vehicles.
2) The EB left and right turns are prohibted except for authorized vehicles.
3) The EB and WB U-turns are prohibited.
4) The WB left turn is prohibited except weekends 8:00-16:00 (authorized vehicles excepted).
5) The WB right turn is prohibted on red.

Schedule

Weekday

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

Weekend

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

Notes

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

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

Asterisk (*) Indicates actuated phase

(fp): Fully Protected Left Turn

◄·····► Pedestrian signal

▬ ► Bike signal

Cost is $61.16 ($54.12 + HST)

Horizon Data Services Ltd

Email: nhyree@gmail.com
Phone: (416) 840-6619 Fax: (416) 840-5297
"Your Traffic Count Specialist"

File Name : Albert Street at Booth Street
Site Code : 00000000
Start Date : 4/19/2022
Page No : 1

Groups Printed- Cars - Trucks - Heavys - Cyclists

	Albert St From North					Booth St From East					Albert St From South					Booth St From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
06:00 AM	7	7	0	1	15	8	30	0	0	38	2	15	15	0	32	49	43	21	0	113	198
06:15 AM	5	10	0	2	17	3	28	0	0	31	0	31	8	1	40	57	44	17	1	119	207
06:30 AM	6	16	2	2	26	4	42	1	0	47	2	42	19	1	64	56	66	23	1	146	283
06:45 AM	12	26	3	4	45	2	51	2	0	55	2	40	31	6	79	30	59	10	1	100	279
Total	30	59	5	9	103	17	151	3	0	171	6	128	73	8	215	192	212	71	3	478	967
07:00 AM	9	19	1	8	37	3	47	3	3	56	1	28	15	5	49	35	55	19	0	109	251
07:15 AM	11	21	2	3	37	0	62	0	0	62	2	43	27	5	77	44	64	9	6	123	299
07:30 AM	12	23	0	6	41	3	73	1	2	79	3	60	32	6	101	43	66	12	5	126	347
07:45 AM	12	43	2	6	63	3	53	4	2	62	2	59	32	6	99	32	62	12	2	108	332
Total	44	106	5	23	178	9	235	8	7	259	8	190	106	22	326	154	247	52	13	466	1229
08:00 AM	8	43	0	8	59	7	57	2	4	70	3	66	39	20	128	34	64	8	3	109	366
08:15 AM	15	41	4	14	74	9	67	2	4	82	5	76	32	8	121	21	59	10	6	96	373
08:30 AM	17	52	3	3	75	7	55	4	1	67	1	78	35	6	120	36	63	9	2	110	372
08:45 AM	18	49	3	9	79	7	51	2	0	60	1	67	42	4	114	27	52	8	2	89	342
Total	58	185	10	34	287	30	230	10	9	279	10	287	148	38	483	118	238	35	13	404	1453
04:00 PM	41	104	10	9	164	6	90	2	0	98	6	64	80	13	163	16	27	8	1	52	477
04:15 PM	29	89	5	2	125	7	104	3	2	116	1	45	83	19	148	16	31	9	3	59	448
04:30 PM	35	113	5	11	164	3	79	4	5	91	6	45	71	4	126	16	28	8	5	57	438
04:45 PM	26	89	0	14	129	4	100	4	2	110	4	61	62	9	136	29	37	5	1	72	447
Total	131	395	20	36	582	20	373	13	9	415	17	215	296	45	573	77	123	30	10	240	1810
05:00 PM	37	91	6	7	141	6	87	6	2	101	1	60	64	4	129	16	25	10	3	54	425
05:15 PM	14	84	6	15	119	3	96	4	1	104	5	47	51	12	115	16	30	6	2	54	392
05:30 PM	24	93	10	7	134	2	87	5	0	94	5	60	58	7	130	19	26	6	1	52	410
05:45 PM	15	56	7	3	81	4	72	5	0	81	7	57	55	4	123	30	38	7	1	76	361
Total	90	324	29	32	475	15	342	20	3	380	18	224	228	27	497	81	119	29	7	236	1588
06:00 PM	19	61	4	2	86	4	73	9	1	87	3	44	64	7	118	21	32	6	4	63	354
06:15 PM	18	54	3	7	82	1	75	6	4	86	3	44	43	7	97	18	37	3	7	65	330
06:30 PM	15	44	3	4	66	4	58	1	5	68	3	33	48	3	87	18	24	6	3	51	272
06:45 PM	14	44	1	8	67	3	54	2	2	61	1	37	40	9	87	25	38	6	0	69	284
Total	66	203	11	21	301	12	260	18	12	302	10	158	195	26	389	82	131	21	14	248	1240

Horizon Data Services Ltd

Email: nhyree@gmail.com
Phone: (416) 840-6619 Fax: (416) 840-5297
"Your Traffic Count Specialist"

File Name : Albert Street at Booth Street
Site Code : 00000000
Start Date : 4/19/2022

Groups Printed- Cars - Trucks - Heavys - Cyclists

	Albert St From North					Booth St From East					Albert St From South					Booth St From West					
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Grand Total	419	1272	80	155	1926	103	1591	72	40	1806	69	1202	1046	166	2483	704	1070	238	60	2072	8287
Apprch %	21.8	66	4.2	8		5.7	88.1	4	2.2		2.8	48.4	42.1	6.7		34	51.6	11.5	2.9		
Total %	5.1	15.3	1	1.9	23.2	1.2	19.2	0.9	0.5	21.8	0.8	14.5	12.6	2	30	8.5	12.9	2.9	0.7	25	
Cars	394	1232	79	155	1860	100	1579	69	40	1788	69	1148	966	166	2349	641	1063	228	60	1992	7989
% Cars	94	96.9	98.8	100	96.6	97.1	99.2	95.8	100	99	100	95.5	92.4	100	94.6	91.1	99.3	95.8	100	96.1	96.4
Trucks	12	13	1	0	26	1	8	2	0	11	0	17	24	0	41	15	4	7	0	26	104
% Trucks	2.9	1	1.2	0	1.3	1	0.5	2.8	0	0.6	0	1.4	2.3	0	1.7	2.1	0.4	2.9	0	1.3	1.3
Heavys	12	27	0	0	39	1	1	1	0	3	0	35	56	0	91	48	2	3	0	53	186
% Heavys	2.9	2.1	0	0	2	1	0.1	1.4	0	0.2	0	2.9	5.4	0	3.7	6.8	0.2	1.3	0	2.6	2.2
Cyclists	1	0	0	0	1	1	3	0	0	4	0	2	0	0	2	0	1	0	0	1	8
% Cyclists	0.2	0	0	0	0.1	1	0.2	0	0	0.2	0	0.2	0	0	0.1	0	0.1	0	0	0	0.1

Horizon Data Services Ltd

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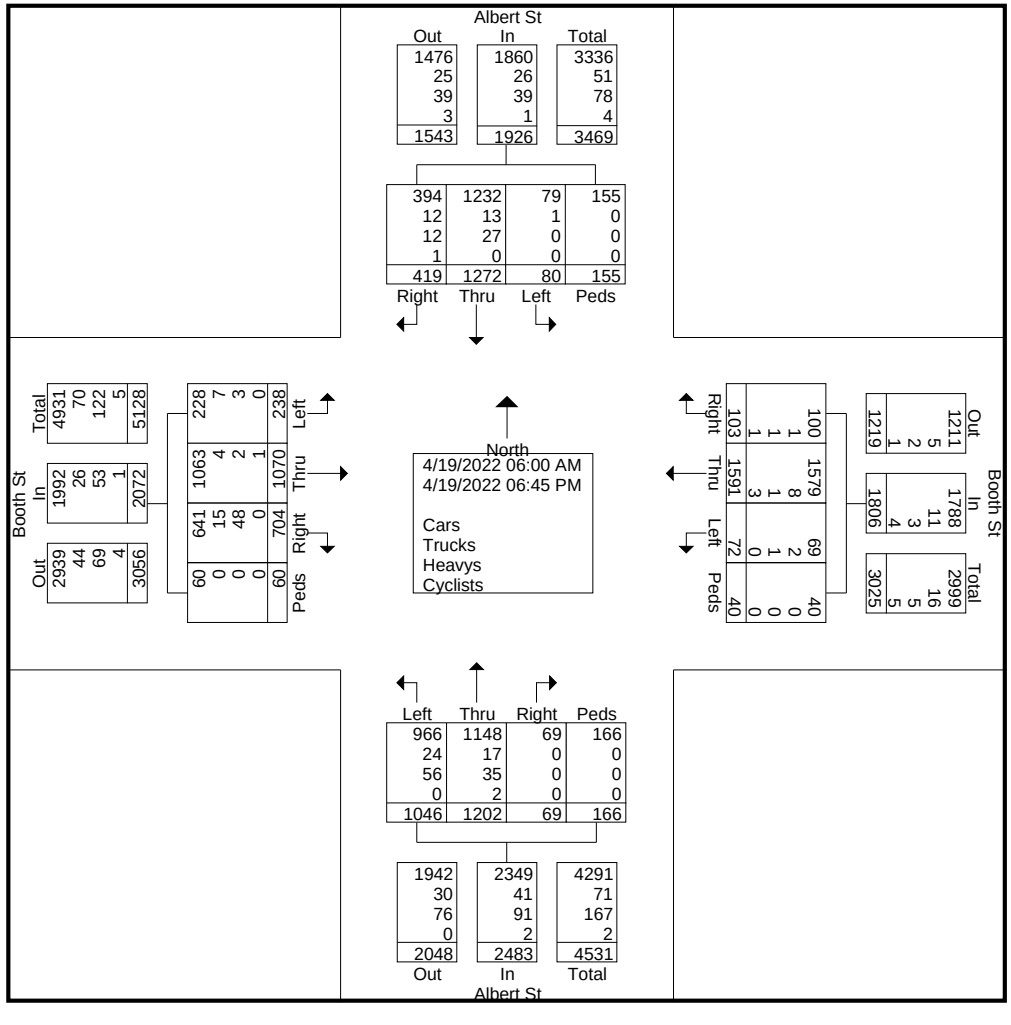
"Your Traffic Count Specialist"

File Name : Albert Street at Booth Street
Site Code : 00000000
Start Date : 4/19/2022



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File Name : Albert Street at Booth Street
Site Code : 00000000
Start Date : 4/19/2022

	Albert St From North					Booth St From East					Albert St From South					Booth St From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 06:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 08:00 AM																					
08:00 AM	8	43	0	8	59	7	57	2	**4**	70	3	66	39	**20**	**128**	34	**64**	8	3	109	366
08:15 AM	15	41	**4**	**14**	74	**9**	**67**	2	4	**82**	**5**	76	32	8	121	21	59	**10**	**6**	96	**373**
08:30 AM	17	**52**	3	3	75	7	55	**4**	1	67	1	**78**	35	6	120	**36**	63	9	2	**110**	372
08:45 AM	**18**	49	3	9	**79**	7	51	2	0	60	1	67	**42**	4	114	27	52	8	2	89	342
Total Volume	58	185	10	34	287	30	230	10	9	279	10	287	148	38	483	118	238	35	13	404	1453
% App. Total	20.2	64.5	3.5	11.8		10.8	82.4	3.6	3.2		2.1	59.4	30.6	7.9		29.2	58.9	8.7	3.2		
PHF	.806	.889	.625	.607	.908	.833	.858	.625	.563	.851	.500	.920	.881	.475	.943	.819	.930	.875	.542	.918	.974
Cars	48	172	10	34	264	28	227	9	9	273	10	263	125	38	436	102	234	33	13	382	1355
% Cars	82.8	93.0	100	100	92.0	93.3	98.7	90.0	100	97.8	100	91.6	84.5	100	90.3	86.4	98.3	94.3	100	94.6	93.3
Trucks	5	5	0	0	10	1	2	1	0	4	0	11	7	0	18	6	2	2	0	10	42
% Trucks	8.6	2.7	0	0	3.5	3.3	0.9	10.0	0	1.4	0	3.8	4.7	0	3.7	5.1	0.8	5.7	0	2.5	2.9
Heavys	5	8	0	0	13	0	1	0	0	1	0	12	16	0	28	10	2	0	0	12	54
% Heavys	8.6	4.3	0	0	4.5	0	0.4	0	0	0.4	0	4.2	10.8	0	5.8	8.5	0.8	0	0	3.0	3.7
Cyclists	0	0	0	0	0	1	0	0	0	1	0	1	0	0	1	0	0	0	0	0	2
% Cyclists	0	0	0	0	0	3.3	0	0	0	0.4	0	0.3	0	0	0.2	0	0	0	0	0	0.1

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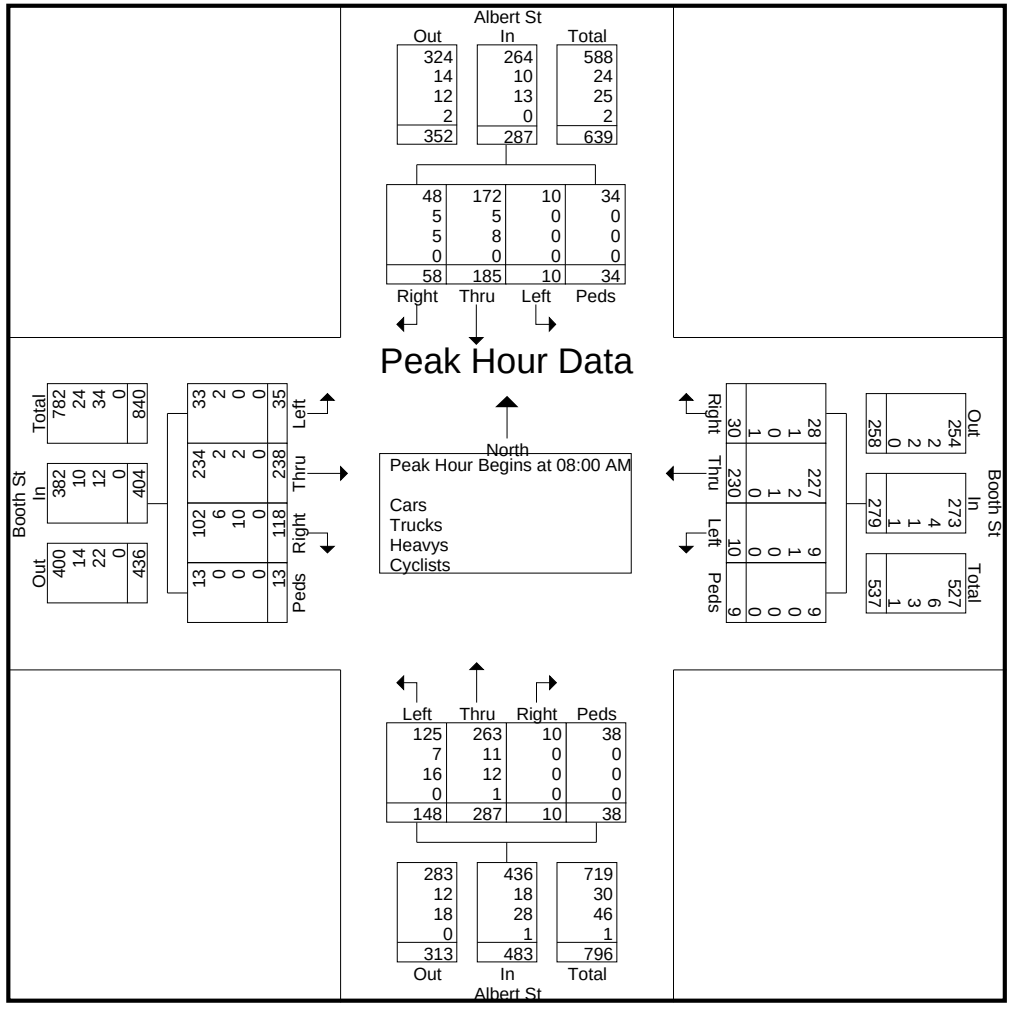
Start Date : 4/19/2022
Page No : 5



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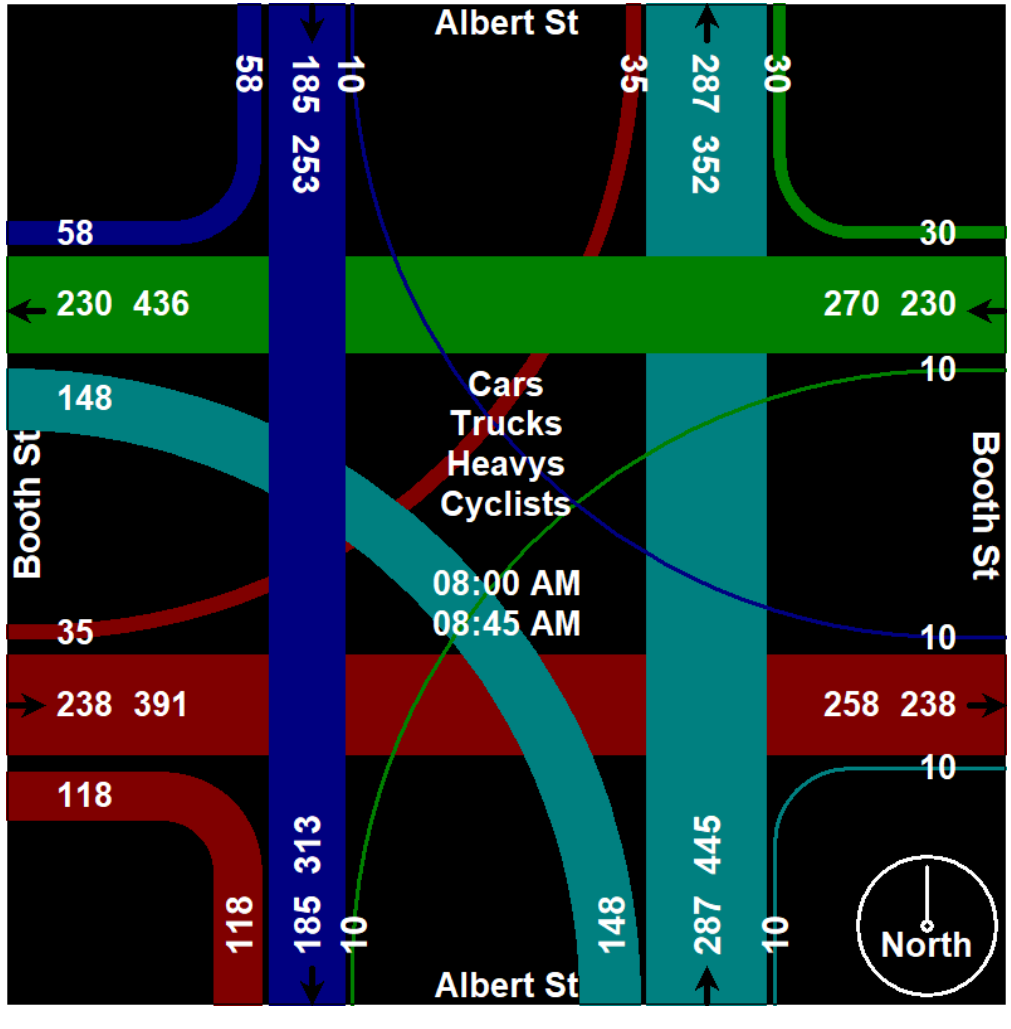

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File Name : Albert Street at Booth Street
Site Code : 00000000
Start Date : 4/19/2022
Page No : 7

	Albert St From North					Booth St From East					Albert St From South					Booth St From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 06:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:00 PM																					
04:00 PM	**41**	104	**10**	9	**164**	6	90	2	0	98	**6**	**64**	80	13	**163**	16	27	8	1	52	**477**
04:15 PM	29	89	5	2	125	**7**	**104**	3	2	**116**	1	45	**83**	**19**	148	16	31	**9**	3	59	448
04:30 PM	35	**113**	5	11	164	3	79	**4**	**5**	91	6	45	71	4	126	16	28	8	**5**	57	438
04:45 PM	26	89	0	**14**	129	4	100	4	2	110	4	61	62	9	136	**29**	**37**	5	1	**72**	447
Total Volume	131	395	20	36	582	20	373	13	9	415	17	215	296	45	573	77	123	30	10	240	1810
% App. Total	22.5	67.9	3.4	6.2		4.8	89.9	3.1	2.2		3	37.5	51.7	7.9		32.1	51.2	12.5	4.2		
PHF	.799	.874	.500	.643	.887	.714	.897	.813	.450	.894	.708	.840	.892	.592	.879	.664	.831	.833	.500	.833	.949
Cars	130	388	19	36	573	20	370	12	9	411	17	207	284	45	553	69	123	29	10	231	1768
% Cars	99.2	98.2	95.0	100	98.5	100	99.2	92.3	100	99.0	100	96.3	95.9	100	96.5	89.6	100	96.7	100	96.3	97.7
Trucks	1	3	1	0	5	0	1	1	0	2	0	2	4	0	6	0	0	0	0	0	13
% Trucks	0.8	0.8	5.0	0	0.9	0	0.3	7.7	0	0.5	0	0.9	1.4	0	1.0	0	0	0	0	0	0.7
Heavys	0	4	0	0	4	0	0	0	0	0	0	6	8	0	14	8	0	1	0	9	27
% Heavys	0	1.0	0	0	0.7	0	0	0	0	0	0	2.8	2.7	0	2.4	10.4	0	3.3	0	3.8	1.5
Cyclists	0	0	0	0	0	0	2	0	0	2	0	0	0	0	0	0	0	0	0	0	2
% Cyclists	0	0	0	0	0	0	0.5	0	0	0.5	0	0	0	0	0	0	0	0	0	0	0.1

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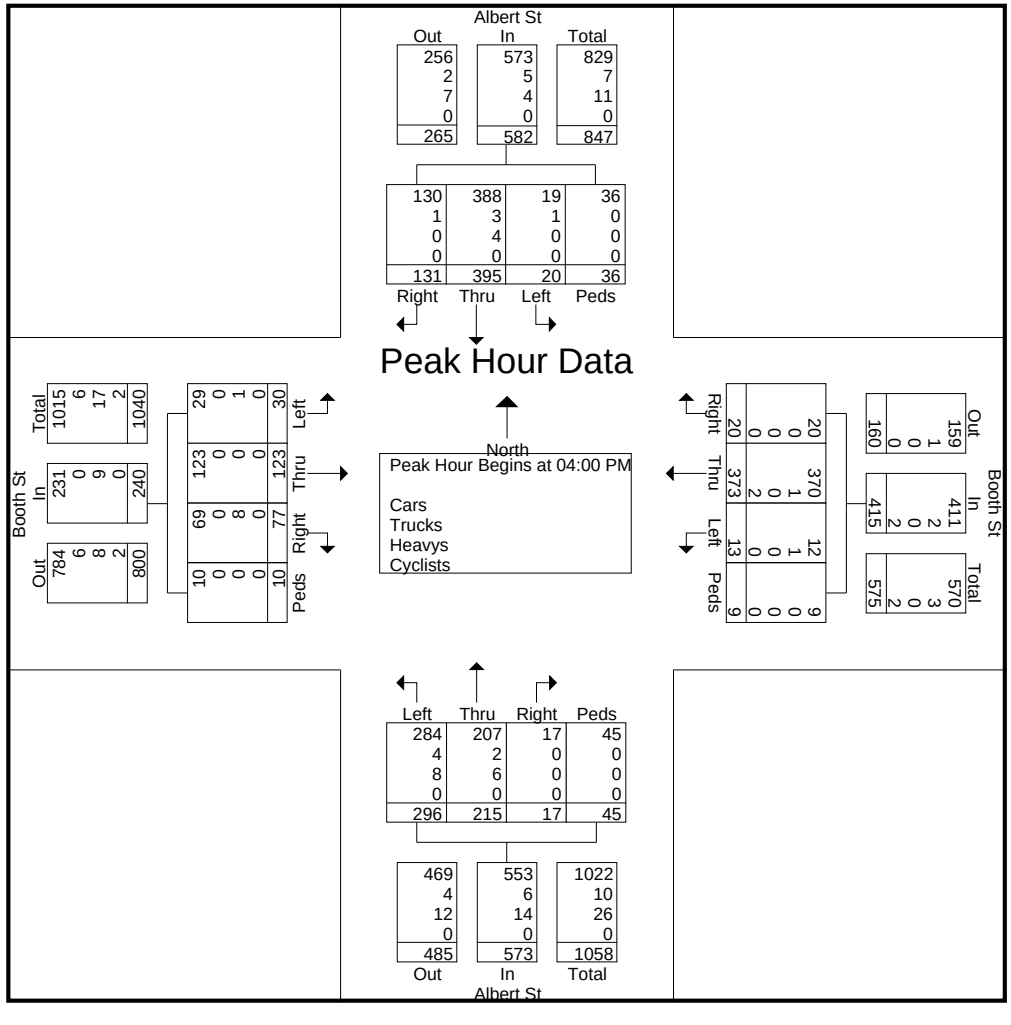
Start Date : 4/19/2022
Page No : 8



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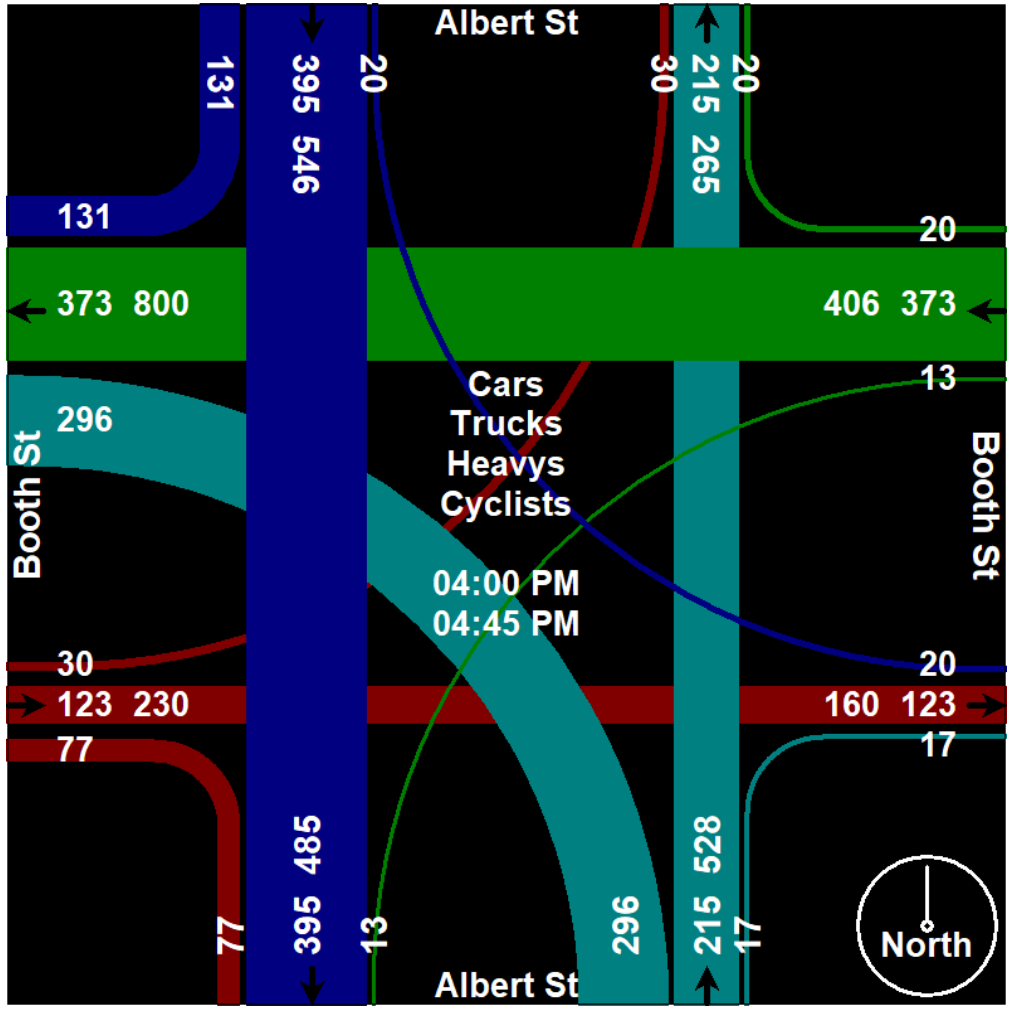

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"Your Traffic Count Specialist"

File Name : Albert Street at Empress Avenue
Site Code : 00000000
Start Date : 4/19/2022
Page No : 1

Groups Printed- Cars - Trucks - Heavys - Cyclists

	Albert St From North					Empress Ave From East					Albert St From South					Access From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
06:00 AM	0	15	1	0	16	0	0	0	0	0	0	43	1	0	44	0	0	0	0	0	60
06:15 AM	0	16	1	0	17	0	0	0	0	0	0	54	0	0	54	0	0	0	1	1	72
06:30 AM	0	23	1	0	24	2	0	0	1	3	0	73	0	1	74	0	0	0	1	1	102
06:45 AM	0	40	0	0	40	0	0	0	0	0	1	52	2	1	56	0	0	0	2	2	98
Total	0	94	3	0	97	2	0	0	1	3	1	222	3	2	228	0	0	0	4	4	332
07:00 AM	0	30	1	0	31	0	0	0	0	0	0	52	0	1	53	0	0	0	2	2	86
07:15 AM	0	33	1	0	34	1	0	0	0	1	0	51	0	0	51	0	0	0	4	4	90
07:30 AM	0	35	0	1	36	0	0	0	1	1	2	78	0	3	83	0	0	0	7	7	127
07:45 AM	0	64	2	2	68	0	0	0	3	3	1	73	0	3	77	0	0	0	5	5	153
Total	0	162	4	3	169	1	0	0	4	5	3	254	0	7	264	0	0	0	18	18	456
08:00 AM	1	45	2	0	48	1	0	0	1	2	3	84	0	3	90	0	0	0	4	4	144
08:15 AM	0	60	5	1	66	2	0	1	3	6	3	92	0	3	98	0	0	0	3	3	173
08:30 AM	2	66	2	2	72	0	0	0	3	3	2	107	0	1	110	0	0	0	2	2	187
08:45 AM	2	76	0	2	80	3	0	1	2	6	1	82	0	1	84	0	0	0	4	4	174
Total	5	247	9	5	266	6	0	2	9	17	9	365	0	8	382	0	0	0	13	13	678
04:00 PM	0	140	1	2	143	9	0	3	3	15	1	76	0	3	80	2	0	1	3	6	244
04:15 PM	3	137	0	2	142	1	0	0	2	3	0	64	0	2	66	0	0	0	6	6	217
04:30 PM	0	140	1	0	141	1	0	1	4	6	0	59	0	4	63	0	0	0	8	8	218
04:45 PM	0	119	0	4	123	0	0	1	0	1	0	70	0	6	76	0	0	0	8	8	208
Total	3	536	2	8	549	11	0	5	9	25	1	269	0	15	285	2	0	1	25	28	887
05:00 PM	0	125	1	3	129	0	0	1	2	3	0	82	0	2	84	0	0	0	6	6	222
05:15 PM	0	115	0	0	115	0	0	1	0	1	0	55	0	2	57	0	0	0	4	4	177
05:30 PM	0	111	1	0	112	1	0	0	0	1	0	73	0	1	74	0	0	0	5	5	192
05:45 PM	0	82	2	1	85	0	0	1	1	2	1	67	0	0	68	0	0	0	5	5	160
Total	0	433	4	4	441	1	0	3	3	7	1	277	0	5	283	0	0	0	20	20	751
06:00 PM	0	77	0	1	78	1	0	0	2	3	0	57	0	3	60	0	0	0	3	3	144
06:15 PM	0	80	0	1	81	0	0	0	2	2	1	45	0	1	47	0	0	0	3	3	133
06:30 PM	0	57	0	1	58	0	0	0	0	0	0	47	0	0	47	0	0	0	5	5	110
06:45 PM	0	58	0	1	59	0	0	0	1	1	0	47	0	3	50	0	0	0	4	4	114
Total	0	272	0	4	276	1	0	0	5	6	1	196	0	7	204	0	0	0	15	15	501

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"Your Traffic Count Specialist"

File Name : Albert Street at Empress Avenue
Site Code : 00000000
Start Date : 4/19/2022
Page No : 2

Groups Printed- Cars - Trucks - Heavys - Cyclists

	Albert St From North					Empress Ave From East					Albert St From South					Access From West					
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Grand Total	8	1744	22	24	1798	22	0	10	31	63	16	1583	3	44	1646	2	0	1	95	98	3605
Apprch %	0.4	97	1.2	1.3		34.9	0	15.9	49.2		1	96.2	0.2	2.7		2	0	1	96.9		
Total %	0.2	48.4	0.6	0.7	49.9	0.6	0	0.3	0.9	1.7	0.4	43.9	0.1	1.2	45.7	0.1	0	0	2.6	2.7	
Cars	5	1674	21	24	1724	21	0	9	31	61	14	1514	3	44	1575	2	0	1	95	98	3458
% Cars	62.5	96	95.5	100	95.9	95.5	0	90	100	96.8	87.5	95.6	100	100	95.7	100	0	100	100	100	95.9
Trucks	0	29	0	0	29	1	0	0	0	1	1	25	0	0	26	0	0	0	0	0	56
% Trucks	0	1.7	0	0	1.6	4.5	0	0	0	1.6	6.2	1.6	0	0	1.6	0	0	0	0	0	1.6
Heavys	0	39	0	0	39	0	0	1	0	1	1	41	0	0	42	0	0	0	0	0	82
% Heavys	0	2.2	0	0	2.2	0	0	10	0	1.6	6.2	2.6	0	0	2.6	0	0	0	0	0	2.3
Cyclists	3	2	1	0	6	0	0	0	0	0	0	3	0	0	3	0	0	0	0	0	9
% Cyclists	37.5	0.1	4.5	0	0.3	0	0	0	0	0	0	0.2	0	0	0.2	0	0	0	0	0	0.2

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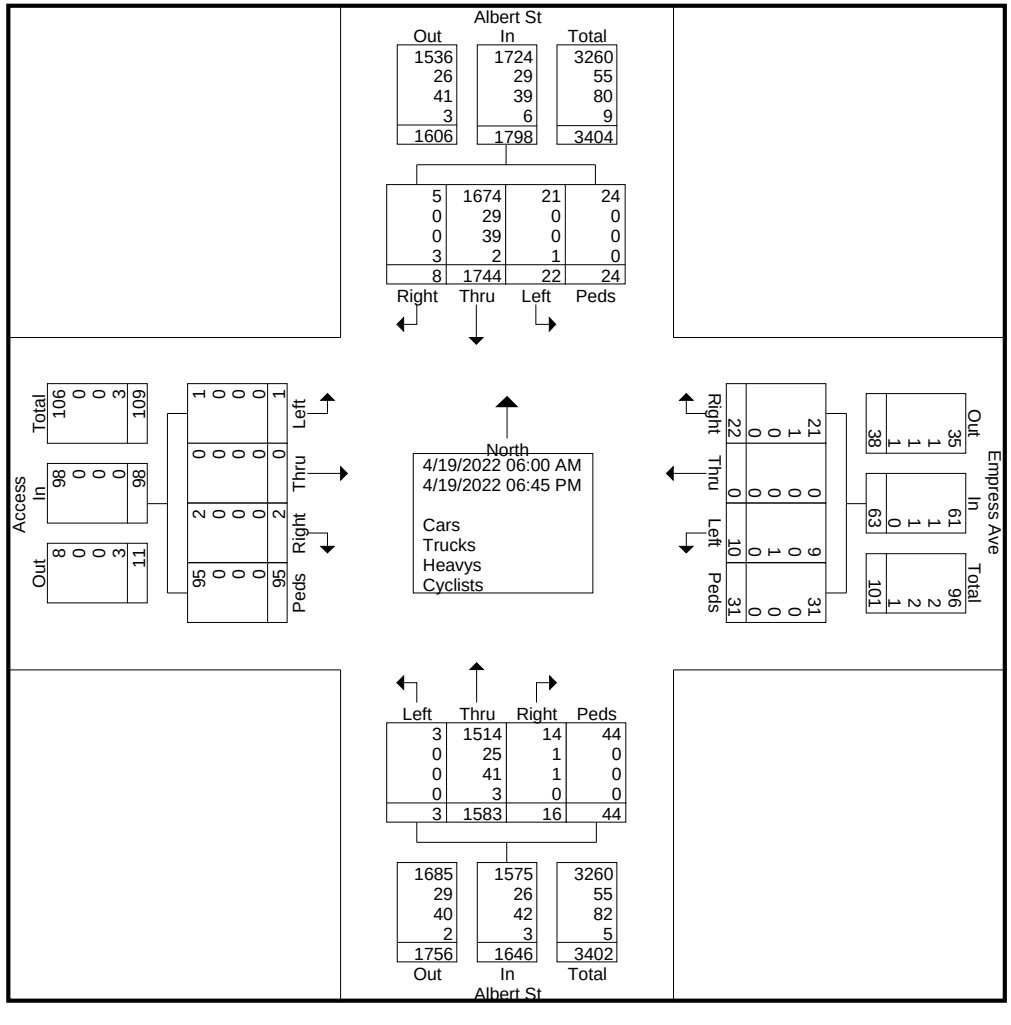

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	Albert St From North					Empress Ave From East					Albert St From South					Access From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 06:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 08:00 AM																					
08:00 AM	1	45	2	0	48	1	0	0	1	2	**3**	84	0	**3**	90	0	0	0	**4**	**4**	144
08:15 AM	0	60	**5**	1	66	2	0	**1**	**3**	**6**	3	92	0	3	98	0	0	0	3	3	173
08:30 AM	**2**	66	2	**2**	72	0	0	0	3	3	2	**107**	0	1	**110**	0	0	0	2	2	**187**
08:45 AM	2	**76**	0	2	**80**	**3**	0	1	2	6	1	82	0	1	84	0	0	0	4	4	174
Total Volume	5	247	9	5	266	6	0	2	9	17	9	365	0	8	382	0	0	0	13	13	678
% App. Total	1.9	92.9	3.4	1.9		35.3	0	11.8	52.9		2.4	95.5	0	2.1		0	0	0	100		
PHF	.625	.813	.450	.625	.831	.500	.000	.500	.750	.708	.750	.853	.000	.667	.868	.000	.000	.000	.813	.813	.906
Cars	5	223	8	5	241	6	0	1	9	16	8	339	0	8	355	0	0	0	13	13	625
% Cars	100	90.3	88.9	100	90.6	100	0	50.0	100	94.1	88.9	92.9	0	100	92.9	0	0	0	100	100	92.2
Trucks	0	10	0	0	10	0	0	0	0	0	0	12	0	0	12	0	0	0	0	0	22
% Trucks	0	4.0	0	0	3.8	0	0	0	0	0	0	3.3	0	0	3.1	0	0	0	0	0	3.2
Heavys	0	14	0	0	14	0	0	1	0	1	1	13	0	0	14	0	0	0	0	0	29
% Heavys	0	5.7	0	0	5.3	0	0	50.0	0	5.9	11.1	3.6	0	0	3.7	0	0	0	0	0	4.3
Cyclists	0	0	1	0	1	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	2
% Cyclists	0	0	11.1	0	0.4	0	0	0	0	0	0	0.3	0	0	0.3	0	0	0	0	0	0.3

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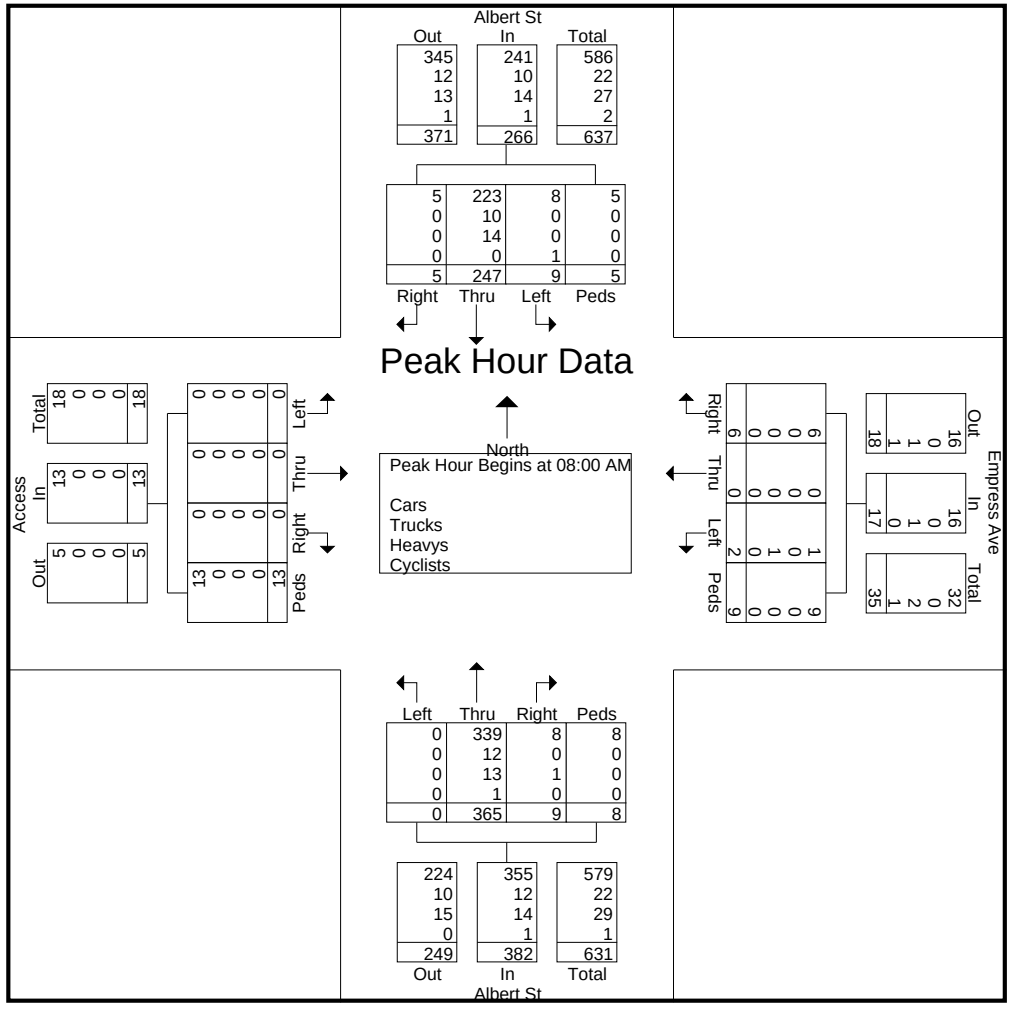

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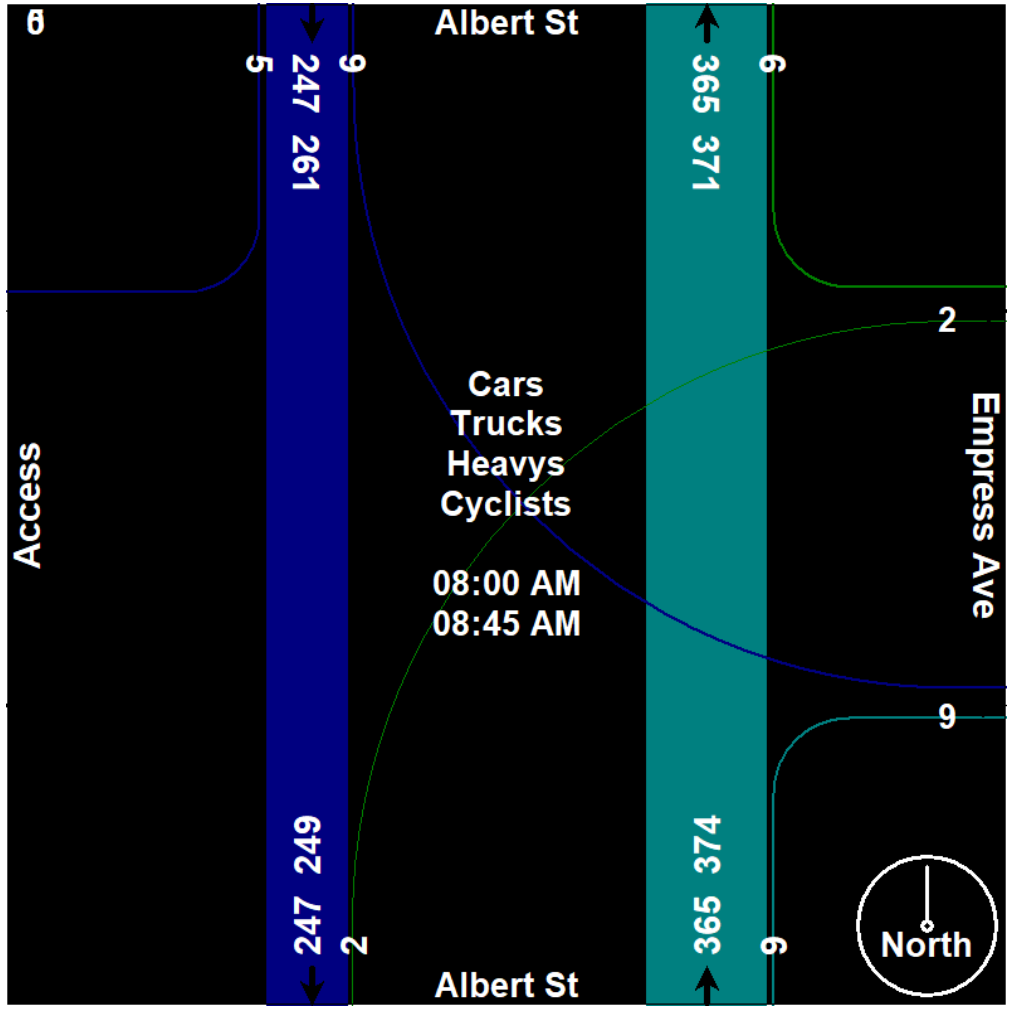

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File Name : Albert Street at Empress Avenue
Site Code : 00000000
Start Date : 4/19/2022
Page No : 7

	Albert St From North					Empress Ave From East					Albert St From South					Access From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 06:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:00 PM																					
04:00 PM	0	**140**	**1**	2	**143**	**9**	0	**3**	3	**15**	**1**	**76**	0	3	**80**	**2**	0	**1**	3	6	**244**
04:15 PM	**3**	137	0	2	142	1	0	0	2	3	0	64	0	2	66	0	0	0	6	6	217
04:30 PM	0	140	1	0	141	1	0	1	**4**	6	0	59	0	4	63	0	0	0	**8**	**8**	218
04:45 PM	0	119	0	**4**	123	0	0	1	0	1	0	70	0	**6**	76	0	0	0	8	8	208
Total Volume	3	536	2	8	549	11	0	5	9	25	1	269	0	15	285	2	0	1	25	28	887
% App. Total	0.5	97.6	0.4	1.5		44	0	20	36		0.4	94.4	0	5.3		7.1	0	3.6	89.3		
PHF	.250	.957	.500	.500	.960	.306	.000	.417	.563	.417	.250	.885	.000	.625	.891	.250	.000	.250	.781	.875	.909
Cars	0	527	2	8	537	10	0	5	9	24	0	261	0	15	276	2	0	1	25	28	865
% Cars	0	98.3	100	100	97.8	90.9	0	100	100	96.0	0	97.0	0	100	96.8	100	0	100	100	100	97.5
Trucks	0	5	0	0	5	1	0	0	0	1	1	1	0	0	2	0	0	0	0	0	8
% Trucks	0	0.9	0	0	0.9	9.1	0	0	0	4.0	100	0.4	0	0	0.7	0	0	0	0	0	0.9
Heavys	0	4	0	0	4	0	0	0	0	0	0	7	0	0	7	0	0	0	0	0	11
% Heavys	0	0.7	0	0	0.7	0	0	0	0	0	0	2.6	0	0	2.5	0	0	0	0	0	1.2
Cyclists	3	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
% Cyclists	100	0	0	0	0.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3

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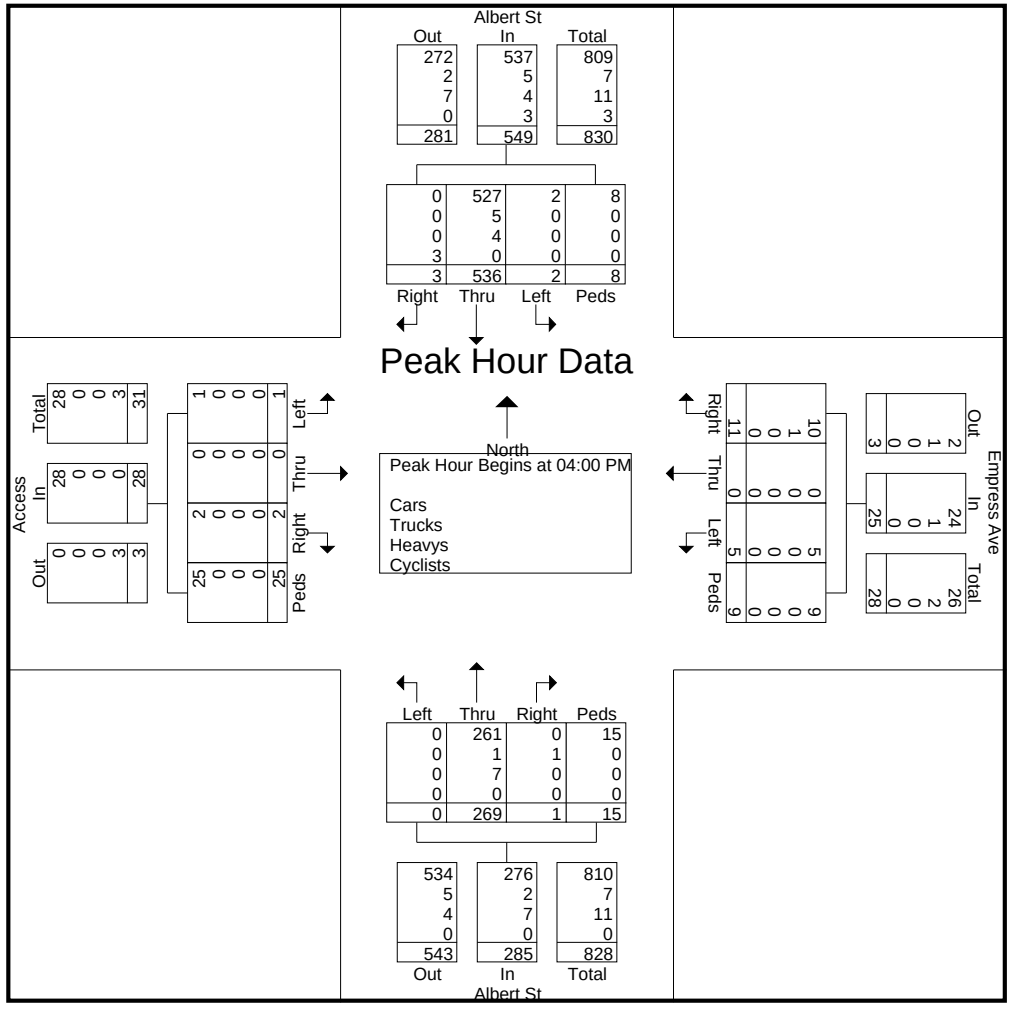
File Name : Albert Street at Empress Avenue
Site Code : 00000000
Start Date : 4/19/2022
Page No : 8



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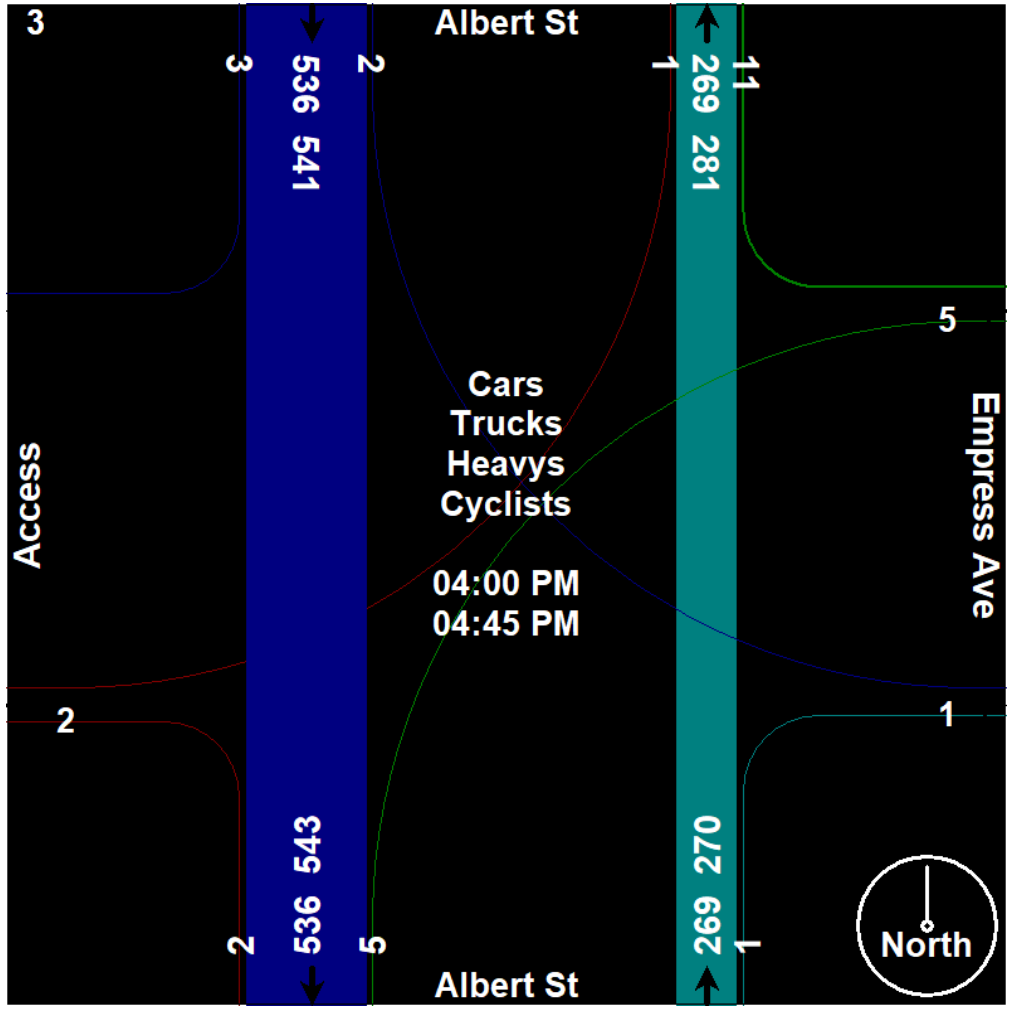
File Name : Albert Street at Empress Avenue
Site Code : 00000000
Start Date : 4/19/2022
Page No : 9



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"Your Traffic Count Specialist"

File Name : Booth Street at Sir John A Macdonald Pkwy
Site Code : 00000000
Start Date : 4/19/2022
Page No : 1

Groups Printed- Cars - Trucks - Heavys - Cyclists

	Booth St From North					Sir John A Macdonald Pkwy From East					Booth St From South					Sir John A Macdonald Pkwy From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
06:00 AM	6	59	110	0	175	2	3	1	0	6	1	28	0	2	31	11	37	0	0	48	260
06:15 AM	8	94	126	1	229	0	3	0	0	3	1	34	0	0	35	14	22	0	0	36	303
06:30 AM	21	103	124	1	249	0	4	2	0	6	1	42	0	0	43	22	42	0	0	64	362
06:45 AM	7	97	103	1	208	0	5	2	1	8	1	46	0	0	47	22	63	0	0	85	348
Total	42	353	463	3	861	2	15	5	1	23	4	150	0	2	156	69	164	0	0	233	1273
07:00 AM	3	90	92	2	187	2	6	1	1	10	1	53	0	1	55	23	52	0	0	75	327
07:15 AM	4	103	115	5	227	0	10	0	0	10	1	74	0	0	75	24	64	0	0	88	400
07:30 AM	8	112	97	3	220	1	10	1	0	12	2	83	0	1	86	42	81	0	0	123	441
07:45 AM	4	113	101	1	219	1	12	1	0	14	0	115	0	3	118	46	50	0	0	96	447
Total	19	418	405	11	853	4	38	3	1	46	4	325	0	5	334	135	247	0	0	382	1615
08:00 AM	11	102	82	5	200	1	14	3	0	18	3	116	0	0	119	35	56	0	0	91	428
08:15 AM	11	142	77	3	233	1	12	1	2	16	2	144	0	2	148	35	70	0	0	105	502
08:30 AM	11	127	94	3	235	0	11	2	1	14	2	113	0	2	117	30	67	0	1	98	464
08:45 AM	7	98	78	2	185	2	7	1	0	10	1	140	0	1	142	38	71	0	0	109	446
Total	40	469	331	13	853	4	44	7	3	58	8	513	0	5	526	138	264	0	1	403	1840
04:00 PM	5	161	39	8	213	2	15	6	1	24	1	117	0	2	120	111	111	0	1	223	580
04:15 PM	2	209	51	1	263	0	9	9	0	18	4	130	0	4	138	130	77	1	0	208	627
04:30 PM	2	161	41	2	206	1	8	8	2	19	0	100	0	2	102	87	98	0	0	185	512
04:45 PM	3	161	52	5	221	1	10	7	0	18	3	109	0	0	112	87	76	0	0	163	514
Total	12	692	183	16	903	4	42	30	3	79	8	456	0	8	472	415	362	1	1	779	2233
05:00 PM	5	131	38	6	180	4	14	11	0	29	2	89	0	0	91	110	95	0	3	208	508
05:15 PM	0	132	44	8	184	0	7	4	2	13	0	110	0	2	112	65	73	1	3	142	451
05:30 PM	3	113	45	4	165	3	9	6	0	18	3	74	0	1	78	62	101	1	0	164	425
05:45 PM	5	116	67	5	193	0	8	3	3	14	0	63	0	2	65	62	69	0	3	134	406
Total	13	492	194	23	722	7	38	24	5	74	5	336	0	5	346	299	338	2	9	648	1790
06:00 PM	2	88	45	3	138	1	6	3	2	12	0	58	0	3	61	58	94	1	2	155	366
06:15 PM	4	75	53	0	132	0	6	4	0	10	0	50	0	6	56	52	76	0	1	129	327
06:30 PM	2	79	40	0	121	3	8	4	0	15	1	49	0	0	50	38	76	0	0	114	300
06:45 PM	1	63	59	0	123	2	8	5	1	16	1	45	0	3	49	25	71	0	0	96	284
Total	9	305	197	3	514	6	28	16	3	53	2	202	0	12	216	173	317	1	3	494	1277

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File Name : Booth Street at Sir John A Macdonald Pkwy
Site Code : 00000000
Start Date : 4/19/2022
Page No : 2

Groups Printed- Cars - Trucks - Heavys - Cyclists

	Booth St From North					Sir John A Macdonald Pwky From East					Booth St From South					Sir John A Macdonald Pwky From West					
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Grand Total	135	2729	1773	69	4706	27	205	85	16	333	31	1982	0	37	2050	1229	1692	4	14	2939	10028
Apprch %	2.9	58	37.7	1.5		8.1	61.6	25.5	4.8		1.5	96.7	0	1.8		41.8	57.6	0.1	0.5		
Total %	1.3	27.2	17.7	0.7	46.9	0.3	2	0.8	0.2	3.3	0.3	19.8	0	0.4	20.4	12.3	16.9	0	0.1	29.3	
Cars	133	2681	1734	69	4617	27	162	85	16	290	31	1976	0	37	2044	1212	1605	4	14	2835	9786
% Cars	98.5	98.2	97.8	100	98.1	100	79	100	100	87.1	100	99.7	0	100	99.7	98.6	94.9	100	100	96.5	97.6
Trucks	1	6	21	0	28	0	4	0	0	4	0	5	0	0	5	9	36	0	0	45	82
% Trucks	0.7	0.2	1.2	0	0.6	0	2	0	0	1.2	0	0.3	0	0	0.2	0.7	2.1	0	0	1.5	0.8
Heavys	1	42	17	0	60	0	39	0	0	39	0	1	0	0	1	8	51	0	0	59	159
% Heavys	0.7	1.5	1	0	1.3	0	19	0	0	11.7	0	0.1	0	0	0	0.7	3	0	0	2	1.6
Cyclists	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
% Cyclists	0	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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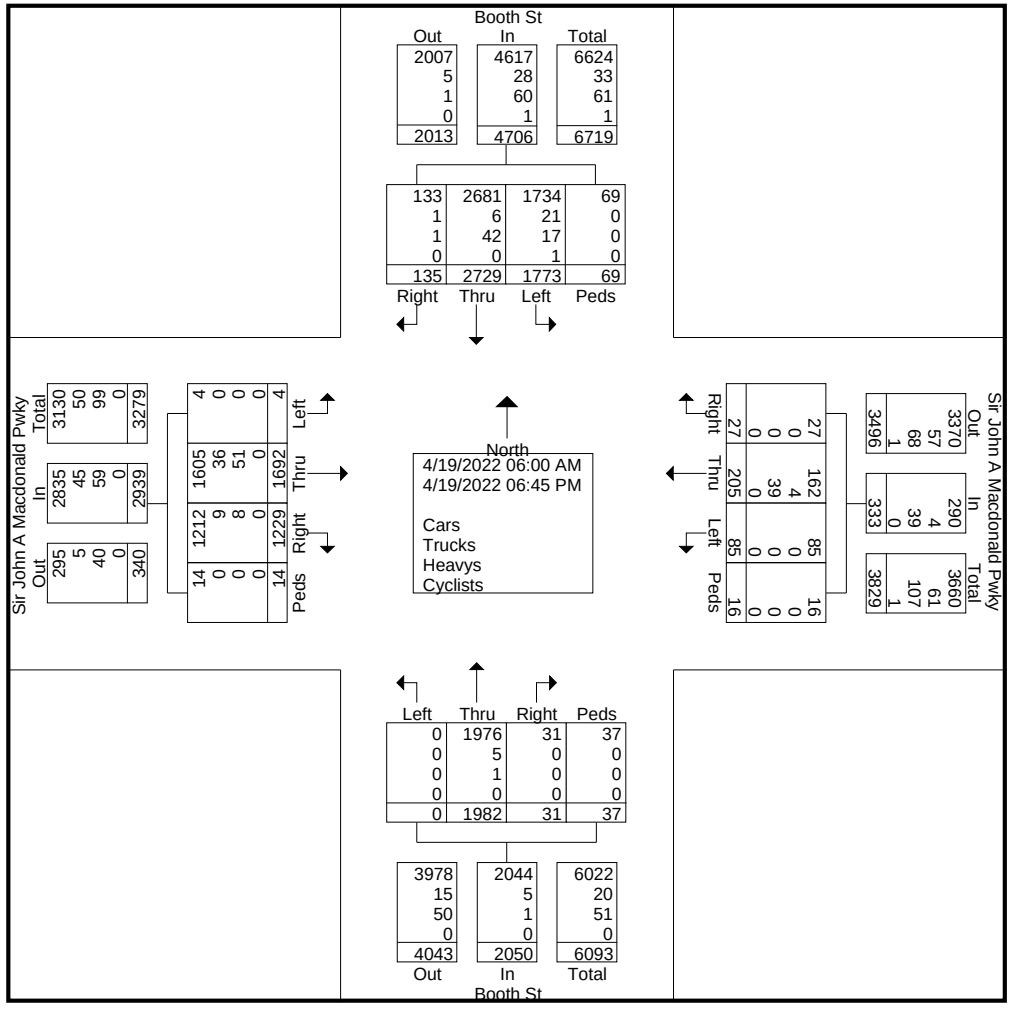
File Name : Booth Street at Sir John A Macdonald Pkwy
Site Code : 00000000
Start Date : 4/19/2022
Page No : 3



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File Name : Booth Street at Sir John A Macdonald Pkwy
Site Code : 00000000
Start Date : 4/19/2022
Page No : 4

	Booth St From North					Sir John A Macdonald Pwky From East					Booth St From South					Sir John A Macdonald Pwky From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 06:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:45 AM																					
07:45 AM	4	113	**101**	1	219	**1**	12	1	0	14	0	115	0	**3**	118	**46**	50	0	0	96	447
08:00 AM	**11**	102	82	**5**	200	1	**14**	**3**	0	**18**	**3**	116	0	0	119	35	56	0	0	91	428
08:15 AM	11	**142**	77	3	233	1	12	1	**2**	16	2	**144**	0	2	**148**	35	**70**	0	0	**105**	**502**
08:30 AM	11	127	94	3	**235**	0	11	2	1	14	2	113	0	2	117	30	67	0	**1**	98	464
Total Volume	37	484	354	12	887	3	49	7	3	62	7	488	0	7	502	146	243	0	1	390	1841
% App. Total	4.2	54.6	39.9	1.4		4.8	79	11.3	4.8		1.4	97.2	0	1.4		37.4	62.3	0	0.3		
PHF	.841	.852	.876	.600	.944	.750	.875	.583	.375	.861	.583	.847	.000	.583	.848	.793	.868	.000	.250	.929	.917
Cars	37	474	336	12	859	3	41	7	3	54	7	487	0	7	501	141	221	0	1	363	1777
% Cars	100	97.9	94.9	100	96.8	100	83.7	100	100	87.1	100	99.8	0	100	99.8	96.6	90.9	0	100	93.1	96.5
Trucks	0	1	10	0	11	0	2	0	0	2	0	1	0	0	1	3	10	0	0	13	27
% Trucks	0	0.2	2.8	0	1.2	0	4.1	0	0	3.2	0	0.2	0	0	0.2	2.1	4.1	0	0	3.3	1.5
Heavys	0	9	8	0	17	0	6	0	0	6	0	0	0	0	0	2	12	0	0	14	37
% Heavys	0	1.9	2.3	0	1.9	0	12.2	0	0	9.7	0	0	0	0	0	1.4	4.9	0	0	3.6	2.0
Cyclists	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Cyclists	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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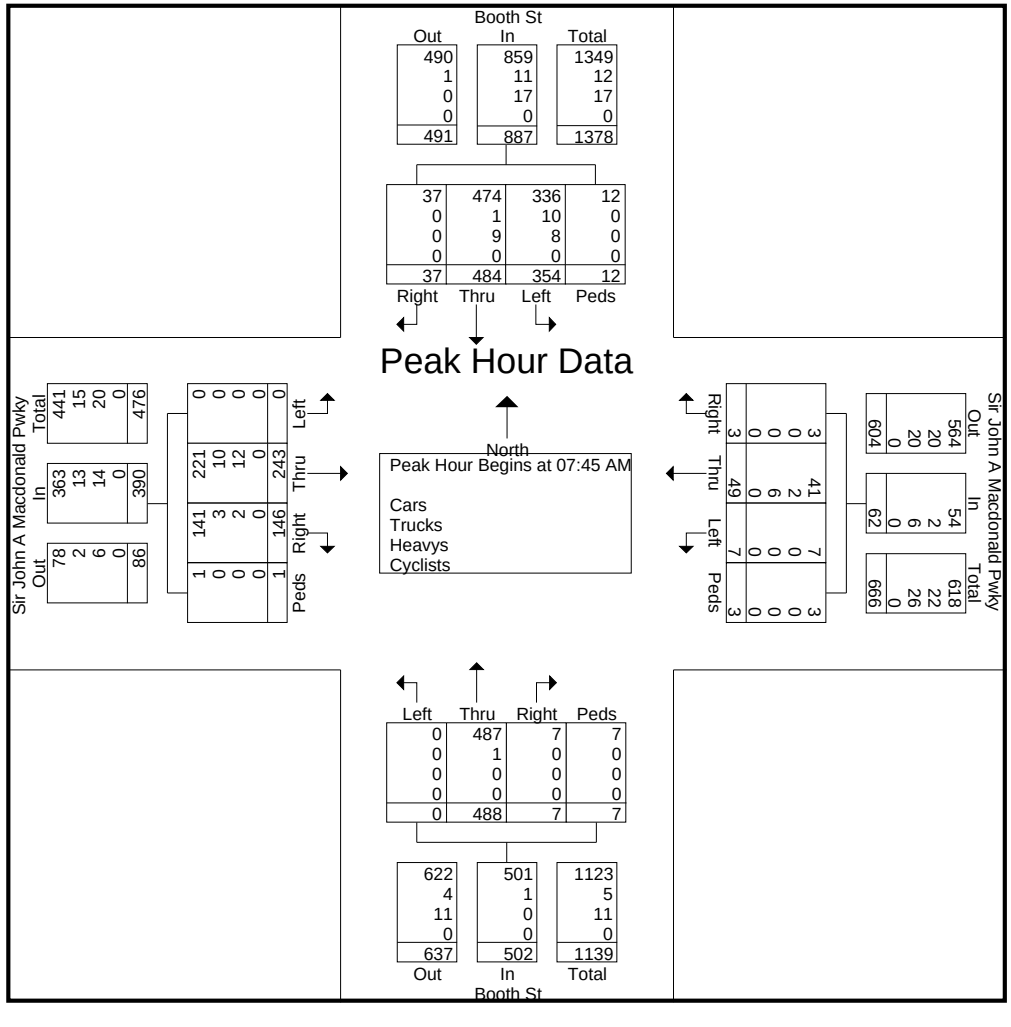
File Name : Booth Street at Sir John A Macdonald Pkwy
Site Code : 00000000
Start Date : 4/19/2022
Page No : 5



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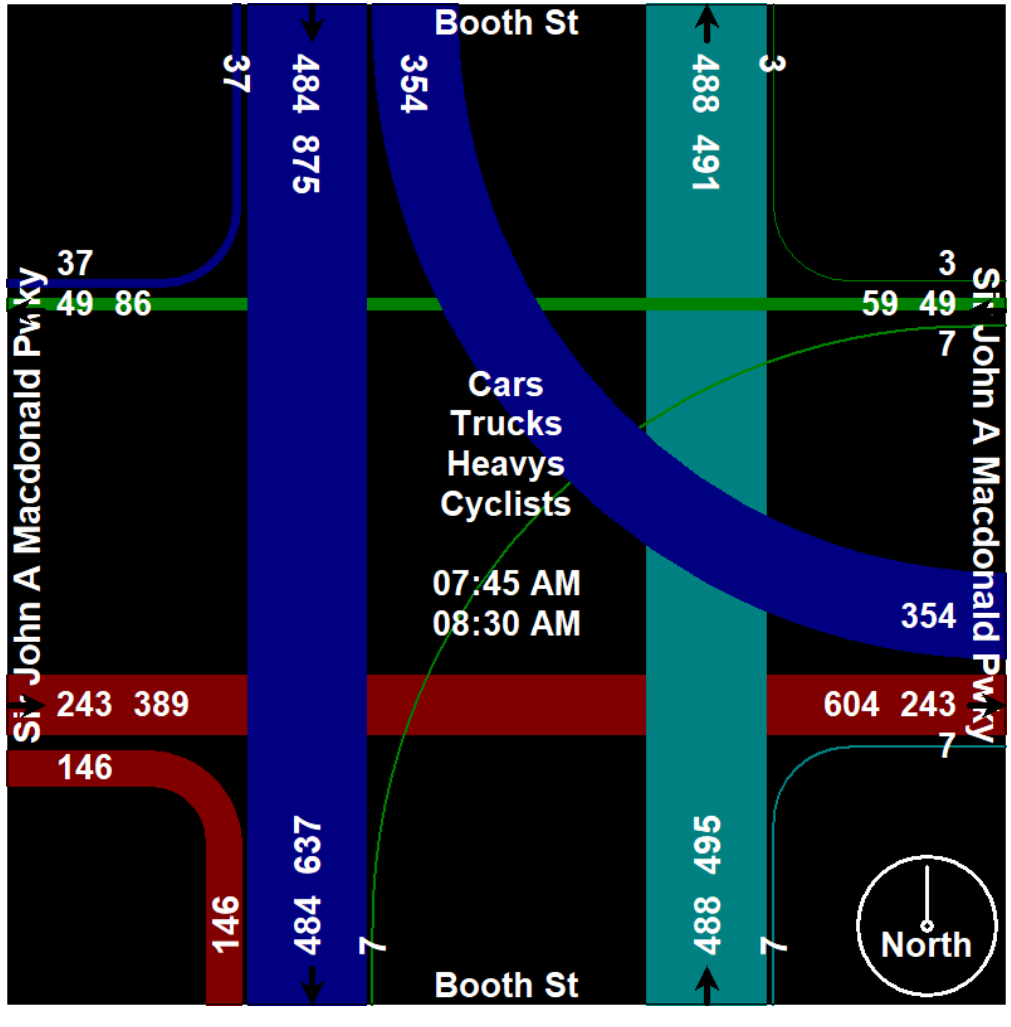
File Name : Booth Street at Sir John A Macdonald Pkwy
Site Code : 00000000
Start Date : 4/19/2022
Page No : 6



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File Name : Booth Street at Sir John A Macdonald Pkwy
Site Code : 00000000
Start Date : 4/19/2022
Page No : 7

	Booth St From North					Sir John A Macdonald Pwky From East					Booth St From South					Sir John A Macdonald Pwky From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 06:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:00 PM																					
04:00 PM	**5**	161	39	**8**	213	**2**	**15**	6	1	**24**	1	117	0	2	120	111	**111**	0	**1**	**223**	580
04:15 PM	2	**209**	51	1	**263**	0	9	**9**	0	18	**4**	**130**	0	**4**	**138**	**130**	77	**1**	0	208	**627**
04:30 PM	2	161	41	2	206	1	8	8	**2**	19	0	100	0	2	102	87	98	0	0	185	512
04:45 PM	3	161	**52**	5	221	1	10	7	0	18	3	109	0	0	112	87	76	0	0	163	514
Total Volume	12	692	183	16	903	4	42	30	3	79	8	456	0	8	472	415	362	1	1	779	2233
% App. Total	1.3	76.6	20.3	1.8		5.1	53.2	38	3.8		1.7	96.6	0	1.7		53.3	46.5	0.1	0.1		
PHF	.600	.828	.880	.500	.858	.500	.700	.833	.375	.823	.500	.877	.000	.500	.855	.798	.815	.250	.250	.873	.890
Cars	12	681	179	16	888	4	33	30	3	70	8	454	0	8	470	414	350	1	1	766	2194
% Cars	100	98.4	97.8	100	98.3	100	78.6	100	100	88.6	100	99.6	0	100	99.6	99.8	96.7	100	100	98.3	98.3
Trucks	0	3	0	0	3	0	0	0	0	0	0	1	0	0	1	0	5	0	0	5	9
% Trucks	0	0.4	0	0	0.3	0	0	0	0	0	0	0.2	0	0	0.2	0	1.4	0	0	0.6	0.4
Heavys	0	8	3	0	11	0	9	0	0	9	0	1	0	0	1	1	7	0	0	8	29
% Heavys	0	1.2	1.6	0	1.2	0	21.4	0	0	11.4	0	0.2	0	0	0.2	0.2	1.9	0	0	1.0	1.3
Cyclists	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
% Cyclists	0	0	0.5	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0

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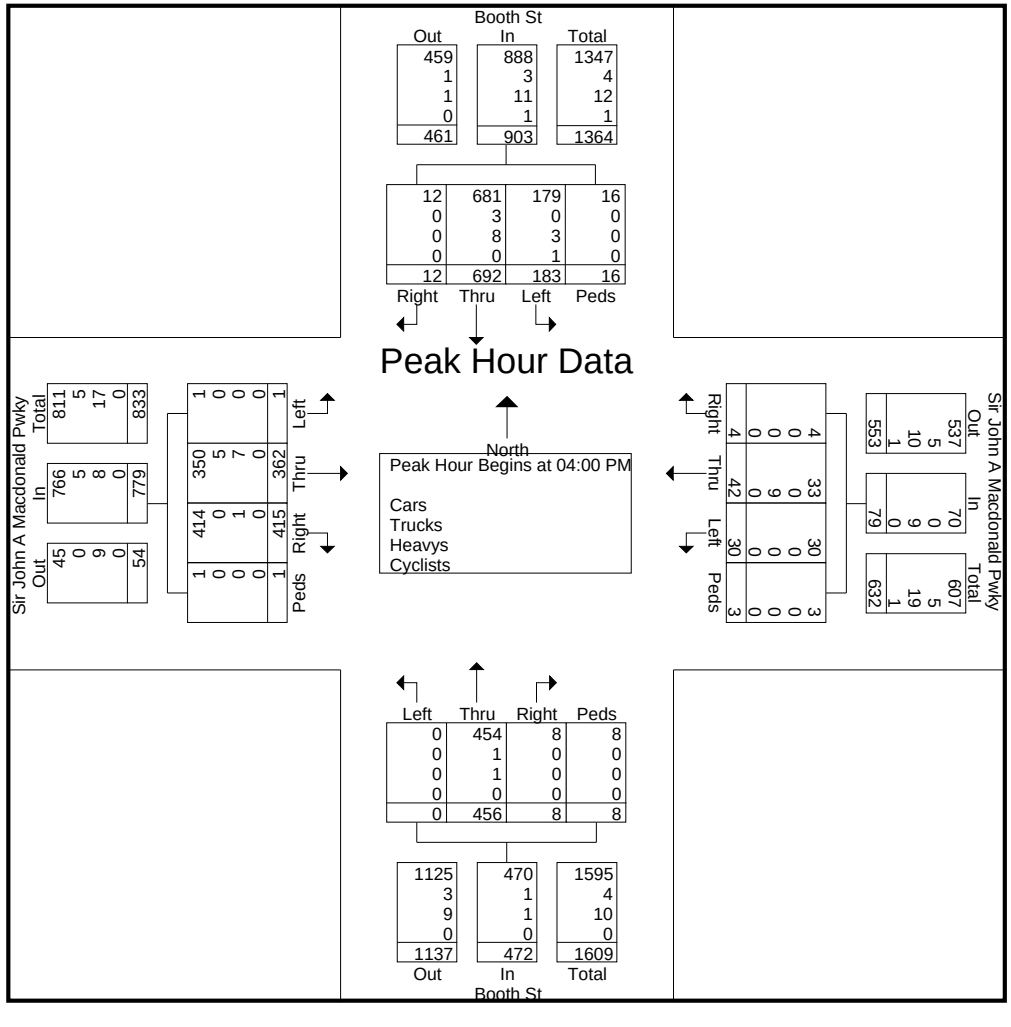
File Name : Booth Street at Sir John A Macdonald Pkwy
Site Code : 00000000
Start Date : 4/19/2022
Page No : 8



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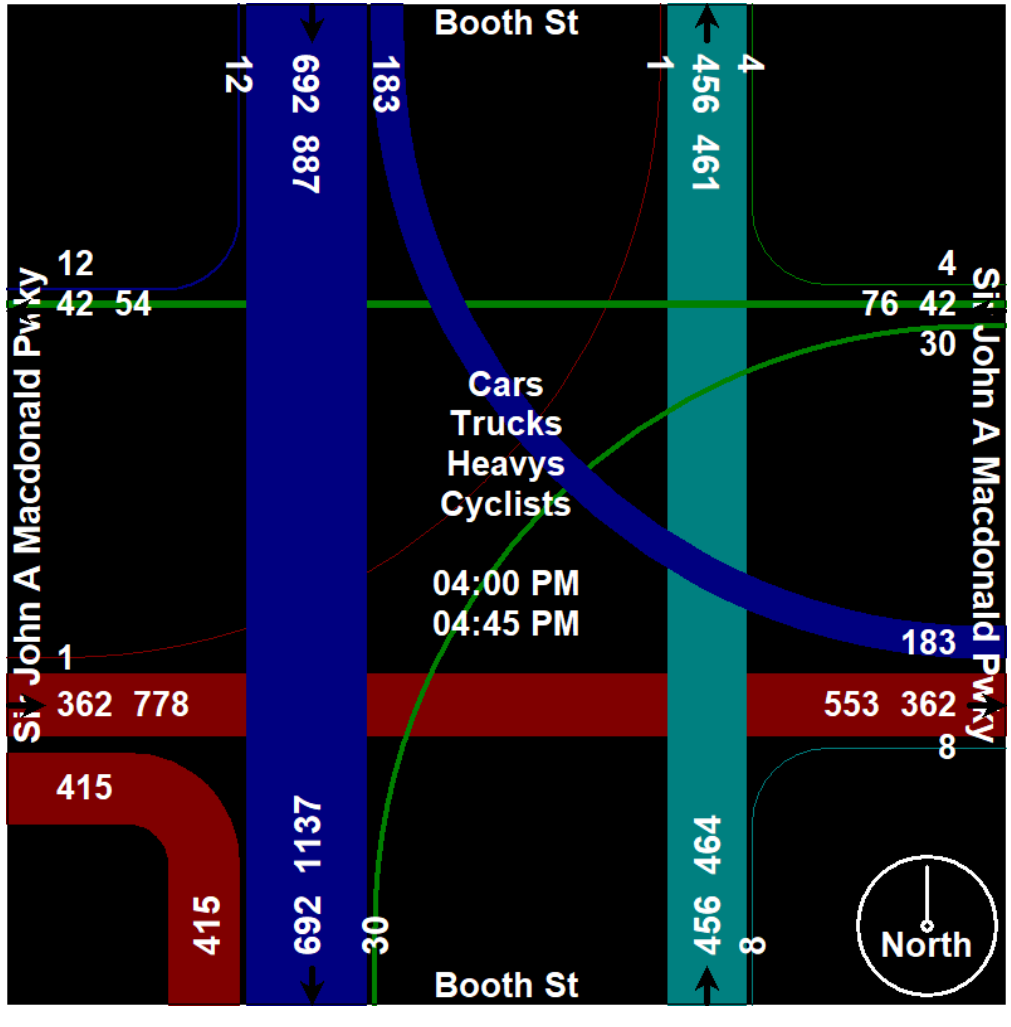
Site Code : 00000000
Start Date : 4/19/2022
Page No : 9



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"Your Traffic Count Specialist"

File Name : Slater Street at Bronson Avenue
Site Code : 00000000
Start Date : 4/19/2022
Page No : 1

Groups Printed- Cars - Trucks - Heavys - Cyclists

	Slater St From North					Bronson Ave From East					Slater St From South					Commissioner St From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
06:00 AM	0	0	0	1	1	19	32	0	0	51	0	10	6	0	16	0	20	0	0	20	88
06:15 AM	0	0	0	1	1	21	47	0	1	69	0	19	5	1	25	0	38	6	0	44	139
06:30 AM	0	0	0	1	1	33	56	0	0	89	0	37	7	0	44	0	48	3	1	52	186
06:45 AM	0	0	0	8	8	27	50	0	0	77	0	25	7	1	33	0	25	4	5	34	152
Total	0	0	0	11	11	100	185	0	1	286	0	91	25	2	118	0	131	13	6	150	565
07:00 AM	1	0	0	2	3	14	29	0	0	43	1	29	6	0	36	0	40	2	2	44	126
07:15 AM	0	0	0	4	4	19	30	0	1	50	0	32	3	2	37	0	42	5	2	49	140
07:30 AM	0	0	0	11	11	20	29	0	1	50	0	55	7	4	66	0	31	4	6	41	168
07:45 AM	0	0	0	12	12	18	34	0	5	57	1	44	9	5	59	0	31	14	3	48	176
Total	1	0	0	29	30	71	122	0	7	200	2	160	25	11	198	0	144	25	13	182	610
08:00 AM	0	0	0	5	5	36	39	0	3	78	1	70	2	4	77	0	44	9	9	62	222
08:15 AM	0	0	0	4	4	17	43	1	2	63	0	65	6	2	73	0	40	7	4	51	191
08:30 AM	0	0	0	1	1	33	42	0	1	76	1	83	6	1	91	0	42	9	1	52	220
08:45 AM	0	0	0	8	8	32	69	0	0	101	1	73	8	2	84	0	25	9	2	36	229
Total	0	0	0	18	18	118	193	1	6	318	3	291	22	9	325	0	151	34	16	201	862
04:00 PM	0	0	0	6	6	17	81	0	0	98	0	68	1	1	70	0	51	10	4	65	239
04:15 PM	0	0	0	6	6	24	77	0	2	103	0	57	2	3	62	0	51	6	2	59	230
04:30 PM	0	0	0	3	3	23	84	0	7	114	1	45	0	4	50	0	57	8	1	66	233
04:45 PM	0	0	0	6	6	23	68	0	3	94	0	56	5	3	64	0	66	9	4	79	243
Total	0	0	0	21	21	87	310	0	12	409	1	226	8	11	246	0	225	33	11	269	945
05:00 PM	0	0	0	6	6	31	79	0	2	112	0	60	5	3	68	0	64	4	6	74	260
05:15 PM	0	0	0	11	11	22	63	0	4	89	0	52	3	3	58	0	33	5	8	46	204
05:30 PM	0	0	0	5	5	19	50	0	2	71	0	55	5	3	63	0	42	5	4	51	190
05:45 PM	0	0	0	13	13	21	58	0	2	81	0	54	5	1	60	0	42	1	6	49	203
Total	0	0	0	35	35	93	250	0	10	353	0	221	18	10	249	0	181	15	24	220	857
06:00 PM	0	0	0	3	3	19	52	0	2	73	1	50	1	1	53	0	26	1	5	32	161
06:15 PM	0	0	0	8	8	11	56	0	1	68	0	38	2	3	43	0	28	5	5	38	157
06:30 PM	0	0	0	7	7	19	30	0	1	50	1	39	1	2	43	0	17	2	5	24	124
06:45 PM	0	0	0	8	8	9	34	0	1	44	0	36	1	4	41	0	25	4	3	32	125
Total	0	0	0	26	26	58	172	0	5	235	2	163	5	10	180	0	96	12	18	126	567

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"Your Traffic Count Specialist"

File Name : Slater Street at Bronson Avenue
Site Code : 00000000
Start Date : 4/19/2022

Groups Printed- Cars - Trucks - Heavys - Cyclists

	Slater St From North					Bronson Ave From East					Slater St From South					Commissioner St From West					
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Grand Total	1	0	0	140	141	527	1232	1	41	1801	8	1152	103	53	1316	0	928	132	88	1148	4406
Apprch %	0.7	0	0	99.3		29.3	68.4	0.1	2.3		0.6	87.5	7.8	4		0	80.8	11.5	7.7		
Total %	0	0	0	3.2	3.2	12	28	0	0.9	40.9	0.2	26.1	2.3	1.2	29.9	0	21.1	3	2	26.1	
Cars	0	0	0	140	140	473	1197	1	41	1712	8	1106	101	53	1268	0	874	100	88	1062	4182
% Cars	0	0	0	100	99.3	89.8	97.2	100	100	95.1	100	96	98.1	100	96.4	0	94.2	75.8	100	92.5	94.9
Trucks	1	0	0	0	1	11	19	0	0	30	0	12	2	0	14	0	18	21	0	39	84
% Trucks	100	0	0	0	0.7	2.1	1.5	0	0	1.7	0	1	1.9	0	1.1	0	1.9	15.9	0	3.4	1.9
Heavys	0	0	0	0	0	43	14	0	0	57	0	33	0	0	33	0	34	4	0	38	128
% Heavys	0	0	0	0	0	8.2	1.1	0	0	3.2	0	2.9	0	0	2.5	0	3.7	3	0	3.3	2.9
Cyclists	0	0	0	0	0	0	2	0	0	2	0	1	0	0	1	0	2	7	0	9	12
% Cyclists	0	0	0	0	0	0	0.2	0	0	0.1	0	0.1	0	0	0.1	0	0.2	5.3	0	0.8	0.3

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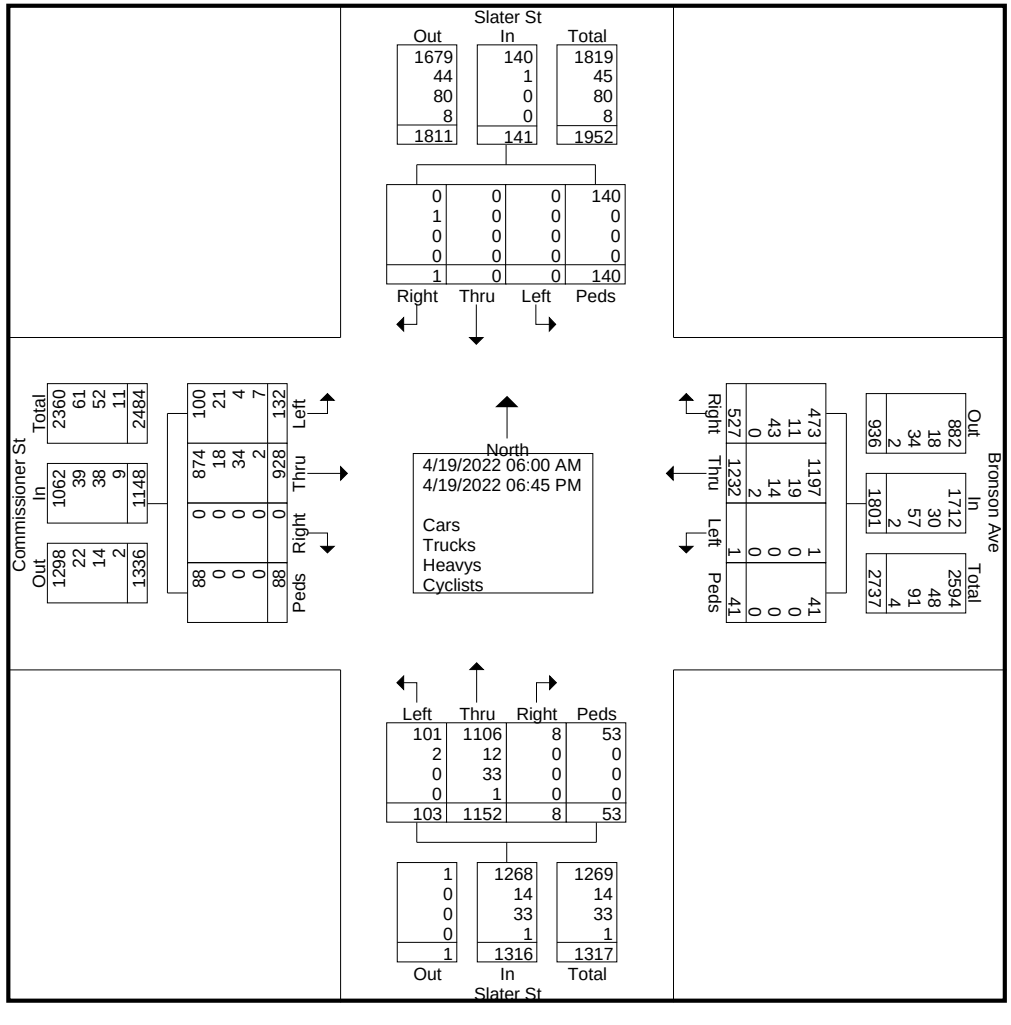
Start Date : 4/19/2022
Page No : 3



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File Name : Slater Street at Bronson Avenue
Site Code : 00000000
Start Date : 4/19/2022

	Slater St From North					Bronson Ave From East					Slater St From South					Commissioner St From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 06:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 08:00 AM																					
08:00 AM	0	0	0	5	5	**36**	39	0	**3**	78	**1**	70	2	**4**	77	0	**44**	**9**	**9**	**62**	222
08:15 AM	0	0	0	4	4	17	43	**1**	2	63	0	65	6	2	73	0	40	7	4	51	191
08:30 AM	0	0	0	1	1	33	42	0	1	76	1	**83**	6	1	**91**	0	42	9	1	52	220
08:45 AM	0	0	0	**8**	**8**	32	**69**	0	0	**101**	1	73	**8**	2	84	0	25	9	2	36	**229**
Total Volume	0	0	0	18	18	118	193	1	6	318	3	291	22	9	325	0	151	34	16	201	862
% App. Total	0	0	0	100		37.1	60.7	0.3	1.9		0.9	89.5	6.8	2.8		0	75.1	16.9	8		
PHF	.000	.000	.000	.563	.563	.819	.699	.250	.500	.787	.750	.877	.688	.563	.893	.000	.858	.944	.444	.810	.941
Cars	0	0	0	18	18	100	179	1	6	286	3	273	21	9	306	0	132	22	16	170	780
% Cars	0	0	0	100	100	84.7	92.7	100	100	89.9	100	93.8	95.5	100	94.2	0	87.4	64.7	100	84.6	90.5
Trucks	0	0	0	0	0	7	9	0	0	16	0	7	1	0	8	0	10	10	0	20	44
% Trucks	0	0	0	0	0	5.9	4.7	0	0	5.0	0	2.4	4.5	0	2.5	0	6.6	29.4	0	10.0	5.1
Heavys	0	0	0	0	0	11	5	0	0	16	0	11	0	0	11	0	9	0	0	9	36
% Heavys	0	0	0	0	0	9.3	2.6	0	0	5.0	0	3.8	0	0	3.4	0	6.0	0	0	4.5	4.2
Cyclists	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	2	2
% Cyclists	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5.9	0	1.0	0.2

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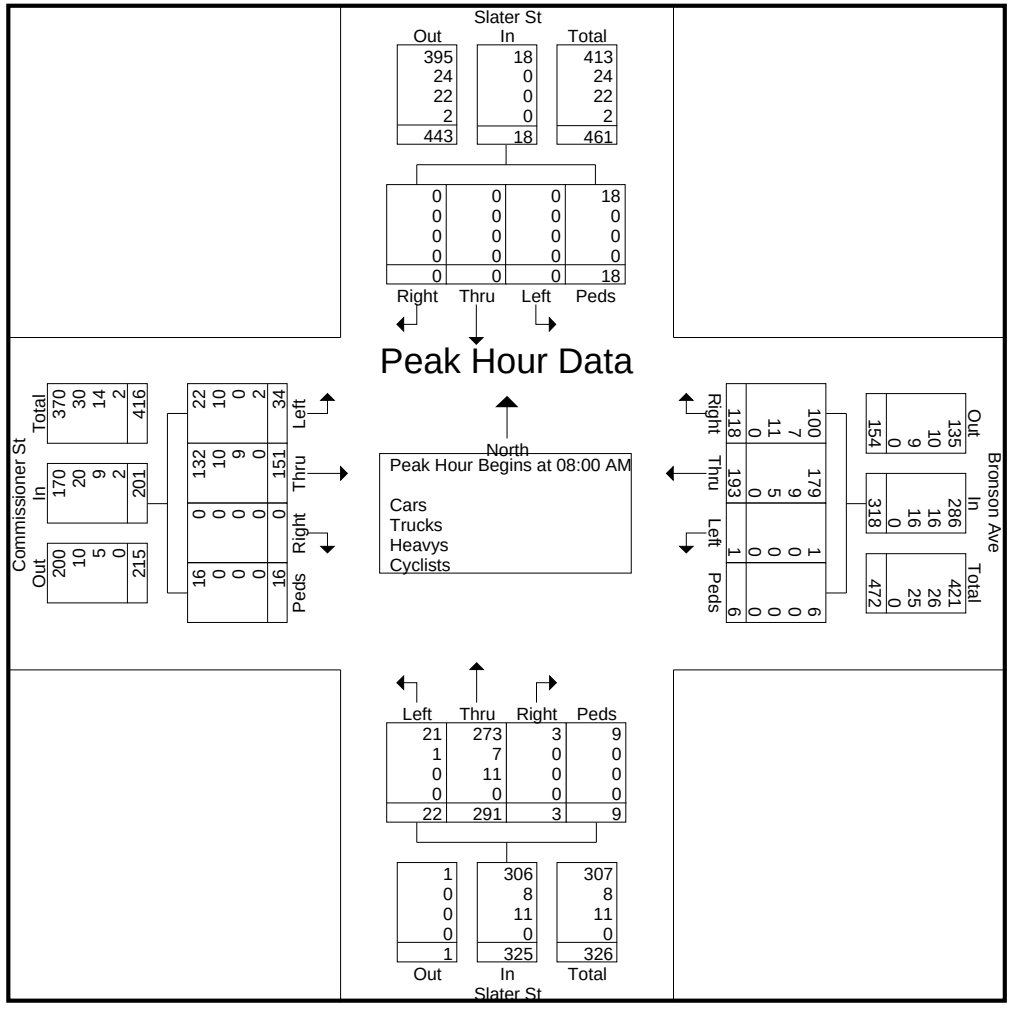
Page No : 5



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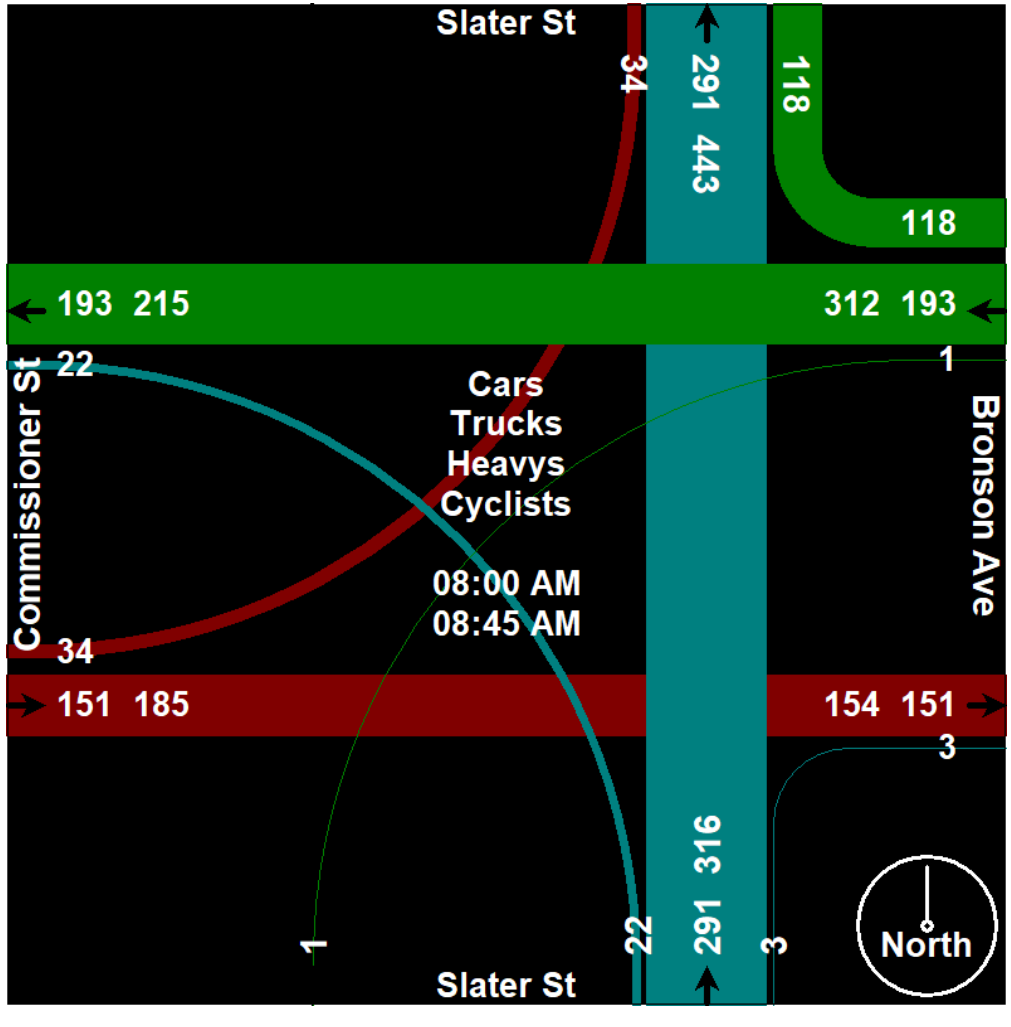
Page No : 6



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File Name : Slater Street at Bronson Avenue
Site Code : 00000000
Start Date : 4/19/2022

	Slater St From North					Bronson Ave From East					Slater St From South					Commissioner St From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 06:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:15 PM																					
04:15 PM	0	0	0	**6**	**6**	24	77	0	2	103	0	57	2	3	62	0	51	6	2	59	230
04:30 PM	0	0	0	3	3	23	**84**	0	**7**	**114**	**1**	45	0	**4**	50	0	57	8	1	66	233
04:45 PM	0	0	0	6	6	23	68	0	3	94	0	56	**5**	3	64	0	**66**	**9**	4	**79**	243
05:00 PM	0	0	0	6	6	**31**	79	0	2	112	0	**60**	5	3	**68**	0	64	4	**6**	74	**260**
Total Volume	0	0	0	21	21	101	308	0	14	423	1	218	12	13	244	0	238	27	13	278	966
% App. Total	0	0	0	100		23.9	72.8	0	3.3		0.4	89.3	4.9	5.3		0	85.6	9.7	4.7		
PHF	.000	.000	.000	.875	.875	.815	.917	.000	.500	.928	.250	.908	.600	.813	.897	.000	.902	.750	.542	.880	.929
Cars	0	0	0	21	21	93	306	0	14	413	1	211	12	13	237	0	230	26	13	269	940
% Cars	0	0	0	100	100	92.1	99.4	0	100	97.6	100	96.8	100	100	97.1	0	96.6	96.3	100	96.8	97.3
Trucks	0	0	0	0	0	1	1	0	0	2	0	1	0	0	1	0	1	1	0	2	5
% Trucks	0	0	0	0	0	1.0	0.3	0	0	0.5	0	0.5	0	0	0.4	0	0.4	3.7	0	0.7	0.5
Heavys	0	0	0	0	0	7	0	0	0	7	0	6	0	0	6	0	7	0	0	7	20
% Heavys	0	0	0	0	0	6.9	0	0	0	1.7	0	2.8	0	0	2.5	0	2.9	0	0	2.5	2.1
Cyclists	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	1
% Cyclists	0	0	0	0	0	0	0.3	0	0	0.2	0	0	0	0	0	0	0	0	0	0	0.1

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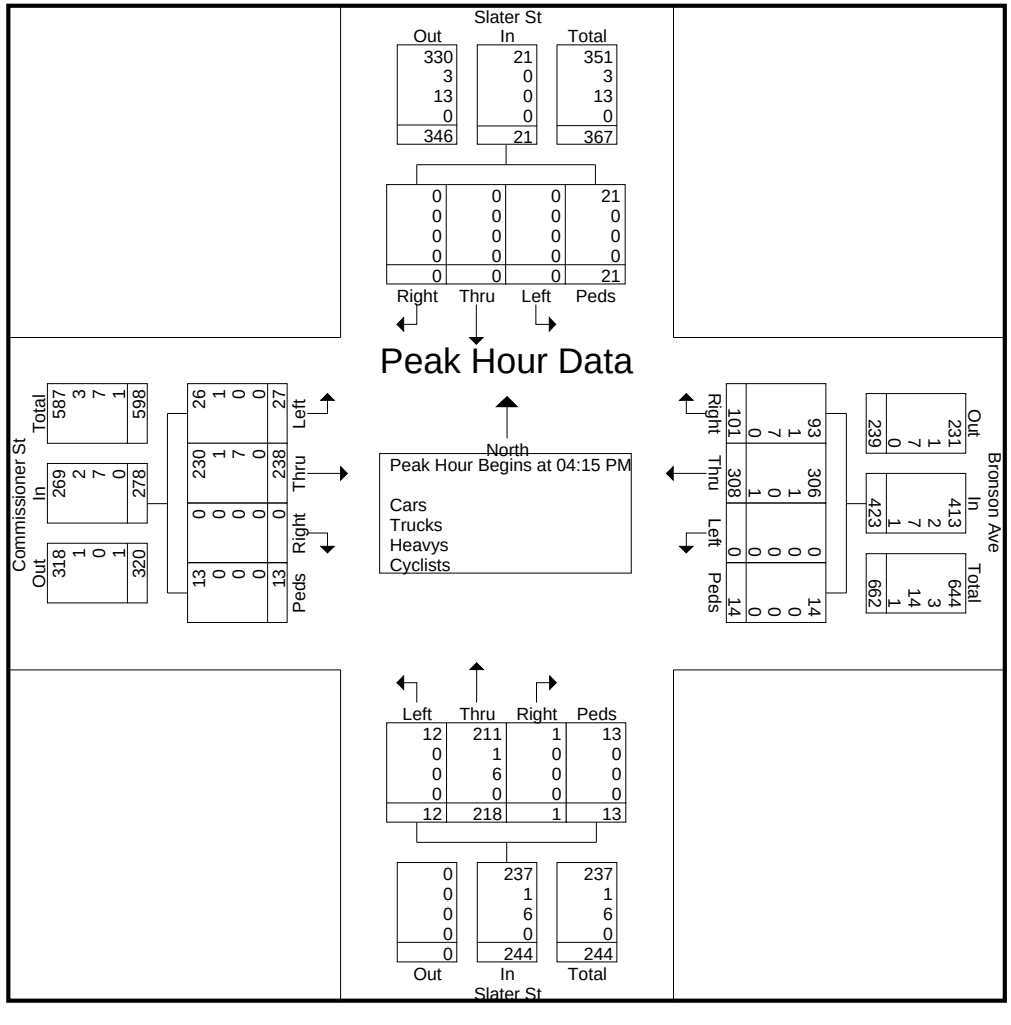

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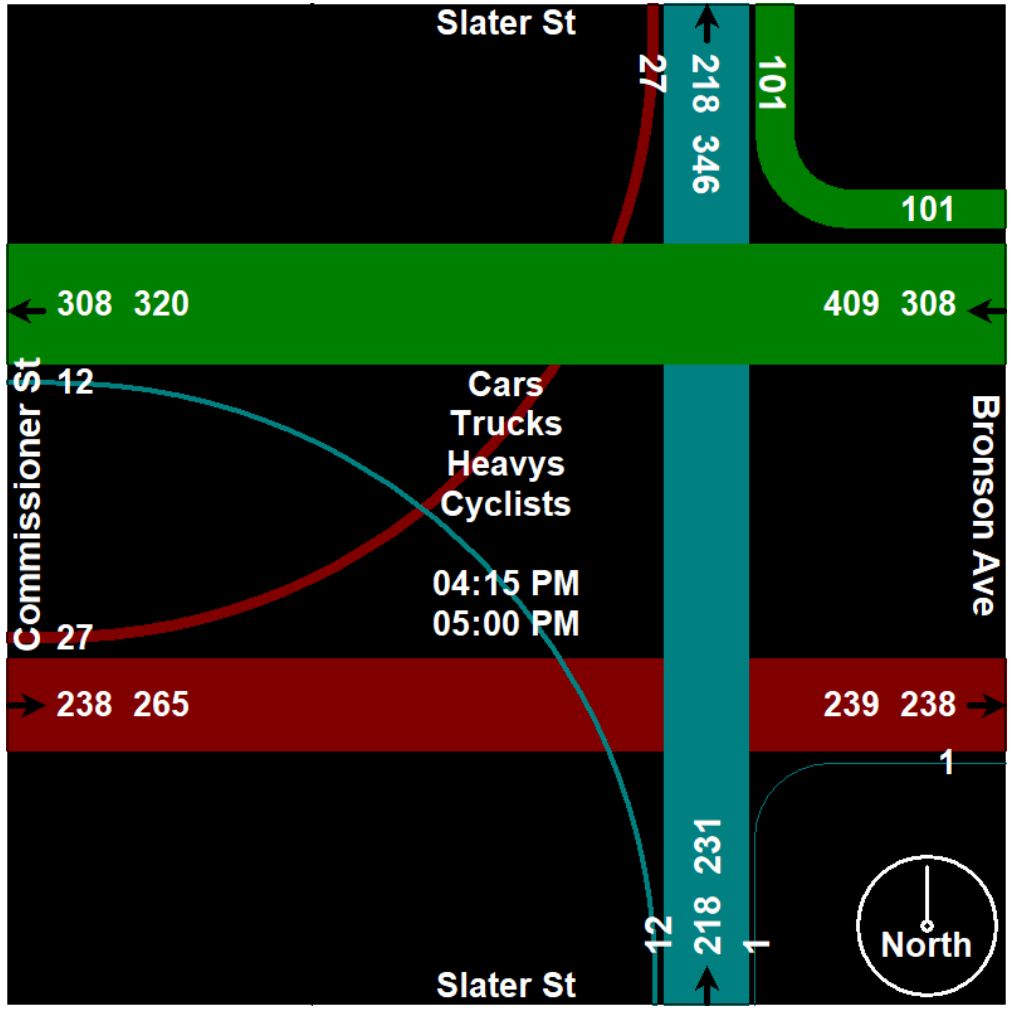
Page No : 9



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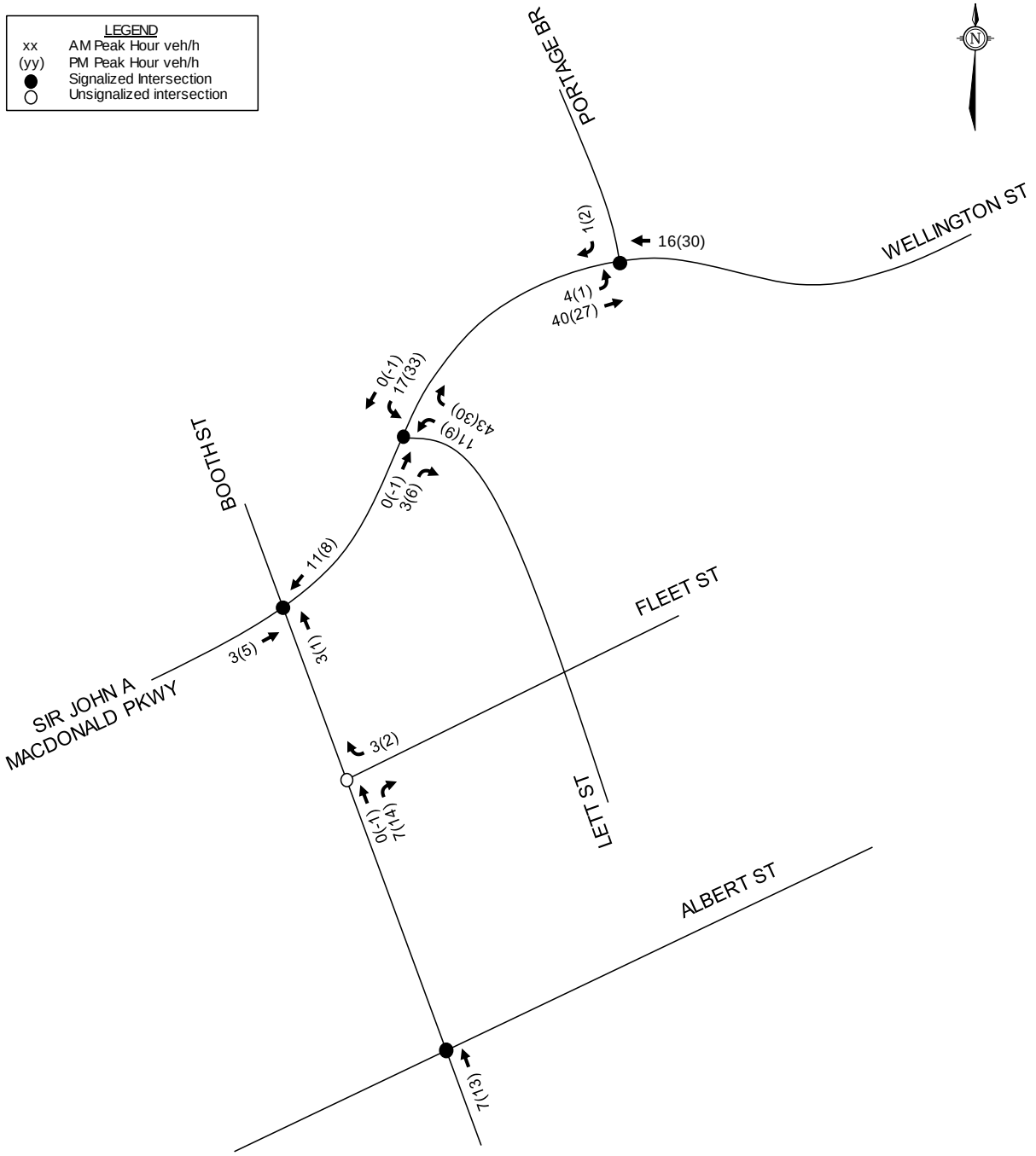
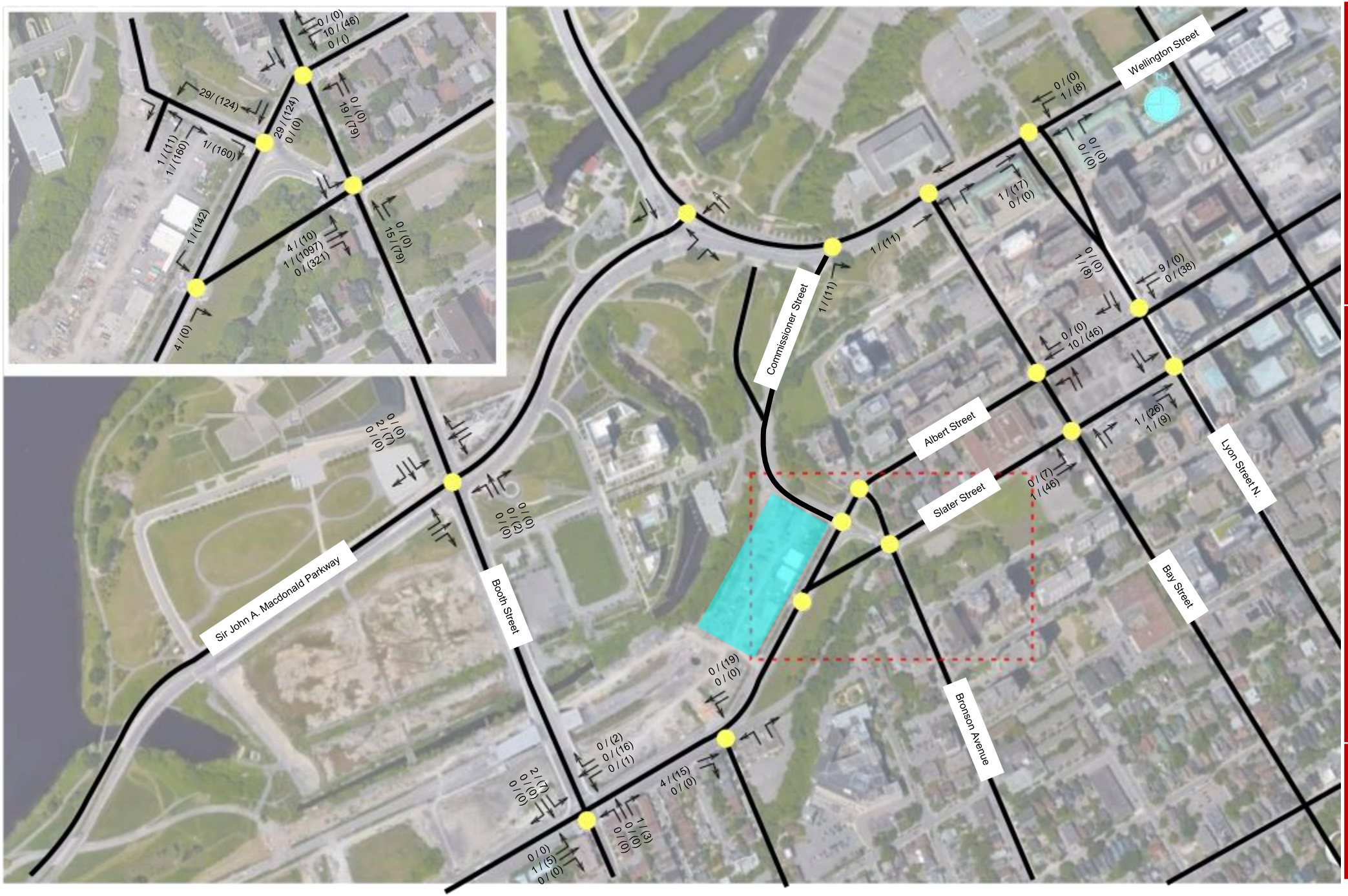
APPENDIX B

Background Developments

Figure 5: Site Generated Traffic





Ottawa Public Library – Library Archives Canada Joint Facility

Transportation Impact Assessment

Figure 3.1

Site Generated Vehicle Trips

WSP Canada Group Ltd.
Suite 300
2611 Queensview Drive
Ottawa, ON
K2B 8K2

www.wsp.com

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APPENDIX C

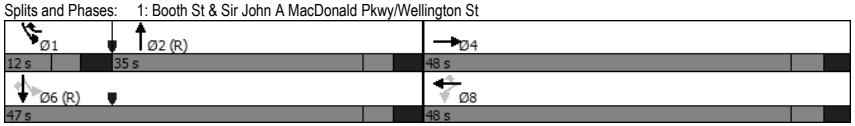
Synchro Reports

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	243	146	7	49	3	0	487	7	354	484	37
Future Volume (vph)	0	243	146	7	49	3	0	487	7	354	484	37
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (m)	3.7	3.4	3.7	3.7	3.4	3.4	3.7	3.5	3.5	3.3	3.8	3.7
Storage Length (m)	0.0		0.0	0.0		90.0	0.0		0.0	135.0		63.0
Storage Lanes	0		0	0		1	0		0	1		1
Taper Length (m)	2.5			2.5			2.5			30.0		
Lane Util. Factor	1.00	0.95	0.95	0.95	0.95	1.00	1.00	0.95	0.95	1.00	0.95	1.00
Ped Bike Factor		0.99			1.00	0.98		1.00		1.00		0.99
Frt		0.944				0.850		0.998				0.850
Flt Protected					0.994					0.950		
Satd. Flow (prot)	0	2909	0	0	3185	1496	0	3342	0	1559	3394	1547
Flt Permitted					0.860					0.295		
Satd. Flow (perm)	0	2909	0	0	2755	1461	0	3342	0	484	3394	1527
Right Turn on Red			Yes			No			Yes			Yes
Satd. Flow (RTOR)		162						2				44
Link Speed (k/h)		60			60			50			50	
Link Distance (m)		199.5			146.4			401.6			200.6	
Travel Time (s)		12.0			8.8			28.9			14.4	
Confl. Peds. (#/hr)			7	7		12			3	3		1
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	2%	10%	4%	0%	5%	0%	2%	1%	0%	6%	3%	0%
Adj. Flow (vph)	0	270	162	8	54	3	0	541	8	393	538	41
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	432	0	0	62	3	0	549	0	393	538	41
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.3			3.3	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	1.06	1.10	1.06	1.06	1.10	1.10	1.06	1.09	1.09	1.12	1.04	1.06
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors		0		1	0	0		0		1	0	0
Detector Template				Left						Left		
Leading Detector (m)		0.0		6.1	0.0	0.0		0.0		6.1	0.0	0.0
Trailing Detector (m)		0.0		0.0	0.0	0.0		0.0		0.0	0.0	0.0
Detector 1 Position(m)		0.0		0.0	0.0	0.0		0.0		0.0	0.0	0.0
Detector 1 Size(m)		0.6		6.1	0.6	2.0		1.8		6.1	1.8	6.1
Detector 1 Type		Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)		0.0		0.0	0.0	0.0		0.0		0.0	0.0	0.0
Detector 1 Queue (s)		0.0		0.0	0.0	0.0		0.0		0.0	0.0	0.0
Detector 1 Delay (s)		0.0		0.0	0.0	0.0		0.0		0.0	0.0	0.0
Turn Type		NA		Perm	NA	pm+ov		NA		pm+pt	NA	Perm
Protected Phases		4			8	1		2		1	6	
Permitted Phases				8		8				6		6
Detector Phase		4		8	8	1		2		1	6	6

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Switch Phase												
Minimum Initial (s)		10.0		10.0	10.0	5.0		10.0		5.0	10.0	10.0
Minimum Split (s)		35.8		35.8	35.8	11.8		31.8		11.8	31.8	31.8
Total Split (s)		48.0		48.0	48.0	12.0		35.0		12.0	47.0	47.0
Total Split (%)		50.5%		50.5%	50.5%	12.6%		36.8%		12.6%	49.5%	49.5%
Maximum Green (s)		41.2		41.2	41.2	5.2		28.2		5.2	40.2	40.2
Yellow Time (s)		3.7		3.7	3.7	3.3		3.3		3.3	3.3	3.3
All-Red Time (s)		3.1		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		
Vehicle Extension (s)		3.0		3.0	3.0	3.0		3.0		3.0	3.0	3.0
Recall Mode		None		None	None	None		C-Max		None	C-Max	C-Max
Walk Time (s)		10.0		10.0	10.0			10.0			10.0	10.0
Flash Dont Walk (s)		19.0		19.0	19.0			15.0			15.0	15.0
Pedestrian Calls (#/hr)		0		0	0			0			0	0
Act Effct Green (s)		15.0			15.0	44.8		29.8		66.4	66.4	66.4
Actuated g/C Ratio		0.16			0.16	0.47		0.31		0.70	0.70	0.70
v/c Ratio		0.72			0.14	0.00		0.52		0.58	0.23	0.04
Control Delay		30.4			33.4	10.3		28.8		11.1	5.9	1.9
Queue Delay		0.0			0.0	0.0		0.0		0.0	0.0	0.0
Total Delay		30.4			33.4	10.3		28.8		11.1	5.9	1.9
LOS		C			C	B		C		B	A	A
Approach Delay		30.4			32.3			28.8			7.8	
Approach LOS		C			C			C			A	
Queue Length 50th (m)		24.8			5.2	0.3		41.8		24.9	15.9	0.0
Queue Length 95th (m)		38.0			10.2	1.5		60.3		54.4	27.5	3.2
Internal Link Dist (m)		175.5			122.4			377.6			176.6	
Turn Bay Length (m)						90.0				135.0		63.0
Base Capacity (vph)		1353			1194	700		1048		675	2371	1080
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		0.32			0.05	0.00		0.52		0.58	0.23	0.04

Intersection Summary			
Area Type:	Other		
Cycle Length: 95			
Actuated Cycle Length: 95			
Offset: 31 (33%), Referenced to phase 2:NBT and 6:SBTL, Start of Green			
Natural Cycle: 90			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.72			
Intersection Signal Delay: 19.1		Intersection LOS: B	
Intersection Capacity Utilization 73.3%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 1: Booth St & Sir John A MacDonald Pkwy/Wellington St



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	243	146	7	49	3	0	487	7	354	484	37
Future Volume (vph)	0	243	146	7	49	3	0	487	7	354	484	37
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	3.7	3.4	3.7	3.7	3.4	3.4	3.7	3.5	3.5	3.3	3.8	3.7
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
Frpb, ped/bikes		0.99			1.00	0.99		1.00		1.00	1.00	0.99
Flpb, ped/bikes		1.00			1.00	1.00		1.00		1.00	1.00	1.00
Frt		0.94			1.00	0.85		1.00		1.00	1.00	0.85
Flt Protected		1.00			0.99	1.00		1.00		0.95	1.00	1.00
Satd. Flow (prot)		2908			3182	1484		3341		1559	3394	1527
Flt Permitted		1.00			0.86	1.00		1.00		0.29	1.00	1.00
Satd. Flow (perm)		2908			2753	1484		3341		483	3394	1527
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	270	162	8	54	3	0	541	8	393	538	41
RTOR Reduction (vph)	0	136	0	0	0	0	0	1	0	0	0	12
Lane Group Flow (vph)	0	296	0	0	62	3	0	548	0	393	538	29
Confl. Peds. (#/hr)			7	7		12			3	3		1
Heavy Vehicles (%)	2%	10%	4%	0%	5%	0%	2%	1%	0%	6%	3%	0%
Turn Type		NA		Perm	NA	pm+ov		NA		pm+pt	NA	Perm
Protected Phases		4			8	1		2		1	6	
Permitted Phases				8		8				6		6
Actuated Green, G (s)		15.0			15.0	44.8		29.8		66.4	66.4	66.4
Effective Green, g (s)		15.0			15.0	44.8		29.8		66.4	66.4	66.4
Actuated g/C Ratio		0.16			0.16	0.47		0.31		0.70	0.70	0.70
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)		459			434	806		1048		675	2372	1067
v/s Ratio Prot		c0.10				0.00		0.16		c0.18	0.16	
v/s Ratio Perm					0.02	0.00				c0.22		0.02
v/c Ratio		0.64			0.14	0.00		0.52		0.58	0.23	0.03
Uniform Delay, d1		37.5			34.5	13.3		26.8		7.5	5.1	4.4
Progression Factor		1.00			1.00	1.00		1.00		1.00	1.00	1.00
Incremental Delay, d2		3.1			0.2	0.0		1.9		1.3	0.2	0.0
Delay (s)		40.6			34.6	13.3		28.6		8.8	5.3	4.4
Level of Service		D			C	B		C		A	A	A
Approach Delay (s)		40.6			33.6			28.6			6.7	
Approach LOS		D			C			C			A	

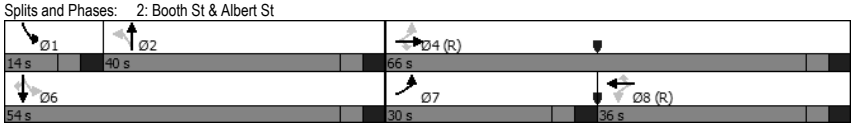
Intersection Summary			
HCM 2000 Control Delay	20.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	95.0	Sum of lost time (s)	20.4
Intersection Capacity Utilization	73.3%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	148	287	10	10	185	58	10	230	30	57	388	192
Future Volume (vph)	148	287	10	10	185	58	10	230	30	57	388	192
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (m)	3.4	3.4	3.6	3.4	3.4	3.4	3.7	3.2	3.7	3.3	3.3	3.5
Storage Length (m)	150.0		42.0	38.0		87.0	0.0		44.0	0.0		56.0
Storage Lanes	1		1	1		1	0		0	1		1
Taper Length (m)	40.0			45.0			2.5			2.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	1.00	0.95	0.95	0.95	1.00	1.00	1.00
Ped Bike Factor	0.99		0.96	0.99		0.97		0.99		0.98		0.94
Frt			0.850			0.850		0.983				0.850
Flt Protected	0.950			0.950				0.998		0.950		
Satd. Flow (prot)	1441	1615	1530	1672	3096	1268	0	3110	0	1559	1706	1327
Flt Permitted	0.532			0.567				0.933		0.462		
Satd. Flow (perm)	799	1615	1471	986	3096	1233	0	2904	0	741	1706	1252
Right Turn on Red			Yes			No			Yes			No
Satd. Flow (RTOR)			91					11				
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		185.1			175.2			57.0			401.6	
Travel Time (s)		13.3			12.6			4.1			28.9	
Confl. Peds. (#/hr)	13		9	9		13	38		34	34		38
Confl. Bikes (#/hr)			1									
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	16%	9%	0%	0%	8%	18%	10%	2%	4%	6%	2%	14%
Adj. Flow (vph)	164	319	11	11	206	64	11	256	33	63	431	213
Shared Lane Traffic (%)												
Lane Group Flow (vph)	164	319	11	11	206	64	0	300	0	63	431	213
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.4			3.4			3.3			3.3	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	1.10	1.10	1.07	1.10	1.10	1.10	1.06	1.14	1.06	1.12	1.12	1.09
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	0	0	0	0	0	1	0		1	0	0
Detector Template	Left						Left			Left		
Leading Detector (m)	6.1	0.0	0.0	0.0	0.0	0.0	6.1	0.0		6.1	0.0	0.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Size(m)	6.1	1.8	6.1	6.1	1.8	6.1	6.1	1.8		6.1	1.8	6.1
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Turn Type	pm+pt	NA	Perm	Perm	NA	Perm	Perm	NA		pm+pt	NA	Perm
Protected Phases	7	4			8			2		1	6	
Permitted Phases	4		4	8		8	2			6		6

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4	4	8	8	8	2	2		1	6	6
Switch Phase												
Minimum Initial (s)	5.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0		5.0	10.0	10.0
Minimum Split (s)	11.5	36.5	36.5	36.0	36.0	36.0	36.5	36.5		11.5	36.5	36.5
Total Split (s)	30.0	66.0	66.0	36.0	36.0	36.0	40.0	40.0		14.0	54.0	54.0
Total Split (%)	25.0%	55.0%	55.0%	30.0%	30.0%	30.0%	33.3%	33.3%		11.7%	45.0%	45.0%
Maximum Green (s)	23.5	59.5	59.5	29.5	29.5	29.5	33.5	33.5		7.5	47.5	47.5
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3		3.3	3.3	3.3
All-Red Time (s)	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2		3.2	3.2	3.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0		0.0		0.0	0.0	0.0
Total Lost Time (s)	6.5	6.5	6.5	6.5	6.5	6.5		6.5		6.5	6.5	6.5
Lead/Lag	Lead			Lag	Lag	Lag	Lag	Lag		Lead		
Lead-Lag Optimize?	Yes			Yes	Yes	Yes	Yes	Yes		Yes		
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Recall Mode	None	C-Max	C-Max	C-Max	C-Max	C-Max	Max	Max		None	Max	Max
Walk Time (s)		7.0	7.0	7.0	7.0	7.0	7.0	7.0			7.0	7.0
Flash Dont Walk (s)		23.0	23.0	22.5	22.5	22.5	23.0	23.0			23.0	23.0
Pedestrian Calls (#/hr)		0	0	0	0	0	0	0			0	0
Act Effct Green (s)	59.5	59.5	59.5	39.6	39.6	39.6		36.3		47.5	47.5	47.5
Actuated g/C Ratio	0.50	0.50	0.50	0.33	0.33	0.33		0.30		0.40	0.40	0.40
v/c Ratio	0.35	0.40	0.01	0.03	0.20	0.16		0.34		0.18	0.64	0.43
Control Delay	19.6	20.9	0.0	22.8	22.1	23.0		33.6		24.4	34.6	29.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0		0.0		0.0	0.0	0.0
Total Delay	19.6	20.9	0.0	22.8	22.1	23.0		33.6		24.4	34.6	29.8
LOS	B	C	A	C	C	C		C		C	C	C
Approach Delay		20.0			22.3			33.6			32.2	
Approach LOS		C			C			C			C	
Queue Length 50th (m)	21.3	45.8	0.0	0.9	9.4	5.6		28.7		9.2	81.0	36.0
Queue Length 95th (m)	35.0	67.8	0.0	3.2	13.8	10.6		41.4		18.6	115.8	57.8
Internal Link Dist (m)		161.1			151.2			33.0			377.6	
Turn Bay Length (m)	150.0		42.0	38.0		87.0						56.0
Base Capacity (vph)	521	800	775	325	1021	407		886		344	675	495
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	0.31	0.40	0.01	0.03	0.20	0.16		0.34		0.18	0.64	0.43

Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 104 (87%), Referenced to phase 4:EBTL and 8:WBTL, Start of Green			
Natural Cycle: 100			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.64			
Intersection Signal Delay: 27.5		Intersection LOS: C	
Intersection Capacity Utilization 99.6%		ICU Level of Service F	
Analysis Period (min) 15			

Splits and Phases: 2: Booth St & Albert St



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	148	287	10	10	185	58	10	230	30	57	388	192
Future Volume (vph)	148	287	10	10	185	58	10	230	30	57	388	192
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	3.4	3.4	3.6	3.4	3.4	3.4	3.7	3.2	3.7	3.3	3.3	3.5
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
Frpb, ped/bikes	1.00	1.00	0.96	1.00	1.00	0.97		0.99		1.00	1.00	0.94
Flpb, ped/bikes	0.99	1.00	1.00	0.99	1.00	1.00		1.00		0.99	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)	1434	1615	1471	1653	3096	1233		3109		1544	1706	1252
Flt Permitted	0.53	1.00	1.00	0.57	1.00	1.00		0.93		0.46	1.00	1.00
Satd. Flow (perm)	803	1615	1471	987	3096	1233		2905		750	1706	1252
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)	164	319	11	11	206	64	11	256	33	63	431	213
RTOR Reduction (vph)	0	0	6	0	0	0	0	8	0	0	0	0
Lane Group Flow (vph)	164	319	5	11	206	64	0	292	0	63	431	213
Confl. Peds. (#/hr)	13		9	9		13	38		34	34		38
Confl. Bikes (#/hr)			1									
Heavy Vehicles (%)	16%	9%	0%	0%	8%	18%	10%	2%	4%	6%	2%	14%
Turn Type	pm+pt	NA	Perm	Perm	NA	Perm	Perm	NA		pm+pt	NA	Perm
Protected Phases	7	4			8			2		1	6	
Permitted Phases	4		4	8		8	2			6		6
Actuated Green, G (s)	58.2	58.2	58.2	38.3	38.3	38.3		36.3		48.8	48.8	48.8
Effective Green, g (s)	58.2	58.2	58.2	38.3	38.3	38.3		36.3		48.8	48.8	48.8
Actuated g/C Ratio	0.49	0.49	0.49	0.32	0.32	0.32		0.30		0.41	0.41	0.41
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)	459	783	713	315	988	393		878		344	693	509
v/s Ratio Prot	0.04	c0.20			0.07					0.01	c0.25	
v/s Ratio Perm	0.13		0.00	0.01		0.05		0.10		0.07		0.17
v/c Ratio	0.36	0.41	0.01	0.03	0.21	0.16		0.33		0.18	0.62	0.42
Uniform Delay, d1	18.2	19.8	16.0	28.1	29.8	29.3		32.5		22.3	28.3	25.5
Progression Factor	1.00	1.00	1.00	0.76	0.72	0.73		1.00		1.00	1.00	1.00
Incremental Delay, d2	0.5	1.6	0.0	0.2	0.5	0.9		1.0		0.3	4.2	2.5
Delay (s)	18.7	21.4	16.0	21.5	22.0	22.2		33.5		22.6	32.4	28.0
Level of Service	B	C	B	C	C	C		C		C	C	C
Approach Delay (s)		20.4			22.0			33.5			30.2	
Approach LOS		C			C			C			C	

Intersection Summary					
HCM 2000 Control Delay	26.7	HCM 2000 Level of Service	C		
HCM 2000 Volume to Capacity ratio	0.57				
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	26.0		
Intersection Capacity Utilization	99.6%	ICU Level of Service	F		
Analysis Period (min)	15				

c Critical Lane Group

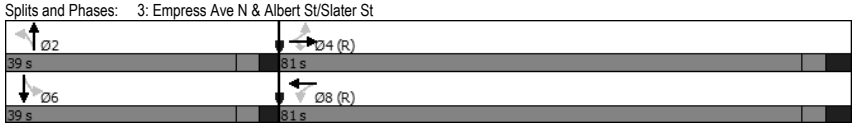
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	365	9	9	247	0	2	0	6	0	0	0
Future Volume (vph)	0	365	9	9	247	0	2	0	6	0	0	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (m)	3.7	3.4	3.5	3.7	3.3	3.7	3.7	3.4	3.7	3.7	3.4	3.7
Storage Length (m)	0.0		45.0	0.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	0		1	0		0	0		0	0		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	0.95	0.95	1.00	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor			0.96		1.00			0.98				
Frt			0.850					0.895				
Flt Protected					0.998			0.989				
Satd. Flow (prot)	0	3125	1351	0	3009	0	0	1383	0	0	1725	0
Flt Permitted					0.938			0.974				
Satd. Flow (perm)	0	3125	1291	0	2827	0	0	1359	0	0	1725	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			30					37				
Link Speed (k/h)		50			50			40			40	
Link Distance (m)		175.2			39.3			118.9			51.7	
Travel Time (s)		12.6			2.8			10.7			4.7	
Confl. Peds. (#/hr)	13		9	9		13	8		5	5		8
Confl. Bikes (#/hr)			1									
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	2%	7%	12%	0%	10%	2%	50%	2%	0%	2%	2%	2%
Adj. Flow (vph)	0	406	10	10	274	0	2	0	7	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	406	10	0	284	0	0	9	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.4			3.4			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	1.06	1.10	1.09	1.06	1.12	1.06	1.06	1.10	1.06	1.06	1.10	1.06
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Turn Type		NA	Perm	Perm	NA		Perm	NA				
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2			6		
Minimum Split (s)	81.0	81.0	81.0	81.0	81.0		39.0	39.0		39.0	39.0	
Total Split (s)	81.0	81.0	81.0	81.0	81.0		39.0	39.0		39.0	39.0	
Total Split (%)	67.5%	67.5%	67.5%	67.5%	67.5%		32.5%	32.5%		32.5%	32.5%	
Maximum Green (s)	73.9	73.9	73.9	73.9	73.9		32.7	32.7		32.7	32.7	
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3		3.3	3.3		3.3	3.3	
All-Red Time (s)	3.8	3.8	3.8	3.8	3.8		3.0	3.0		3.0	3.0	
Lost Time Adjust (s)		0.0	0.0		0.0			0.0			0.0	
Total Lost Time (s)		7.1	7.1		7.1			6.3			6.3	
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	7.0	7.0	7.0	7.0	7.0		10.0	10.0		10.0	10.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Flash Dont Walk (s)	15.0	15.0	15.0	15.0	15.0		22.7	22.7		22.7	22.7	
Pedestrian Calls (#/hr)	0	0	0	0	0		0	0		0	0	
Act Effct Green (s)		73.9	73.9		73.9			32.7				
Actuated g/C Ratio		0.62	0.62		0.62			0.27				
v/c Ratio		0.21	0.01		0.16			0.02				
Control Delay		4.1	0.0		10.1			0.1				
Queue Delay		0.0	0.0		0.0			0.0				
Total Delay		4.1	0.0		10.1			0.1				
LOS		A	A		B			A				
Approach Delay		4.0			10.1			0.1				
Approach LOS		A			B			A				
Queue Length 50th (m)		6.9	0.0		14.0			0.0				
Queue Length 95th (m)		9.1	m0.0		20.2			0.0				
Internal Link Dist (m)		151.2			15.3			94.9			27.7	
Turn Bay Length (m)			45.0									
Base Capacity (vph)		1924	806		1740			397				
Starvation Cap Reductn		0	0		0			0				
Spillback Cap Reductn		0	0		0			0				
Storage Cap Reductn		0	0		0			0				
Reduced v/c Ratio		0.21	0.01		0.16			0.02				

Intersection Summary		
Area Type:	Other	
Cycle Length: 120		
Actuated Cycle Length: 120		
Offset: 87 (73%), Referenced to phase 4:EBTL and 8:WBTL, Start of Green		
Natural Cycle: 120		
Control Type: Pretimed		
Maximum v/c Ratio: 0.21		
Intersection Signal Delay: 6.4	Intersection LOS: A	
Intersection Capacity Utilization 135.0%	ICU Level of Service H	
Analysis Period (min) 15		

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

Splits and Phases: 3: Empress Ave N & Albert St/Slater St



HCM Signalized Intersection Capacity Analysis
3: Empress Ave N & Albert St/Slater St

05/02/2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	365	9	9	247	0	2	0	6	0	0	0
Future Volume (vph)	0	365	9	9	247	0	2	0	6	0	0	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	3.7	3.4	3.5	3.7	3.3	3.7	3.7	3.4	3.7	3.7	3.4	3.7
Total Lost time (s)		7.1	7.1		7.1			6.3				
Lane Util. Factor		0.95	1.00		0.95			1.00				
Frpb, ped/bikes		1.00	0.96		1.00			0.99				
Flpb, ped/bikes		1.00	1.00		1.00			1.00				
Frt		1.00	0.85		1.00			0.90				
Flt Protected		1.00	1.00		1.00			0.99				
Satd. Flow (prot)		3125	1291		3008			1380				
Flt Permitted		1.00	1.00		0.94			0.97				
Satd. Flow (perm)		3125	1291		2826			1359				
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	406	10	10	274	0	2	0	7	0	0	0
RTOR Reduction (vph)	0	0	4	0	0	0	0	7	0	0	0	0
Lane Group Flow (vph)	0	406	6	0	284	0	0	2	0	0	0	0
Confl. Peds. (#/hr)	13		9	9		13	8		5	5		8
Confl. Bikes (#/hr)			1									
Heavy Vehicles (%)	2%	7%	12%	0%	10%	2%	50%	2%	0%	2%	2%	2%
Turn Type		NA	Perm	Perm	NA		Perm	NA				
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)		73.9	73.9		73.9			32.7				
Effective Green, g (s)		73.9	73.9		73.9			32.7				
Actuated g/C Ratio		0.62	0.62		0.62			0.27				
Clearance Time (s)		7.1	7.1		7.1			6.3				
Lane Grp Cap (vph)		1924	795		1740			370				
v/s Ratio Prot		c0.13										
v/s Ratio Perm			0.00		0.10			c0.00				
v/c Ratio		0.21	0.01		0.16			0.01				
Uniform Delay, d1		10.2	8.9		9.8			31.8				
Progression Factor		0.38	0.00		1.00			1.00				
Incremental Delay, d2		0.2	0.0		0.2			0.0				
Delay (s)		4.1	0.0		10.0			31.8				
Level of Service		A	A		B			C				
Approach Delay (s)		4.0			10.0			31.8			0.0	
Approach LOS		A			B			C			A	

Intersection Summary				
HCM 2000 Control Delay	6.8	HCM 2000 Level of Service	A	
HCM 2000 Volume to Capacity ratio	0.15			
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	13.4	
Intersection Capacity Utilization	135.0%	ICU Level of Service	H	
Analysis Period (min)	15			
c Critical Lane Group				

Lanes, Volumes, Timings
4: Bronson Ave & Slater St

05/02/2022

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	22	291	3	0	0	0	0	193	118	34	151	0
Future Volume (vph)	22	291	3	0	0	0	0	193	118	34	151	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (m)	3.7	3.3	3.7	3.7	3.7	3.7	3.7	3.5	3.7	3.6	3.8	3.7
Storage Length (m)	0.0		0.0	0.0		0.0	0.0		0.0	20.0		0.0
Storage Lanes	0		0	0		0	0		0	1		0
Taper Length (m)	2.5			2.5			2.5			8.0		
Lane Util. Factor	0.95	0.95	0.95	1.00	1.00	1.00	1.00	0.95	0.95	1.00	1.00	1.00
Ped Bike Factor		1.00						0.99		0.99		
Frt		0.999						0.943				
Flt Protected		0.997								0.950		
Satd. Flow (prot)	0	3082	0	0	0	0	0	2837	0	1315	1628	0
Flt Permitted		0.997								0.545		
Satd. Flow (perm)	0	3077	0	0	0	0	0	2837	0	745	1628	0
Right Turn on Red			Yes			Yes			No			Yes
Satd. Flow (RTOR)		1										
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		115.0			115.8			103.4			50.3	
Travel Time (s)		8.3			8.3			7.4			3.6	
Confl. Peds. (#/hr)	16		6	6		16	9		18	18		9
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	5%	7%	0%	2%	2%	2%	2%	8%	16%	30%	13%	2%
Adj. Flow (vph)	24	323	3	0	0	0	0	214	131	38	168	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	350	0	0	0	0	0	345	0	38	168	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	1.06	1.12	1.06	1.06	1.06	1.06	1.06	1.09	1.06	1.07	1.04	1.06
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Turn Type	Perm	NA						NA		pm+pt	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4									6		
Minimum Split (s)	35.0	35.0						29.0		11.0	40.0	
Total Split (s)	35.0	35.0						29.0		11.0	40.0	
Total Split (%)	46.7%	46.7%						38.7%		14.7%	53.3%	
Maximum Green (s)	29.1	29.1						23.0		5.0	34.0	
Yellow Time (s)	3.3	3.3						3.3		3.3	3.3	
All-Red Time (s)	2.6	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		
Walk Time (s)	7.0	7.0						13.0			13.0	
Flash Dont Walk (s)	7.0	7.0						7.0			7.0	

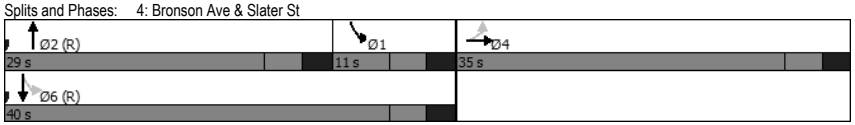
Lanes, Volumes, Timings
4: Bronson Ave & Slater St

05/02/2022

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Pedestrian Calls (#/hr)	0	0						0			0	
Act Effct Green (s)		29.1						23.0		34.0	34.0	
Actuated g/C Ratio		0.39						0.31		0.45	0.45	
v/c Ratio		0.29						0.40		0.10	0.23	
Control Delay		16.6						22.2		12.9	13.6	
Queue Delay		0.0						0.0		0.0	0.0	
Total Delay		16.6						22.2		12.9	13.6	
LOS		B						C		B	B	
Approach Delay		16.6						22.2			13.4	
Approach LOS		B						C			B	
Queue Length 50th (m)		17.4						20.0		2.9	13.9	
Queue Length 95th (m)		26.8						31.1		7.7	25.4	
Internal Link Dist (m)		91.0			91.8			79.4			26.3	
Turn Bay Length (m)										20.0		
Base Capacity (vph)		1194						870		375	738	
Starvation Cap Reductn		0						0		0	0	
Spillback Cap Reductn		0						0		0	0	
Storage Cap Reductn		0						0		0	0	
Reduced v/c Ratio		0.29						0.40		0.10	0.23	

Intersection Summary			
Area Type:	Other		
Cycle Length: 75			
Actuated Cycle Length: 75			
Offset: 16 (21%), Referenced to phase 2:NBT and 6:SBTL, Start of Green			
Natural Cycle: 75			
Control Type: Pretimed			
Maximum v/c Ratio: 0.40			
Intersection Signal Delay: 18.0		Intersection LOS: B	
Intersection Capacity Utilization 62.5%		ICU Level of Service B	
Analysis Period (min) 15			

Splits and Phases: 4: Bronson Ave & Slater St



HCM Signalized Intersection Capacity Analysis
4: Bronson Ave & Slater St

05/02/2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	22	291	3	0	0	0	0	193	118	34	151	0
Future Volume (vph)	22	291	3	0	0	0	0	193	118	34	151	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	3.7	3.3	3.7	3.7	3.7	3.7	3.7	3.5	3.7	3.6	3.8	3.7
Total Lost time (s)		5.9						6.0		6.0	6.0	
Lane Util. Factor		0.95						0.95		1.00	1.00	
Frpb, ped/bikes		1.00						0.99		1.00	1.00	
Flpb, ped/bikes		1.00						1.00		0.99	1.00	
Frt		1.00						0.94		1.00	1.00	
Flt Protected		1.00						1.00		0.95	1.00	
Satd. Flow (prot)		3075						2838		1307	1628	
Flt Permitted		1.00						1.00		0.54	1.00	
Satd. Flow (perm)		3075						2838		749	1628	
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)	24	323	3	0	0	0	0	214	131	38	168	0
RTOR Reduction (vph)	0	1	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	349	0	0	0	0	0	345	0	38	168	0
Confl. Peds. (#/hr)	16		6	6		16	9		18	18		9
Heavy Vehicles (%)	5%	7%	0%	2%	2%	2%	2%	8%	16%	30%	13%	2%
Turn Type	Perm	NA						NA		pm+pt	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4									6		
Actuated Green, G (s)		29.1						23.0		34.0	34.0	
Effective Green, g (s)		29.1						23.0		34.0	34.0	
Actuated g/C Ratio		0.39						0.31		0.45	0.45	
Clearance Time (s)		5.9						6.0		6.0	6.0	
Lane Grp Cap (vph)		1193						870		376	738	
v/s Ratio Prot								c0.12		0.01	c0.10	
v/s Ratio Perm		0.11								0.04		
v/c Ratio		0.29						0.40		0.10	0.23	
Uniform Delay, d1		15.8						20.5		11.8	12.5	
Progression Factor		1.00						1.00		1.00	1.00	
Incremental Delay, d2		0.6						1.4		0.5	0.7	
Delay (s)		16.5						21.9		12.3	13.2	
Level of Service		B						C		B	B	
Approach Delay (s)		16.5			0.0			21.9			13.1	
Approach LOS		B			A			C			B	

Intersection Summary					
HCM 2000 Control Delay	17.8	HCM 2000 Level of Service		B	
HCM 2000 Volume to Capacity ratio	0.34				
Actuated Cycle Length (s)	75.0	Sum of lost time (s)		17.9	
Intersection Capacity Utilization	62.5%	ICU Level of Service		B	
Analysis Period (min)	15				

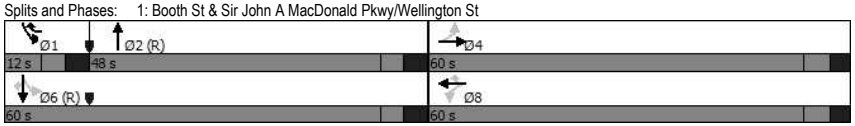
c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	30	42	4	1	362	415	0	639	11	183	692	12
Future Volume (vph)	30	42	4	1	362	415	0	639	11	183	692	12
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (m)	3.7	3.4	3.7	3.7	3.4	3.4	3.7	3.5	3.5	3.3	3.8	3.7
Storage Length (m)	0.0		0.0	0.0		90.0	0.0		0.0	135.0		63.0
Storage Lanes	0		0	0		1	0		0	1		1
Taper Length (m)	2.5			2.5			2.5			30.0		
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	1.00	1.00	0.95	0.95	1.00	0.95	1.00
Ped Bike Factor		1.00			1.00	0.98		1.00		1.00		0.98
Frt		0.993				0.850		0.998				0.850
Flt Protected		0.981								0.950		
Satd. Flow (prot)	0	2896	0	0	3216	1481	0	3212	0	1653	3461	1547
Flt Permitted		0.654			0.955					0.272		
Satd. Flow (perm)	0	1927	0	0	3071	1449	0	3212	0	473	3461	1522
Right Turn on Red			Yes			No			Yes			Yes
Satd. Flow (RTOR)		4						1				35
Link Speed (k/h)		60			60			50			50	
Link Distance (m)		199.5			146.4			401.6			200.6	
Travel Time (s)		12.0			8.8			28.9			14.4	
Confl. Peds. (#/hr)	8		16	16		8	3		1	1		3
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	0%	22%	0%	0%	4%	1%	2%	3%	0%	0%	1%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	10	10	0	0	0
Adj. Flow (vph)	33	47	4	1	402	461	0	710	12	203	769	13
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	84	0	0	403	461	0	722	0	203	769	13
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.3			3.3	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	1.06	1.10	1.06	1.06	1.10	1.10	1.06	1.12	1.09	1.12	1.04	1.06
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	0		1	0	0		0		1	0	0
Detector Template	Left			Left						Left		
Leading Detector (m)	2.0	0.0		6.1	0.0	0.0		0.0		6.1	0.0	0.0
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0		0.0		0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0		0.0		0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6		6.1	0.6	2.0		1.8		6.1	1.8	6.1
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0		0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0		0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0		0.0		0.0	0.0	0.0
Turn Type	Perm	NA		Perm	NA	pm+ov		NA		pm+pt	NA	Perm
Protected Phases		4			8	1		2		1	6	
Permitted Phases	4			8		8				6		6

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	4	4		8	8	1		2		1	6	6
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0	5.0		10.0		5.0	1.0	1.0
Minimum Split (s)	35.8	35.8		35.8	35.8	11.8		31.8		11.8	31.8	31.8
Total Split (s)	60.0	60.0		60.0	60.0	12.0		48.0		12.0	60.0	60.0
Total Split (%)	50.0%	50.0%		50.0%	50.0%	10.0%		40.0%		10.0%	50.0%	50.0%
Maximum Green (s)	53.2	53.2		53.2	53.2	5.2		41.2		5.2	53.2	53.2
Yellow Time (s)	3.7	3.7		3.7	3.7	3.3		3.3		3.3	3.3	3.3
All-Red Time (s)	3.1	3.1		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		
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0		3.0		3.0	3.0	3.0
Recall Mode	None	None		None	None	None		C-Max		None	C-Max	C-Max
Walk Time (s)	10.0	10.0		10.0	10.0			10.0			10.0	10.0
Flash Dont Walk (s)	19.0	19.0		19.0	19.0			15.0			15.0	15.0
Pedestrian Calls (#/hr)	0	0		0	0			0			0	0
Act Effct Green (s)		21.6			21.6	44.4		55.2		84.8	84.8	84.8
Actuated g/C Ratio		0.18			0.18	0.37		0.46		0.71	0.71	0.71
v/c Ratio		0.24			0.73	0.85		0.49		0.36	0.31	0.01
Control Delay		40.4			54.2	45.5		20.7		8.4	7.5	0.3
Queue Delay		0.0			0.0	0.0		0.0		0.0	0.0	0.0
Total Delay		40.4			54.2	45.5		20.7		8.4	7.5	0.3
LOS		D			D	D		C		A	A	A
Approach Delay		40.4			49.5			20.7			7.6	
Approach LOS		D			D			C			A	
Queue Length 50th (m)		8.5			47.6	87.2		58.2		14.3	32.1	0.0
Queue Length 95th (m)		15.2			61.1	107.4		87.1		26.9	48.5	0.5
Internal Link Dist (m)		175.5			122.4			377.6			176.6	
Turn Bay Length (m)						90.0				135.0		63.0
Base Capacity (vph)		856			1361	542		1477		558	2445	1085
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		0.10			0.30	0.85		0.49		0.36	0.31	0.01

Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 3 (3%), Referenced to phase 2:NBT and 6:SBTL, Start of Green			
Natural Cycle: 80			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.85			
Intersection Signal Delay: 25.8		Intersection LOS: C	
Intersection Capacity Utilization 80.7%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 1: Booth St & Sir John A MacDonald Pkwy/Wellington St



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	30	42	4	1	362	415	0	639	11	183	692	12
Future Volume (vph)	30	42	4	1	362	415	0	639	11	183	692	12
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	3.7	3.4	3.7	3.7	3.4	3.4	3.7	3.5	3.5	3.3	3.8	3.7
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
Frpb, ped/bikes		1.00			1.00	0.99		1.00		1.00	1.00	0.98
Flpb, ped/bikes		1.00			1.00	1.00		1.00		1.00	1.00	1.00
Frt		0.99			1.00	0.85		1.00		1.00	1.00	0.85
Flt Protected		0.98			1.00	1.00		1.00		0.95	1.00	1.00
Satd. Flow (prot)		2889			3215	1466		3211		1653	3461	1522
Flt Permitted		0.65			0.95	1.00		1.00		0.27	1.00	1.00
Satd. Flow (perm)		1926			3069	1466		3211		473	3461	1522
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)	33	47	4	1	402	461	0	710	12	203	769	13
RTOR Reduction (vph)	0	3	0	0	0	0	0	1	0	0	0	4
Lane Group Flow (vph)	0	81	0	0	403	461	0	721	0	203	769	9
Confl. Peds. (#/hr)	8		16	16		8	3		1	1		3
Heavy Vehicles (%)	0%	22%	0%	0%	4%	1%	2%	3%	0%	0%	1%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	10	10	0	0	0
Turn Type	Perm	NA		Perm	NA	pm+ov		NA		pm+pt	NA	Perm
Protected Phases		4			8	1		2		1	6	
Permitted Phases	4			8		8				6		6
Actuated Green, G (s)		21.6			21.6	44.4		55.2		84.8	84.8	84.8
Effective Green, g (s)		21.6			21.6	44.4		55.2		84.8	84.8	84.8
Actuated g/C Ratio		0.18			0.18	0.37		0.46		0.71	0.71	0.71
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)		346			552	625		1477		558	2445	1075
v/s Ratio Prot						c0.14		c0.22		0.07	0.22	
v/s Ratio Perm		0.04			0.13	0.17				0.19		0.01
v/c Ratio		0.23			0.73	0.74		0.49		0.36	0.31	0.01
Uniform Delay, d1		42.1			46.4	32.8		22.6		7.7	6.6	5.2
Progression Factor		1.00			1.00	1.00		0.81		1.00	1.00	1.00
Incremental Delay, d2		0.3			4.9	4.5		1.0		0.4	0.3	0.0
Delay (s)		42.5			51.4	37.3		19.1		8.1	7.0	5.2
Level of Service		D			D	D		B		A	A	A
Approach Delay (s)		42.5			43.9			19.1			7.2	
Approach LOS		D			D			B			A	

Intersection Summary					
HCM 2000 Control Delay	23.5	HCM 2000 Level of Service	C		
HCM 2000 Volume to Capacity ratio	0.65				
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	20.4		
Intersection Capacity Utilization	80.7%	ICU Level of Service	D		
Analysis Period (min)	15				

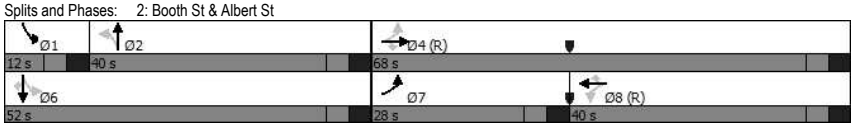
c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	296	215	17	20	395	131	13	373	20	91	373	233
Future Volume (vph)	296	215	17	20	395	131	13	373	20	91	373	233
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (m)	3.4	3.4	3.6	3.4	3.4	3.4	3.7	3.2	3.7	3.3	3.3	3.5
Storage Length (m)	150.0		42.0	38.0		87.0	0.0		44.0	0.0		56.0
Storage Lanes	1		1	1		1	0		0	1		1
Taper Length (m)	40.0			45.0			2.5			2.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	1.00	0.95	0.95	0.95	1.00	1.00	1.00
Ped Bike Factor	0.99		0.96	0.99		0.98		1.00		0.98		0.94
Frt			0.850			0.850		0.993				0.850
Flt Protected	0.950			0.950				0.998		0.950		
Satd. Flow (prot)	1592	1692	1530	1592	3278	1481	0	3192	0	1589	1740	1363
Flt Permitted	0.352			0.610				0.934		0.331		
Satd. Flow (perm)	587	1692	1472	1009	3278	1446	0	2985	0	544	1740	1275
Right Turn on Red			Yes			No			Yes			No
Satd. Flow (RTOR)			91					4				
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		185.1			175.2			57.0			401.6	
Travel Time (s)		13.3			12.6			4.1			28.9	
Confl. Peds. (#/hr)	10		9	9		10	45		36	36		45
Confl. Bikes (#/hr)									2			
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	5%	4%	0%	5%	2%	1%	8%	1%	0%	4%	0%	11%
Adj. Flow (vph)	329	239	19	22	439	146	14	414	22	101	414	259
Shared Lane Traffic (%)												
Lane Group Flow (vph)	329	239	19	22	439	146	0	450	0	101	414	259
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.4			3.4			3.3			3.3	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	1.10	1.10	1.07	1.10	1.10	1.10	1.06	1.14	1.06	1.12	1.12	1.09
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	0	0	0	0	0	1	0		1	0	0
Detector Template	Left						Left			Left		
Leading Detector (m)	6.1	0.0	0.0	0.0	0.0	0.0	6.1	0.0		6.1	0.0	0.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Size(m)	6.1	1.8	6.1	6.1	1.8	6.1	6.1	1.8		6.1	1.8	6.1
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Turn Type	pm+pt	NA	Perm	Perm	NA	Perm	Perm	NA		pm+pt	NA	Perm
Protected Phases	7	4			8			2		1	6	
Permitted Phases	4		4	8		8	2			6		6

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4	4	8	8	8	2	2		1	6	6
Switch Phase												
Minimum Initial (s)	5.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0		5.0	10.0	10.0
Minimum Split (s)	11.5	36.5	36.5	36.5	36.5	36.5	36.5	36.5		11.5	36.5	36.5
Total Split (s)	28.0	68.0	68.0	40.0	40.0	40.0	40.0	40.0		12.0	52.0	52.0
Total Split (%)	23.3%	56.7%	56.7%	33.3%	33.3%	33.3%	33.3%	33.3%		10.0%	43.3%	43.3%
Maximum Green (s)	21.5	61.5	61.5	33.5	33.5	33.5	33.5	33.5		5.5	45.5	45.5
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3		3.3	3.3	3.3
All-Red Time (s)	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2		3.2	3.2	3.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0		0.0		0.0	0.0	0.0
Total Lost Time (s)	6.5	6.5	6.5	6.5	6.5	6.5		6.5		6.5	6.5	6.5
Lead/Lag	Lead			Lag	Lag	Lag	Lag	Lag		Lead		
Lead-Lag Optimize?	Yes			Yes	Yes	Yes	Yes	Yes		Yes		
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Recall Mode	None	C-Max	C-Max	C-Max	C-Max	C-Max	Max	Max		None	Max	Max
Walk Time (s)		7.0	7.0	7.0	7.0	7.0	7.0	7.0			7.0	7.0
Flash Dont Walk (s)		23.0	23.0	23.0	23.0	23.0	23.0	23.0			23.0	23.0
Pedestrian Calls (#/hr)		0	0	0	0	0	0	0			0	0
Act Effct Green (s)	61.5	61.5	61.5	35.9	35.9	35.9		33.5		45.5	45.5	45.5
Actuated g/C Ratio	0.51	0.51	0.51	0.30	0.30	0.30		0.28		0.38	0.38	0.38
v/c Ratio	0.72	0.28	0.02	0.07	0.45	0.34		0.54		0.40	0.63	0.54
Control Delay	27.6	17.7	0.1	21.9	25.5	25.5		39.2		40.0	48.0	45.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0		0.0		0.0	0.0	0.0
Total Delay	27.6	17.7	0.1	21.9	25.5	25.5		39.2		40.0	48.0	45.9
LOS	C	B	A	C	C	C		D		D	D	D
Approach Delay		22.7			25.3			39.2			46.3	
Approach LOS		C			C			D			D	
Queue Length 50th (m)	46.0	30.9	0.0	3.7	44.9	27.4		46.9		20.6	103.1	61.7
Queue Length 95th (m)	68.0	47.2	0.0	10.4	61.1	46.4		63.5		36.8	135.9	92.1
Internal Link Dist (m)		161.1			151.2			33.0			377.6	
Turn Bay Length (m)	150.0		42.0	38.0		87.0						56.0
Base Capacity (vph)	480	867	798	301	980	432		836		254	659	483
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	0.69	0.28	0.02	0.07	0.45	0.34		0.54		0.40	0.63	0.54

Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 9 (8%), Referenced to phase 4:EBTL and 8:WBTL, Start of Green			
Natural Cycle: 100			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.72			
Intersection Signal Delay: 34.0		Intersection LOS: C	
Intersection Capacity Utilization 114.0%		ICU Level of Service H	
Analysis Period (min) 15			

Splits and Phases: 2: Booth St & Albert St



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	296	215	17	20	395	131	13	373	20	91	373	233
Future Volume (vph)	296	215	17	20	395	131	13	373	20	91	373	233
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	3.4	3.4	3.6	3.4	3.4	3.4	3.7	3.2	3.7	3.3	3.3	3.5
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
Frpb, ped/bikes	1.00	1.00	0.96	1.00	1.00	0.98		1.00		1.00	1.00	0.94
Flpb, ped/bikes	1.00	1.00	1.00	0.99	1.00	1.00		1.00		0.99	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)	1590	1692	1472	1572	3278	1446		3190		1581	1740	1275
Flt Permitted	0.35	1.00	1.00	0.61	1.00	1.00		0.93		0.33	1.00	1.00
Satd. Flow (perm)	589	1692	1472	1009	3278	1446		2983		550	1740	1275
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)	329	239	19	22	439	146	14	414	22	101	414	259
RTOR Reduction (vph)	0	0	9	0	0	0	0	3	0	0	0	0
Lane Group Flow (vph)	329	239	10	22	439	146	0	447	0	101	414	259
Confl. Peds. (#/hr)	10		9	9		10	45		36	36		45
Confl. Bikes (#/hr)									2			
Heavy Vehicles (%)	5%	4%	0%	5%	2%	1%	8%	1%	0%	4%	0%	11%
Turn Type	pm+pt	NA	Perm	Perm	NA	Perm	Perm	NA		pm+pt	NA	Perm
Protected Phases	7	4			8			2		1	6	
Permitted Phases	4		4	8		8	2			6		6
Actuated Green, G (s)	61.5	61.5	61.5	35.9	35.9	35.9		33.5		45.5	45.5	45.5
Effective Green, g (s)	61.5	61.5	61.5	35.9	35.9	35.9		33.5		45.5	45.5	45.5
Actuated g/C Ratio	0.51	0.51	0.51	0.30	0.30	0.30		0.28		0.38	0.38	0.38
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)	461	867	754	301	980	432		832		255	659	483
v/s Ratio Prot	c0.11	0.14			0.13					0.02	c0.24	
v/s Ratio Perm	c0.25		0.01	0.02		0.10		0.15		0.13		0.20
v/c Ratio	0.71	0.28	0.01	0.07	0.45	0.34		0.54		0.40	0.63	0.54
Uniform Delay, d1	19.0	16.6	14.4	30.1	34.0	32.8		36.7		25.5	30.4	29.0
Progression Factor	1.00	1.00	1.00	0.67	0.69	0.68		1.00		1.39	1.41	1.40
Incremental Delay, d2	5.2	0.8	0.0	0.5	1.4	2.0		2.5		1.0	4.3	4.1
Delay (s)	24.2	17.4	14.4	20.5	24.9	24.4		39.2		36.5	47.1	44.8
Level of Service	C	B	B	C	C	C		D		D	D	D
Approach Delay (s)		21.1			24.6			39.2			44.9	
Approach LOS		C			C			D			D	

Intersection Summary					
HCM 2000 Control Delay	33.0	HCM 2000 Level of Service	C		
HCM 2000 Volume to Capacity ratio	0.75				
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	26.0		
Intersection Capacity Utilization	114.0%	ICU Level of Service	H		
Analysis Period (min)	15				

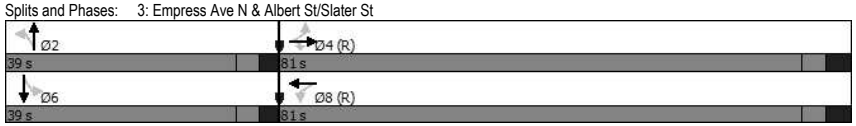
c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	269	1	2	536	0	5	0	11	0	0	0
Future Volume (vph)	0	269	1	2	536	0	5	0	11	0	0	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (m)	3.7	3.4	3.5	3.7	3.3	3.7	3.7	3.4	3.7	3.7	3.4	3.7
Storage Length (m)	0.0		45.0	0.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	0		1	0		0	0		0	0		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	0.95	0.95	1.00	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor			0.96		1.00			0.98				
Frt			0.850					0.910				
Flt Protected								0.984				
Satd. Flow (prot)	0	3247	756	0	3241	0	0	1457	0	0	1725	0
Flt Permitted					0.954			0.949				
Satd. Flow (perm)	0	3247	723	0	3092	0	0	1398	0	0	1725	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			30					37				
Link Speed (k/h)		50			50			40			40	
Link Distance (m)		175.2			39.3			118.9			51.7	
Travel Time (s)		12.6			2.8			10.7			4.7	
Confl. Peds. (#/hr)	25		9	9		25	15		8	8		15
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	2%	3%	100%	0%	2%	2%	0%	2%	10%	2%	2%	2%
Adj. Flow (vph)	0	299	1	2	596	0	6	0	12	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	299	1	0	598	0	0	18	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.4			3.4			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	1.06	1.10	1.09	1.06	1.12	1.06	1.06	1.10	1.06	1.06	1.10	1.06
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Turn Type		NA	Perm	Perm	NA		Perm	NA				
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2			6		
Minimum Split (s)	29.1	29.1	29.1	29.1	29.1		39.0	39.0		39.0	39.0	
Total Split (s)	81.0	81.0	81.0	81.0	81.0		39.0	39.0		39.0	39.0	
Total Split (%)	67.5%	67.5%	67.5%	67.5%	67.5%		32.5%	32.5%		32.5%	32.5%	
Maximum Green (s)	73.9	73.9	73.9	73.9	73.9		32.7	32.7		32.7	32.7	
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3		3.3	3.3		3.3	3.3	
All-Red Time (s)	3.8	3.8	3.8	3.8	3.8		3.0	3.0		3.0	3.0	
Lost Time Adjust (s)		0.0	0.0		0.0			0.0			0.0	
Total Lost Time (s)		7.1	7.1		7.1			6.3			6.3	
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	7.0	7.0	7.0	7.0	7.0		10.0	10.0		10.0	10.0	
Flash Dont Walk (s)	15.0	15.0	15.0	15.0	15.0		22.7	22.7		22.7	22.7	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Pedestrian Calls (#/hr)	0	0	0	0	0		0	0		0	0	
Act Effct Green (s)		73.9	73.9		73.9			32.7				
Actuated g/C Ratio		0.62	0.62		0.62			0.27				
v/c Ratio		0.15	0.00		0.31			0.04				
Control Delay		9.7	0.0		11.5			3.6				
Queue Delay		0.0	0.0		0.0			0.0				
Total Delay		9.7	0.0		11.5			3.6				
LOS		A	A		B			A				
Approach Delay		9.7			11.5			3.6				
Approach LOS		A			B			A				
Queue Length 50th (m)		15.8	0.0		33.0			0.0				
Queue Length 95th (m)		20.5	m0.0		43.0			2.3				
Internal Link Dist (m)		151.2			15.3			94.9			27.7	
Turn Bay Length (m)			45.0									
Base Capacity (vph)		1999	456		1904			407				
Starvation Cap Reductn		0	0		0			0				
Spillback Cap Reductn		0	0		0			0				
Storage Cap Reductn		0	0		0			0				
Reduced v/c Ratio		0.15	0.00		0.31			0.04				

Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 87 (73%), Referenced to phase 4:EBTL and 8:WBTL, Start of Green			
Natural Cycle: 70			
Control Type: Pretimed			
Maximum v/c Ratio: 0.31			
Intersection Signal Delay: 10.8		Intersection LOS: B	
Intersection Capacity Utilization 56.8%		ICU Level of Service B	
Analysis Period (min) 15			
m Volume for 95th percentile queue is metered by upstream signal.			

Splits and Phases: 3: Empress Ave N & Albert St/Slater St



HCM Signalized Intersection Capacity Analysis
3: Empress Ave N & Albert St/Slater St

05/02/2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	269	1	2	536	0	5	0	11	0	0	0
Future Volume (vph)	0	269	1	2	536	0	5	0	11	0	0	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	3.7	3.4	3.5	3.7	3.3	3.7	3.7	3.4	3.7	3.7	3.4	3.7
Total Lost time (s)		7.1	7.1		7.1			6.3				
Lane Util. Factor		0.95	1.00		0.95			1.00				
Frpb, ped/bikes		1.00	0.96		1.00			0.99				
Flpb, ped/bikes		1.00	1.00		1.00			0.99				
Frt		1.00	0.85		1.00			0.91				
Flt Protected		1.00	1.00		1.00			0.98				
Satd. Flow (prot)		3247	723		3241			1449				
Flt Permitted		1.00	1.00		0.95			0.95				
Satd. Flow (perm)		3247	723		3093			1397				
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	299	1	2	596	0	6	0	12	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	13	0	0	0	0
Lane Group Flow (vph)	0	299	1	0	598	0	0	5	0	0	0	0
Confl. Peds. (#/hr)	25		9	9		25	15		8	8		15
Heavy Vehicles (%)	2%	3%	100%	0%	2%	2%	0%	2%	10%	2%	2%	2%
Turn Type		NA	Perm	Perm	NA		Perm	NA				
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)		73.9	73.9		73.9			32.7				
Effective Green, g (s)		73.9	73.9		73.9			32.7				
Actuated g/C Ratio		0.62	0.62		0.62			0.27				
Clearance Time (s)		7.1	7.1		7.1			6.3				
Lane Grp Cap (vph)		1999	445		1904			380				
v/s Ratio Prot		0.09										
v/s Ratio Perm			0.00		c0.19			c0.00				
v/c Ratio		0.15	0.00		0.31			0.01				
Uniform Delay, d1		9.8	8.9		11.0			31.9				
Progression Factor		0.97	1.00		1.00			1.00				
Incremental Delay, d2		0.2	0.0		0.4			0.1				
Delay (s)		9.6	8.9		11.4			31.9				
Level of Service		A	A		B			C				
Approach Delay (s)		9.6			11.4			31.9			0.0	
Approach LOS		A			B			C			A	

Intersection Summary				
HCM 2000 Control Delay	11.2	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.22			
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			

c Critical Lane Group

Lanes, Volumes, Timings
4: Bronson Ave & Slater St

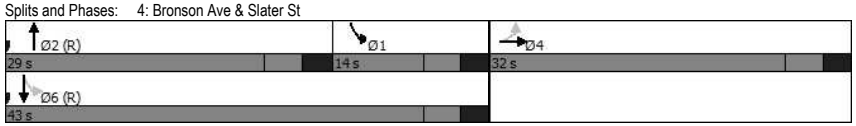
05/02/2022

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	12	218	1	0	0	0	0	308	101	27	238	0
Future Volume (vph)	12	218	1	0	0	0	0	308	101	27	238	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (m)	3.7	3.3	3.7	3.7	3.7	3.7	3.7	3.5	3.7	3.6	3.8	3.7
Storage Length (m)	0.0		0.0	0.0		0.0	0.0		0.0	20.0		0.0
Storage Lanes	0		0	0		0	0		0	1		0
Taper Length (m)	2.5			2.5			2.5			8.0		
Lane Util. Factor	0.95	0.95	0.95	1.00	1.00	1.00	1.00	0.95	0.95	1.00	1.00	1.00
Ped Bike Factor		1.00						0.99		0.99		
Frt		0.999						0.963				
Flt Protected		0.997								0.950		
Satd. Flow (prot)	0	3172	0	0	0	0	0	3142	0	1644	1769	0
Flt Permitted		0.997								0.490		
Satd. Flow (perm)	0	3169	0	0	0	0	0	3142	0	838	1769	0
Right Turn on Red			Yes			Yes			No			Yes
Satd. Flow (RTOR)		1										
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		115.0			115.8			103.4			50.3	
Travel Time (s)		8.3			8.3			7.4			3.6	
Confl. Peds. (#/hr)	13		14	14		13	13		21	21		13
Confl. Bikes (#/hr)									1			
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	0%	4%	0%	2%	2%	2%	2%	1%	8%	4%	4%	2%
Adj. Flow (vph)	13	242	1	0	0	0	0	342	112	30	264	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	256	0	0	0	0	0	454	0	30	264	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	1.06	1.12	1.06	1.06	1.06	1.06	1.06	1.09	1.06	1.07	1.04	1.06
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	0						0		0	0	
Detector Template	Left											
Leading Detector (m)	6.1	0.0						0.0		0.0	0.0	
Trailing Detector (m)	0.0	0.0						0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0						0.0		0.0	0.0	
Detector 1 Size(m)	6.1	1.8						1.8		6.1	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex						Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0						0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0						0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0						0.0		0.0	0.0	
Turn Type	Perm	NA						NA		pm+pt	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4									6		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	4	4						2		1	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0						10.0		5.0	10.0	
Minimum Split (s)	19.9	19.9						26.0		11.0	26.0	
Total Split (s)	32.0	32.0						29.0		14.0	43.0	
Total Split (%)	42.7%	42.7%						38.7%		18.7%	57.3%	
Maximum Green (s)	26.1	26.1						23.0		8.0	37.0	
Yellow Time (s)	3.3	3.3						3.3		3.3	3.3	
All-Red Time (s)	2.6	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		
Vehicle Extension (s)	3.0	3.0						3.0		3.0	3.0	
Recall Mode	None	None						C-Max		Max	C-Max	
Walk Time (s)	7.0	7.0						13.0			13.0	
Flash Dont Walk (s)	7.0	7.0						7.0			7.0	
Pedestrian Calls (#/hr)	0	0						0			0	
Act Effct Green (s)		11.8						37.3		51.3	51.3	
Actuated g/C Ratio		0.16						0.50		0.68	0.68	
v/c Ratio		0.52						0.29		0.05	0.22	
Control Delay		32.4						12.1		4.7	5.2	
Queue Delay		0.0						0.0		0.0	0.0	
Total Delay		32.4						12.1		4.7	5.2	
LOS		C						B		A	A	
Approach Delay		32.4						12.1			5.2	
Approach LOS		C						B			A	
Queue Length 50th (m)		17.7						18.4		1.1	11.4	
Queue Length 95th (m)		27.1						30.1		3.8	22.8	
Internal Link Dist (m)		91.0			91.8			79.4			26.3	
Turn Bay Length (m)										20.0		
Base Capacity (vph)		1103						1564		659	1210	
Starvation Cap Reductn		0						0		0	0	
Spillback Cap Reductn		0						0		0	0	
Storage Cap Reductn		0						0		0	0	
Reduced v/c Ratio		0.23						0.29		0.05	0.22	

Intersection Summary			
Area Type:	Other		
Cycle Length: 75			
Actuated Cycle Length: 75			
Offset: 38 (51%), Referenced to phase 2:NBT and 6:SBTL, Start of Green			
Natural Cycle: 60			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.52			
Intersection Signal Delay: 15.2		Intersection LOS: B	
Intersection Capacity Utilization 44.3%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 4: Bronson Ave & Slater St



HCM Signalized Intersection Capacity Analysis
4: Bronson Ave & Slater St

05/02/2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	12	218	1	0	0	0	0	308	101	27	238	0
Future Volume (vph)	12	218	1	0	0	0	0	308	101	27	238	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	3.7	3.3	3.7	3.7	3.7	3.7	3.7	3.5	3.7	3.6	3.8	3.7
Total Lost time (s)		5.9						6.0		6.0	6.0	
Lane Util. Factor		0.95						0.95		1.00	1.00	
Frpb, ped/bikes		1.00						0.99		1.00	1.00	
Flpb, ped/bikes		1.00						1.00		0.99	1.00	
Frt		1.00						0.96		1.00	1.00	
Flt Protected		1.00						1.00		0.95	1.00	
Satd. Flow (prot)		3172						3143		1635	1769	
Flt Permitted		1.00						1.00		0.49	1.00	
Satd. Flow (perm)		3172						3143		843	1769	
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)	13	242	1	0	0	0	0	342	112	30	264	0
RTOR Reduction (vph)	0	1	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	255	0	0	0	0	0	454	0	30	264	0
Confl. Peds. (#/hr)	13		14	14		13	13		21	21		13
Confl. Bikes (#/hr)									1			
Heavy Vehicles (%)	0%	4%	0%	2%	2%	2%	2%	1%	8%	4%	4%	2%
Turn Type	Perm	NA						NA		pm+pt	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4									6		
Actuated Green, G (s)		11.8						37.3		51.3	51.3	
Effective Green, g (s)		11.8						37.3		51.3	51.3	
Actuated g/C Ratio		0.16						0.50		0.68	0.68	
Clearance Time (s)		5.9						6.0		6.0	6.0	
Vehicle Extension (s)		3.0						3.0		3.0	3.0	
Lane Grp Cap (vph)		499						1563		661	1209	
v/s Ratio Prot								c0.14		0.00	c0.15	
v/s Ratio Perm		0.08								0.03		
v/c Ratio		0.51						0.29		0.05	0.22	
Uniform Delay, d1		29.0						11.1		3.9	4.4	
Progression Factor		1.00						1.00		1.00	1.00	
Incremental Delay, d2		0.9						0.5		0.1	0.4	
Delay (s)		29.8						11.5		4.0	4.8	
Level of Service		C						B		A	A	
Approach Delay (s)		29.8			0.0			11.5			4.7	
Approach LOS		C			A			B			A	

Intersection Summary				
HCM 2000 Control Delay	14.2	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.34			
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	17.9	
Intersection Capacity Utilization	44.3%	ICU Level of Service	A	
Analysis Period (min)	15			

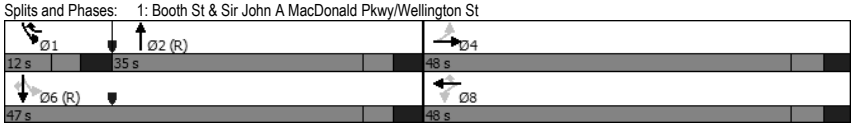
c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	2	259	146	9	63	3	0	515	9	354	512	37
Future Volume (vph)	2	259	146	9	63	3	0	515	9	354	512	37
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (m)	3.7	3.4	3.7	3.7	3.4	3.4	3.7	3.5	3.5	3.3	3.8	3.7
Storage Length (m)	0.0		0.0	0.0		90.0	0.0		0.0	135.0		63.0
Storage Lanes	0		0	0		1	0		0	1		1
Taper Length (m)	2.5			2.5			2.5			30.0		
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	1.00	1.00	0.95	0.95	1.00	0.95	1.00
Ped Bike Factor		0.99			1.00	0.98		1.00		1.00		0.99
Frt		0.946				0.850		0.997				0.850
Flt Protected					0.994					0.950		
Satd. Flow (prot)	0	2914	0	0	3185	1496	0	3338	0	1559	3394	1547
Flt Permitted		0.954			0.867					0.264		
Satd. Flow (perm)	0	2780	0	0	2776	1461	0	3338	0	433	3394	1527
Right Turn on Red			Yes			No			Yes			Yes
Satd. Flow (RTOR)		143						2				44
Link Speed (k/h)		60			60			50			50	
Link Distance (m)		199.5			146.4			401.6			200.6	
Travel Time (s)		12.0			8.8			28.9			14.4	
Confl. Peds. (#/hr)			7	7		12			3	3		1
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	2%	10%	4%	0%	5%	0%	2%	1%	0%	6%	3%	0%
Adj. Flow (vph)	2	288	162	10	70	3	0	572	10	393	569	41
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	452	0	0	80	3	0	582	0	393	569	41
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.3			3.3	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	1.06	1.10	1.06	1.06	1.10	1.10	1.06	1.09	1.09	1.12	1.04	1.06
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	0		1	0	0		0		1	0	0
Detector Template	Left			Left						Left		
Leading Detector (m)	2.0	0.0		6.1	0.0	0.0		0.0		6.1	0.0	0.0
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0		0.0		0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0		0.0		0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6		6.1	0.6	2.0		1.8		6.1	1.8	6.1
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0		0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0		0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0		0.0		0.0	0.0	0.0
Turn Type	Perm	NA		Perm	NA	pm+ov		NA		pm+pt	NA	Perm
Protected Phases		4			8	1		2		1	6	
Permitted Phases	4			8		8				6		6
Detector Phase	4	4		8	8	1		2		1	6	6

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0	5.0		10.0		5.0	10.0	10.0
Minimum Split (s)	35.8	35.8		35.8	35.8	11.8		31.8		11.8	31.8	31.8
Total Split (s)	48.0	48.0		48.0	48.0	12.0		35.0		12.0	47.0	47.0
Total Split (%)	50.5%	50.5%		50.5%	50.5%	12.6%		36.8%		12.6%	49.5%	49.5%
Maximum Green (s)	41.2	41.2		41.2	41.2	5.2		28.2		5.2	40.2	40.2
Yellow Time (s)	3.7	3.7		3.7	3.7	3.3		3.3		3.3	3.3	3.3
All-Red Time (s)	3.1	3.1		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		
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0		3.0		3.0	3.0	3.0
Recall Mode	None	None		None	None	None		C-Max		None	C-Max	C-Max
Walk Time (s)	10.0	10.0		10.0	10.0			10.0			10.0	10.0
Flash Dont Walk (s)	19.0	19.0		19.0	19.0			15.0			15.0	15.0
Pedestrian Calls (#/hr)	0	0		0	0			0			0	0
Act Effct Green (s)		16.7			16.7	46.3		28.3		64.7	64.7	64.7
Actuated g/C Ratio		0.18			0.18	0.49		0.30		0.68	0.68	0.68
v/c Ratio		0.75			0.16	0.00		0.58		0.61	0.25	0.04
Control Delay		32.6			32.1	9.7		31.0		13.7	6.7	2.2
Queue Delay		0.0			0.0	0.0		0.0		0.0	0.0	0.0
Total Delay		32.6			32.1	9.7		31.0		13.7	6.7	2.2
LOS		C			C	A		C		B	A	A
Approach Delay		32.6			31.3			31.0			9.3	
Approach LOS		C			C			C			A	
Queue Length 50th (m)		28.5			6.6	0.3		47.4		27.0	18.5	0.0
Queue Length 95th (m)		41.5			11.9	1.5		64.3		64.2	31.6	3.4
Internal Link Dist (m)		175.5			122.4			377.6			176.6	
Turn Bay Length (m)						90.0				135.0		63.0
Base Capacity (vph)		1286			1203	722		997		645	2311	1054
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		0.35			0.07	0.00		0.58		0.61	0.25	0.04

Intersection Summary			
Area Type:	Other		
Cycle Length: 95			
Actuated Cycle Length: 95			
Offset: 31 (33%), Referenced to phase 2:NBT and 6:SBTL, Start of Green			
Natural Cycle: 90			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.75			
Intersection Signal Delay: 21.1		Intersection LOS: C	
Intersection Capacity Utilization 74.9%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 1: Booth St & Sir John A MacDonald Pkwy/Wellington St



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	2	259	146	9	63	3	0	515	9	354	512	37
Future Volume (vph)	2	259	146	9	63	3	0	515	9	354	512	37
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	3.7	3.4	3.7	3.7	3.4	3.4	3.7	3.5	3.5	3.3	3.8	3.7
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
Frpb, ped/bikes		0.99			1.00	0.99		1.00		1.00	1.00	0.99
Flpb, ped/bikes		1.00			1.00	1.00		1.00		1.00	1.00	1.00
Frt		0.95			1.00	0.85		1.00		1.00	1.00	0.85
Flt Protected		1.00			0.99	1.00		1.00		0.95	1.00	1.00
Satd. Flow (prot)		2915			3183	1483		3340		1559	3394	1527
Flt Permitted		0.95			0.87	1.00		1.00		0.26	1.00	1.00
Satd. Flow (perm)		2781			2777	1483		3340		433	3394	1527
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)	2	288	162	10	70	3	0	572	10	393	569	41
RTOR Reduction (vph)	0	118	0	0	0	0	0	1	0	0	0	13
Lane Group Flow (vph)	0	334	0	0	80	3	0	581	0	393	569	28
Confl. Peds. (#/hr)			7	7		12			3	3		1
Heavy Vehicles (%)	2%	10%	4%	0%	5%	0%	2%	1%	0%	6%	3%	0%
Turn Type	Perm	NA		Perm	NA	pm+ov		NA		pm+pt	NA	Perm
Protected Phases		4			8	1		2		1	6	
Permitted Phases	4			8		8				6		6
Actuated Green, G (s)		16.7			16.7	46.3		28.3		64.7	64.7	64.7
Effective Green, g (s)		16.7			16.7	46.3		28.3		64.7	64.7	64.7
Actuated g/C Ratio		0.18			0.18	0.49		0.30		0.68	0.68	0.68
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)		488			488	828		994		645	2311	1039
v/s Ratio Prot						0.00		0.17		c0.19	0.17	
v/s Ratio Perm		c0.12			0.03	0.00				c0.22		0.02
v/c Ratio		0.68			0.16	0.00		0.58		0.61	0.25	0.03
Uniform Delay, d1		36.7			33.2	12.5		28.3		8.7	5.8	4.9
Progression Factor		1.00			1.00	1.00		1.00		1.00	1.00	1.00
Incremental Delay, d2		4.0			0.2	0.0		2.5		1.6	0.3	0.0
Delay (s)		40.6			33.4	12.5		30.9		10.3	6.1	5.0
Level of Service		D			C	B		C		B	A	A
Approach Delay (s)		40.6			32.6			30.9			7.7	
Approach LOS		D			C			C			A	

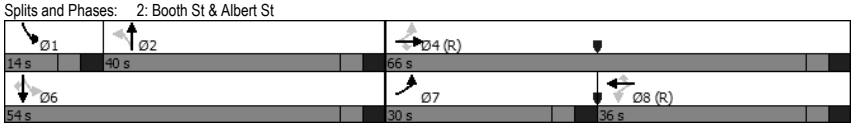
Intersection Summary			
HCM 2000 Control Delay	22.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	95.0	Sum of lost time (s)	20.4
Intersection Capacity Utilization	74.9%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	148	304	10	12	196	60	10	249	35	62	408	192
Future Volume (vph)	148	304	10	12	196	60	10	249	35	62	408	192
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (m)	3.4	3.4	3.6	3.4	3.4	3.4	3.7	3.2	3.7	3.3	3.3	3.5
Storage Length (m)	150.0		42.0	38.0		87.0	0.0		44.0	0.0		56.0
Storage Lanes	1		1	1		1	0		0	1		1
Taper Length (m)	40.0			45.0			2.5			2.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	1.00	0.95	0.95	0.95	1.00	1.00	1.00
Ped Bike Factor	0.99		0.96	0.99		0.97		0.99		0.98		0.94
Frt			0.850			0.850		0.982				0.850
Flt Protected	0.950			0.950				0.998		0.950		
Satd. Flow (prot)	1441	1615	1530	1672	3096	1268	0	3105	0	1559	1706	1327
Flt Permitted	0.526			0.557				0.933		0.440		
Satd. Flow (perm)	790	1615	1471	969	3096	1233	0	2901	0	706	1706	1252
Right Turn on Red			Yes			No			Yes			No
Satd. Flow (RTOR)			91					12				
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		185.1			175.2			57.0			401.6	
Travel Time (s)		13.3			12.6			4.1			28.9	
Confl. Peds. (#/hr)	13		9	9		13	38		34	34		38
Confl. Bikes (#/hr)			1									
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	16%	9%	0%	0%	8%	18%	10%	2%	4%	6%	2%	14%
Adj. Flow (vph)	164	338	11	13	218	67	11	277	39	69	453	213
Shared Lane Traffic (%)												
Lane Group Flow (vph)	164	338	11	13	218	67	0	327	0	69	453	213
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.4			3.4			3.3			3.3	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	1.10	1.10	1.07	1.10	1.10	1.10	1.06	1.14	1.06	1.12	1.12	1.09
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	0	0	0	0	0	1	0		1	0	0
Detector Template	Left						Left			Left		
Leading Detector (m)	6.1	0.0	0.0	0.0	0.0	0.0	6.1	0.0		6.1	0.0	0.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Size(m)	6.1	1.8	6.1	6.1	1.8	6.1	6.1	1.8		6.1	1.8	6.1
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Turn Type	pm+pt	NA	Perm	Perm	NA	Perm	Perm	NA		pm+pt	NA	Perm
Protected Phases	7	4			8			2		1	6	
Permitted Phases	4		4	8		8	2			6		6

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4	4	8	8	8	2	2		1	6	6
Switch Phase												
Minimum Initial (s)	5.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0		5.0	10.0	10.0
Minimum Split (s)	11.5	36.5	36.5	36.0	36.0	36.0	36.5	36.5		11.5	36.5	36.5
Total Split (s)	30.0	66.0	66.0	36.0	36.0	36.0	40.0	40.0		14.0	54.0	54.0
Total Split (%)	25.0%	55.0%	55.0%	30.0%	30.0%	30.0%	33.3%	33.3%		11.7%	45.0%	45.0%
Maximum Green (s)	23.5	59.5	59.5	29.5	29.5	29.5	33.5	33.5		7.5	47.5	47.5
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3		3.3	3.3	3.3
All-Red Time (s)	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2		3.2	3.2	3.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0		0.0		0.0	0.0	0.0
Total Lost Time (s)	6.5	6.5	6.5	6.5	6.5	6.5		6.5		6.5	6.5	6.5
Lead/Lag	Lead			Lag	Lag	Lag	Lag	Lag		Lead		
Lead-Lag Optimize?	Yes			Yes	Yes	Yes	Yes	Yes		Yes		
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Recall Mode	None	C-Max	C-Max	C-Max	C-Max	C-Max	Max	Max		None	Max	Max
Walk Time (s)		7.0	7.0	7.0	7.0	7.0	7.0	7.0			7.0	7.0
Flash Dont Walk (s)		23.0	23.0	22.5	22.5	22.5	23.0	23.0			23.0	23.0
Pedestrian Calls (#/hr)		0	0	0	0	0	0	0			0	0
Act Effct Green (s)	59.5	59.5	59.5	39.6	39.6	39.6		36.3		47.5	47.5	47.5
Actuated g/C Ratio	0.50	0.50	0.50	0.33	0.33	0.33		0.30		0.40	0.40	0.40
v/c Ratio	0.35	0.42	0.01	0.04	0.21	0.16		0.37		0.21	0.67	0.43
Control Delay	19.7	21.4	0.0	22.8	22.0	22.9		34.1		24.7	35.8	29.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0		0.0		0.0	0.0	0.0
Total Delay	19.7	21.4	0.0	22.8	22.0	22.9		34.1		24.7	35.8	29.8
LOS	B	C	A	C	C	C		C		C	D	C
Approach Delay		20.4			22.2			34.1			33.0	
Approach LOS		C			C			C			C	
Queue Length 50th (m)	21.3	49.2	0.0	1.1	9.8	5.8		31.6		10.1	86.7	36.0
Queue Length 95th (m)	35.0	72.7	0.0	3.6	14.2	11.0		45.1		19.9	123.8	57.8
Internal Link Dist (m)		161.1			151.2			33.0			377.6	
Turn Bay Length (m)	150.0		42.0	38.0		87.0						56.0
Base Capacity (vph)	519	800	775	319	1021	407		885		332	675	495
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	0.32	0.42	0.01	0.04	0.21	0.16		0.37		0.21	0.67	0.43

Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 104 (87%), Referenced to phase 4:EBTL and 8:WBTL, Start of Green			
Natural Cycle: 100			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.67			
Intersection Signal Delay: 28.0		Intersection LOS: C	
Intersection Capacity Utilization 104.0%		ICU Level of Service G	
Analysis Period (min) 15			

Splits and Phases: 2: Booth St & Albert St



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	148	304	10	12	196	60	10	249	35	62	408	192
Future Volume (vph)	148	304	10	12	196	60	10	249	35	62	408	192
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	3.4	3.4	3.6	3.4	3.4	3.4	3.7	3.2	3.7	3.3	3.3	3.5
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
Frpb, ped/bikes	1.00	1.00	0.96	1.00	1.00	0.97		0.99		1.00	1.00	0.94
Flpb, ped/bikes	0.99	1.00	1.00	0.99	1.00	1.00		1.00		0.99	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)	1434	1615	1471	1653	3096	1233		3104		1545	1706	1252
Flt Permitted	0.53	1.00	1.00	0.56	1.00	1.00		0.93		0.44	1.00	1.00
Satd. Flow (perm)	794	1615	1471	970	3096	1233		2902		715	1706	1252
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)	164	338	11	13	218	67	11	277	39	69	453	213
RTOR Reduction (vph)	0	0	6	0	0	0	0	8	0	0	0	0
Lane Group Flow (vph)	164	338	5	13	218	67	0	319	0	69	453	213
Confl. Peds. (#/hr)	13		9	9		13	38		34	34		38
Confl. Bikes (#/hr)			1									
Heavy Vehicles (%)	16%	9%	0%	0%	8%	18%	10%	2%	4%	6%	2%	14%
Turn Type	pm+pt	NA	Perm	Perm	NA	Perm	Perm	NA		pm+pt	NA	Perm
Protected Phases	7	4			8			2		1	6	
Permitted Phases	4		4	8		8	2			6		6
Actuated Green, G (s)	58.2	58.2	58.2	38.3	38.3	38.3		36.3		48.8	48.8	48.8
Effective Green, g (s)	58.2	58.2	58.2	38.3	38.3	38.3		36.3		48.8	48.8	48.8
Actuated g/C Ratio	0.49	0.49	0.49	0.32	0.32	0.32		0.30		0.41	0.41	0.41
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)	456	783	713	309	988	393		877		332	693	509
v/s Ratio Prot	0.04	c0.21			0.07					0.01	c0.27	
v/s Ratio Perm	0.13		0.00	0.01		0.05		0.11		0.07		0.17
v/c Ratio	0.36	0.43	0.01	0.04	0.22	0.17		0.36		0.21	0.65	0.42
Uniform Delay, d1	18.2	20.1	16.0	28.2	29.9	29.4		32.8		22.5	28.8	25.5
Progression Factor	1.00	1.00	1.00	0.76	0.72	0.72		1.00		1.00	1.00	1.00
Incremental Delay, d2	0.5	1.7	0.0	0.3	0.5	0.9		1.2		0.3	4.8	2.5
Delay (s)	18.7	21.9	16.0	21.6	21.9	22.1		34.0		22.8	33.5	28.0
Level of Service	B	C	B	C	C	C		C		C	C	C
Approach Delay (s)		20.7			22.0			34.0			30.9	
Approach LOS		C			C			C			C	

Intersection Summary					
HCM 2000 Control Delay	27.2	HCM 2000 Level of Service	C		
HCM 2000 Volume to Capacity ratio	0.61				
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	26.0		
Intersection Capacity Utilization	104.0%	ICU Level of Service	G		
Analysis Period (min)	15				

c Critical Lane Group

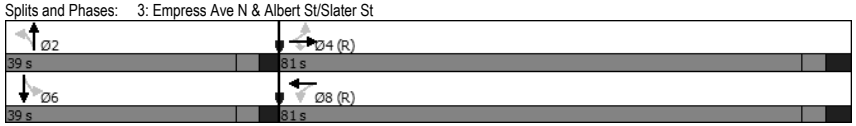
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	394	9	9	265	0	2	0	6	0	0	0
Future Volume (vph)	0	394	9	9	265	0	2	0	6	0	0	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (m)	3.7	3.4	3.5	3.7	3.3	3.7	3.7	3.4	3.7	3.7	3.4	3.7
Storage Length (m)	0.0		45.0	0.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	0		1	0		0	0		0	0		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	0.95	0.95	1.00	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor			0.96		1.00			0.98				
Frt			0.850					0.895				
Flt Protected					0.998			0.989				
Satd. Flow (prot)	0	3125	1351	0	3008	0	0	1383	0	0	1725	0
Flt Permitted					0.938			0.974				
Satd. Flow (perm)	0	3125	1291	0	2826	0	0	1359	0	0	1725	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			30					37				
Link Speed (k/h)		50			50			40			40	
Link Distance (m)		175.2			39.3			118.9			51.7	
Travel Time (s)		12.6			2.8			10.7			4.7	
Confl. Peds. (#/hr)	13		9	9		13	8		5	5		8
Confl. Bikes (#/hr)			1									
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	2%	7%	12%	0%	10%	2%	50%	2%	0%	2%	2%	2%
Adj. Flow (vph)	0	438	10	10	294	0	2	0	7	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	438	10	0	304	0	0	9	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.4			3.4			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	1.06	1.10	1.09	1.06	1.12	1.06	1.06	1.10	1.06	1.06	1.10	1.06
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Turn Type		NA	Perm	Perm	NA		Perm	NA				
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2			6		
Minimum Split (s)	81.0	81.0	81.0	81.0	81.0		39.0	39.0		39.0	39.0	
Total Split (s)	81.0	81.0	81.0	81.0	81.0		39.0	39.0		39.0	39.0	
Total Split (%)	67.5%	67.5%	67.5%	67.5%	67.5%		32.5%	32.5%		32.5%	32.5%	
Maximum Green (s)	73.9	73.9	73.9	73.9	73.9		32.7	32.7		32.7	32.7	
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3		3.3	3.3		3.3	3.3	
All-Red Time (s)	3.8	3.8	3.8	3.8	3.8		3.0	3.0		3.0	3.0	
Lost Time Adjust (s)		0.0	0.0		0.0			0.0			0.0	
Total Lost Time (s)		7.1	7.1		7.1			6.3			6.3	
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	7.0	7.0	7.0	7.0	7.0		10.0	10.0		10.0	10.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Flash Dont Walk (s)	15.0	15.0	15.0	15.0	15.0		22.7	22.7		22.7	22.7	
Pedestrian Calls (#/hr)	0	0	0	0	0		0	0		0	0	
Act Effct Green (s)		73.9	73.9		73.9			32.7				
Actuated g/C Ratio		0.62	0.62		0.62			0.27				
v/c Ratio		0.23	0.01		0.17			0.02				
Control Delay		4.5	0.0		10.2			0.1				
Queue Delay		0.0	0.0		0.0			0.0				
Total Delay		4.5	0.0		10.2			0.1				
LOS		A	A		B			A				
Approach Delay		4.4			10.2			0.1				
Approach LOS		A			B			A				
Queue Length 50th (m)		8.0	0.0		15.2			0.0				
Queue Length 95th (m)		10.4	m0.0		21.6			0.0				
Internal Link Dist (m)		151.2			15.3			94.9			27.7	
Turn Bay Length (m)			45.0									
Base Capacity (vph)		1924	806		1740			397				
Starvation Cap Reductn		0	0		0			0				
Spillback Cap Reductn		0	0		0			0				
Storage Cap Reductn		0	0		0			0				
Reduced v/c Ratio		0.23	0.01		0.17			0.02				

Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 87 (73%), Referenced to phase 4:EBTL and 8:WBTL, Start of Green			
Natural Cycle: 120			
Control Type: Pretimed			
Maximum v/c Ratio: 0.23			
Intersection Signal Delay: 6.7		Intersection LOS: A	
Intersection Capacity Utilization 135.0%		ICU Level of Service H	
Analysis Period (min) 15			

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

Splits and Phases: 3: Empress Ave N & Albert St/Slater St



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	394	9	9	265	0	2	0	6	0	0	0
Future Volume (vph)	0	394	9	9	265	0	2	0	6	0	0	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	3.7	3.4	3.5	3.7	3.3	3.7	3.7	3.4	3.7	3.7	3.4	3.7
Total Lost time (s)		7.1	7.1		7.1			6.3				
Lane Util. Factor		0.95	1.00		0.95			1.00				
Frpb, ped/bikes		1.00	0.96		1.00			0.99				
Flpb, ped/bikes		1.00	1.00		1.00			1.00				
Frt		1.00	0.85		1.00			0.90				
Flt Protected		1.00	1.00		1.00			0.99				
Satd. Flow (prot)		3125	1291		3008			1380				
Flt Permitted		1.00	1.00		0.94			0.97				
Satd. Flow (perm)		3125	1291		2825			1359				
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	438	10	10	294	0	2	0	7	0	0	0
RTOR Reduction (vph)	0	0	4	0	0	0	0	7	0	0	0	0
Lane Group Flow (vph)	0	438	6	0	304	0	0	2	0	0	0	0
Confl. Peds. (#/hr)	13		9	9		13	8		5	5		8
Confl. Bikes (#/hr)			1									
Heavy Vehicles (%)	2%	7%	12%	0%	10%	2%	50%	2%	0%	2%	2%	2%
Turn Type		NA	Perm	Perm	NA		Perm	NA				
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)		73.9	73.9		73.9			32.7				
Effective Green, g (s)		73.9	73.9		73.9			32.7				
Actuated g/C Ratio		0.62	0.62		0.62			0.27				
Clearance Time (s)		7.1	7.1		7.1			6.3				
Lane Grp Cap (vph)		1924	795		1739			370				
v/s Ratio Prot		c0.14										
v/s Ratio Perm			0.00		0.11			c0.00				
v/c Ratio		0.23	0.01		0.17			0.01				
Uniform Delay, d1		10.3	8.9		9.9			31.8				
Progression Factor		0.40	0.00		1.00			1.00				
Incremental Delay, d2		0.3	0.0		0.2			0.0				
Delay (s)		4.4	0.0		10.1			31.8				
Level of Service		A	A		B			C				
Approach Delay (s)		4.3			10.1			31.8			0.0	
Approach LOS		A			B			C			A	

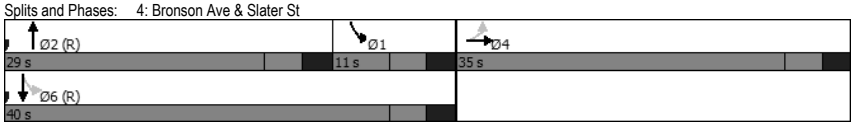
Intersection Summary				
HCM 2000 Control Delay	7.0	HCM 2000 Level of Service	A	
HCM 2000 Volume to Capacity ratio	0.16			
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	13.4	
Intersection Capacity Utilization	135.0%	ICU Level of Service	H	
Analysis Period (min)	15			
c Critical Lane Group				

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	22	306	3	0	0	0	0	211	118	34	161	0
Future Volume (vph)	22	306	3	0	0	0	0	211	118	34	161	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (m)	3.7	3.3	3.7	3.7	3.7	3.7	3.7	3.5	3.7	3.6	3.8	3.7
Storage Length (m)	0.0		0.0	0.0		0.0	0.0		0.0	20.0		0.0
Storage Lanes	0		0	0		0	0		0	1		0
Taper Length (m)	2.5			2.5			2.5			8.0		
Lane Util. Factor	0.95	0.95	0.95	1.00	1.00	1.00	1.00	0.95	0.95	1.00	1.00	1.00
Ped Bike Factor		1.00						0.99		0.99		
Frt		0.999						0.946				
Flt Protected		0.997								0.950		
Satd. Flow (prot)	0	3082	0	0	0	0	0	2853	0	1315	1628	0
Flt Permitted		0.997								0.530		
Satd. Flow (perm)	0	3077	0	0	0	0	0	2853	0	725	1628	0
Right Turn on Red			Yes			Yes			No			Yes
Satd. Flow (RTOR)		1										
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		115.0			115.8			103.4			50.3	
Travel Time (s)		8.3			8.3			7.4			3.6	
Confl. Peds. (#/hr)	16		6	6		16	9		18	18		9
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	5%	7%	0%	2%	2%	2%	2%	8%	16%	30%	13%	2%
Adj. Flow (vph)	24	340	3	0	0	0	0	234	131	38	179	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	367	0	0	0	0	0	365	0	38	179	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	1.06	1.12	1.06	1.06	1.06	1.06	1.06	1.09	1.06	1.07	1.04	1.06
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Turn Type	Perm	NA						NA		pm+pt	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4									6		
Minimum Split (s)	35.0	35.0						29.0		11.0	40.0	
Total Split (s)	35.0	35.0						29.0		11.0	40.0	
Total Split (%)	46.7%	46.7%						38.7%		14.7%	53.3%	
Maximum Green (s)	29.1	29.1						23.0		5.0	34.0	
Yellow Time (s)	3.3	3.3						3.3		3.3	3.3	
All-Red Time (s)	2.6	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		
Walk Time (s)	7.0	7.0						13.0			13.0	
Flash Dont Walk (s)	7.0	7.0						7.0			7.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Pedestrian Calls (#/hr)	0	0						0			0	
Act Effct Green (s)		29.1						23.0		34.0	34.0	
Actuated g/C Ratio		0.39						0.31		0.45	0.45	
v/c Ratio		0.31						0.42		0.10	0.24	
Control Delay		16.8						22.5		12.9	13.7	
Queue Delay		0.0						0.0		0.0	0.0	
Total Delay		16.8						22.5		12.9	13.7	
LOS		B						C		B	B	
Approach Delay		16.8						22.5			13.6	
Approach LOS		B						C			B	
Queue Length 50th (m)		18.4						21.3		2.9	14.9	
Queue Length 95th (m)		28.1						32.9		7.7	27.0	
Internal Link Dist (m)		91.0			91.8			79.4			26.3	
Turn Bay Length (m)										20.0		
Base Capacity (vph)		1194						874		368	738	
Starvation Cap Reductn		0						0		0	0	
Spillback Cap Reductn		0						0		0	0	
Storage Cap Reductn		0						0		0	0	
Reduced v/c Ratio		0.31						0.42		0.10	0.24	

Intersection Summary			
Area Type:	Other		
Cycle Length: 75			
Actuated Cycle Length: 75			
Offset: 16 (21%), Referenced to phase 2:NBT and 6:SBTL, Start of Green			
Natural Cycle: 75			
Control Type: Pretimed			
Maximum v/c Ratio: 0.42			
Intersection Signal Delay: 18.2		Intersection LOS: B	
Intersection Capacity Utilization 62.5%		ICU Level of Service B	
Analysis Period (min) 15			

Splits and Phases: 4: Bronson Ave & Slater St



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	22	306	3	0	0	0	0	211	118	34	161	0
Future Volume (vph)	22	306	3	0	0	0	0	211	118	34	161	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	3.7	3.3	3.7	3.7	3.7	3.7	3.7	3.5	3.7	3.6	3.8	3.7
Total Lost time (s)		5.9						6.0		6.0	6.0	
Lane Util. Factor		0.95						0.95		1.00	1.00	
Frpb, ped/bikes		1.00						0.99		1.00	1.00	
Flpb, ped/bikes		1.00						1.00		0.99	1.00	
Frt		1.00						0.95		1.00	1.00	
Flt Protected		1.00						1.00		0.95	1.00	
Satd. Flow (prot)		3076						2853		1307	1628	
Flt Permitted		1.00						1.00		0.53	1.00	
Satd. Flow (perm)		3076						2853		730	1628	
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)	24	340	3	0	0	0	0	234	131	38	179	0
RTOR Reduction (vph)	0	1	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	366	0	0	0	0	0	365	0	38	179	0
Confl. Peds. (#/hr)	16		6	6		16	9		18	18		9
Heavy Vehicles (%)	5%	7%	0%	2%	2%	2%	2%	8%	16%	30%	13%	2%
Turn Type	Perm	NA						NA		pm+pt	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4									6		
Actuated Green, G (s)		29.1						23.0		34.0	34.0	
Effective Green, g (s)		29.1						23.0		34.0	34.0	
Actuated g/C Ratio		0.39						0.31		0.45	0.45	
Clearance Time (s)		5.9						6.0		6.0	6.0	
Lane Grp Cap (vph)		1193						874		369	738	
v/s Ratio Prot								c0.13		0.01	c0.11	
v/s Ratio Perm		0.12								0.04		
v/c Ratio		0.31						0.42		0.10	0.24	
Uniform Delay, d1		15.9						20.7		11.9	12.6	
Progression Factor		1.00						1.00		1.00	1.00	
Incremental Delay, d2		0.7						1.5		0.6	0.8	
Delay (s)		16.6						22.1		12.5	13.4	
Level of Service		B						C		B	B	
Approach Delay (s)		16.6			0.0			22.1			13.2	
Approach LOS		B			A			C			B	

Intersection Summary					
HCM 2000 Control Delay	18.0	HCM 2000 Level of Service		B	
HCM 2000 Volume to Capacity ratio	0.36				
Actuated Cycle Length (s)	75.0	Sum of lost time (s)		17.9	
Intersection Capacity Utilization	62.5%	ICU Level of Service		B	
Analysis Period (min)	15				

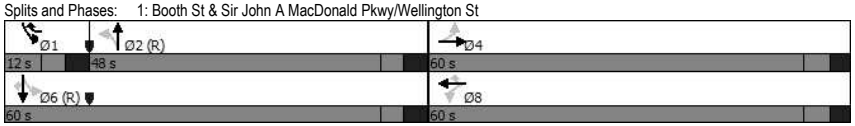
c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	30	50	12	21	389	415	13	678	25	183	739	12
Future Volume (vph)	30	50	12	21	389	415	13	678	25	183	739	12
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (m)	3.7	3.4	3.7	3.7	3.4	3.4	3.7	3.5	3.5	3.3	3.8	3.7
Storage Length (m)	0.0		0.0	0.0		90.0	0.0		0.0	135.0		63.0
Storage Lanes	0		0	0		1	0		0	1		1
Taper Length (m)	2.5			2.5			2.5			30.0		
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	1.00	0.95	0.95	0.95	1.00	0.95	1.00
Ped Bike Factor		0.99			1.00	0.98		1.00		1.00		0.98
Frt		0.981				0.850		0.995				0.850
Flt Protected		0.984			0.997			0.999		0.950		
Satd. Flow (prot)	0	2869	0	0	3212	1481	0	3201	0	1653	3461	1547
Flt Permitted		0.668			0.933			0.932		0.240		
Satd. Flow (perm)	0	1944	0	0	3003	1449	0	2986	0	417	3461	1522
Right Turn on Red			Yes			No			Yes			Yes
Satd. Flow (RTOR)		13						3				35
Link Speed (k/h)		60			60			50			50	
Link Distance (m)		199.5			146.4			401.6			200.6	
Travel Time (s)		12.0			8.8			28.9			14.4	
Confl. Peds. (#/hr)	8		16	16		8	3		1	1		3
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	0%	22%	0%	0%	4%	1%	2%	3%	0%	0%	1%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	10	10	0	0	0
Adj. Flow (vph)	33	56	13	23	432	461	14	753	28	203	821	13
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	102	0	0	455	461	0	795	0	203	821	13
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.3			3.3	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	1.06	1.10	1.06	1.06	1.10	1.10	1.06	1.12	1.09	1.12	1.04	1.06
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	0		1	0	0	1	0		1	0	0
Detector Template	Left			Left			Left			Left		
Leading Detector (m)	2.0	0.0		6.1	0.0	0.0	6.1	0.0		6.1	0.0	0.0
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6		6.1	0.6	2.0	6.1	1.8		6.1	1.8	6.1
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Turn Type	Perm	NA		Perm	NA	pm+ov	Perm	NA		pm+pt	NA	Perm
Protected Phases		4			8	1		2		1	6	
Permitted Phases	4			8		8	2			6		6

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	4	4		8	8	1	2	2		1	6	6
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0	5.0	10.0	10.0		5.0	1.0	1.0
Minimum Split (s)	35.8	35.8		35.8	35.8	11.8	31.8	31.8		11.8	31.8	31.8
Total Split (s)	60.0	60.0		60.0	60.0	12.0	48.0	48.0		12.0	60.0	60.0
Total Split (%)	50.0%	50.0%		50.0%	50.0%	10.0%	40.0%	40.0%		10.0%	50.0%	50.0%
Maximum Green (s)	53.2	53.2		53.2	53.2	5.2	41.2	41.2		5.2	53.2	53.2
Yellow Time (s)	3.7	3.7		3.7	3.7	3.3	3.3	3.3		3.3	3.3	3.3
All-Red Time (s)	3.1	3.1		3.1	3.1	3.5	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	Lag		Lead		
Lead-Lag Optimize?						Yes	Yes	Yes		Yes		
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None		None	None	None	C-Max	C-Max		None	C-Max	C-Max
Walk Time (s)	10.0	10.0		10.0	10.0		10.0	10.0			10.0	10.0
Flash Dont Walk (s)	19.0	19.0		19.0	19.0		15.0	15.0			15.0	15.0
Pedestrian Calls (#/hr)	0	0		0	0		0	0			0	0
Act Effct Green (s)		24.1			24.1	44.5		55.1		82.3	82.3	82.3
Actuated g/C Ratio		0.20			0.20	0.37		0.46		0.69	0.69	0.69
v/c Ratio		0.26			0.76	0.85		0.58		0.41	0.35	0.01
Control Delay		35.4			53.2	45.3		23.1		10.0	8.7	0.3
Queue Delay		0.0			0.0	0.0		0.0		0.0	0.0	0.0
Total Delay		35.4			53.2	45.3		23.1		10.0	8.7	0.3
LOS		D			D	D		C		B	A	A
Approach Delay		35.4			49.2			23.1			8.9	
Approach LOS		D			D			C			A	
Queue Length 50th (m)		9.3			53.5	89.5		67.8		15.5	38.0	0.0
Queue Length 95th (m)		16.3			67.0	108.2		106.0		29.2	57.1	0.5
Internal Link Dist (m)		175.5			122.4			377.6			176.6	
Turn Bay Length (m)						90.0				135.0		63.0
Base Capacity (vph)		869			1331	542		1373		495	2374	1055
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		0.12			0.34	0.85		0.58		0.41	0.35	0.01

Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 3 (3%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 80			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.85			
Intersection Signal Delay: 26.8		Intersection LOS: C	
Intersection Capacity Utilization 87.0%		ICU Level of Service E	
Analysis Period (min) 15			

Splits and Phases: 1: Booth St & Sir John A MacDonald Pkwy/Wellington St



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	30	50	12	21	389	415	13	678	25	183	739	12
Future Volume (vph)	30	50	12	21	389	415	13	678	25	183	739	12
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	3.7	3.4	3.7	3.7	3.4	3.4	3.7	3.5	3.5	3.3	3.8	3.7
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
Frpb, ped/bikes		1.00			1.00	0.99		1.00		1.00	1.00	0.98
Flpb, ped/bikes		1.00			1.00	1.00		1.00		1.00	1.00	1.00
Frt		0.98			1.00	0.85		0.99		1.00	1.00	0.85
Flt Protected		0.98			1.00	1.00		1.00		0.95	1.00	1.00
Satd. Flow (prot)		2864			3211	1464		3200		1653	3461	1522
Flt Permitted		0.67			0.93	1.00		0.93		0.24	1.00	1.00
Satd. Flow (perm)		1945			3003	1464		2985		417	3461	1522
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)	33	56	13	23	432	461	14	753	28	203	821	13
RTOR Reduction (vph)	0	10	0	0	0	0	0	2	0	0	0	4
Lane Group Flow (vph)	0	92	0	0	455	461	0	793	0	203	821	9
Confl. Peds. (#/hr)	8		16	16		8	3		1	1		3
Heavy Vehicles (%)	0%	22%	0%	0%	4%	1%	2%	3%	0%	0%	1%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	10	10	0	0	0
Turn Type	Perm	NA		Perm	NA	pm+ov	Perm	NA		pm+pt	NA	Perm
Protected Phases		4			8	1		2		1	6	
Permitted Phases	4			8		8	2			6		6
Actuated Green, G (s)		24.1			24.1	44.5		55.1		82.3	82.3	82.3
Effective Green, g (s)		24.1			24.1	44.5		55.1		82.3	82.3	82.3
Actuated g/C Ratio		0.20			0.20	0.37		0.46		0.69	0.69	0.69
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)		390			603	625		1370		496	2373	1043
v/s Ratio Prot						c0.13				0.07	0.24	
v/s Ratio Perm		0.05			0.15	0.19		c0.27		0.21		0.01
v/c Ratio		0.23			0.75	0.74		0.58		0.41	0.35	0.01
Uniform Delay, d1		40.2			45.2	32.7		23.9		9.2	7.8	6.0
Progression Factor		1.00			1.00	1.00		0.85		1.00	1.00	1.00
Incremental Delay, d2		0.3			5.3	4.5		1.4		0.6	0.4	0.0
Delay (s)		40.5			50.5	37.2		21.7		9.7	8.2	6.0
Level of Service		D			D	D		C		A	A	A
Approach Delay (s)		40.5			43.8			21.7			8.4	
Approach LOS		D			D			C			A	

Intersection Summary						
HCM 2000 Control Delay	24.6	HCM 2000 Level of Service	C			
HCM 2000 Volume to Capacity ratio	0.70					
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	20.4			
Intersection Capacity Utilization	87.0%	ICU Level of Service	E			
Analysis Period (min)	15					

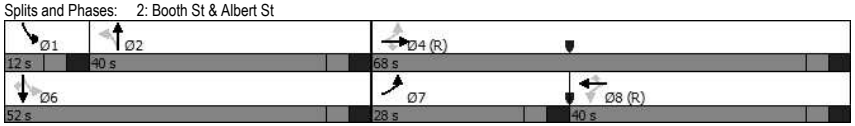
c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	296	240	17	58	430	163	13	406	53	122	393	233
Future Volume (vph)	296	240	17	58	430	163	13	406	53	122	393	233
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (m)	3.4	3.4	3.6	3.4	3.4	3.4	3.7	3.2	3.7	3.3	3.3	3.5
Storage Length (m)	150.0		42.0	38.0		87.0	0.0		44.0	0.0		56.0
Storage Lanes	1		1	1		1	0		0	1		1
Taper Length (m)	40.0			45.0			2.5			2.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	1.00	0.95	0.95	0.95	1.00	1.00	1.00
Ped Bike Factor	1.00		0.96	0.99		0.98		0.99		0.98		0.94
Frt			0.850			0.850		0.983				0.850
Flt Protected	0.950			0.950				0.999		0.950		
Satd. Flow (prot)	1592	1692	1530	1592	3278	1481	0	3155	0	1589	1740	1363
Flt Permitted	0.324			0.595				0.936		0.279		
Satd. Flow (perm)	541	1692	1472	985	3278	1446	0	2954	0	460	1740	1275
Right Turn on Red			Yes			No			Yes			No
Satd. Flow (RTOR)			91					11				
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		185.1			175.2			57.0			401.6	
Travel Time (s)		13.3			12.6			4.1			28.9	
Confl. Peds. (#/hr)	10		9	9		10	45		36	36		45
Confl. Bikes (#/hr)									2			
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	5%	4%	0%	5%	2%	1%	8%	1%	0%	4%	0%	11%
Adj. Flow (vph)	329	267	19	64	478	181	14	451	59	136	437	259
Shared Lane Traffic (%)												
Lane Group Flow (vph)	329	267	19	64	478	181	0	524	0	136	437	259
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.4			3.4			3.3			3.3	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	1.10	1.10	1.07	1.10	1.10	1.10	1.06	1.14	1.06	1.12	1.12	1.09
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	0	0	0	0	0	1	0		1	0	0
Detector Template	Left						Left			Left		
Leading Detector (m)	6.1	0.0	0.0	0.0	0.0	0.0	6.1	0.0		6.1	0.0	0.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Size(m)	6.1	1.8	6.1	6.1	1.8	6.1	6.1	1.8		6.1	1.8	6.1
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Turn Type	pm+pt	NA	Perm	Perm	NA	Perm	Perm	NA		pm+pt	NA	Perm
Protected Phases	7	4			8			2		1	6	
Permitted Phases	4		4	8		8	2			6		6

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4	4	8	8	8	2	2		1	6	6
Switch Phase												
Minimum Initial (s)	5.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0		5.0	10.0	10.0
Minimum Split (s)	11.5	36.5	36.5	36.5	36.5	36.5	36.5	36.5		11.5	36.5	36.5
Total Split (s)	28.0	68.0	68.0	40.0	40.0	40.0	40.0	40.0		12.0	52.0	52.0
Total Split (%)	23.3%	56.7%	56.7%	33.3%	33.3%	33.3%	33.3%	33.3%		10.0%	43.3%	43.3%
Maximum Green (s)	21.5	61.5	61.5	33.5	33.5	33.5	33.5	33.5		5.5	45.5	45.5
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3		3.3	3.3	3.3
All-Red Time (s)	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2		3.2	3.2	3.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0		0.0		0.0	0.0	0.0
Total Lost Time (s)	6.5	6.5	6.5	6.5	6.5	6.5		6.5		6.5	6.5	6.5
Lead/Lag	Lead			Lag	Lag	Lag	Lag	Lag		Lead		
Lead-Lag Optimize?	Yes			Yes	Yes	Yes	Yes	Yes		Yes		
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Recall Mode	None	C-Max	C-Max	C-Max	C-Max	C-Max	Max	Max		None	Max	Max
Walk Time (s)		7.0	7.0	7.0	7.0	7.0	7.0	7.0			7.0	7.0
Flash Dont Walk (s)		23.0	23.0	23.0	23.0	23.0	23.0	23.0			23.0	23.0
Pedestrian Calls (#/hr)		0	0	0	0	0	0	0			0	0
Act Effct Green (s)	61.5	61.5	61.5	35.9	35.9	35.9		33.5		45.5	45.5	45.5
Actuated g/C Ratio	0.51	0.51	0.51	0.30	0.30	0.30		0.28		0.38	0.38	0.38
v/c Ratio	0.74	0.31	0.02	0.22	0.49	0.42		0.63		0.60	0.66	0.54
Control Delay	29.2	18.2	0.1	23.6	25.4	26.4		41.0		47.8	46.7	43.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0		0.0		0.0	0.0	0.0
Total Delay	29.2	18.2	0.1	23.6	25.4	26.4		41.0		47.8	46.7	43.3
LOS	C	B	A	C	C	C		D		D	D	D
Approach Delay		23.5			25.5			41.0			45.8	
Approach LOS		C			C			D			D	
Queue Length 50th (m)	46.0	35.1	0.0	11.6	49.5	35.0		55.6		27.2	105.9	59.2
Queue Length 95th (m)	68.0	53.0	0.0	23.7	66.8	56.9		74.2		46.1	139.0	89.7
Internal Link Dist (m)		161.1			151.2			33.0			377.6	
Turn Bay Length (m)	150.0		42.0	38.0		87.0						56.0
Base Capacity (vph)	465	867	798	294	980	432		832		226	659	483
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	0.71	0.31	0.02	0.22	0.49	0.42		0.63		0.60	0.66	0.54

Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 9 (8%), Referenced to phase 4:EBTL and 8:WBTL, Start of Green			
Natural Cycle: 100			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.74			
Intersection Signal Delay: 34.3		Intersection LOS: C	
Intersection Capacity Utilization 114.0%		ICU Level of Service H	
Analysis Period (min) 15			

Splits and Phases: 2: Booth St & Albert St



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	296	240	17	58	430	163	13	406	53	122	393	233
Future Volume (vph)	296	240	17	58	430	163	13	406	53	122	393	233
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	3.4	3.4	3.6	3.4	3.4	3.4	3.7	3.2	3.7	3.3	3.3	3.5
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
Frpb, ped/bikes	1.00	1.00	0.96	1.00	1.00	0.98		0.99		1.00	1.00	0.94
Flpb, ped/bikes	1.00	1.00	1.00	0.99	1.00	1.00		1.00		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)	1590	1692	1472	1573	3278	1446		3152		1584	1740	1275
Flt Permitted	0.32	1.00	1.00	0.59	1.00	1.00		0.94		0.28	1.00	1.00
Satd. Flow (perm)	543	1692	1472	984	3278	1446		2954		465	1740	1275
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)	329	267	19	64	478	181	14	451	59	136	437	259
RTOR Reduction (vph)	0	0	9	0	0	0	0	8	0	0	0	0
Lane Group Flow (vph)	329	267	10	64	478	181	0	516	0	136	437	259
Confl. Peds. (#/hr)	10		9	9		10	45		36	36		45
Confl. Bikes (#/hr)									2			
Heavy Vehicles (%)	5%	4%	0%	5%	2%	1%	8%	1%	0%	4%	0%	11%
Turn Type	pm+pt	NA	Perm	Perm	NA	Perm	Perm	NA		pm+pt	NA	Perm
Protected Phases	7	4			8			2		1	6	
Permitted Phases	4		4	8		8	2			6		6
Actuated Green, G (s)	61.5	61.5	61.5	35.9	35.9	35.9		33.5		45.5	45.5	45.5
Effective Green, g (s)	61.5	61.5	61.5	35.9	35.9	35.9		33.5		45.5	45.5	45.5
Actuated g/C Ratio	0.51	0.51	0.51	0.30	0.30	0.30		0.28		0.38	0.38	0.38
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)	444	867	754	294	980	432		824		227	659	483
v/s Ratio Prot	c0.12	0.16			0.15					0.03	c0.25	
v/s Ratio Perm	c0.26		0.01	0.07		0.13		0.17		0.20		0.20
v/c Ratio	0.74	0.31	0.01	0.22	0.49	0.42		0.63		0.60	0.66	0.54
Uniform Delay, d1	19.3	16.9	14.4	31.5	34.5	33.7		37.8		29.2	30.9	29.0
Progression Factor	1.00	1.00	1.00	0.65	0.67	0.67		1.00		1.33	1.32	1.32
Incremental Delay, d2	6.5	0.9	0.0	1.6	1.6	2.8		3.6		4.0	5.0	4.0
Delay (s)	25.8	17.9	14.4	22.2	24.8	25.4		41.4		42.9	45.8	42.2
Level of Service	C	B	B	C	C	C		D		D	D	D
Approach Delay (s)		22.0			24.7			41.4			44.2	
Approach LOS		C			C			D			D	

Intersection Summary				
HCM 2000 Control Delay	33.4	HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio	0.78			
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	26.0	
Intersection Capacity Utilization	114.0%	ICU Level of Service	H	
Analysis Period (min)	15			

c Critical Lane Group

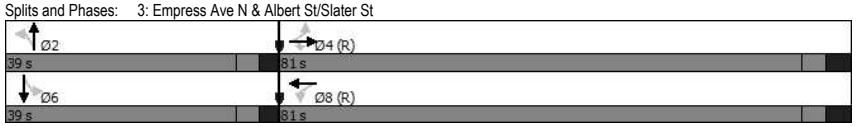
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	353	1	2	648	0	5	0	11	0	0	0
Future Volume (vph)	0	353	1	2	648	0	5	0	11	0	0	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (m)	3.7	3.4	3.5	3.7	3.3	3.7	3.7	3.4	3.7	3.7	3.4	3.7
Storage Length (m)	0.0		45.0	0.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	0		1	0		0	0		0	0		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	0.95	0.95	1.00	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor			0.96		1.00			0.98				
Frt			0.850					0.910				
Flt Protected								0.984				
Satd. Flow (prot)	0	3247	756	0	3241	0	0	1457	0	0	1725	0
Flt Permitted					0.954			0.949				
Satd. Flow (perm)	0	3247	723	0	3092	0	0	1398	0	0	1725	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			30					37				
Link Speed (k/h)		50			50			40			40	
Link Distance (m)		175.2			39.3			118.9			51.7	
Travel Time (s)		12.6			2.8			10.7			4.7	
Confl. Peds. (#/hr)	25		9	9		25	15		8	8		15
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	2%	3%	100%	0%	2%	2%	0%	2%	10%	2%	2%	2%
Adj. Flow (vph)	0	392	1	2	720	0	6	0	12	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	392	1	0	722	0	0	18	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.4			3.4			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	1.06	1.10	1.09	1.06	1.12	1.06	1.06	1.10	1.06	1.06	1.10	1.06
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Turn Type		NA	Perm	Perm	NA		Perm	NA				
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2			6		
Minimum Split (s)	29.1	29.1	29.1	29.1	29.1		39.0	39.0		39.0	39.0	
Total Split (s)	81.0	81.0	81.0	81.0	81.0		39.0	39.0		39.0	39.0	
Total Split (%)	67.5%	67.5%	67.5%	67.5%	67.5%		32.5%	32.5%		32.5%	32.5%	
Maximum Green (s)	73.9	73.9	73.9	73.9	73.9		32.7	32.7		32.7	32.7	
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3		3.3	3.3		3.3	3.3	
All-Red Time (s)	3.8	3.8	3.8	3.8	3.8		3.0	3.0		3.0	3.0	
Lost Time Adjust (s)		0.0	0.0		0.0			0.0			0.0	
Total Lost Time (s)		7.1	7.1		7.1			6.3			6.3	
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	7.0	7.0	7.0	7.0	7.0		10.0	10.0		10.0	10.0	
Flash Dont Walk (s)	15.0	15.0	15.0	15.0	15.0		22.7	22.7		22.7	22.7	

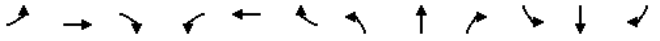
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Pedestrian Calls (#/hr)	0	0	0	0	0		0	0		0	0	
Act Effct Green (s)		73.9	73.9		73.9			32.7				
Actuated g/C Ratio		0.62	0.62		0.62			0.27				
v/c Ratio		0.20	0.00		0.38			0.04				
Control Delay		9.5	0.0		12.3			3.6				
Queue Delay		0.0	0.0		0.0			0.0				
Total Delay		9.5	0.0		12.3			3.6				
LOS		A	A		B			A				
Approach Delay		9.4			12.3			3.6				
Approach LOS		A			B			A				
Queue Length 50th (m)		22.8	0.0		42.0			0.0				
Queue Length 95th (m)		23.0	m0.0		53.7			2.3				
Internal Link Dist (m)		151.2			15.3			94.9			27.7	
Turn Bay Length (m)			45.0									
Base Capacity (vph)		1999	456		1904			407				
Starvation Cap Reductn		0	0		0			0				
Spillback Cap Reductn		0	0		0			0				
Storage Cap Reductn		0	0		0			0				
Reduced v/c Ratio		0.20	0.00		0.38			0.04				

Intersection Summary

Area Type: Other
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 87 (73%), Referenced to phase 4:EBTL and 8:WBTL, Start of Green
Natural Cycle: 70
Control Type: Pretimed
Maximum v/c Ratio: 0.38
Intersection Signal Delay: 11.2 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: 3: Empress Ave N & Albert St/Slater St

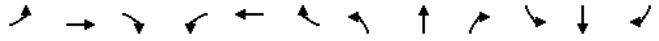




Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	353	1	2	648	0	5	0	11	0	0	0
Future Volume (vph)	0	353	1	2	648	0	5	0	11	0	0	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	3.7	3.4	3.5	3.7	3.3	3.7	3.7	3.4	3.7	3.7	3.4	3.7
Total Lost time (s)		7.1	7.1		7.1			6.3				
Lane Util. Factor		0.95	1.00		0.95			1.00				
Frpb, ped/bikes		1.00	0.96		1.00			0.99				
Flpb, ped/bikes		1.00	1.00		1.00			0.99				
Frt		1.00	0.85		1.00			0.91				
Flt Protected		1.00	1.00		1.00			0.98				
Satd. Flow (prot)		3247	723		3241			1449				
Flt Permitted		1.00	1.00		0.95			0.95				
Satd. Flow (perm)		3247	723		3093			1397				
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	392	1	2	720	0	6	0	12	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	13	0	0	0	0
Lane Group Flow (vph)	0	392	1	0	722	0	0	5	0	0	0	0
Confl. Peds. (#/hr)	25		9	9		25	15		8	8		15
Heavy Vehicles (%)	2%	3%	100%	0%	2%	2%	0%	2%	10%	2%	2%	2%
Turn Type		NA	Perm	Perm	NA		Perm	NA				
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)		73.9	73.9		73.9			32.7				
Effective Green, g (s)		73.9	73.9		73.9			32.7				
Actuated g/C Ratio		0.62	0.62		0.62			0.27				
Clearance Time (s)		7.1	7.1		7.1			6.3				
Lane Grp Cap (vph)		1999	445		1904			380				
v/s Ratio Prot		0.12										
v/s Ratio Perm			0.00		c0.23			c0.00				
v/c Ratio		0.20	0.00		0.38			0.01				
Uniform Delay, d1		10.1	8.9		11.6			31.9				
Progression Factor		0.91	1.00		1.00			1.00				
Incremental Delay, d2		0.2	0.0		0.6			0.1				
Delay (s)		9.4	8.9		12.1			31.9				
Level of Service		A	A		B			C				
Approach Delay (s)		9.4			12.1			31.9			0.0	
Approach LOS		A			B			C			A	

Intersection Summary				
HCM 2000 Control Delay	11.5	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.27			
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	13.4	
Intersection Capacity Utilization	58.8%	ICU Level of Service	B	
Analysis Period (min)	15			

c Critical Lane Group

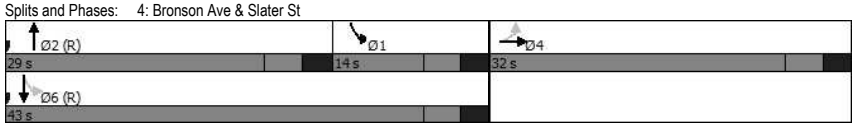


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	12	230	1	0	0	0	0	365	101	27	303	0
Future Volume (vph)	12	230	1	0	0	0	0	365	101	27	303	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (m)	3.7	3.3	3.7	3.7	3.7	3.7	3.7	3.5	3.7	3.6	3.8	3.7
Storage Length (m)	0.0		0.0	0.0		0.0	0.0		0.0	20.0		0.0
Storage Lanes	0		0	0		0	0		0	1		0
Taper Length (m)	2.5			2.5			2.5			8.0		
Lane Util. Factor	0.95	0.95	0.95	1.00	1.00	1.00	1.00	0.95	0.95	1.00	1.00	1.00
Ped Bike Factor		1.00						0.99		0.99		
Frt		0.999						0.968				
Flt Protected		0.998								0.950		
Satd. Flow (prot)	0	3175	0	0	0	0	0	3169	0	1644	1769	0
Flt Permitted		0.998								0.452		
Satd. Flow (perm)	0	3172	0	0	0	0	0	3169	0	774	1769	0
Right Turn on Red			Yes			Yes			No			Yes
Satd. Flow (RTOR)		1										
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		115.0			115.8			103.4			50.3	
Travel Time (s)		8.3			8.3			7.4			3.6	
Confl. Peds. (#/hr)	13		14	14		13	13		21	21		13
Confl. Bikes (#/hr)									1			
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	0%	4%	0%	2%	2%	2%	2%	1%	8%	4%	4%	2%
Adj. Flow (vph)	13	256	1	0	0	0	0	406	112	30	337	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	270	0	0	0	0	0	518	0	30	337	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	1.06	1.12	1.06	1.06	1.06	1.06	1.06	1.09	1.06	1.07	1.04	1.06
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	0						0		0	0	
Detector Template	Left											
Leading Detector (m)	6.1	0.0						0.0		0.0	0.0	
Trailing Detector (m)	0.0	0.0						0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0						0.0		0.0	0.0	
Detector 1 Size(m)	6.1	1.8						1.8		6.1	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex						Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0						0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0						0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0						0.0		0.0	0.0	
Turn Type	Perm	NA						NA		pm+pt	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4									6		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	4	4						2		1	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0						10.0		5.0	10.0	
Minimum Split (s)	19.9	19.9						26.0		11.0	26.0	
Total Split (s)	32.0	32.0						29.0		14.0	43.0	
Total Split (%)	42.7%	42.7%						38.7%		18.7%	57.3%	
Maximum Green (s)	26.1	26.1						23.0		8.0	37.0	
Yellow Time (s)	3.3	3.3						3.3		3.3	3.3	
All-Red Time (s)	2.6	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		
Vehicle Extension (s)	3.0	3.0						3.0		3.0	3.0	
Recall Mode	None	None						C-Max		Max	C-Max	
Walk Time (s)	7.0	7.0						13.0			13.0	
Flash Dont Walk (s)	7.0	7.0						7.0			7.0	
Pedestrian Calls (#/hr)	0	0						0			0	
Act Effct Green (s)		12.0						37.1		51.1	51.1	
Actuated g/C Ratio		0.16						0.49		0.68	0.68	
v/c Ratio		0.53						0.33		0.05	0.28	
Control Delay		32.4						12.6		4.9	5.8	
Queue Delay		0.0						0.0		0.0	0.0	
Total Delay		32.4						12.6		4.9	5.8	
LOS		C						B		A	A	
Approach Delay		32.4						12.6			5.7	
Approach LOS		C						B			A	
Queue Length 50th (m)		18.7						21.7		1.1	15.5	
Queue Length 95th (m)		28.1						34.8		3.9	30.1	
Internal Link Dist (m)		91.0			91.8			79.4			26.3	
Turn Bay Length (m)										20.0		
Base Capacity (vph)		1104						1566		619	1204	
Starvation Cap Reductn		0						0		0	0	
Spillback Cap Reductn		0						0		0	0	
Storage Cap Reductn		0						0		0	0	
Reduced v/c Ratio		0.24						0.33		0.05	0.28	

Intersection Summary			
Area Type:	Other		
Cycle Length: 75			
Actuated Cycle Length: 75			
Offset: 38 (51%), Referenced to phase 2:NBT and 6:SBTL, Start of Green			
Natural Cycle: 60			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.53			
Intersection Signal Delay: 15.0		Intersection LOS: B	
Intersection Capacity Utilization 44.5%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 4: Bronson Ave & Slater St



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	12	230	1	0	0	0	0	365	101	27	303	0
Future Volume (vph)	12	230	1	0	0	0	0	365	101	27	303	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	3.7	3.3	3.7	3.7	3.7	3.7	3.7	3.5	3.7	3.6	3.8	3.7
Total Lost time (s)		5.9						6.0		6.0	6.0	
Lane Util. Factor		0.95						0.95		1.00	1.00	
Frpb, ped/bikes		1.00						0.99		1.00	1.00	
Flpb, ped/bikes		1.00						1.00		1.00	1.00	
Frt		1.00						0.97		1.00	1.00	
Flt Protected		1.00						1.00		0.95	1.00	
Satd. Flow (prot)		3172						3168		1636	1769	
Flt Permitted		1.00						1.00		0.45	1.00	
Satd. Flow (perm)		3172						3168		779	1769	
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)	13	256	1	0	0	0	0	406	112	30	337	0
RTOR Reduction (vph)	0	1	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	269	0	0	0	0	0	518	0	30	337	0
Confl. Peds. (#/hr)	13		14	14		13	13		21	21		13
Confl. Bikes (#/hr)									1			
Heavy Vehicles (%)	0%	4%	0%	2%	2%	2%	2%	1%	8%	4%	4%	2%
Turn Type	Perm	NA						NA		pm+pt	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4									6		
Actuated Green, G (s)		12.0						37.1		51.1	51.1	
Effective Green, g (s)		12.0						37.1		51.1	51.1	
Actuated g/C Ratio		0.16						0.49		0.68	0.68	
Clearance Time (s)		5.9						6.0		6.0	6.0	
Vehicle Extension (s)		3.0						3.0		3.0	3.0	
Lane Grp Cap (vph)		507						1567		622	1205	
v/s Ratio Prot								c0.16		0.01	c0.19	
v/s Ratio Perm		0.08								0.03		
v/c Ratio		0.53						0.33		0.05	0.28	
Uniform Delay, d1		28.9						11.4		4.2	4.7	
Progression Factor		1.00						1.00		1.00	1.00	
Incremental Delay, d2		1.1						0.6		0.1	0.6	
Delay (s)		30.0						12.0		4.4	5.3	
Level of Service		C						B		A	A	
Approach Delay (s)		30.0			0.0			12.0			5.2	
Approach LOS		C			A			B			A	

Intersection Summary				
HCM 2000 Control Delay	14.1	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.38			
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	17.9	
Intersection Capacity Utilization	44.5%	ICU Level of Service	A	
Analysis Period (min)	15			

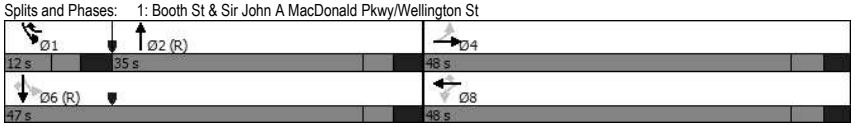
c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	2	272	146	9	66	3	0	541	9	354	538	37
Future Volume (vph)	2	272	146	9	66	3	0	541	9	354	538	37
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (m)	3.7	3.4	3.7	3.7	3.4	3.4	3.7	3.5	3.5	3.3	3.8	3.7
Storage Length (m)	0.0		0.0	0.0		90.0	0.0		0.0	135.0		63.0
Storage Lanes	0		0	0		1	0		0	1		1
Taper Length (m)	2.5			2.5			2.5			30.0		
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	1.00	1.00	0.95	0.95	1.00	0.95	1.00
Ped Bike Factor		0.99			1.00	0.98		1.00		1.00		0.99
Frt		0.948				0.850		0.998				0.850
Flt Protected					0.994					0.950		
Satd. Flow (prot)	0	2919	0	0	3184	1496	0	3342	0	1559	3394	1547
Flt Permitted		0.954			0.871					0.246		
Satd. Flow (perm)	0	2785	0	0	2789	1461	0	3342	0	403	3394	1527
Right Turn on Red			Yes			No			Yes			Yes
Satd. Flow (RTOR)		131						2				44
Link Speed (k/h)		60			60			50			50	
Link Distance (m)		199.5			146.4			401.6			200.6	
Travel Time (s)		12.0			8.8			28.9			14.4	
Confl. Peds. (#/hr)			7	7		12			3	3		1
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	2%	10%	4%	0%	5%	0%	2%	1%	0%	6%	3%	0%
Adj. Flow (vph)	2	302	162	10	73	3	0	601	10	393	598	41
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	466	0	0	83	3	0	611	0	393	598	41
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.3			3.3	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	1.06	1.10	1.06	1.06	1.10	1.10	1.06	1.09	1.09	1.12	1.04	1.06
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	0		1	0	0		0		1	0	0
Detector Template	Left			Left						Left		
Leading Detector (m)	2.0	0.0		6.1	0.0	0.0		0.0		6.1	0.0	0.0
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0		0.0		0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0		0.0		0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6		6.1	0.6	2.0		1.8		6.1	1.8	6.1
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0		0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0		0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0		0.0		0.0	0.0	0.0
Turn Type	Perm	NA		Perm	NA	pm+ov		NA		pm+pt	NA	Perm
Protected Phases		4			8	1		2		1	6	
Permitted Phases	4			8		8				6		6
Detector Phase	4	4		8	8	1		2		1	6	6

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0	5.0		10.0		5.0	10.0	10.0
Minimum Split (s)	35.8	35.8		35.8	35.8	11.8		31.8		11.8	31.8	31.8
Total Split (s)	48.0	48.0		48.0	48.0	12.0		35.0		12.0	47.0	47.0
Total Split (%)	50.5%	50.5%		50.5%	50.5%	12.6%		36.8%		12.6%	49.5%	49.5%
Maximum Green (s)	41.2	41.2		41.2	41.2	5.2		28.2		5.2	40.2	40.2
Yellow Time (s)	3.7	3.7		3.7	3.7	3.3		3.3		3.3	3.3	3.3
All-Red Time (s)	3.1	3.1		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		
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0		3.0		3.0	3.0	3.0
Recall Mode	None	None		None	None	None		C-Max		None	C-Max	C-Max
Walk Time (s)	10.0	10.0		10.0	10.0			10.0			10.0	10.0
Flash Dont Walk (s)	19.0	19.0		19.0	19.0			15.0			15.0	15.0
Pedestrian Calls (#/hr)	0	0		0	0			0			0	0
Act Effct Green (s)		17.6			17.6	46.4		28.2		63.8	63.8	63.8
Actuated g/C Ratio		0.19			0.19	0.49		0.30		0.67	0.67	0.67
v/c Ratio		0.75			0.16	0.00		0.62		0.63	0.26	0.04
Control Delay		33.4			31.4	9.3		31.8		15.8	7.2	2.3
Queue Delay		0.0			0.0	0.0		0.0		0.0	0.0	0.0
Total Delay		33.4			31.4	9.3		31.8		15.8	7.2	2.3
LOS		C			C	A		C		B	A	A
Approach Delay		33.4			30.6			31.8			10.3	
Approach LOS		C			C			C			B	
Queue Length 50th (m)		30.8			6.7	0.3		50.3		28.0	20.3	0.0
Queue Length 95th (m)		44.0			12.1	1.5		68.0		#76.9	34.4	3.5
Internal Link Dist (m)		175.5			122.4			377.6			176.6	
Turn Bay Length (m)						90.0				135.0		63.0
Base Capacity (vph)		1281			1209	724		993		620	2278	1039
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		0.36			0.07	0.00		0.62		0.63	0.26	0.04

Intersection Summary			
Area Type:	Other		
Cycle Length: 95			
Actuated Cycle Length: 95			
Offset: 31 (33%), Referenced to phase 2:NBT and 6:SBTL, Start of Green			
Natural Cycle: 90			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.75			
Intersection Signal Delay: 22.0		Intersection LOS: C	
Intersection Capacity Utilization 75.2%		ICU Level of Service D	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 1: Booth St & Sir John A MacDonald Pkwy/Wellington St



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	2	272	146	9	66	3	0	541	9	354	538	37
Future Volume (vph)	2	272	146	9	66	3	0	541	9	354	538	37
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	3.7	3.4	3.7	3.7	3.4	3.4	3.7	3.5	3.5	3.3	3.8	3.7
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
Frpb, ped/bikes		0.99			1.00	0.99		1.00		1.00	1.00	0.99
Flpb, ped/bikes		1.00			1.00	1.00		1.00		1.00	1.00	1.00
Frt		0.95			1.00	0.85		1.00		1.00	1.00	0.85
Flt Protected		1.00			0.99	1.00		1.00		0.95	1.00	1.00
Satd. Flow (prot)		2918			3183	1483		3340		1559	3394	1527
Flt Permitted		0.95			0.87	1.00		1.00		0.25	1.00	1.00
Satd. Flow (perm)		2785			2789	1483		3340		404	3394	1527
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)	2	302	162	10	73	3	0	601	10	393	598	41
RTOR Reduction (vph)	0	107	0	0	0	0	0	1	0	0	0	13
Lane Group Flow (vph)	0	359	0	0	83	3	0	610	0	393	598	28
Confl. Peds. (#/hr)			7	7		12			3	3		1
Heavy Vehicles (%)	2%	10%	4%	0%	5%	0%	2%	1%	0%	6%	3%	0%
Turn Type	Perm	NA		Perm	NA	pm+ov		NA		pm+pt	NA	Perm
Protected Phases		4			8	1		2		1	6	
Permitted Phases	4			8		8				6		6
Actuated Green, G (s)		17.6			17.6	46.4		28.2		63.8	63.8	63.8
Effective Green, g (s)		17.6			17.6	46.4		28.2		63.8	63.8	63.8
Actuated g/C Ratio		0.19			0.19	0.49		0.30		0.67	0.67	0.67
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)		515			516	830		991		621	2279	1025
v/s Ratio Prot						0.00		0.18		c0.19	0.18	
v/s Ratio Perm		c0.13			0.03	0.00				c0.23		0.02
v/c Ratio		0.70			0.16	0.00		0.62		0.63	0.26	0.03
Uniform Delay, d1		36.2			32.5	12.5		28.7		9.4	6.2	5.2
Progression Factor		1.00			1.00	1.00		1.00		1.00	1.00	1.00
Incremental Delay, d2		4.1			0.1	0.0		2.9		2.1	0.3	0.0
Delay (s)		40.3			32.6	12.5		31.6		11.5	6.5	5.3
Level of Service		D			C	B		C		B	A	A
Approach Delay (s)		40.3			31.9			31.6			8.4	
Approach LOS		D			C			C			A	

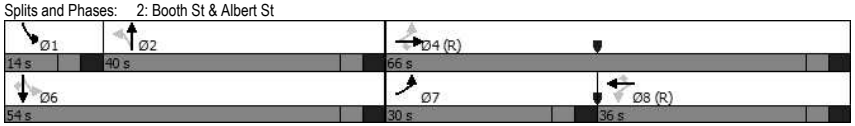
Intersection Summary				
HCM 2000 Control Delay	22.5	HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio	0.68			
Actuated Cycle Length (s)	95.0	Sum of lost time (s)	20.4	
Intersection Capacity Utilization	75.2%	ICU Level of Service	D	
Analysis Period (min)	15			
c Critical Lane Group				

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	148	320	10	12	206	60	10	262	35	62	429	192
Future Volume (vph)	148	320	10	12	206	60	10	262	35	62	429	192
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (m)	3.4	3.4	3.6	3.4	3.4	3.4	3.7	3.2	3.7	3.3	3.3	3.5
Storage Length (m)	150.0		42.0	38.0		87.0	0.0		44.0	0.0		56.0
Storage Lanes	1		1	1		1	0		0	1		1
Taper Length (m)	40.0			45.0			2.5			2.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	1.00	0.95	0.95	0.95	1.00	1.00	1.00
Ped Bike Factor	0.99		0.96	0.99		0.97		0.99		0.98		0.94
Frt			0.850			0.850		0.983				0.850
Flt Protected	0.950			0.950				0.998		0.950		
Satd. Flow (prot)	1441	1615	1530	1672	3096	1268	0	3110	0	1559	1706	1327
Flt Permitted	0.521			0.548				0.933		0.428		
Satd. Flow (perm)	782	1615	1471	954	3096	1233	0	2905	0	688	1706	1252
Right Turn on Red			Yes			No			Yes			No
Satd. Flow (RTOR)			91					12				
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		185.1			175.2			57.0			401.6	
Travel Time (s)		13.3			12.6			4.1			28.9	
Confl. Peds. (#/hr)	13		9	9		13	38		34	34		38
Confl. Bikes (#/hr)			1									
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	16%	9%	0%	0%	8%	18%	10%	2%	4%	6%	2%	14%
Adj. Flow (vph)	164	356	11	13	229	67	11	291	39	69	477	213
Shared Lane Traffic (%)												
Lane Group Flow (vph)	164	356	11	13	229	67	0	341	0	69	477	213
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.4			3.4			3.3			3.3	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	1.10	1.10	1.07	1.10	1.10	1.10	1.06	1.14	1.06	1.12	1.12	1.09
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	0	0	0	0	0	1	0		1	0	0
Detector Template	Left						Left			Left		
Leading Detector (m)	6.1	0.0	0.0	0.0	0.0	0.0	6.1	0.0		6.1	0.0	0.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Size(m)	6.1	1.8	6.1	6.1	1.8	6.1	6.1	1.8		6.1	1.8	6.1
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Turn Type	pm+pt	NA	Perm	Perm	NA	Perm	Perm	NA		pm+pt	NA	Perm
Protected Phases	7	4			8			2		1	6	
Permitted Phases	4		4	8		8	2			6		6

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4	4	8	8	8	2	2		1	6	6
Switch Phase												
Minimum Initial (s)	5.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0		5.0	10.0	10.0
Minimum Split (s)	11.5	36.5	36.5	36.0	36.0	36.0	36.5	36.5		11.5	36.5	36.5
Total Split (s)	30.0	66.0	66.0	36.0	36.0	36.0	40.0	40.0		14.0	54.0	54.0
Total Split (%)	25.0%	55.0%	55.0%	30.0%	30.0%	30.0%	33.3%	33.3%		11.7%	45.0%	45.0%
Maximum Green (s)	23.5	59.5	59.5	29.5	29.5	29.5	33.5	33.5		7.5	47.5	47.5
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3		3.3	3.3	3.3
All-Red Time (s)	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2		3.2	3.2	3.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0		0.0		0.0	0.0	0.0
Total Lost Time (s)	6.5	6.5	6.5	6.5	6.5	6.5		6.5		6.5	6.5	6.5
Lead/Lag	Lead			Lag	Lag	Lag	Lag	Lag		Lead		
Lead-Lag Optimize?	Yes			Yes	Yes	Yes	Yes	Yes		Yes		
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Recall Mode	None	C-Max	C-Max	C-Max	C-Max	C-Max	Max	Max		None	Max	Max
Walk Time (s)		7.0	7.0	7.0	7.0	7.0	7.0	7.0			7.0	7.0
Flash Dont Walk (s)		23.0	23.0	22.5	22.5	22.5	23.0	23.0			23.0	23.0
Pedestrian Calls (#/hr)		0	0	0	0	0	0	0			0	0
Act Effct Green (s)	59.5	59.5	59.5	39.6	39.6	39.6		36.3		47.5	47.5	47.5
Actuated g/C Ratio	0.50	0.50	0.50	0.33	0.33	0.33		0.30		0.40	0.40	0.40
v/c Ratio	0.36	0.45	0.01	0.04	0.22	0.16		0.38		0.21	0.71	0.43
Control Delay	19.7	21.8	0.0	22.4	22.0	22.8		34.4		24.8	37.3	29.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0		0.0		0.0	0.0	0.0
Total Delay	19.7	21.8	0.0	22.4	22.0	22.8		34.4		24.8	37.3	29.8
LOS	B	C	A	C	C	C		C		C	D	C
Approach Delay		20.7			22.2			34.4			34.1	
Approach LOS		C			C			C			C	
Queue Length 50th (m)	21.3	52.6	0.0	1.1	10.2	5.7		33.2		10.1	93.0	36.0
Queue Length 95th (m)	35.0	77.1	0.0	3.5	14.7	10.9		47.0		19.9	132.3	57.8
Internal Link Dist (m)		161.1			151.2			33.0			377.6	
Turn Bay Length (m)	150.0		42.0	38.0		87.0						56.0
Base Capacity (vph)	516	800	775	315	1021	407		887		326	675	495
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	0.32	0.45	0.01	0.04	0.22	0.16		0.38		0.21	0.71	0.43

Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 104 (87%), Referenced to phase 4:EBTL and 8:WBTL, Start of Green			
Natural Cycle: 100			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.71			
Intersection Signal Delay: 28.6		Intersection LOS: C	
Intersection Capacity Utilization 104.0%		ICU Level of Service G	
Analysis Period (min) 15			

Splits and Phases: 2: Booth St & Albert St



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	148	320	10	12	206	60	10	262	35	62	429	192
Future Volume (vph)	148	320	10	12	206	60	10	262	35	62	429	192
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	3.4	3.4	3.6	3.4	3.4	3.4	3.7	3.2	3.7	3.3	3.3	3.5
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
Frpb, ped/bikes	1.00	1.00	0.96	1.00	1.00	0.97		0.99		1.00	1.00	0.94
Flpb, ped/bikes	0.99	1.00	1.00	0.99	1.00	1.00		1.00		0.99	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)	1434	1615	1471	1654	3096	1233		3108		1546	1706	1252
Flt Permitted	0.52	1.00	1.00	0.55	1.00	1.00		0.93		0.43	1.00	1.00
Satd. Flow (perm)	786	1615	1471	954	3096	1233		2906		697	1706	1252
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)	164	356	11	13	229	67	11	291	39	69	477	213
RTOR Reduction (vph)	0	0	6	0	0	0	0	8	0	0	0	0
Lane Group Flow (vph)	164	356	5	13	229	67	0	333	0	69	477	213
Confl. Peds. (#/hr)	13		9	9		13	38		34	34		38
Confl. Bikes (#/hr)			1									
Heavy Vehicles (%)	16%	9%	0%	0%	8%	18%	10%	2%	4%	6%	2%	14%
Turn Type	pm+pt	NA	Perm	Perm	NA	Perm	Perm	NA		pm+pt	NA	Perm
Protected Phases	7	4			8			2		1	6	
Permitted Phases	4		4	8		8	2			6		6
Actuated Green, G (s)	58.2	58.2	58.2	38.3	38.3	38.3		36.3		48.8	48.8	48.8
Effective Green, g (s)	58.2	58.2	58.2	38.3	38.3	38.3		36.3		48.8	48.8	48.8
Actuated g/C Ratio	0.49	0.49	0.49	0.32	0.32	0.32		0.30		0.41	0.41	0.41
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)	453	783	713	304	988	393		879		325	693	509
v/s Ratio Prot	0.04	c0.22			0.07					0.01	c0.28	
v/s Ratio Perm	0.14		0.00	0.01		0.05		0.11		0.08		0.17
v/c Ratio	0.36	0.45	0.01	0.04	0.23	0.17		0.38		0.21	0.69	0.42
Uniform Delay, d1	18.2	20.4	16.0	28.2	30.0	29.4		33.0		22.5	29.3	25.5
Progression Factor	1.00	1.00	1.00	0.74	0.71	0.72		1.00		1.00	1.00	1.00
Incremental Delay, d2	0.5	1.9	0.0	0.3	0.5	0.9		1.2		0.3	5.5	2.5
Delay (s)	18.7	22.3	16.0	21.2	22.0	22.1		34.2		22.8	34.9	28.0
Level of Service	B	C	B	C	C	C		C		C	C	C
Approach Delay (s)		21.1			22.0			34.2			31.8	
Approach LOS		C			C			C			C	

Intersection Summary					
HCM 2000 Control Delay	27.7	HCM 2000 Level of Service	C		
HCM 2000 Volume to Capacity ratio	0.64				
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	26.0		
Intersection Capacity Utilization	104.0%	ICU Level of Service	G		
Analysis Period (min)	15				

c Critical Lane Group

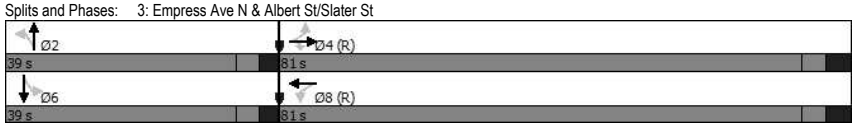
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	414	9	9	278	0	2	0	6	0	0	0
Future Volume (vph)	0	414	9	9	278	0	2	0	6	0	0	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (m)	3.7	3.4	3.5	3.7	3.3	3.7	3.7	3.4	3.7	3.7	3.4	3.7
Storage Length (m)	0.0		45.0	0.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	0		1	0		0	0		0	0		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	0.95	0.95	1.00	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor			0.96		1.00			0.98				
Frt			0.850					0.895				
Flt Protected					0.998			0.989				
Satd. Flow (prot)	0	3125	1351	0	3008	0	0	1383	0	0	1725	0
Flt Permitted					0.938			0.974				
Satd. Flow (perm)	0	3125	1291	0	2826	0	0	1359	0	0	1725	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			30					37				
Link Speed (k/h)		50			50			40			40	
Link Distance (m)		175.2			39.3			118.9			51.7	
Travel Time (s)		12.6			2.8			10.7			4.7	
Confl. Peds. (#/hr)	13		9	9		13	8		5	5		8
Confl. Bikes (#/hr)			1									
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	2%	7%	12%	0%	10%	2%	50%	2%	0%	2%	2%	2%
Adj. Flow (vph)	0	460	10	10	309	0	2	0	7	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	460	10	0	319	0	0	9	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.4			3.4			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	1.06	1.10	1.09	1.06	1.12	1.06	1.06	1.10	1.06	1.06	1.10	1.06
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Turn Type		NA	Perm	Perm	NA		Perm	NA				
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2			6		
Minimum Split (s)	81.0	81.0	81.0	81.0	81.0		39.0	39.0		39.0	39.0	
Total Split (s)	81.0	81.0	81.0	81.0	81.0		39.0	39.0		39.0	39.0	
Total Split (%)	67.5%	67.5%	67.5%	67.5%	67.5%		32.5%	32.5%		32.5%	32.5%	
Maximum Green (s)	73.9	73.9	73.9	73.9	73.9		32.7	32.7		32.7	32.7	
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3		3.3	3.3		3.3	3.3	
All-Red Time (s)	3.8	3.8	3.8	3.8	3.8		3.0	3.0		3.0	3.0	
Lost Time Adjust (s)		0.0	0.0		0.0			0.0			0.0	
Total Lost Time (s)		7.1	7.1		7.1			6.3			6.3	
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	7.0	7.0	7.0	7.0	7.0		10.0	10.0		10.0	10.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Flash Dont Walk (s)	15.0	15.0	15.0	15.0	15.0		22.7	22.7		22.7	22.7	
Pedestrian Calls (#/hr)	0	0	0	0	0		0	0		0	0	
Act Effct Green (s)		73.9	73.9		73.9			32.7				
Actuated g/C Ratio		0.62	0.62		0.62			0.27				
v/c Ratio		0.24	0.01		0.18			0.02				
Control Delay		4.4	0.0		10.3			0.1				
Queue Delay		0.0	0.0		0.0			0.0				
Total Delay		4.4	0.0		10.3			0.1				
LOS		A	A		B			A				
Approach Delay		4.3			10.3			0.1				
Approach LOS		A			B			A				
Queue Length 50th (m)		8.2	0.0		16.0			0.0				
Queue Length 95th (m)		10.5	m0.0		22.7			0.0				
Internal Link Dist (m)		151.2			15.3			94.9			27.7	
Turn Bay Length (m)			45.0									
Base Capacity (vph)		1924	806		1740			397				
Starvation Cap Reductn		0	0		0			0				
Spillback Cap Reductn		0	0		0			0				
Storage Cap Reductn		0	0		0			0				
Reduced v/c Ratio		0.24	0.01		0.18			0.02				

Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 87 (73%), Referenced to phase 4:EBTL and 8:WBTL, Start of Green			
Natural Cycle: 120			
Control Type: Pretimed			
Maximum v/c Ratio: 0.24			
Intersection Signal Delay: 6.6		Intersection LOS: A	
Intersection Capacity Utilization 135.0%		ICU Level of Service H	
Analysis Period (min) 15			

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

Splits and Phases: 3: Empress Ave N & Albert St/Slater St



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	414	9	9	278	0	2	0	6	0	0	0
Future Volume (vph)	0	414	9	9	278	0	2	0	6	0	0	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	3.7	3.4	3.5	3.7	3.3	3.7	3.7	3.4	3.7	3.7	3.4	3.7
Total Lost time (s)		7.1	7.1		7.1			6.3				
Lane Util. Factor		0.95	1.00		0.95			1.00				
Frpb, ped/bikes		1.00	0.96		1.00			0.99				
Flpb, ped/bikes		1.00	1.00		1.00			1.00				
Frt		1.00	0.85		1.00			0.90				
Flt Protected		1.00	1.00		1.00			0.99				
Satd. Flow (prot)		3125	1291		3008			1380				
Flt Permitted		1.00	1.00		0.94			0.97				
Satd. Flow (perm)		3125	1291		2825			1359				
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	460	10	10	309	0	2	0	7	0	0	0
RTOR Reduction (vph)	0	0	4	0	0	0	0	7	0	0	0	0
Lane Group Flow (vph)	0	460	6	0	319	0	0	2	0	0	0	0
Confl. Peds. (#/hr)	13		9	9		13	8		5	5		8
Confl. Bikes (#/hr)			1									
Heavy Vehicles (%)	2%	7%	12%	0%	10%	2%	50%	2%	0%	2%	2%	2%
Turn Type		NA	Perm	Perm	NA		Perm	NA				
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)		73.9	73.9		73.9			32.7				
Effective Green, g (s)		73.9	73.9		73.9			32.7				
Actuated g/C Ratio		0.62	0.62		0.62			0.27				
Clearance Time (s)		7.1	7.1		7.1			6.3				
Lane Grp Cap (vph)		1924	795		1739			370				
v/s Ratio Prot		c0.15										
v/s Ratio Perm			0.00		0.11			c0.00				
v/c Ratio		0.24	0.01		0.18			0.01				
Uniform Delay, d1		10.4	8.9		10.0			31.8				
Progression Factor		0.39	0.00		1.00			1.00				
Incremental Delay, d2		0.3	0.0		0.2			0.0				
Delay (s)		4.3	0.0		10.2			31.8				
Level of Service		A	A		B			C				
Approach Delay (s)		4.2			10.2			31.8			0.0	
Approach LOS		A			B			C			A	

Intersection Summary				
HCM 2000 Control Delay	6.9	HCM 2000 Level of Service	A	
HCM 2000 Volume to Capacity ratio	0.17			
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	13.4	
Intersection Capacity Utilization	135.0%	ICU Level of Service	H	
Analysis Period (min)	15			
c Critical Lane Group				

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	22	322	3	0	0	0	0	222	118	34	169	0
Future Volume (vph)	22	322	3	0	0	0	0	222	118	34	169	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (m)	3.7	3.3	3.7	3.7	3.7	3.7	3.7	3.5	3.7	3.6	3.8	3.7
Storage Length (m)	0.0		0.0	0.0		0.0	0.0		0.0	20.0		0.0
Storage Lanes	0		0	0		0	0		0	1		0
Taper Length (m)	2.5			2.5			2.5			8.0		
Lane Util. Factor	0.95	0.95	0.95	1.00	1.00	1.00	1.00	0.95	0.95	1.00	1.00	1.00
Ped Bike Factor		1.00						0.99		0.99		
Frt		0.999						0.948				
Flt Protected		0.997								0.950		
Satd. Flow (prot)	0	3082	0	0	0	0	0	2862	0	1315	1628	0
Flt Permitted		0.997								0.519		
Satd. Flow (perm)	0	3077	0	0	0	0	0	2862	0	710	1628	0
Right Turn on Red			Yes			Yes			No			Yes
Satd. Flow (RTOR)		1										
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		115.0			115.8			103.4			50.3	
Travel Time (s)		8.3			8.3			7.4			3.6	
Confl. Peds. (#/hr)	16		6	6		16	9		18	18		9
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	5%	7%	0%	2%	2%	2%	2%	8%	16%	30%	13%	2%
Adj. Flow (vph)	24	358	3	0	0	0	0	247	131	38	188	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	385	0	0	0	0	0	378	0	38	188	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	1.06	1.12	1.06	1.06	1.06	1.06	1.06	1.09	1.06	1.07	1.04	1.06
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Turn Type	Perm	NA						NA		pm+pt	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4									6		
Minimum Split (s)	35.0	35.0						29.0		11.0	40.0	
Total Split (s)	35.0	35.0						29.0		11.0	40.0	
Total Split (%)	46.7%	46.7%						38.7%		14.7%	53.3%	
Maximum Green (s)	29.1	29.1						23.0		5.0	34.0	
Yellow Time (s)	3.3	3.3						3.3		3.3	3.3	
All-Red Time (s)	2.6	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		
Walk Time (s)	7.0	7.0						13.0			13.0	
Flash Dont Walk (s)	7.0	7.0						7.0			7.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Pedestrian Calls (#/hr)	0	0						0			0	
Act Effct Green (s)		29.1						23.0		34.0	34.0	
Actuated g/C Ratio		0.39						0.31		0.45	0.45	
v/c Ratio		0.32						0.43		0.10	0.25	
Control Delay		17.0						22.7		13.0	13.9	
Queue Delay		0.0						0.0		0.0	0.0	
Total Delay		17.0						22.7		13.0	13.9	
LOS		B						C		B	B	
Approach Delay		17.0						22.7			13.7	
Approach LOS		B						C			B	
Queue Length 50th (m)		19.4						22.3		2.9	15.7	
Queue Length 95th (m)		29.5						34.0		7.7	28.3	
Internal Link Dist (m)		91.0			91.8			79.4			26.3	
Turn Bay Length (m)										20.0		
Base Capacity (vph)		1194						877		362	738	
Starvation Cap Reductn		0						0		0	0	
Spillback Cap Reductn		0						0		0	0	
Storage Cap Reductn		0						0		0	0	
Reduced v/c Ratio		0.32						0.43		0.10	0.25	

Intersection Summary			
Area Type:	Other		
Cycle Length: 75			
Actuated Cycle Length: 75			
Offset: 16 (21%), Referenced to phase 2:NBT and 6:SBTL, Start of Green			
Natural Cycle: 75			
Control Type: Pretimed			
Maximum v/c Ratio: 0.43			
Intersection Signal Delay: 18.4		Intersection LOS: B	
Intersection Capacity Utilization 62.5%		ICU Level of Service B	
Analysis Period (min) 15			

Splits and Phases: 4: Bronson Ave & Slater St

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	22	322	3	0	0	0	0	222	118	34	169	0
Future Volume (vph)	22	322	3	0	0	0	0	222	118	34	169	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	3.7	3.3	3.7	3.7	3.7	3.7	3.7	3.5	3.7	3.6	3.8	3.7
Total Lost time (s)		5.9						6.0		6.0	6.0	
Lane Util. Factor		0.95						0.95		1.00	1.00	
Frpb, ped/bikes		1.00						0.99		1.00	1.00	
Flpb, ped/bikes		1.00						1.00		0.99	1.00	
Frt		1.00						0.95		1.00	1.00	
Flt Protected		1.00						1.00		0.95	1.00	
Satd. Flow (prot)		3076						2862		1308	1628	
Flt Permitted		1.00						1.00		0.52	1.00	
Satd. Flow (perm)		3076						2862		715	1628	
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)	24	358	3	0	0	0	0	247	131	38	188	0
RTOR Reduction (vph)	0	1	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	384	0	0	0	0	0	378	0	38	188	0
Confl. Peds. (#/hr)	16		6	6		16	9		18	18		9
Heavy Vehicles (%)	5%	7%	0%	2%	2%	2%	2%	8%	16%	30%	13%	2%
Turn Type	Perm	NA						NA		pm+pt	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4									6		
Actuated Green, G (s)		29.1						23.0		34.0	34.0	
Effective Green, g (s)		29.1						23.0		34.0	34.0	
Actuated g/C Ratio		0.39						0.31		0.45	0.45	
Clearance Time (s)		5.9						6.0		6.0	6.0	
Lane Grp Cap (vph)		1193						877		363	738	
v/s Ratio Prot								c0.13		0.01	c0.12	
v/s Ratio Perm		0.12								0.04		
v/c Ratio		0.32						0.43		0.10	0.25	
Uniform Delay, d1		16.1						20.8		12.1	12.7	
Progression Factor		1.00						1.00		1.00	1.00	
Incremental Delay, d2		0.7						1.5		0.6	0.8	
Delay (s)		16.8						22.3		12.7	13.5	
Level of Service		B						C		B	B	
Approach Delay (s)		16.8			0.0			22.3			13.4	
Approach LOS		B			A			C			B	

Intersection Summary					
HCM 2000 Control Delay	18.1	HCM 2000 Level of Service		B	
HCM 2000 Volume to Capacity ratio	0.37				
Actuated Cycle Length (s)	75.0	Sum of lost time (s)		17.9	
Intersection Capacity Utilization	62.5%	ICU Level of Service		B	
Analysis Period (min)	15				

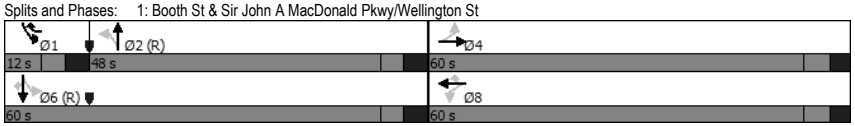
c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	30	52	12	21	408	415	13	712	25	183	776	12
Future Volume (vph)	30	52	12	21	408	415	13	712	25	183	776	12
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (m)	3.7	3.4	3.7	3.7	3.4	3.4	3.7	3.5	3.5	3.3	3.8	3.7
Storage Length (m)	0.0		0.0	0.0		90.0	0.0		0.0	135.0		63.0
Storage Lanes	0		0	0		1	0		0	1		1
Taper Length (m)	2.5			2.5			2.5			30.0		
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	1.00	0.95	0.95	0.95	1.00	0.95	1.00
Ped Bike Factor		0.99			1.00	0.98		1.00				0.98
Frt		0.981				0.850		0.995				0.850
Flt Protected		0.984			0.998			0.999		0.950		
Satd. Flow (prot)	0	2864	0	0	3215	1481	0	3201	0	1653	3461	1547
Flt Permitted		0.667			0.934			0.932		0.221		
Satd. Flow (perm)	0	1938	0	0	3006	1449	0	2986	0	385	3461	1522
Right Turn on Red			Yes			No			Yes			Yes
Satd. Flow (RTOR)		13						3				35
Link Speed (k/h)		60			60			50			50	
Link Distance (m)		199.5			146.4			401.6			200.6	
Travel Time (s)		12.0			8.8			28.9			14.4	
Confl. Peds. (#/hr)	8		16	16		8	3		1	1		3
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	0%	22%	0%	0%	4%	1%	2%	3%	0%	0%	1%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	10	10	0	0	0
Adj. Flow (vph)	33	58	13	23	453	461	14	791	28	203	862	13
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	104	0	0	476	461	0	833	0	203	862	13
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.3			3.3	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	1.06	1.10	1.06	1.06	1.10	1.10	1.06	1.12	1.09	1.12	1.04	1.06
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	0		1	0	0	1	0		1	0	0
Detector Template	Left			Left			Left			Left		
Leading Detector (m)	2.0	0.0		6.1	0.0	0.0	6.1	0.0		6.1	0.0	0.0
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6		6.1	0.6	2.0	6.1	1.8		6.1	1.8	6.1
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Turn Type	Perm	NA		Perm	NA	pm+ov	Perm	NA		pm+pt	NA	Perm
Protected Phases		4			8	1		2		1	6	
Permitted Phases	4			8		8	2			6		6

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	4	4		8	8	1	2	2		1	6	6
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0	5.0	10.0	10.0		5.0	1.0	1.0
Minimum Split (s)	35.8	35.8		35.8	35.8	11.8	31.8	31.8		11.8	31.8	31.8
Total Split (s)	60.0	60.0		60.0	60.0	12.0	48.0	48.0		12.0	60.0	60.0
Total Split (%)	50.0%	50.0%		50.0%	50.0%	10.0%	40.0%	40.0%		10.0%	50.0%	50.0%
Maximum Green (s)	53.2	53.2		53.2	53.2	5.2	41.2	41.2		5.2	53.2	53.2
Yellow Time (s)	3.7	3.7		3.7	3.7	3.3	3.3	3.3		3.3	3.3	3.3
All-Red Time (s)	3.1	3.1		3.1	3.1	3.5	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	Lag		Lead		
Lead-Lag Optimize?						Yes	Yes	Yes		Yes		
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None		None	None	None	C-Max	C-Max		None	C-Max	C-Max
Walk Time (s)	10.0	10.0		10.0	10.0		10.0	10.0			10.0	10.0
Flash Dont Walk (s)	19.0	19.0		19.0	19.0		15.0	15.0			15.0	15.0
Pedestrian Calls (#/hr)	0	0		0	0		0	0			0	0
Act Effct Green (s)		25.0			25.0	45.3		54.3		81.4	81.4	81.4
Actuated g/C Ratio		0.21			0.21	0.38		0.45		0.68	0.68	0.68
v/c Ratio		0.25			0.76	0.84		0.62		0.43	0.37	0.01
Control Delay		34.8			52.7	43.3		23.9		10.7	9.3	0.3
Queue Delay		0.0			0.0	0.0		0.0		0.0	0.0	0.0
Total Delay		34.8			52.7	43.3		23.9		10.7	9.3	0.3
LOS		C			D	D		C		B	A	A
Approach Delay		34.8			48.1			23.9			9.5	
Approach LOS		C			D			C			A	
Queue Length 50th (m)		9.4			56.0	91.2		72.2		15.9	41.4	0.0
Queue Length 95th (m)		16.3			69.5	108.5		114.4		30.0	62.3	0.5
Internal Link Dist (m)		175.5			122.4			377.6			176.6	
Turn Bay Length (m)						90.0				135.0		63.0
Base Capacity (vph)		866			1332	552		1353		476	2348	1044
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		0.12			0.36	0.84		0.62		0.43	0.37	0.01

Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 3 (3%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 80			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.84			
Intersection Signal Delay: 26.7		Intersection LOS: C	
Intersection Capacity Utilization 89.1%		ICU Level of Service E	
Analysis Period (min) 15			

Splits and Phases: 1: Booth St & Sir John A MacDonald Pkwy/Wellington St



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	30	52	12	21	408	415	13	712	25	183	776	12
Future Volume (vph)	30	52	12	21	408	415	13	712	25	183	776	12
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	3.7	3.4	3.7	3.7	3.4	3.4	3.7	3.5	3.5	3.3	3.8	3.7
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
Frpb, ped/bikes		1.00			1.00	0.99		1.00		1.00	1.00	0.98
Flpb, ped/bikes		1.00			1.00	1.00		1.00		1.00	1.00	1.00
Frt		0.98			1.00	0.85		0.99		1.00	1.00	0.85
Flt Protected		0.98			1.00	1.00		1.00		0.95	1.00	1.00
Satd. Flow (prot)		2862			3211	1463		3201		1653	3461	1522
Flt Permitted		0.67			0.93	1.00		0.93		0.22	1.00	1.00
Satd. Flow (perm)		1940			3007	1463		2984		385	3461	1522
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)	33	58	13	23	453	461	14	791	28	203	862	13
RTOR Reduction (vph)	0	10	0	0	0	0	0	2	0	0	0	4
Lane Group Flow (vph)	0	94	0	0	476	461	0	831	0	203	862	9
Confl. Peds. (#/hr)	8		16	16		8	3		1	1		3
Heavy Vehicles (%)	0%	22%	0%	0%	4%	1%	2%	3%	0%	0%	1%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	10	10	0	0	0
Turn Type	Perm	NA		Perm	NA	pm+ov	Perm	NA		pm+pt	NA	Perm
Protected Phases		4			8	1		2		1	6	
Permitted Phases	4			8		8	2			6		6
Actuated Green, G (s)		25.0			25.0	45.3		54.3		81.4	81.4	81.4
Effective Green, g (s)		25.0			25.0	45.3		54.3		81.4	81.4	81.4
Actuated g/C Ratio		0.21			0.21	0.38		0.45		0.68	0.68	0.68
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)		404			626	635		1350		475	2347	1032
v/s Ratio Prot						c0.12				0.07	0.25	
v/s Ratio Perm		0.05			0.16	0.19		c0.28		0.22		0.01
v/c Ratio		0.23			0.76	0.73		0.62		0.43	0.37	0.01
Uniform Delay, d1		39.5			44.7	32.0		24.9		9.9	8.3	6.2
Progression Factor		1.00			1.00	1.00		0.85		1.00	1.00	1.00
Incremental Delay, d2		0.3			5.4	4.1		1.6		0.6	0.4	0.0
Delay (s)		39.8			50.1	36.2		22.7		10.5	8.7	6.3
Level of Service		D			D	D		C		B	A	A
Approach Delay (s)		39.8			43.2			22.7			9.0	
Approach LOS		D			D			C			A	

Intersection Summary			
HCM 2000 Control Delay	24.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	20.4
Intersection Capacity Utilization	89.1%	ICU Level of Service	E
Analysis Period (min)	15		

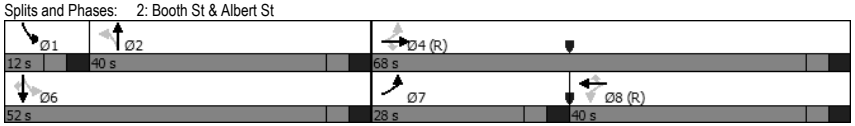
c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	296	252	17	58	451	163	13	426	53	122	413	233
Future Volume (vph)	296	252	17	58	451	163	13	426	53	122	413	233
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (m)	3.4	3.4	3.6	3.4	3.4	3.4	3.7	3.2	3.7	3.3	3.3	3.5
Storage Length (m)	150.0		42.0	38.0		87.0	0.0		44.0	0.0		56.0
Storage Lanes	1		1	1		1	0		0	1		1
Taper Length (m)	40.0			45.0			2.5			2.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	1.00	0.95	0.95	0.95	1.00	1.00	1.00
Ped Bike Factor	1.00		0.96	0.99		0.98		0.99		0.99		0.94
Frt			0.850			0.850		0.984				0.850
Flt Protected	0.950			0.950				0.999		0.950		
Satd. Flow (prot)	1592	1692	1530	1592	3278	1481	0	3159	0	1589	1740	1363
Flt Permitted	0.308			0.588				0.936		0.264		
Satd. Flow (perm)	514	1692	1472	974	3278	1446	0	2958	0	435	1740	1275
Right Turn on Red			Yes			No			Yes			No
Satd. Flow (RTOR)			91					11				
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		185.1			175.2			57.0			401.6	
Travel Time (s)		13.3			12.6			4.1			28.9	
Confl. Peds. (#/hr)	10		9	9		10	45		36	36		45
Confl. Bikes (#/hr)									2			
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	5%	4%	0%	5%	2%	1%	8%	1%	0%	4%	0%	11%
Adj. Flow (vph)	329	280	19	64	501	181	14	473	59	136	459	259
Shared Lane Traffic (%)												
Lane Group Flow (vph)	329	280	19	64	501	181	0	546	0	136	459	259
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.4			3.4			3.3			3.3	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	1.10	1.10	1.07	1.10	1.10	1.10	1.06	1.14	1.06	1.12	1.12	1.09
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	0	0	0	0	0	1	0		1	0	0
Detector Template	Left						Left			Left		
Leading Detector (m)	6.1	0.0	0.0	0.0	0.0	0.0	6.1	0.0		6.1	0.0	0.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Size(m)	6.1	1.8	6.1	6.1	1.8	6.1	6.1	1.8		6.1	1.8	6.1
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Turn Type	pm+pt	NA	Perm	Perm	NA	Perm	Perm	NA		pm+pt	NA	Perm
Protected Phases	7	4			8			2		1	6	
Permitted Phases	4		4	8		8	2			6		6

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4	4	8	8	8	2	2		1	6	6
Switch Phase												
Minimum Initial (s)	5.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0		5.0	10.0	10.0
Minimum Split (s)	11.5	36.5	36.5	36.5	36.5	36.5	36.5	36.5		11.5	36.5	36.5
Total Split (s)	28.0	68.0	68.0	40.0	40.0	40.0	40.0	40.0		12.0	52.0	52.0
Total Split (%)	23.3%	56.7%	56.7%	33.3%	33.3%	33.3%	33.3%	33.3%		10.0%	43.3%	43.3%
Maximum Green (s)	21.5	61.5	61.5	33.5	33.5	33.5	33.5	33.5		5.5	45.5	45.5
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3		3.3	3.3	3.3
All-Red Time (s)	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2		3.2	3.2	3.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0		0.0		0.0	0.0	0.0
Total Lost Time (s)	6.5	6.5	6.5	6.5	6.5	6.5		6.5		6.5	6.5	6.5
Lead/Lag	Lead			Lag	Lag	Lag	Lag	Lag		Lead		
Lead-Lag Optimize?	Yes			Yes	Yes	Yes	Yes	Yes		Yes		
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Recall Mode	None	C-Max	C-Max	C-Max	C-Max	C-Max	Max	Max		None	Max	Max
Walk Time (s)		7.0	7.0	7.0	7.0	7.0	7.0	7.0			7.0	7.0
Flash Dont Walk (s)		23.0	23.0	23.0	23.0	23.0	23.0	23.0			23.0	23.0
Pedestrian Calls (#/hr)		0	0	0	0	0	0	0			0	0
Act Effct Green (s)	61.5	61.5	61.5	35.8	35.8	35.8		33.5		45.5	45.5	45.5
Actuated g/C Ratio	0.51	0.51	0.51	0.30	0.30	0.30		0.28		0.38	0.38	0.38
v/c Ratio	0.75	0.32	0.02	0.22	0.51	0.42		0.66		0.63	0.70	0.54
Control Delay	30.1	18.4	0.1	23.6	25.8	26.3		41.8		49.2	47.8	42.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0		0.0		0.0	0.0	0.0
Total Delay	30.1	18.4	0.1	23.6	25.8	26.3		41.8		49.2	47.8	42.9
LOS	C	B	A	C	C	C		D		D	D	D
Approach Delay		24.0			25.7			41.8			46.5	
Approach LOS		C			C			D			D	
Queue Length 50th (m)	46.0	37.2	0.0	11.7	52.5	34.8		58.6		27.3	112.8	59.2
Queue Length 95th (m)	68.0	55.8	0.0	23.7	70.2	56.9		77.7		46.3	145.9	89.5
Internal Link Dist (m)		161.1			151.2			33.0			377.6	
Turn Bay Length (m)	150.0		42.0	38.0		87.0						56.0
Base Capacity (vph)	456	867	798	290	978	431		833		217	659	483
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	0.72	0.32	0.02	0.22	0.51	0.42		0.66		0.63	0.70	0.54

Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 9 (8%), Referenced to phase 4:EBTL and 8:WBTL, Start of Green			
Natural Cycle: 100			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.75			
Intersection Signal Delay: 34.9		Intersection LOS: C	
Intersection Capacity Utilization 114.0%		ICU Level of Service H	
Analysis Period (min) 15			

Splits and Phases: 2: Booth St & Albert St



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	296	252	17	58	451	163	13	426	53	122	413	233
Future Volume (vph)	296	252	17	58	451	163	13	426	53	122	413	233
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	3.4	3.4	3.6	3.4	3.4	3.4	3.7	3.2	3.7	3.3	3.3	3.5
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
Frpb, ped/bikes	1.00	1.00	0.96	1.00	1.00	0.98		0.99		1.00	1.00	0.94
Flpb, ped/bikes	1.00	1.00	1.00	0.99	1.00	1.00		1.00		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)	1590	1692	1472	1573	3278	1446		3156		1584	1740	1275
Flt Permitted	0.31	1.00	1.00	0.59	1.00	1.00		0.94		0.26	1.00	1.00
Satd. Flow (perm)	516	1692	1472	973	3278	1446		2956		440	1740	1275
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)	329	280	19	64	501	181	14	473	59	136	459	259
RTOR Reduction (vph)	0	0	9	0	0	0	0	8	0	0	0	0
Lane Group Flow (vph)	329	280	10	64	501	181	0	538	0	136	459	259
Confl. Peds. (#/hr)	10		9	9		10	45		36	36		45
Confl. Bikes (#/hr)									2			
Heavy Vehicles (%)	5%	4%	0%	5%	2%	1%	8%	1%	0%	4%	0%	11%
Turn Type	pm+pt	NA	Perm	Perm	NA	Perm	Perm	NA		pm+pt	NA	Perm
Protected Phases	7	4			8			2		1	6	
Permitted Phases	4		4	8		8	2			6		6
Actuated Green, G (s)	61.5	61.5	61.5	35.8	35.8	35.8		33.5		45.5	45.5	45.5
Effective Green, g (s)	61.5	61.5	61.5	35.8	35.8	35.8		33.5		45.5	45.5	45.5
Actuated g/C Ratio	0.51	0.51	0.51	0.30	0.30	0.30		0.28		0.38	0.38	0.38
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)	436	867	754	290	977	431		825		219	659	483
v/s Ratio Prot	c0.12	0.17			0.15					0.03	c0.26	
v/s Ratio Perm	c0.27		0.01	0.07		0.13		0.18		0.21		0.20
v/c Ratio	0.75	0.32	0.01	0.22	0.51	0.42		0.65		0.62	0.70	0.54
Uniform Delay, d1	19.5	17.1	14.4	31.6	34.9	33.8		38.1		29.5	31.4	29.0
Progression Factor	1.00	1.00	1.00	0.65	0.67	0.67		1.00		1.32	1.31	1.30
Incremental Delay, d2	7.3	1.0	0.0	1.6	1.8	2.8		4.0		5.1	5.7	4.0
Delay (s)	26.7	18.1	14.4	22.2	25.2	25.3		42.1		44.0	46.9	41.8
Level of Service	C	B	B	C	C	C		D		D	D	D
Approach Delay (s)		22.5			25.0			42.1			44.9	
Approach LOS		C			C			D			D	

Intersection Summary					
HCM 2000 Control Delay	33.9	HCM 2000 Level of Service	C		
HCM 2000 Volume to Capacity ratio	0.81				
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	26.0		
Intersection Capacity Utilization	114.0%	ICU Level of Service	H		
Analysis Period (min)	15				

c Critical Lane Group

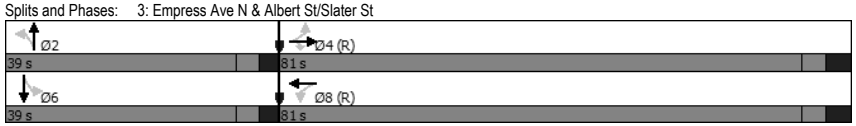
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	368	1	2	677	0	5	0	11	0	0	0
Future Volume (vph)	0	368	1	2	677	0	5	0	11	0	0	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (m)	3.7	3.4	3.5	3.7	3.3	3.7	3.7	3.4	3.7	3.7	3.4	3.7
Storage Length (m)	0.0		45.0	0.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	0		1	0		0	0		0	0		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	0.95	0.95	1.00	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor			0.96		1.00			0.98				
Frt			0.850					0.910				
Flt Protected								0.984				
Satd. Flow (prot)	0	3247	756	0	3241	0	0	1457	0	0	1725	0
Flt Permitted					0.954			0.949				
Satd. Flow (perm)	0	3247	723	0	3092	0	0	1398	0	0	1725	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			30					37				
Link Speed (k/h)		50			50			40			40	
Link Distance (m)		175.2			39.3			118.9			51.7	
Travel Time (s)		12.6			2.8			10.7			4.7	
Confl. Peds. (#/hr)	25		9	9		25	15		8	8		15
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	2%	3%	100%	0%	2%	2%	0%	2%	10%	2%	2%	2%
Adj. Flow (vph)	0	409	1	2	752	0	6	0	12	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	409	1	0	754	0	0	18	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.4			3.4			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	1.06	1.10	1.09	1.06	1.12	1.06	1.06	1.10	1.06	1.06	1.10	1.06
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Turn Type		NA	Perm	Perm	NA		Perm	NA				
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2			6		
Minimum Split (s)	29.1	29.1	29.1	29.1	29.1		39.0	39.0		39.0	39.0	
Total Split (s)	81.0	81.0	81.0	81.0	81.0		39.0	39.0		39.0	39.0	
Total Split (%)	67.5%	67.5%	67.5%	67.5%	67.5%		32.5%	32.5%		32.5%	32.5%	
Maximum Green (s)	73.9	73.9	73.9	73.9	73.9		32.7	32.7		32.7	32.7	
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3		3.3	3.3		3.3	3.3	
All-Red Time (s)	3.8	3.8	3.8	3.8	3.8		3.0	3.0		3.0	3.0	
Lost Time Adjust (s)		0.0	0.0		0.0			0.0			0.0	
Total Lost Time (s)		7.1	7.1		7.1			6.3			6.3	
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	7.0	7.0	7.0	7.0	7.0		10.0	10.0		10.0	10.0	
Flash Dont Walk (s)	15.0	15.0	15.0	15.0	15.0		22.7	22.7		22.7	22.7	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Pedestrian Calls (#/hr)	0	0	0	0	0		0	0		0	0	
Act Effct Green (s)		73.9	73.9		73.9			32.7				
Actuated g/C Ratio		0.62	0.62		0.62			0.27				
v/c Ratio		0.20	0.00		0.40			0.04				
Control Delay		9.3	0.0		12.5			3.6				
Queue Delay		0.0	0.0		0.0			0.0				
Total Delay		9.3	0.0		12.5			3.6				
LOS		A	A		B			A				
Approach Delay		9.3			12.5			3.6				
Approach LOS		A			B			A				
Queue Length 50th (m)		23.2	0.0		44.4			0.0				
Queue Length 95th (m)		22.8	m0.0		56.6			2.3				
Internal Link Dist (m)		151.2			15.3			94.9			27.7	
Turn Bay Length (m)			45.0									
Base Capacity (vph)		1999	456		1904			407				
Starvation Cap Reductn		0	0		0			0				
Spillback Cap Reductn		0	0		0			0				
Storage Cap Reductn		0	0		0			0				
Reduced v/c Ratio		0.20	0.00		0.40			0.04				

Intersection Summary

Area Type: Other
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 87 (73%), Referenced to phase 4:EBTL and 8:WBTL, Start of Green
Natural Cycle: 70
Control Type: Pretimed
Maximum v/c Ratio: 0.40
Intersection Signal Delay: 11.2 Intersection LOS: B
Intersection Capacity Utilization 59.6% ICU Level of Service B
Analysis Period (min) 15
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: Empress Ave N & Albert St/Slater St



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	368	1	2	677	0	5	0	11	0	0	0
Future Volume (vph)	0	368	1	2	677	0	5	0	11	0	0	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	3.7	3.4	3.5	3.7	3.3	3.7	3.7	3.4	3.7	3.7	3.4	3.7
Total Lost time (s)		7.1	7.1		7.1			6.3				
Lane Util. Factor		0.95	1.00		0.95			1.00				
Frpb, ped/bikes		1.00	0.96		1.00			0.99				
Flpb, ped/bikes		1.00	1.00		1.00			0.99				
Frt		1.00	0.85		1.00			0.91				
Flt Protected		1.00	1.00		1.00			0.98				
Satd. Flow (prot)		3247	723		3241			1449				
Flt Permitted		1.00	1.00		0.95			0.95				
Satd. Flow (perm)		3247	723		3093			1397				
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	409	1	2	752	0	6	0	12	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	13	0	0	0	0
Lane Group Flow (vph)	0	409	1	0	754	0	0	5	0	0	0	0
Confl. Peds. (#/hr)	25		9	9		25	15		8	8		15
Heavy Vehicles (%)	2%	3%	100%	0%	2%	2%	0%	2%	10%	2%	2%	2%
Turn Type		NA	Perm	Perm	NA		Perm	NA				
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)		73.9	73.9		73.9			32.7				
Effective Green, g (s)		73.9	73.9		73.9			32.7				
Actuated g/C Ratio		0.62	0.62		0.62			0.27				
Clearance Time (s)		7.1	7.1		7.1			6.3				
Lane Grp Cap (vph)		1999	445		1904			380				
v/s Ratio Prot		0.13										
v/s Ratio Perm			0.00		c0.24			c0.00				
v/c Ratio		0.20	0.00		0.40			0.01				
Uniform Delay, d1		10.1	8.9		11.7			31.9				
Progression Factor		0.89	1.00		1.00			1.00				
Incremental Delay, d2		0.2	0.0		0.6			0.1				
Delay (s)		9.2	8.9		12.3			31.9				
Level of Service		A	A		B			C				
Approach Delay (s)		9.2			12.3			31.9			0.0	
Approach LOS		A			B			C			A	

Intersection Summary				
HCM 2000 Control Delay	11.6	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	59.6%	ICU Level of Service	B	
Analysis Period (min)	15			

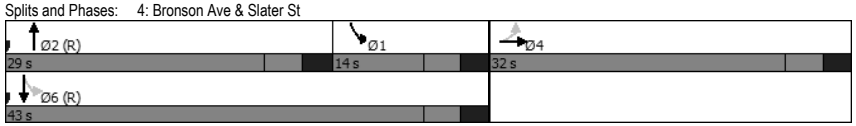
c Critical Lane Group

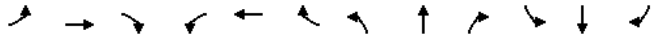
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	12	241	1	0	0	0	0	382	101	27	315	0
Future Volume (vph)	12	241	1	0	0	0	0	382	101	27	315	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (m)	3.7	3.3	3.7	3.7	3.7	3.7	3.7	3.5	3.7	3.6	3.8	3.7
Storage Length (m)	0.0		0.0	0.0		0.0	0.0		0.0	20.0		0.0
Storage Lanes	0		0	0		0	0		0	1		0
Taper Length (m)	2.5			2.5			2.5			8.0		
Lane Util. Factor	0.95	0.95	0.95	1.00	1.00	1.00	1.00	0.95	0.95	1.00	1.00	1.00
Ped Bike Factor		1.00						0.99		0.99		
Frt		0.999						0.969				
Flt Protected		0.998								0.950		
Satd. Flow (prot)	0	3175	0	0	0	0	0	3174	0	1644	1769	0
Flt Permitted		0.998								0.441		
Satd. Flow (perm)	0	3172	0	0	0	0	0	3174	0	755	1769	0
Right Turn on Red			Yes			Yes			No			Yes
Satd. Flow (RTOR)		1										
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		115.0			115.8			103.4			50.3	
Travel Time (s)		8.3			8.3			7.4			3.6	
Confl. Peds. (#/hr)	13		14	14		13	13		21	21		13
Confl. Bikes (#/hr)									1			
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	0%	4%	0%	2%	2%	2%	2%	1%	8%	4%	4%	2%
Adj. Flow (vph)	13	268	1	0	0	0	0	424	112	30	350	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	282	0	0	0	0	0	536	0	30	350	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	1.06	1.12	1.06	1.06	1.06	1.06	1.06	1.09	1.06	1.07	1.04	1.06
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	0						0		0	0	
Detector Template	Left											
Leading Detector (m)	6.1	0.0						0.0		0.0	0.0	
Trailing Detector (m)	0.0	0.0						0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0						0.0		0.0	0.0	
Detector 1 Size(m)	6.1	1.8						1.8		6.1	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex						Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0						0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0						0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0						0.0		0.0	0.0	
Turn Type	Perm	NA						NA		pm+pt	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4									6		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	4	4						2		1	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0						10.0		5.0	10.0	
Minimum Split (s)	19.9	19.9						26.0		11.0	26.0	
Total Split (s)	32.0	32.0						29.0		14.0	43.0	
Total Split (%)	42.7%	42.7%						38.7%		18.7%	57.3%	
Maximum Green (s)	26.1	26.1						23.0		8.0	37.0	
Yellow Time (s)	3.3	3.3						3.3		3.3	3.3	
All-Red Time (s)	2.6	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		
Vehicle Extension (s)	3.0	3.0						3.0		3.0	3.0	
Recall Mode	None	None						C-Max		Max	C-Max	
Walk Time (s)	7.0	7.0						13.0			13.0	
Flash Dont Walk (s)	7.0	7.0						7.0			7.0	
Pedestrian Calls (#/hr)	0	0						0			0	
Act Effct Green (s)		12.3						36.8		50.8	50.8	
Actuated g/C Ratio		0.16						0.49		0.68	0.68	
v/c Ratio		0.54						0.34		0.05	0.29	
Control Delay		32.4						12.9		5.0	6.0	
Queue Delay		0.0						0.0		0.0	0.0	
Total Delay		32.4						12.9		5.0	6.0	
LOS		C						B		A	A	
Approach Delay		32.4						12.9			5.9	
Approach LOS		C						B			A	
Queue Length 50th (m)		19.5						22.8		1.2	16.5	
Queue Length 95th (m)		29.2						36.6		4.0	32.2	
Internal Link Dist (m)		91.0			91.8			79.4			26.3	
Turn Bay Length (m)										20.0		
Base Capacity (vph)		1104						1558		606	1198	
Starvation Cap Reductn		0						0		0	0	
Spillback Cap Reductn		0						0		0	0	
Storage Cap Reductn		0						0		0	0	
Reduced v/c Ratio		0.26						0.34		0.05	0.29	

Intersection Summary			
Area Type:	Other		
Cycle Length: 75			
Actuated Cycle Length: 75			
Offset: 38 (51%), Referenced to phase 2:NBT and 6:SBTL, Start of Green			
Natural Cycle: 60			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.54			
Intersection Signal Delay: 15.3		Intersection LOS: B	
Intersection Capacity Utilization 44.7%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 4: Bronson Ave & Slater St





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	12	241	1	0	0	0	0	382	101	27	315	0
Future Volume (vph)	12	241	1	0	0	0	0	382	101	27	315	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	3.7	3.3	3.7	3.7	3.7	3.7	3.7	3.5	3.7	3.6	3.8	3.7
Total Lost time (s)		5.9						6.0		6.0	6.0	
Lane Util. Factor		0.95						0.95		1.00	1.00	
Frpb, ped/bikes		1.00						0.99		1.00	1.00	
Flpb, ped/bikes		1.00						1.00		1.00	1.00	
Frt		1.00						0.97		1.00	1.00	
Flt Protected		1.00						1.00		0.95	1.00	
Satd. Flow (prot)		3172						3173		1637	1769	
Flt Permitted		1.00						1.00		0.44	1.00	
Satd. Flow (perm)		3172						3173		760	1769	
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)	13	268	1	0	0	0	0	424	112	30	350	0
RTOR Reduction (vph)	0	1	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	281	0	0	0	0	0	536	0	30	350	0
Confl. Peds. (#/hr)	13		14	14		13	13		21	21		13
Confl. Bikes (#/hr)									1			
Heavy Vehicles (%)	0%	4%	0%	2%	2%	2%	2%	1%	8%	4%	4%	2%
Turn Type	Perm	NA						NA		pm+pt	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4									6		
Actuated Green, G (s)		12.3						36.8		50.8	50.8	
Effective Green, g (s)		12.3						36.8		50.8	50.8	
Actuated g/C Ratio		0.16						0.49		0.68	0.68	
Clearance Time (s)		5.9						6.0		6.0	6.0	
Vehicle Extension (s)		3.0						3.0		3.0	3.0	
Lane Grp Cap (vph)		520						1556		608	1198	
v/s Ratio Prot								c0.17		0.01	c0.20	
v/s Ratio Perm		0.09								0.03		
v/c Ratio		0.54						0.34		0.05	0.29	
Uniform Delay, d1		28.8						11.7		4.4	4.9	
Progression Factor		1.00						1.00		1.00	1.00	
Incremental Delay, d2		1.2						0.6		0.2	0.6	
Delay (s)		29.9						12.3		4.6	5.5	
Level of Service		C						B		A	A	
Approach Delay (s)		29.9			0.0			12.3			5.4	
Approach LOS		C			A			B			A	

Intersection Summary			
HCM 2000 Control Delay	14.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.39		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	17.9
Intersection Capacity Utilization	44.7%	ICU Level of Service	A
Analysis Period (min)	15		

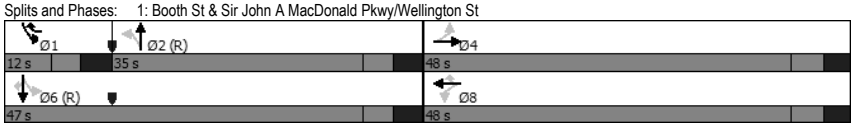
c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	6	405	0	13	63	3	5	518	26	354	518	37
Future Volume (vph)	6	405	0	13	63	3	5	518	26	354	518	37
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (m)	3.7	3.4	3.7	3.7	3.4	3.4	3.7	3.5	3.5	3.3	3.8	3.7
Storage Length (m)	0.0		0.0	0.0		90.0	0.0		0.0	135.0		63.0
Storage Lanes	0		0	0		1	0		0	1		1
Taper Length (m)	2.5			2.5			2.5			30.0		
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	1.00	0.95	0.95	0.95	1.00	0.95	1.00
Ped Bike Factor					1.00	0.98		1.00		1.00		0.99
Frt						0.850		0.993				0.850
Flt Protected		0.999			0.992					0.950		
Satd. Flow (prot)	0	3040	0	0	3185	1496	0	3324	0	1559	3394	1547
Flt Permitted		0.951			0.848			0.948		0.246		
Satd. Flow (perm)	0	2894	0	0	2721	1461	0	3151	0	403	3394	1527
Right Turn on Red			Yes			No			Yes			Yes
Satd. Flow (RTOR)								5				44
Link Speed (k/h)		60			60			50			50	
Link Distance (m)		199.5			146.4			401.6			200.6	
Travel Time (s)		12.0			8.8			28.9			14.4	
Confl. Peds. (#/hr)			7	7		12			3	3		1
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	2%	10%	4%	0%	5%	0%	2%	1%	0%	6%	3%	0%
Adj. Flow (vph)	7	450	0	14	70	3	6	576	29	393	576	41
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	457	0	0	84	3	0	611	0	393	576	41
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.3			3.3	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	1.06	1.10	1.06	1.06	1.10	1.10	1.06	1.09	1.09	1.12	1.04	1.06
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	0		1	0	0	1	0		1	0	0
Detector Template	Left			Left			Left			Left		
Leading Detector (m)	2.0	0.0		6.1	0.0	0.0	6.1	0.0		6.1	0.0	0.0
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6		6.1	0.6	2.0	6.1	1.8		6.1	1.8	6.1
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Turn Type	Perm	NA		Perm	NA	pm+ov	Perm	NA		pm+pt	NA	Perm
Protected Phases		4			8	1		2		1	6	
Permitted Phases	4			8		8	2			6		6
Detector Phase	4	4		8	8	1	2	2		1	6	6

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0	5.0	10.0	10.0		5.0	10.0	10.0
Minimum Split (s)	35.8	35.8		35.8	35.8	11.8	31.8	31.8		11.8	31.8	31.8
Total Split (s)	48.0	48.0		48.0	48.0	12.0	35.0	35.0		12.0	47.0	47.0
Total Split (%)	50.5%	50.5%		50.5%	50.5%	12.6%	36.8%	36.8%		12.6%	49.5%	49.5%
Maximum Green (s)	41.2	41.2		41.2	41.2	5.2	28.2	28.2		5.2	40.2	40.2
Yellow Time (s)	3.7	3.7		3.7	3.7	3.3	3.3	3.3		3.3	3.3	3.3
All-Red Time (s)	3.1	3.1		3.1	3.1	3.5	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	Lag		Lead		
Lead-Lag Optimize?						Yes	Yes	Yes		Yes		
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None		None	None	None	C-Max	C-Max		None	C-Max	C-Max
Walk Time (s)	10.0	10.0		10.0	10.0		10.0	10.0			10.0	10.0
Flash Dont Walk (s)	19.0	19.0		19.0	19.0		15.0	15.0			15.0	15.0
Pedestrian Calls (#/hr)	0	0		0	0		0	0			0	0
Act Effct Green (s)		20.7			20.7	46.4		28.2		60.7	60.7	60.7
Actuated g/C Ratio		0.22			0.22	0.49		0.30		0.64	0.64	0.64
v/c Ratio		0.73			0.14	0.00		0.65		0.69	0.27	0.04
Control Delay		41.1			28.9	9.3		32.8		19.4	8.4	2.6
Queue Delay		0.0			0.0	0.0		0.0		0.0	0.0	0.0
Total Delay		41.1			28.9	9.3		32.8		19.4	8.4	2.6
LOS		D			C	A		C		B	A	A
Approach Delay		41.1			28.3			32.8			12.4	
Approach LOS		D			C			C			B	
Queue Length 50th (m)		41.2			6.5	0.3		50.7		31.4	21.8	0.0
Queue Length 95th (m)		53.2			11.7	1.5		69.0		#85.1	35.7	3.8
Internal Link Dist (m)		175.5			122.4			377.6			176.6	
Turn Bay Length (m)						90.0				135.0		63.0
Base Capacity (vph)		1255			1180	723		938		570	2168	991
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		0.36			0.07	0.00		0.65		0.69	0.27	0.04

Intersection Summary			
Area Type:	Other		
Cycle Length: 95			
Actuated Cycle Length: 95			
Offset: 31 (33%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 90			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.73			
Intersection Signal Delay: 24.9		Intersection LOS: C	
Intersection Capacity Utilization 75.8%		ICU Level of Service D	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 1: Booth St & Sir John A MacDonald Pkwy/Wellington St



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	6	405	0	13	63	3	5	518	26	354	518	37
Future Volume (vph)	6	405	0	13	63	3	5	518	26	354	518	37
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	3.7	3.4	3.7	3.7	3.4	3.4	3.7	3.5	3.5	3.3	3.8	3.7
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
Frpb, ped/bikes		1.00			1.00	0.99		1.00		1.00	1.00	0.99
Flpb, ped/bikes		1.00			1.00	1.00		1.00		1.00	1.00	1.00
Frt		1.00			1.00	0.85		0.99		1.00	1.00	0.85
Flt Protected		1.00			0.99	1.00		1.00		0.95	1.00	1.00
Satd. Flow (prot)		3041			3182	1480		3322		1559	3394	1527
Flt Permitted		0.95			0.85	1.00		0.95		0.25	1.00	1.00
Satd. Flow (perm)		2893			2719	1480		3150		404	3394	1527
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)	7	450	0	14	70	3	6	576	29	393	576	41
RTOR Reduction (vph)	0	0	0	0	0	0	0	4	0	0	0	15
Lane Group Flow (vph)	0	457	0	0	84	3	0	607	0	393	576	26
Confl. Peds. (#/hr)			7	7		12			3	3		1
Heavy Vehicles (%)	2%	10%	4%	0%	5%	0%	2%	1%	0%	6%	3%	0%
Turn Type	Perm	NA		Perm	NA	pm+ov	Perm	NA		pm+pt	NA	Perm
Protected Phases		4			8	1		2		1	6	
Permitted Phases	4			8		8	2			6		6
Actuated Green, G (s)		20.7			20.7	46.4		28.2		60.7	60.7	60.7
Effective Green, g (s)		20.7			20.7	46.4		28.2		60.7	60.7	60.7
Actuated g/C Ratio		0.22			0.22	0.49		0.30		0.64	0.64	0.64
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)		630			592	828		935		570	2168	975
v/s Ratio Prot						0.00				c0.19	0.17	
v/s Ratio Perm		c0.16			0.03	0.00		0.19		c0.25		0.02
v/c Ratio		0.73			0.14	0.00		0.65		0.69	0.27	0.03
Uniform Delay, d1		34.5			30.0	12.5		29.1		10.9	7.5	6.3
Progression Factor		1.00			1.00	1.00		1.00		1.00	1.00	1.00
Incremental Delay, d2		4.1			0.1	0.0		3.5		3.5	0.3	0.1
Delay (s)		38.7			30.1	12.5		32.6		14.3	7.8	6.4
Level of Service		D			C	B		C		B	A	A
Approach Delay (s)		38.7			29.5			32.6			10.3	
Approach LOS		D			C			C			B	

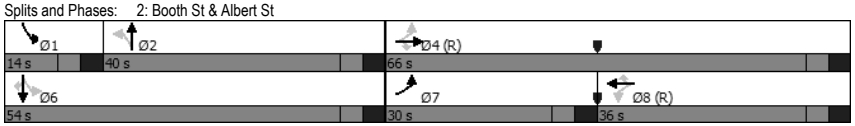
Intersection Summary			
HCM 2000 Control Delay	23.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	95.0	Sum of lost time (s)	20.4
Intersection Capacity Utilization	75.8%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	148	308	10	32	205	83	10	249	45	71	408	192
Future Volume (vph)	148	308	10	32	205	83	10	249	45	71	408	192
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (m)	3.4	3.4	3.6	3.4	3.4	3.4	3.7	3.2	3.7	3.3	3.3	3.5
Storage Length (m)	150.0		42.0	38.0		87.0	0.0		44.0	0.0		56.0
Storage Lanes	1		1	1		1	0		0	1		1
Taper Length (m)	40.0			45.0			2.5			2.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	1.00	0.95	0.95	0.95	1.00	1.00	1.00
Ped Bike Factor	0.99		0.96	0.99		0.97		0.99		0.98		0.94
Frt			0.850			0.850		0.978				0.850
Flt Protected	0.950			0.950				0.998		0.950		
Satd. Flow (prot)	1441	1615	1530	1672	3096	1268	0	3086	0	1559	1706	1327
Flt Permitted	0.521			0.555				0.934		0.431		
Satd. Flow (perm)	782	1615	1471	966	3096	1233	0	2886	0	692	1706	1252
Right Turn on Red			Yes			No			Yes			No
Satd. Flow (RTOR)			91					16				
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		185.1			175.2			57.0			401.6	
Travel Time (s)		13.3			12.6			4.1			28.9	
Confl. Peds. (#/hr)	13		9	9		13	38		34	34		38
Confl. Bikes (#/hr)			1									
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	16%	9%	0%	0%	8%	18%	10%	2%	4%	6%	2%	14%
Adj. Flow (vph)	164	342	11	36	228	92	11	277	50	79	453	213
Shared Lane Traffic (%)												
Lane Group Flow (vph)	164	342	11	36	228	92	0	338	0	79	453	213
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.4			3.4			3.3			3.3	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	1.10	1.10	1.07	1.10	1.10	1.10	1.06	1.14	1.06	1.12	1.12	1.09
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	0	0	0	0	0	1	0		1	0	0
Detector Template	Left						Left			Left		
Leading Detector (m)	6.1	0.0	0.0	0.0	0.0	0.0	6.1	0.0		6.1	0.0	0.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Size(m)	6.1	1.8	6.1	6.1	1.8	6.1	6.1	1.8		6.1	1.8	6.1
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Turn Type	pm+pt	NA	Perm	Perm	NA	Perm	Perm	NA		pm+pt	NA	Perm
Protected Phases	7	4			8			2		1	6	
Permitted Phases	4		4	8		8	2			6		6

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4	4	8	8	8	2	2		1	6	6
Switch Phase												
Minimum Initial (s)	5.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0		5.0	10.0	10.0
Minimum Split (s)	11.5	36.5	36.5	36.0	36.0	36.0	36.5	36.5		11.5	36.5	36.5
Total Split (s)	30.0	66.0	66.0	36.0	36.0	36.0	40.0	40.0		14.0	54.0	54.0
Total Split (%)	25.0%	55.0%	55.0%	30.0%	30.0%	30.0%	33.3%	33.3%		11.7%	45.0%	45.0%
Maximum Green (s)	23.5	59.5	59.5	29.5	29.5	29.5	33.5	33.5		7.5	47.5	47.5
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3		3.3	3.3	3.3
All-Red Time (s)	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2		3.2	3.2	3.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0		0.0		0.0	0.0	0.0
Total Lost Time (s)	6.5	6.5	6.5	6.5	6.5	6.5		6.5		6.5	6.5	6.5
Lead/Lag	Lead			Lag	Lag	Lag	Lag	Lag		Lead		
Lead-Lag Optimize?	Yes			Yes	Yes	Yes	Yes	Yes		Yes		
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Recall Mode	None	C-Max	C-Max	C-Max	C-Max	C-Max	Max	Max		None	Max	Max
Walk Time (s)		7.0	7.0	7.0	7.0	7.0	7.0	7.0			7.0	7.0
Flash Dont Walk (s)		23.0	23.0	22.5	22.5	22.5	23.0	23.0			23.0	23.0
Pedestrian Calls (#/hr)		0	0	0	0	0	0	0			0	0
Act Effct Green (s)	59.5	59.5	59.5	39.6	39.6	39.6		36.3		47.5	47.5	47.5
Actuated g/C Ratio	0.50	0.50	0.50	0.33	0.33	0.33		0.30		0.40	0.40	0.40
v/c Ratio	0.36	0.43	0.01	0.11	0.22	0.23		0.38		0.24	0.67	0.43
Control Delay	19.7	21.4	0.0	24.4	23.8	25.4		33.9		25.2	35.8	29.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0		0.0		0.0	0.0	0.0
Total Delay	19.7	21.4	0.0	24.4	23.8	25.4		33.9		25.2	35.8	29.8
LOS	B	C	A	C	C	C		C		C	D	C
Approach Delay		20.4			24.3			33.9			33.0	
Approach LOS		C			C			C			C	
Queue Length 50th (m)	21.3	49.9	0.0	4.0	12.8	9.8		32.5		11.7	86.7	36.0
Queue Length 95th (m)	35.0	73.6	0.0	8.9	19.3	19.0		46.3		22.1	123.8	57.8
Internal Link Dist (m)		161.1			151.2			33.0			377.6	
Turn Bay Length (m)	150.0		42.0	38.0		87.0						56.0
Base Capacity (vph)	516	800	775	318	1021	407		884		328	675	495
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	0.32	0.43	0.01	0.11	0.22	0.23		0.38		0.24	0.67	0.43

Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 104 (87%), Referenced to phase 4:EBTL and 8:WBTL, Start of Green			
Natural Cycle: 100			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.67			
Intersection Signal Delay: 28.2		Intersection LOS: C	
Intersection Capacity Utilization 105.0%		ICU Level of Service G	
Analysis Period (min) 15			

Splits and Phases: 2: Booth St & Albert St



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	148	308	10	32	205	83	10	249	45	71	408	192
Future Volume (vph)	148	308	10	32	205	83	10	249	45	71	408	192
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	3.4	3.4	3.6	3.4	3.4	3.4	3.7	3.2	3.7	3.3	3.3	3.5
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
Frpb, ped/bikes	1.00	1.00	0.96	1.00	1.00	0.97		0.99		1.00	1.00	0.94
Flpb, ped/bikes	0.99	1.00	1.00	0.99	1.00	1.00		1.00		0.99	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)	1434	1615	1471	1653	3096	1233		3085		1546	1706	1252
Flt Permitted	0.52	1.00	1.00	0.56	1.00	1.00		0.93		0.43	1.00	1.00
Satd. Flow (perm)	787	1615	1471	966	3096	1233		2886		701	1706	1252
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)	164	342	11	36	228	92	11	277	50	79	453	213
RTOR Reduction (vph)	0	0	6	0	0	0	0	11	0	0	0	0
Lane Group Flow (vph)	164	342	5	36	228	92	0	327	0	79	453	213
Confl. Peds. (#/hr)	13		9	9		13	38		34	34		38
Confl. Bikes (#/hr)			1									
Heavy Vehicles (%)	16%	9%	0%	0%	8%	18%	10%	2%	4%	6%	2%	14%
Turn Type	pm+pt	NA	Perm	Perm	NA	Perm	Perm	NA		pm+pt	NA	Perm
Protected Phases	7	4			8			2		1	6	
Permitted Phases	4		4	8		8	2			6		6
Actuated Green, G (s)	58.2	58.2	58.2	38.3	38.3	38.3		36.3		48.8	48.8	48.8
Effective Green, g (s)	58.2	58.2	58.2	38.3	38.3	38.3		36.3		48.8	48.8	48.8
Actuated g/C Ratio	0.49	0.49	0.49	0.32	0.32	0.32		0.30		0.41	0.41	0.41
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)	453	783	713	308	988	393		873		327	693	509
v/s Ratio Prot	0.04	c0.21			0.07					0.01	c0.27	
v/s Ratio Perm	0.13		0.00	0.04		0.07		0.11		0.09		0.17
v/c Ratio	0.36	0.44	0.01	0.12	0.23	0.23		0.37		0.24	0.65	0.42
Uniform Delay, d1	18.2	20.2	16.0	28.9	30.0	30.1		32.9		22.6	28.8	25.5
Progression Factor	1.00	1.00	1.00	0.78	0.77	0.78		1.00		1.00	1.00	1.00
Incremental Delay, d2	0.5	1.8	0.0	0.8	0.5	1.4		1.2		0.4	4.8	2.5
Delay (s)	18.7	22.0	16.0	23.3	23.7	24.7		34.1		23.0	33.5	28.0
Level of Service	B	C	B	C	C	C		C		C	C	C
Approach Delay (s)		20.8			23.9			34.1			30.8	
Approach LOS		C			C			C			C	

Intersection Summary					
HCM 2000 Control Delay	27.5	HCM 2000 Level of Service	C		
HCM 2000 Volume to Capacity ratio	0.61				
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	26.0		
Intersection Capacity Utilization	105.0%	ICU Level of Service	G		
Analysis Period (min)	15				

c Critical Lane Group

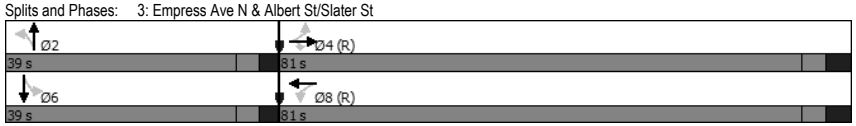
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	22	394	9	9	265	18	2	0	6	41	0	51
Future Volume (vph)	22	394	9	9	265	18	2	0	6	41	0	51
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (m)	3.7	3.4	3.5	3.7	3.3	3.7	3.7	3.4	3.7	3.7	3.4	3.7
Storage Length (m)	0.0		45.0	0.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	0		1	0		0	0		0	0		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	0.95	0.95	1.00	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		1.00	0.96		1.00			0.98			0.99	
Frt			0.850		0.991			0.895			0.925	
Flt Protected		0.997			0.998			0.989			0.978	
Satd. Flow (prot)	0	3123	1351	0	2984	0	0	1383	0	0	1543	0
Flt Permitted		0.922			0.938			0.964			0.872	
Satd. Flow (perm)	0	2885	1291	0	2804	0	0	1346	0	0	1373	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			30		10			37			51	
Link Speed (k/h)		50			50			40			40	
Link Distance (m)		175.2			39.3			118.9			51.7	
Travel Time (s)		12.6			2.8			10.7			4.7	
Confl. Peds. (#/hr)	13		9	9		13	8		5	5		8
Confl. Bikes (#/hr)			1									
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	2%	7%	12%	0%	10%	2%	50%	2%	0%	2%	2%	2%
Adj. Flow (vph)	24	438	10	10	294	20	2	0	7	46	0	57
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	462	10	0	324	0	0	9	0	0	103	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.4			3.4			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	1.06	1.10	1.09	1.06	1.12	1.06	1.06	1.10	1.06	1.06	1.10	1.06
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2			6		
Minimum Split (s)	81.0	81.0	81.0	81.0	81.0		39.0	39.0		39.0	39.0	
Total Split (s)	81.0	81.0	81.0	81.0	81.0		39.0	39.0		39.0	39.0	
Total Split (%)	67.5%	67.5%	67.5%	67.5%	67.5%		32.5%	32.5%		32.5%	32.5%	
Maximum Green (s)	73.9	73.9	73.9	73.9	73.9		32.7	32.7		32.7	32.7	
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3		3.3	3.3		3.3	3.3	
All-Red Time (s)	3.8	3.8	3.8	3.8	3.8		3.0	3.0		3.0	3.0	
Lost Time Adjust (s)		0.0	0.0		0.0			0.0			0.0	
Total Lost Time (s)		7.1	7.1		7.1			6.3			6.3	
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	7.0	7.0	7.0	7.0	7.0		10.0	10.0		10.0	10.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Flash Dont Walk (s)	15.0	15.0	15.0	15.0	15.0		22.7	22.7		22.7	22.7	
Pedestrian Calls (#/hr)	0	0	0	0	0		0	0		0	0	
Act Effct Green (s)		73.9	73.9		73.9			32.7			32.7	
Actuated g/C Ratio		0.62	0.62		0.62			0.27			0.27	
v/c Ratio		0.26	0.01		0.19			0.02			0.25	
Control Delay		5.3	0.0		10.0			0.1			19.9	
Queue Delay		0.0	0.0		0.0			0.0			0.0	
Total Delay		5.3	0.0		10.0			0.1			19.9	
LOS		A	A		B			A			B	
Approach Delay		5.2			10.0			0.1			19.9	
Approach LOS		A			B			A			B	
Queue Length 50th (m)		9.7	0.0		15.7			0.0			9.3	
Queue Length 95th (m)		12.5	m0.0		22.4			0.0			23.7	
Internal Link Dist (m)		151.2			15.3			94.9			27.7	
Turn Bay Length (m)			45.0									
Base Capacity (vph)		1776	806		1730			393			411	
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		0.26	0.01		0.19			0.02			0.25	

Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 87 (73%), Referenced to phase 4:EBTL and 8:WBTL, Start of Green			
Natural Cycle: 120			
Control Type: Pretimed			
Maximum v/c Ratio: 0.26			
Intersection Signal Delay: 8.5		Intersection LOS: A	
Intersection Capacity Utilization 167.5%		ICU Level of Service H	
Analysis Period (min) 15			

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

Splits and Phases: 3: Empress Ave N & Albert St/Slater St



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	22	394	9	9	265	18	2	0	6	41	0	51
Future Volume (vph)	22	394	9	9	265	18	2	0	6	41	0	51
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	3.7	3.4	3.5	3.7	3.3	3.7	3.7	3.4	3.7	3.7	3.4	3.7
Total Lost time (s)		7.1	7.1		7.1			6.3			6.3	
Lane Util. Factor		0.95	1.00		0.95			1.00			1.00	
Frpb, ped/bikes		1.00	0.96		1.00			0.99			0.99	
Flpb, ped/bikes		1.00	1.00		1.00			1.00			1.00	
Frt		1.00	0.85		0.99			0.90			0.93	
Flt Protected		1.00	1.00		1.00			0.99			0.98	
Satd. Flow (prot)		3121	1291		2984			1381			1540	
Flt Permitted		0.92	1.00		0.94			0.96			0.87	
Satd. Flow (perm)		2886	1291		2803			1346			1372	
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)	24	438	10	10	294	20	2	0	7	46	0	57
RTOR Reduction (vph)	0	0	4	0	4	0	0	7	0	0	37	0
Lane Group Flow (vph)	0	462	6	0	320	0	0	2	0	0	66	0
Confl. Peds. (#/hr)	13		9	9		13	8		5	5		8
Confl. Bikes (#/hr)			1									
Heavy Vehicles (%)	2%	7%	12%	0%	10%	2%	50%	2%	0%	2%	2%	2%
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)		73.9	73.9		73.9			32.7			32.7	
Effective Green, g (s)		73.9	73.9		73.9			32.7			32.7	
Actuated g/C Ratio		0.62	0.62		0.62			0.27			0.27	
Clearance Time (s)		7.1	7.1		7.1			6.3			6.3	
Lane Grp Cap (vph)		1777	795		1726			366			373	
v/s Ratio Prot												
v/s Ratio Perm		c0.16	0.00		0.11			0.00			c0.05	
v/c Ratio		0.26	0.01		0.19			0.01			0.18	
Uniform Delay, d1		10.5	8.9		10.0			31.8			33.4	
Progression Factor		0.47	0.00		1.00			1.00			1.00	
Incremental Delay, d2		0.3	0.0		0.2			0.0			1.0	
Delay (s)		5.3	0.0		10.2			31.8			34.4	
Level of Service		A	A		B			C			C	
Approach Delay (s)		5.2			10.2			31.8			34.4	
Approach LOS		A			B			C			C	

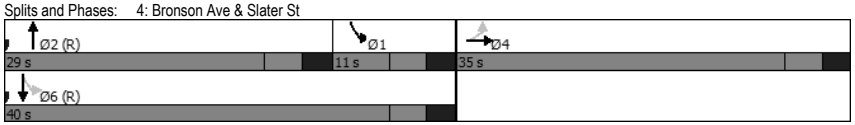
Intersection Summary				
HCM 2000 Control Delay	10.6	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.23			
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	13.4	
Intersection Capacity Utilization	167.5%	ICU Level of Service	H	
Analysis Period (min)	15			
c Critical Lane Group				

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	25	320	28	0	0	0	0	225	118	34	161	0
Future Volume (vph)	25	320	28	0	0	0	0	225	118	34	161	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (m)	3.7	3.3	3.7	3.7	3.7	3.7	3.7	3.5	3.7	3.6	3.8	3.7
Storage Length (m)	0.0		0.0	0.0		0.0	0.0		0.0	20.0		0.0
Storage Lanes	0		0	0		0	0		0	1		0
Taper Length (m)	2.5			2.5			2.5			8.0		
Lane Util. Factor	0.95	0.95	0.95	1.00	1.00	1.00	1.00	0.95	0.95	1.00	1.00	1.00
Ped Bike Factor		1.00						0.99		0.99		
Frt		0.989						0.948				
Flt Protected		0.997								0.950		
Satd. Flow (prot)	0	3060	0	0	0	0	0	2863	0	1315	1628	0
Flt Permitted		0.997								0.517		
Satd. Flow (perm)	0	3055	0	0	0	0	0	2863	0	707	1628	0
Right Turn on Red			Yes			Yes			No			Yes
Satd. Flow (RTOR)		13										
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		115.0			115.8			103.4			50.3	
Travel Time (s)		8.3			8.3			7.4			3.6	
Confl. Peds. (#/hr)	16		6	6		16	9		18	18		9
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	5%	7%	0%	2%	2%	2%	2%	8%	16%	30%	13%	2%
Adj. Flow (vph)	28	356	31	0	0	0	0	250	131	38	179	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	415	0	0	0	0	0	381	0	38	179	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	1.06	1.12	1.06	1.06	1.06	1.06	1.06	1.09	1.06	1.07	1.04	1.06
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Turn Type	Perm	NA						NA		pm+pt	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4									6		
Minimum Split (s)	35.0	35.0						29.0		11.0	40.0	
Total Split (s)	35.0	35.0						29.0		11.0	40.0	
Total Split (%)	46.7%	46.7%						38.7%		14.7%	53.3%	
Maximum Green (s)	29.1	29.1						23.0		5.0	34.0	
Yellow Time (s)	3.3	3.3						3.3		3.3	3.3	
All-Red Time (s)	2.6	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		
Walk Time (s)	7.0	7.0						13.0			13.0	
Flash Dont Walk (s)	7.0	7.0						7.0			7.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Pedestrian Calls (#/hr)	0	0						0			0	
Act Effct Green (s)		29.1						23.0		34.0	34.0	
Actuated g/C Ratio		0.39						0.31		0.45	0.45	
v/c Ratio		0.35						0.43		0.11	0.24	
Control Delay		16.7						22.7		13.0	13.7	
Queue Delay		0.0						0.0		0.0	0.0	
Total Delay		16.7						22.7		13.0	13.7	
LOS		B						C		B	B	
Approach Delay		16.7						22.7			13.6	
Approach LOS		B						C			B	
Queue Length 50th (m)		20.5						22.4		2.9	14.9	
Queue Length 95th (m)		31.0						34.2		7.7	27.0	
Internal Link Dist (m)		91.0			91.8			79.4			26.3	
Turn Bay Length (m)										20.0		
Base Capacity (vph)		1193						877		361	738	
Starvation Cap Reductn		0						0		0	0	
Spillback Cap Reductn		0						0		0	0	
Storage Cap Reductn		0						0		0	0	
Reduced v/c Ratio		0.35						0.43		0.11	0.24	

Intersection Summary			
Area Type:	Other		
Cycle Length: 75			
Actuated Cycle Length: 75			
Offset: 16 (21%), Referenced to phase 2:NBT and 6:SBTL, Start of Green			
Natural Cycle: 75			
Control Type: Pretimed			
Maximum v/c Ratio: 0.43			
Intersection Signal Delay: 18.3		Intersection LOS: B	
Intersection Capacity Utilization 62.5%		ICU Level of Service B	
Analysis Period (min) 15			

Splits and Phases: 4: Bronson Ave & Slater St



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	25	320	28	0	0	0	0	225	118	34	161	0
Future Volume (vph)	25	320	28	0	0	0	0	225	118	34	161	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	3.7	3.3	3.7	3.7	3.7	3.7	3.7	3.5	3.7	3.6	3.8	3.7
Total Lost time (s)		5.9						6.0		6.0	6.0	
Lane Util. Factor		0.95						0.95		1.00	1.00	
Frpb, ped/bikes		1.00						0.99		1.00	1.00	
Flpb, ped/bikes		1.00						1.00		0.99	1.00	
Frt		0.99						0.95		1.00	1.00	
Flt Protected		1.00						1.00		0.95	1.00	
Satd. Flow (prot)		3053						2865		1308	1628	
Flt Permitted		1.00						1.00		0.52	1.00	
Satd. Flow (perm)		3053						2865		711	1628	
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)	28	356	31	0	0	0	0	250	131	38	179	0
RTOR Reduction (vph)	0	8	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	407	0	0	0	0	0	381	0	38	179	0
Confl. Peds. (#/hr)	16		6	6		16	9		18	18		9
Heavy Vehicles (%)	5%	7%	0%	2%	2%	2%	2%	8%	16%	30%	13%	2%
Turn Type	Perm	NA						NA		pm+pt	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4									6		
Actuated Green, G (s)		29.1						23.0		34.0	34.0	
Effective Green, g (s)		29.1						23.0		34.0	34.0	
Actuated g/C Ratio		0.39						0.31		0.45	0.45	
Clearance Time (s)		5.9						6.0		6.0	6.0	
Lane Grp Cap (vph)		1184						878		362	738	
v/s Ratio Prot								c0.13		0.01	c0.11	
v/s Ratio Perm		0.13								0.04		
v/c Ratio		0.34						0.43		0.10	0.24	
Uniform Delay, d1		16.2						20.8		12.1	12.6	
Progression Factor		1.00						1.00		1.00	1.00	
Incremental Delay, d2		0.8						1.6		0.6	0.8	
Delay (s)		17.0						22.4		12.7	13.4	
Level of Service		B						C		B	B	
Approach Delay (s)		17.0			0.0			22.4			13.3	
Approach LOS		B			A			C			B	

Intersection Summary					
HCM 2000 Control Delay	18.2	HCM 2000 Level of Service		B	
HCM 2000 Volume to Capacity ratio	0.38				
Actuated Cycle Length (s)	75.0	Sum of lost time (s)		17.9	
Intersection Capacity Utilization	62.5%	ICU Level of Service		B	
Analysis Period (min)	15				

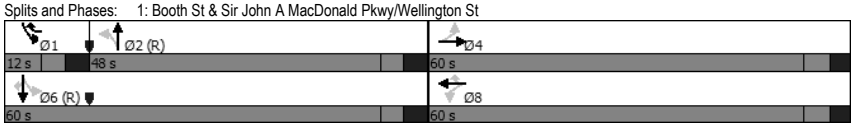
c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	35	62	0	32	389	415	18	680	30	183	745	12
Future Volume (vph)	35	62	0	32	389	415	18	680	30	183	745	12
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (m)	3.7	3.4	3.7	3.7	3.4	3.4	3.7	3.5	3.5	3.3	3.8	3.7
Storage Length (m)	0.0		0.0	0.0		90.0	0.0		0.0	135.0		63.0
Storage Lanes	0		0	0		1	0		0	1		1
Taper Length (m)	2.5			2.5			2.5			30.0		
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	1.00	0.95	0.95	0.95	1.00	0.95	1.00
Ped Bike Factor		1.00			1.00	0.98		1.00		1.00		0.98
Frt						0.850		0.994				0.850
Flt Protected		0.982			0.996			0.999		0.950		
Satd. Flow (prot)	0	2879	0	0	3212	1481	0	3198	0	1653	3461	1547
Flt Permitted		0.634			0.917			0.917		0.233		
Satd. Flow (perm)	0	1856	0	0	2953	1449	0	2936	0	405	3461	1522
Right Turn on Red			Yes			No			Yes			Yes
Satd. Flow (RTOR)								4				35
Link Speed (k/h)		60			60			50			50	
Link Distance (m)		199.5			146.4			401.6			200.6	
Travel Time (s)		12.0			8.8			28.9			14.4	
Confl. Peds. (#/hr)	8		16	16		8	3		1	1		3
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	0%	22%	0%	0%	4%	1%	2%	3%	0%	0%	1%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	10	10	0	0	0
Adj. Flow (vph)	39	69	0	36	432	461	20	756	33	203	828	13
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	108	0	0	468	461	0	809	0	203	828	13
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.3			3.3	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	1.06	1.10	1.06	1.06	1.10	1.10	1.06	1.12	1.09	1.12	1.04	1.06
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	0		1	0	0	1	0		1	0	0
Detector Template	Left			Left			Left			Left		
Leading Detector (m)	2.0	0.0		6.1	0.0	0.0	6.1	0.0		6.1	0.0	0.0
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6		6.1	0.6	2.0	6.1	1.8		6.1	1.8	6.1
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Turn Type	Perm	NA		Perm	NA	pm+ov	Perm	NA		pm+pt	NA	Perm
Protected Phases		4			8	1		2		1	6	
Permitted Phases	4			8		8	2			6		6

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	4	4		8	8	1	2	2		1	6	6
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0	5.0	10.0	10.0		5.0	1.0	1.0
Minimum Split (s)	35.8	35.8		35.8	35.8	11.8	31.8	31.8		11.8	31.8	31.8
Total Split (s)	60.0	60.0		60.0	60.0	12.0	48.0	48.0		12.0	60.0	60.0
Total Split (%)	50.0%	50.0%		50.0%	50.0%	10.0%	40.0%	40.0%		10.0%	50.0%	50.0%
Maximum Green (s)	53.2	53.2		53.2	53.2	5.2	41.2	41.2		5.2	53.2	53.2
Yellow Time (s)	3.7	3.7		3.7	3.7	3.3	3.3	3.3		3.3	3.3	3.3
All-Red Time (s)	3.1	3.1		3.1	3.1	3.5	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	Lag		Lead		
Lead-Lag Optimize?						Yes	Yes	Yes		Yes		
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None		None	None	None	C-Max	C-Max		None	C-Max	C-Max
Walk Time (s)	10.0	10.0		10.0	10.0		10.0	10.0			10.0	10.0
Flash Dont Walk (s)	19.0	19.0		19.0	19.0		15.0	15.0			15.0	15.0
Pedestrian Calls (#/hr)	0	0		0	0		0	0			0	0
Act Effct Green (s)		24.9			24.9	44.8		54.8		81.5	81.5	81.5
Actuated g/C Ratio		0.21			0.21	0.37		0.46		0.68	0.68	0.68
v/c Ratio		0.28			0.76	0.84		0.60		0.42	0.35	0.01
Control Delay		40.6			53.0	44.4		23.9		10.6	9.2	0.3
Queue Delay		0.0			0.0	0.0		0.0		0.0	0.0	0.0
Total Delay		40.6			53.0	44.4		23.9		10.6	9.2	0.3
LOS		D			D	D		C		B	A	A
Approach Delay		40.6			48.7			23.9			9.3	
Approach LOS		D			D			C			A	
Queue Length 50th (m)		11.3			55.1	90.4		69.4		15.9	39.3	0.0
Queue Length 95th (m)		18.5			68.6	108.5		109.9		30.0	59.2	0.5
Internal Link Dist (m)		175.5			122.4			377.6			176.6	
Turn Bay Length (m)						90.0				135.0		63.0
Base Capacity (vph)		822			1309	546		1343		481	2349	1044
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		0.13			0.36	0.84		0.60		0.42	0.35	0.01

Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 3 (3%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 80			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.84			
Intersection Signal Delay: 27.2		Intersection LOS: C	
Intersection Capacity Utilization 91.3%		ICU Level of Service F	
Analysis Period (min) 15			

Splits and Phases: 1: Booth St & Sir John A MacDonald Pkwy/Wellington St



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	35	62	0	32	389	415	18	680	30	183	745	12
Future Volume (vph)	35	62	0	32	389	415	18	680	30	183	745	12
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	3.7	3.4	3.7	3.7	3.4	3.4	3.7	3.5	3.5	3.3	3.8	3.7
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
Frpb, ped/bikes		1.00			1.00	0.99		1.00		1.00	1.00	0.98
Flpb, ped/bikes		1.00			1.00	1.00		1.00		1.00	1.00	1.00
Frt		1.00			1.00	0.85		0.99		1.00	1.00	0.85
Flt Protected		0.98			1.00	1.00		1.00		0.95	1.00	1.00
Satd. Flow (prot)		2875			3208	1463		3197		1653	3461	1522
Flt Permitted		0.63			0.92	1.00		0.92		0.23	1.00	1.00
Satd. Flow (perm)		1856			2952	1463		2935		405	3461	1522
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)	39	69	0	36	432	461	20	756	33	203	828	13
RTOR Reduction (vph)	0	0	0	0	0	0	0	2	0	0	0	4
Lane Group Flow (vph)	0	108	0	0	468	461	0	807	0	203	828	9
Confl. Peds. (#/hr)	8		16	16		8	3		1	1		3
Heavy Vehicles (%)	0%	22%	0%	0%	4%	1%	2%	3%	0%	0%	1%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	10	10	0	0	0
Turn Type	Perm	NA		Perm	NA	pm+ov	Perm	NA		pm+pt	NA	Perm
Protected Phases		4			8	1		2		1	6	
Permitted Phases	4			8		8	2			6		6
Actuated Green, G (s)		24.9			24.9	44.8		54.8		81.5	81.5	81.5
Effective Green, g (s)		24.9			24.9	44.8		54.8		81.5	81.5	81.5
Actuated g/C Ratio		0.21			0.21	0.37		0.46		0.68	0.68	0.68
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)		385			612	629		1340		482	2350	1033
v/s Ratio Prot						c0.12				0.07	0.24	
v/s Ratio Perm		0.06			0.16	0.19		c0.27		0.22		0.01
v/c Ratio		0.28			0.76	0.73		0.60		0.42	0.35	0.01
Uniform Delay, d1		40.0			44.8	32.4		24.4		9.6	8.1	6.2
Progression Factor		1.00			1.00	1.00		0.86		1.00	1.00	1.00
Incremental Delay, d2		0.4			5.7	4.4		1.6		0.6	0.4	0.0
Delay (s)		40.4			50.5	36.8		22.5		10.2	8.5	6.2
Level of Service		D			D	D		C		B	A	A
Approach Delay (s)		40.4			43.7			22.5			8.8	
Approach LOS		D			D			C			A	

Intersection Summary			
HCM 2000 Control Delay	25.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	20.4
Intersection Capacity Utilization	91.3%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	296	248	17	72	435	175	13	406	71	139	393	233
Future Volume (vph)	296	248	17	72	435	175	13	406	71	139	393	233
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (m)	3.4	3.4	3.6	3.4	3.4	3.4	3.7	3.2	3.7	3.3	3.3	3.5
Storage Length (m)	150.0		42.0	38.0		87.0	0.0		44.0	0.0		56.0
Storage Lanes	1		1	1		1	0		0	1		1
Taper Length (m)	40.0			45.0			2.5			2.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	1.00	0.95	0.95	0.95	1.00	1.00	1.00
Ped Bike Factor	1.00		0.96	0.99		0.98		0.99		0.99		0.94
Frt			0.850			0.850		0.978				0.850
Flt Protected	0.950			0.950				0.999		0.950		
Satd. Flow (prot)	1592	1692	1530	1592	3278	1481	0	3135	0	1589	1740	1363
Flt Permitted	0.321			0.590				0.936		0.265		
Satd. Flow (perm)	536	1692	1472	977	3278	1446	0	2935	0	437	1740	1275
Right Turn on Red			Yes			No			Yes			No
Satd. Flow (RTOR)			91					16				
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		185.1			175.2			57.0			401.6	
Travel Time (s)		13.3			12.6			4.1			28.9	
Confl. Peds. (#/hr)	10		9	9		10	45		36	36		45
Confl. Bikes (#/hr)									2			
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	5%	4%	0%	5%	2%	1%	8%	1%	0%	4%	0%	11%
Adj. Flow (vph)	329	276	19	80	483	194	14	451	79	154	437	259
Shared Lane Traffic (%)												
Lane Group Flow (vph)	329	276	19	80	483	194	0	544	0	154	437	259
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.4			3.4			3.3			3.3	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	1.10	1.10	1.07	1.10	1.10	1.10	1.06	1.14	1.06	1.12	1.12	1.09
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	0	0	0	0	0	1	0		1	0	0
Detector Template	Left						Left			Left		
Leading Detector (m)	6.1	0.0	0.0	0.0	0.0	0.0	6.1	0.0		6.1	0.0	0.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Size(m)	6.1	1.8	6.1	6.1	1.8	6.1	6.1	1.8		6.1	1.8	6.1
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Turn Type	pm+pt	NA	Perm	Perm	NA	Perm	Perm	NA		pm+pt	NA	Perm
Protected Phases	7	4			8			2		1	6	
Permitted Phases	4		4	8		8	2			6		6

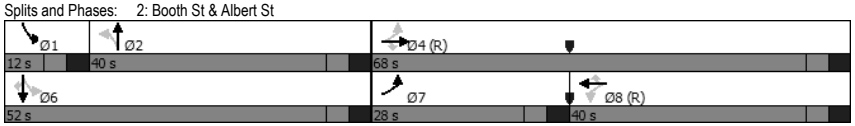
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4	4	8	8	8	2	2		1	6	6
Switch Phase												
Minimum Initial (s)	5.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0		5.0	10.0	10.0
Minimum Split (s)	11.5	36.5	36.5	36.5	36.5	36.5	36.5	36.5		11.5	36.5	36.5
Total Split (s)	28.0	68.0	68.0	40.0	40.0	40.0	40.0	40.0		12.0	52.0	52.0
Total Split (%)	23.3%	56.7%	56.7%	33.3%	33.3%	33.3%	33.3%	33.3%		10.0%	43.3%	43.3%
Maximum Green (s)	21.5	61.5	61.5	33.5	33.5	33.5	33.5	33.5		5.5	45.5	45.5
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3		3.3	3.3	3.3
All-Red Time (s)	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2		3.2	3.2	3.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0		0.0		0.0	0.0	0.0
Total Lost Time (s)	6.5	6.5	6.5	6.5	6.5	6.5		6.5		6.5	6.5	6.5
Lead/Lag	Lead			Lag	Lag	Lag	Lag	Lag		Lead		
Lead-Lag Optimize?	Yes			Yes	Yes	Yes	Yes	Yes		Yes		
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Recall Mode	None	C-Max	C-Max	C-Max	C-Max	C-Max	Max	Max		None	Max	Max
Walk Time (s)		7.0	7.0	7.0	7.0	7.0	7.0	7.0			7.0	7.0
Flash Dont Walk (s)		23.0	23.0	23.0	23.0	23.0	23.0	23.0			23.0	23.0
Pedestrian Calls (#/hr)		0	0	0	0	0	0	0			0	0
Act Effct Green (s)	61.5	61.5	61.5	35.9	35.9	35.9		33.5		45.5	45.5	45.5
Actuated g/C Ratio	0.51	0.51	0.51	0.30	0.30	0.30		0.28		0.38	0.38	0.38
v/c Ratio	0.74	0.32	0.02	0.27	0.49	0.45		0.66		0.71	0.66	0.54
Control Delay	29.4	18.3	0.1	25.8	26.5	28.2		41.4		55.5	46.6	43.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0		0.0		0.0	0.0	0.0
Total Delay	29.4	18.3	0.1	25.8	26.5	28.2		41.4		55.5	46.6	43.2
LOS	C	B	A	C	C	C		D		E	D	D
Approach Delay		23.6			26.8			41.4			47.2	
Approach LOS		C			C			D			D	
Queue Length 50th (m)	46.0	36.6	0.0	14.9	50.6	38.1		57.8		31.4	106.1	59.3
Queue Length 95th (m)	68.0	55.0	0.0	29.2	68.0	61.2		77.0		#58.2	139.6	90.0
Internal Link Dist (m)		161.1			151.2			33.0			377.6	
Turn Bay Length (m)	150.0		42.0	38.0		87.0						56.0
Base Capacity (vph)	463	867	798	292	980	432		830		218	659	483
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	0.71	0.32	0.02	0.27	0.49	0.45		0.66		0.71	0.66	0.54

Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 9 (8%), Referenced to phase 4:EBTL and 8:WBTL, Start of Green			
Natural Cycle: 100			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.74			
Intersection Signal Delay: 35.2		Intersection LOS: D	
Intersection Capacity Utilization 114.0%		ICU Level of Service H	
Analysis Period (min) 15			

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 2: Booth St & Albert St



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	296	248	17	72	435	175	13	406	71	139	393	233
Future Volume (vph)	296	248	17	72	435	175	13	406	71	139	393	233
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	3.4	3.4	3.6	3.4	3.4	3.4	3.7	3.2	3.7	3.3	3.3	3.5
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
Frpb, ped/bikes	1.00	1.00	0.96	1.00	1.00	0.98		0.99		1.00	1.00	0.94
Flpb, ped/bikes	1.00	1.00	1.00	0.99	1.00	1.00		1.00		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)	1590	1692	1472	1573	3278	1446		3132		1584	1740	1275
Flt Permitted	0.32	1.00	1.00	0.59	1.00	1.00		0.94		0.27	1.00	1.00
Satd. Flow (perm)	537	1692	1472	977	3278	1446		2937		442	1740	1275
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)	329	276	19	80	483	194	14	451	79	154	437	259
RTOR Reduction (vph)	0	0	9	0	0	0	0	12	0	0	0	0
Lane Group Flow (vph)	329	276	10	80	483	194	0	532	0	154	437	259
Confl. Peds. (#/hr)	10		9	9		10	45		36	36		45
Confl. Bikes (#/hr)									2			
Heavy Vehicles (%)	5%	4%	0%	5%	2%	1%	8%	1%	0%	4%	0%	11%
Turn Type	pm+pt	NA	Perm	Perm	NA	Perm	Perm	NA		pm+pt	NA	Perm
Protected Phases	7	4			8			2		1	6	
Permitted Phases	4		4	8		8	2			6		6
Actuated Green, G (s)	61.5	61.5	61.5	35.9	35.9	35.9		33.5		45.5	45.5	45.5
Effective Green, g (s)	61.5	61.5	61.5	35.9	35.9	35.9		33.5		45.5	45.5	45.5
Actuated g/C Ratio	0.51	0.51	0.51	0.30	0.30	0.30		0.28		0.38	0.38	0.38
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)	442	867	754	292	980	432		819		219	659	483
v/s Ratio Prot	c0.12	0.16			0.15					0.03	c0.25	
v/s Ratio Perm	c0.26		0.01	0.08		0.13		0.18		c0.23		0.20
v/c Ratio	0.74	0.32	0.01	0.27	0.49	0.45		0.65		0.70	0.66	0.54
Uniform Delay, d1	19.3	17.0	14.4	32.1	34.6	34.0		38.1		31.4	30.9	29.0
Progression Factor	1.00	1.00	1.00	0.69	0.70	0.70		1.00		1.34	1.32	1.31
Incremental Delay, d2	6.7	1.0	0.0	2.2	1.7	3.1		4.0		9.4	5.0	4.0
Delay (s)	26.0	18.0	14.4	24.3	25.9	27.1		42.1		51.3	45.6	42.1
Level of Service	C	B	B	C	C	C		D		D	D	D
Approach Delay (s)		22.1			26.0			42.1			45.6	
Approach LOS		C			C			D			D	

Intersection Summary					
HCM 2000 Control Delay	34.3	HCM 2000 Level of Service	C		
HCM 2000 Volume to Capacity ratio	0.80				
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	26.0		
Intersection Capacity Utilization	114.0%	ICU Level of Service	H		
Analysis Period (min)	15				

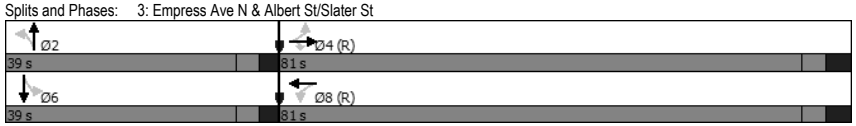
c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	42	353	1	2	648	34	5	0	11	25	0	29
Future Volume (vph)	42	353	1	2	648	34	5	0	11	25	0	29
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (m)	3.7	3.4	3.5	3.7	3.3	3.7	3.7	3.4	3.7	3.7	3.4	3.7
Storage Length (m)	0.0		45.0	0.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	0		1	0		0	0		0	0		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	0.95	0.95	1.00	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		1.00	0.96		1.00			0.98			0.98	
Frt			0.850		0.992			0.910			0.928	
Flt Protected		0.995						0.984			0.977	
Satd. Flow (prot)	0	3234	756	0	3201	0	0	1457	0	0	1541	0
Flt Permitted		0.797			0.954			0.938			0.881	
Satd. Flow (perm)	0	2585	723	0	3054	0	0	1382	0	0	1384	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			30		8			37			37	
Link Speed (k/h)		50			50			40			40	
Link Distance (m)		175.2			39.3			118.9			51.7	
Travel Time (s)		12.6			2.8			10.7			4.7	
Confl. Peds. (#/hr)	25		9	9		25	15		8	8		15
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	2%	3%	100%	0%	2%	2%	0%	2%	10%	2%	2%	2%
Adj. Flow (vph)	47	392	1	2	720	38	6	0	12	28	0	32
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	439	1	0	760	0	0	18	0	0	60	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.4			3.4			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	1.06	1.10	1.09	1.06	1.12	1.06	1.06	1.10	1.06	1.06	1.10	1.06
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2			6		
Minimum Split (s)	29.1	29.1	29.1	29.1	29.1		39.0	39.0		39.0	39.0	
Total Split (s)	81.0	81.0	81.0	81.0	81.0		39.0	39.0		39.0	39.0	
Total Split (%)	67.5%	67.5%	67.5%	67.5%	67.5%		32.5%	32.5%		32.5%	32.5%	
Maximum Green (s)	73.9	73.9	73.9	73.9	73.9		32.7	32.7		32.7	32.7	
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3		3.3	3.3		3.3	3.3	
All-Red Time (s)	3.8	3.8	3.8	3.8	3.8		3.0	3.0		3.0	3.0	
Lost Time Adjust (s)		0.0	0.0		0.0			0.0			0.0	
Total Lost Time (s)		7.1	7.1		7.1			6.3			6.3	
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	7.0	7.0	7.0	7.0	7.0		10.0	10.0		10.0	10.0	
Flash Dont Walk (s)	15.0	15.0	15.0	15.0	15.0		22.7	22.7		22.7	22.7	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Pedestrian Calls (#/hr)	0	0	0	0	0		0	0		0	0	
Act Effct Green (s)		73.9	73.9		73.9			32.7			32.7	
Actuated g/C Ratio		0.62	0.62		0.62			0.27			0.27	
v/c Ratio		0.28	0.00		0.40			0.04			0.15	
Control Delay		10.2	0.0		12.4			3.7			16.9	
Queue Delay		0.0	0.0		0.0			0.0			0.0	
Total Delay		10.2	0.0		12.4			3.7			16.9	
LOS		B	A		B			A			B	
Approach Delay		10.2			12.4			3.7			16.9	
Approach LOS		B			B			A			B	
Queue Length 50th (m)		28.0	0.0		44.5			0.0			4.0	
Queue Length 95th (m)		28.7	m0.0		57.0			2.3			14.6	
Internal Link Dist (m)		151.2			15.3			94.9			27.7	
Turn Bay Length (m)			45.0									
Base Capacity (vph)		1591	456		1883			403			404	
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	0.00		0.40			0.04			0.15	

Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 87 (73%), Referenced to phase 4:EBTL and 8:WBTL, Start of Green			
Natural Cycle: 70			
Control Type: Pretimed			
Maximum v/c Ratio: 0.40			
Intersection Signal Delay: 11.7		Intersection LOS: B	
Intersection Capacity Utilization 82.9%		ICU Level of Service E	
Analysis Period (min) 15			
m Volume for 95th percentile queue is metered by upstream signal.			

Splits and Phases: 3: Empress Ave N & Albert St/Slater St



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	42	353	1	2	648	34	5	0	11	25	0	29
Future Volume (vph)	42	353	1	2	648	34	5	0	11	25	0	29
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	3.7	3.4	3.5	3.7	3.3	3.7	3.7	3.4	3.7	3.7	3.4	3.7
Total Lost time (s)		7.1	7.1		7.1			6.3			6.3	
Lane Util. Factor		0.95	1.00		0.95			1.00			1.00	
Frpb, ped/bikes		1.00	0.96		1.00			0.99			0.98	
Flpb, ped/bikes		1.00	1.00		1.00			0.99			1.00	
Frt		1.00	0.85		0.99			0.91			0.93	
Flt Protected		0.99	1.00		1.00			0.98			0.98	
Satd. Flow (prot)		3226	723		3203			1449			1535	
Flt Permitted		0.80	1.00		0.95			0.94			0.88	
Satd. Flow (perm)		2584	723		3057			1382			1384	
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)	47	392	1	2	720	38	6	0	12	28	0	32
RTOR Reduction (vph)	0	0	0	0	3	0	0	13	0	0	27	0
Lane Group Flow (vph)	0	439	1	0	757	0	0	5	0	0	33	0
Confl. Peds. (#/hr)	25		9	9		25	15		8	8		15
Heavy Vehicles (%)	2%	3%	100%	0%	2%	2%	0%	2%	10%	2%	2%	2%
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)		73.9	73.9		73.9			32.7			32.7	
Effective Green, g (s)		73.9	73.9		73.9			32.7			32.7	
Actuated g/C Ratio		0.62	0.62		0.62			0.27			0.27	
Clearance Time (s)		7.1	7.1		7.1			6.3			6.3	
Lane Grp Cap (vph)		1591	445		1882			376			377	
v/s Ratio Prot												
v/s Ratio Perm		0.17	0.00		c0.25			0.00			c0.02	
v/c Ratio		0.28	0.00		0.40			0.01			0.09	
Uniform Delay, d1		10.7	8.9		11.8			31.9			32.5	
Progression Factor		0.91	1.00		1.00			1.00			1.00	
Incremental Delay, d2		0.4	0.0		0.6			0.1			0.5	
Delay (s)		10.1	8.9		12.4			31.9			33.0	
Level of Service		B	A		B			C			C	
Approach Delay (s)		10.1			12.4			31.9			33.0	
Approach LOS		B			B			C			C	

Intersection Summary				
HCM 2000 Control Delay	12.8	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.31			
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	13.4	
Intersection Capacity Utilization	82.9%	ICU Level of Service	E	
Analysis Period (min)	15			

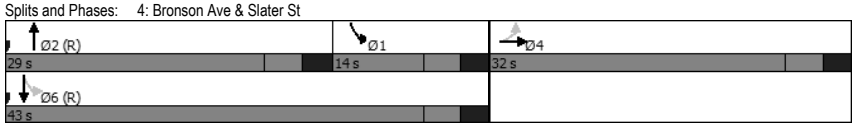
c Critical Lane Group

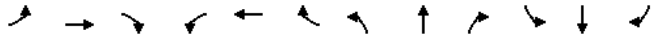
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	13	236	20	0	0	0	0	387	101	27	303	0
Future Volume (vph)	13	236	20	0	0	0	0	387	101	27	303	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (m)	3.7	3.3	3.7	3.7	3.7	3.7	3.7	3.5	3.7	3.6	3.8	3.7
Storage Length (m)	0.0		0.0	0.0		0.0	0.0		0.0	20.0		0.0
Storage Lanes	0		0	0		0	0		0	1		0
Taper Length (m)	2.5			2.5			2.5			8.0		
Lane Util. Factor	0.95	0.95	0.95	1.00	1.00	1.00	1.00	0.95	0.95	1.00	1.00	1.00
Ped Bike Factor		1.00						0.99		0.99		
Frt		0.989						0.969				
Flt Protected		0.998								0.950		
Satd. Flow (prot)	0	3144	0	0	0	0	0	3175	0	1644	1769	0
Flt Permitted		0.998								0.437		
Satd. Flow (perm)	0	3141	0	0	0	0	0	3175	0	749	1769	0
Right Turn on Red			Yes			Yes			No			Yes
Satd. Flow (RTOR)		12										
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		115.0			115.8			103.4			50.3	
Travel Time (s)		8.3			8.3			7.4			3.6	
Confl. Peds. (#/hr)	13		14	14		13	13		21	21		13
Confl. Bikes (#/hr)									1			
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	0%	4%	0%	2%	2%	2%	2%	1%	8%	4%	4%	2%
Adj. Flow (vph)	14	262	22	0	0	0	0	430	112	30	337	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	298	0	0	0	0	0	542	0	30	337	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	1.06	1.12	1.06	1.06	1.06	1.06	1.06	1.09	1.06	1.07	1.04	1.06
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	0						0		0	0	
Detector Template	Left											
Leading Detector (m)	6.1	0.0						0.0		0.0	0.0	
Trailing Detector (m)	0.0	0.0						0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0						0.0		0.0	0.0	
Detector 1 Size(m)	6.1	1.8						1.8		6.1	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex						Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0						0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0						0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0						0.0		0.0	0.0	
Turn Type	Perm	NA						NA		pm+pt	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4									6		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	4	4						2		1	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0						10.0		5.0	10.0	
Minimum Split (s)	19.9	19.9						26.0		11.0	26.0	
Total Split (s)	32.0	32.0						29.0		14.0	43.0	
Total Split (%)	42.7%	42.7%						38.7%		18.7%	57.3%	
Maximum Green (s)	26.1	26.1						23.0		8.0	37.0	
Yellow Time (s)	3.3	3.3						3.3		3.3	3.3	
All-Red Time (s)	2.6	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		
Vehicle Extension (s)	3.0	3.0						3.0		3.0	3.0	
Recall Mode	None	None						C-Max		Max	C-Max	
Walk Time (s)	7.0	7.0						13.0			13.0	
Flash Dont Walk (s)	7.0	7.0						7.0			7.0	
Pedestrian Calls (#/hr)	0	0						0			0	
Act Effct Green (s)		12.5						36.6		50.6	50.6	
Actuated g/C Ratio		0.17						0.49		0.67	0.67	
v/c Ratio		0.56						0.35		0.05	0.28	
Control Delay		31.5						13.1		5.1	6.0	
Queue Delay		0.0						0.0		0.0	0.0	
Total Delay		31.5						13.1		5.1	6.0	
LOS		C						B		A	A	
Approach Delay		31.5						13.1			5.9	
Approach LOS		C						B			A	
Queue Length 50th (m)		19.8						23.3		1.2	15.9	
Queue Length 95th (m)		29.8						37.3		4.0	31.1	
Internal Link Dist (m)		91.0			91.8			79.4			26.3	
Turn Bay Length (m)										20.0		
Base Capacity (vph)		1100						1551		600	1194	
Starvation Cap Reductn		0						0		0	0	
Spillback Cap Reductn		0						0		0	0	
Storage Cap Reductn		0						0		0	0	
Reduced v/c Ratio		0.27						0.35		0.05	0.28	

Intersection Summary			
Area Type:	Other		
Cycle Length: 75			
Actuated Cycle Length: 75			
Offset: 38 (51%), Referenced to phase 2:NBT and 6:SBTL, Start of Green			
Natural Cycle: 60			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.56			
Intersection Signal Delay: 15.5		Intersection LOS: B	
Intersection Capacity Utilization 45.1%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 4: Bronson Ave & Slater St





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	13	236	20	0	0	0	0	387	101	27	303	0
Future Volume (vph)	13	236	20	0	0	0	0	387	101	27	303	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	3.7	3.3	3.7	3.7	3.7	3.7	3.7	3.5	3.7	3.6	3.8	3.7
Total Lost time (s)		5.9						6.0		6.0	6.0	
Lane Util. Factor		0.95						0.95		1.00	1.00	
Frpb, ped/bikes		1.00						0.99		1.00	1.00	
Flpb, ped/bikes		1.00						1.00		1.00	1.00	
Frt		0.99						0.97		1.00	1.00	
Flt Protected		1.00						1.00		0.95	1.00	
Satd. Flow (prot)		3140						3175		1637	1769	
Flt Permitted		1.00						1.00		0.44	1.00	
Satd. Flow (perm)		3140						3175		753	1769	
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)	14	262	22	0	0	0	0	430	112	30	337	0
RTOR Reduction (vph)	0	10	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	288	0	0	0	0	0	542	0	30	337	0
Confl. Peds. (#/hr)	13		14	14		13	13		21	21		13
Confl. Bikes (#/hr)									1			
Heavy Vehicles (%)	0%	4%	0%	2%	2%	2%	2%	1%	8%	4%	4%	2%
Turn Type	Perm	NA						NA		pm+pt	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4									6		
Actuated Green, G (s)		12.5						36.6		50.6	50.6	
Effective Green, g (s)		12.5						36.6		50.6	50.6	
Actuated g/C Ratio		0.17						0.49		0.67	0.67	
Clearance Time (s)		5.9						6.0		6.0	6.0	
Vehicle Extension (s)		3.0						3.0		3.0	3.0	
Lane Grp Cap (vph)		523						1549		602	1193	
v/s Ratio Prot								c0.17		0.01	c0.19	
v/s Ratio Perm		0.09								0.03		
v/c Ratio		0.55						0.35		0.05	0.28	
Uniform Delay, d1		28.7						11.9		4.6	4.9	
Progression Factor		1.00						1.00		1.00	1.00	
Incremental Delay, d2		1.3						0.6		0.2	0.6	
Delay (s)		29.9						12.5		4.7	5.5	
Level of Service		C						B		A	A	
Approach Delay (s)		29.9			0.0			12.5			5.4	
Approach LOS		C			A			B			A	

Intersection Summary				
HCM 2000 Control Delay	14.6	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.40			
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	17.9	
Intersection Capacity Utilization	45.1%	ICU Level of Service	A	
Analysis Period (min)	15			

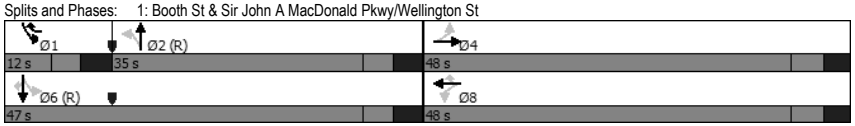
c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	6	418	0	13	66	3	5	544	26	354	544	37
Future Volume (vph)	6	418	0	13	66	3	5	544	26	354	544	37
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (m)	3.7	3.4	3.7	3.7	3.4	3.4	3.7	3.5	3.5	3.3	3.8	3.7
Storage Length (m)	0.0		0.0	0.0		90.0	0.0		0.0	135.0		63.0
Storage Lanes	0		0	0		1	0		0	1		1
Taper Length (m)	2.5			2.5			2.5			30.0		
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	1.00	0.95	0.95	0.95	1.00	0.95	1.00
Ped Bike Factor					1.00	0.98		1.00		1.00		0.99
Frt						0.850		0.993				0.850
Flt Protected		0.999			0.992					0.950		
Satd. Flow (prot)	0	3040	0	0	3184	1496	0	3324	0	1559	3394	1547
Flt Permitted		0.951			0.849			0.948		0.230		
Satd. Flow (perm)	0	2894	0	0	2723	1461	0	3151	0	377	3394	1527
Right Turn on Red			Yes			No			Yes			Yes
Satd. Flow (RTOR)								5				44
Link Speed (k/h)		60			60			50			50	
Link Distance (m)		199.5			146.4			401.6			200.6	
Travel Time (s)		12.0			8.8			28.9			14.4	
Confl. Peds. (#/hr)			7	7		12			3	3		1
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	2%	10%	4%	0%	5%	0%	2%	1%	0%	6%	3%	0%
Adj. Flow (vph)	7	464	0	14	73	3	6	604	29	393	604	41
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	471	0	0	87	3	0	639	0	393	604	41
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.3			3.3	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	1.06	1.10	1.06	1.06	1.10	1.10	1.06	1.09	1.09	1.12	1.04	1.06
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	0		1	0	0	1	0		1	0	0
Detector Template	Left			Left			Left			Left		
Leading Detector (m)	2.0	0.0		6.1	0.0	0.0	6.1	0.0		6.1	0.0	0.0
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6		6.1	0.6	2.0	6.1	1.8		6.1	1.8	6.1
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Turn Type	Perm	NA		Perm	NA	pm+ov	Perm	NA		pm+pt	NA	Perm
Protected Phases		4			8	1		2		1	6	
Permitted Phases	4			8		8	2			6		6
Detector Phase	4	4		8	8	1	2	2		1	6	6

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0	5.0	10.0	10.0		5.0	10.0	10.0
Minimum Split (s)	35.8	35.8		35.8	35.8	11.8	31.8	31.8		11.8	31.8	31.8
Total Split (s)	48.0	48.0		48.0	48.0	12.0	35.0	35.0		12.0	47.0	47.0
Total Split (%)	50.5%	50.5%		50.5%	50.5%	12.6%	36.8%	36.8%		12.6%	49.5%	49.5%
Maximum Green (s)	41.2	41.2		41.2	41.2	5.2	28.2	28.2		5.2	40.2	40.2
Yellow Time (s)	3.7	3.7		3.7	3.7	3.3	3.3	3.3		3.3	3.3	3.3
All-Red Time (s)	3.1	3.1		3.1	3.1	3.5	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	Lag		Lead		
Lead-Lag Optimize?						Yes	Yes	Yes		Yes		
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None		None	None	None	C-Max	C-Max		None	C-Max	C-Max
Walk Time (s)	10.0	10.0		10.0	10.0		10.0	10.0			10.0	10.0
Flash Dont Walk (s)	19.0	19.0		19.0	19.0		15.0	15.0			15.0	15.0
Pedestrian Calls (#/hr)	0	0		0	0		0	0			0	0
Act Effct Green (s)		21.2			21.2	46.4		28.2		60.2	60.2	60.2
Actuated g/C Ratio		0.22			0.22	0.49		0.30		0.63	0.63	0.63
v/c Ratio		0.73			0.14	0.00		0.68		0.71	0.28	0.04
Control Delay		40.8			28.6	9.3		33.6		21.6	8.8	2.7
Queue Delay		0.0			0.0	0.0		0.0		0.0	0.0	0.0
Total Delay		40.8			28.6	9.3		33.6		21.6	8.8	2.7
LOS		D			C	A		C		C	A	A
Approach Delay		40.8			27.9			33.6			13.4	
Approach LOS		D			C			C			B	
Queue Length 50th (m)		42.3			6.7	0.3		53.6		33.6	23.5	0.0
Queue Length 95th (m)		54.5			11.9	1.5		72.7		#90.9	38.3	3.9
Internal Link Dist (m)		175.5			122.4			377.6			176.6	
Turn Bay Length (m)						90.0				135.0		63.0
Base Capacity (vph)		1255			1180	722		938		552	2150	983
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		0.38			0.07	0.00		0.68		0.71	0.28	0.04

Intersection Summary			
Area Type:	Other		
Cycle Length: 95			
Actuated Cycle Length: 95			
Offset: 31 (33%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 90			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.73			
Intersection Signal Delay: 25.5		Intersection LOS: C	
Intersection Capacity Utilization 76.1%		ICU Level of Service D	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 1: Booth St & Sir John A MacDonald Pkwy/Wellington St



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	6	418	0	13	66	3	5	544	26	354	544	37
Future Volume (vph)	6	418	0	13	66	3	5	544	26	354	544	37
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	3.7	3.4	3.7	3.7	3.4	3.4	3.7	3.5	3.5	3.3	3.8	3.7
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
Frpb, ped/bikes		1.00			1.00	0.99		1.00		1.00	1.00	0.99
Flpb, ped/bikes		1.00			1.00	1.00		1.00		1.00	1.00	1.00
Frt		1.00			1.00	0.85		0.99		1.00	1.00	0.85
Flt Protected		1.00			0.99	1.00		1.00		0.95	1.00	1.00
Satd. Flow (prot)		3041			3182	1480		3323		1559	3394	1527
Flt Permitted		0.95			0.85	1.00		0.95		0.23	1.00	1.00
Satd. Flow (perm)		2894			2724	1480		3151		377	3394	1527
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)	7	464	0	14	73	3	6	604	29	393	604	41
RTOR Reduction (vph)	0	0	0	0	0	0	0	4	0	0	0	15
Lane Group Flow (vph)	0	471	0	0	87	3	0	635	0	393	604	26
Confl. Peds. (#/hr)			7	7		12			3	3		1
Heavy Vehicles (%)	2%	10%	4%	0%	5%	0%	2%	1%	0%	6%	3%	0%
Turn Type	Perm	NA		Perm	NA	pm+ov	Perm	NA		pm+pt	NA	Perm
Protected Phases		4			8	1		2		1	6	
Permitted Phases	4			8		8	2			6		6
Actuated Green, G (s)		21.2			21.2	46.4		28.2		60.2	60.2	60.2
Effective Green, g (s)		21.2			21.2	46.4		28.2		60.2	60.2	60.2
Actuated g/C Ratio		0.22			0.22	0.49		0.30		0.63	0.63	0.63
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)		645			607	828		935		552	2150	967
v/s Ratio Prot						0.00				c0.19	0.18	
v/s Ratio Perm		c0.16			0.03	0.00		0.20		c0.26		0.02
v/c Ratio		0.73			0.14	0.00		0.68		0.71	0.28	0.03
Uniform Delay, d1		34.2			29.6	12.5		29.4		12.2	7.8	6.5
Progression Factor		1.00			1.00	1.00		1.00		1.00	1.00	1.00
Incremental Delay, d2		4.2			0.1	0.0		4.0		4.3	0.3	0.1
Delay (s)		38.5			29.7	12.5		33.4		16.5	8.1	6.5
Level of Service		D			C	B		C		B	A	A
Approach Delay (s)		38.5			29.1			33.4			11.2	
Approach LOS		D			C			C			B	

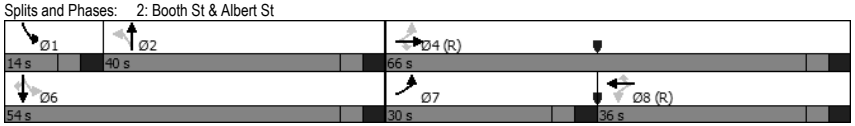
Intersection Summary			
HCM 2000 Control Delay	24.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	95.0	Sum of lost time (s)	20.4
Intersection Capacity Utilization	76.1%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	148	324	10	32	215	83	10	262	45	71	429	192
Future Volume (vph)	148	324	10	32	215	83	10	262	45	71	429	192
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (m)	3.4	3.4	3.6	3.4	3.4	3.4	3.7	3.2	3.7	3.3	3.3	3.5
Storage Length (m)	150.0		42.0	38.0		87.0	0.0		44.0	0.0		56.0
Storage Lanes	1		1	1		1	0		0	1		1
Taper Length (m)	40.0			45.0			2.5			2.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	1.00	0.95	0.95	0.95	1.00	1.00	1.00
Ped Bike Factor	0.99		0.96	0.99		0.97		0.99		0.98		0.94
Frt			0.850			0.850		0.979				0.850
Flt Protected	0.950			0.950				0.998		0.950		
Satd. Flow (prot)	1441	1615	1530	1672	3096	1268	0	3091	0	1559	1706	1327
Flt Permitted	0.516			0.546				0.934		0.420		
Satd. Flow (perm)	775	1615	1471	950	3096	1233	0	2891	0	675	1706	1252
Right Turn on Red			Yes			No			Yes			No
Satd. Flow (RTOR)			91					15				
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		185.1			175.2			57.0			401.6	
Travel Time (s)		13.3			12.6			4.1			28.9	
Confl. Peds. (#/hr)	13		9	9		13	38		34	34		38
Confl. Bikes (#/hr)			1									
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	16%	9%	0%	0%	8%	18%	10%	2%	4%	6%	2%	14%
Adj. Flow (vph)	164	360	11	36	239	92	11	291	50	79	477	213
Shared Lane Traffic (%)												
Lane Group Flow (vph)	164	360	11	36	239	92	0	352	0	79	477	213
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.4			3.4			3.3			3.3	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	1.10	1.10	1.07	1.10	1.10	1.10	1.06	1.14	1.06	1.12	1.12	1.09
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	0	0	0	0	0	1	0		1	0	0
Detector Template	Left						Left			Left		
Leading Detector (m)	6.1	0.0	0.0	0.0	0.0	0.0	6.1	0.0		6.1	0.0	0.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Size(m)	6.1	1.8	6.1	6.1	1.8	6.1	6.1	1.8		6.1	1.8	6.1
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Turn Type	pm+pt	NA	Perm	Perm	NA	Perm	Perm	NA		pm+pt	NA	Perm
Protected Phases	7	4			8			2		1	6	
Permitted Phases	4		4	8		8	2			6		6

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4	4	8	8	8	2	2		1	6	6
Switch Phase												
Minimum Initial (s)	5.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0		5.0	10.0	10.0
Minimum Split (s)	11.5	36.5	36.5	36.0	36.0	36.0	36.5	36.5		11.5	36.5	36.5
Total Split (s)	30.0	66.0	66.0	36.0	36.0	36.0	40.0	40.0		14.0	54.0	54.0
Total Split (%)	25.0%	55.0%	55.0%	30.0%	30.0%	30.0%	33.3%	33.3%		11.7%	45.0%	45.0%
Maximum Green (s)	23.5	59.5	59.5	29.5	29.5	29.5	33.5	33.5		7.5	47.5	47.5
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3		3.3	3.3	3.3
All-Red Time (s)	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2		3.2	3.2	3.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0		0.0		0.0	0.0	0.0
Total Lost Time (s)	6.5	6.5	6.5	6.5	6.5	6.5		6.5		6.5	6.5	6.5
Lead/Lag	Lead			Lag	Lag	Lag	Lag	Lag		Lead		
Lead-Lag Optimize?	Yes			Yes	Yes	Yes	Yes	Yes		Yes		
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Recall Mode	None	C-Max	C-Max	C-Max	C-Max	C-Max	Max	Max		None	Max	Max
Walk Time (s)		7.0	7.0	7.0	7.0	7.0	7.0	7.0			7.0	7.0
Flash Dont Walk (s)		23.0	23.0	22.5	22.5	22.5	23.0	23.0			23.0	23.0
Pedestrian Calls (#/hr)		0	0	0	0	0	0	0			0	0
Act Effct Green (s)	59.5	59.5	59.5	39.6	39.6	39.6		36.3		47.5	47.5	47.5
Actuated g/C Ratio	0.50	0.50	0.50	0.33	0.33	0.33		0.30		0.40	0.40	0.40
v/c Ratio	0.36	0.45	0.01	0.12	0.23	0.23		0.40		0.25	0.71	0.43
Control Delay	19.7	21.9	0.0	24.3	23.7	25.2		34.3		25.3	37.3	29.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0		0.0		0.0	0.0	0.0
Total Delay	19.7	21.9	0.0	24.3	23.7	25.2		34.3		25.3	37.3	29.8
LOS	B	C	A	C	C	C		C		C	D	C
Approach Delay		20.8			24.2			34.3			34.0	
Approach LOS		C			C			C			C	
Queue Length 50th (m)	21.3	53.3	0.0	3.8	13.3	9.7		34.2		11.7	93.0	36.0
Queue Length 95th (m)	35.0	78.2	0.0	8.8	19.6	18.1		48.3		22.1	132.3	57.8
Internal Link Dist (m)		161.1			151.2			33.0			377.6	
Turn Bay Length (m)	150.0		42.0	38.0		87.0						56.0
Base Capacity (vph)	514	800	775	313	1021	407		884		322	675	495
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	0.32	0.45	0.01	0.12	0.23	0.23		0.40		0.25	0.71	0.43

Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 104 (87%), Referenced to phase 4:EBTL and 8:WBTL, Start of Green			
Natural Cycle: 100			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.71			
Intersection Signal Delay: 28.8		Intersection LOS: C	
Intersection Capacity Utilization 105.0%		ICU Level of Service G	
Analysis Period (min) 15			

Splits and Phases: 2: Booth St & Albert St



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	148	324	10	32	215	83	10	262	45	71	429	192
Future Volume (vph)	148	324	10	32	215	83	10	262	45	71	429	192
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	3.4	3.4	3.6	3.4	3.4	3.4	3.7	3.2	3.7	3.3	3.3	3.5
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
Frpb, ped/bikes	1.00	1.00	0.96	1.00	1.00	0.97		0.99		1.00	1.00	0.94
Flpb, ped/bikes	1.00	1.00	1.00	0.99	1.00	1.00		1.00		0.99	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)	1434	1615	1471	1654	3096	1233		3089		1547	1706	1252
Flt Permitted	0.52	1.00	1.00	0.55	1.00	1.00		0.93		0.42	1.00	1.00
Satd. Flow (perm)	778	1615	1471	951	3096	1233		2890		683	1706	1252
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)	164	360	11	36	239	92	11	291	50	79	477	213
RTOR Reduction (vph)	0	0	6	0	0	0	0	10	0	0	0	0
Lane Group Flow (vph)	164	360	5	36	239	92	0	342	0	79	477	213
Confl. Peds. (#/hr)	13		9	9		13	38		34	34		38
Confl. Bikes (#/hr)			1									
Heavy Vehicles (%)	16%	9%	0%	0%	8%	18%	10%	2%	4%	6%	2%	14%
Turn Type	pm+pt	NA	Perm	Perm	NA	Perm	Perm	NA		pm+pt	NA	Perm
Protected Phases	7	4			8			2		1	6	
Permitted Phases	4		4	8		8	2			6		6
Actuated Green, G (s)	58.2	58.2	58.2	38.3	38.3	38.3		36.3		48.8	48.8	48.8
Effective Green, g (s)	58.2	58.2	58.2	38.3	38.3	38.3		36.3		48.8	48.8	48.8
Actuated g/C Ratio	0.49	0.49	0.49	0.32	0.32	0.32		0.30		0.41	0.41	0.41
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)	450	783	713	303	988	393		874		320	693	509
v/s Ratio Prot	0.04	c0.22			0.08					0.01	c0.28	
v/s Ratio Perm	0.14		0.00	0.04		0.07		0.12		0.09		0.17
v/c Ratio	0.36	0.46	0.01	0.12	0.24	0.23		0.39		0.25	0.69	0.42
Uniform Delay, d1	18.2	20.5	16.0	28.9	30.1	30.1		33.1		22.7	29.3	25.5
Progression Factor	1.00	1.00	1.00	0.77	0.77	0.77		1.00		1.00	1.00	1.00
Incremental Delay, d2	0.5	1.9	0.0	0.8	0.6	1.4		1.3		0.4	5.5	2.5
Delay (s)	18.7	22.4	16.0	23.2	23.7	24.5		34.4		23.1	34.9	28.0
Level of Service	B	C	B	C	C	C		C		C	C	C
Approach Delay (s)		21.1			23.8			34.4			31.7	
Approach LOS		C			C			C			C	

Intersection Summary					
HCM 2000 Control Delay	28.0	HCM 2000 Level of Service	C		
HCM 2000 Volume to Capacity ratio	0.64				
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	26.0		
Intersection Capacity Utilization	105.0%	ICU Level of Service	G		
Analysis Period (min)	15				

c Critical Lane Group

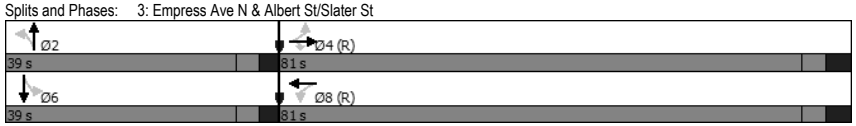
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	22	414	9	9	278	18	2	0	6	41	0	51
Future Volume (vph)	22	414	9	9	278	18	2	0	6	41	0	51
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (m)	3.7	3.4	3.5	3.7	3.3	3.7	3.7	3.4	3.7	3.7	3.4	3.7
Storage Length (m)	0.0		45.0	0.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	0		1	0		0	0		0	0		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	0.95	0.95	1.00	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		1.00	0.96		1.00			0.98			0.99	
Frt			0.850		0.991			0.895			0.925	
Flt Protected		0.998			0.999			0.989			0.978	
Satd. Flow (prot)	0	3126	1351	0	2987	0	0	1383	0	0	1543	0
Flt Permitted		0.923			0.938			0.964			0.872	
Satd. Flow (perm)	0	2888	1291	0	2803	0	0	1346	0	0	1373	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			30		10			37			51	
Link Speed (k/h)		50			50			40			40	
Link Distance (m)		175.2			39.3			118.9			51.7	
Travel Time (s)		12.6			2.8			10.7			4.7	
Confl. Peds. (#/hr)	13		9	9		13	8		5	5		8
Confl. Bikes (#/hr)			1									
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	2%	7%	12%	0%	10%	2%	50%	2%	0%	2%	2%	2%
Adj. Flow (vph)	24	460	10	10	309	20	2	0	7	46	0	57
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	484	10	0	339	0	0	9	0	0	103	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.4			3.4			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	1.06	1.10	1.09	1.06	1.12	1.06	1.06	1.10	1.06	1.06	1.10	1.06
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2			6		
Minimum Split (s)	81.0	81.0	81.0	81.0	81.0		39.0	39.0		39.0	39.0	
Total Split (s)	81.0	81.0	81.0	81.0	81.0		39.0	39.0		39.0	39.0	
Total Split (%)	67.5%	67.5%	67.5%	67.5%	67.5%		32.5%	32.5%		32.5%	32.5%	
Maximum Green (s)	73.9	73.9	73.9	73.9	73.9		32.7	32.7		32.7	32.7	
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3		3.3	3.3		3.3	3.3	
All-Red Time (s)	3.8	3.8	3.8	3.8	3.8		3.0	3.0		3.0	3.0	
Lost Time Adjust (s)		0.0	0.0		0.0			0.0			0.0	
Total Lost Time (s)		7.1	7.1		7.1			6.3			6.3	
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	7.0	7.0	7.0	7.0	7.0		10.0	10.0		10.0	10.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Flash Dont Walk (s)	15.0	15.0	15.0	15.0	15.0		22.7	22.7		22.7	22.7	
Pedestrian Calls (#/hr)	0	0	0	0	0		0	0		0	0	
Act Effct Green (s)		73.9	73.9		73.9			32.7			32.7	
Actuated g/C Ratio		0.62	0.62		0.62			0.27			0.27	
v/c Ratio		0.27	0.01		0.20			0.02			0.25	
Control Delay		5.2	0.0		10.1			0.1			19.9	
Queue Delay		0.0	0.0		0.0			0.0			0.0	
Total Delay		5.2	0.0		10.1			0.1			19.9	
LOS		A	A		B			A			B	
Approach Delay		5.1			10.1			0.1			19.9	
Approach LOS		A			B			A			B	
Queue Length 50th (m)		10.0	0.0		16.6			0.0			9.3	
Queue Length 95th (m)		12.7	m0.0		23.5			0.0			23.7	
Internal Link Dist (m)		151.2			15.3			94.9			27.7	
Turn Bay Length (m)			45.0									
Base Capacity (vph)		1778	806		1730			393			411	
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		0.27	0.01		0.20			0.02			0.25	

Intersection Summary		
Area Type:	Other	
Cycle Length: 120		
Actuated Cycle Length: 120		
Offset: 87 (73%), Referenced to phase 4:EBTL and 8:WBTL, Start of Green		
Natural Cycle: 120		
Control Type: Pretimed		
Maximum v/c Ratio: 0.27		
Intersection Signal Delay: 8.5		Intersection LOS: A
Intersection Capacity Utilization 167.5%		ICU Level of Service H
Analysis Period (min) 15		

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

Splits and Phases: 3: Empress Ave N & Albert St/Slater St



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	22	414	9	9	278	18	2	0	6	41	0	51
Future Volume (vph)	22	414	9	9	278	18	2	0	6	41	0	51
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	3.7	3.4	3.5	3.7	3.3	3.7	3.7	3.4	3.7	3.7	3.4	3.7
Total Lost time (s)		7.1	7.1		7.1			6.3			6.3	
Lane Util. Factor		0.95	1.00		0.95			1.00			1.00	
Frpb, ped/bikes		1.00	0.96		1.00			0.99			0.99	
Flpb, ped/bikes		1.00	1.00		1.00			1.00			1.00	
Frt		1.00	0.85		0.99			0.90			0.93	
Flt Protected		1.00	1.00		1.00			0.99			0.98	
Satd. Flow (prot)		3121	1291		2985			1381			1540	
Flt Permitted		0.92	1.00		0.94			0.96			0.87	
Satd. Flow (perm)		2887	1291		2804			1346			1372	
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)	24	460	10	10	309	20	2	0	7	46	0	57
RTOR Reduction (vph)	0	0	4	0	4	0	0	7	0	0	37	0
Lane Group Flow (vph)	0	484	6	0	335	0	0	2	0	0	66	0
Confl. Peds. (#/hr)	13		9	9		13	8		5	5		8
Confl. Bikes (#/hr)			1									
Heavy Vehicles (%)	2%	7%	12%	0%	10%	2%	50%	2%	0%	2%	2%	2%
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)		73.9	73.9		73.9			32.7			32.7	
Effective Green, g (s)		73.9	73.9		73.9			32.7			32.7	
Actuated g/C Ratio		0.62	0.62		0.62			0.27			0.27	
Clearance Time (s)		7.1	7.1		7.1			6.3			6.3	
Lane Grp Cap (vph)		1777	795		1726			366			373	
v/s Ratio Prot												
v/s Ratio Perm		c0.17	0.00		0.12			0.00			c0.05	
v/c Ratio		0.27	0.01		0.19			0.01			0.18	
Uniform Delay, d1		10.6	8.9		10.1			31.8			33.4	
Progression Factor		0.45	0.00		1.00			1.00			1.00	
Incremental Delay, d2		0.4	0.0		0.3			0.0			1.0	
Delay (s)		5.2	0.0		10.3			31.8			34.4	
Level of Service		A	A		B			C			C	
Approach Delay (s)		5.1			10.3			31.8			34.4	
Approach LOS		A			B			C			C	

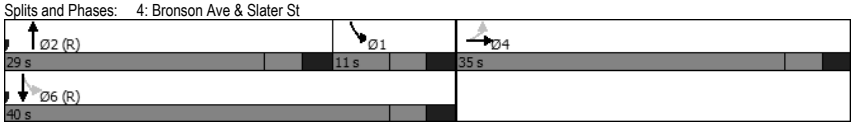
Intersection Summary				
HCM 2000 Control Delay	10.4	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.24			
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	13.4	
Intersection Capacity Utilization	167.5%	ICU Level of Service	H	
Analysis Period (min)	15			
c Critical Lane Group				

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	25	336	28	0	0	0	0	236	118	34	169	0
Future Volume (vph)	25	336	28	0	0	0	0	236	118	34	169	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (m)	3.7	3.3	3.7	3.7	3.7	3.7	3.7	3.5	3.7	3.6	3.8	3.7
Storage Length (m)	0.0		0.0	0.0		0.0	0.0		0.0	20.0		0.0
Storage Lanes	0		0	0		0	0		0	1		0
Taper Length (m)	2.5			2.5			2.5			8.0		
Lane Util. Factor	0.95	0.95	0.95	1.00	1.00	1.00	1.00	0.95	0.95	1.00	1.00	1.00
Ped Bike Factor		1.00						0.99		0.99		
Frt		0.989						0.950				
Flt Protected		0.997								0.950		
Satd. Flow (prot)	0	3060	0	0	0	0	0	2872	0	1315	1628	0
Flt Permitted		0.997								0.506		
Satd. Flow (perm)	0	3055	0	0	0	0	0	2872	0	693	1628	0
Right Turn on Red			Yes			Yes			No			Yes
Satd. Flow (RTOR)		12										
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		115.0			115.8			103.4			50.3	
Travel Time (s)		8.3			8.3			7.4			3.6	
Confl. Peds. (#/hr)	16		6	6		16	9		18	18		9
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	5%	7%	0%	2%	2%	2%	2%	8%	16%	30%	13%	2%
Adj. Flow (vph)	28	373	31	0	0	0	0	262	131	38	188	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	432	0	0	0	0	0	393	0	38	188	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	1.06	1.12	1.06	1.06	1.06	1.06	1.06	1.09	1.06	1.07	1.04	1.06
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Turn Type	Perm	NA						NA		pm+pt	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4									6		
Minimum Split (s)	35.0	35.0						29.0		11.0	40.0	
Total Split (s)	35.0	35.0						29.0		11.0	40.0	
Total Split (%)	46.7%	46.7%						38.7%		14.7%	53.3%	
Maximum Green (s)	29.1	29.1						23.0		5.0	34.0	
Yellow Time (s)	3.3	3.3						3.3		3.3	3.3	
All-Red Time (s)	2.6	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		
Walk Time (s)	7.0	7.0						13.0			13.0	
Flash Dont Walk (s)	7.0	7.0						7.0			7.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Pedestrian Calls (#/hr)	0	0						0			0	
Act Effct Green (s)		29.1						23.0		34.0	34.0	
Actuated g/C Ratio		0.39						0.31		0.45	0.45	
v/c Ratio		0.36						0.45		0.11	0.25	
Control Delay		16.9						22.9		13.0	13.9	
Queue Delay		0.0						0.0		0.0	0.0	
Total Delay		16.9						22.9		13.0	13.9	
LOS		B						C		B	B	
Approach Delay		16.9						22.9			13.7	
Approach LOS		B						C			B	
Queue Length 50th (m)		21.5						23.3		2.9	15.7	
Queue Length 95th (m)		32.4						35.3		7.7	28.3	
Internal Link Dist (m)		91.0			91.8			79.4			26.3	
Turn Bay Length (m)										20.0		
Base Capacity (vph)		1192						880		355	738	
Starvation Cap Reductn		0						0		0	0	
Spillback Cap Reductn		0						0		0	0	
Storage Cap Reductn		0						0		0	0	
Reduced v/c Ratio		0.36						0.45		0.11	0.25	

Intersection Summary			
Area Type:	Other		
Cycle Length: 75			
Actuated Cycle Length: 75			
Offset: 16 (21%), Referenced to phase 2:NBT and 6:SBTL, Start of Green			
Natural Cycle: 75			
Control Type: Pretimed			
Maximum v/c Ratio: 0.45			
Intersection Signal Delay: 18.5		Intersection LOS: B	
Intersection Capacity Utilization 62.5%		ICU Level of Service B	
Analysis Period (min) 15			

Splits and Phases: 4: Bronson Ave & Slater St



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	25	336	28	0	0	0	0	236	118	34	169	0
Future Volume (vph)	25	336	28	0	0	0	0	236	118	34	169	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	3.7	3.3	3.7	3.7	3.7	3.7	3.7	3.5	3.7	3.6	3.8	3.7
Total Lost time (s)		5.9						6.0		6.0	6.0	
Lane Util. Factor		0.95						0.95		1.00	1.00	
Frpb, ped/bikes		1.00						0.99		1.00	1.00	
Flpb, ped/bikes		1.00						1.00		0.99	1.00	
Frt		0.99						0.95		1.00	1.00	
Flt Protected		1.00						1.00		0.95	1.00	
Satd. Flow (prot)		3055						2872		1308	1628	
Flt Permitted		1.00						1.00		0.51	1.00	
Satd. Flow (perm)		3055						2872		697	1628	
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)	28	373	31	0	0	0	0	262	131	38	188	0
RTOR Reduction (vph)	0	7	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	425	0	0	0	0	0	393	0	38	188	0
Confl. Peds. (#/hr)	16		6	6		16	9		18	18		9
Heavy Vehicles (%)	5%	7%	0%	2%	2%	2%	2%	8%	16%	30%	13%	2%
Turn Type	Perm	NA						NA		pm+pt	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4									6		
Actuated Green, G (s)		29.1						23.0		34.0	34.0	
Effective Green, g (s)		29.1						23.0		34.0	34.0	
Actuated g/C Ratio		0.39						0.31		0.45	0.45	
Clearance Time (s)		5.9						6.0		6.0	6.0	
Lane Grp Cap (vph)		1185						880		356	738	
v/s Ratio Prot								c0.14		0.01	c0.12	
v/s Ratio Perm		0.14								0.04		
v/c Ratio		0.36						0.45		0.11	0.25	
Uniform Delay, d1		16.3						20.9		12.3	12.7	
Progression Factor		1.00						1.00		1.00	1.00	
Incremental Delay, d2		0.8						1.6		0.6	0.8	
Delay (s)		17.2						22.5		12.9	13.5	
Level of Service		B						C		B	B	
Approach Delay (s)		17.2			0.0			22.5			13.4	
Approach LOS		B			A			C			B	

Intersection Summary					
HCM 2000 Control Delay	18.4	HCM 2000 Level of Service		B	
HCM 2000 Volume to Capacity ratio	0.40				
Actuated Cycle Length (s)	75.0	Sum of lost time (s)		17.9	
Intersection Capacity Utilization	62.5%	ICU Level of Service		B	
Analysis Period (min)	15				

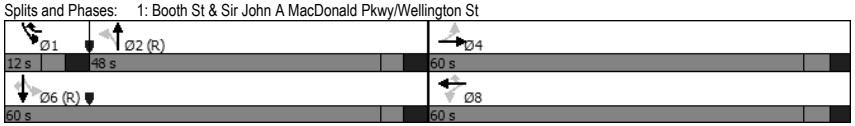
c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	35	64	0	32	408	415	18	714	30	183	782	12
Future Volume (vph)	35	64	0	32	408	415	18	714	30	183	782	12
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (m)	3.7	3.4	3.7	3.7	3.4	3.4	3.7	3.5	3.5	3.3	3.8	3.7
Storage Length (m)	0.0		0.0	0.0		90.0	0.0		0.0	135.0		63.0
Storage Lanes	0		0	0		1	0		0	1		1
Taper Length (m)	2.5			2.5			2.5			30.0		
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	1.00	0.95	0.95	0.95	1.00	0.95	1.00
Ped Bike Factor		1.00			1.00	0.98		1.00				0.98
Frt						0.850		0.994				0.850
Flt Protected		0.983			0.996			0.999		0.950		
Satd. Flow (prot)	0	2878	0	0	3212	1481	0	3198	0	1653	3461	1547
Flt Permitted		0.634			0.918			0.916		0.215		
Satd. Flow (perm)	0	1853	0	0	2956	1449	0	2932	0	374	3461	1522
Right Turn on Red			Yes			No			Yes			Yes
Satd. Flow (RTOR)								4				35
Link Speed (k/h)		60			60			50			50	
Link Distance (m)		199.5			146.4			401.6			200.6	
Travel Time (s)		12.0			8.8			28.9			14.4	
Confl. Peds. (#/hr)	8		16	16		8	3		1	1		3
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	0%	22%	0%	0%	4%	1%	2%	3%	0%	0%	1%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	10	10	0	0	0
Adj. Flow (vph)	39	71	0	36	453	461	20	793	33	203	869	13
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	110	0	0	489	461	0	846	0	203	869	13
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.3			3.3	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	1.06	1.10	1.06	1.06	1.10	1.10	1.06	1.12	1.09	1.12	1.04	1.06
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	0		1	0	0	1	0		1	0	0
Detector Template	Left			Left			Left			Left		
Leading Detector (m)	2.0	0.0		6.1	0.0	0.0	6.1	0.0		6.1	0.0	0.0
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6		6.1	0.6	2.0	6.1	1.8		6.1	1.8	6.1
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Turn Type	Perm	NA		Perm	NA	pm+ov	Perm	NA		pm+pt	NA	Perm
Protected Phases		4			8	1		2		1	6	
Permitted Phases	4			8		8	2			6		6

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	4	4		8	8	1	2	2		1	6	6
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0	5.0	10.0	10.0		5.0	1.0	1.0
Minimum Split (s)	35.8	35.8		35.8	35.8	11.8	31.8	31.8		11.8	31.8	31.8
Total Split (s)	60.0	60.0		60.0	60.0	12.0	48.0	48.0		12.0	60.0	60.0
Total Split (%)	50.0%	50.0%		50.0%	50.0%	10.0%	40.0%	40.0%		10.0%	50.0%	50.0%
Maximum Green (s)	53.2	53.2		53.2	53.2	5.2	41.2	41.2		5.2	53.2	53.2
Yellow Time (s)	3.7	3.7		3.7	3.7	3.3	3.3	3.3		3.3	3.3	3.3
All-Red Time (s)	3.1	3.1		3.1	3.1	3.5	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	Lag		Lead		
Lead-Lag Optimize?						Yes	Yes	Yes		Yes		
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None		None	None	None	C-Max	C-Max		None	C-Max	C-Max
Walk Time (s)	10.0	10.0		10.0	10.0		10.0	10.0			10.0	10.0
Flash Dont Walk (s)	19.0	19.0		19.0	19.0		15.0	15.0			15.0	15.0
Pedestrian Calls (#/hr)	0	0		0	0		0	0			0	0
Act Effct Green (s)		25.8			25.8	45.7		53.9		80.6	80.6	80.6
Actuated g/C Ratio		0.22			0.22	0.38		0.45		0.67	0.67	0.67
v/c Ratio		0.28			0.77	0.83		0.64		0.44	0.37	0.01
Control Delay		39.8			52.4	42.5		24.7		11.3	9.8	0.3
Queue Delay		0.0			0.0	0.0		0.0		0.0	0.0	0.0
Total Delay		39.8			52.4	42.5		24.7		11.3	9.8	0.3
LOS		D			D	D		C		B	A	A
Approach Delay		39.8			47.6			24.7			9.9	
Approach LOS		D			D			C			A	
Queue Length 50th (m)		11.4			57.4	92.0		73.8		16.3	43.1	0.0
Queue Length 95th (m)		18.4			70.8	108.6		117.8		30.8	64.6	0.5
Internal Link Dist (m)		175.5			122.4			377.6			176.6	
Turn Bay Length (m)						90.0				135.0		63.0
Base Capacity (vph)		821			1310	556		1320		462	2323	1033
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		0.13			0.37	0.83		0.64		0.44	0.37	0.01

Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 3 (3%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 80			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.83			
Intersection Signal Delay: 27.2		Intersection LOS: C	
Intersection Capacity Utilization 93.4%		ICU Level of Service F	
Analysis Period (min) 15			

Splits and Phases: 1: Booth St & Sir John A MacDonald Pkwy/Wellington St



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	35	64	0	32	408	415	18	714	30	183	782	12
Future Volume (vph)	35	64	0	32	408	415	18	714	30	183	782	12
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	3.7	3.4	3.7	3.7	3.4	3.4	3.7	3.5	3.5	3.3	3.8	3.7
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
Frpb, ped/bikes		1.00			1.00	0.99		1.00		1.00	1.00	0.98
Flpb, ped/bikes		1.00			1.00	1.00		1.00		1.00	1.00	1.00
Frt		1.00			1.00	0.85		0.99		1.00	1.00	0.85
Flt Protected		0.98			1.00	1.00		1.00		0.95	1.00	1.00
Satd. Flow (prot)		2873			3209	1463		3198		1653	3461	1522
Flt Permitted		0.63			0.92	1.00		0.92		0.21	1.00	1.00
Satd. Flow (perm)		1853			2957	1463		2933		374	3461	1522
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)	39	71	0	36	453	461	20	793	33	203	869	13
RTOR Reduction (vph)	0	0	0	0	0	0	0	2	0	0	0	4
Lane Group Flow (vph)	0	110	0	0	489	461	0	844	0	203	869	9
Confl. Peds. (#/hr)	8		16	16		8	3		1	1		3
Heavy Vehicles (%)	0%	22%	0%	0%	4%	1%	2%	3%	0%	0%	1%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	10	10	0	0	0
Turn Type	Perm	NA		Perm	NA	pm+ov	Perm	NA		pm+pt	NA	Perm
Protected Phases		4			8	1		2		1	6	
Permitted Phases	4			8		8	2			6		6
Actuated Green, G (s)		25.8			25.8	45.6		54.0		80.6	80.6	80.6
Effective Green, g (s)		25.8			25.8	45.6		54.0		80.6	80.6	80.6
Actuated g/C Ratio		0.22			0.22	0.38		0.45		0.67	0.67	0.67
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)		398			635	638		1319		462	2324	1022
v/s Ratio Prot						c0.12				0.07	0.25	
v/s Ratio Perm		0.06			0.17	0.20		c0.29		0.22		0.01
v/c Ratio		0.28			0.77	0.72		0.64		0.44	0.37	0.01
Uniform Delay, d1		39.3			44.3	31.8		25.5		10.4	8.6	6.5
Progression Factor		1.00			1.00	1.00		0.85		1.00	1.00	1.00
Incremental Delay, d2		0.4			5.7	4.0		1.8		0.7	0.5	0.0
Delay (s)		39.7			50.0	35.8		23.6		11.1	9.1	6.5
Level of Service		D			D	D		C		B	A	A
Approach Delay (s)		39.7			43.2			23.6			9.4	
Approach LOS		D			D			C			A	

Intersection Summary			
HCM 2000 Control Delay	25.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	20.4
Intersection Capacity Utilization	93.4%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	296	260	17	72	456	175	13	426	71	139	413	233
Future Volume (vph)	296	260	17	72	456	175	13	426	71	139	413	233
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (m)	3.4	3.4	3.6	3.4	3.4	3.4	3.7	3.2	3.7	3.3	3.3	3.5
Storage Length (m)	150.0		42.0	38.0		87.0	0.0		44.0	0.0		56.0
Storage Lanes	1		1	1		1	0		0	1		1
Taper Length (m)	40.0			45.0			2.5			2.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	1.00	0.95	0.95	0.95	1.00	1.00	1.00
Ped Bike Factor	1.00		0.96	0.99		0.98		0.99		0.99		0.94
Frt			0.850			0.850		0.979				0.850
Flt Protected	0.950			0.950				0.999		0.950		
Satd. Flow (prot)	1592	1692	1530	1592	3278	1481	0	3139	0	1589	1740	1363
Flt Permitted	0.304			0.583				0.936		0.251		
Satd. Flow (perm)	507	1692	1472	965	3278	1446	0	2939	0	414	1740	1275
Right Turn on Red			Yes			No			Yes			No
Satd. Flow (RTOR)			91					15				
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		185.1			175.2			57.0			401.6	
Travel Time (s)		13.3			12.6			4.1			28.9	
Confl. Peds. (#/hr)	10		9	9		10	45		36	36		45
Confl. Bikes (#/hr)									2			
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	5%	4%	0%	5%	2%	1%	8%	1%	0%	4%	0%	11%
Adj. Flow (vph)	329	289	19	80	507	194	14	473	79	154	459	259
Shared Lane Traffic (%)												
Lane Group Flow (vph)	329	289	19	80	507	194	0	566	0	154	459	259
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.4			3.4			3.3			3.3	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	1.10	1.10	1.07	1.10	1.10	1.10	1.06	1.14	1.06	1.12	1.12	1.09
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	0	0	0	0	0	1	0		1	0	0
Detector Template	Left						Left			Left		
Leading Detector (m)	6.1	0.0	0.0	0.0	0.0	0.0	6.1	0.0		6.1	0.0	0.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Size(m)	6.1	1.8	6.1	6.1	1.8	6.1	6.1	1.8		6.1	1.8	6.1
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Turn Type	pm+pt	NA	Perm	Perm	NA	Perm	Perm	NA		pm+pt	NA	Perm
Protected Phases	7	4			8			2		1	6	
Permitted Phases	4		4	8		8	2			6		6

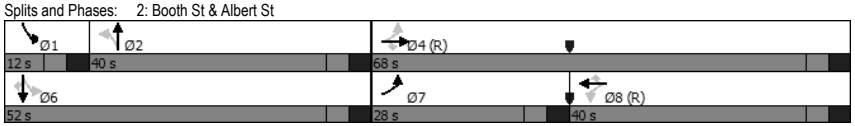
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4	4	8	8	8	2	2		1	6	6
Switch Phase												
Minimum Initial (s)	5.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0		5.0	10.0	10.0
Minimum Split (s)	11.5	36.5	36.5	36.5	36.5	36.5	36.5	36.5		11.5	36.5	36.5
Total Split (s)	28.0	68.0	68.0	40.0	40.0	40.0	40.0	40.0		12.0	52.0	52.0
Total Split (%)	23.3%	56.7%	56.7%	33.3%	33.3%	33.3%	33.3%	33.3%		10.0%	43.3%	43.3%
Maximum Green (s)	21.5	61.5	61.5	33.5	33.5	33.5	33.5	33.5		5.5	45.5	45.5
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3		3.3	3.3	3.3
All-Red Time (s)	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2		3.2	3.2	3.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0		0.0		0.0	0.0	0.0
Total Lost Time (s)	6.5	6.5	6.5	6.5	6.5	6.5		6.5		6.5	6.5	6.5
Lead/Lag	Lead			Lag	Lag	Lag	Lag	Lag		Lead		
Lead-Lag Optimize?	Yes			Yes	Yes	Yes	Yes	Yes		Yes		
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Recall Mode	None	C-Max	C-Max	C-Max	C-Max	C-Max	Max	Max		None	Max	Max
Walk Time (s)		7.0	7.0	7.0	7.0	7.0	7.0	7.0			7.0	7.0
Flash Dont Walk (s)		23.0	23.0	23.0	23.0	23.0	23.0	23.0			23.0	23.0
Pedestrian Calls (#/hr)		0	0	0	0	0	0	0			0	0
Act Effct Green (s)	61.5	61.5	61.5	35.8	35.8	35.8		33.5		45.5	45.5	45.5
Actuated g/C Ratio	0.51	0.51	0.51	0.30	0.30	0.30		0.28		0.38	0.38	0.38
v/c Ratio	0.76	0.33	0.02	0.28	0.52	0.45		0.68		0.73	0.70	0.54
Control Delay	30.4	18.6	0.1	25.7	26.8	28.0		42.3		57.7	47.6	42.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0		0.0		0.0	0.0	0.0
Total Delay	30.4	18.6	0.1	25.7	26.8	28.0		42.3		57.7	47.6	42.7
LOS	C	B	A	C	C	C		D		E	D	D
Approach Delay		24.1			27.0			42.3			47.9	
Approach LOS		C			C			D			D	
Queue Length 50th (m)	46.0	38.7	0.0	14.9	53.5	38.0		60.8		31.4	112.9	59.6
Queue Length 95th (m)	68.0	57.7	0.0	29.2	71.4	61.3		80.5		#60.6	146.1	90.2
Internal Link Dist (m)		161.1			151.2			33.0			377.6	
Turn Bay Length (m)	150.0		42.0	38.0		87.0						56.0
Base Capacity (vph)	454	867	798	287	977	430		831		210	659	483
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	0.72	0.33	0.02	0.28	0.52	0.45		0.68		0.73	0.70	0.54

Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 9 (8%), Referenced to phase 4:EBTL and 8:WBTL, Start of Green			
Natural Cycle: 100			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.76			
Intersection Signal Delay: 35.8		Intersection LOS: D	
Intersection Capacity Utilization 114.0%		ICU Level of Service H	
Analysis Period (min) 15			

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 2: Booth St & Albert St



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	296	260	17	72	456	175	13	426	71	139	413	233
Future Volume (vph)	296	260	17	72	456	175	13	426	71	139	413	233
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	3.4	3.4	3.6	3.4	3.4	3.4	3.7	3.2	3.7	3.3	3.3	3.5
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
Frpb, ped/bikes	1.00	1.00	0.96	1.00	1.00	0.98		0.99		1.00	1.00	0.94
Flpb, ped/bikes	1.00	1.00	1.00	0.99	1.00	1.00		1.00		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)	1590	1692	1472	1573	3278	1446		3136		1585	1740	1275
Flt Permitted	0.30	1.00	1.00	0.58	1.00	1.00		0.94		0.25	1.00	1.00
Satd. Flow (perm)	509	1692	1472	965	3278	1446		2940		419	1740	1275
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)	329	289	19	80	507	194	14	473	79	154	459	259
RTOR Reduction (vph)	0	0	9	0	0	0	0	11	0	0	0	0
Lane Group Flow (vph)	329	289	10	80	507	194	0	555	0	154	459	259
Confl. Peds. (#/hr)	10		9	9		10	45		36	36		45
Confl. Bikes (#/hr)									2			
Heavy Vehicles (%)	5%	4%	0%	5%	2%	1%	8%	1%	0%	4%	0%	11%
Turn Type	pm+pt	NA	Perm	Perm	NA	Perm	Perm	NA		pm+pt	NA	Perm
Protected Phases	7	4			8			2		1	6	
Permitted Phases	4		4	8		8	2			6		6
Actuated Green, G (s)	61.5	61.5	61.5	35.8	35.8	35.8		33.5		45.5	45.5	45.5
Effective Green, g (s)	61.5	61.5	61.5	35.8	35.8	35.8		33.5		45.5	45.5	45.5
Actuated g/C Ratio	0.51	0.51	0.51	0.30	0.30	0.30		0.28		0.38	0.38	0.38
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)	433	867	754	287	977	431		820		212	659	483
v/s Ratio Prot	c0.12	0.17			0.15					0.03	c0.26	
v/s Ratio Perm	c0.27		0.01	0.08		0.13		0.19		c0.24		0.20
v/c Ratio	0.76	0.33	0.01	0.28	0.52	0.45		0.68		0.73	0.70	0.54
Uniform Delay, d1	19.5	17.2	14.4	32.2	35.0	34.1		38.4		31.8	31.4	29.0
Progression Factor	1.00	1.00	1.00	0.68	0.70	0.70		1.00		1.32	1.30	1.30
Incremental Delay, d2	7.5	1.0	0.0	2.2	1.8	3.1		4.5		11.1	5.7	4.0
Delay (s)	27.0	18.2	14.4	24.2	26.2	26.9		42.9		53.0	46.6	41.6
Level of Service	C	B	B	C	C	C		D		D	D	D
Approach Delay (s)		22.7			26.2			42.9			46.3	
Approach LOS		C			C			D			D	

Intersection Summary				
HCM 2000 Control Delay	34.8	HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio	0.82			
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	26.0	
Intersection Capacity Utilization	114.0%	ICU Level of Service	H	
Analysis Period (min)	15			

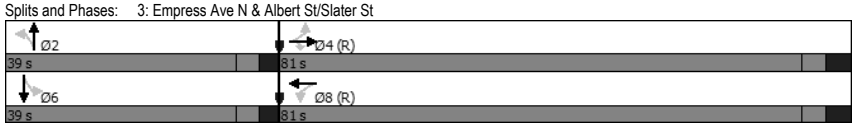
c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	42	368	1	2	677	34	5	0	11	25	0	29
Future Volume (vph)	42	368	1	2	677	34	5	0	11	25	0	29
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (m)	3.7	3.4	3.5	3.7	3.3	3.7	3.7	3.4	3.7	3.7	3.4	3.7
Storage Length (m)	0.0		45.0	0.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	0		1	0		0	0		0	0		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	0.95	0.95	1.00	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		1.00	0.96		1.00			0.98			0.98	
Frt			0.850		0.993			0.910			0.928	
Flt Protected		0.995						0.984			0.977	
Satd. Flow (prot)	0	3234	756	0	3205	0	0	1457	0	0	1541	0
Flt Permitted		0.795			0.954			0.938			0.881	
Satd. Flow (perm)	0	2579	723	0	3058	0	0	1382	0	0	1384	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			30		8			37			37	
Link Speed (k/h)		50			50			40			40	
Link Distance (m)		175.2			39.3			118.9			51.7	
Travel Time (s)		12.6			2.8			10.7			4.7	
Confl. Peds. (#/hr)	25		9	9		25	15		8	8		15
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	2%	3%	100%	0%	2%	2%	0%	2%	10%	2%	2%	2%
Adj. Flow (vph)	47	409	1	2	752	38	6	0	12	28	0	32
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	456	1	0	792	0	0	18	0	0	60	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.4			3.4			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	1.06	1.10	1.09	1.06	1.12	1.06	1.06	1.10	1.06	1.06	1.10	1.06
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2			6		
Minimum Split (s)	29.1	29.1	29.1	29.1	29.1		39.0	39.0		39.0	39.0	
Total Split (s)	81.0	81.0	81.0	81.0	81.0		39.0	39.0		39.0	39.0	
Total Split (%)	67.5%	67.5%	67.5%	67.5%	67.5%		32.5%	32.5%		32.5%	32.5%	
Maximum Green (s)	73.9	73.9	73.9	73.9	73.9		32.7	32.7		32.7	32.7	
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3		3.3	3.3		3.3	3.3	
All-Red Time (s)	3.8	3.8	3.8	3.8	3.8		3.0	3.0		3.0	3.0	
Lost Time Adjust (s)		0.0	0.0		0.0			0.0			0.0	
Total Lost Time (s)		7.1	7.1		7.1			6.3			6.3	
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	7.0	7.0	7.0	7.0	7.0		10.0	10.0		10.0	10.0	
Flash Dont Walk (s)	15.0	15.0	15.0	15.0	15.0		22.7	22.7		22.7	22.7	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Pedestrian Calls (#/hr)	0	0	0	0	0		0	0		0	0	
Act Effct Green (s)		73.9	73.9		73.9			32.7			32.7	
Actuated g/C Ratio		0.62	0.62		0.62			0.27			0.27	
v/c Ratio		0.29	0.00		0.42			0.04			0.15	
Control Delay		10.1	0.0		12.6			3.7			16.9	
Queue Delay		0.0	0.0		0.0			0.0			0.0	
Total Delay		10.1	0.0		12.6			3.7			16.9	
LOS		B	A		B			A			B	
Approach Delay		10.0			12.6			3.7			16.9	
Approach LOS		B			B			A			B	
Queue Length 50th (m)		28.5	0.0		47.0			0.0			4.0	
Queue Length 95th (m)		29.1	m0.0		60.1			2.3			14.6	
Internal Link Dist (m)		151.2			15.3			94.9			27.7	
Turn Bay Length (m)			45.0									
Base Capacity (vph)		1588	456		1886			403			404	
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		0.29	0.00		0.42			0.04			0.15	

Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 87 (73%), Referenced to phase 4:EBTL and 8:WBTL, Start of Green			
Natural Cycle: 70			
Control Type: Pretimed			
Maximum v/c Ratio: 0.42			
Intersection Signal Delay: 11.8		Intersection LOS: B	
Intersection Capacity Utilization 83.7%		ICU Level of Service E	
Analysis Period (min) 15			
m Volume for 95th percentile queue is metered by upstream signal.			

Splits and Phases: 3: Empress Ave N & Albert St/Slater St



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	42	368	1	2	677	34	5	0	11	25	0	29
Future Volume (vph)	42	368	1	2	677	34	5	0	11	25	0	29
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	3.7	3.4	3.5	3.7	3.3	3.7	3.7	3.4	3.7	3.7	3.4	3.7
Total Lost time (s)		7.1	7.1		7.1			6.3			6.3	
Lane Util. Factor		0.95	1.00		0.95			1.00			1.00	
Frpb, ped/bikes		1.00	0.96		1.00			0.99			0.98	
Flpb, ped/bikes		1.00	1.00		1.00			0.99			1.00	
Frt		1.00	0.85		0.99			0.91			0.93	
Flt Protected		0.99	1.00		1.00			0.98			0.98	
Satd. Flow (prot)		3227	723		3204			1449			1535	
Flt Permitted		0.79	1.00		0.95			0.94			0.88	
Satd. Flow (perm)		2578	723		3058			1382			1384	
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)	47	409	1	2	752	38	6	0	12	28	0	32
RTOR Reduction (vph)	0	0	0	0	3	0	0	13	0	0	27	0
Lane Group Flow (vph)	0	456	1	0	789	0	0	5	0	0	33	0
Confl. Peds. (#/hr)	25		9	9		25	15		8	8		15
Heavy Vehicles (%)	2%	3%	100%	0%	2%	2%	0%	2%	10%	2%	2%	2%
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)		73.9	73.9		73.9			32.7			32.7	
Effective Green, g (s)		73.9	73.9		73.9			32.7			32.7	
Actuated g/C Ratio		0.62	0.62		0.62			0.27			0.27	
Clearance Time (s)		7.1	7.1		7.1			6.3			6.3	
Lane Grp Cap (vph)		1587	445		1883			376			377	
v/s Ratio Prot												
v/s Ratio Perm		0.18	0.00		c0.26			0.00			c0.02	
v/c Ratio		0.29	0.00		0.42			0.01			0.09	
Uniform Delay, d1		10.8	8.9		11.9			31.9			32.5	
Progression Factor		0.89	1.00		1.00			1.00			1.00	
Incremental Delay, d2		0.4	0.0		0.7			0.1			0.5	
Delay (s)		9.9	8.9		12.6			31.9			33.0	
Level of Service		A	A		B			C			C	
Approach Delay (s)		9.9			12.6			31.9			33.0	
Approach LOS		A			B			C			C	

Intersection Summary			
HCM 2000 Control Delay	12.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.32		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	13.4
Intersection Capacity Utilization	83.7%	ICU Level of Service	E
Analysis Period (min)	15		

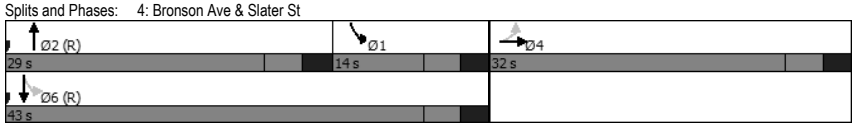
c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	13	247	20	0	0	0	0	404	101	27	315	0
Future Volume (vph)	13	247	20	0	0	0	0	404	101	27	315	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (m)	3.7	3.3	3.7	3.7	3.7	3.7	3.7	3.5	3.7	3.6	3.8	3.7
Storage Length (m)	0.0		0.0	0.0		0.0	0.0		0.0	20.0		0.0
Storage Lanes	0		0	0		0	0		0	1		0
Taper Length (m)	2.5			2.5			2.5			8.0		
Lane Util. Factor	0.95	0.95	0.95	1.00	1.00	1.00	1.00	0.95	0.95	1.00	1.00	1.00
Ped Bike Factor		1.00						0.99		0.99		
Frt		0.989						0.970				
Flt Protected		0.998								0.950		
Satd. Flow (prot)	0	3144	0	0	0	0	0	3181	0	1644	1769	0
Flt Permitted		0.998								0.425		
Satd. Flow (perm)	0	3141	0	0	0	0	0	3181	0	728	1769	0
Right Turn on Red			Yes			Yes			No			Yes
Satd. Flow (RTOR)		11										
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		115.0			115.8			103.4			50.3	
Travel Time (s)		8.3			8.3			7.4			3.6	
Confl. Peds. (#/hr)	13		14	14		13	13		21	21		13
Confl. Bikes (#/hr)									1			
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	0%	4%	0%	2%	2%	2%	2%	1%	8%	4%	4%	2%
Adj. Flow (vph)	14	274	22	0	0	0	0	449	112	30	350	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	310	0	0	0	0	0	561	0	30	350	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	1.06	1.12	1.06	1.06	1.06	1.06	1.06	1.09	1.06	1.07	1.04	1.06
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	0						0		0	0	
Detector Template	Left											
Leading Detector (m)	6.1	0.0						0.0		0.0	0.0	
Trailing Detector (m)	0.0	0.0						0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0						0.0		0.0	0.0	
Detector 1 Size(m)	6.1	1.8						1.8		6.1	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex						Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0						0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0						0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0						0.0		0.0	0.0	
Turn Type	Perm	NA						NA		pm+pt	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4									6		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	4	4						2		1	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0						10.0		5.0	10.0	
Minimum Split (s)	19.9	19.9						26.0		11.0	26.0	
Total Split (s)	32.0	32.0						29.0		14.0	43.0	
Total Split (%)	42.7%	42.7%						38.7%		18.7%	57.3%	
Maximum Green (s)	26.1	26.1						23.0		8.0	37.0	
Yellow Time (s)	3.3	3.3						3.3		3.3	3.3	
All-Red Time (s)	2.6	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		
Vehicle Extension (s)	3.0	3.0						3.0		3.0	3.0	
Recall Mode	None	None						C-Max		Max	C-Max	
Walk Time (s)	7.0	7.0						13.0			13.0	
Flash Dont Walk (s)	7.0	7.0						7.0			7.0	
Pedestrian Calls (#/hr)	0	0						0			0	
Act Effct Green (s)		12.7						36.4		50.4	50.4	
Actuated g/C Ratio		0.17						0.49		0.67	0.67	
v/c Ratio		0.57						0.36		0.05	0.29	
Control Delay		31.6						13.4		5.3	6.2	
Queue Delay		0.0						0.0		0.0	0.0	
Total Delay		31.6						13.4		5.3	6.2	
LOS		C						B		A	A	
Approach Delay		31.6						13.4			6.2	
Approach LOS		C						B			A	
Queue Length 50th (m)		20.7						24.5		1.2	17.0	
Queue Length 95th (m)		30.7						39.2		4.1	33.1	
Internal Link Dist (m)		91.0			91.8			79.4			26.3	
Turn Bay Length (m)										20.0		
Base Capacity (vph)		1100						1543		586	1188	
Starvation Cap Reductn		0						0		0	0	
Spillback Cap Reductn		0						0		0	0	
Storage Cap Reductn		0						0		0	0	
Reduced v/c Ratio		0.28						0.36		0.05	0.29	

Intersection Summary			
Area Type:	Other		
Cycle Length: 75			
Actuated Cycle Length: 75			
Offset: 38 (51%), Referenced to phase 2:NBT and 6:SBTL, Start of Green			
Natural Cycle: 60			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.57			
Intersection Signal Delay: 15.7		Intersection LOS: B	
Intersection Capacity Utilization 45.3%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 4: Bronson Ave & Slater St



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	13	247	20	0	0	0	0	404	101	27	315	0
Future Volume (vph)	13	247	20	0	0	0	0	404	101	27	315	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	3.7	3.3	3.7	3.7	3.7	3.7	3.7	3.5	3.7	3.6	3.8	3.7
Total Lost time (s)		5.9						6.0		6.0	6.0	
Lane Util. Factor		0.95						0.95		1.00	1.00	
Frpb, ped/bikes		1.00						0.99		1.00	1.00	
Flpb, ped/bikes		1.00						1.00		1.00	1.00	
Frt		0.99						0.97		1.00	1.00	
Flt Protected		1.00						1.00		0.95	1.00	
Satd. Flow (prot)		3141						3181		1637	1769	
Flt Permitted		1.00						1.00		0.43	1.00	
Satd. Flow (perm)		3141						3181		733	1769	
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)	14	274	22	0	0	0	0	449	112	30	350	0
RTOR Reduction (vph)	0	9	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	301	0	0	0	0	0	561	0	30	350	0
Confl. Peds. (#/hr)	13		14	14		13	13		21	21		13
Confl. Bikes (#/hr)									1			
Heavy Vehicles (%)	0%	4%	0%	2%	2%	2%	2%	1%	8%	4%	4%	2%
Turn Type	Perm	NA						NA		pm+pt	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4									6		
Actuated Green, G (s)		12.7						36.4		50.4	50.4	
Effective Green, g (s)		12.7						36.4		50.4	50.4	
Actuated g/C Ratio		0.17						0.49		0.67	0.67	
Clearance Time (s)		5.9						6.0		6.0	6.0	
Vehicle Extension (s)		3.0						3.0		3.0	3.0	
Lane Grp Cap (vph)		531						1543		589	1188	
v/s Ratio Prot								c0.18		0.01	c0.20	
v/s Ratio Perm		0.10								0.03		
v/c Ratio		0.57						0.36		0.05	0.29	
Uniform Delay, d1		28.6						12.1		4.8	5.0	
Progression Factor		1.00						1.00		1.00	1.00	
Incremental Delay, d2		1.4						0.7		0.2	0.6	
Delay (s)		30.0						12.7		4.9	5.7	
Level of Service		C						B		A	A	
Approach Delay (s)		30.0			0.0			12.7			5.6	
Approach LOS		C			A			B			A	

Intersection Summary			
HCM 2000 Control Delay	14.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.41		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	17.9
Intersection Capacity Utilization	45.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

TYLin

APPENDIX D

Vehicle Movement Diagrams

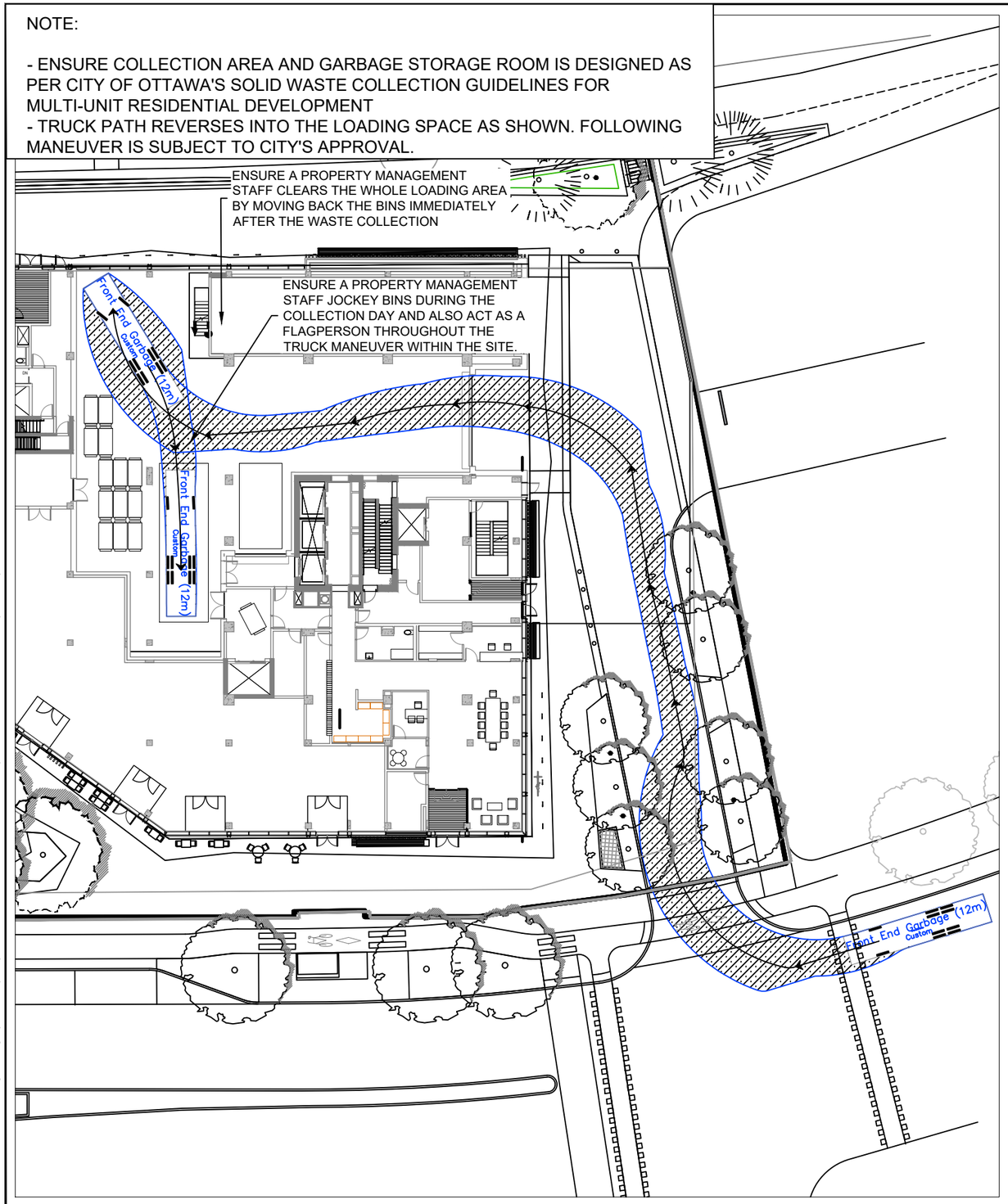
NOTE:

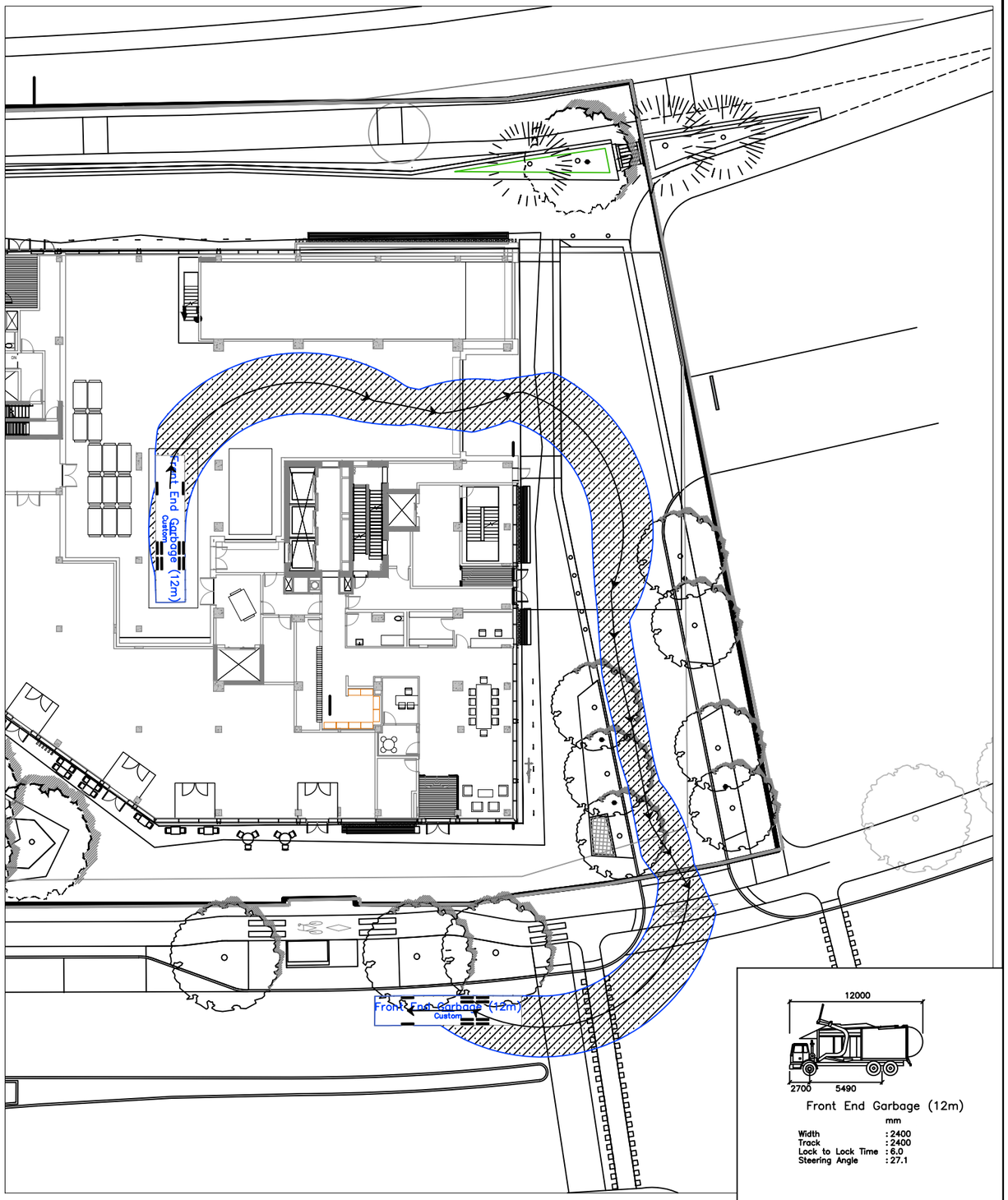
- ENSURE COLLECTION AREA AND GARBAGE STORAGE ROOM IS DESIGNED AS PER CITY OF OTTAWA'S SOLID WASTE COLLECTION GUIDELINES FOR MULTI-UNIT RESIDENTIAL DEVELOPMENT
- TRUCK PATH REVERSES INTO THE LOADING SPACE AS SHOWN. FOLLOWING MANEUVER IS SUBJECT TO CITY'S APPROVAL.

ENSURE A PROPERTY MANAGEMENT STAFF CLEARS THE WHOLE LOADING AREA BY MOVING BACK THE BINS IMMEDIATELY AFTER THE WASTE COLLECTION

ENSURE A PROPERTY MANAGEMENT STAFF JOCKEY BINS DURING THE COLLECTION DAY AND ALSO ACT AS A FLAGPERSON THROUGHOUT THE TRUCK MANEUVER WITHIN THE SITE.

Front End Garbage (12m) Custom





Front End Garbage (12m)

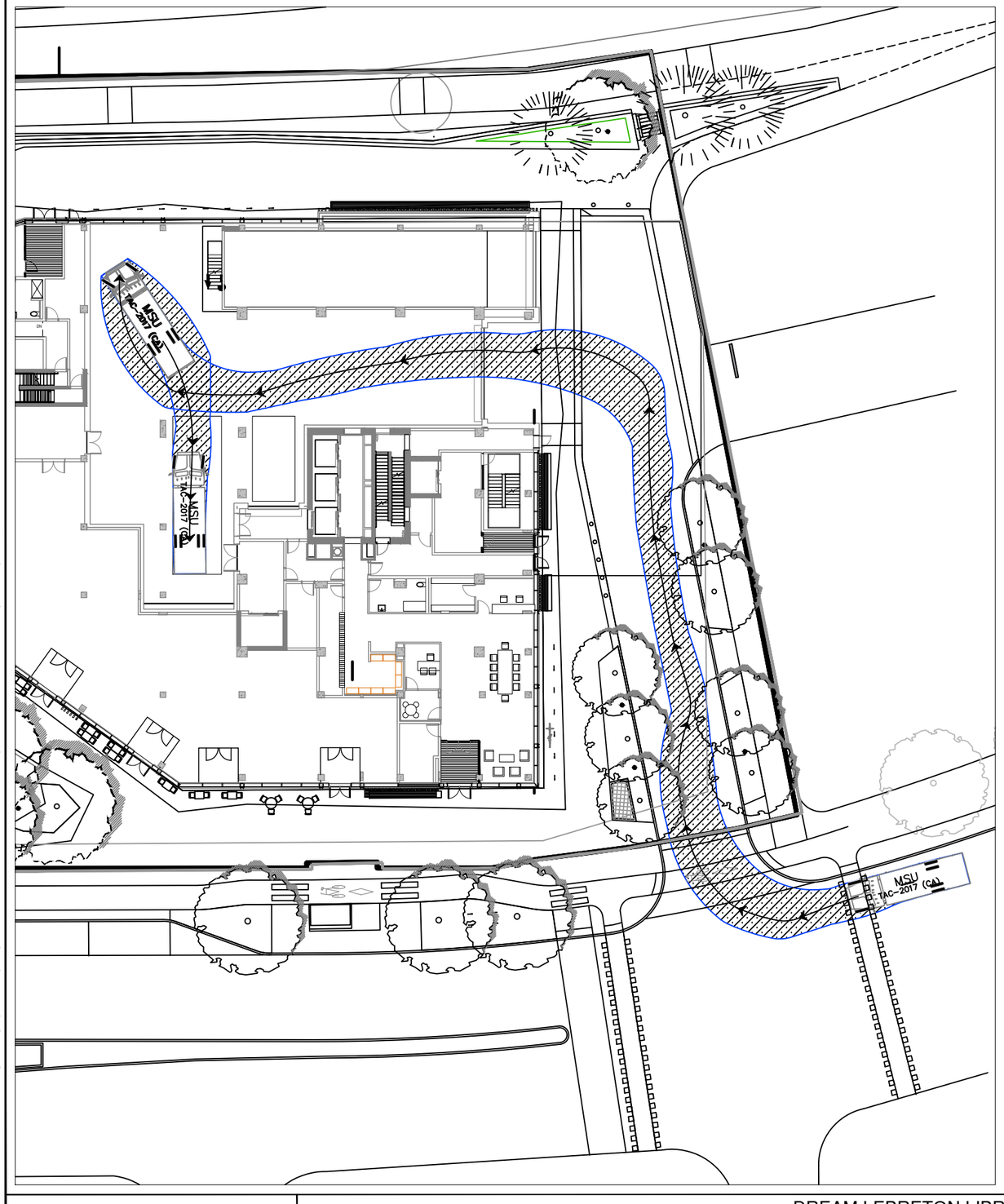
	mm
Width	: 2400
Track	: 2400
Lock to Lock Time	: 6.0
Steering Angle	: 27.1

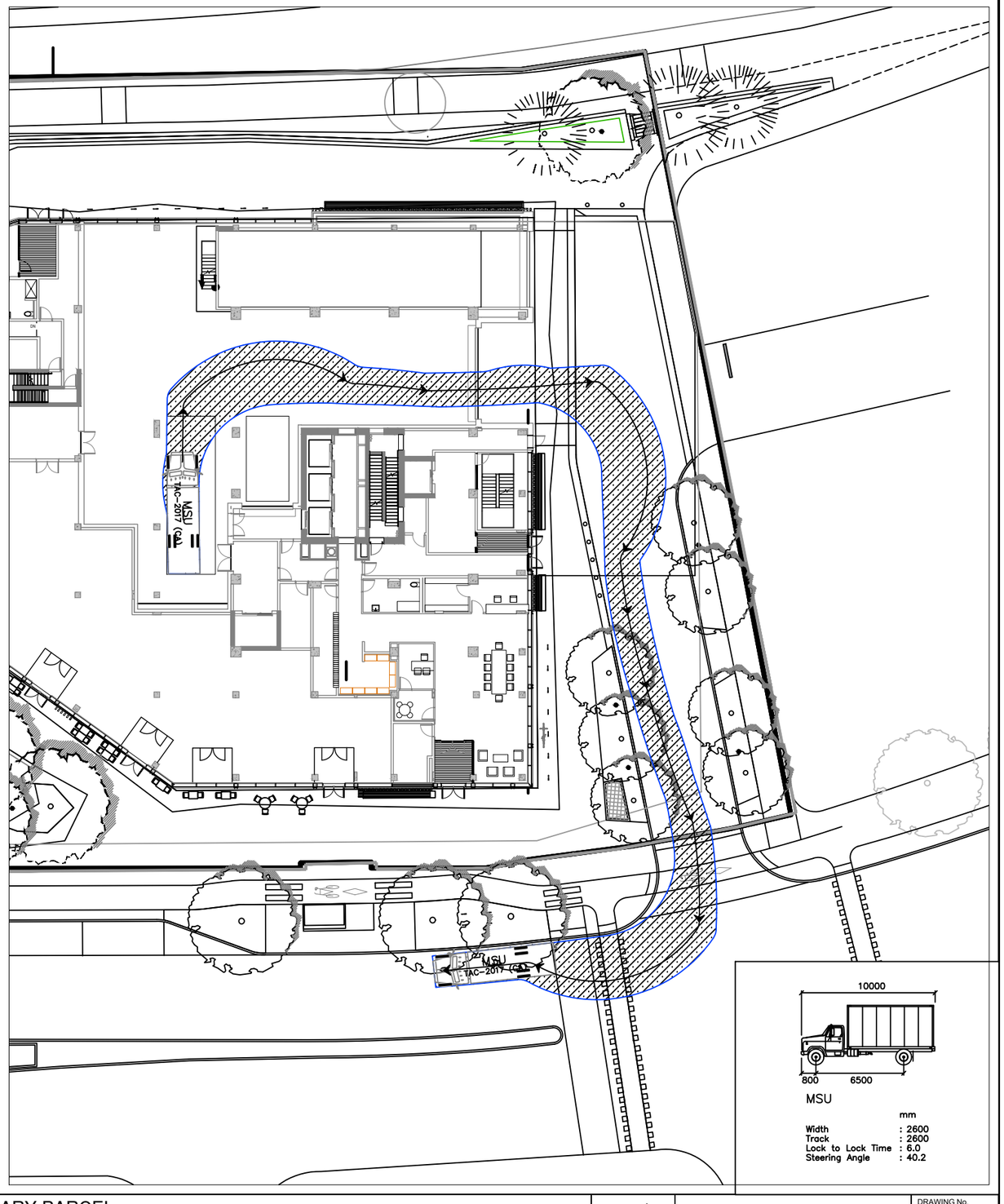
TYLin
8800 Dufferin Street,
Suite 200
Vaughan, ON
L4K 0C5
p: 905.738.5700

DREAM LEBRETON LIBRARY PARCEL
SITE PLAN REVIEW - 12m FRONT-END GARBAGE TRUCK
SWEPT PATH ANALYSIS

SCALE: 1:400
4 0 4 8 12m

DRAWING No. 001
DATE OCT/2022





MSU

	mm
Width	: 2600
Track	: 2600
Lock to Lock Time	: 6.0
Steering Angle	: 40.2

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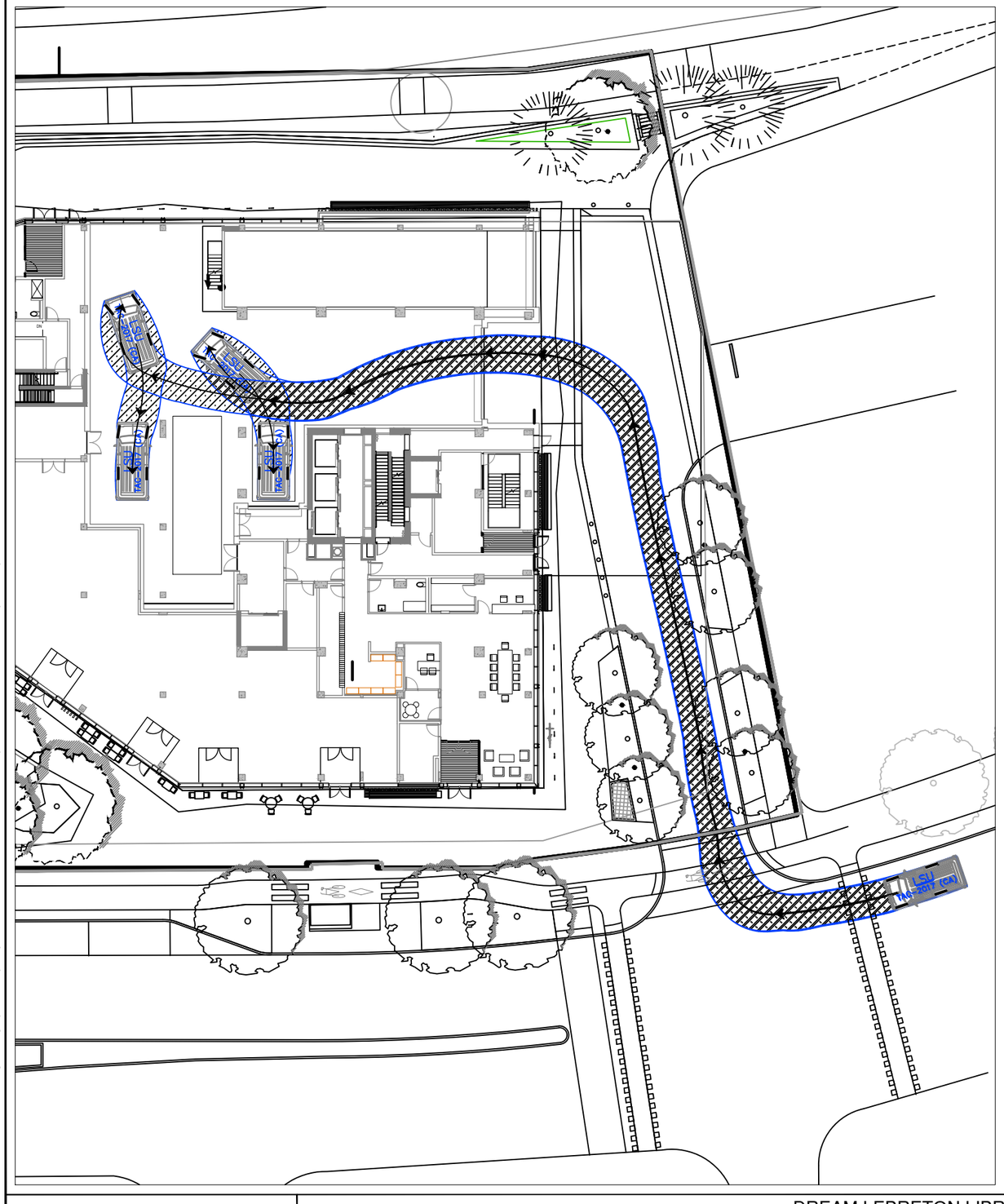
DREAM LEBRETON LIBRARY PARCEL
SITE PLAN REVIEW - MOVING/DELIVERY MSU TRUCK
SWEPT PATH ANALYSIS

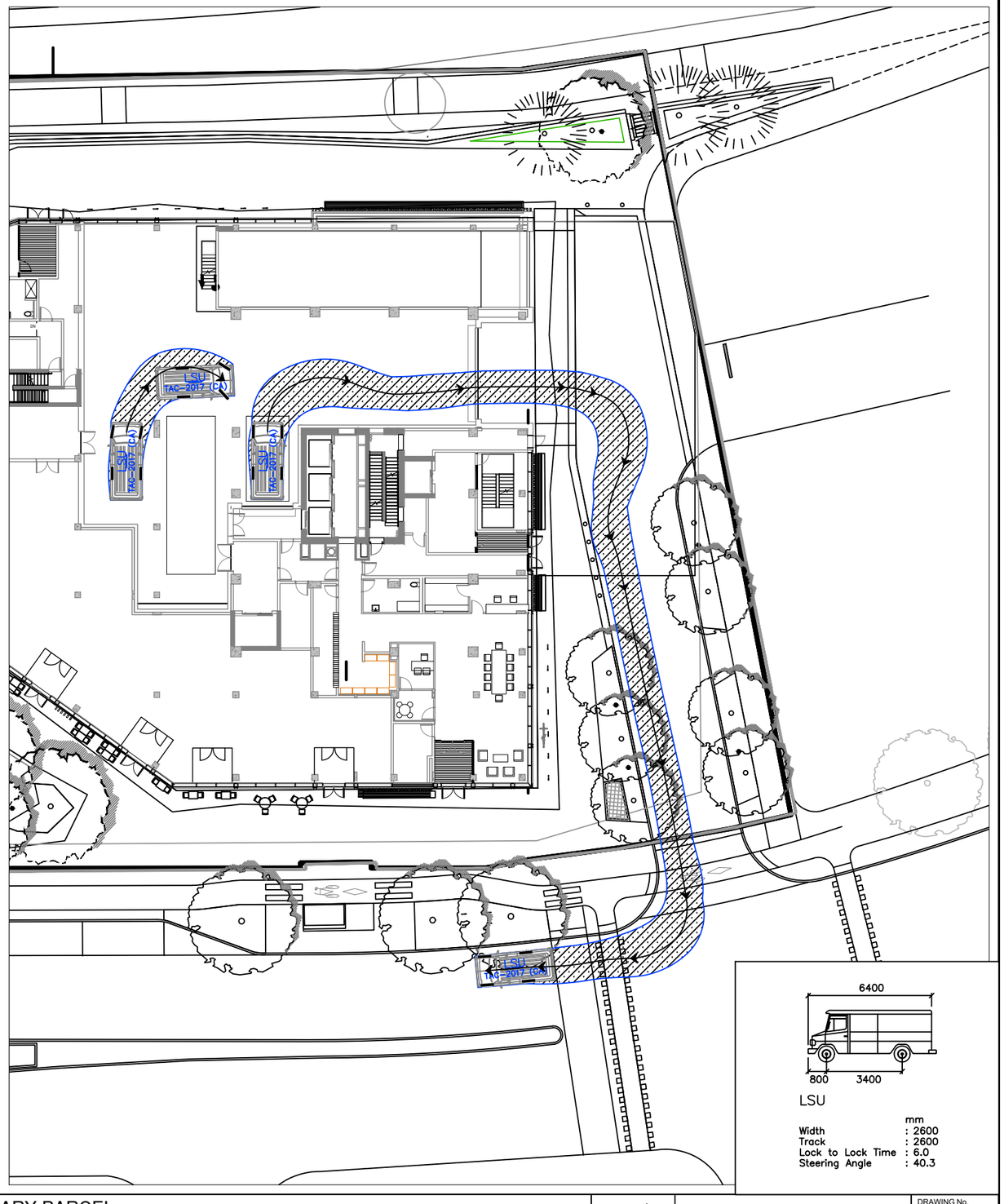
N

SCALE: 1:400
4 0 4 8 12m

DRAWING No.
002

DATE
OCT/2022





LSU

	mm
Width	: 2600
Track	: 2600
Lock to Lock Time	: 6.0
Steering Angle	: 40.3

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8800 Dufferin Street,
Suite 200
Vaughan, ON
L4K 0C5
p: 905.738.5700

DREAM LEBRETON LIBRARY PARCEL
SITE PLAN REVIEW - DELIVERY LSU TRUCK
SWEPT PATH ANALYSIS

SCALE: 1:400

4 0 4 8 12m

DRAWING No. 003

DATE OCT/2022

P
TAC-2017 (CA)

P
TAC-2017 (CA)

P
TAC-2017 (CA)

P
TAC-2017 (CA)

5600

1100 3200

P

	mm
Width	: 2000
Track	: 2000
Lock to Lock Time	: 6.0
Steering Angle	: 35.9

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Suite 200
Vaughan, ON
L4K 0C5
p: 905.738.5700

DREAM LEBRETON LIBRARY PARCEL
SITE PLAN REVIEW - PASSENGER VEHICLE P TAC
SWEPT PATH ANALYSIS

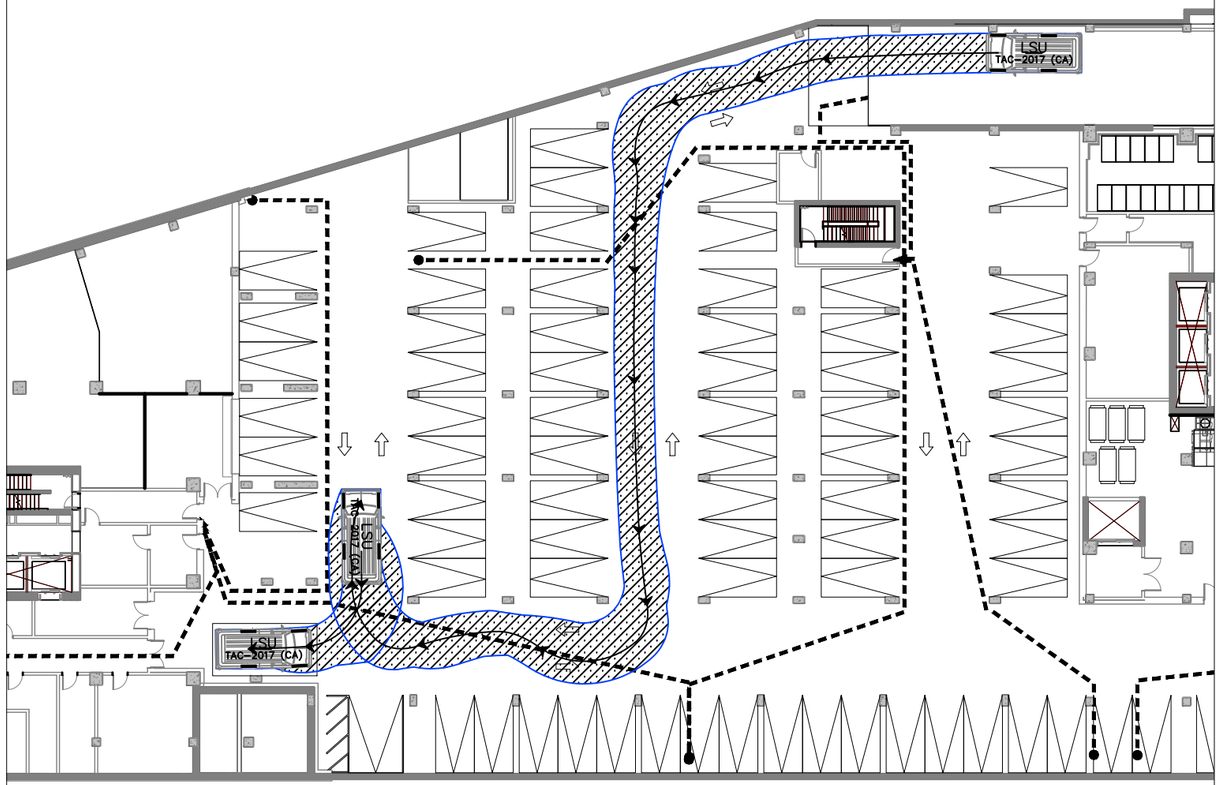
SCALE: 1:300

3 0 3 6 9m

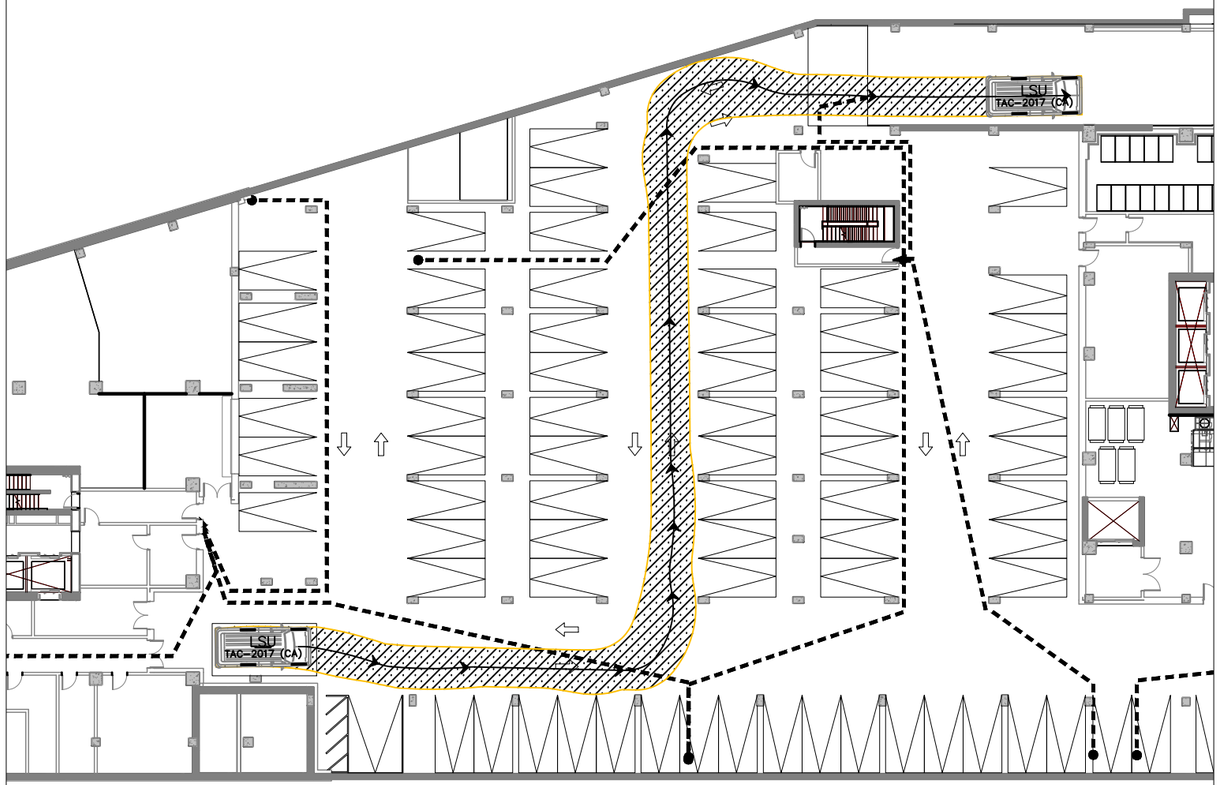
DRAWING No. 004

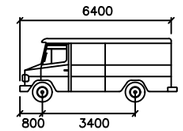
DATE OCT/2022

ENTRY PATH



EXIT PATH





LSU

	mm
Width	: 2600
Track	: 2600
Lock to Lock Time	: 6.0
Steering Angle	: 40.3

TYLin
8800 Dufferin Street,
Suite 200
Vaughan, ON
L4K 0C5
p: 905.738.5700

DREAM LEBRETON LIBRARY PARCEL
SITE PLAN REVIEW - SMALL DELIVERY TRUCK (LSU)
SWEPT PATH ANALYSIS - LEVEL P1

SCALE: 1:400
4 0 4 8 12m

DRAWING No. 006
DATE SEPT/2022

TYLin

APPENDIX E

Transportation Demand Management Plan & Checklists

Mike Giampa
Project Manager, Infrastructure Approvals
City of Ottawa
110 Laurier Avenue West
Ottawa, ON K1P 1J1
Canada

Date	Oct 12, 2022	Handled by	Wayne G, Eric P & Veronique R
Topic	Building LeBreton Library Parcel – Traffic Demand Management (TDM) Measures		
Attachment(s)	Draft TDM Checklists		

Referencing TYLin's TIA Forecasting Report (May 9, 2022), the latest site plan consists of 608 dwelling units, 1,324.48 m^2 of retail ground floor area (GFA), and 1,230.43 m^2 of day care facility GFA on the 3rd floor of the proposed mixed-use development. In order to support TIA report assumptions and achieve the ambitious mode share targets for sustainable mobility set by the National Capital Commission for the LeBreton area, a suite of TDM measures will need to be implemented. The most important principle to reduce car use and facilitate car-free lifestyle, is to make car use and car ownership less attractive and to make the use of other modes of transport more attractive.

In search of TDM measures best suited for the subject development, we have reviewed TIA's for similar developments in the area and conducted desktop research on measures that have a proven record of successful implementation for sustainable development projects in Europe.

Following the City of Ottawa's TIA Guidelines, a review of both the TDM Measures Checklist and TDM-Supported Development Design and Infrastructure Checklist was conducted. Due to its mixed use nature, it is expected that the subject development would warrant completing the checklists for both the residential and the non-residential components. Given the scale of the commercial use, the TDM measures for residential development will be the primary focus and non-residential be secondary. The completed checklists draft can be found in the attachment.

Please note that the site plan proposes a total of 756 bicycle parking spaces to be provided, including 638 interior secure spaces and 118 exterior spaces. In addition to what is outlined in the site plan in terms of development design and infrastructure features to support the TDM, it is our recommendation that:

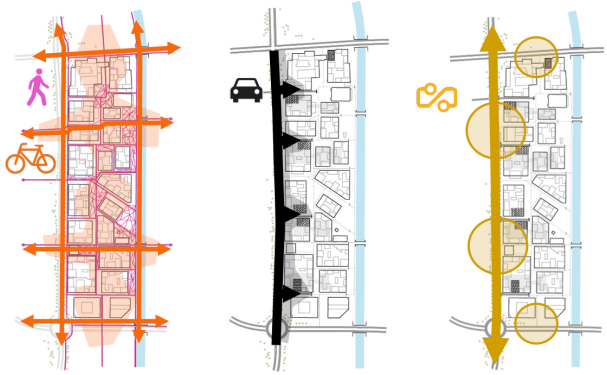


Figure 1. Design Principles for Pedestrians, Cyclists, Cars and Public Transport (Mobility Concept for Merwede, Utrecht)

Based on measures listed in City's TDM checklists

- A community bike shop, which can serve as a communal amenity, be secured as an anchor tenant to provide a full suite of services for local and area residents, including bike education and skill training, repair and maintenance, valet bike parking, and support the implementation of on-site bikeshare program. Free or subsidized access to bike education and skill training and bikeshare memberships may be considered for residents.

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www.mobycon.com

- Provide free or subsidized carshare memberships for residents to take advantage of nearby, off-site carshare vehicles as well as information packages to educate residents on carsharing.
- Install wayfinding signage at strategic locations and provide bike maps and pamphlets at store and residential entrances.
- Display relevant transit schedules and route maps at entrances.
- Provide preloaded transit pass for tenants and residence purchase/move-in, to encourage people to use transit.

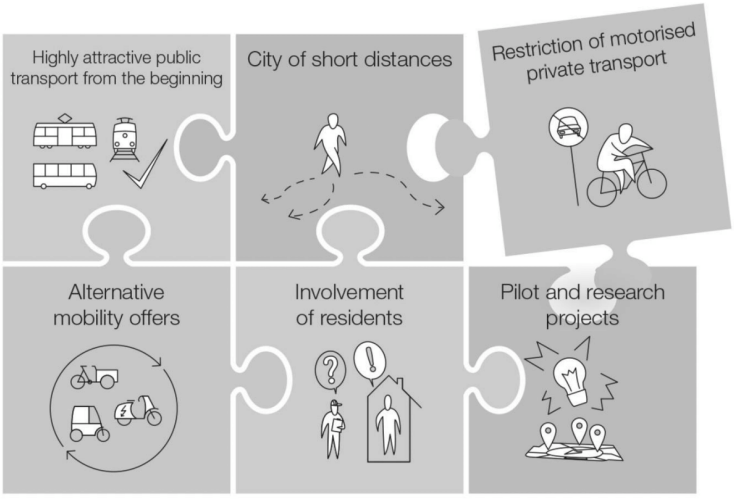

Figure 2. The six central building blocks for traffic demand management (the development of Aspern Seestadt in Vienna, Austria)

- Unbundle parking cost from lease rates and purchase price (condominium) or monthly rent (apartment).
- Charge for both short-term (hourly) and long-term (daily, weekly, monthly) parking.
- Provide a multi-modal travel option information package to new residents.
- Offer personalized trip planning to new residents.

Additional measures not directly mentioned in the City's TDM checklists

- Access to indoor bike parking facility to be made more convenient than underground car parking facility.
- Include cargo bikes as part of the bikeshare system, allowing residents to bike for larger purchases/shopping trips.
- Offer extra on-site bicycle parking to accommodate commuters for bike-train trip chaining at Pimisi Station. This measure contributes to a broader catchment area to reduce traffic demand.

We anticipate further review and discussion with the project owner and the consultant group will be anticipated to confirm the feasibility of those TDM measures outlined above as well as their logistics for implementation. Should you have any questions, please do not hesitate to contact Wayne Gong at w.gong@mobycon.com.

Technical References:

- Aspern Seestadt development, Vienna, Austria
  https://www.aspern-seestadt.at/en/lifestyle_hub/mobility
  https://www.mobillab.wien/storymaps/en/index.html

- Car Share Study Summary Booklet, The Metro Vancouver
  http://www.metrovancouver.org/services/regional-planning/PlanningPublications/1507_PPE_MV_Car_Share_Study_14Oct20HR.pdf

- Discussion Paper: The Power of Parking: A New Parking Paradigm for Kingston?, City of Kingston
  https://www.cityofkingston.ca/documents/10180/18914138/Projects_Bylaw_ParkingDiscussionPaper.pdf/53ccdf4f-4b32-cd80-395b-90f3fb69258d?t=1622570454241

- Mobility Concept for Merwede, Municipality of Utrecht
  https://omgevingsvisie.utrecht.nl/fileadmin/uploads/documenten/zz-omgevingsvisie/gebiedsbeleid/merwedekanaalzone/2018-04-Eindrapport-Mobiliteitsconcept-voor-Merwede.pdf (in Dutch)

- Off Street Parking Space Regulations, City of Vancouver
  https://bylaws.vancouver.ca/parking/Sec04.pdf

- Parking, Queuing and Loading Provisions, City of Ottawa
  https://ottawa.ca/en/living-ottawa/laws-licences-and-permits/laws/law-z/planning-development-and-construction/maps-and-zoning/zoning-law-no-2008-250/zoning-law-2008-250-consolidation/part-4-parking-queuing-and-loading-provisions-sections-100-114#section-111-bicycle-parking-space-rates-and-provisions

- Parking Standards for Bicycle and Cars, Municipality of Utrecht
  https://utrecht.bestuurlijkeinformatie.nl/Agenda/Document/3a2786ca-2d0e-4f6f-9ea1-44910d7cacb9?documentId=ee16983e-00a5-444c-a6d8-1ae1c09eca36&agendaItemId=32d21c08-4806-4970-87db-f74cdc67b0dd (in Dutch).

- Vauban development, Freiburg, Germany
  https://www.fastcompany.com/90327301/what-can-we-learn-from-this-thriving-car-free-german-neighborhood-get-rid-of-parking-spaces
  https://carfree.com/papers/freiburg.pdf

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	☑ Install wayfinding signage at strategic locations; Provide bike maps and pamphlets at store entrances
		2.2 Bicycle skills training	
		Commuter travel	
BETTER	★ 2.2.1	Offer on-site cycling courses for commuters, or subsidize off-site courses	☑ To be provided by on-site community bike shop, with support from property management
		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)	☑ To be provided by on-site community bike shop, with support from property management

		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	☐ N/A. Development not a major employment centre
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)	☐ N/A. Development not a major employment centre
		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)	☐ N/A. Development not a major employment centre
		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	☐ N/A. Development not a major employment centre
		4.2	**Carpool parking price incentives**	
			Commuter travel	
BETTER		4.2.1	Provide discounts on parking costs for registered carpools	☐ N/A. Development not a major employment centre
		4.3	**Vanpool service**	
			Commuter travel	
BETTER		4.3.1	Provide a vanpooling service for long-distance commuters	☐ N/A. Development not a major employment centre
		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	☐ N/A. Development not a major employment centre
		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	☐ N/A. Development not a major employment centre
		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	☐ N/A. Development not a major employment centre
			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	☐ N/A. Development not a major employment centre
		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	☐ N/A. Development not a major employment centre
		8.2	**Alternative work arrangements**	
			Commuter travel	
BASIC	★	8.2.1	Encourage flexible work hours	☐
BETTER		8.2.2	Encourage compressed workweeks	☐ N/A. Development not a major employment centre
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	☐ N/A. Development not a major employment centre
		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	☑

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

Legend

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

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

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

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

			TDM measures: *Residential developments*	Check if proposed & add descriptions
		3.	**TRANSIT**	
		3.1	**Transit information**	
BASIC		3.1.1	Display relevant transit schedules and route maps at entrances *(multi-family, condominium)*	☑
BETTER		3.1.2	Provide real-time arrival information display at entrances *(multi-family, condominium)*	☐
		3.2	**Transit fare incentives**	
BASIC	★	3.2.1	Offer PRESTO cards preloaded with one monthly transit pass on residence purchase/move-in, to encourage residents to use transit	☑
BETTER		3.2.2	Offer at least one year of free monthly transit passes on residence purchase/move-in	☐
		3.3	**Enhanced public transit service**	
BETTER	★	3.3.1	Contract with OC Transpo to provide early transit services until regular services are warranted by occupancy levels *(subdivision)*	☐
		3.4	**Private transit service**	
BETTER		3.4.1	Provide shuttle service for seniors homes or lifestyle communities (e.g. scheduled mall or supermarket runs)	☐
		4.	**CARSHARING & BIKESHARING**	
		4.1	**Bikeshare stations & memberships**	
BETTER		4.1.1	Contract with provider to install on-site bikeshare station (*multi-family)*	☑ In partnership with on-site community bike shop and utilize bike parking space
BETTER		4.1.2	Provide residents with bikeshare memberships, either free or subsidized *(multi-family)*	☑ In partnership with on-site community bike shop
		4.2	**Carshare vehicles & memberships**	
BETTER		4.2.1	Contract with provider to install on-site carshare vehicles and promote their use by residents	☐
BETTER		4.2.2	Provide residents with carshare memberships, either free or subsidized	☑ In partnership with Communauto or other local car sharing providers
		5.	**PARKING**	
		5.1	**Priced parking**	
BASIC	★	5.1.1	Unbundle parking cost from purchase price *(condominium)*	☑
BASIC	★	5.1.2	Unbundle parking cost from monthly rent *(multi-family)*	☑

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

TDM-Supportive Development Design and Infrastructure Checklist:
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	☑ Underground parking via lane access
BASIC	1.1.2	Locate building entrances in order to minimize walking distances to sidewalks and transit stops/stations	☑ Business entrances either face Booth Street or Albert Street
BASIC	1.1.3	Locate building doors and windows to ensure visibility of pedestrians from the building, for their security and comfort	☑
	1.2	**Facilities for walking & cycling**	
REQUIRED	1.2.1	Provide convenient, direct access to stations or major stops along rapid transit routes within 600 metres; minimize walking distances from buildings to rapid transit; provide pedestrian-friendly, weather-protected (where possible) environment between rapid transit accesses and building entrances; ensure quality linkages from sidewalks through building entrances to integrated stops/stations *(see Official Plan policy 4.3.3)*	☑
REQUIRED	1.2.2	Provide safe, direct and attractive pedestrian access from public sidewalks to building entrances through such measures as: reducing distances between public sidewalks and major building entrances; providing walkways from public streets to major building entrances; within a site, providing walkways along the front of adjoining buildings, between adjacent buildings, and connecting areas where people may congregate, such as courtyards and transit stops; and providing weather protection through canopies, colonnades, and other design elements wherever possible *(see Official Plan policy 4.3.12)*	☑

		TDM-supportive design & infrastructure measures: *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	☑ Walking connection to Pimisi Station follows desire line and has streetscaping improvements
BASIC	1.2.7	Ensure that walking routes to transit stops are secure, visible, lighted, shaded and wind-protected wherever possible	☑
BASIC	1.2.8	Design roads used for access or circulation by cyclists using a target operating speed of no more than 30 km/h, or provide a separated cycling facility	☑ Cycle tracks provided along Albert Street and Booth Street
	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)*	☑ 638 indoor bicycle parking provided in the two buildings + 118 outdoor bicycle parking for customers and visitors
REQUIRED	2.1.2	Provide the number of bicycle parking spaces specified for various land uses in different parts of Ottawa; provide convenient access to main entrances or well-used areas *(see Zoning By-law Section 111)*	☑
REQUIRED	2.1.3	Ensure that bicycle parking spaces and access aisles meet minimum dimensions; that no more than 50% of spaces are vertical spaces; and that parking racks are securely anchored *(see Zoning By-law Section 111)*	☑
BASIC	2.1.4	Provide bicycle parking spaces equivalent to the expected number of 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	☑ 638 indoor bicycle parking spaces and118 exterior bike parking proposed for residents, customers and visitors. Total bicycle parking more than double bylaw requirements (310).
	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)*	☐ Not applicable to the subject site as no office space is proposed.
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)	☑ Facilitated by on-site full service community bike shop

		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	☐ No 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	☐ N/A
BETTER	3.1.3	Provide a secure and comfortable interior waiting area by integrating any on-site transit stops into the building	☐ N/A
	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	☑ Parking bay provided on Albert Street for taxis and ride-hailing services
	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	☑ Expected as part of proposed 638 indoor bicycle parking spaces

		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	☑ On-site day care proposed

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

Legend

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

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

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

		TDM-supportive design & infrastructure measures: *Residential developments*	Check if completed & add descriptions, explanations or plan/drawing references
	2.	**WALKING & CYCLING: END-OF-TRIP FACILITIES**	
	2.1	**Bicycle parking**	
REQUIRED	2.1.1	Provide bicycle parking in highly visible and lighted areas, sheltered from the weather wherever possible *(see Official Plan policy 4.3.6)*	☑ 638 indoor bicycle parking provided in the two buildings for tenants and residents + 118 outdoor bicycle parking for customers and visitors
REQUIRED	2.1.2	Provide the number of bicycle parking spaces specified for various land uses in different parts of Ottawa; provide convenient access to main entrances or well-used areas *(see Zoning By-law Section 111)*	☑
REQUIRED	2.1.3	Ensure that bicycle parking spaces and access aisles meet minimum dimensions; that no more than 50% of spaces are vertical spaces; and that parking racks are securely anchored *(see Zoning By-law Section 111)*	☑
BASIC	2.1.4	Provide bicycle parking spaces equivalent to the expected number of resident-owned bicycles, plus the expected peak number of visitor cyclists	☑ 638 indoor bicycle parking spaces and 118 exterior bike parking proposed for residents, customers and visitors. Total bicycle parking more than double bylaw requirements (310).
	2.2	**Secure bicycle parking**	
REQUIRED	2.2.1	Where more than 50 bicycle parking spaces are provided for a single residential building, locate at least 25% of spaces within a building/structure, a secure area (e.g. supervised parking lot or enclosure) or bicycle lockers *(see Zoning By-law Section 111)*	☑ 638 interior secure spaces proposed (about 84% of total)
BETTER	2.2.2	Provide secure bicycle parking spaces equivalent to at least the number of units at condominiums or multi-family residential developments	☑
	2.3	**Bicycle repair station**	
BETTER	2.3.1	Provide a permanent bike repair station, with commonly used tools and an air pump, adjacent to the main bicycle parking area (or secure bicycle parking area, if provided)	☑ Facilitated by on-site, full service community bike shop
	3.	**TRANSIT**	
	3.1	**Customer amenities**	
BASIC	3.1.1	Provide shelters, lighting and benches at any on-site transit stops	☐ No 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	☐ N/A
BETTER	3.1.3	Provide a secure and comfortable interior waiting area by integrating any on-site transit stops into the building	☐ N/A

		TDM-supportive design & infrastructure measures: *Residential developments*	Check if completed & add descriptions, explanations or plan/drawing references
	4.	**RIDESHARING**	
	4.1	**Pick-up & drop-off facilities**	
BASIC	4.1.1	Provide a designated area for carpool drivers (plus taxis and ride-hailing services) to drop off or pick up passengers without using fire lanes or other no-stopping zones	☑ Parking bay provided on Albert Street for taxis and ride-hailing services
	5.	**CARSHARING & BIKESHARING**	
	5.1	**Carshare parking spaces**	
BETTER	5.1.1	Provide up to three carshare parking spaces in an R3, R4 or R5 Zone for specified residential uses *(see Zoning By-law Section 94)*	☐
	5.2	**Bikeshare station location**	
BETTER	5.2.1	Provide a designated bikeshare station area near a major building entrance, preferably lighted and sheltered with a direct walkway connection	☑ Expected as part of the proposed 638 indoor bicycle parking spaces
	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	☑ 130 residential and 76 visitor residential spaces provided
BASIC	6.1.3	Where a site features more than one use, provide shared parking and reduce the cumulative number of parking spaces accordingly *(see Zoning By-law Section 104)*	☐
BETTER	6.1.4	Reduce the minimum number of parking spaces required by zoning by one space for each 13 square metres of gross floor area provided as shower rooms, change rooms, locker rooms and other facilities for cyclists in conjunction with bicycle parking *(see Zoning By-law Section 111)*	☐
	6.2	**Separate long-term & short-term parking areas**	
BETTER	6.2.1	Provide separate areas for short-term and long-term parking (using signage or physical barriers) to permit access controls and simplify enforcement (i.e. to discourage residents from parking in visitor spaces, and vice versa)	☑

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APPENDIX F

Multi-Modal Level of Service (MMLOS) Evaluation Summary

Intersection #1: Sir John A Macdonald Pkwy at Booth Street									
Criteria		**North Approach**		**South Approach**		**East Approach**		**West Approach**	
5.1: Crossing Distance & Conditions									
Total Lane Crossed	**With Median (>2.4m)**		0	4	90		0		0
	No Median	6	55		0	4	88	4	88
Island Refuge	**Y/N**	No	-4	No	-4	No	-4	No	-4
5.2: Signal Phasing & Timing Features									
Left turn Conflict		No left turn/prohibited	0	No left turn/prohibited	0	Protected/permissive	-8	No left turn/prohibited	0
Right Turn Conflict		Permissive or yield contro	-5	No right turn	0	Permissive or yield control	-5	Permissive or yield control	-5
Right Turn on Red (RTOR)		RTOR prohibited	0	RTOR prohibited	0	RTOR allowed	-3	RTOR allowed	-3
Leading Ped Interval (Y/N)		No	-4	No	-4	No	-4	No	-4
5.3: Corner Radius									
Corner Radius Type		5m-10m	-5	5m-10m	-5	5m-10m	-5	5m-10m	-5
5.4 Crosswalk Treatment									
Treatment Type		Zebra stripe hi-vis markin	-4	Zebra stripe hi-vis markings	-4	Zebra stripe hi-vis markings	-4	Zebra stripe hi-vis markings	-4
PEDSI Score			33		73		55		63
LOS			**E**		**C**		**D**		**C**
Average Ped Crossing Delay	**Cycle Length**	120		120		120		120	
	Effective Walk time	10		10		10		10	
	Delay	50.4		50.4		50.4		50.4	
	LOS	**E**		**E**		**E**		**E**	
OVERALL LOS		E		E		E		E	

Intersection #2: Booth Street and Albert Street									
Criteria		**North Approach**		**South Approach**		**East Approach**		**West Approach**	
5.1: Crossing Distance & Conditions									
Total Lane Crossed	**With Median (>2.4m)**		0		0		0		0
	No Median	5	72	3	105	7	39	6	55
Island Refuge	**Y/N**	No	-4	No	-4	No	-4	No	-4
5.2: Signal Phasing & Timing Features									
Left turn Conflict		Permissive	-8	Permissive	-8	Protected/permissive	-8	Permissive	-8
Right Turn Conflict		Permissive or yield contro	-5	Permissive or yield control	-5	Permissive or yield control	-5	Permissive or yield control	-5
Right Turn on Red (RTOR)		R prohibited at certain tin	-2	RTOR allowed	-3	RTOR allowed	-3	RTOR prohibited at certain time(s)	-2
Leading Ped Interval (Y/N)		No	-4	No	-4	No	-4	No	-4
5.3: Corner Radius									
Corner Radius Type		10m-15m	-6	5m-10m	-5	5m-10m	-5	10m-15m	-6
5.4 Crosswalk Treatment									
Treatment Type		Zebra stripe hi-vis markin	-4	Zebra stripe hi-vis markings	-4	Zebra stripe hi-vis markings	-4	Zebra stripe hi-vis markings	-4
PEDSI Score			39		72		6		22
LOS			**E**		**C**		**F**		**F**
Average Ped Crossing Delay	**Cycle Length**	120		120		120		120	
	Effective Walk time	7		7		7		7	
	Delay	53.2		53.2		53.2		53.2	
	LOS	**E**		**E**		**E**		**E**	
OVERALL LOS		E		E		F		F	

Intersection #3: Albert Street at Empress Avenue									
Criteria		**North Approach**		**South Approach**		**East Approach**		**West Approach**	
5.1: Crossing Distance & Conditions									
Total Lane Crossed	**With Median (>2.4m)**		0		0		0		0
	No Median		0	2	120	6	55	6	55
Island Refuge	**Y/N**		-4	No	-4	No	-4	No	-4
5.2: Signal Phasing & Timing Features									
Left turn Conflict			0	Permissive	-8	No left turn/prohibited	0	Permissive	-8
Right Turn Conflict			0	Permissive or yield control	-5	Permissive or yield control	-5	Permissive or yield control	-5
Right Turn on Red (RTOR)			0	RTOR allowed	-3	RTOR allowed	-3	RTOR prohibited at certain time(s)	-2
Leading Ped Interval (Y/N)			-4	No	-4	No	-4	No	-4
5.3: Corner Radius									
Corner Radius Type			0	5m-10m	-5	3m-5m	-4	10m-15m	-6
5.4 Crosswalk Treatment									
Treatment Type			0	Standard transverse markings	-7	Standard transverse markings	-7	Standard transverse markings	-7
PEDSI Score			-8		84		28		19
LOS			**F**		**B**		**F**		**F**
Average Ped Crossing Delay	**Cycle Length**			120		120		120	
	Effective Walk time			7		7		7	
	Delay			53.2		53.2		53.2	
	LOS			**E**		**E**		**E**	
OVERALL LOS				E		F		F	

Intersection #4: Slater Street and Bronson Avenue									
Criteria		**North Approach**		**South Approach**		**East Approach**		**West Approach**	
5.1: Crossing Distance & Conditions									
Total Lane Crossed	**With Median (>2.4m)**		0		0		0		0
	No Median	4	88	4	88	3	105	3	105
Island Refuge	**Y/N**	Yes	0	No	-4	No	-4	No	-4
5.2: Signal Phasing & Timing Features									
Left turn Conflict		Permissive	-8	No left turn/prohibited	0	Protected/permissive	-8	No left turn/prohibited	0
Right Turn Conflict		No right turn	0	No right turn	0	Permissive or yield control	-5	No right turn	0
Right Turn on Red (RTOR)		RTOR prohibited	0	RTOR prohibited	0	RTOR prohibited	0	RTOR prohibited	0
Leading Ped Interval (Y/N)		No	-4	No	-4	No	-4	No	-4
5.3: Corner Radius									
Corner Radius Type		No rigt turn	0	No rigt turn	0	3m-5m	-4	No rigt turn	0
5.4 Crosswalk Treatment									
Treatment Type		Standard transverse mark	-7	Standard transverse markings	-7	Standard transverse markings	-7	Standard transverse markings	-7
PEDSI Score			69		73		73		90
LOS			**C**		**C**		**C**		**A**
Average Ped Crossing Delay	**Cycle Length**	75		75		75		75	
	Effective Walk time	7		7		13		13	
	Delay	30.8		30.8		25.6		25.6	
	LOS	**D**		**D**		**C**		**C**	
OVERALL LOS		D		D		C		C	

Road Segment Approach	Bike Lane Type	Left-Turn or Right-Turn Evaluation	# of lane crossed and operating speed	BLOS
Intersection #1: Sir John A Macdonald Pkwy at Booth Street				
North Approach	Grade Separated Bike Lane	Right-Turn	No impact on LTS	A
		Left-Turn	Two-stage	A
South Approach	Grade Separated Bike Lane	Right-Turn	No impact on LTS	A
		Left-Turn	Two-stage	A
East Approach	Grade Separated Bike Lane	Right-Turn	No impact on LTS	A
		Left-Turn	Two-stage	A
West Approach	Grade Separated Bike Lane	Right-Turn	No impact on LTS	A
		Left-Turn	Two-stage	A
Intersection #2: Booth Street and Albert Street				
North Approach	Grade Separated Bike Lane	Right-Turn	No impact on LTS	A
		Left-Turn	2 or more lanes crossed, ≥ 50km/h	F
South Approach	Mixed Traffic	Right-Turn	Right-turn lane 25-50m, turning speed ≤ 25km/h	D
		Left-Turn	1 lane crossed, ≤ 40km/h	B
East Approach	Grade Separated Bike Lane	Right-Turn	No impact on LTS	A
		Left-Turn	2 or more lanes crossed, ≥ 50km/h	F
West Approach	Grade Separated Bike Lane	Right-Turn	No impact on LTS	A
		Left-Turn	Two-stage	A
Intersection #3: Albert Street at Empress Avenue				
South Approach	Mixed Traffic	Right-Turn	Right-turn lane 25-50m, turning speed ≤ 25km/h	D
		Left-Turn	No lane crossed, ≤ 50km/h	B
East Approach	Grade Separated Bike Lane	Right-Turn	No impact on LTS	D
		Left-Turn	Two-stage	A
West Approach	Grade Separated Bike Lane	Right-Turn	Right-turn lane 25-50m, turning speed ≤ 25km/h	D
		Left-Turn	2 or more lanes crossed, ≥ 50km/h	F
Intersection #4: Slater Street and Bronson Avenue				
North Approach	Two-way Separated Bike Lane	Right-Turn	No impact on LTS	A
		Left-Turn	Two-stage	A
South Approach	Mixed Traffic	Right-Turn	Right-turn lane 25-50m, turning speed ≤ 25km/h	D
		Left-Turn	1 lane crossed, 50km/h	D
East Approach	Two-way Separated Bike Lane	Right-Turn	No impact on LTS	A
		Left-Turn	One-stage	A
West Approach	Mixed Traffic	Right-Turn	Right-turn lane 25-50m, turning speed ≤ 25km/h	D
		Left-Turn	Two-stage	A

Intersections		Sir John A. Macdonald Pkwy / Wellington St at Booth Street				Booth Street at Albert Street				Albert Street / Slater Street at Empress Avenue				Slater Street at Bronson Avenue			
		North	South	East	West	North	South	East	West	North	South	East	West	North	South	East	West
Pedestrian	Lanes	6	4	4	4	5	3	7	6		2	6	6	4	4	3	3
	Median	No	Yes	No	No	No	No	No	No		No	No	No	No	No	No	No
	Island Refuge	No	No	No	No	No	No	No	No		No	No	No	Yes	No	No	No
	Conflicting Left Turns	None/Prohibited	None/Prohibited	Prot+Perm	None/Prohibited	Permissive	Permissive	Prot+Perm	Permissive		Permissive	None/Prohibited	Permissive	Permissive	None/Prohibited	Prot+Perm	None/Prohibited
	Conflicting Right Turns	Permissive/Yield	None	Permissive/Yield	Permissive/Yield	Permissive/Yield	Permissive/Yield	Permissive/Yield	Permissive/Yield		Permissive/Yield	Permissive/Yield	Permissive/Yield	None	None	Permissive/Yield	None
	RTOR	Fully Prohibited	Fully Prohibited	Allowed	Allowed	Time Prohibited	Allowed	Allowed	Time Prohibited		Allowed	Allowed	Time Prohibited	Fully Prohibited	Fully Prohibited	Fully Prohibited	Fully Prohibited
	Ped Leading Interval	No	No	No	No	No	No	No	No		No	No	No	No	No	No	No
	Corner Radius (largest)	5-10m	5-10m	5-10m	5-10m	10-15m	5-10m	5-10m	10-15m		5-10m	3-5m	10-15m	No Right Turn	No Right Turn	3-5m	No Right Turn
	Crosswalk Type	Zebra Stripe	Zebra Stripe	Zebra Stripe	Zebra Stripe	Zebra Stripe	Zebra Stripe	Zebra Stripe	Zebra Stripe		Standard	Standard	Standard	Standard	Standard	Standard	Standard
	Level of Service	E (33)	C (73)	D (55)	C (63)	E (39)	C (72)	F (6)	F (22)	(N/A)	B (84)	F (28)	F (19)	C (69)	C (73)	C (73)	A (90)
		E				**F**				**F**				**C**			
Cyclist	Type of Bikeway	Bike Lanes	Bike Lanes	Bike Lanes	Bike Lanes	Bike Lanes	Mixed Traffic	Bike Lanes	Bike Lanes		Mixed Traffic	Bike Lanes	Bike Lanes	Bike Lanes	Mixed Traffic	Bike Lanes	Mixed Traffic
	Turning speed (25km to 80km)	<=25 km/h	<=25 km/h	<=25 km/h	<=25 km/h	<=25 km/h	<=25 km/h	<=25 km/h	<=25 km/h		<=25 km/h	<=25 km/h	<=25 km/h	<=25 km/h	<=25 km/h	<=25 km/h	<=25 km/h
	Introduction of Right-Turn Lane	Right of Bike Lane	Right of Bike Lane	Right of Bike Lane	Right of Bike Lane	Right of Bike Lane	Right of Bike Lane	Right of Bike Lane	Right of Bike Lane		Right of Bike Lane	Right of Bike Lane	Right of Bike Lane	Right of Bike Lane	Right of Bike Lane	Right of Bike Lane	Right of Bike Lane
	Right Turn Storage Length	>50 m	>50 m	>50 m	>50 m	>50 m	<=50 m	<=50 m	<=50 m		<=50 m	<=50 m	<=50 m	<=50 m	<=50 m	<=50 m	<=50 m
	Dual Right Turn	No	No	No	No	No	No	No	No		No	No	No	No	No	No	No
	Shared Through-Right	No	No	No	No	No	Yes	No	No		No	No	No	No	No	No	No
	Bike Box	Yes	Yes	Yes	Yes	No	No	No	No		No	No	No	Yes	No	Yes	Yes
	Number of Lanes Crossed for LTs	None	None	None	None	2 or more	None	2 or more	2 or more		None	None	None	None	1	None	None
	Operating Speed on Approach	<=40 km/h	<=40 km/h	<=40 km/h	<=40 km/h	50 km/h	<=40 km/h	50 km/h	50 km/h		<=40 km/h	50 km/h	50 km/h	<=40 km/h	50 km/h	<=40 km/h	<=40 km/h
	Dual Left Turn Lanes	No	No	No	No	No	No	No	No		No	No	No	No	No	No	No
	Level of Service	A	A	A	A	F	F	F	F	N/A	D	B	B	A	D	A	D
		A				**F**				**D**				**D**			
Transit	Average Signal Delay	<=10 sec	<=20 sec	>40 sec	>40 sec	>40 sec	<=40 sec	<=30 sec	<=20 sec			<=10 sec	<=10 sec	<=10 sec	<=20 sec		<=30 sec
	Level of Service	B	C	F	F	F	E	D	C	N/A	N/A	B	B	B	C	N/A	D
		F				**F**				**B**				**D**			
Truck	Turning Radius (smallest)	<10 m	<10 m	<10 m	<10 m	>15 m	<10 m	<10 m	<10 m	<10 m	<10 m	<10 m	<10 m	<10 m	<10 m	<10 m	<10 m
	Number of Receiving Lanes	More than One	More than One	More than One	More than One	More than One	More than One	More than One	More than One	More than One	More than One	More than One	More than One	More than One	More than One	More than One	More than One
	Level of Service	D	D	D	D	A	D	D	D	D	D	D	D	D	D	D	D
		D				**D**				**D**				**D**			
Auto	Level of Service	**C**				**C**				**B**				**B**			

TYLin

APPENDIX G

Traffic Volume Figures

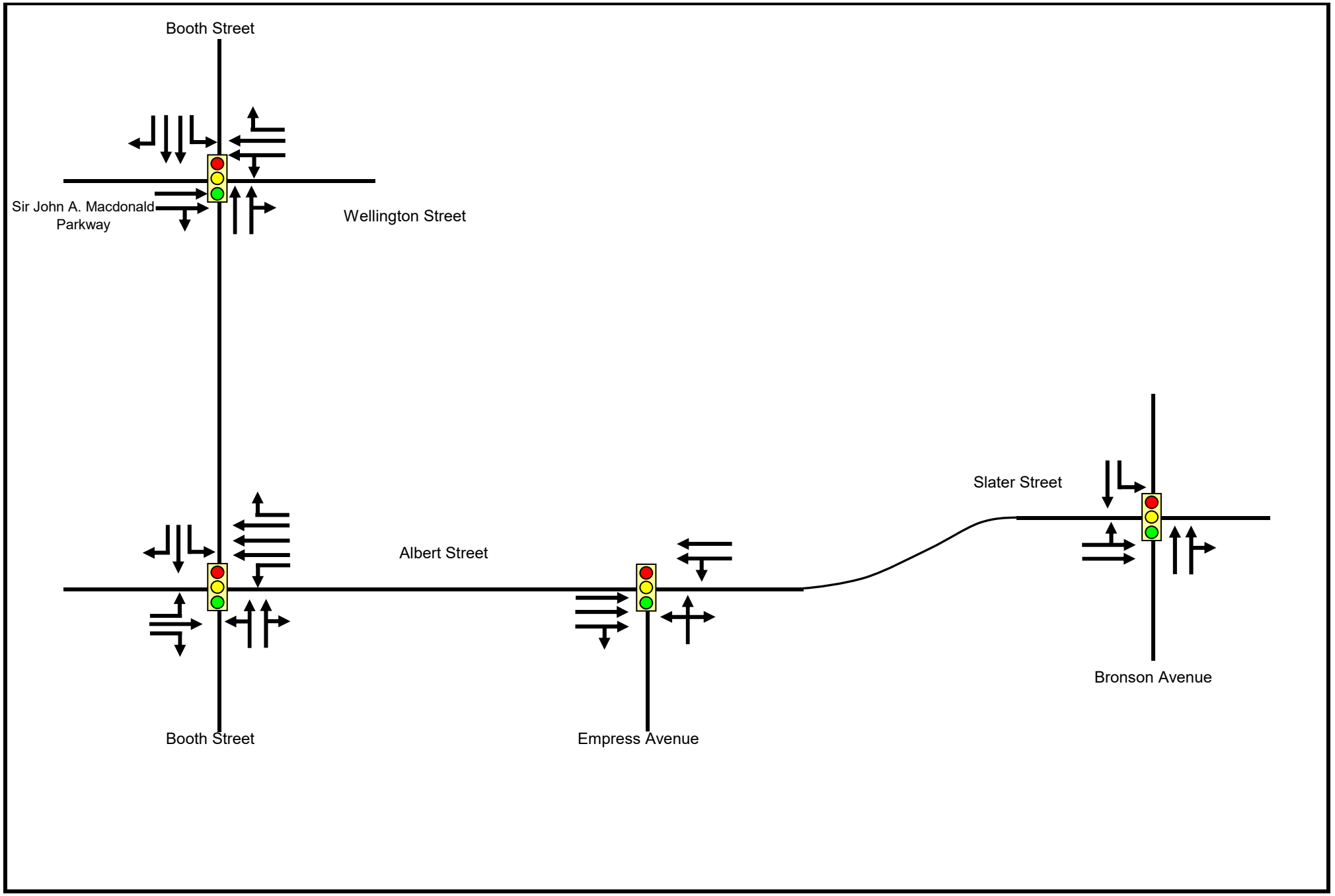
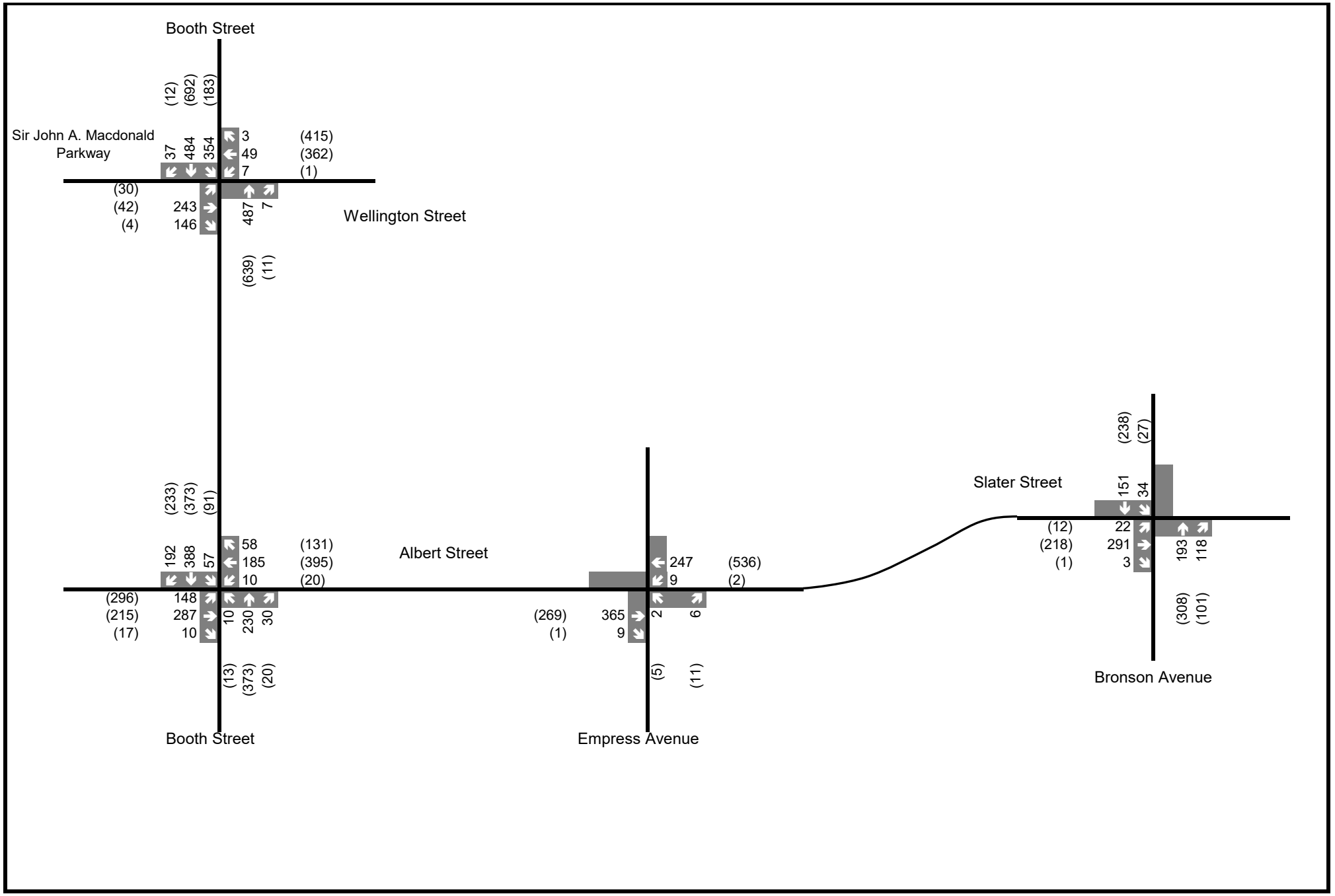


Figure 3-1

Existing Lane Configurations



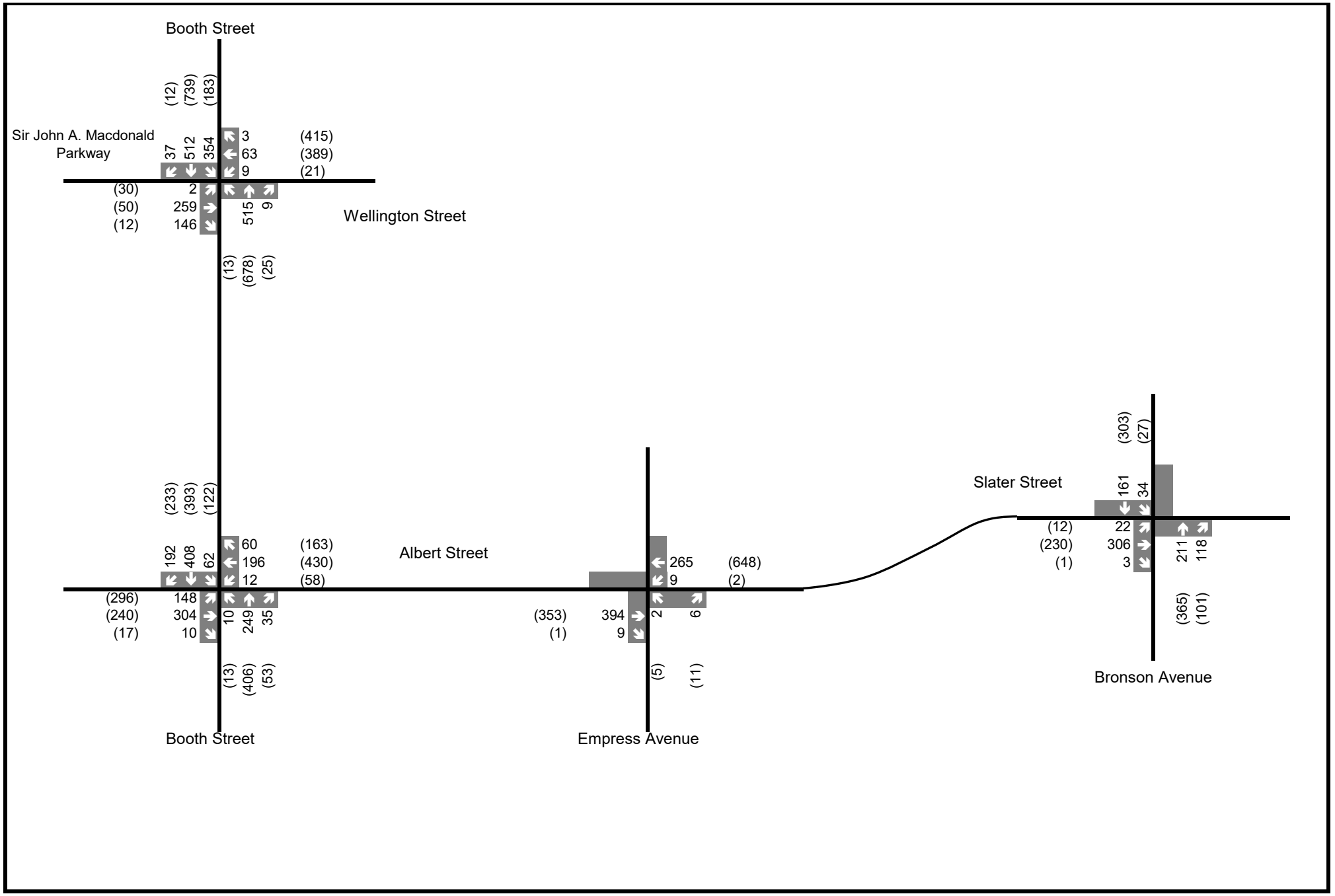
Legend

xx A.M. Peak Hour Traffic
(xx) P.M. Peak Hour Traffic

TYLin

Figure 3-2

Baseline 2022
Traffic Volumes



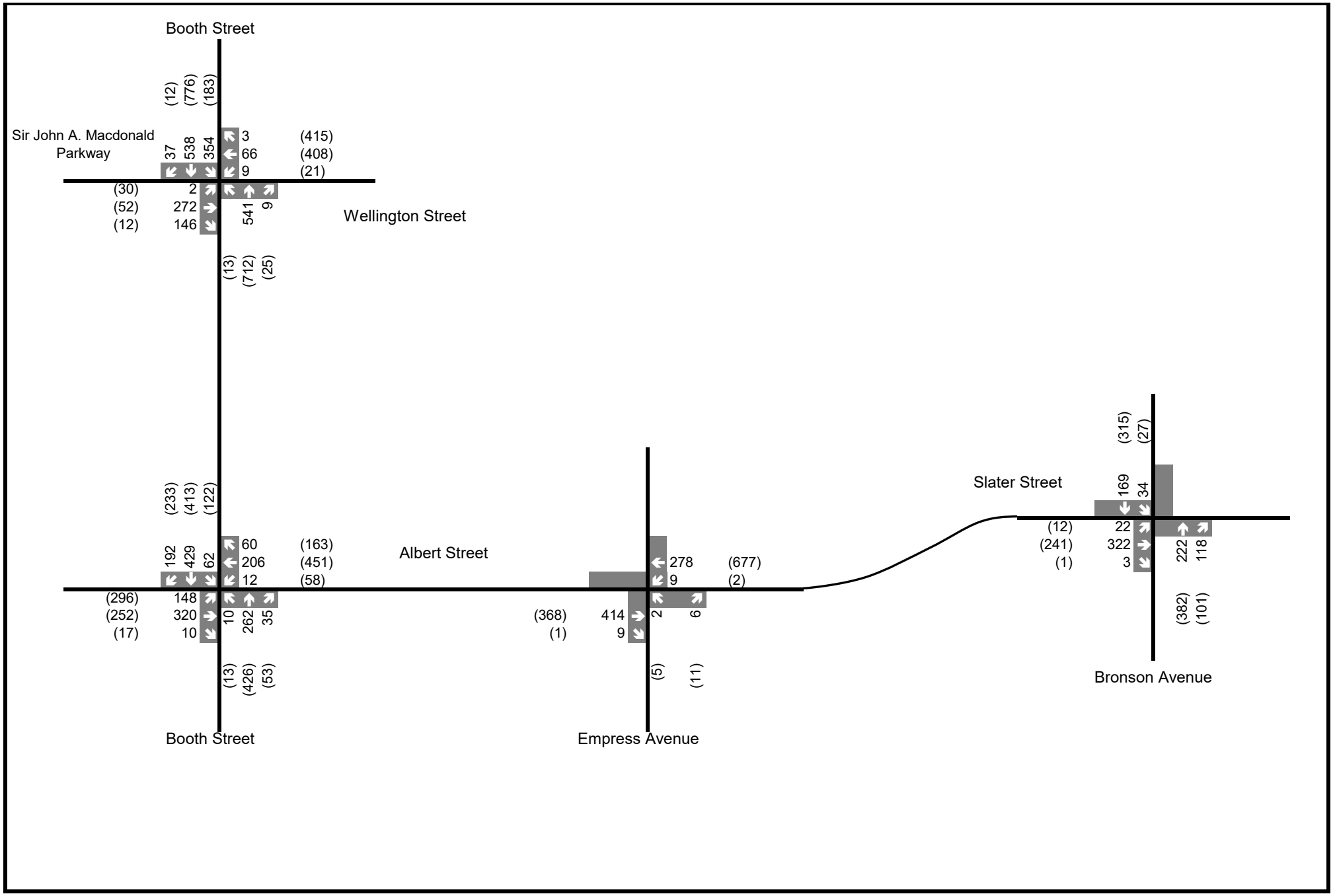
Legend

xx A.M. Peak Hour Traffic
(xx) P.M. Peak Hour Traffic

TYLin

Figure 3-3

Future Background 2027
Traffic Volumes



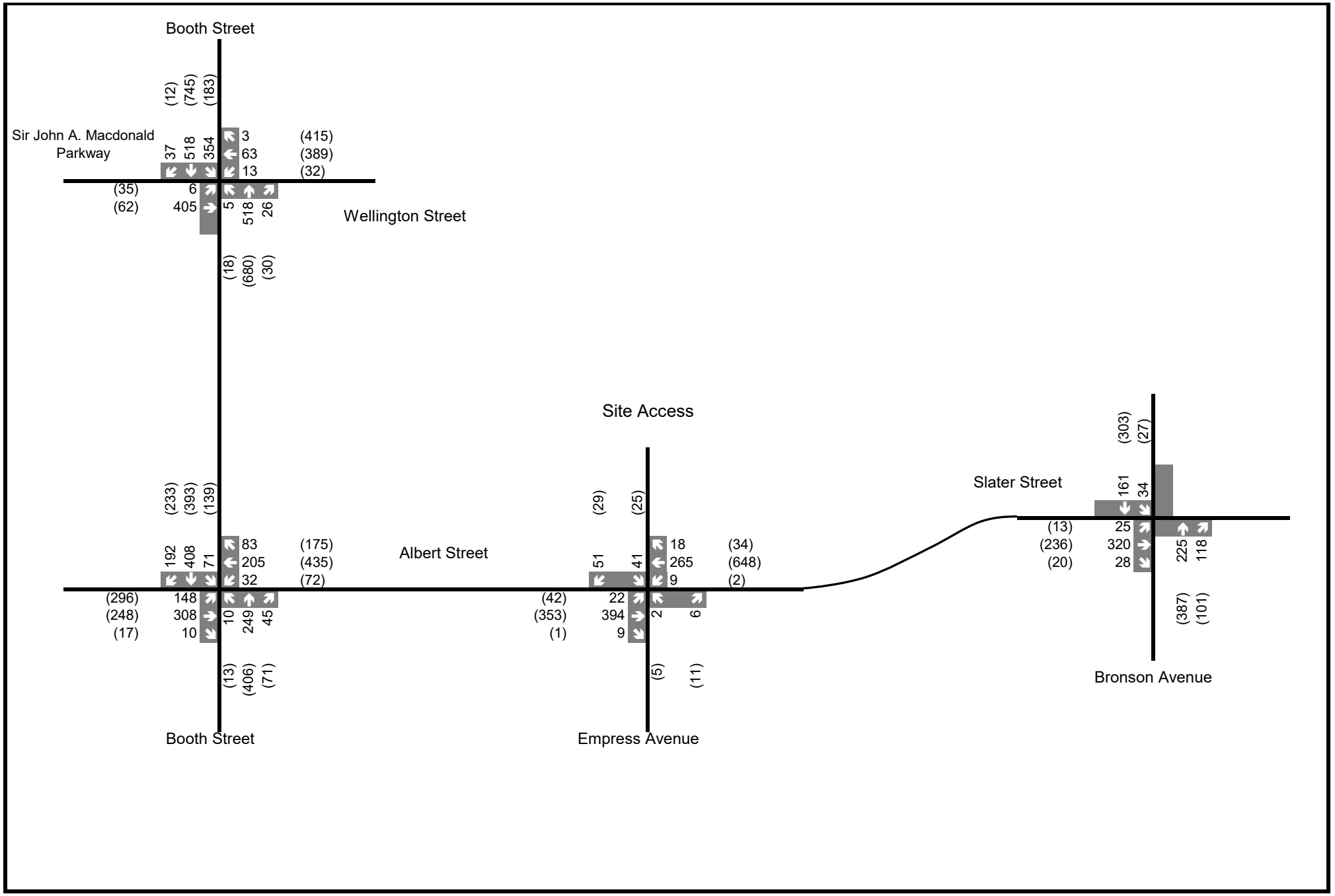
Legend

xx A.M. Peak Hour Traffic
(xx) P.M. Peak Hour Traffic

TYLin

Figure 3-4

Future Background 2032
Traffic Volumes



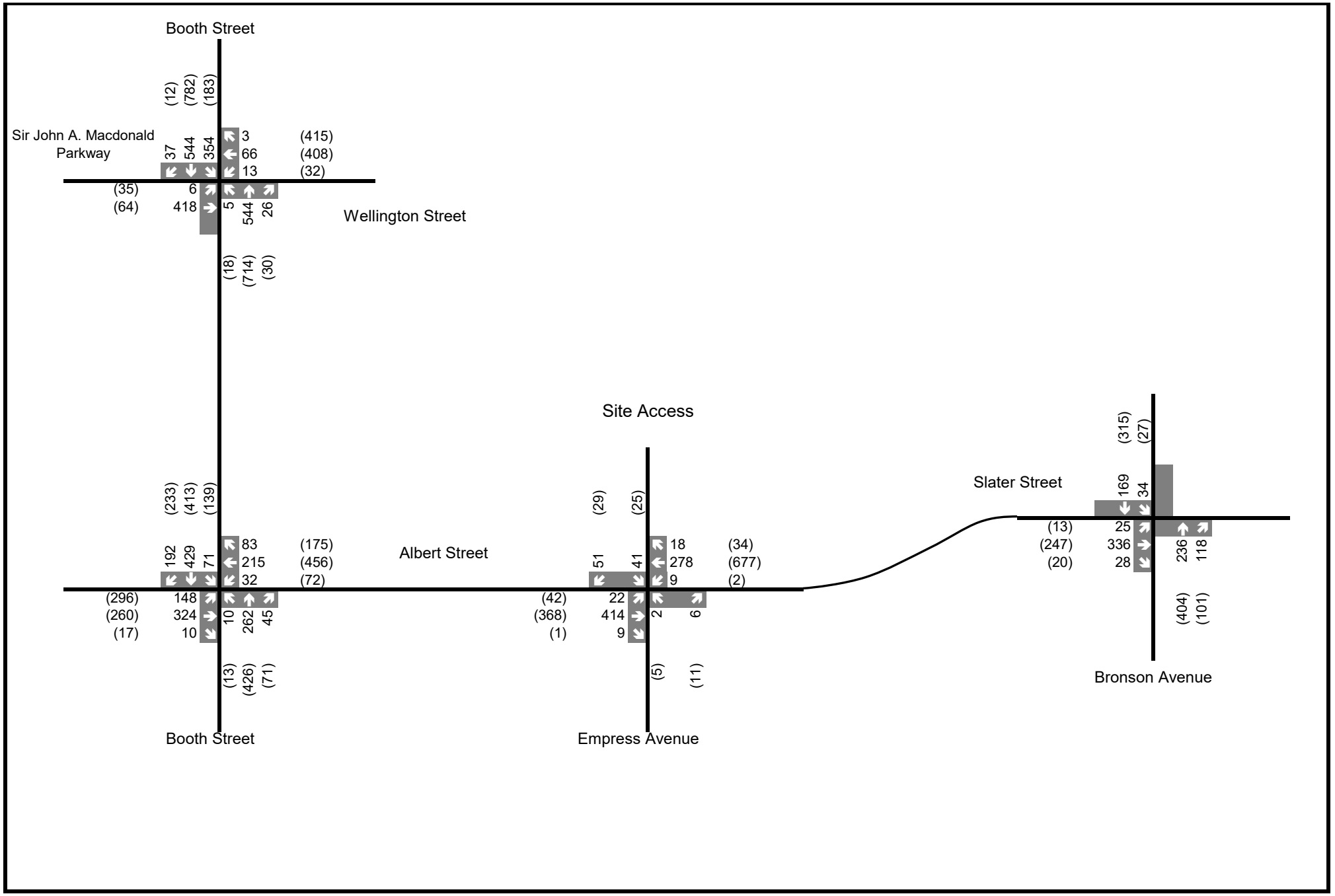
Legend

xx A.M. Peak Hour Traffic
(xx) P.M. Peak Hour Traffic

TYLin

Figure 3-5

Future Total 2027
Traffic Volumes



Legend

xx A.M. Peak Hour Traffic
(xx) P.M. Peak Hour Traffic

TYLin

Figure 3-6

Future Total 2032
Traffic Volumes

TYLin

APPENDIX H

Albert Street Reference Drawing Set

ALBERT STREET RECONSTRUCTION

GRADING & DRAINAGE
ALBERT STREET
STA. 9+150 TO STA. 9+300

R. Holder, P. Eng. — Manager, Light Rail Projects
L. Foley, P. Eng. — Project Manager, Rail Design & Construction

Robinson Consultants

LICENSED PROFESSIONAL ENGINEER — G.A. BLOW — 8 Oct. '14 — PROVINCE OF ONTARIO

Ottawa

Contract No. ISD12-5096	Dwg. No. P1
Sheet _ of _	
Asset No. ----------	
Asset Group ---	
Des. D.H. / I.M	Chk'd. G.B. / L.D.
Dwn. D.H. / I.M.	Chk'd. G.B. / L.D.
Utility Circ. No. ____	Index No. ____
Const. Inspector ____	

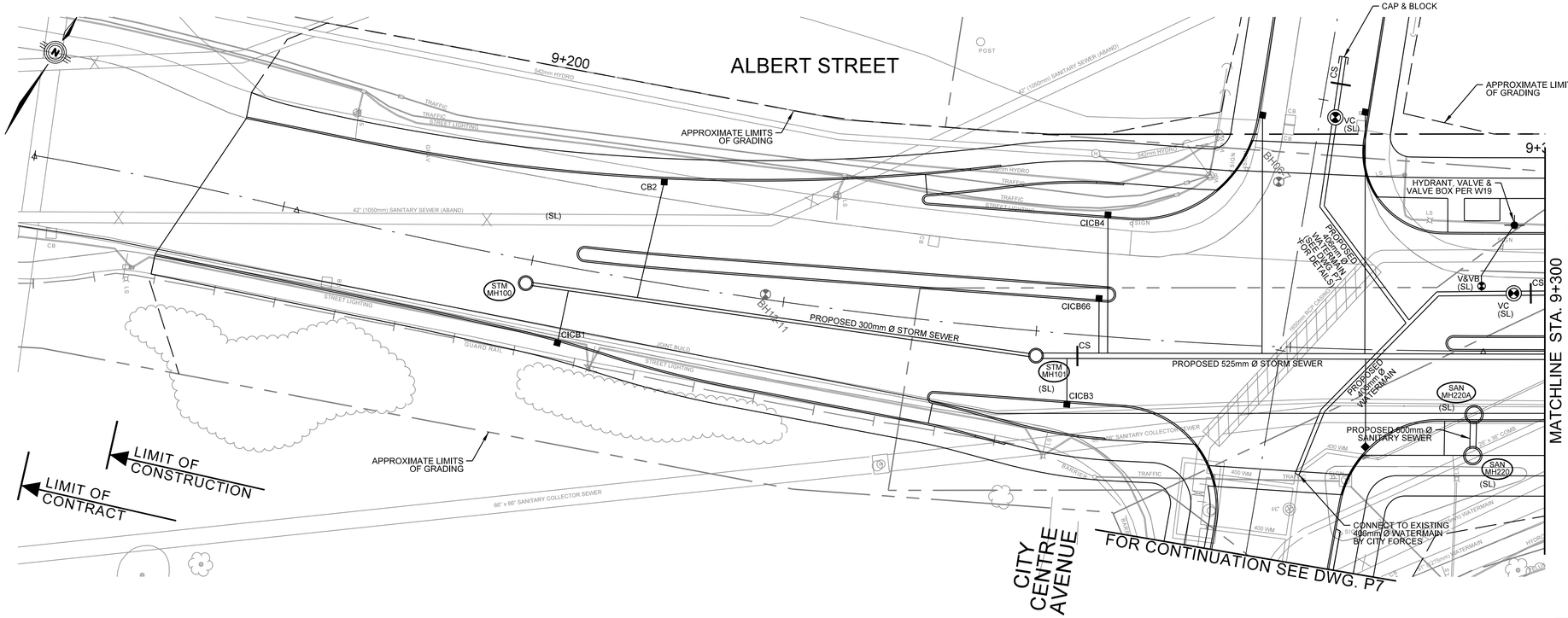
Scale: HORIZONTAL 0m 2.5 5 10 — VERTICAL 0m 1 2

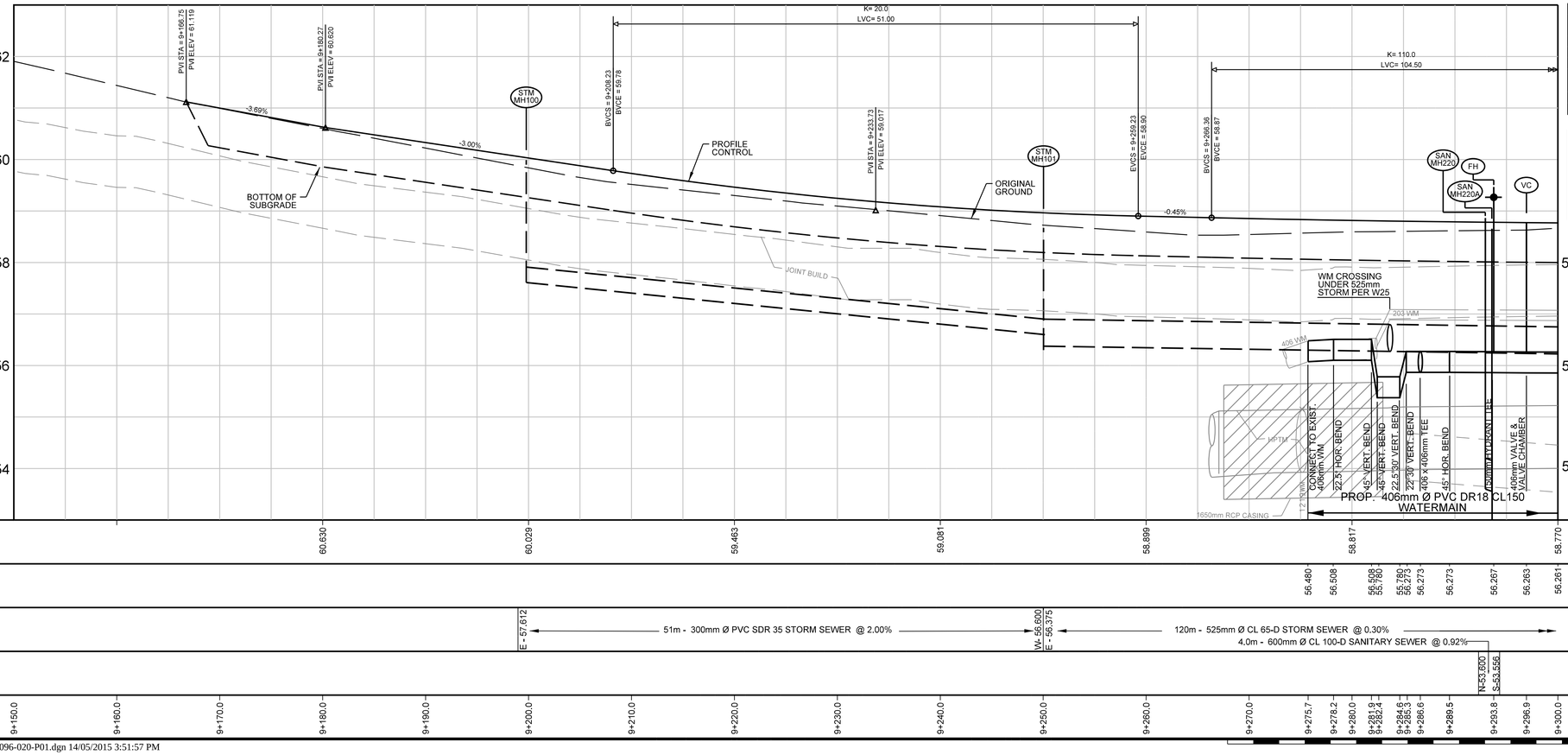
NOTE: The location of utilities is approximate only, the exact location should be determined by consulting the municipal authorities and utility companies concerned. The contractor shall prove the location of utilities and shall be responsible for adequate protection from damage.

REVISIONS

No.	Description	By	Date (dd/mm/yy)
2	ISSUED FOR CIRCULATION	R.C.	07.06.13
3	ISSUED FOR TENDER	R.C.	03.08.13
4	RE-ISSUED FOR CIRCULATION	R.C.	25.11.13
5	ISSUED FOR ECA APPLICATION	R.C.	30.01.14
6	ISSUED FOR CONSTRUCTION	R.C.	30.04.14
7	ISSUED FOR CHANGE ORDER	G.B.	25.06.14
8	ISSUED FOR SCM No. 16 (ALBERT / CITY CENTRE CURB REVISIONS)	R.C.	17.09.14
9	ISSUED FOR SCM (DROP MH'S 217A & 220A)	G.B.	08.10.14

NOTE:
THE FOLLOWING MH REQUIRE A SAFETY PLATFORM BE INSTALLED:
SAN MH211 / SANMH215 / SANMH223A / SANMH224 / SANMH225 / SANMH226 / STMMH105 / STMMH106 / STMMH107 / STMMH108 / STMMH118 STMMH125 / STMMH126 / STMMH127 / STMMH128 / STMMH129 / STMMH130 / STMMH131 (SEE DETAIL DWG. D1)





STORM MANHOLE DATA

No.	Station	Offset (m)	Type		Elevations		Grate to Invert
			Structure	Cover	Grate	Low Inv.	
STM MH100	9+199.78	2.31 R	701.010	S24.1 / S25	59.99	57.61	2.38
STM MH101	9+250.03	2.44 R	701.010	S24.1 / S25	58.95	56.38	2.58

SANITARY MANHOLE DATA

No.	Station	Offset (m)	Type		Elevations		Grate to Invert
			Structure	Cover	Grate	Low Inv.	
SAN MH220	9+292.95	10.274R	701.011	S24 / S25	58.78	53.60	5.18
SAN MH220A	9+293.07	6.236R	701.010	S24 / S25	58.78	53.26	5.52

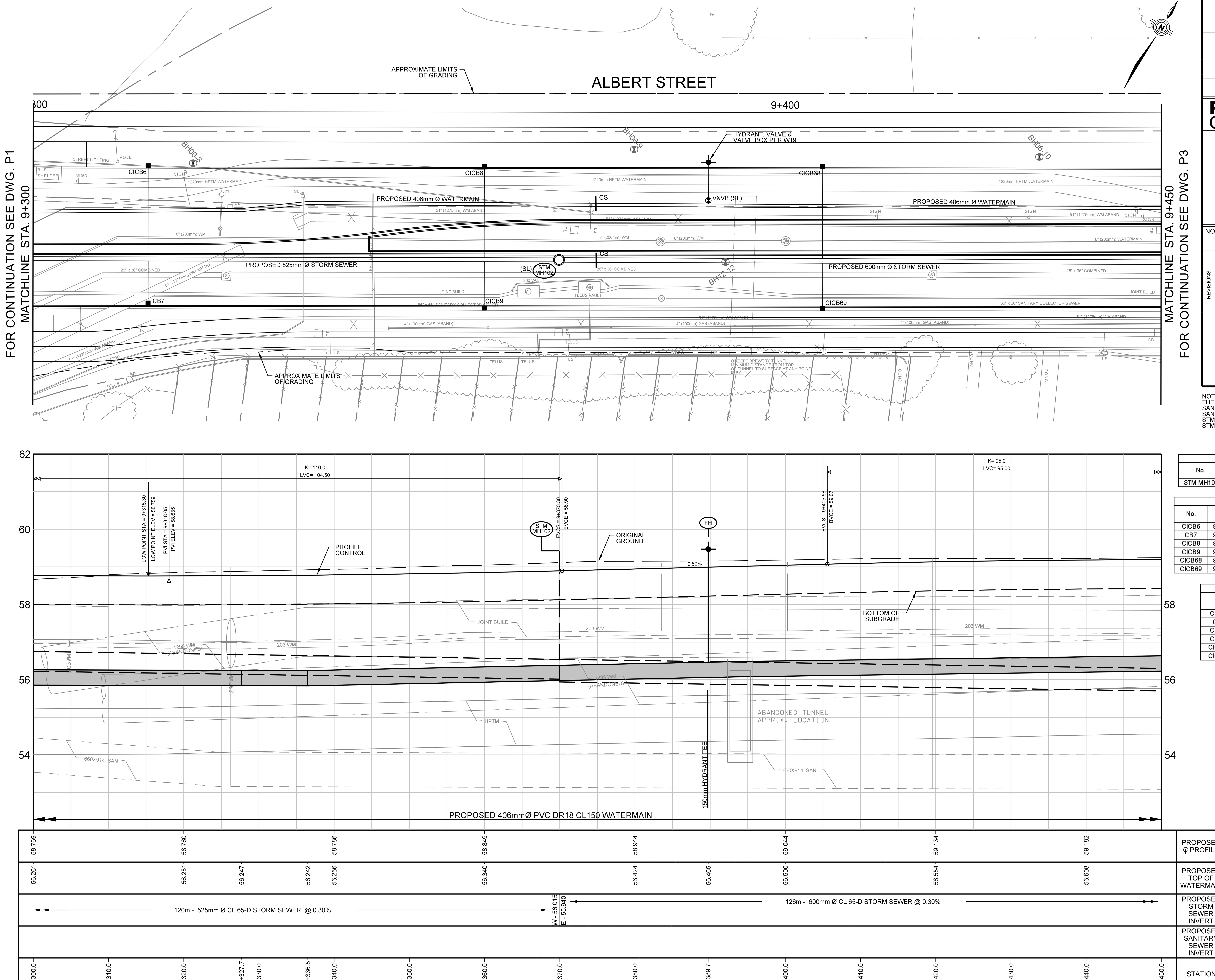
CATCH BASIN DATA

No.	Station	Offset (m)	Type		Elevations		Grate to Invert
			Structure	Grate	Grate	Low Inv.	
CICB1	9+203.90	7.20 R	705.010	S22 / S23	59.92	58.07	1.85
CB2	9+211.50	9.89 L	705.010	S19 / 400.020	59.70	58.00	1.70
CICB3	9+253.58	6.61 R	705.010	S22 / S23	58.96	57.11	1.85
CICB4	9+256.14	11.94 L	705.010	S22 / S23	58.84	56.99	1.85
CICB66	9+255.90	3.69 L	705.010	S22 / S23	59.00	57.15	1.85

CATCH BASIN LEAD DATA

Structure to Structure	Dia.	Type	Length	Invert Elevations	
				Upstream	Downstream
CICB1 TO MAIN	200mm	PVC	5.5	58.07	58.02
CB2 TO MAIN	200mm	PVC	12.7	58.00	57.87
CICB3 TO MAIN	200mm	PVC	4.8	57.11	57.06
CICB4 TO MAIN	200mm	PVC	13.6	56.99	56.85
CICB66 TO MAIN	200mm	PVC	5.4	57.15	57.10

ISSUED



ALBERT STREET RECONSTRUCTION

GRADING & DRAINAGE
ALBERT STREET
STA. 9+300 TO STA. 9+450

R. Holder, P. Eng.
Manager
Light Rail Projects

L. Foley, P. Eng.
Project Manager
Rail Design & Construction

Robinson Consultants

LICENSED PROFESSIONAL ENGINEER — G.A. BLOW — 8 Oct. '14 — PROVINCE OF ONTARIO

Ottawa

Contract No. ISD12-5096	Dwg. No. P2
Sheet _ of _	
Asset No. --------	
Asset Group ---	
Des. D.H. / I.M	Chk'd. G.B. / L.D.
Dwn. D.H. / I.M.	Chk'd. G.B. / L.D.
Utility Circ. No. ------	Index No. ------
Const. Inspector ----------	

Scale: HORIZONTAL 0m 2.5 5 10; VERTICAL 0m 1 2

NOTE: The location of utilities is approximate only, the exact location should be determined by consulting the municipal authorities and utility companies concerned. The contractor shall prove the location of utilities and shall be responsible for adequate protection from damage.

REVISIONS

No.	Description	By	Date (dd/mm/yy)
2	ISSUED FOR CIRCULATION	R.C.	07.06.13
3	ISSUED FOR TENDER	R.C.	03.08.13
4	RE-ISSUED FOR CIRCULATION	R.C.	25.11.13
5	ISSUED FOR ECA APPLICATION	R.C.	30.01.14
6	ISSUED FOR CONSTRUCTION	R.C.	30.04.14
7	ISSUED FOR SCM No. 7	R.C.	22.07.14
8	ISSUED FOR SCM No. 16 (ALBERT / CITY CENTRE CURB REVISIONS)	R.C.	17.09.14
9	ISSUED FOR SCM (DROP MH'S 217A & 220A)	G.B.	08.10.14

NOTE:
THE FOLLOWING MH REQUIRE A SAFETY PLATFORM BE INSTALLED:
SAN MH211 / SANMH215 / SANMH223A / SANMH224 / SANMH225 / SANMH226 / STMMH105 / STMMH106 / STMMH107 / STMMH108 / STMMH 118 STMMH125 / STMMH126 / STMMH127 / STMMH128 / STMMH129 / STMMH130 / STMMH131 (SEE DETAIL DWG. D1)

STORM MANHOLE DATA

No.	Station	Offset (m)	Type		Elevations		Grate to
			Structure	Cover	Grate	Low Inv.	Invert
STM MH102	9+369.94	0.64 R	701.010	S24.1 / S25	58.88	55.94	2.94

CATCH BASIN DATA

No.	Station	Offset (m)	Type		Elevations		Grate to
			Structure	Grate	Grate	Low Inv.	Invert
CICB6	9+315.30	11.50 L	705.010	S22 / S23	58.61	56.76	1.85
CB7	9+315.30	6.75 R	705.010	S19.1 / 400.020	58.56	56.86	1.70
CICB8	9+360.00	11.50 L	705.010	S22 / S23	58.77	56.92	1.85
CICB9	9+360.00	6.75 R	705.010	S22 / S23	58.87	57.02	1.85
CICB68	9+405.00	11.50 L	705.010	S22 / S23	58.99	57.14	1.85
CICB69	9+405.00	6.75 R	705.010	S22 / S23	59.09	57.24	1.85

CATCH BASIN LEAD DATA

Structure to Structure	Dia.	Type	Length	Invert Elevations	
				Upstream	Downstream
CICB6 TO MAIN	200mm	PVC	12.1	56.76	56.64
CB7 TO MAIN	200mm	PVC	5.6	56.86	56.80
CICB8 TO MAIN	200mm	PVC	12.2	56.92	56.80
CICB9 TO MAIN	200mm	PVC	5.2	57.02	56.96
CICB68 TO MAIN	200mm	PVC	12.2	57.14	57.02
CICB69 TO MAIN	200mm	PVC	6.0	57.24	57.18

ISSUED

ALBERT STREET RECONSTRUCTION

GRADING & DRAINAGE
ALBERT STREET
STA. 9+450 TO STA. 9+600

R. Holder, P. Eng. — Manager, Light Rail Projects
L. Foley, P. Eng. — Project Manager, Rail Design & Construction

Robinson Consultants

LICENSED PROFESSIONAL ENGINEER — G.A. BLOW — 27 April 15 — PROVINCE OF ONTARIO

Ottawa

Contract No.	Dwg. No.
ISD12-5096	P3

Sheet _ of _

Asset No. ---------

Asset Group ---

Des.	Chk'd.
D.H. / I.M	G.B. / R.C.
Dwn.	Chk'd.
D.H. / I.M.	G.B. / R.C.
Utility Circ. No.	Index No.
____	____

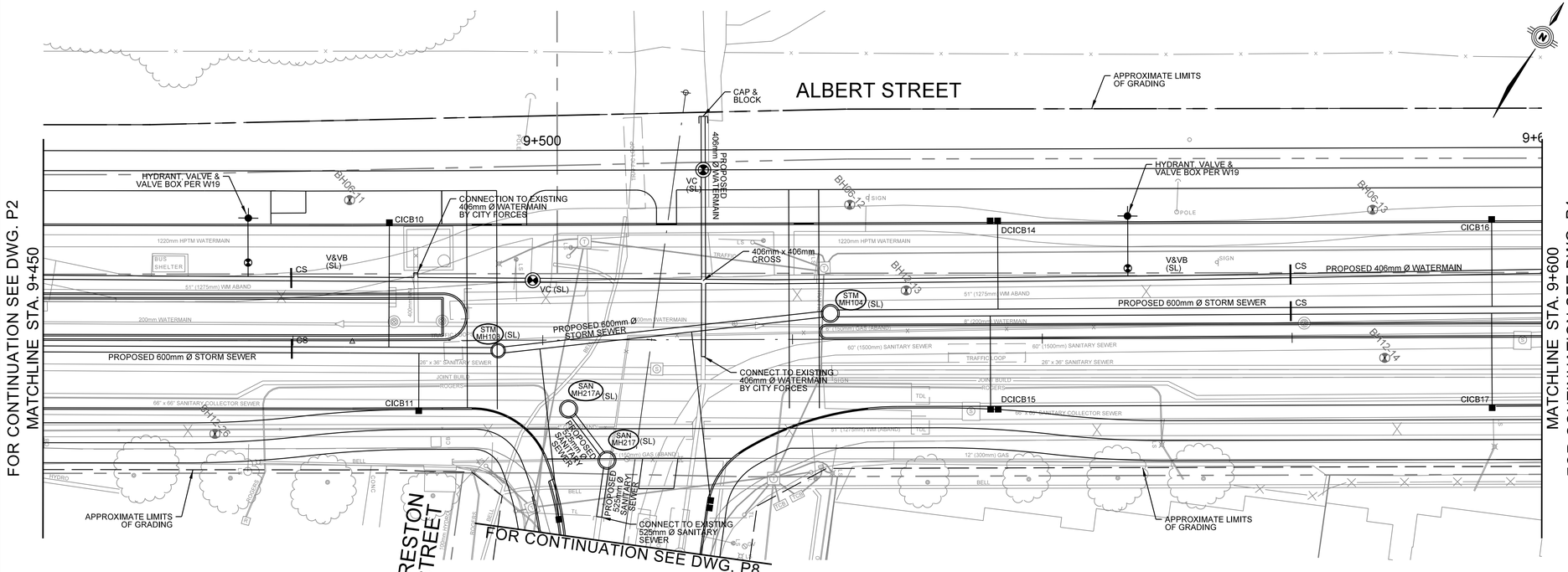
Const. Inspector _____

Scale: HORIZONTAL 0m 2.5 5 10 / 0m 1 2 VERTICAL

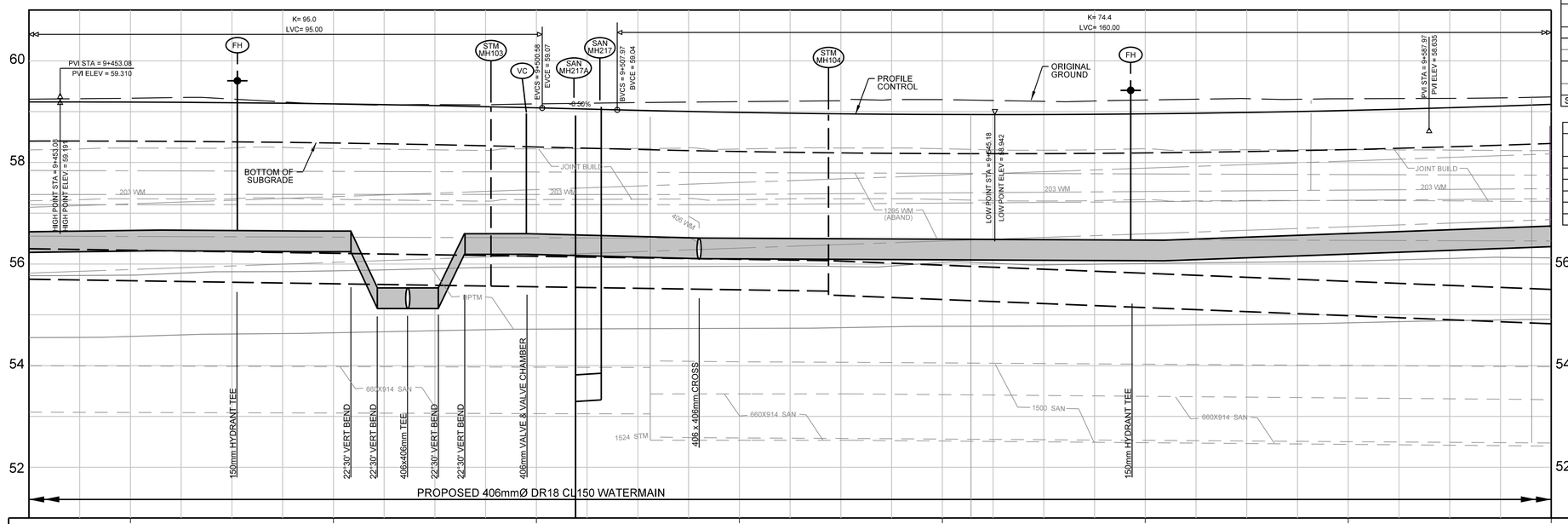
NOTE: The location of utilities is approximate only, the exact location should be determined by consulting the municipal authorities and utility companies concerned. The contractor shall prove the location of utilities and shall be responsible for adequate protection from damage.

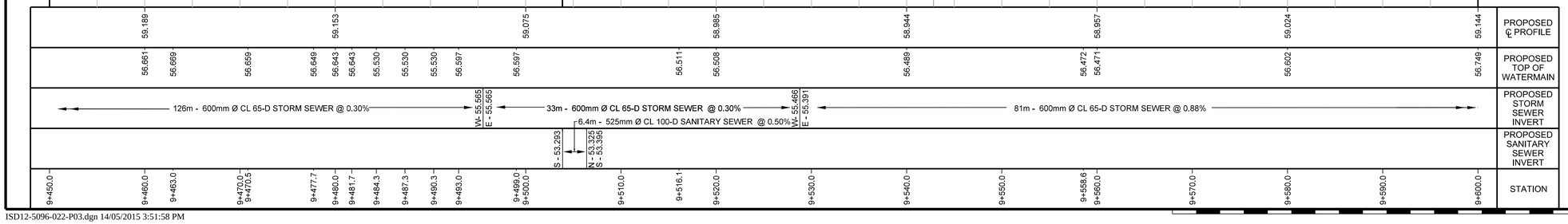
REVISIONS

No.	Description	By	Date (dd/mm/yy)
1	ISSUED FOR RIO SUBMISSION	R.C.	30.04.13
2	ISSUED FOR CIRCULATION	R.C.	07.06.13
3	ISSUED FOR TENDER	R.C.	03.08.13
4	RE-ISSUED FOR CIRCULATION	R.C.	25.11.13
5	ISSUED FOR ECA APPLICATION	R.C.	30.01.14
6	ISSUED FOR CONSTRUCTION	R.C.	30.04.14
7	ISSUED FOR SCM No. 7	R.C.	22.07.14
8	ISSUED FOR SCM (DROP MH'S 217A & 220A)	G.B.	08.10.14
9	ISSUED FOR CHANGE IN HYDRANT LOCATION	G.B.	27.04.15



NOTE:
THE FOLLOWING MH REQUIRE A SAFETY PLATFORM BE INSTALLED:
SAN MH211 / SANMH215 / SANMH223A / SANMH224 / SANMH225 / SANMH226 / STMMH105 / STMMH106 / STMMH107 / STMMH108 / STMMH118 / STMMH125 / STMMH126 / STMMH127 / STMMH128 / STMMH129 / STMMH130 / STMMH131 (SEE DETAIL DWG. D1)





ISSUED

STORM MANHOLE DATA							
No.	Station	Offset (m)	Type		Elevations		Grate to Invert
			Structure	Cover	Grate	Low Inv.	
STM MH103	9+495.53	1.03 R	701.010	S24.1 / S25	59.08	55.57	3.51
STM MH104	9+528.79	2.59 L	701.010	S24.1 / S25	58.91	55.47	3.44
SANITARY MANHOLE DATA							
No.	Station	Offset (m)	Type		Elevations		Grate to Invert
			Structure	Cover	Grate	Low Inv.	
SAN MH217	9+506.81	12.041R	701.011	S24 / S25	59.05	53.32	5.72
SAN MH217A	9+502.56	6.907 R	701.010	S24 / S25	59.07	52.99	6.08

CATCH BASIN DATA						
No.	Station	Offset (m)	Type		Elevations		Grate to Invert
			Structure	Grate	Grate	Low Inv.	
CICB10	9+484.68	11.83 L	705.010	S22 / S23	59.06	57.21	1.85
CICB11	9+487.57	7.03 R	705.010	S22 / S23	59.14	57.29	1.85
DCICB14	9+545.18	11.50 L	705.020	S22 / S23 (2)	58.81	56.96	1.85
DCICB15	9+545.18	6.75 R	705.020	S22 / S23 (2)	58.91	57.06	1.85
CICB16	9+595.00	11.50 L	705.010	S22 / S23	59.03	57.18	1.85
CICB17	9+595.00	6.75 R	705.010	S22 / S23	59.12	57.27	1.85

CATCH BASIN LEAD DATA					
Structure to Structure	Dia.	Type	Length	Invert Elevations	
				Upstream	Downstream
CICB10 TO MAIN	200mm	PVC	12.5	57.21	57.08
CICB11 TO MAIN	200mm	PVC	5.8	57.29	57.24
DCICB14 TO MAIN	250mm	PVC	9.0	56.96	56.87
DCICB15 TO MAIN	250mm	PVC	9.5	57.06	56.96
CICB16 TO MAIN	200mm	PVC	8.9	57.18	57.09
CICB17 TO MAIN	200mm	PVC	9.7	57.27	57.18

ALBERT STREET RECONSTRUCTION

GRADING & DRAINAGE ALBERT STREET STA. 9+600 TO STA. 9+750

Contract No. ISD12-5096 | Dwg. No. P4

Sheet _ of _

Asset No. --------

Asset Group ---

R. Holder, P. Eng. — *Manager, Light Rail Projects*

L. Foley, P. Eng. — *Project Manager, Rail Design & Construction*

Robinson Consultants

Ottawa

Des.	Chk'd.
D.H. / I.M	G.B.

Dwn.	Chk'd.
D.H. / I.M.	G.B.

Utility Circ. No. ____ | Index No. ____

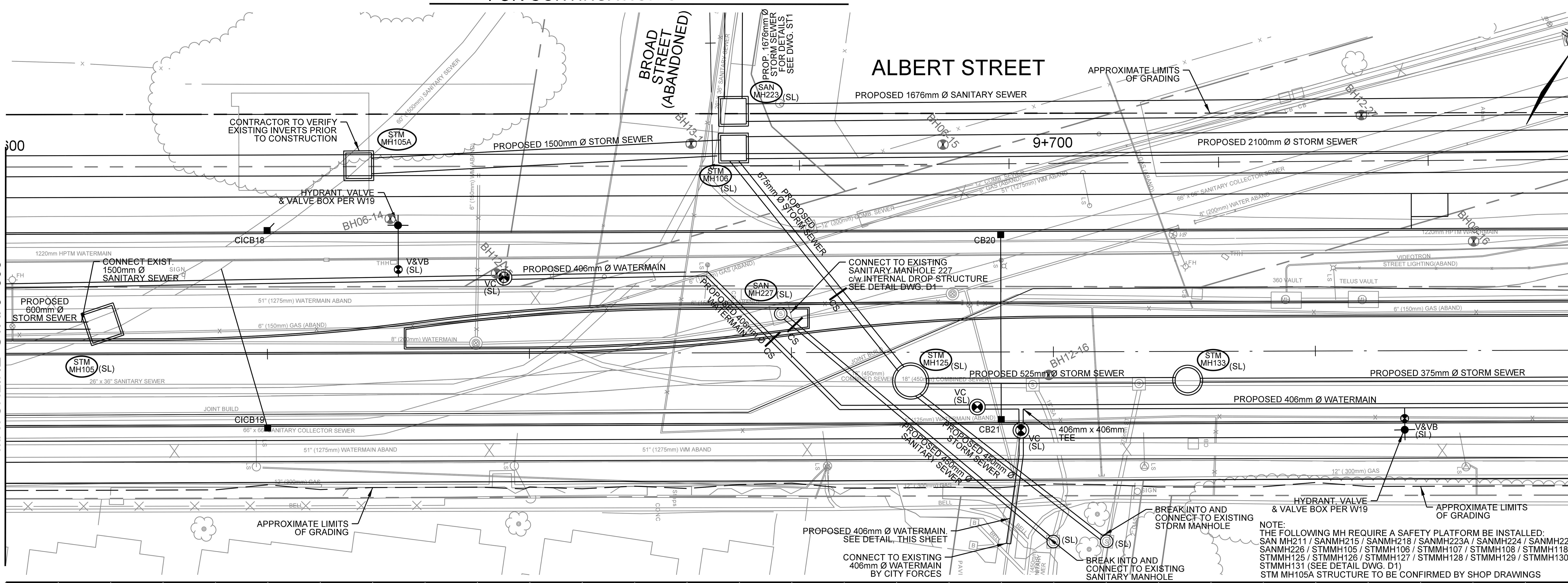
Const. Inspector ________

Scale: HORIZONTAL 0m 2.5 5 10; VERTICAL 0m 1 2

FOR CONTINUATION SEE DWG. ST1

FOR CONTINUATION SEE DWG. P3 — MATCHLINE STA. 9+600

MATCHLINE STA. 9+750 — FOR CONTINUATION SEE DWG. P5



NOTE:
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SAN MH211 / SANMH215 / SANMH218 / SANMH223A / SANMH224 / SANMH225 / SANMH226 / STMMH105 / STMMH106 / STMMH107 / STMMH108 / STMMH118 / STMMH125 / STMMH126 / STMMH127 / STMMH128 / STMMH129 / STMMH130 / STMMH131 (SEE DETAIL DWG. D1)
STM MH105A STRUCTURE TO BE CONFIRMED BY SHOP DRAWINGS

NOTE: The location of utilities is approximate only, the exact location should be determined by consulting the municipal authorities and utility companies concerned. The contractor shall prove the location of utilities and shall be responsible for adequate protection from damage.

REVISIONS

No.	Description	By	Date (dd/mm/yy)
1	ISSUED FOR RIO SUBMISSION	R.C.	30.04.13
2	ISSUED FOR CIRCULATION	R.C.	07.06.13
3	ISSUED FOR TENDER	R.C.	03.08.13
4	RE-ISSUED FOR CIRCULATION	R.C.	25.11.13
5	ISSUED FOR ECA APPLICATION	R.C.	30.01.14
6	ISSUED FOR CONSTRUCTION	R.C.	30.04.14
7	ISSUED IN RESPONSE TO RFI	G.B.	28.08.14

No.	Station	Offset (m)	Type: Structure	Type: Cover	Elevations: Grate	Elevations: Low Inv.	Grate to Invert
STM MH105	9+609.31	2.73 L	2440 x 2440	S24.1 / S25	59.16	52.30	6.86
STM MH125	9+686.38	2.75 R	701.011	S24.1 / S25	60.20	53.46	6.74
STM MH133	9+712.81	2.75 R	701.010	S24.1 / S25	60.64	55.40	5.25

SANITARY MANHOLE DATA

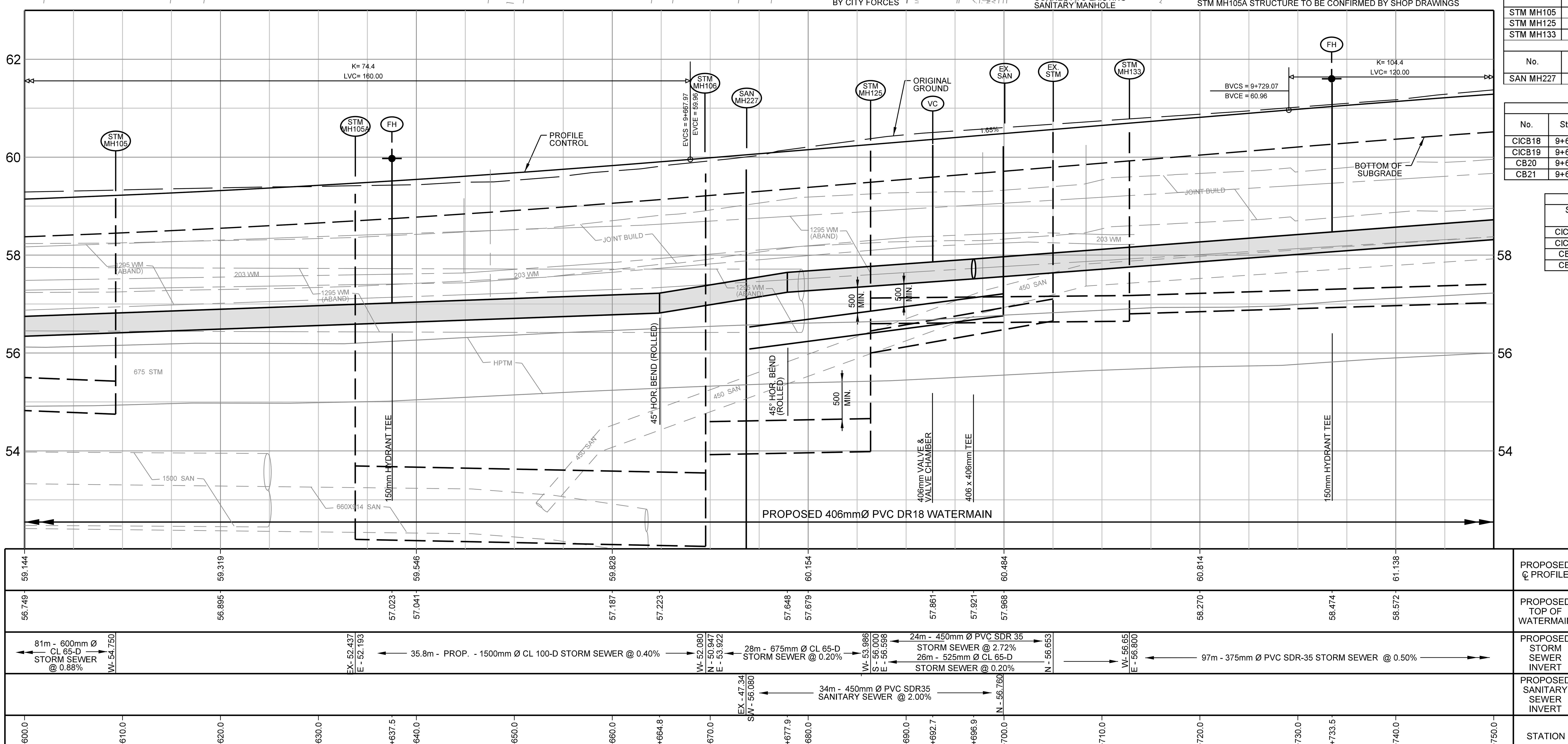
No.	Station	Offset (m)	Type: Structure	Type: Cover	Elevations: Grate	Elevations: Low Inv.	Grate to Invert
SAN MH227	9+673.99	3.71 L	EXISTING	S24 / S25	60.20	47.34	12.86

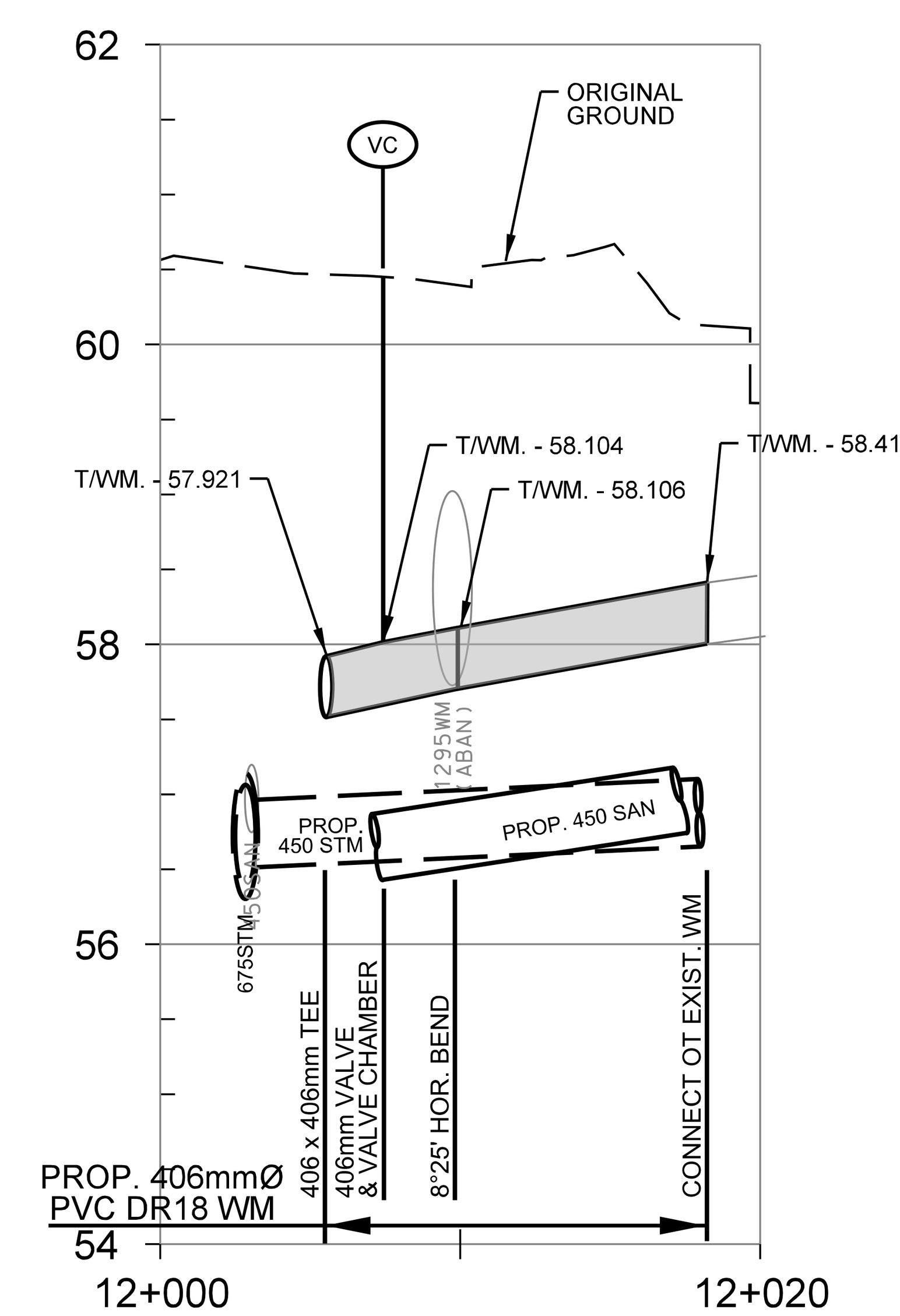
CATCH BASIN DATA

No.	Station	Offset (m)	Type: Structure	Type: Grate	Elevations: Grate	Elevations: Low Inv.	Grate to Invert
CICB18	9+625.00	11.50 L	705.010	S22 / S23	59.29	57.44	1.85
CICB19	9+625.00	6.75 R	705.010	S22 / S23	59.39	57.54	1.85
CB20	9+695.00	11.50 L	705.010	S19.1 / 400.020	60.30	58.60	1.70
CB21	9+695.00	6.75 R	705.010	S19.1 / 400.020	60.27	58.57	1.70

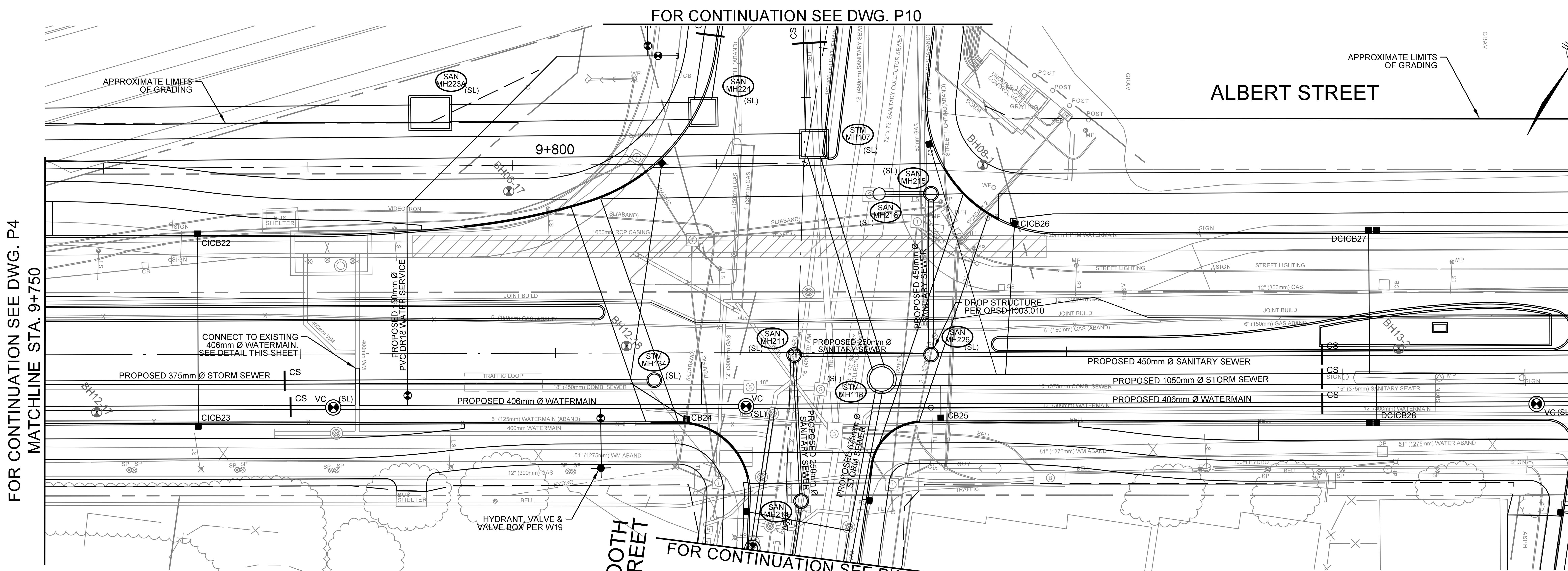
CATCH BASIN LEAD DATA

Structure to Structure	Dia.	Type	Length	Invert Elevations: Upstream	Invert Elevations: Downstream
CICB18 TO MAIN	200mm	PVC	1.0	57.44	57.43
CICB19 TO MAIN	200mm	PVC	15.5	57.54	57.38
CB20 TO MAIN	200mm	PVC	13.7	58.60	58.46
CB21 TO MAIN	200mm	PVC	3.4	58.57	58.53

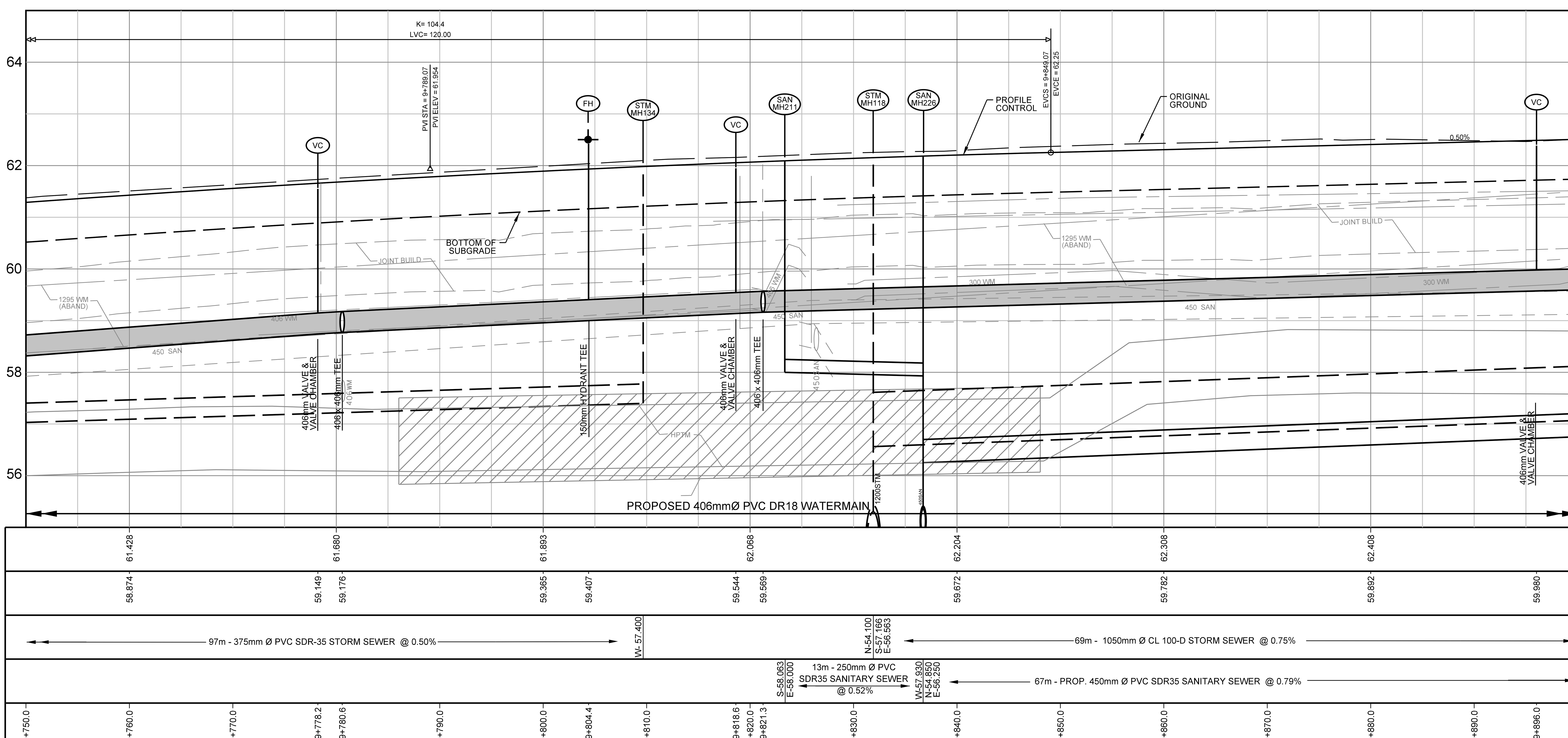


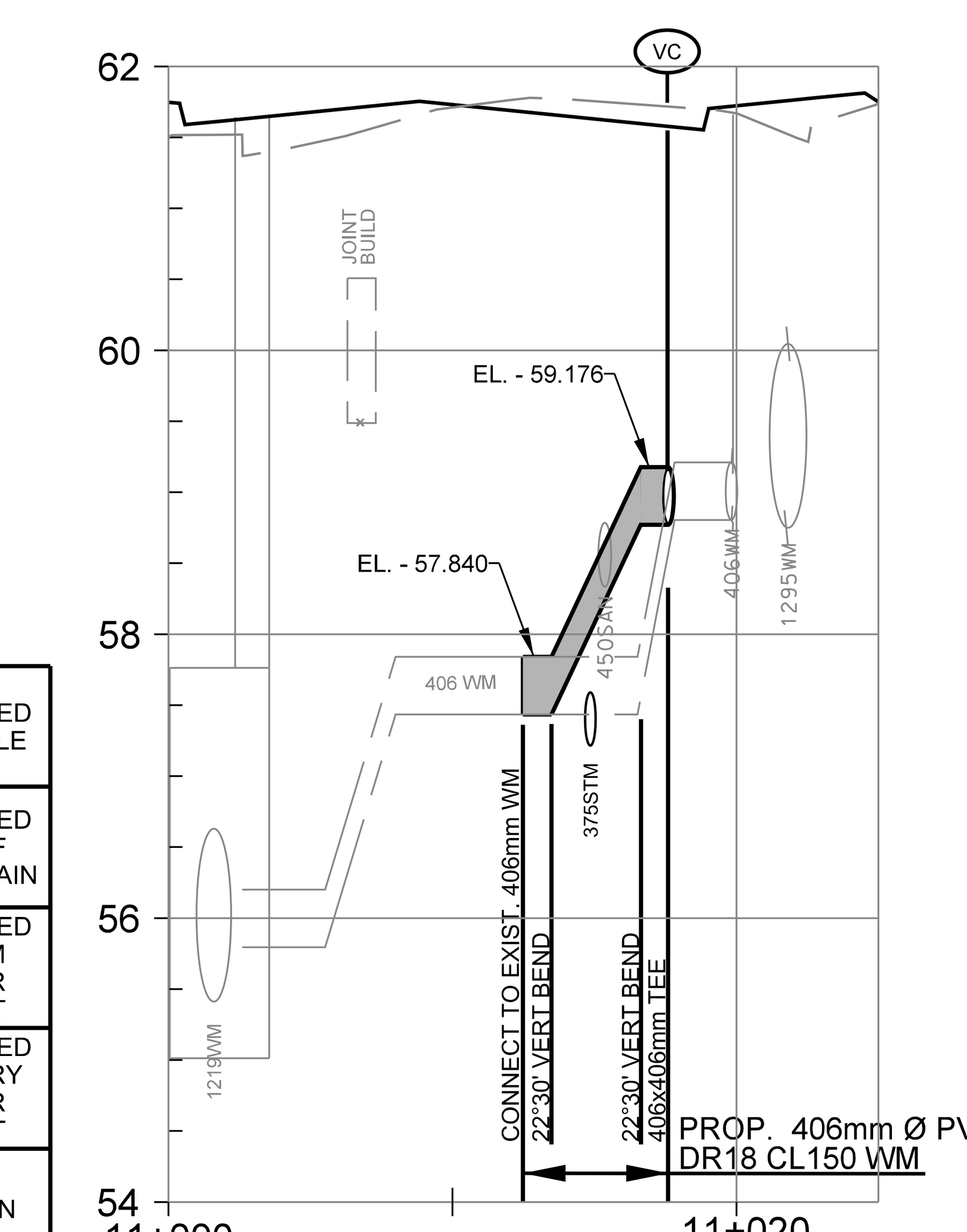


ISSUED



NOTE: THE FOLLOWING MANHOLES REQUIRE A SAFETY PLATFORM TO BE INSTALLED: SANMH202 / SANMH203 / SANMH204 / SANMH207 / SANMH215 / SANMH218 / SANMH223A / SANMH224 / SANMH225 /SANMH226 / STMMH105 / STMMH106 / STMMH107 / STMMH108 / STMMH109 / STMMH110 / STMMH114 / STMMH118 / STMMH125 / STMMH126 / STMMH127 / STMMH128 / STMMH129 / STMMH130 / STMMH131 (SEE DETAIL DWG. D1)





ALBERT STREET RECONSTRUCTION

GRADING & DRAINAGE
ALBERT STREET
STA. 9+750 TO STA. 9+900

R. Holder, P. Eng. *Manager* *Light Rail Projects*	L. Foley, P. Eng. *Project Manager* *Rail Design & Construction*

Robinson Consultants

Contract No. ISD12-5096	Dwg. No. P5
Sheet _ of _	
Asset No. --------	
Asset Group ---	
Des. D.H. / I.M	Chk'd. G.B. / L.D.
Dwn. D.H. / I.M.	Chk'd. G.B. / L.D.
Utility Circ. No. ____	Index No. ____
Const. Inspector ______	

Scale: HORIZONTAL 0m 2.5 5 10; VERTICAL 0m 1 2

NOTE: The location of utilities is approximate only, the exact location should be determined by consulting the municipal authorities and utility companies concerned. The contractor shall prove the location of utilities and shall be responsible for adequate protection from damage.

REVISIONS

No.	Description	By	Date (dd/mm/yy)
1	ISSUED FOR RIO SUBMISSION	R.C.	30.04.13
2	ISSUED FOR CIRCULATION	R.C.	07.06.13
3	ISSUED FOR TENDER	R.C.	03.08.13
4	RE-ISSUED FOR CIRCULATION	R.C.	25.11.13
5	ISSUED FOR ECA APPLICATION	R.C.	30.01.14
6	ISSUED FOR CONSTRUCTION	R.C.	30.04.14
7	ISSUED FOR REVIEW - BRICKHILL EXTENSION	G.B.	13.03.2015
8	ISSUED FOR CIRCULATION	G.B.	14.04.2015
9	ISSUED FOR CHANGE IN GEOMETRY	G.B.	15.05.2015

STORM MANHOLE DATA

No.	Station	Offset (m)	Type		Elevations		Grate to Invert
			Structure	Cover	Grate	Low Inv.	
STM MH118	9+832.81	2.67 R	701.013	S24.1 / S25	62.10	54.10	8.00
STM MH134	9+809.65	2.75 R	701.010	S24.1 / S25	61.93	57.40	4.53

SANITARY MANHOLE DATA

No.	Station	Offset (m)	Type		Elevations		Grate to Invert
			Structure	Cover	Grate	Low Inv.	
SAN MH211	9+823.36	0.25 L	701.010	S24 / S25	62.09	58.00	4.09
SAN MH226	9+836.76	0.2 R	701.010	S24 / S25	62.18	54.85	7.33

CATCH BASIN DATA

No.	Station	Offset (m)	Type		Elevations		Grate to Invert
			Structure	Grate	Grate	Low Inv.	
CICB22	9+765.00	11.50 L	705.010	S22 / S23	61.55	59.70	1.85
CICB23	9+765.00	6.75 R	705.010	S22 / S23	61.51	59.66	1.85
CB24	9+812.77	6.78 R	705.010	S19.1 / 400.020	61.87	59.27	2.60
CB25	9+837.69	6.75 R	705.010	S19.1 / 400.020	62.05	60.05	2.00
CICB26	9+844.96	12.57 L	705.010	S22 / S23	61.91	60.21	1.70
DCICB27	9+880.00	11.50 L	705.020	S22 / S23 (2)	62.33	60.43	1.90
DCICB28	9+880.00	6.75 R	705.020	S22 / S23 (2)	62.42	60.52	1.90

CATCH BASIN LEAD DATA

Structure to Structure	Dia.	Type	Length	Invert Elevations	
				Upstream	Downstream
CICB22 TO MAIN	200mm	PVC	14.5	59.70	59.55
CICB23 TO MAIN	200mm	PVC	4.2	59.66	59.62
CB24 TO MAIN	200mm	PVC	6.5	59.27	59.21
CB25 TO MAIN	200mm	PVC	3.2	60.05	60.02
CICB26 TO MAIN	200mm	PVC	14.8	60.21	60.06
DCICB27 TO MAIN	250mm	PVC	14.5	60.43	60.28
DCICB28 TO MAIN	250mm	PVC	4.3	60.52	60.48

ISSUED

ALBERT STREET RECONSTRUCTION

GRADING & DRAINAGE
ALBERT STREET
STA. 9+900 TO STA. 10+050

R. Holder, P. Eng. — Manager, Light Rail Projects
L. Foley, P. Eng. — Project Manager, Rail Design & Construction

Robinson Consultants

LICENSED PROFESSIONAL ENGINEER — G.A. BLOW — 27 Apr 15 — PROVINCE OF ONTARIO

Ottawa

Contract No.	Dwg. No.
ISD12-5096	P6

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Asset No. ---

Asset Group ---

Des.	Chk'd.
D.H. / I.M	G.B. / L.D.
Dwn.	Chk'd.
D.H. / I.M.	G.B. / L.D.
Utility Circ. No.	Index No.
---	---

Const. Inspector ---

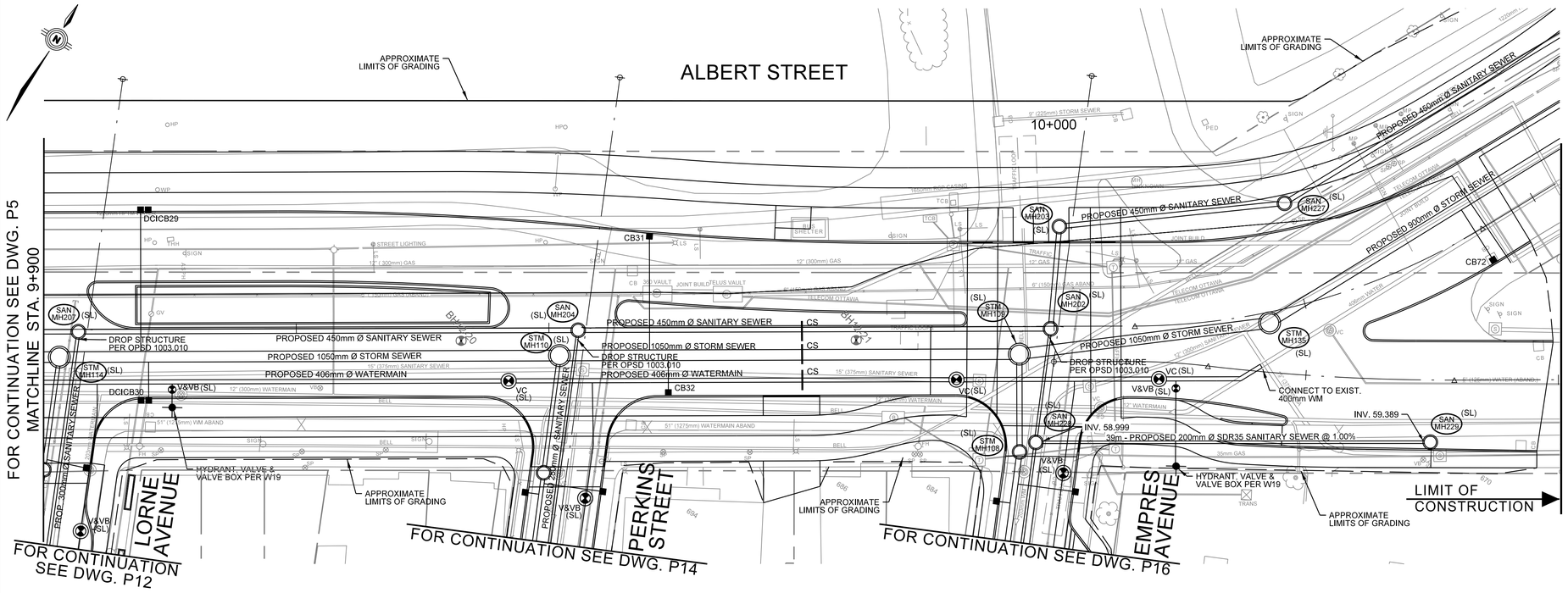
Scale: HORIZONTAL 0m 2.5 5 10 / 0m 1 2 VERTICAL

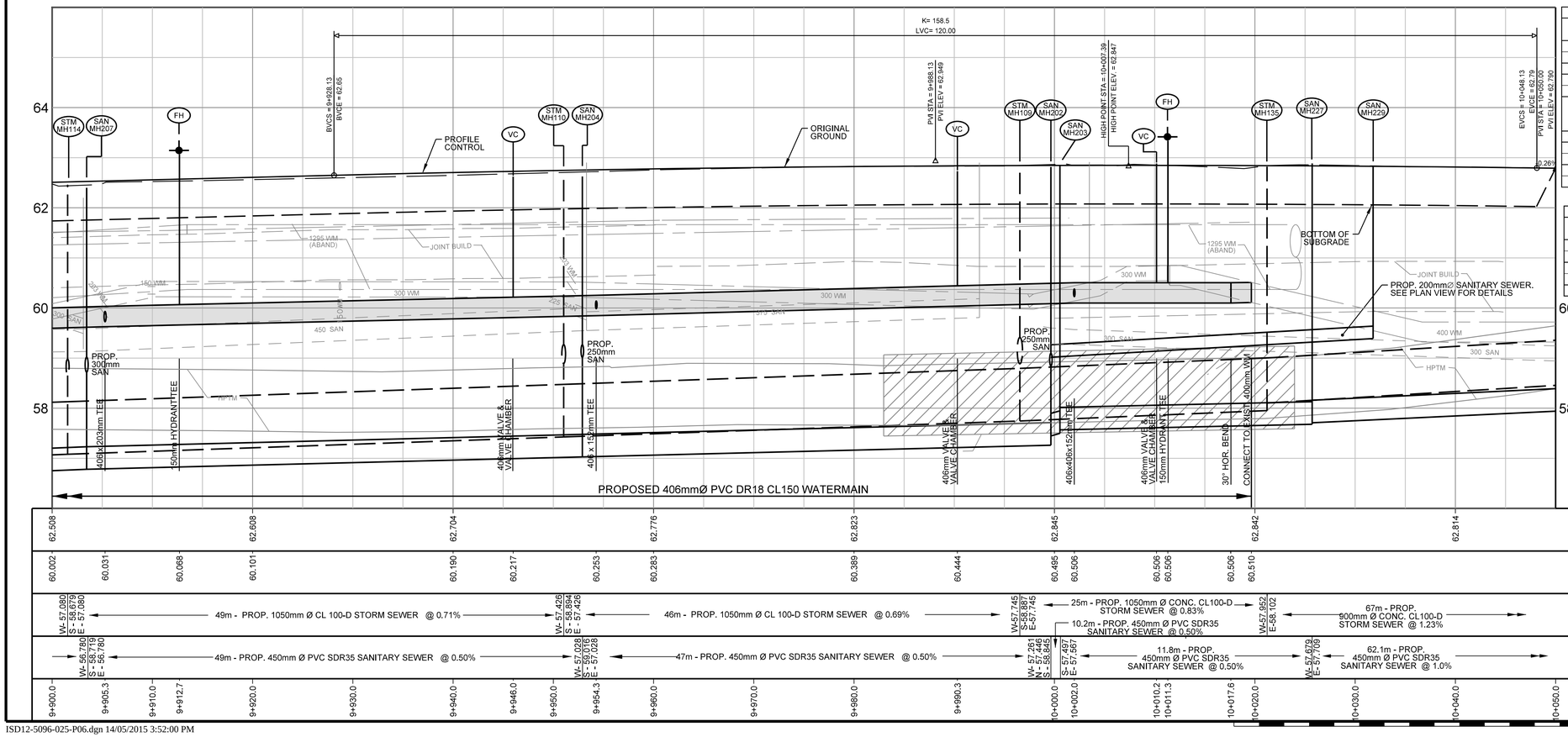
NOTE: The location of utilities is approximate only, the exact location should be determined by consulting the municipal authorities and utility companies concerned. The contractor shall prove the location of utilities and shall be responsible for adequate protection from damage.

REVISIONS

No.	Description	By	Date (dd/mm/yy)
1	ISSUED FOR RIO SUBMISSION	R.C.	30.04.13
2	ISSUED FOR CIRCULATION	R.C.	07.06.13
3	ISSUED FOR TENDER	R.C.	03.08.13
4	RE-ISSUED FOR CIRCULATION	R.C.	25.11.13
5	ISSUED FOR ECA APPLICATION	R.C.	30.01.14
6	ISSUED FOR CONSTRUCTION	R.C.	30.04.14
7	ISSUED FOR REVIEW - BRICKHILL EXTENSION	G.B.	13.03.15
8	ISSUED FOR CIRCULATION	G.B.	14.04.2015
9	ISSUED FOR CHANGE IN FIRE HYDRANT LOCATION	G.B.	27.04.2015

NOTE: THE FOLLOWING MANHOLES REQUIRE A SAFETY PLATFORM TO BE INSTALLED: SANMH202 / SANMH203 / SANMH204 / SANMH207 / SANMH215 / SANMH218 / SANMH223A / SANMH224 / SANMH225 /SANMH226 / STMMH105 / STMMH106 / STMMH107 / STMMH108 / STMMH109 / STMMH110 / STMMH114 / STMMH118 /STMMH125 / STMMH126 / STMMH127 / STMMH128 / STMMH129 / STMMH130 / STMMH131 (SEE DETAIL DWG. D1)





STORM MANHOLE DATA

No.	Station	Offset (m)	Type		Elevations		Grate to Invert
			Structure	Cover	Grate	Low Inv.	
STM MH114	9+901.54	2.75 R	701.012	S24.1 / S25	62.46	57.08	5.38
STM MH110	9+951.04	2.75 R	701.012	S24.1 / S25	62.69	57.43	5.27
STM MH109	9+996.55	2.75 R	701.012	S24.1 / S25	62.79	57.75	5.04
STM MH135	10+021.20	1.05 R	701.012	S24.1 / S25	62.83	57.95	4.88

SANITARY MANHOLE DATA

No.	Station	Offset (m)	Type		Elevations		Grate to Invert
			Structure	Cover	Grate	Low Inv.	
SAN MH207	9+903.44	0.25 R	701.010	S24 / S25	62.52	56.78	5.74
SAN MH204	9+952.90	0.25 R	701.010	S24 / S25	62.75	57.03	5.72
SAN MH202	9+999.64	0.25 R	701.010	S24 / S25	62.84	57.26	5.58
SAN MH203	10+000.55	9.87 L	701.010	S24 / S25	62.85	57.50	5.35
SAN MH227	10+025.70	10.12 L	701.010	S24 / S25	62.84	57.68	5.16

CATCH BASIN DATA

No.	Station	Offset (m)	Type		Elevations		Grate to Invert
			Structure	Grate	Grate	Low Inv.	
DCICB29	9+910.00	11.50 L	705.020	S22 / S23 (2)	62.48	60.58	1.90
DCICB30	9+910.00	6.75 R	705.020	S22 / S23 (2)	62.57	60.67	1.90
CB31	9+960.00	9.34 L	705.010	S19.1 / 400.020	62.59	60.89	1.70
CB32	9+961.80	6.45 R	705.010	S19.1 / 400.020	62.65	60.95	1.70
CB72	10+043.47	3.26 R	705.010	S19.1 / 400.020	62.71	61.01	1.70

CATCH BASIN LEAD DATA

Structure to Structure	Dia.	Type	Length	Invert Elevations	
				Upstream	Downstream
DCICB29 TO MAIN	250mm	PVC	14.5	60.58	60.43
DCICB30 TO MAIN	250mm	PVC	4.3	60.67	60.63
CB31 TO MAIN	200mm	PVC	11.8	60.89	60.77
CB32 TO MAIN	200mm	PVC	2.9	60.95	60.92
CB72 TO MAIN	200mm	PVC	6.0	61.01	60.95

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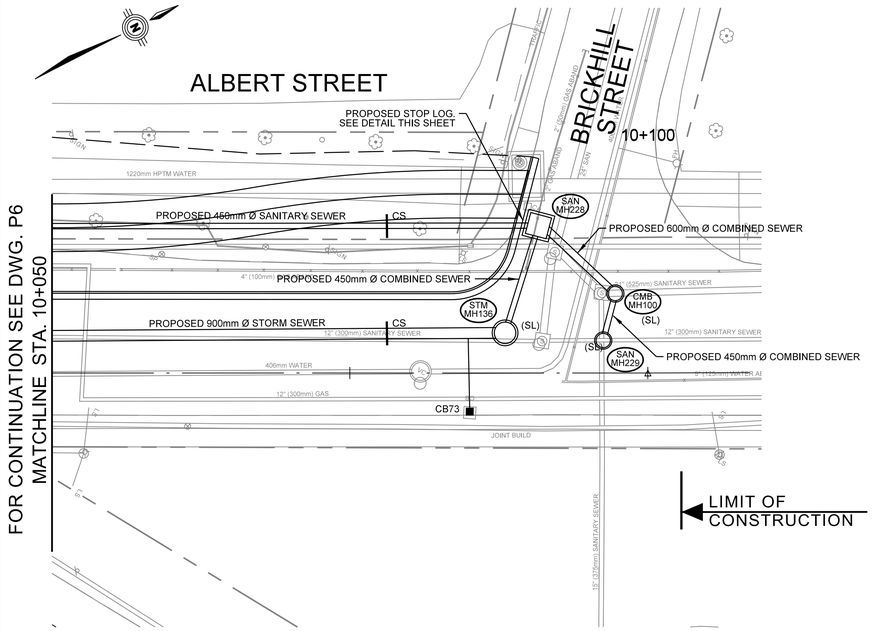
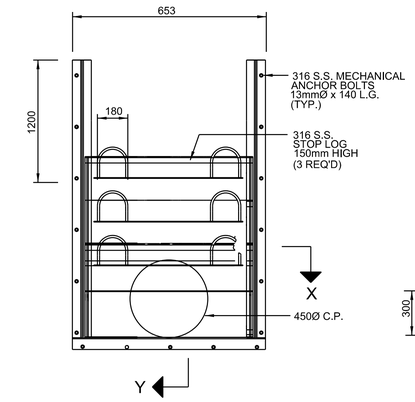
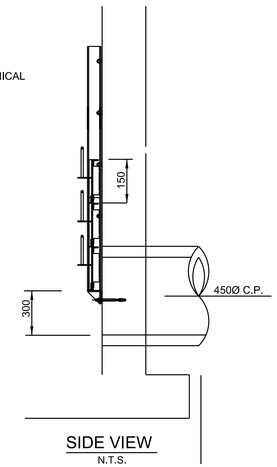
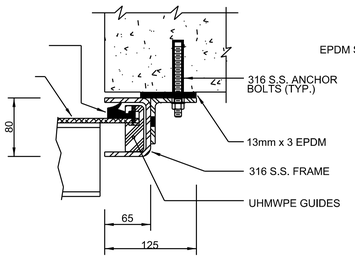




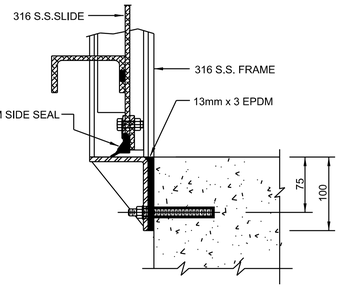
FRONT VIEW
N.T.S.



SIDE VIEW
N.T.S.



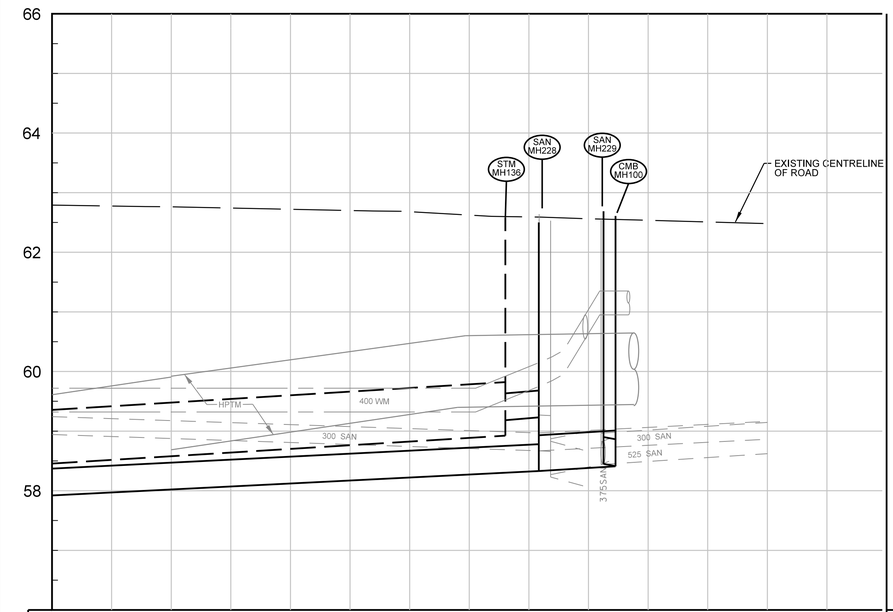
SECTIONAL PLAN (X)
N.T.S.

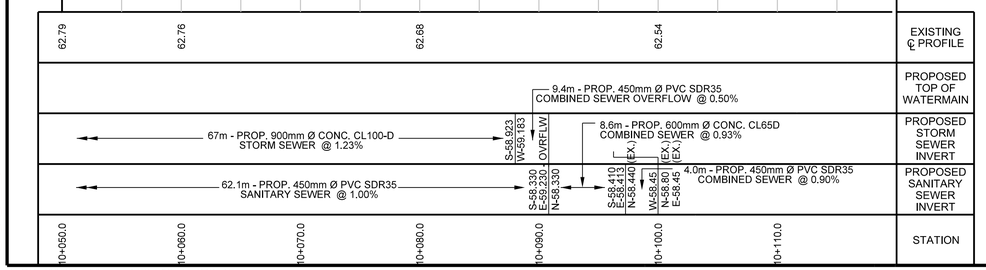


SECTION (Y)
N.T.S.

NOTE :
STOP LOG GATES BY H. FONTAINE LTD.
ALL COMPONENTS OF THIS STOP LOG MUST BE MADE OF 316 S.S. FRAME DIMENSIONS MUST BE SUFFICIENT TO ENSURE THAT ANCHOR BOLTS ARE BEYOND THE OUTSIDE DIAMETER OF THE PIPE WALL AND ADEQUATELY ANCHORED INTO THE CONCRETE WALL

STOP LOG GATE DETAILS
N.T.S.





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ALBERT STREET RECONSTRUCTION

GRADING & DRAINAGE
ALBERT STREET
STA. 10+050 TO STA. 10+200

R. Holder, P. Eng.	L. Foley, P. Eng.
Manager, Light Rail Projects	Project Manager, Rail Design & Construction

Robinson Consultants

LICENSED PROFESSIONAL ENGINEER
G.A. BLOW
7 MAY, '15
PROVINCE OF ONTARIO

Ottawa

Contract No.	Dwg. No.
ISD12-5096	P6A

Sheet _ of _

Asset No. ---------

Asset Group ---

Des.	Chk'd.
D.H. / I.M	G.B. / L.D.
Dwn.	Chk'd.
D.H. / I.M.	G.B. / L.D.
Utility Circ. No.	Index No.
____	____

Const. Inspector _____

Scale: HORIZONTAL 0m 2.5 5 10
0m 1 2
VERTICAL

NOTE: The location of utilities is approximate only, the exact location should be determined by consulting the municipal authorities and utility companies concerned. The contractor shall prove the location of utilities and shall be responsible for adequate protection from damage.

REVISIONS

No.	Description	By	Date (dd/mm/yy)
1	ISSUED FOR REVIEW - BRICKHILL EXTENSION	G.B.	13.03.2015
2	ISSUED FOR CIRCULATION	G.B.	14.04.2015
3	ISSUED FOR CHANGE ORDER	G.B.	7.05.2015

NOTE: THE FOLLOWING MANHOLES REQUIRE A SAFETY PLATFORM TO BE INSTALLED: SANMH202 / SANMH203 / SANMH204 / SANMH207 / SANMH215 / SANMH218 / SANMH223A / SANMH224 / SANMH225 /SANMH226 / STMMH105 / STMMH106 / STMMH107 / STMMH108 / STMMH109 / STMMH110 / STMMH114 / STMMH118 /STMMH125 / STMMH126 / STMMH127 / STMMH128 / STMMH129 / STMMH130 / STMMH131 (SEE DETAIL DWG. D1)

STORM MANHOLE DATA

No.	Station	Offset (m)	Type		Elevations		Grate to Invert
			Structure	Cover	Grate	Low Inv.	
STM MH136	10+088.03	3.37 L	701.012	S24.1 / S25	62.69	58.92	3.77

SANITARY MANHOLE DATA

No.	Station	Offset (m)	Type		Elevations		Grate to Invert
			Structure	Cover	Grate	Low Inv.	
SAN MH228	10+090.83	12.36 L	1800x1800	S24 / S25	62.50	58.33	4.17
SAN MH229	10+096.26	2.72 L	701.010	S24 / S25	62.65	58.45	4.20

COMBINED MANHOLE DATA

No.	Station	Offset (m)	Type		Elevations		Grate to Invert
			Structure	Cover	Grate	Low Inv.	
CMB MH100	10+097.27	6.67 L	701.010	S24 / S25	62.61	58.41	4.20

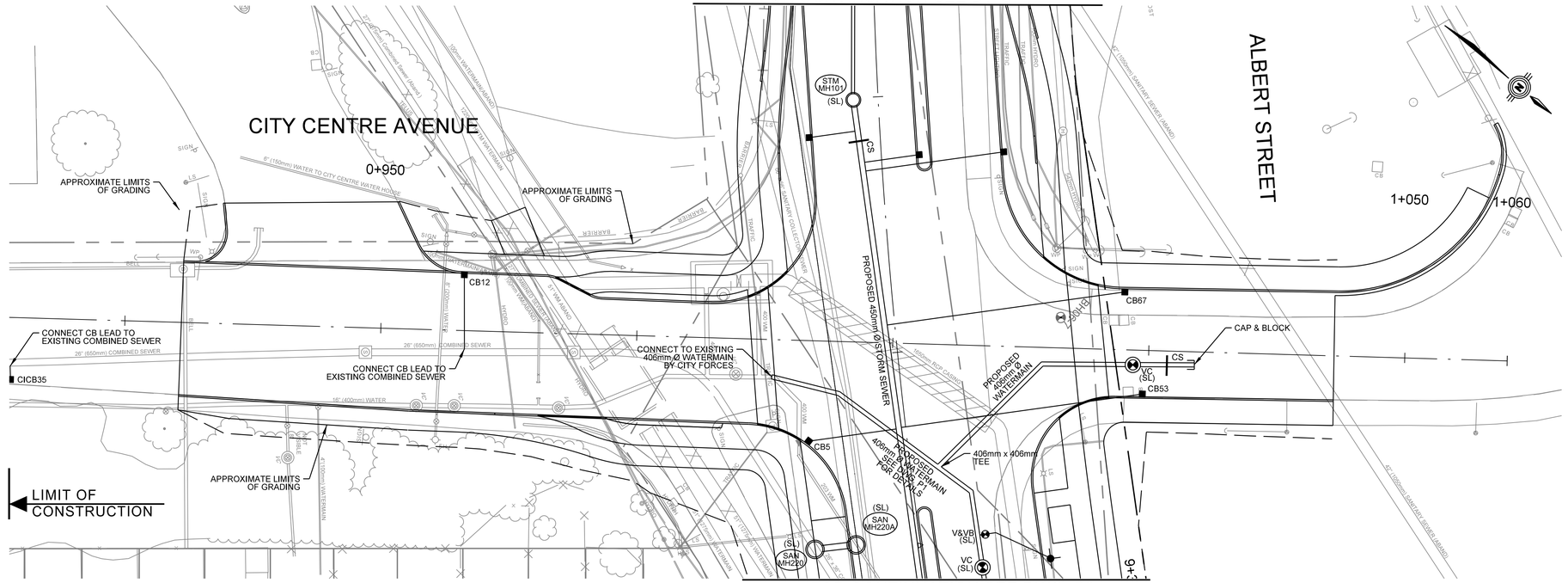
CATCH BASIN DATA

No.	Station	Offset (m)	Type		Elevations		Grate to Invert
			Structure	Grate	Grate	Low Inv.	
CB73	10+085.06	3.24 R	705.010	S19.1 / 400.020	62.48	60.78	1.70

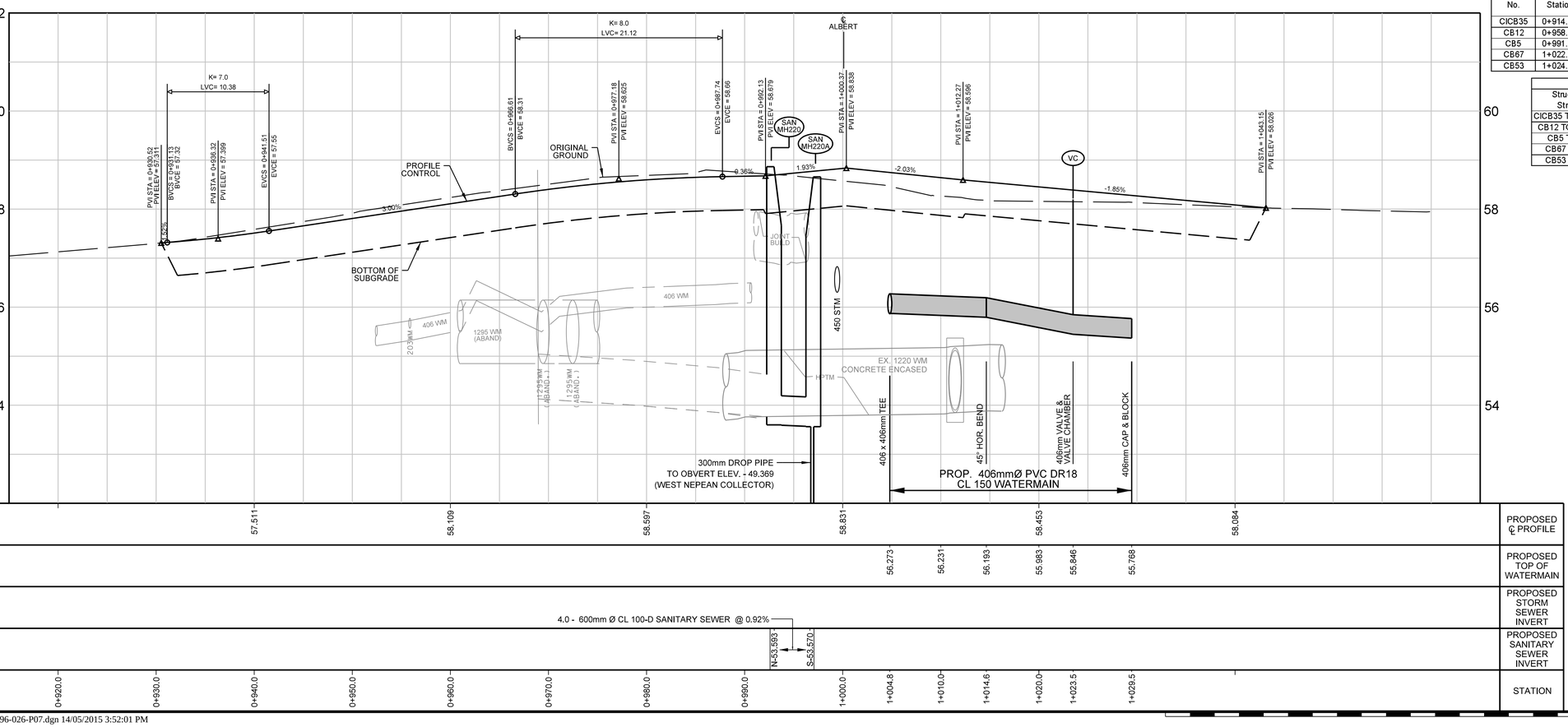
CATCH BASIN LEAD DATA

Structure to Structure	Dia.	Type	Length	Invert Elevations	
				Upstream	Downstream
CB73 TO MAIN	200mm	PVC	6.2	60.78	60.72

FOR CONTINUATION SEE DWG. P1



FOR CONTINUATION SEE DWG. P2



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ALBERT STREET RECONSTRUCTION

GRADING & DRAINAGE CITY CENTRE AVENUE STA. 0+915 TO STA. 1+065

R. Holder, P. Eng.	L. Foley, P. Eng.
Manager Light Rail Projects	Project Manager Rail Design & Construction

Robinson Consultants

LICENSED PROFESSIONAL ENGINEER G.A. BLOW 8 OCT. '13 PROVINCE OF ONTARIO

Ottawa

Contract No.	Dwg. No.
ISD12-5096	P7

Sheet _ of _

Asset No. ---------

Asset Group ---

Des.	Chk'd.
D.H. / I.M	G.B. / L.D.
Dwn.	Chk'd.
D.H. / I.M.	G.B. / L.D.
Utility Circ. No.	Index No.
___	___

Const. Inspector _____

Scale: HORIZONTAL 0m 2.5 5 10 / 0m 1 2 VERTICAL

NOTE: The location of utilities is approximate only, the exact location should be determined by consulting the municipal authorities and utility companies concerned. The contractor shall prove the location of utilities and shall be responsible for adequate protection from damage.

REVISIONS

No.	Description	By	Date (dd/mm/yy)
1	**ISSUED FOR RIO SUBMISSION**	**R.C.**	**30.04.13**
2	**ISSUED FOR CIRCULATION**	**R.C.**	**07.06.13**
3	**ISSUED FOR TENDER**	**R.C.**	**03.08.13**
4	**RE-ISSUED FOR CIRCULATION**	**R.C.**	**25.11.13**
5	**ISSUED FOR ECA APPLICATION**	**R.C.**	**30.01.14**
6	**ISSUED FOR CONSTRUCTION**	**R.C.**	**30.04.14**
7	ISSUED FOR SCM No. 16 (ALBERT / CITY CENTRE CURB REVISIONS)	R.C.	17.09.14
8	ISSUED FOR SCM (DROP MH'S 217A & 220A)	G.B.	08.10.14

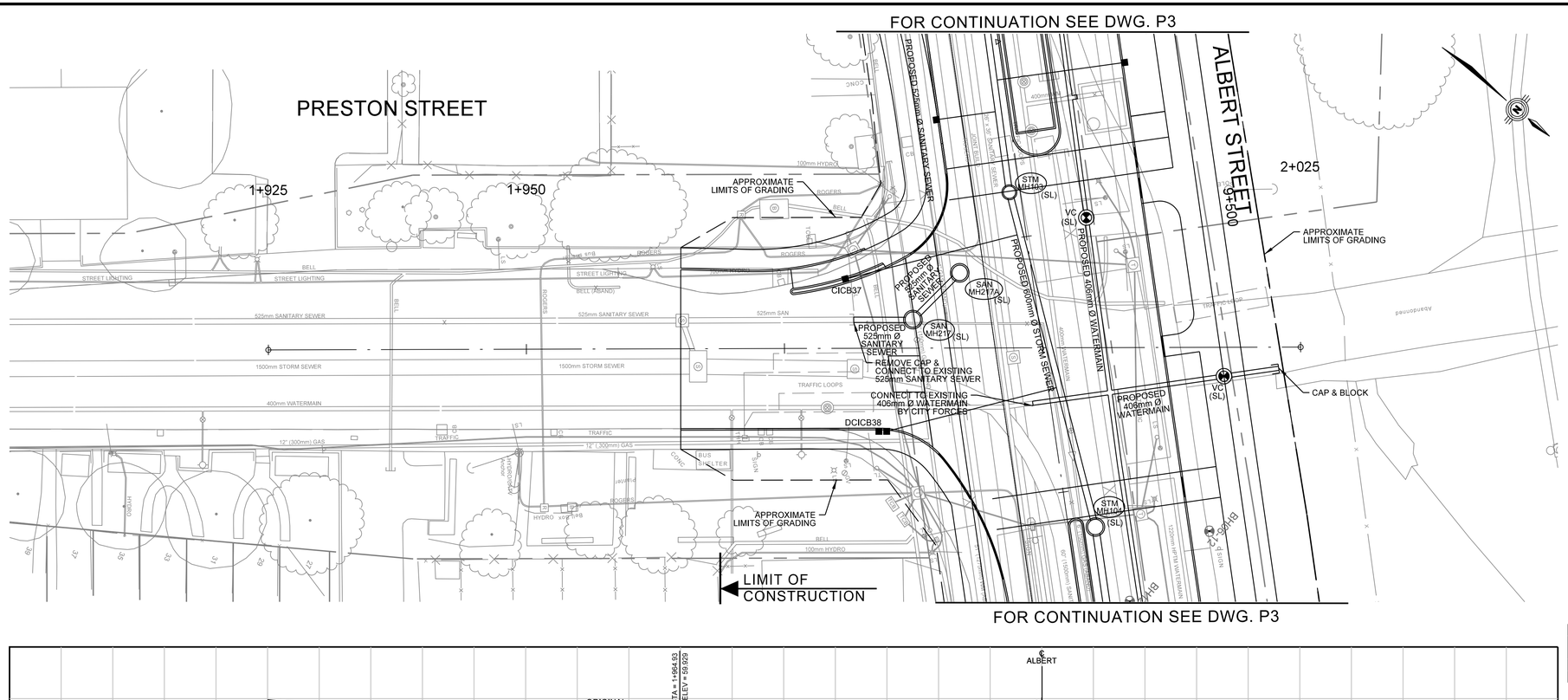
NOTE:
THE FOLLOWING MH REQUIRE A SAFETY PLATFORM BE INSTALLED:
SAN MH211 / SANMH215 / SANMH223A / SANMH224 / SANMH225 / SANMH226 / STMMH105 / STMMH106 / STMMH107 / STMMH108 / STMMH118 / STMMH125 / STMMH126 / STMMH127 / STMMH128 / STMMH129 / STMMH130 / STMMH131 (SEE DETAIL DWG. D1)

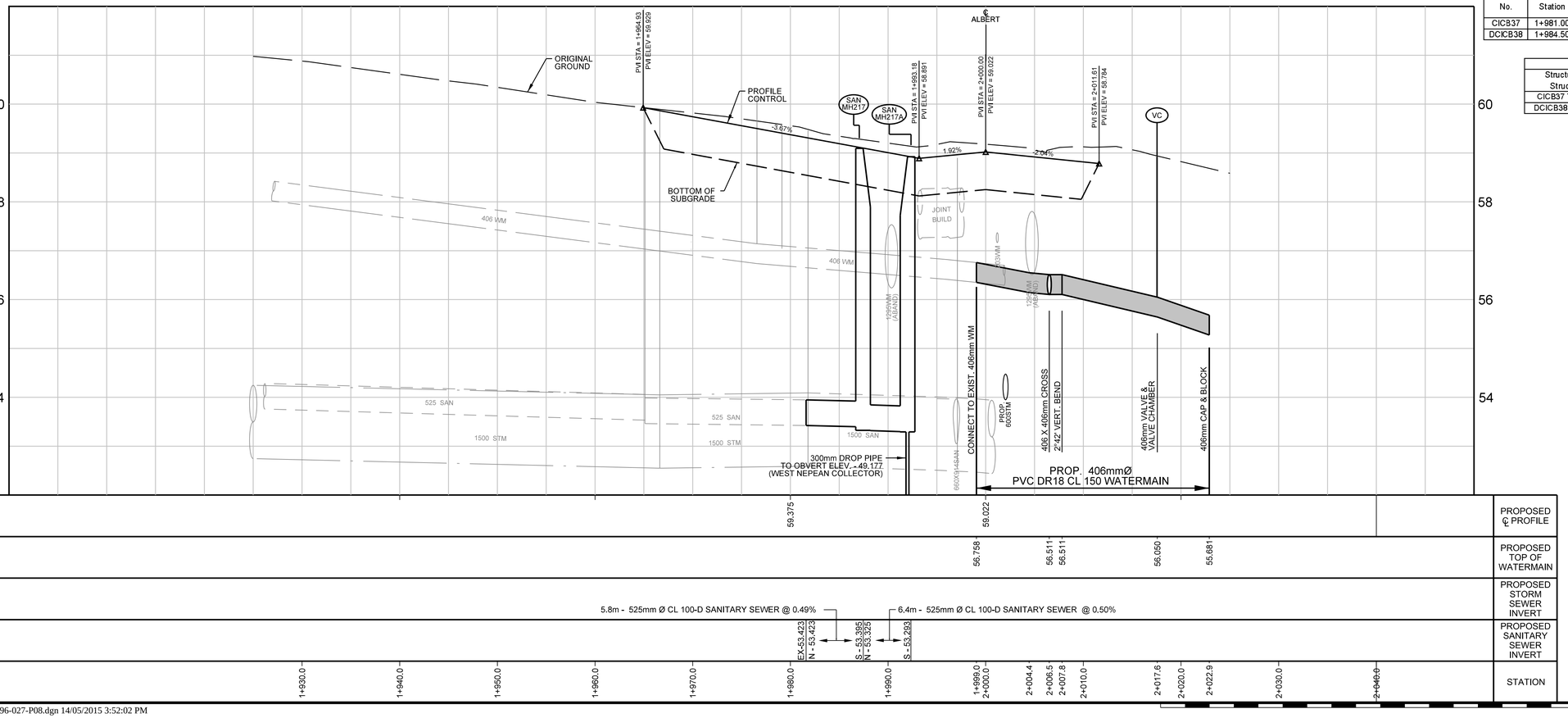
CATCH BASIN DATA

No.	Station	Offset (m)	Type		Elevations		Grate to Invert
			Structure	Grate	Grate	Low Inv.	
CICB35	0+914.00	5.75 R	705.010	S22 / S23	57.10	55.25	1.85
CB12	0+958.00	5.75 L	705.010	S19.1 / 400.020	57.94	56.24	1.70
CB5	0+991.90	10.05 R	705.010	S19.1 / 400.020	58.57	56.72	1.85
CB67	1+022.50	5.94 L	705.010	S19.1 / 400.020	58.10	56.40	1.70
CB53	1+024.50	4.56 R	705.010	S19.1 / 400.020	58.19	56.49	1.70

CATCH BASIN LEAD DATA

Structure to Structure	Dia.	Type	Length	Invert Elevations	
				Upstream	Downstream
CICB35 TO EX. MAIN	200mm	PVC	1.3	55.25	55.24
CB12 TO EX. MAIN	200mm	PVC	7.3	56.24	56.16
CB5 TO MAIN	200mm	PVC	8.9	56.72	56.63
CB67 TO MAIN	200mm	PVC	23.4	56.40	56.17
CB53 TO MAIN	200mm	PVC	23.8	56.49	56.25





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ALBERT STREET RECONSTRUCTION

GRADING & DRAINAGE PRESTON STREET STA. 1+925 TO STA. 2+025

R. Holder, P. Eng.	L. Foley, P. Eng.
Manager Light Rail Projects	Project Manager Rail Design & Construction

Robinson Consultants

LICENSED PROFESSIONAL ENGINEER G.A. BLOW 8 OCT. '13 PROVINCE OF ONTARIO

Ottawa

Contract No.	Dwg. No.
ISD12-5096	P8

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Asset No. ---------

Asset Group ---

Des.	Chk'd.
D.H. / I.M	G.B. / L.D.
Dwn.	Chk'd.
D.H. / I.M.	G.B. / L.D.
Utility Circ. No.	Index No.
____	____

Const. Inspector _____

Scale: HORIZONTAL 0m 2.5 5 10 / 0m 1 2 VERTICAL

NOTE: The location of utilities is approximate only, the exact location should be determined by consulting the municipal authorities and utility companies concerned. The contractor shall prove the location of utilities and shall be responsible for adequate protection from damage.

REVISIONS

No.	Description	By	Date (dd/mm/yy)
1	ISSUED FOR RIO SUBMISSION	R.C.	30.04.13
2	ISSUED FOR CIRCULATION	R.C.	07.06.13
3	ISSUED FOR TENDER	R.C.	03.08.13
4	RE-ISSUED FOR CIRCULATION	R.C.	25.11.13
5	ISSUED FOR ECA APPLICATION	R.C.	30.01.14
6	ISSUED FOR CONSTRUCTION	R.C.	30.04.14
7	ISSUED FOR SCM (DROP MH'S 217A & 220A)	G.B.	08.10.14

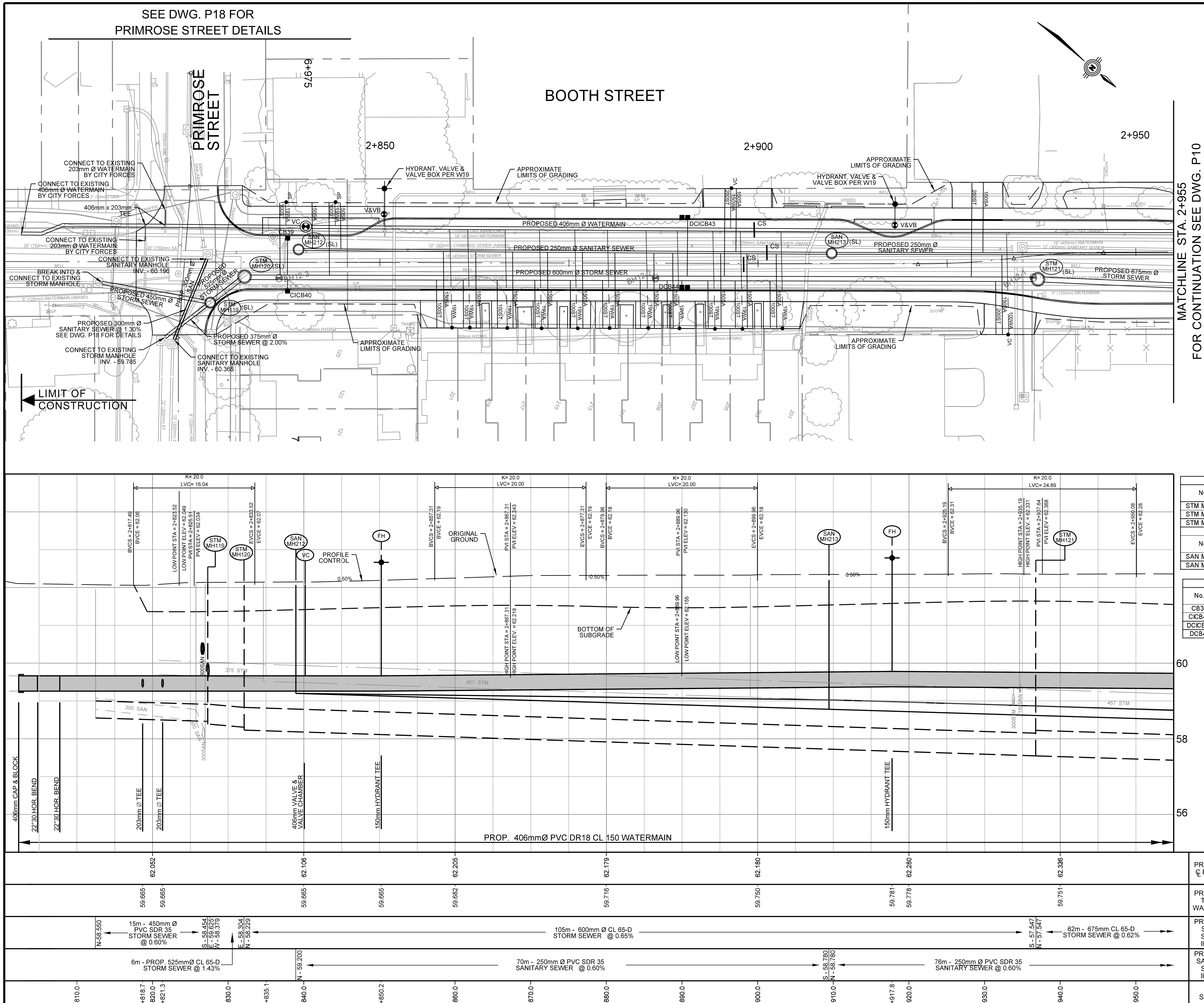
NOTE:
THE FOLLOWING MH REQUIRE A SAFETY PLATFORM BE INSTALLED:
SAN MH211 / SANMH215 / SANMH223A / SANMH224 / SANMH225 / SANMH226 / STMMH105 / STMMH106 / STMMH107 / STMMH108 / STMMH118 / STMMH125 / STMMH126 / STMMH127 / STMMH128 / STMMH129 / STMMH130 / STMMH131 (SEE DETAIL DWG. D1)

CATCH BASIN DATA

No.	Station	Offset (m)	Type		Elevations		Grate to Invert
			Structure	Grate	Grate	Low Inv.	
CICB37	1+981.00	6.42 L	705.010	S22 / S23	59.40	57.55	1.85
DCICB38	1+984.50	7.74 R	705.020	S22 / S23 (2)	59.24	57.34	1.90

CATCH BASIN LEAD DATA

Structure to Structure	Dia.	Type	Length	Invert Elevations	
				Upstream	Downstream
CICB37 TO MAIN	200mm	PVC	17.2	57.55	57.38
DCICB38 TO MAIN	250mm	PVC	17.0	57.34	57.17


SEE DWG. P18 FOR PRIMROSE STREET DETAILS
BOOTH STREET
PRIMROSE STREET
2+850
2+900
2+950
HYDRANT, VALVE & VALVE BOX PER W19
APPROXIMATE LIMITS OF GRADING
CONNECT TO EXISTING 203mm Ø WATERMAIN BY CITY FORCES
CONNECT TO EXISTING 406mm Ø WATERMAIN BY CITY FORCES
406mm x 203mm TEE
PROPOSED 406mm Ø WATERMAIN
PROPOSED 250mm Ø SANITARY SEWER
PROPOSED 600mm Ø STORM SEWER
PROPOSED 675mm Ø STORM SEWER
PROPOSED 450mm Ø STORM SEWER
PROPOSED 300mm Ø SANITARY SEWER @ 1.30% SEE DWG. P18 FOR DETAILS
PROPOSED 375mm Ø STORM SEWER @ 2.00%
CONNECT TO EXISTING STORM MANHOLE INV. - 59.785
CONNECT TO EXISTING SANITARY MANHOLE INV. - 60.365
CONNECT TO EXISTING SANITARY MANHOLE INV. - 60.196
BREAK INTO & CONNECT TO EXISTING STORM MANHOLE
LIMIT OF CONSTRUCTION
MATCHLINE STA. 2+955
FOR CONTINUATION SEE DWG. P10
ORIGINAL GROUND
PROFILE CONTROL
BOTTOM OF SUBGRADE
406mm CAP & BLOCK
22°30 HOR. BEND
203mm Ø TEE
406mm VALVE & VALVE CHAMBER
150mm HYDRANT TEE
PROP. 406mmØ PVC DR18 CL 150 WATERMAIN
PROPOSED ℄ PROFILE
PROPOSED TOP OF WATERMAIN
PROPOSED STORM SEWER INVERT
PROPOSED SANITARY SEWER INVERT
STATION
15m - 450mm Ø PVC SDR 35 STORM SEWER @ 0.60%
105m - 600mm Ø CL 65-D STORM SEWER @ 0.65%
62m - 675mm CL 65-D STORM SEWER @ 0.62%
6m - PROP. 525mmØ CL 65-D STORM SEWER @ 1.43%
70m - 250mm Ø PVC SDR 35 SANITARY SEWER @ 0.60%
76m - 250mm Ø PVC SDR 35 SANITARY SEWER @ 0.60%

ISSUED

ALBERT STREET RECONSTRUCTION

Ottawa

Contract No. ISD12-5096 | Dwg. No. P9

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GRADING & DRAINAGE
BOOTH STREET
STA. 2+800 TO STA. 2+955

R. Holder, P. Eng. — Manager, Light Rail Projects

L. Foley, P. Eng. — Project Manager, Rail Design & Construction

Robinson Consultants

Asset No. --------

Asset Group ---

Des. D.H. / I.M — Chk'd. G.B. / L.D.

Dwn. D.H. / I.M. — Chk'd. G.B. / L.D.

Utility Circ. No. — Index No. ___

Const. Inspector ________

LICENSED PROFESSIONAL ENGINEER — G.A. BLOW — 28 April, '15 — PROVINCE OF ONTARIO

Scale: HORIZONTAL 0m 2.5 5 10; VERTICAL 0m 1 2

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REVISIONS

No.	Description	By	Date (dd/mm/yy)
1	ISSUED FOR RIO SUBMISSION	R.C.	30.04.13
2	ISSUED FOR CIRCULATION	R.C.	07.06.13
3	ISSUED FOR TENDER	R.C.	03.08.13
4	RE-ISSUED FOR CIRCULATION	R.C.	25.11.13
5	ISSUED FOR ECA APPLICATION	R.C.	30.01.14
6	ISSUED FOR CONSTRUCTION	R.C.	30.04.14
7	ISSUED FOR CHANGE ORDER	G.B.	12.12.14
8	ISSUED FOR REVIEW - BRICKHILL EXTENSION	G.B.	13.03.2015
9	ISSUED FOR CIRCULATION	G.B.	14.04.2015
10	ISSUED FOR CHANGE ORDER	G.B.	28.04.2015

NOTE: THE FOLLOWING MANHOLES REQUIRE A SAFETY PLATFORM TO BE INSTALLED: SANMH202 / SANMH203 / SANMH204 / SANMH207 / SANMH215 / SANMH218 / SANMH223A / SANMH224 / SANMH225 /SANMH226 / STMMH105 / STMMH106 / STMMH107 / STMMH108 / STMMH109 / STMMH110 / STMMH114 / STMMH118 /STMMH125 / STMMH126 / STMMH127 / STMMH128 / STMMH129 / STMMH130 / STMMH131 (SEE DETAIL DWG. D1)

STORM MANHOLE DATA

No.	Station	Offset (m)	Type		Elevations		Grate to Invert
			Structure	Cover	Grate	Low Inv.	
STM MH119	2+827.30	5.36 R	701.010	S24.1 / S25	62.09	58.39	3.70
STM MH120	2+832.11	1.91 R	701.011	S24.1 / S25	62.07	58.23	3.85
STM MH121	2+936.75	3.15 R	701.011	S24.1 / S25	62.33	57.55	4.78

SANITARY MANHOLE DATA

No.	Station	Offset (m)	Type		Elevations		Grate to Invert
			Structure	Cover	Grate	Low Inv.	
SAN MH212	2+838.95	1.69 L	701.010	S24 / S25	62.07	59.20	2.87
SAN MH213	2+909.43	1.37 L	701.010	S24 / S25	62.20	58.78	3.42

CATCH BASIN DATA

No.	Station	Offset (m)	Type		Elevations		Grate to Invert
			Structure	Grate	Grate	Low Inv.	
CB39	2+837.50	3.50 L	705.010	S19.1 / 400.020	62.01	60.31	1.70
CICB40	2+837.50	3.50 R	705.010	S22 / S23	62.16	60.46	1.70
DCICB43	2+890.00	5.75 L	705.020	S22 / S23 (2)	62.19	60.34	1.85
DCB44	2+890.00	3.50 R	705.020	S19.1 / 400.020 (2)	62.08	60.33	1.75

CATCH BASIN LEAD DATA

Structure to Structure	Dia.	Type	Length	Invert Elevations	
				Upstream	Downstream
CB39 TO MAIN	200mm	PVC	4.9	60.31	60.26
CICB40 TO MAIN	200mm	PVC	1.5	60.46	60.45
DCICB43 TO MAIN	250mm	PVC	7.8	60.34	60.26
DCICB44 TO MAIN	250mm	PVC	0.9	60.33	60.32

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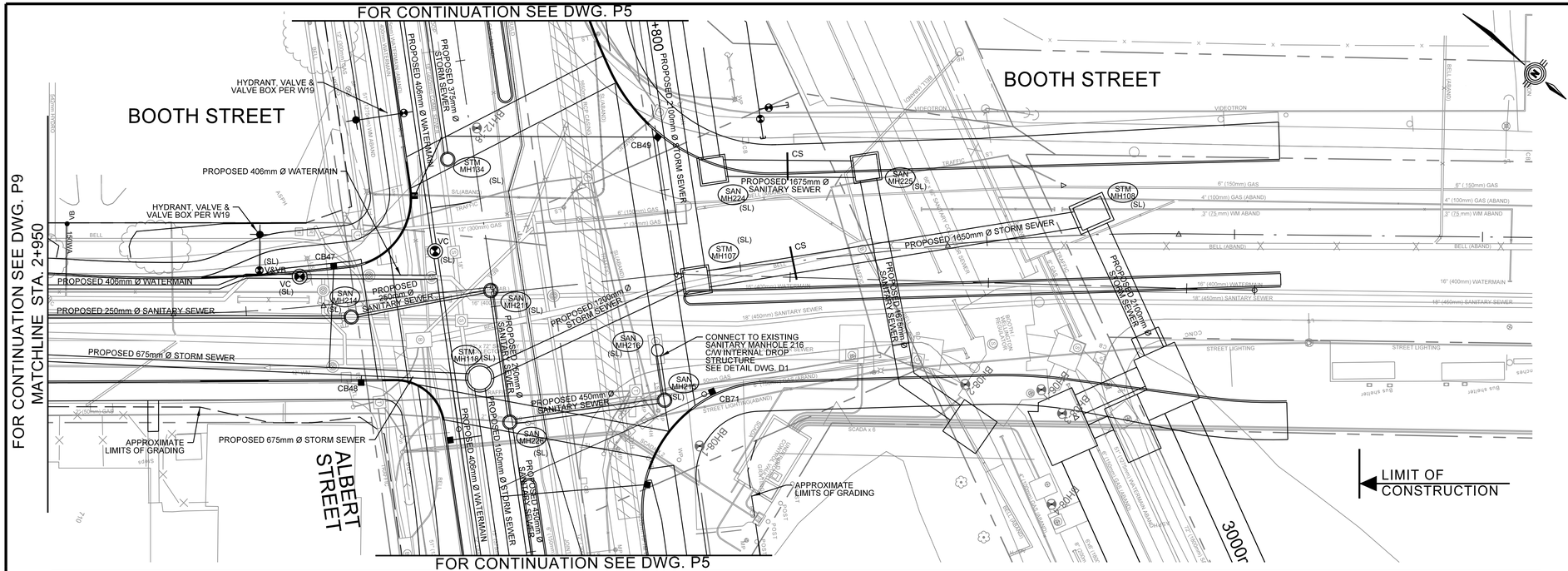

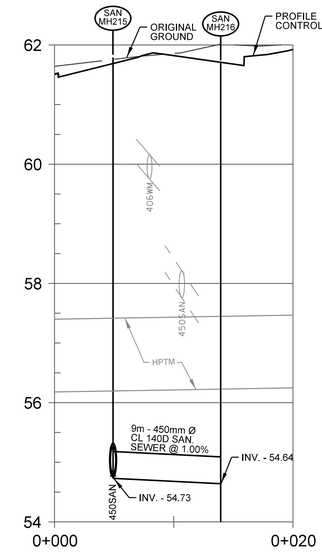

ALBERT STREET RECONSTRUCTION

GRADING & DRAINAGE BOOTH STREET STA. 2+955 TO STA. 3+100

R. Holder, P. Eng.	L. Foley, P. Eng.
Manager Light Rail Projects	*Project Manager Rail Design & Construction*

Robinson Consultants

LICENSED PROFESSIONAL ENGINEER G.A. BLOW PROVINCE OF ONTARIO

Ottawa

Contract No.	Dwg. No.
ISD12-5096	P10

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Asset No. ---------

Asset Group ---

Des.	Chk'd.
D.H. / I.M	G.B. / L.D.
Dwn.	**Chk'd.**
D.H. / I.M.	G.B. / L.D.
Utility Circ. No.	Index No.
___	___

Const. Inspector _____

Scale: HORIZONTAL 0m 2.5 5 10 / 0m 1 2 VERTICAL

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REVISIONS

No.	Description	By	Date (dd/mm/yy)
1	ISSUED FOR RIO SUBMISSION	R.C.	30.04.13
2	ISSUED FOR CIRCULATION	R.C.	07.06.13
3	ISSUED FOR TENDER	R.C.	03.08.13
4	RE-ISSUED FOR CIRCULATION	R.C.	25.11.13
5	ISSUED FOR ECA APPLICATION	R.C.	30.01.14
6	ISSUED FOR CONSTRUCTION	R.C.	30.04.14
7	ISSUED FOR CHANGE ORDER	G.B.	12.12.14
8	ISSUED FOR REVIEW - BRICKHILL EXTENSION	G.B.	13.03.15
9	ISSUED FOR CIRCULATION	G.B.	14.04.2015
9	ISSUED FOR CHANGE ORDER	G.B.	28.04.2015

NOTE: THE FOLLOWING MANHOLES REQUIRE A SAFETY PLATFORM TO BE INSTALLED: SANMH202 / SANMH203 / SANMH204 / SANMH207 / SANMH215 / SANMH218 / SANMH223A / SANMH224 / SANMH225 /SANMH226 / STMMH105 / STMMH106 / STMMH107 / STMMH108 / STMMH109 / STMMH110 / STMMH114 / STMMH118 /STMMH125 / STMMH126 / STMMH127 / STMMH128 / STMMH129 / STMMH130 / STMMH131 (SEE DETAIL DWG. D1)

SANITARY MANHOLE DATA

No.	Station	Offset (m)	Type		Elevations		Grate to Invert
			Structure	Cover	Grate	Low Inv.	
SAN MH214	2+985.31	1.27 L	701.010	S24 / S25	62.03	58.15	3.88
SAN MH215	3+015.38	3.34 L	701.010	S24 / S25	61.79	54.73	7.06
SAN MH216	3+015.61	5.68 R	EXISTING	S24 / S25	61.72	47.23	14.49

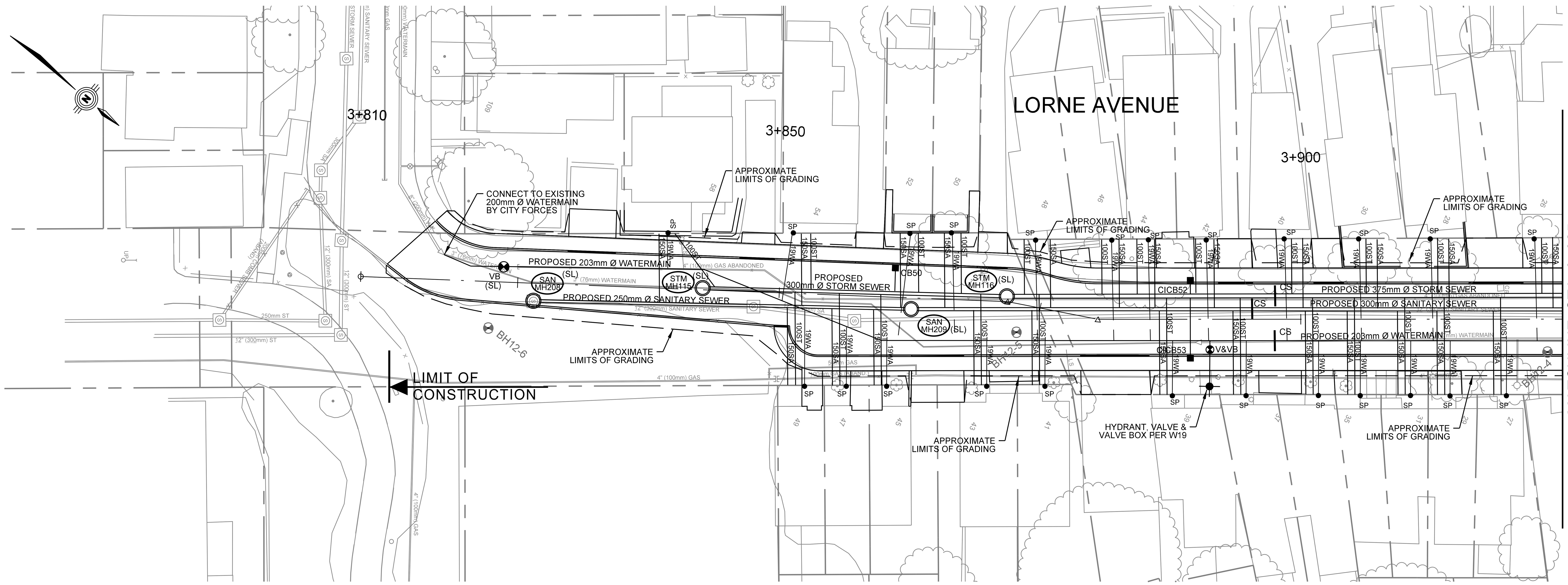
CATCH BASIN DATA

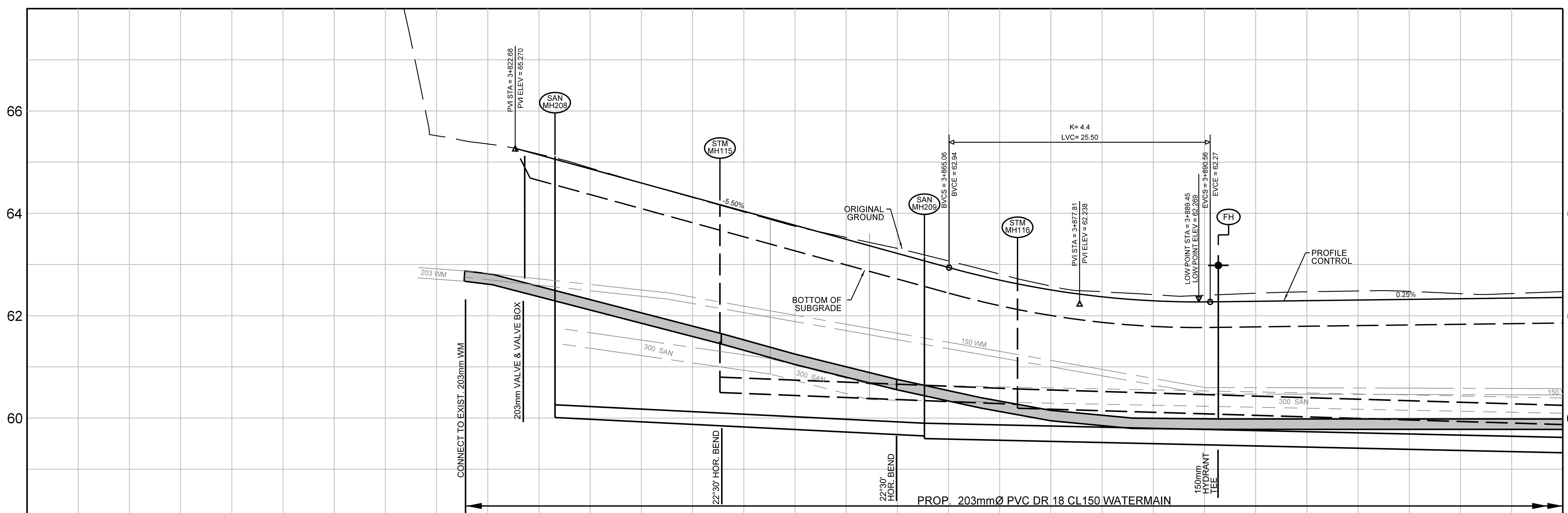
No.	Station	Offset (m)	Type		Elevations		Grate to Invert
			Structure	Grate	Grate	Low Inv.	
CB47	2+984.27	3.50 L	705.010	S19.1 / 400.020	62.10	60.70	1.40
CB48	2+985.82	7.86 R	705.010	S19.1 / 400.020	62.05	60.20	1.85
CB49	3+018.31	14.10 L	705.010	S19.1 / 400.020	61.73	60.03	1.70
CB71	3+020.94	12.49 R	705.010	S19.1 / 400.020	61.87	60.17	1.70

CATCH BASIN LEAD DATA

Structure to Structure	Dia.	Type	Length	Invert Elevations	
				Upstream	Downstream
CB47 TO MAIN	200mm	PVC	10.2	60.70	60.60
CB48 TO MAIN	200mm	PVC	0.7	60.20	60.19
CB49 TO MAIN	200mm	PVC	21.4	60.03	59.82
CB49 TO MAIN	200mm	PVC	23.5	60.17	59.93

ISSUED





PROPOSED ℄ PROFILE	64.318, 63.218, 62.370, 62.294, 62.344
PROPOSED TOP OF WATERMAIN	62.876, 62.809, 61.660, 61.250, 60.755, 60.400, 60.150, 60.000, 59.983, 59.983, 59.983
PROPOSED STORM SEWER INVERT	N - 60.492; 29m - 300mm Ø PVC SDR 35 STORM SEWER @ 0.60%; S - 60.318 / N - 60.243; 114m - 375mm Ø PVC SDR 35 STORM SEWER @ 0.70%
PROPOSED SANITARY SEWER INVERT	N - 60.010; 36m - 250mm Ø SDR 35 SANITARY SEWER @ 1.00%; S - 59.650 / N - 59.600; 70m - 300mm Ø PVC SDR 35 SANITARY SEWER @ 0.45%
STATION	3+817.7, 3+822.3, 3+825.0, 3+830.0, 3+835.0, 3+840.0, 3+842.7, 3+845.0, 3+850.0, 3+860.0, 3+868.1, 3+875.0, 3+880.0, 3+882.9, 3+891.4, 3+900.0, 3+919.2, 3+920.0

ALBERT STREET RECONSTRUCTION

GRADING & DRAINAGE
LORNE AVENUE
STA. 3+810 TO STA. 3+925

R. Holder, P. Eng.
Manager
Light Rail Projects

L. Foley, P. Eng.
Project Manager
Rail Design & Construction

Robinson Consultants

Ottawa

Contract No. ISD12-5096
Dwg. No. P11
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Asset No. --------
Asset Group ---
Des. D.H. / I.M
Chk'd. G.B. / L.D.
Dwn. D.H. / I.M.
Chk'd. G.B. / L.D.
Utility Circ. No. ____
Index No. ____
Const. Inspector ______

Scale:
HORIZONTAL 0m 2.5 5 10
VERTICAL 0m 1 2

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REVISIONS

No.	Description	By	Date (dd/mm/yy)
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3	ISSUED FOR TENDER	R.C.	03.08.13
4	RE-ISSUED FOR CIRCULATION	R.C.	25.11.13
5	ISSUED FOR ECA APPLICATION	R.C.	30.01.14
6	ISSUED FOR CONSTRUCTION	R.C.	30.04.14

NOTE:
THE FOLLOWING MH REQUIRE A SAFETY PLATFORM BE INSTALLED:
SAN MH211 / SANMH215 / SANMH218 / SANMH223A / SANMH224 / SANMH225 / SANMH226 / STMMH105 / STMMH106 / STMMH107 / STMMH108 / STMMH118 / STMMH125 / STMMH126 / STMMH127 / STMMH128 / STMMH129 / STMMH130 / STMMH131 (SEE DETAIL DWG. D1)

STORM MANHOLE DATA

No.	Station	Offset (m)	Type Structure	Type Cover	Elevations Grate	Elevations Low Inv.	Grate to Invert
STM MH115	3+842.67	0.16 L	701.010	S24.1 / S25	64.08	60.50	3.58
STM MH116	3+871.74	0.51 L	701.010	S24.1 / S25	62.55	60.19	2.36

SANITARY MANHOLE DATA

No.	Station	Offset (m)	Type Structure	Type Cover	Elevations Grate	Elevations Low Inv.	Grate to Invert
SAN MH208	3+826.57	1.68 R	701.010	S24 / S25	65.05	60.01	5.04

CATCH BASIN DATA

No.	Station	Offset (m)	Type Structure	Type Grate	Elevations Grate	Elevations Low Inv.	Grate to Invert
CB50	3+861.00	3.11 L	705.010	S19.1 / 400.020	63.00	61.30	1.70
CICB52	3+889.45	3.40 L	705.010	S22 / S23	62.32	60.47	1.85
CICB53	3+889.45	3.40 R	705.010	S22 / S23	62.36	60.51	1.85

CATCH BASIN LEAD DATA

Structure to Structure	Dia.	Type	Length	Invert Elevations Upstream	Invert Elevations Downstream
CB50 TO MAIN	200mm	PVC	2.5	61.30	61.27
CICB52 TO MAIN	200mm	PVC	1.5	60.47	60.46
CICB53 TO MAIN	200mm	PVC	6.0	60.51	60.45

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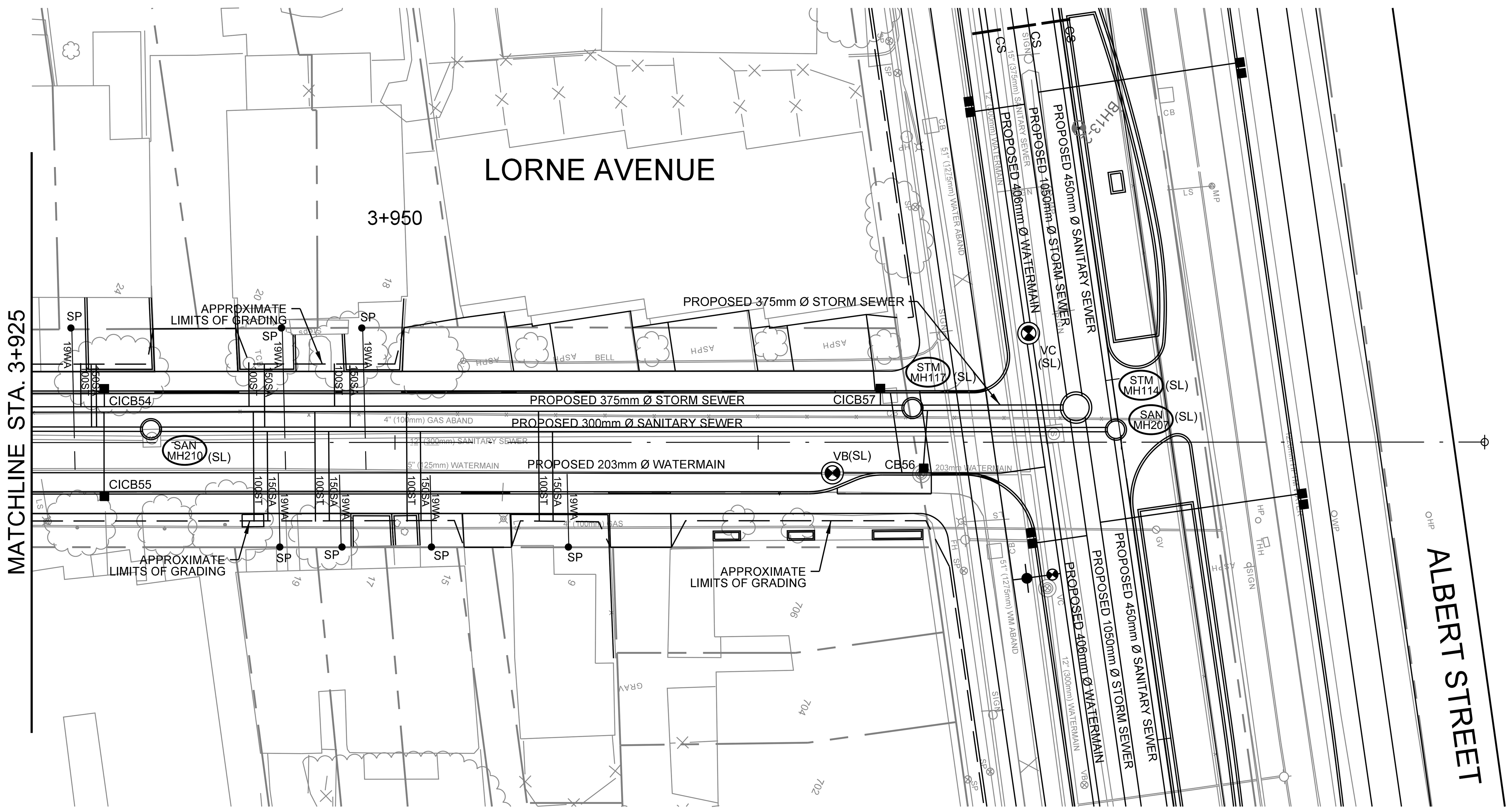

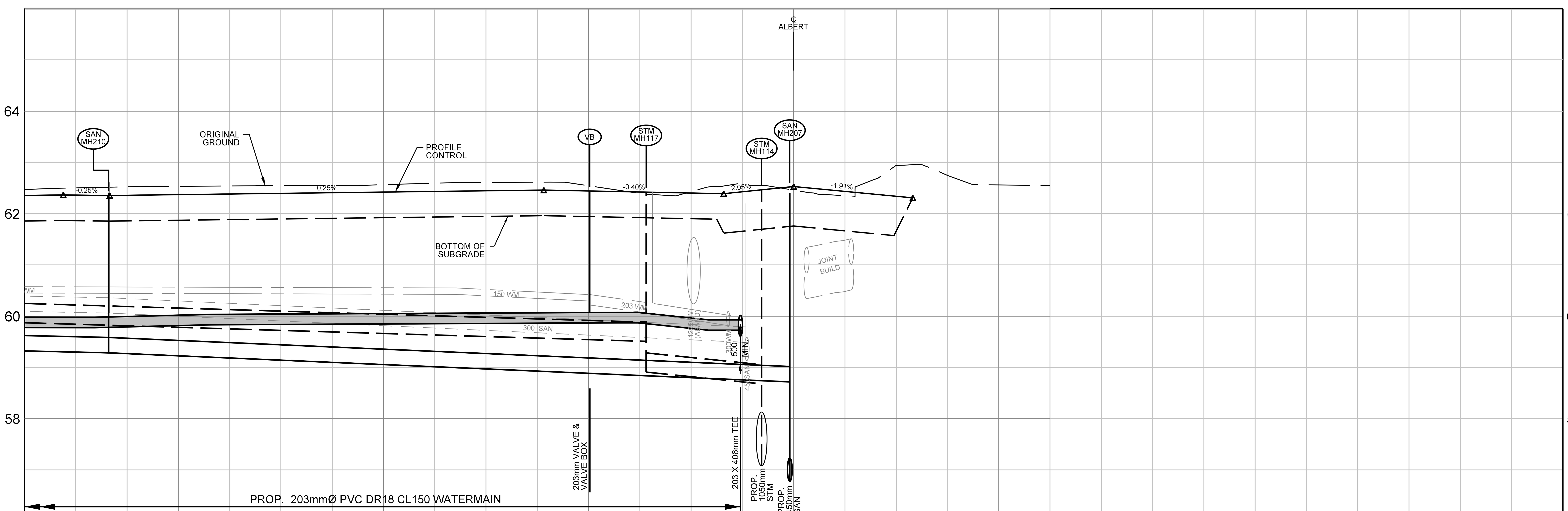

PROPOSED ℄ PROFILE	62.371 / 62.421 / 62.443 / 62.530
PROPOSED TOP OF WATERMAIN	59.979 / 60.036 / 60.053 / 60.075 / 59.930 / 59.930
PROPOSED STORM SEWER INVERT	
PROPOSED SANITARY SEWER INVERT	S - 59.285, N - 59.285 / 66m - 300mm Ø PVC SDR 35 SANITARY SEWER @ 0.86% / S-58.719, W-56.780, E-56.780
STATION	3+931.9 / 3+940.0 / 3+943.2 / 3+951.8 / 3+960.0 / 3+980.0 / 3+982.8 / 3+984.8 / 3+988.3 / 3+990.7 / 4+000.0

ALBERT STREET RECONSTRUCTION

GRADING & DRAINAGE
LORNE AVENUE
STA. 3+925 TO STA. 4+025

Ottawa

Contract No.	ISD12-5096
Dwg. No.	P12
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Asset No.	--------
Asset Group	---
Des.	D.H. / I.M
Chk'd.	G.B. / L.D.
Dwn.	D.H. / I.M.
Chk'd.	G.B. / L.D.
Utility Circ. No.	____
Index No.	____
Const. Inspector	________

R. Holder, P. Eng.
Manager
Light Rail Projects

L. Foley, P. Eng.
Project Manager
Rail Design & Construction

Robinson Consultants

Scale:
HORIZONTAL 0m 2.5 5 10
VERTICAL 0m 1 2

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REVISIONS

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8	ISSUED FOR CIRCULATION	G.B.	14.04.2015

NOTE: THE FOLLOWING MANHOLES REQUIRE A SAFETY PLATFORM TO BE INSTALLED: SANMH202 / SANMH203 / SANMH204 / SANMH207 / SANMH215 / SANMH218 / SANMH223A / SANMH224 / SANMH225 /SANMH226 / STMMH105 / STMMH106 / STMMH107 / STMMH108 / STMMH109 / STMMH110 / STMMH114 / STMMH118 /STMMH125 / STMMH126 / STMMH127 / STMMH128 / STMMH129 / STMMH130 / STMMH131 (SEE DETAIL DWG. D1)

STORM MANHOLE DATA

No.	Station	Offset (m)	Type		Elevations		Grate to
			Structure	Cover	Grate	Low Inv.	Invert
STM MH117	3+985.62	2.36 L	701.010	S24.1 / S25	62.35	58.91	3.44

SANITARY MANHOLE DATA

No.	Station	Offset (m)	Type		Elevations		Grate to
			Structure	Cover	Grate	Low Inv.	Invert
SAN MH210	3+933.21	0.92 L	701.010	S24 / S25	62.33	59.29	3.05

CATCH BASIN DATA

No.	Station	Offset (m)	Type		Elevations		Grate to
			Structure	Grate	Grate	Low Inv.	Invert
CICB54	3+930.00	3.40 L	705.010	S22 / S23	62.39	60.54	1.85
CICB55	3+930.00	3.40 R	705.010	S22 / S23	62.43	60.58	1.85
CB56	3+986.39	1.80 R	705.010	S19.1 / 400.020	62.53	60.83	1.70
CICB57	3+983.4	3.70 L	705.010	S22 / S23	62.46	60.61	1.85

CATCH BASIN LEAD DATA

Structure to Structure	Dia.	Type	Length	Invert Elevations	
				Upstream	Downstream
CICB54 TO MAIN	200mm	PVC	1.5	60.54	60.53
CICB55 TO MAIN	200mm	PVC	6.0	60.58	60.52
CICB56 TO MAIN	200mm	PVC	4.0	60.83	60.79
CICB57 TO MAIN	200mm	PVC	1.1	60.61	60.60

ISSUED

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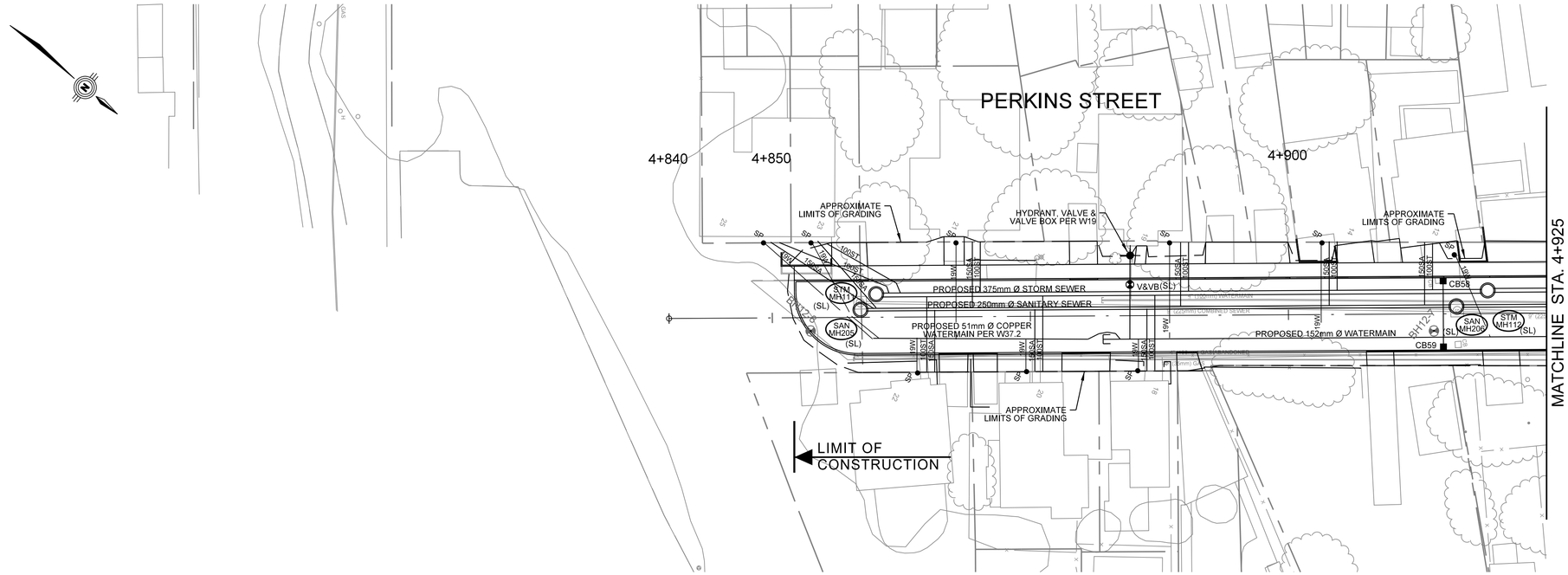
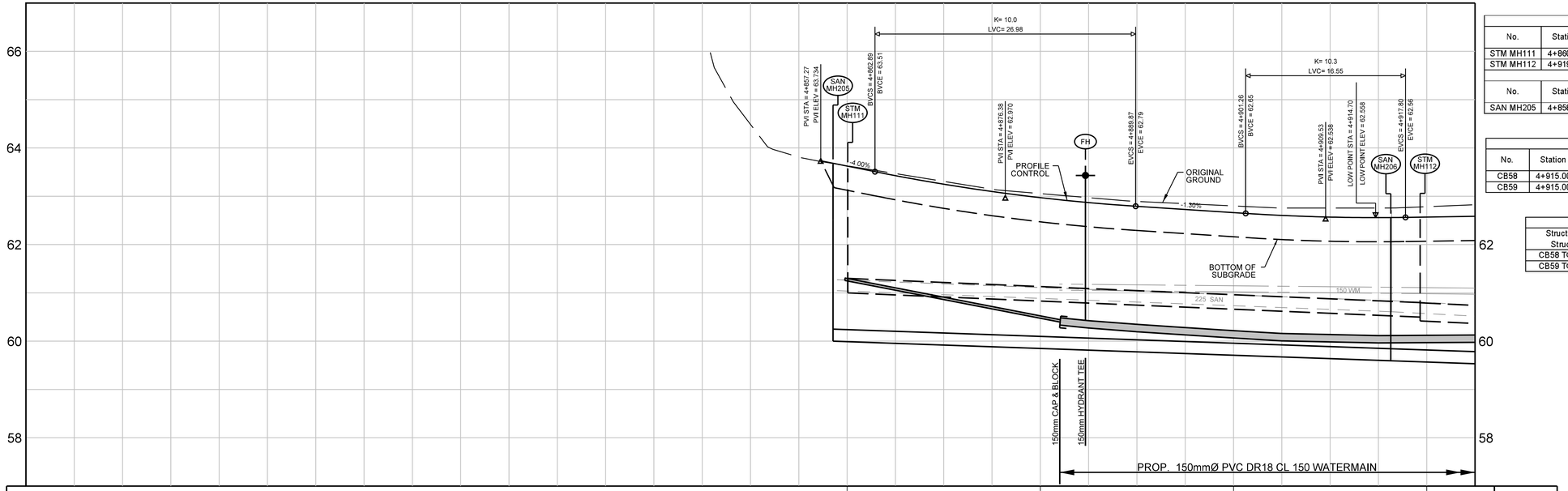




PROPOSED ℄ PROFILE	63.625			62.971			62.662				62.570		
PROPOSED TOP OF WATERMAIN	61.299			60.483	60.424	60.346	60.266	60.198	60.159	60.116	60.122		
PROPOSED STORM SEWER INVERT	N - 60.922	59m - 375mm Ø PVC SDR 35 STORM SEWER @ 0.85%									S - 60.420 N - 60.420	66m - 375mm PVC SDR 35 STM SEWER @ 0.95%	
PROPOSED SANITARY SEWER INVERT	N - 60.000	58m - 250mm Ø PVC SDR 35 SANITARY SEWER @ 0.70%									S - 59.594 N - 59.594	83m - 250mm PVC SDR 35 SAN SEWER @ 0.70%	
STATION	4+850.0	4+858.6	4+860.0	4+870.0	4+880.0	4+882.0	4+885.0	4+890.1	4+896.3	4+900.0	4+901.6	4+905.0	4+910.0	4+915.0	4+920.0

STORM MANHOLE DATA

No.	Station	Offset (m)	Type		Elevations		Grate to Invert
			Structure	Cover	Grate	Low Inv.	
STM MH111	4+860.07	2.24 L	701.010	S24.1 / S25	63.58	61.00	2.58
STM MH112	4+919.31	2.24 L	701.010	S24.1 / S25	62.52	60.42	2.10

SANITARY MANHOLE DATA

No.	Station	Offset (m)	Type		Elevations		Grate to Invert
			Structure	Cover	Grate	Low Inv.	
SAN MH205	4+858.54	0.82 L	701.010	S24 / S25	63.67	60.00	3.67

CATCH BASIN DATA

No.	Station	Offset (m)	Type		Elevations		Grate to Invert
			Structure	Grate	Grate	Low Inv.	
CB58	4+915.00	3.50 L	705.010	S19.1 / 400.020	62.49	60.79	1.70
CB59	4+915.00	3.50 R	705.010	S19.1 / 400.020	62.49	60.79	1.70

CATCH BASIN LEAD DATA

Structure to Structure	Dia.	Type	Length	Invert Elevations	
				Upstream	Downstream
CB58 TO MAIN	200mm	PVC	1.0	60.79	60.78
CB59 TO MAIN	200mm	PVC	5.4	60.79	60.74

NOTE:
THE FOLLOWING MH REQUIRE A SAFETY PLATFORM BE INSTALLED:
SAN MH211 / SANMH215 / SANMH218 / SANMH223A / SANMH224 / SANMH225 / SANMH226 / STMMH105 / STMMH106 / STMMH107 / STMMH108 / STMMH118 / STMMH125 / STMMH126 / STMMH127 / STMMH128 / STMMH129 / STMMH130 / STMMH131 {SEE DETAIL DWG. D1}

ALBERT STREET
RECONSTRUCTION

GRADING & DRAINAGE
PERKINS STREET
STA. 4+840 TO STA. 4+925

R. Holder, P. Eng.
Manager
Light Rail Projects

L. Foley, P. Eng.
Project Manager
Rail Design & Construction

Robinson Consultants

Ottawa

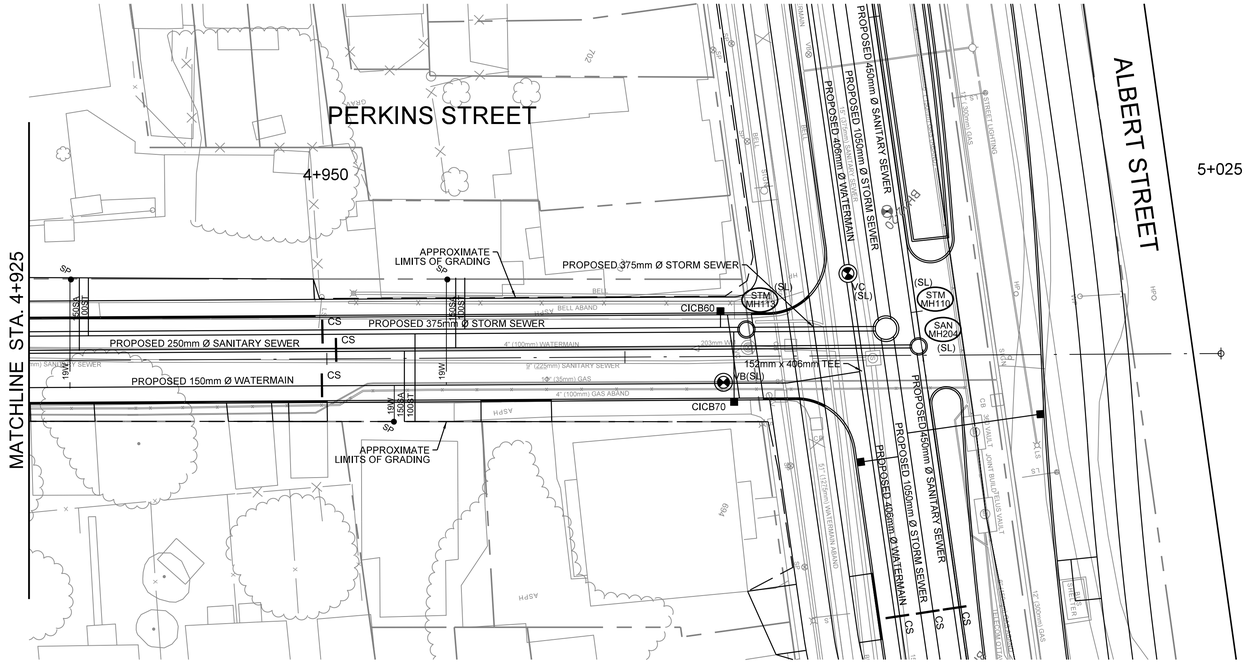
Contract No. ISD12-5096 | Dwg. No. P13
Sheet _ of _
Asset No. --------
Asset Group ---
Des. D.H. / I.M | Chk'd. G.B. / L.D.
Dwn. D.H. / I.M. | Chk'd. G.B. / L.D.
Utility Circ. No. ____ | Index No. ____
Const. Inspector _____
Scale: HORIZONTAL 0m 2.5 5 10 / 0m 1 2 VERTICAL

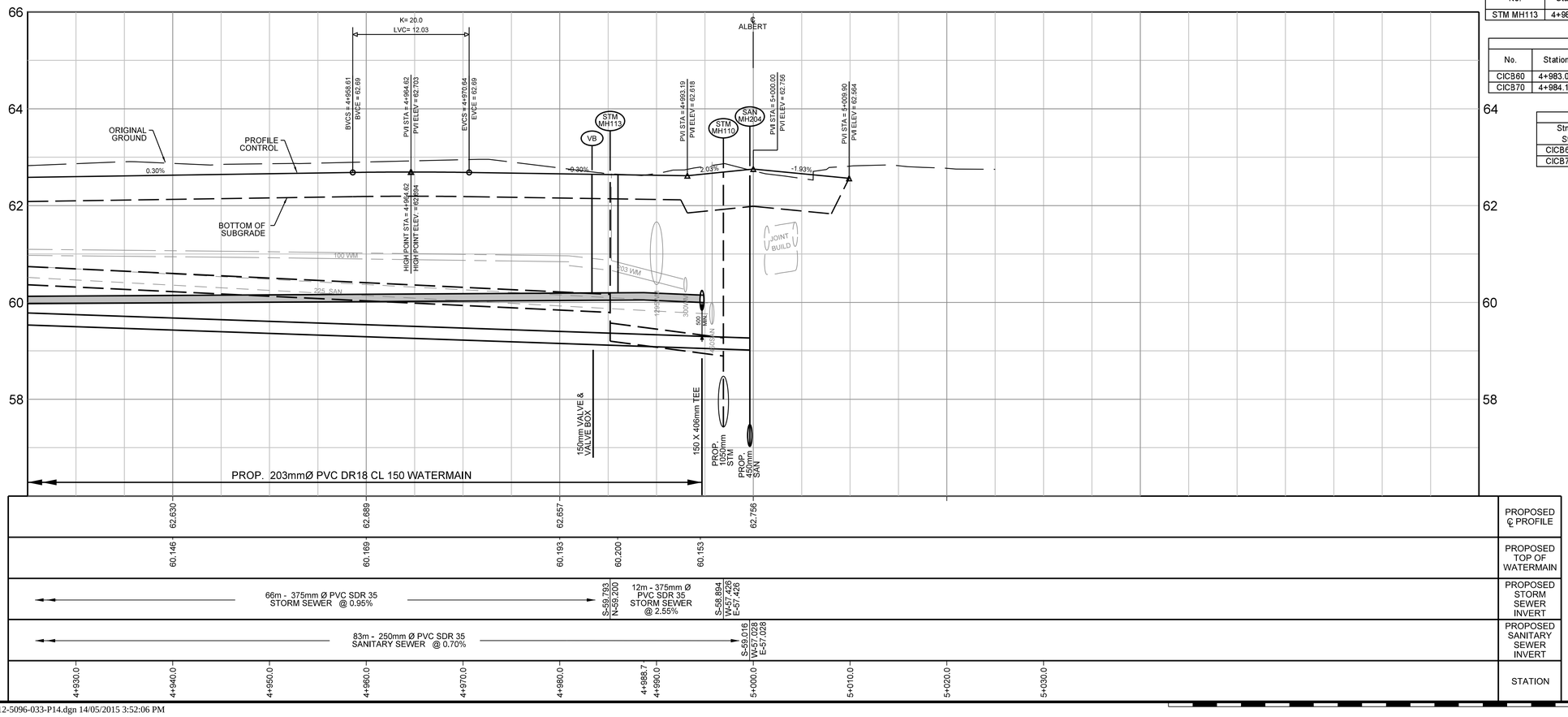
NOTE: The location of utilities is approximate only, the exact location should be determined by consulting the municipal authorities and utility companies concerned. The contractor shall prove the location of utilities and shall be responsible for adequate protection from damage.

REVISIONS

No.	Description	By	Date (dd/mm/yy)
1	ISSUED FOR RIO SUBMISSION	R.C.	30.04.13
2	ISSUED FOR CIRCULATION	R.C.	07.06.13
3	ISSUED FOR TENDER	R.C.	03.08.13
4	RE-ISSUED FOR CIRCULATION	R.C.	25.11.13
5	ISSUED FOR ECA APPLICATION	R.C.	30.01.14
6	ISSUED FOR CONSTRUCTION	R.C.	30.04.14

ISSUED





ISSUED

ALBERT STREET RECONSTRUCTION

GRADING & DRAINAGE PERKINS STREET STA. 4+925 TO STA. 5+025

R. Holder, P. Eng.	L. Foley, P. Eng.
Manager Light Rail Projects	*Project Manager Rail Design & Construction*

Robinson Consultants

Ottawa

Contract No.	Dwg. No.
ISD12-5096	P14

Sheet _ of _

Asset No. ---------

Asset Group ---

Des.	Chk'd.
D.H. / I.M	G.B. / L.D.
Dwn.	Chk'd.
D.H. / I.M.	G.B. / L.D.
Utility Circ. No. ____	Index No. ____

Const. Inspector _____

Scale: HORIZONTAL 0m 2.5 5 10 / 0m 1 2 VERTICAL

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REVISIONS

No.	Description	By	Date (dd/mm/yy)
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2	ISSUED FOR CIRCULATION	R.C.	07.06.13
3	ISSUED FOR TENDER	R.C.	03.08.13
4	RE-ISSUED FOR CIRCULATION	R.C.	25.11.13
5	ISSUED FOR ECA APPLICATION	R.C.	30.01.14
6	ISSUED FOR CONSTRUCTION	R.C.	30.04.14
7	ISSUED FOR REVIEW - BRICKHILL EXTENSION	G.B.R.C.	13.03.15
8	ISSUED FOR CIRCULATION	G.B.	14.04.2015

NOTE: THE FOLLOWING MANHOLES REQUIRE A SAFETY PLATFORM TO BE INSTALLED: SANMH202 / SANMH203 / SANMH204 / SANMH207 / SANMH215 / SANMH218 / SANMH223A / SANMH224 / SANMH225 /SANMH226 / STMMH105 / STMMH106 / STMMH107 / STMMH108 / STMMH109 / STMMH110 / STMMH114 / STMMH118 /STMMH125 / STMMH126 / STMMH127 / STMMH128 / STMMH129 / STMMH130 / STMMH131 (SEE DETAIL DWG. D1)

STORM MANHOLE DATA

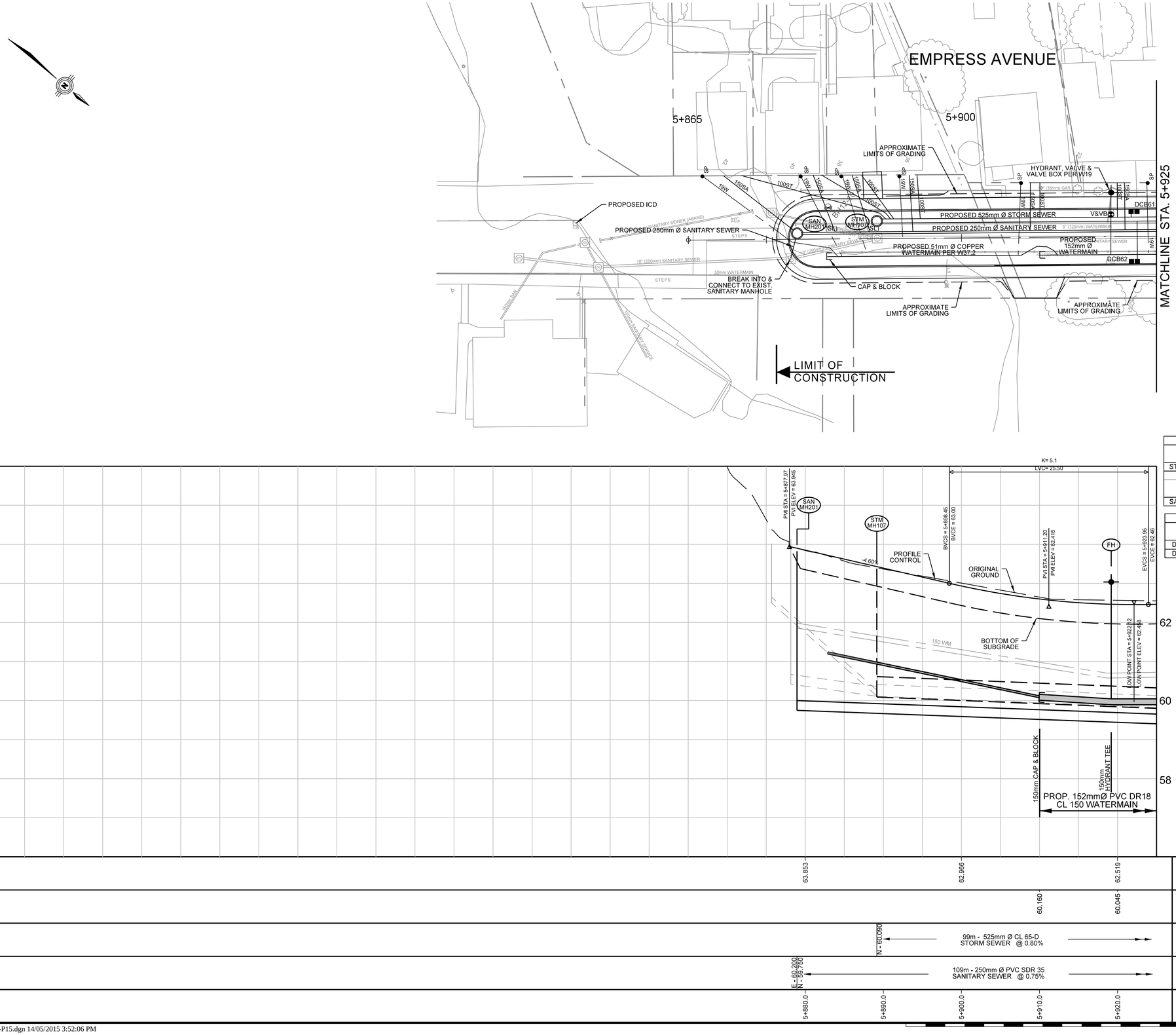
No.	Station	Offset (m)	Type		Elevations		Grate to Invert
			Structure	Cover	Grate	Low Inv.	
STM MH113	4+985.20	2.25 L	701.010	S24.1 / S25	62.60	59.20	3.40

CATCH BASIN DATA

No.	Station	Offset (m)	Type		Elevations		Grate to Invert
			Structure	Grate	Grate	Low Inv.	
CICB60	4+983.04	3.80 L	705.010	S22 / S23	62.73	60.88	1.85
CICB70	4+984.14	3.81 R	705.010	S22 / S23	62.72	60.87	1.85

CATCH BASIN LEAD DATA

Structure to Structure	Dia.	Type	Length	Invert Elevations	
				Upstream	Downstream
CICB60 TO MAIN	200mm	PVC	1.4	60.88	60.86
CICB70 TO MAIN	200mm	PVC	5.9	60.87	60.82



ISSUED

ALBERT STREET RECONSTRUCTION

GRADING & DRAINAGE EMPRESS AVENUE STA. 5+865 TO STA. 5+925

R. Holder, P. Eng.	L. Foley, P. Eng.
Manager Light Rail Projects	*Project Manager Rail Design & Construction*

Robinson Consultants

Ottawa

Contract No.	Dwg. No.
ISD12-5096	P15

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Asset No. ---------

Asset Group ---

Des.	Chk'd.
D.H. / I.M	G.B. / L.D.
Dwn.	Chk'd.
D.H. / I.M.	G.B. / L.D.

Utility Circ. No. ____ Index No. ____

Const. Inspector _____

Scale: HORIZONTAL 0m 2.5 5 10 / VERTICAL 0m 1 2

NOTE: The location of utilities is approximate only, the exact location should be determined by consulting the municipal authorities and utility companies concerned. The contractor shall prove the location of utilities and shall be responsible for adequate protection from damage.

REVISIONS

No.	Description	By	Date (dd/mm/yy)
1	ISSUED FOR RIO SUBMISSION	R.C.	30.04.13
2	ISSUED FOR CIRCULATION	R.C.	07.06.13
3	ISSUED FOR TENDER	R.C.	03.08.13
4	RE-ISSUED FOR CIRCULATION	R.C.	25.11.13
5	ISSUED FOR ECA APPLICATION	R.C.	30.01.14
6	ISSUED FOR CONSTRUCTION	R.C.	30.04.14
7	ISSUED FOR REVIEW - BRICKHILL EXTENSION	G.B.	13.03.15
8	ISSUED FOR CIRCULATION	G.B.	14.04.2015

NOTE: THE FOLLOWING MANHOLES REQUIRE A SAFETY PLATFORM TO BE INSTALLED: SANMH202 / SANMH203 / SANMH204 / SANMH207 / SANMH215 / SANMH218 / SANMH223A / SANMH224 / SANMH225 /SANMH226 / STMMH105 / STMMH106 / STMMH107 / STMMH108 / STMMH109 / STMMH110 / STMMH114 / STMMH118 /STMMH125 / STMMH126 / STMMH127 / STMMH128 / STMMH129 / STMMH130 / STMMH131 (SEE DETAIL DWG. D1)

STORM MANHOLE DATA

No.	Station	Offset (m)	Type		Elevations		Grate to Invert
			Structure	Cover	Grate	Low Inv.	
STM MH107	5+889.16	2.24 L	701.010	S24.1 / S25	63.39	60.09	3.29

SANITARY MANHOLE DATA

No.	Station	Offset (m)	Type		Elevations		Grate to Invert
			Structure	Cover	Grate	Low Inv.	
SAN MH201	5+878.94	0.74 L	701.010	S24 / S25	63.87	59.75	4.12

CATCH BASIN DATA

No.	Station	Offset (m)	Type		Elevations		Grate to Invert
			Structure	Grate	Grate	Low Inv.	
DCB61	5+922.12	3.50 L	705.020	S19.1 / 400.020 (2)	62.38	60.63	1.75
DCB62	5+922.12	3.50 R	705.020	S19.1 / 400.020 (2)	62.38	60.63	1.75

CATCH BASIN LEAD DATA

Structure to Structure	Dia.	Type	Length	Invert Elevations	
				Upstream	Downstream
DCB61 TO MAIN	250mm	PVC	1.0	60.63	60.62
DCB62 TO MAIN	250mm	PVC	5.4	60.63	60.58

FOR CONTINUATION SEE DWG. P6

FOR CONTINUATION SEE DWG. P15
MATCHLINE STA. 5+925

EMPRESS AVENUE

5+950

ALBERT STREET

6+025

6+000

APPROXIMATE LIMITS OF GRADING

PROPOSED 525mm Ø STORM SEWER

PROPOSED 525mm Ø STORM SEWER

PROPOSED 250mm Ø SANITARY SEWER

PROPOSED 250mm Ø SANITARY SEWER

PROPOSED 152mm Ø WATERMAIN

PROPOSED 406mm Ø WATERMAIN

PROPOSED 1050mm Ø STORM SEWER

PROPOSED 450mm Ø SANITARY SEWER

PROPOSED 450mm Ø SANITARY SEWER

CICB63

CICB65

CICB33

CICB64

STM MH108 (SL)

STM MH109 (SL)

SAN MH228 (SL)

SAN MH202 (SL)

SAN MH203 (SL)

SAN MH227 (SL)

VB (SL)

TRANSITWAY

APPROXIMATE LIMITS OF GRADING

FOR CONTINUATION SEE DWG. P6 & P17

ALBERT STREET
RECONSTRUCTION

GRADING & DRAINAGE
EMPRESS AVENUE
STA. 5+925 TO STA. 6+025

R. Holder, P. Eng.	L. Foley, P. Eng.
Manager Light Rail Projects	Project Manager Rail Design & Construction

Robinson Consultants

Ottawa

Contract No.	Dwg. No.
ISD12-5096	P16

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Asset No. ---------

Asset Group ---

Des.	Chk'd.
D.H. / I.M	G.B. / L.D.
Dwn.	Chk'd.
D.H. / I.M.	G.B. / L.D.
Utility Circ. No.	Index No.
----	----

Const. Inspector _____

Scale:
HORIZONTAL
0m 2.5 5 10
0m 1 2
VERTICAL

NOTE: The location of utilities is approximate only, the exact location should be determined by consulting the municipal authorities and utility companies concerned. The contractor shall prove the location of utilities and shall be responsible for adequate protection from damage.

REVISIONS

No.	Description	By	Date (dd/mm/yy)
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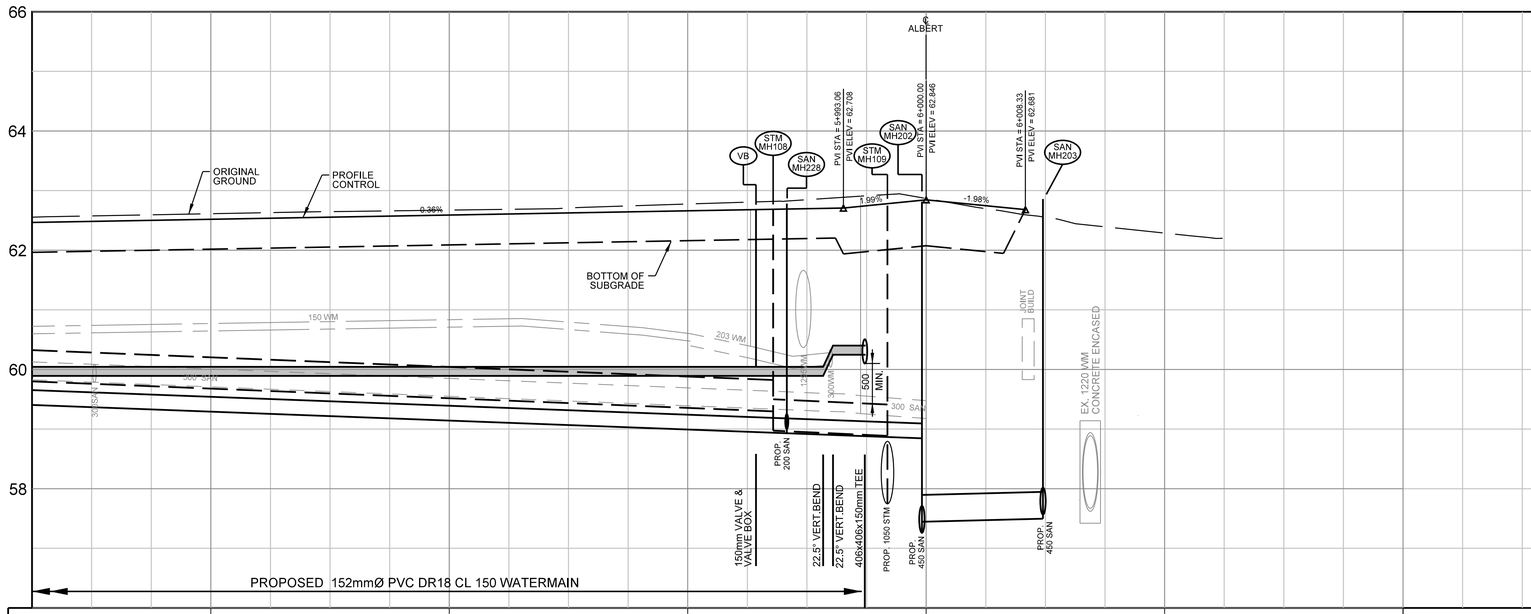
2	ISSUED FOR CIRCULATION	R.C.	07.06.13
3	ISSUED FOR TENDER	R.C.	03.08.13
4	RE-ISSUED FOR CIRCULATION	R.C.	25.11.13
5	ISSUED FOR ECA APPLICATION	R.C.	30.01.14
6	ISSUED FOR CONSTRUCTION	R.C.	30.04.14
7	ISSUED FOR REVIEW - BRICKHILL EXTENSION	G.B.	13.03.15
8	ISSUED FOR CIRCULATION	G.B.	14.04.2015

NOTE: THE FOLLOWING MANHOLES REQUIRE A SAFETY PLATFORM TO BE INSTALLED:
SANMH202 / SANMH203 / SANMH204 / SANMH207 / SANMH215 / SANMH218 / SANMH223A / SANMH224 / SANMH225 /SANMH226 / STMMH105 / STMMH106 / STMMH107 / STMMH108 / STMMH109 / STMMH110 / STMMH114 / STMMH118 /STMMH125 / STMMH126 / STMMH127 / STMMH128 / STMMH129 / STMMH130 / STMMH131 (SEE DETAIL DWG. D1)



62.560 62.630 62.700 62.884	PROPOSED ℄ PROFILE
60.045 60.045 60.045 60.045 60.045 60.400 60.400	PROPOSED TOP OF WATERMAIN
98m - 525mm Ø CL 65-D STORM SEWER @ 0.81% → S-59.298 N-58.975 → 10m - 525mm Ø CL 65-D STM SEWER @ 0.88% → S-58.887 W-57.745 E-57.745	PROPOSED STORM SEWER INVERT
109m - 250mm Ø PVC SDR35 SANITARY SEWER @ 0.75% → S-58.929 W-58.999 E-58.929 → 11m - 250mm Ø PVC SDR35 SAN. SEWER @ 0.75% → S-58.845 W-57.446 N-57.446 → 10.2m - 450mm Ø PVC SDR35 SAN. SEWER @ 0.50% → S-57.407 W-57.357	PROPOSED SANITARY SEWER INVERT
5+930.0 5+940.0 5+950.0 5+960.0 5+970.0 5+980.0 5+985.7 5+990.0 5+991.4 5+992.2 5+994.9 6+000.0 6+010.0 6+020.0 6+030.0 6+040.0	STATION

STORM MANHOLE DATA

No.	Station	Offset (m)	Type		Elevations		Grate to Invert
			Structure	Cover	Grate	Low Inv.	
STM MH108	5+987.16	2.18 L	701.010	S24.1 / S25	62.64	58.98	3.67

SANITARY MANHOLE DATA

No.	Station	Offset (m)	Type		Elevations		Grate to Invert
			Structure	Cover	Grate	Low Inv.	
SAN MH228	5+988.31	0.72 L	701.010	S24 / S25	62.69	58.43	4.26

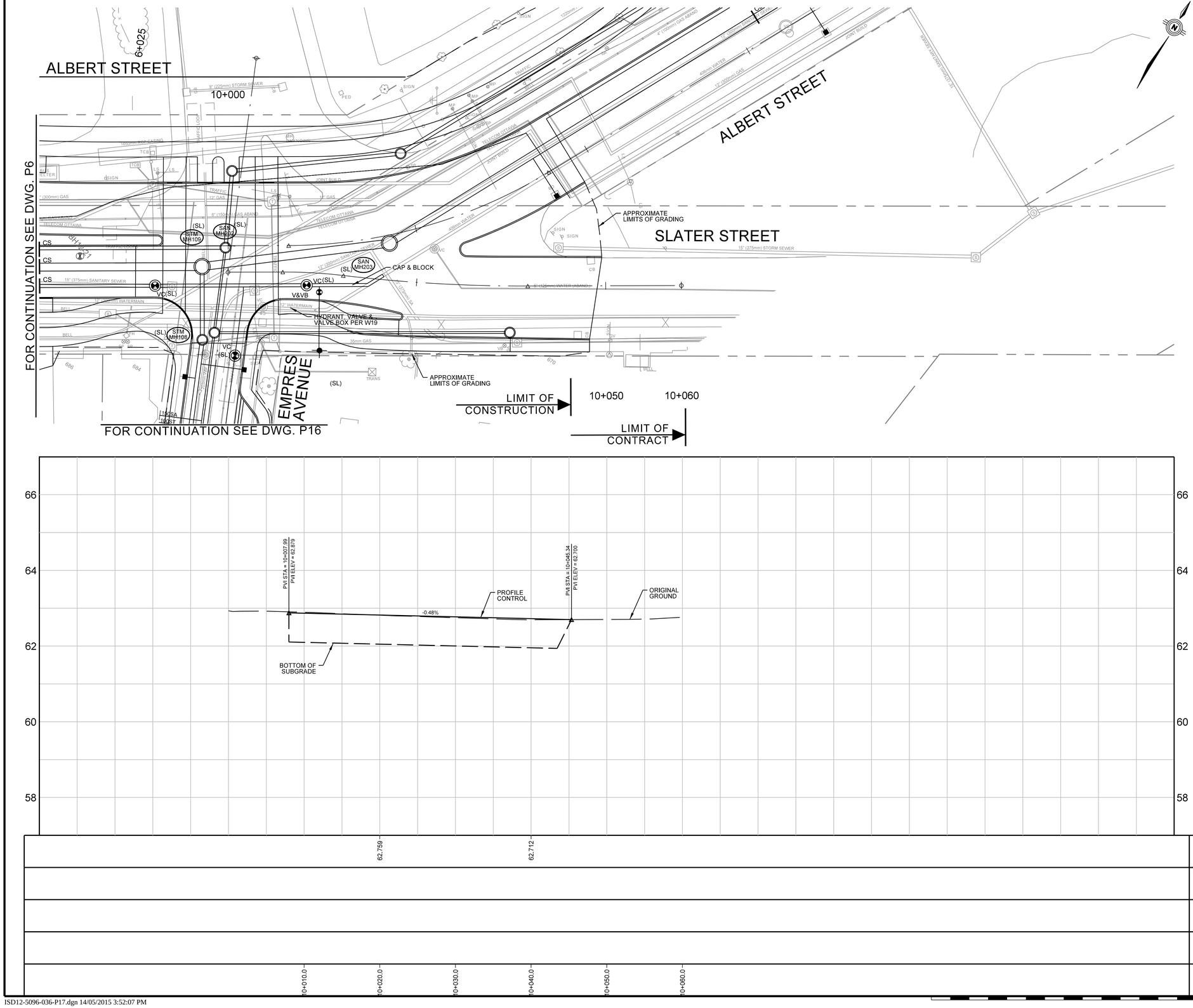
CATCH BASIN DATA

No.	Station	Offset (m)	Type		Elevations		Grate to Invert
			Structure	Grate	Grate	Low Inv.	
CICB63	5+946.50	3.50 L	705.010	S22 / S23	62.62	60.77	1.85
CICB64	5+946.50	3.50 R	705.010	S22 / S23	62.62	60.77	1.85
CICB65	5+982.03	3.50 L	705.010	S22 / S23	62.75	60.90	1.85
CICB33	5+983.98	3.81 R	705.010	S22 / S23	62.76	60.91	1.85

CATCH BASIN LEAD DATA

Structure to Structure	Dia.	Type	Length	Invert Elevations	
				Upstream	Downstream
CICB63 TO MAIN	200mm	PVC	1.4	60.77	60.76
CICB64 TO MAIN	200mm	PVC	5.8	60.77	60.71
CICB65 TO MAIN	200mm	PVC	1.4	60.90	60.88
CICB33 TO MAIN	200mm	PVC	5.7	60.91	60.85

ISSUED



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ALBERT STREET RECONSTRUCTION

GRADING & DRAINAGE SLATER STREET STA. 10+000 TO STA. 10+060

R. Holder, P. Eng.	L. Foley, P. Eng.
Manager Light Rail Projects	Project Manager Rail Design & Construction

Robinson Consultants

Ottawa

Contract No.	Dwg. No.
ISD12-5096	P17

Sheet _ of _

Asset No. --------

Asset Group ---

Des.	Chk'd.
D.H. / I.M	G.B. / L.D.
Dwn. D.H. / I.M.	Chk'd. G.B. / L.D.
Utility Circ. No. ___	Index No. ___

Const. Inspector _____

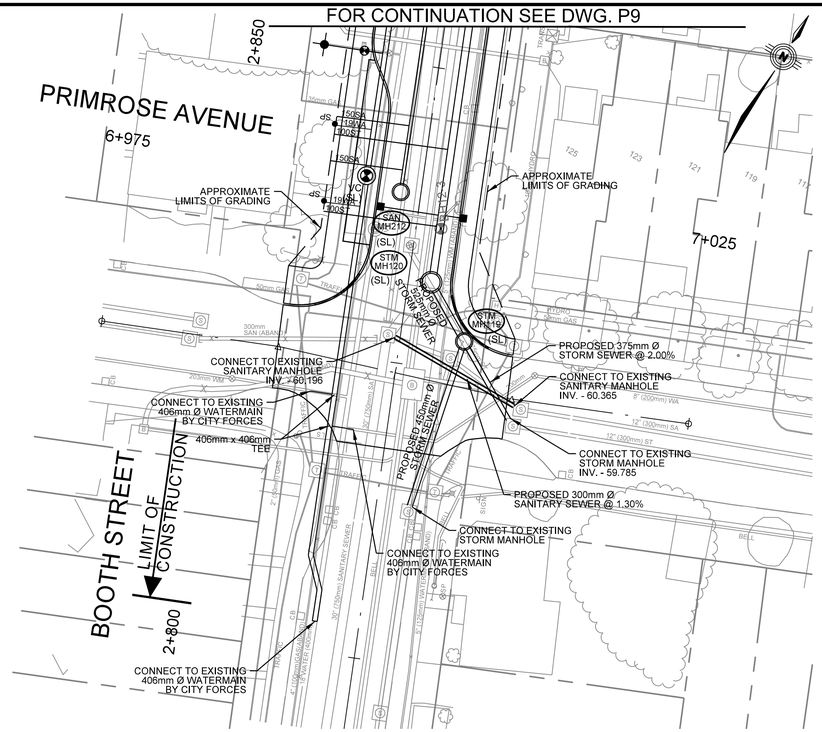
Scale:
HORIZONTAL
0m 2.5 5 10
0m 1 2
VERTICAL

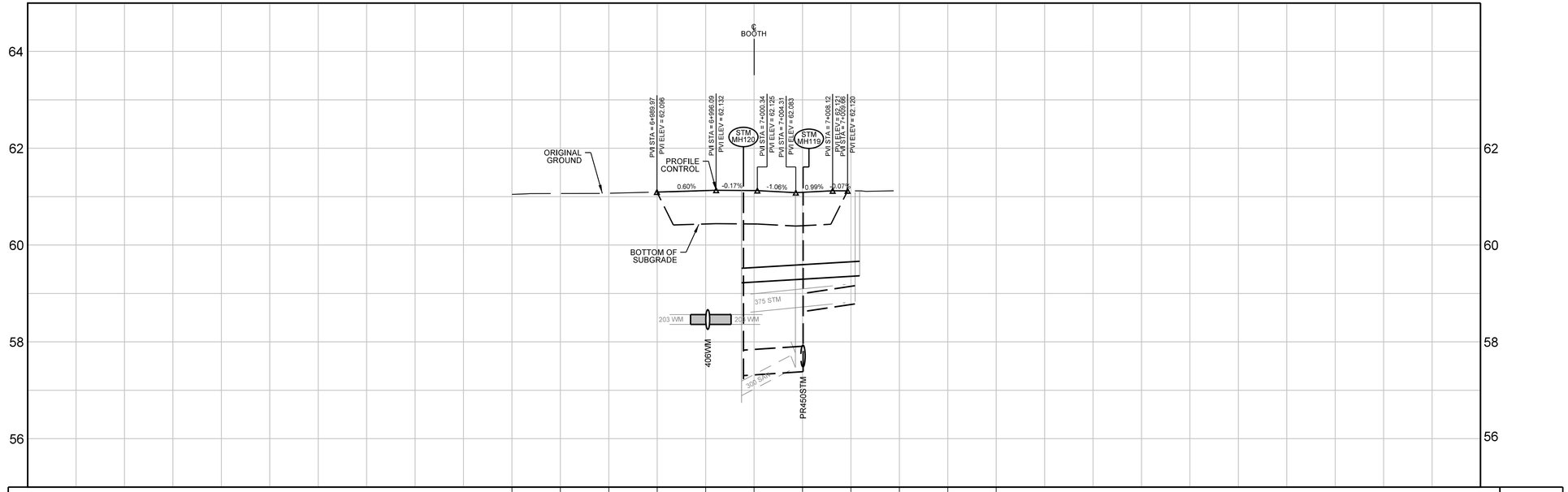
NOTE: The location of utilities is approximate only, the exact location should be determined by consulting the municipal authorities and utility companies concerned. The contractor shall prove the location of utilities and shall be responsible for adequate protection from damage.

REVISIONS

No.	Description	By	Date (dd/mm/yy)
1	ISSUED FOR RIO SUBMISSION	R.C.	30.04.13
2	ISSUED FOR CIRCULATION	R.C.	07.06.13
3	ISSUED FOR TENDER	R.C.	03.08.13
4	RE-ISSUED FOR CIRCULATION	R.C.	25.11.13
5	ISSUED FOR ECA APPLICATION	R.C.	30.01.14
6	ISSUED FOR CONSTRUCTION	R.C.	30.04.14

NOTE:
THE FOLLOWING MH REQUIRE A SAFETY PLATFORM BE INSTALLED:
SAN MH211 / SANMH215 / SANMH218 / SANMH223A / SANMH224 / SANMH225 / SANMH226 / STMMH105 / STMMH106 / STMMH107 / STMMH108 / STMMH118 / STMMH125 / STMMH126 / STMMH127 / STMMH128 / STMMH129 / STMMH130 / STMMH131 (SEE DETAIL DWG. D1)





62.096 62.126 62.126 62.090	PROPOSED ℄ PROFILE
9m - 525mm Ø CL 65-D STM. SEWER @ 0.90%; 8m - 375mm Ø PVC SDR 35 STM. SEWER @ 2.00%	PROPOSED TOP OF WATERMAIN
INV - 58.304 E - 58.304; INV - 58.454 E - 59.625; INV - 59.379 E - 59.625; INV - 59.785 E - 59.830 (EX)	PROPOSED STORM SEWER INVERT
INV - 60.221 E - 60.196; 13m - 300mm Ø PVC SDR 35 SAN. SEWER @ 1.30%; INV - 60.365 E - 60.365 (EX)	PROPOSED SANITARY SEWER INVERT
6+970.0 6+980.0 6+990.0 7+000.0 7+010.0 7+020.0 7+030.0	STATION

ISSUED

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ALBERT STREET RECONSTRUCTION

GRADING & DRAINAGE PRIMROSE AVENUE STA. 6+975 TO STA. 7+025

R. Holder, P. Eng.	L. Foley, P. Eng.
Manager Light Rail Projects	Project Manager Rail Design & Construction

Robinson Consultants

Ottawa

Contract No.	Dwg. No.
ISD12-5096	P18

Sheet _ of _

Asset No. ---------

Asset Group ---

Des.	Chk'd.
D.H. / I.M	G.B. / L.D.
Dwn.	Chk'd.
D.H. / I.M.	G.B. / L.D.
Utility Circ. No. ____	Index No. ____

Const. Inspector _____

Scale: HORIZONTAL 0m 2.5 5 10 / 0m 1 2 VERTICAL

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REVISIONS

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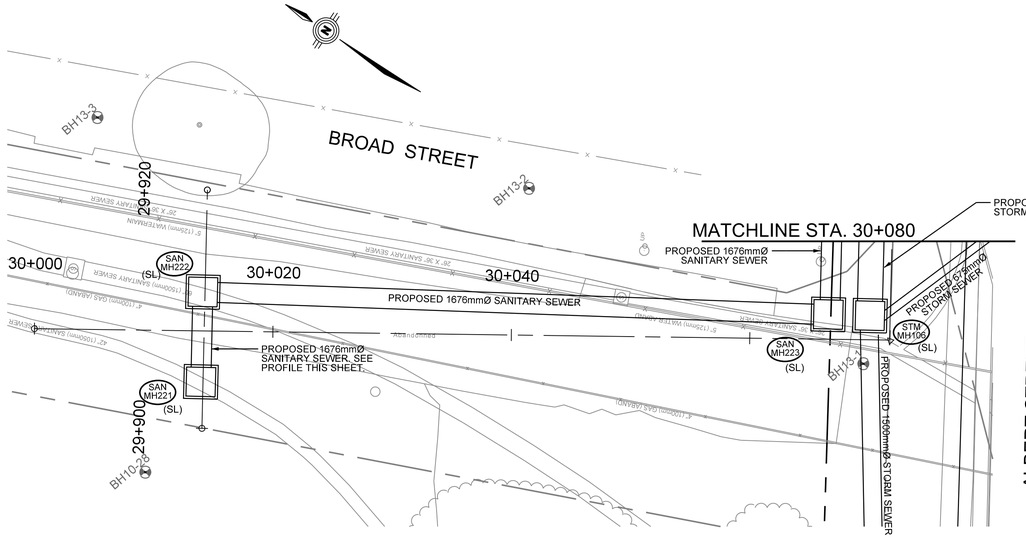
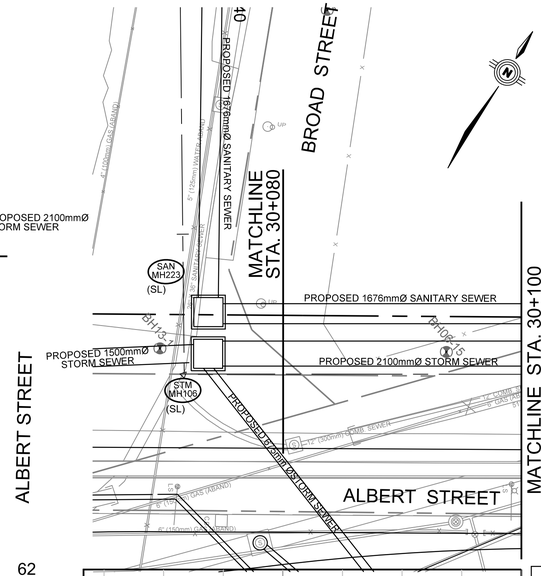
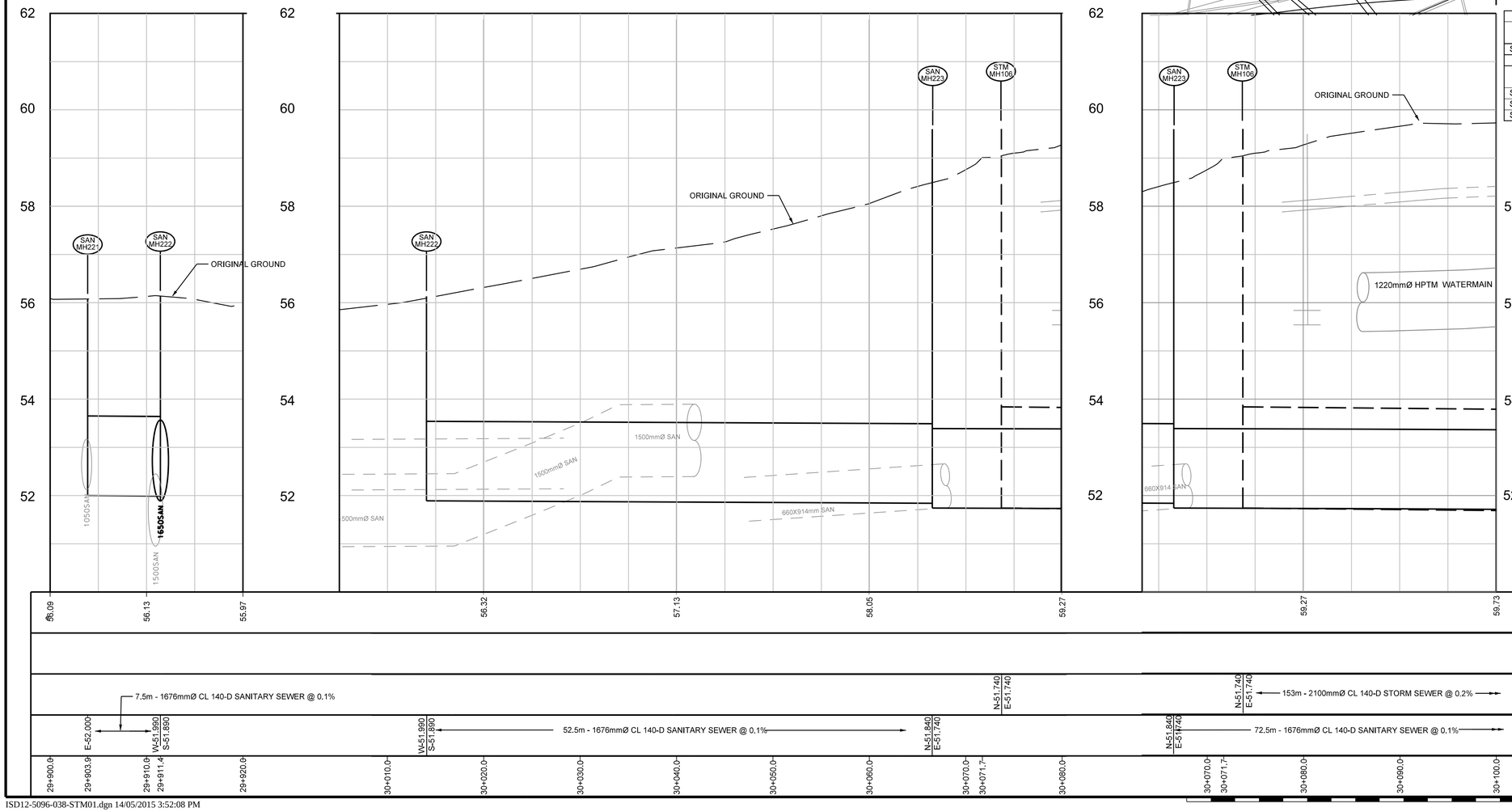
3	ISSUED FOR TENDER	R.C.	03.08.13
4	RE-ISSUED FOR CIRCULATION	R.C.	25.11.13
5	ISSUED FOR ECA APPLICATION	R.C.	30.01.14
6	ISSUED FOR CONSTRUCTION	R.C.	30.04.14

NOTE:
THE FOLLOWING MH REQUIRE A SAFETY PLATFORM BE INSTALLED:
SAN MH211 / SANMH215 / SANMH218 / SANMH223A / SANMH224 / SANMH225 / SANMH226 / STMMH105 / STMMH106 / STMMH107 / STMMH108 / STMMH118 / STMMH125 / STMMH126 / STMMH127 / STMMH128 / STMMH129 / STMMH130 / STMMH131 (SEE DETAIL DWG. D1)







NOTE:
THE FOLLOWING MH REQUIRE A SAFETY PLATFORM BE INSTALLED:
SAN MH211 / SANMH215 / SANMH218 / SANMH223A / SANMH224 / SANMH225 / SANMH226 / STMMH105 / STMMH106 / STMMH107 / STMMH108 / STMMH118 / STMMH125 / STMMH126 / STMMH127 / STMMH128 / STMMH129 / STMMH130 / STMMH131 (SEE DETAIL DWG. D1)

STORM MANHOLE DATA							
No.	Station	Offset (m)	Type		Elevations		Grate to Invert
			Structure	Cover	Grate	Low Inv.	
STM MH106	30+073.73	1.70 L	2440 x 3050	S24.1 / S25	58.78	51.74	7.04

SANITARY MANHOLE DATA							
No.	Station	Offset (m)	Type		Elevations		Grate to Invert
			Structure	Cover	Grate	Low Inv.	
SAN MH221	30+014.02	4.28 R	2440 x 2440	S24 / S25	56.04	52.00	4.04
SAN MH222	30+014.09	3.27 L	2440 x 2440	S24 / S25	56.14	51.89	4.25
SAN MH223	30+066.56	2.08 L	2440 x 2440	S24 / S25	58.56	51.74	6.82

ALBERT STREET
RECONSTRUCTION

STORM SEWER
STA. 29+900 TO STA. 30+100

R. Holder, P. Eng. — Manager, Light Rail Projects
L. Foley, P. Eng. — Project Manager, Rail Design & Construction

Robinson Consultants

LICENSED PROFESSIONAL ENGINEER R.E. COTNAM 100079713 PROVINCE OF ONTARIO

LICENSED PROFESSIONAL ENGINEER G.A. BLOW PROVINCE OF ONTARIO

Ottawa

Contract No.	Dwg. No.
ISD12-5096	ST1

Sheet of

Asset No.

Asset Group

Des.	Chk'd.
D.H.	G.B.
Dwn.	Chk'd.
D.H.	G.B.

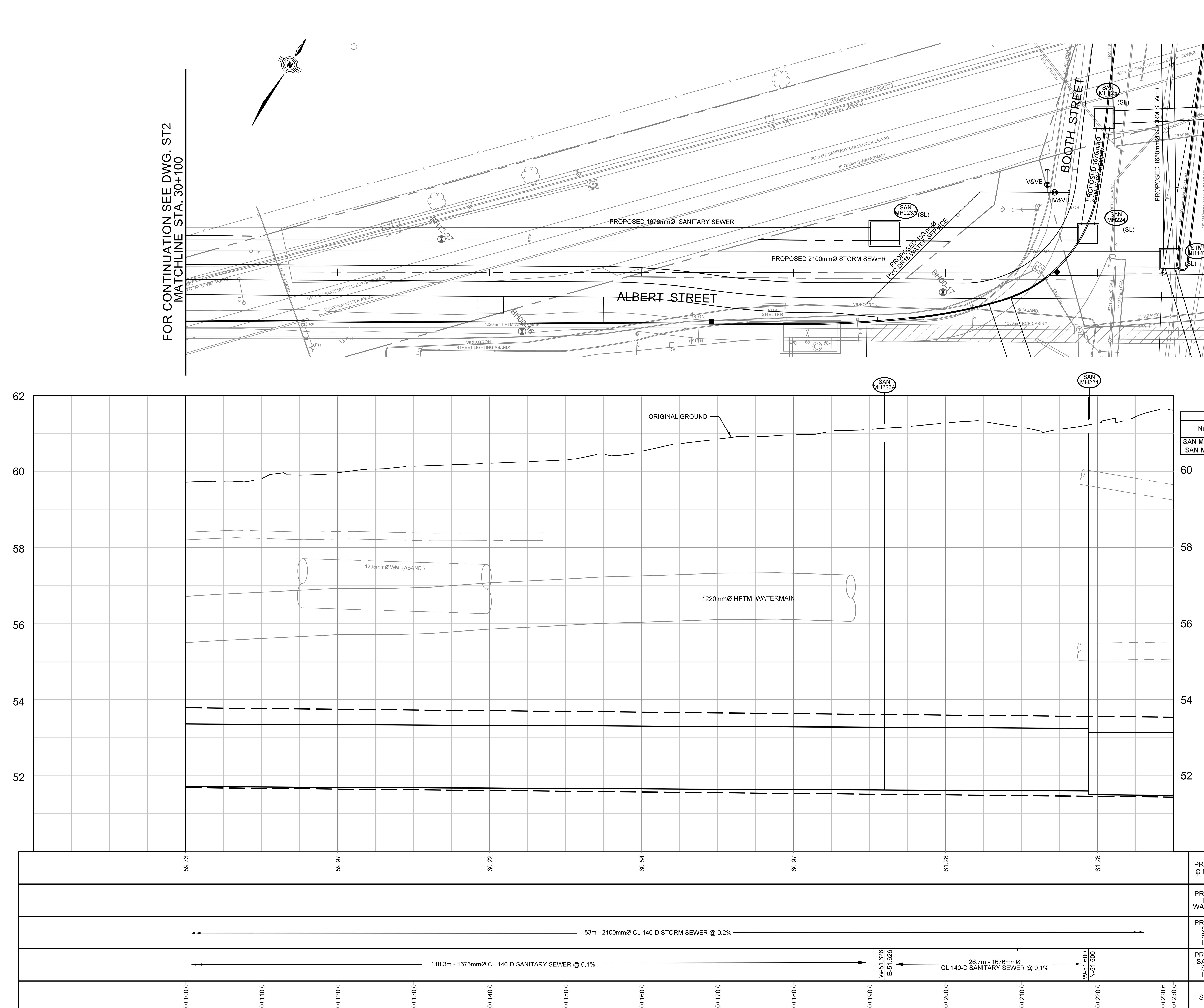
Utility Circ. No. | Index No.

Const. Inspector

Scale: HORIZONTAL 0m 2.5 5 10; VERTICAL 0m 1 2

NOTE: The location of utilities is approximate only, the exact location should be determined by consulting the municipal authorities and utility companies concerned. The contractor shall prove the location of utilities and shall be responsible for adequate protection from damage.

REVISIONS	No.	Description	By	Date (dd/mm/yy)
	1	RE-ISSUED FOR CIRCULATION	R.C.	25,11,13
	2	ISSUED FOR ECA APPLICATION	R.C.	30,01,14
	3	ISSUED FOR CONSTRUCTION	R.C.	30,04,14



ALBERT STREET RECONSTRUCTION

STORM SEWER STA. 30+100 TO STA. 30+220

Ottawa

Contract No. ISD12-5096 | Dwg. No. ST2

Sheet of

Asset No.

Asset Group

R. Holder, P. Eng.
Manager
Light Rail Projects

L. Foley, P. Eng.
Project Manager
Rail Design & Construction

Robinson Consultants

LICENSED PROFESSIONAL ENGINEER
G.A. BLOW
8 Apr. 1, '15
PROVINCE OF ONTARIO

Des.	D.H.	Chk'd.	G.B.
Dwn.	D.H.	Chk'd.	G.B.
Utility Circ. No.		Index No.	
Const. Inspector			

Scale: HORIZONTAL 0m 2.5 5 10; VERTICAL 0m 1 2

NOTE: The location of utilities is approximate only, the exact location should be determined by consulting the municipal authorities and utility companies concerned. The contractor shall prove the location of utilities and shall be responsible for adequate protection from damage.

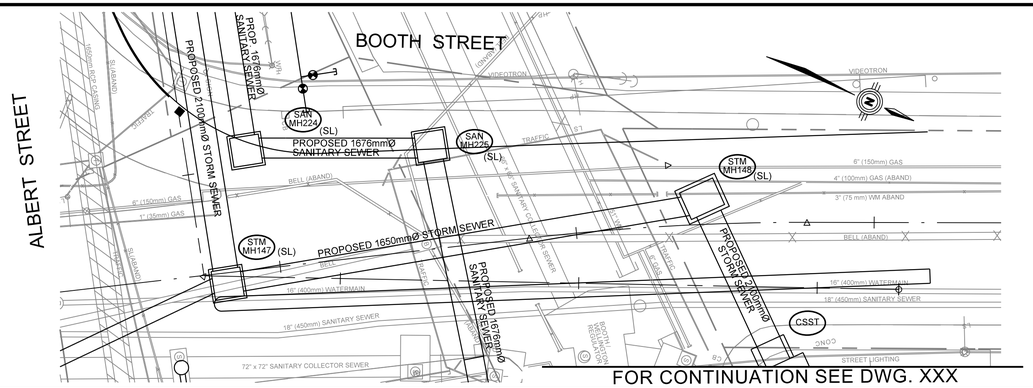
REVISIONS

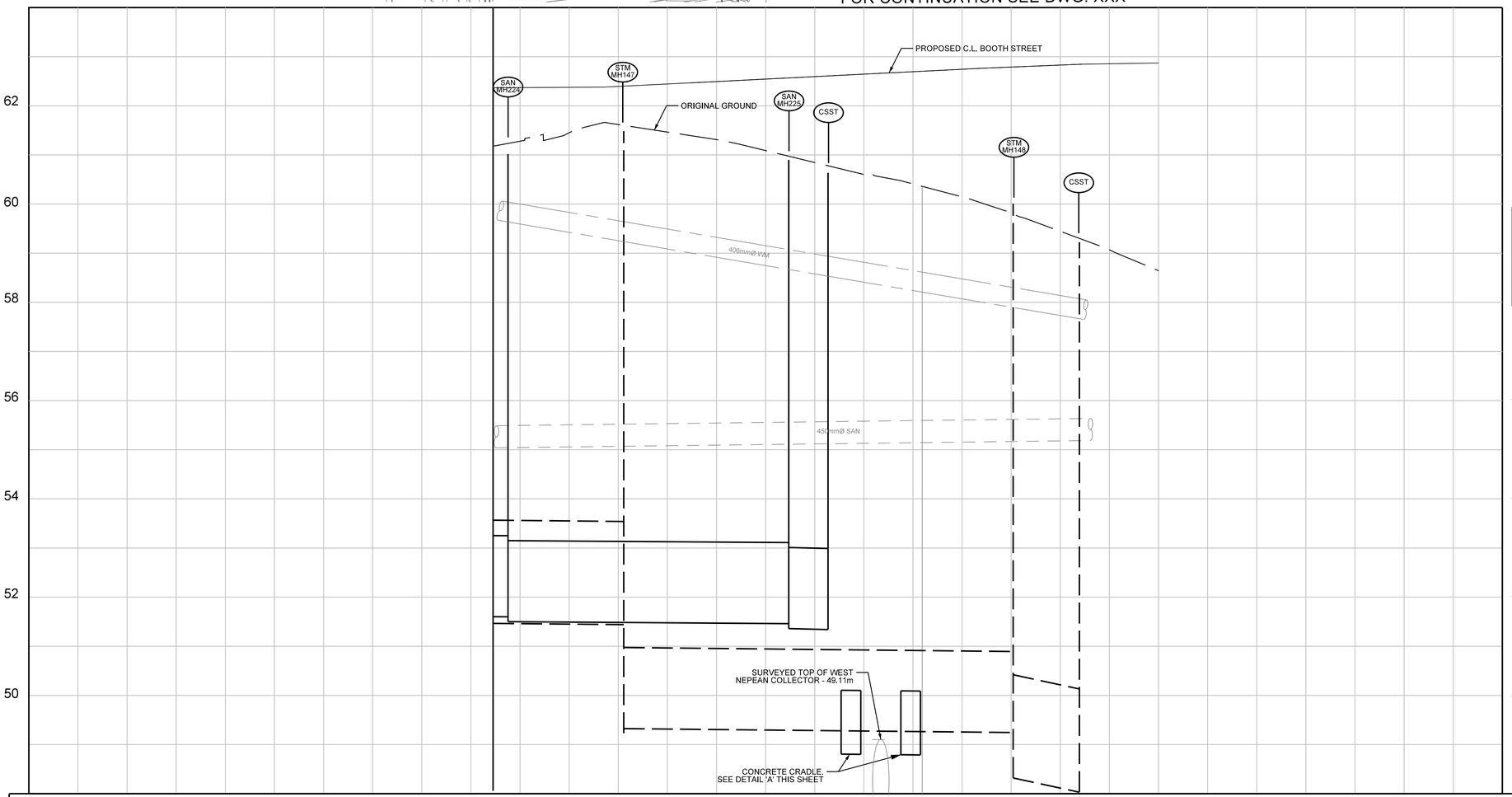
No.	Description	By	Date (dd/mm/yy)
1	RE-ISSUED FOR CIRCULATION	R.C.	25.11.13
2	ISSUED FOR ECA APPLICATION	R.C.	30.01.14
3	ISSUED FOR CONSTRUCTION	R.C.	30.04.14
4	ISSUED FOR CHANGE ORDER	G.B.	08.04.15

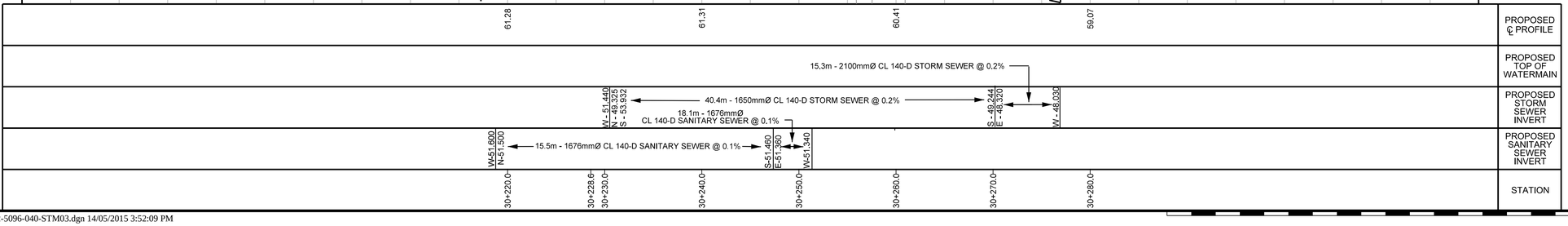
NOTE:
THE FOLLOWING MH REQUIRE A SAFETY PLATFORM BE INSTALLED:
SAN MH211 / SANMH215 / SANMH218 / SANMH223A / SANMH224 / SANMH225 / SANMH226 / STMMH105 / STMMH106 / STMMH107 / STMMH108 / STMMH118 / STMMH125 / STMMH126 / STMMH127 / STMMH128 / STMMH129 / STMMH130 / STMMH131 (SEE DETAIL DWG. D1)

SANITARY MANHOLE DATA

No.	Station	Offset (m)	Type		Elevations		Grate to Invert
			Structure	Cover	Grate	Low Inv.	
SAN MH223a	30+192.01	5.19 L	3050 x 3810	S24 / S25	60.78	51.63	9.16
SAN MH224	30+218.75	5.11 L	2440 x 2440	S24 / S25	60.95	51.50	9.45







ALBERT STREET RECONSTRUCTION

STORM SEWER STA. 30+220 TO STA. 30+280

R. Holder, P. Eng. Manager Light Rail Projects	L. Foley, P. Eng. Project Manager Rail Design & Construction

Robinson Consultants

LICENSED PROFESSIONAL ENGINEER G.A. BLOW 8 Apr 1, '15 PROVINCE OF ONTARIO

Ottawa

Contract No.	Dwg. No.
ISD12-5096	ST3

Sheet of

Asset No.

Asset Group

Des.	Chk'd.
D.H.	G.B.
Dwn.	Chk'd.
D.H.	G.B.
Utility Circ. No.	Index No.

Const. Inspector

Scale:
HORIZONTAL 0m 2.5 5 10
VERTICAL 0m 1 2

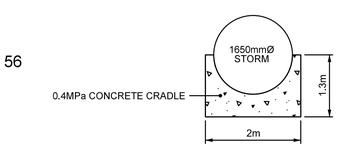
NOTE: The location of utilities is approximate only, the exact location should be determined by consulting the municipal authorities and utility companies concerned. The contractor shall prove the location of utilities and shall be responsible for adequate protection from damage.

REVISIONS

No.	Description	By	Date (dd/mm/yy)
1.	ISSUED FOR ECA APPLICATION	R.C.	30.01.14
2	ISSUED FOR CONSTRUCTION	R.C.	30.04.14
3	ISSUED FOR CHANGE ORDER	G.B.	08.04.15

NOTE:
THE FOLLOWING MH REQUIRE A SAFETY PLATFORM BE INSTALLED:
SAN MH211 / SANMH215 / SANMH218 / SANMH223A / SANMH224 / SANMH225 / SANMH226 / STMMH105 / STMMH106 / STMMH107 / STMMH108 / STMMH118 / STMMH125 / STMMH126 / STMMH127 / STMMH128 / STMMH129 / STMMH130 / STMMH131 (SEE DETAIL DWG. D1)

STORM MANHOLE DATA							
No.	Station	Offset (m)	Type		Elevations		Grate to Invert
			Structure	Cover	Grate	Low Inv.	
STM MH147	30+230.56	0.62 R	3050 x 3050	S24.1 / S25	61.48	49.33	12.15
STM MH148	30+270.20	7.28 L	3050 x 3050	S24.1 / S25	60.02	48.32	11.70
SANITARY MANHOLE DATA							
No.	Station	Offset (m)	Type		Elevations		Grate to Invert
			Structure	Cover	Grate	Low Inv.	
SAN MH225	30+247.36	11.23 L	2440 x 2440	S24 / S25	59.90	51.36	8.54



SECTION 'A-A'
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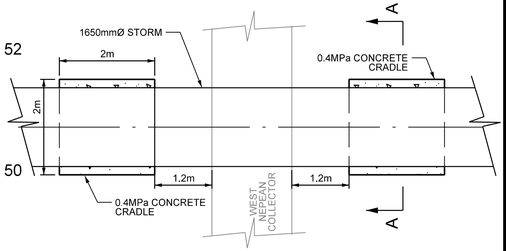

DETAIL 'A'
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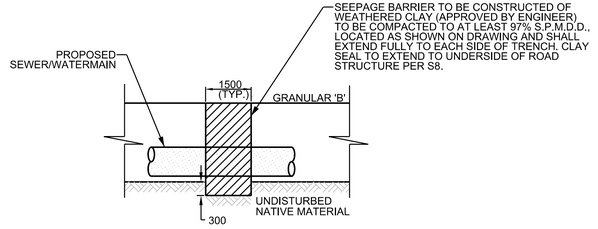
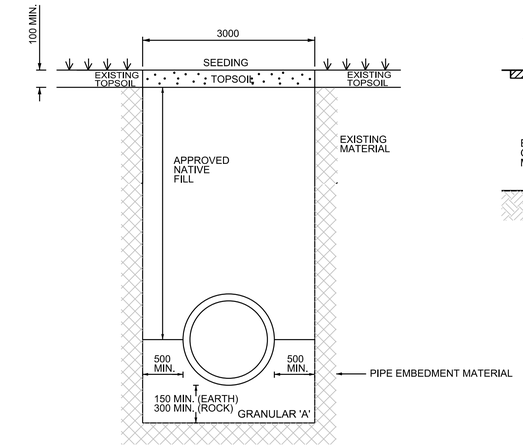
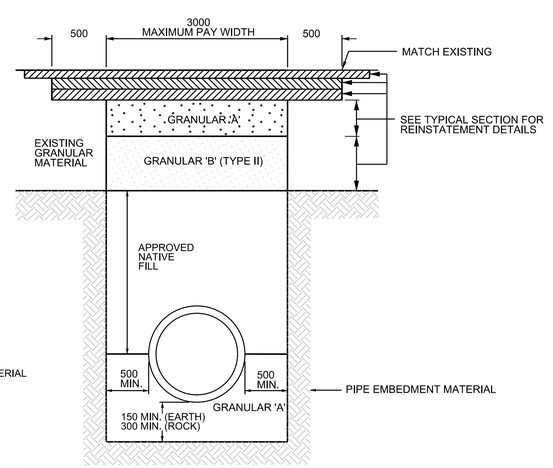


CLAY SEAL
N.T.S.



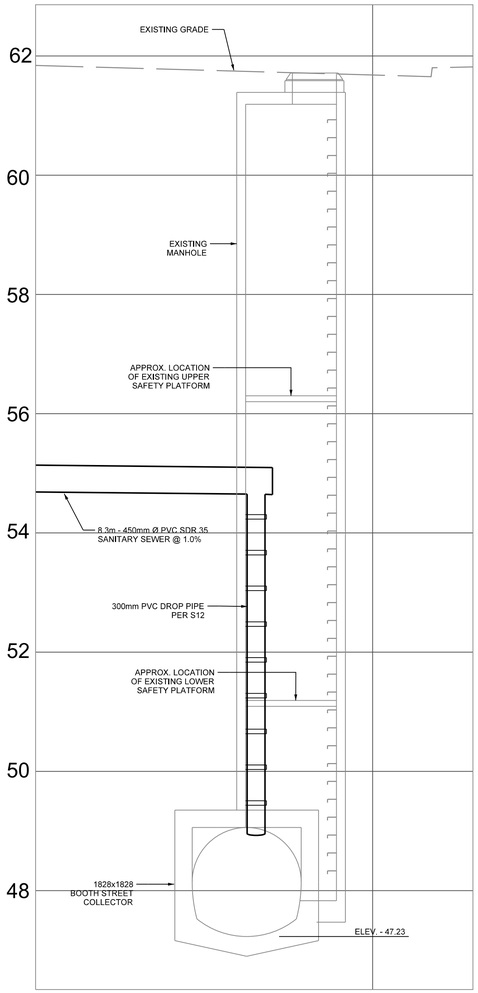
NOTES:
1. TRENCH TO BE CONSTRUCTED TO ALL HEALTH AND SAFETY REGULATIONS.
2. TRENCH WIDTH IS PROVIDED FOR PAYMENT PURPOSES ONLY.
3. WHERE SUB EXCAVATION IS REQUIRED AS SHOWN ON THE CONRACT DRAWINGS, SUB-BEDDING SHALL CONSIST OF OPSS GRANULAR B TYPE II
4. SEWER TRENCH DETAIL AS PER S6 AND AS MODIFIED IN THIS DETAIL
5. WATERMAIN TRENCH DETAIL AS PER W17

DETAIL - SEWER TRENCH IN LANDSCAPED AREAS
N.T.S.

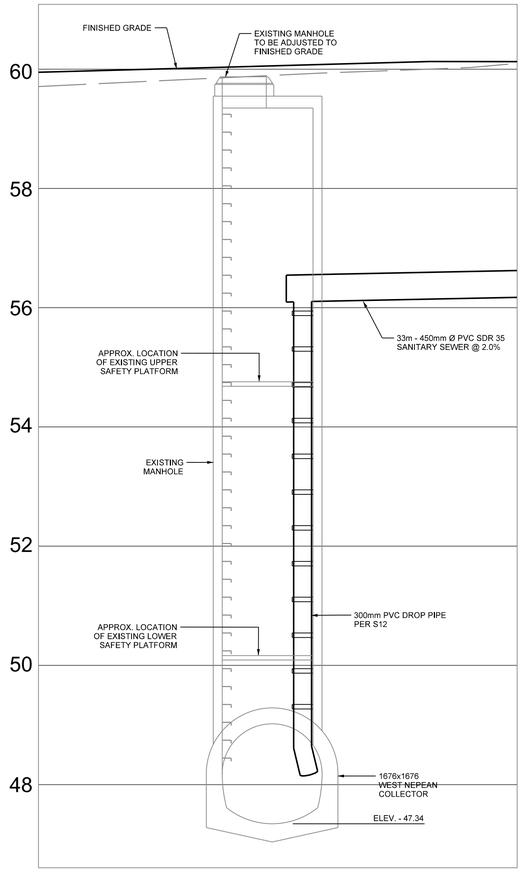


NOTES:
1. TRENCH TO BE CONSTRUCTED TO ALL HEALTH AND SAFETY REGULATIONS.
2. TRENCH WIDTH IS PROVIDED FOR PAYMENT PURPOSES ONLY.
3. ROADWAY TO BE REINSTATED TO MINIMUM DEPTH AS SPECIFIED OR TO MATCH EXISTING.
4. ALL EXISTING ASPHALT TO BE SAWCUT.
5. 500mm KEY TO BE SAWCUT AND REMOVED OR MILLED.
6. SEWER TRENCH DETAIL AS PER S6 AND AS MODIFIED IN THIS DETAIL
7. WATERMAIN TRENCH DETAIL AS PER W17

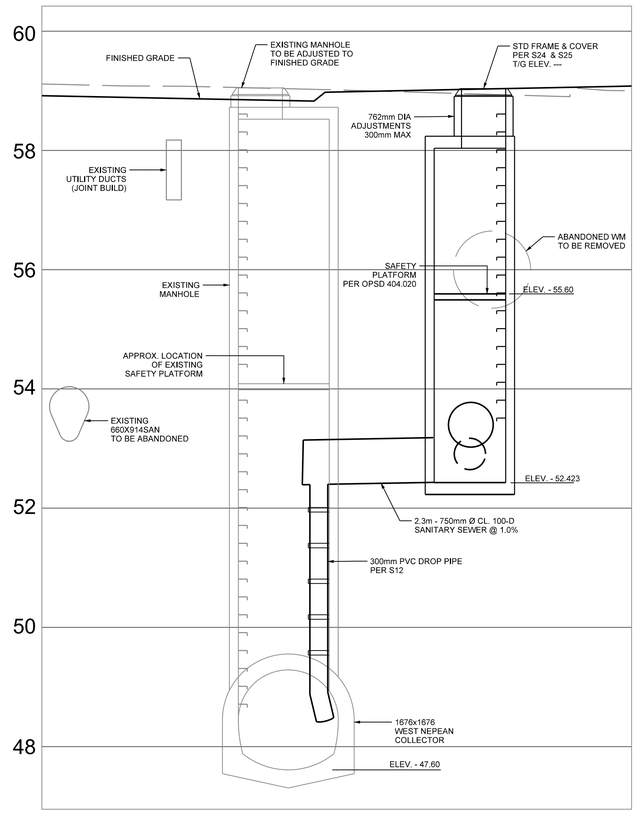
DETAIL - SEWER TRENCH IN ROADWAY
N.T.S.



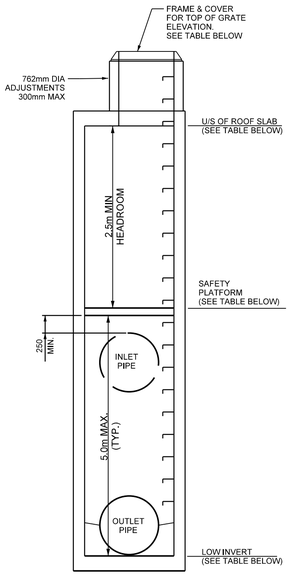
DROP STRUCTURE
SANMH 216



DROP STRUCTURE
SANMH 227



DROP STRUCTURE
SANMH's 218 & 219



MH ID	SAFETY PLATFORM		TOP OF GRATE	U/S OF ROOF SLAB	LOW INVERT
	TYPE	ELEV			
SANMH211	404.020	58.59	62.09	61.09	54.90
SANMH215	404.020	57.76	61.79	60.79	54.73
SANMH218	404.020	55.76	59.03	58.43	53.09
SANMH223	404.020	54.74	60.78	57.24	51.74
SANMH223A	404.020	57.34	60.78	55.84	51.63
SANMH224	404.020	56.50	61.02	59.00	51.50
SANMH225	404.020	56.36	60.33	58.86	51.36
SANMH226	2440 x 2440	58.35	62.18	60.85	54.85
STMMH105	2440 x 2440	55.66	59.16	58.16	52.30
STMMH106	2440 x 2440	55.00	59.92	58.92	50.95
STMMH107	2440 x 3810	53.75	61.48	56.25	48.78
STMMH108	2440 x 3050	53.32	60.01	55.82	48.32
STMMH118	404.020	54.36	62.10	61.86	56.86
STMMH125	404.020	56.70	60.20	59.20	53.46
STMMH126	2440 x 3810	52.70	55.80	55.20	49.53
STMMH127	2440 x 3810	51.93	55.43	54.43	49.34
STMMH128	2440 x 3810	51.94	55.44	54.44	49.19
STMMH129	2440 x 3810	51.30	55.69	54.69	47.07
STMMH130	2440 x 3810	50.80	55.80	54.80	46.71

SAFETY PLATFORM
PLACEMENT DETAIL

ALBERT STREET
RECONSTRUCTION

ENGINEERING DETAILS I

R. Holder, P. Eng. — Manager, Light Rail Projects
L. Foley, P. Eng. — Project Manager, Rail Design & Construction

Robinson Consultants

LICENSED PROFESSIONAL ENGINEER R. E. COTNAM 100079713 PROVINCE OF ONTARIO

LICENSED PROFESSIONAL ENGINEER G.A. BLOW PROVINCE OF ONTARIO

Ottawa

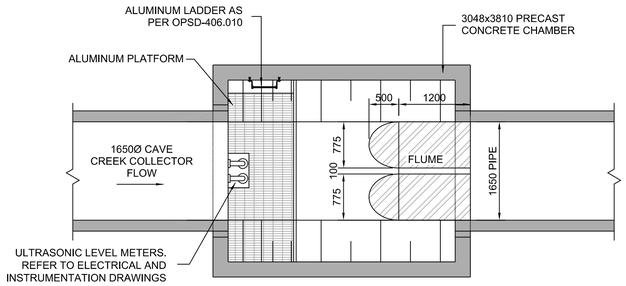
Contract No. ISD12-5096 | Dwg. No. D1
Sheet _ of _
Asset No. --------
Asset Group ---
Des. - | Chk'd. -
Dwn. I.M. | Chk'd. G.B.
Utility Circ. No. ____ | Index No. ____
Const. Inspector _____
Scale: HORIZONTAL 0m 0.5 1 2 / 0m 1 2 VERTICAL

NOTE: The location of utilities is approximate only, the exact location should be determined by consulting the municipal authorities and utility companies concerned. The contractor shall prove the location of utilities and shall be responsible for adequate protection from damage.

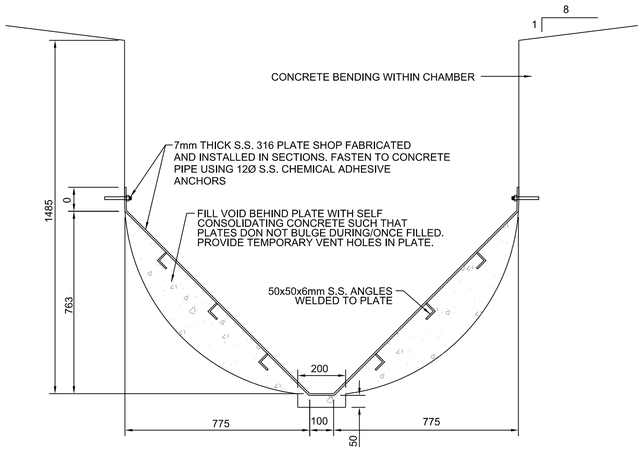
REVISIONS

No.	Description	By	Date (dd/mm/yy)
1	ISSUED FOR RIO SUBMISSION	R.C.	30.04.13
2	ISSUED FOR CIRCULATION	R.C.	07.06.13
3	ISSUED FOR TENDER	R.C.	03.08.13
4	RE-ISSUED FOR CIRCULATION	R.C.	25.11.13
5	ISSUED FOR TENDER	R.C.	20.12.13
6	ISSUED FOR CONSTRUCTION	R.C.	30.04.14

ISSUED



PLAN
SCALE 1:50



SECTION B-B
SCALE 1:12.5

SECTION A-A
SCALE 1:50

ALBERT STREET
RECONSTRUCTION

CAVE CREEK COLLECTOR
FLOW AND FLOW
MONITORING MANHOLE

R. Holder, P. Eng.
Manager
Light Rail Projects

L. Foley, P. Eng.
Project Manager
Rail Design & Construction

Robinson Consultants

LICENSED PROFESSIONAL ENGINEER
G.A. BLOW
22 May 15
PROVINCE OF ONTARIO

Ottawa

Contract No.	Dwg. No.
ISD12-5096	D2

Sheet _ of _

Asset No. ---------

Asset Group ---

Des.	Chk'd.
-	-
Dwn.	Chk'd.
I.M.	G.B.
Utility Circ. No.	Index No.
____	____

Const. Inspector _____

Scale:

AS NOTED

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REVISIONS

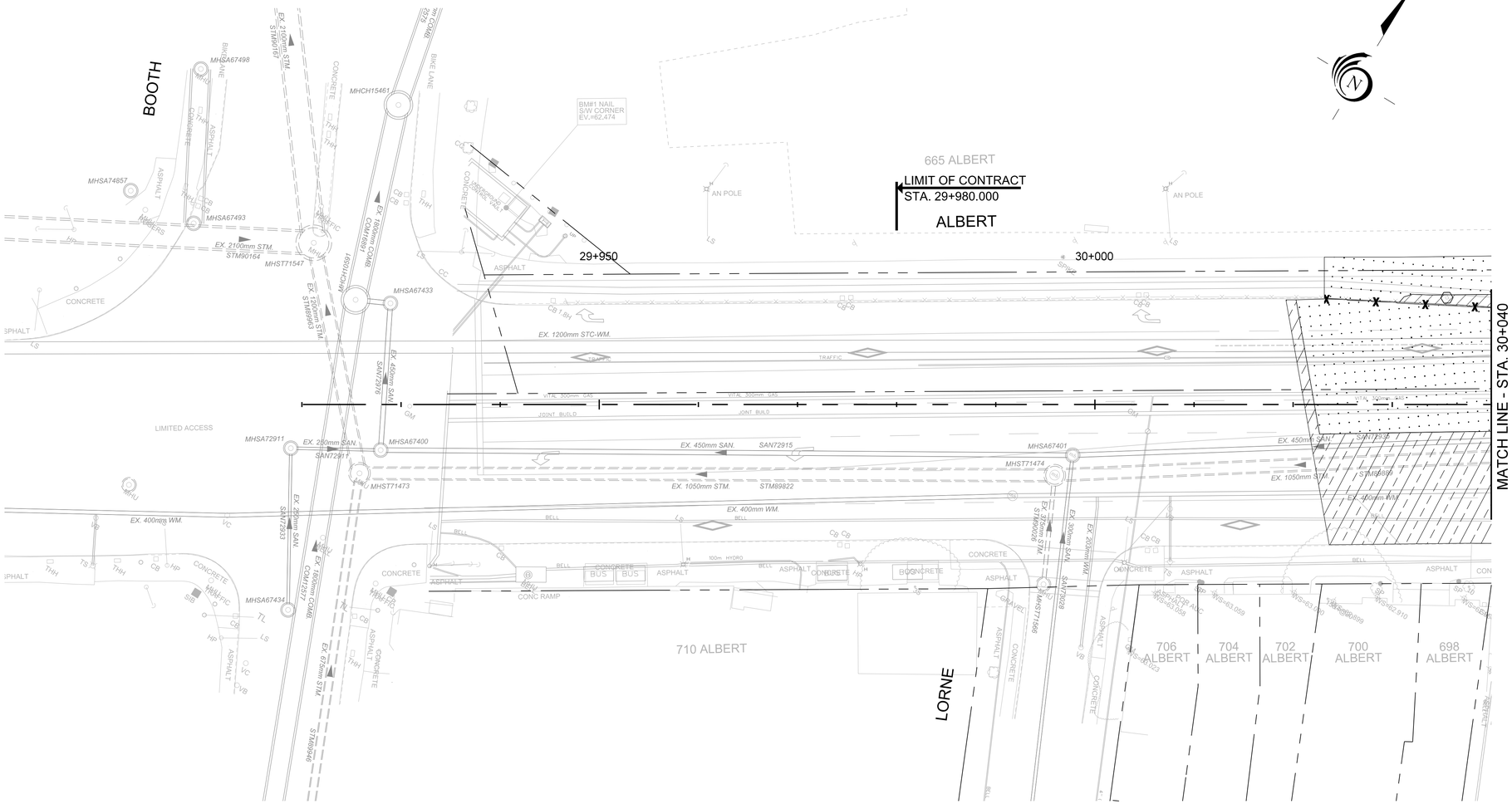
No.	Description	By	Date (dd/mm/yy)
1	ISSUED FOR RIO SUBMISSION	R.C.	30.04.13
2	ISSUED FOR CIRCULATION	R.C.	07.06.13
3	ISSUED FOR TENDER	R.C.	03.08.13
4	RE-ISSUED FOR CIRCULATION	R.C.	25.11.13
5	ISSUED FOR TENDER	R.C.	20.12.13
6	ISSUED FOR CONSTRUCTION	R.C.	30.04.14

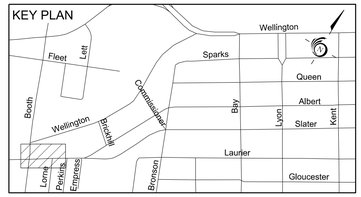
NOTE:

1. CONTRACTOR TO SUBMIT SHOP DRAWINGS OF PROPOSED FLUME FOR REVIEW BY CITY AND THE CONTRACT ADMIISTRATOR.
2. ALL HARDWARE TO BE 316 STAINLESS STEEL.
3. CONTRACTOR TO SUBMIT SHOP DRAWINGS OF LEVEL METER WALL BRACKET.

ISSUED


ALBERT STREET CYCLING / PEDESTRIAN MODIFICATIONS
MARCH 19, 2019 SCALE 1:250
GREEN SPACE
PROPOSED LANDSCAPING
EXISTING TREES
ALBERT STREET
SAMPLE CROSS SECTION
CITY CENTRE TO BOOTH
ALBERT STREET
SAMPLE CROSS SECTION
BOOTH TO EMPRESS
TRANSIT WAY (CLOSED)
PIMISI MULTI-USE PATHWAY
BOOTH
BRICKHILL
ALBERT
CITY CENTRE
PRESTON
LORNE
PERKINS
EMPRESS
SLATER
MAINTAIN EXISTING MULTI-USE PATHWAY
EB CYCLE TRACK
WB CYCLE TRACK
BI-DIRECTIONAL CYCLE TRACK
BUS STOP
DRAFT FOR INFORMATION ONLY





ALBERT/QUEEN/SLATER RENEWAL
EMPRESS AVENUE TO BAY STREET
BRONSON RENEWAL
QUEEN STREET TO LAURIER AVENUE

REMOVALS 1
ALBERT STREET
LIMIT OF CONTRACT TO STA. 30+040

C. DUCLOS, P.Eng.	F. BONANNO, P.Eng.
Director	*Project Manager*

PARSONS

LICENSED PROFESSIONAL ENGINEER
C. L. E. REDDEN
100134814
26/01/2022
PROVINCE OF ONTARIO

LICENSED PROFESSIONAL ENGINEER
K. P. McCAMBLEY
26/01/2022
PROVINCE OF ONTARIO

Ottawa

Contract No.	Dwg. No.
CP000322	009

Sheet 009 of 112

Asset No.

Asset Group: ISD

Des.	Chk'd.
DDC	CLER
Dwn.	**Chk'd.**
DDC	CLER

Utility Circ. No. CTY2110131

Index No.

Const. Inspector

Scale: HORIZONTAL
0m 2.5 5 10

NOTE: The location of utilities is approximate only, the exact location should be determined by consulting the municipal authorities and utility companies concerned, The contractor shall prove the location of utilities and shall be responsible for adequate protection from damage,

REVISIONS

No.	Description	By	Date (dd/mm/yy)
1	ISSUED FOR TENDER	CLER	12/11/21
2	ISSUED FOR CONSTRUCTION	CLER	26/01/22

NOTES:

1. REFER TO LANDSCAPE DRAWINGS FOR TREE REMOVALS AND PROTECTION DETAILS.

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Last Saved: 2021-10-20 12:30:45 PM
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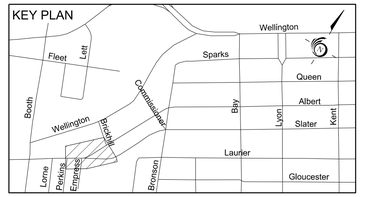
KEY PLAN



ALBERT/QUEEN/SLATER RENEWAL
EMPRESS AVENUE TO BAY STREET
BRONSON RENEWAL
QUEEN STREET TO LAURIER AVENUE

REMOVALS 2
ALBERT STREET
STA. 30+040 TO STA. 30+190

C. DUCLOS, P.Eng.	F. BONANNO, P.Eng.
Director	*Project Manager*

PARSONS

LICENSED PROFESSIONAL ENGINEER
C. L. E. REDDEN
100134814
26/01/2022
PROVINCE OF ONTARIO

LICENSED PROFESSIONAL ENGINEER
K. P. McCAMBLEY
26/01/2022
PROVINCE OF ONTARIO

Ottawa

Contract No.	Dwg. No.
CP000322	010

Sheet 010 of 112

Asset No.

Asset Group: ISD

Des.	Chk'd.
DDC	CLER
Dwn.	**Chk'd.**
DDC	CLER

Utility Circ. No. CTY2110131 | Index No.

Const. Inspector

Scale: HORIZONTAL
0m 2.5 5 10

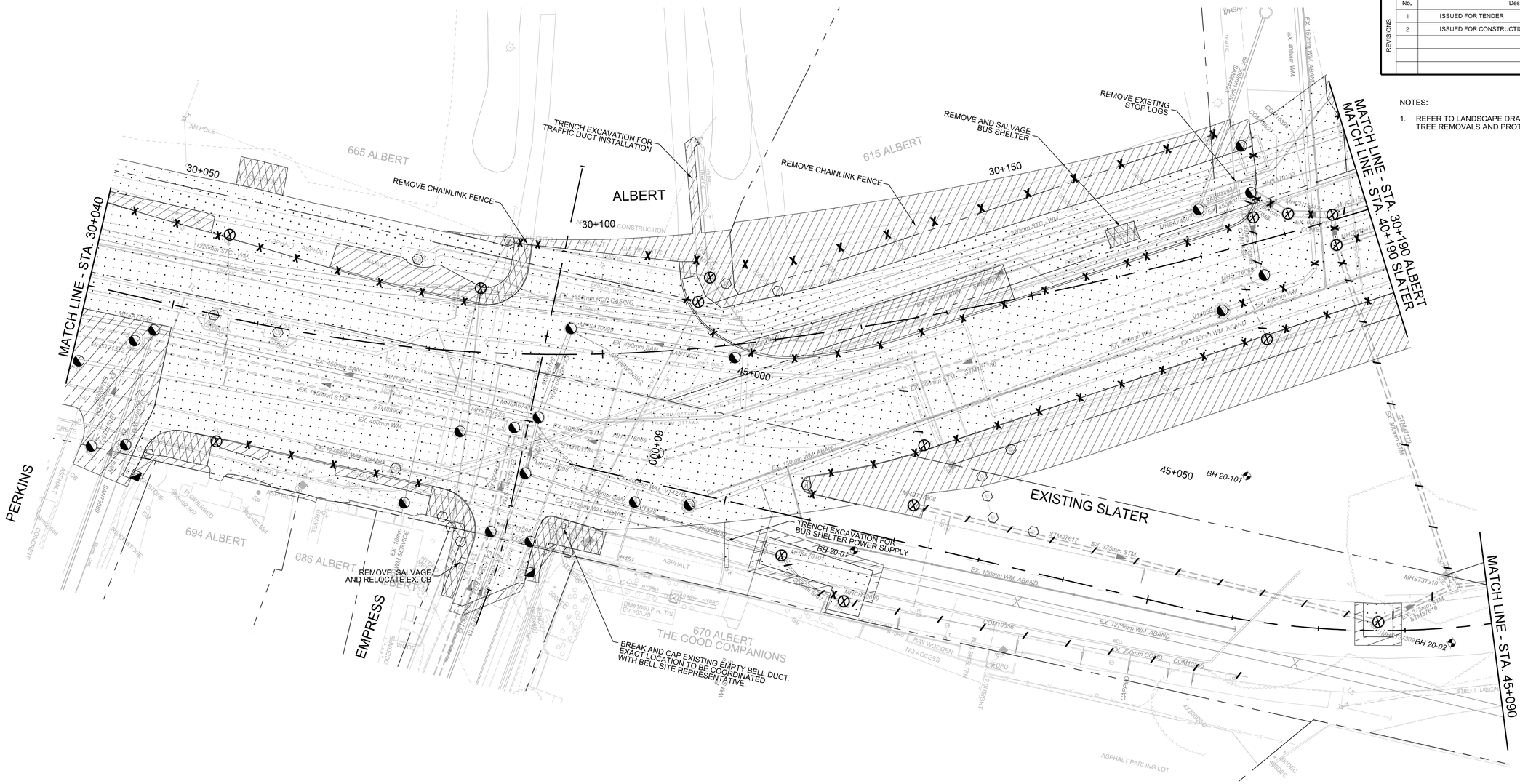
NOTE: The location of utilities is approximate only, the exact location should be determined by consulting the municipal authorities and utility companies concerned, The contractor shall prove the location of utilities and shall be responsible for adequate protection from damage,

REVISIONS

No.	Description	By	Date (dd/mm/yy)
1	ISSUED FOR TENDER	CLER	12/11/21
2	ISSUED FOR CONSTRUCTION	CLER	26/01/22

NOTES:

1. REFER TO LANDSCAPE DRAWINGS FOR TREE REMOVALS AND PROTECTION DETAILS.



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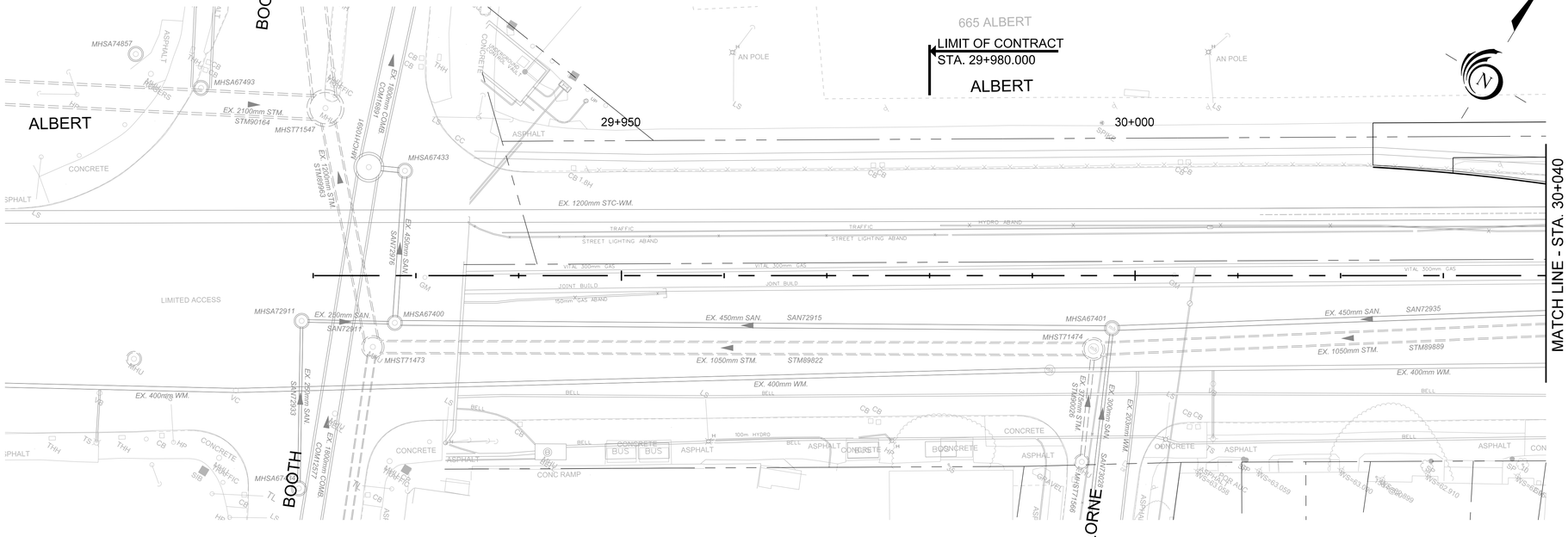


ALBERT/QUEEN/SLATER RENEWAL
EMPRESS AVENUE TO BAY STREET
BRONSON RENEWAL
QUEEN STREET TO LAURIER AVENUE

GRADING & DRAINAGE 1
ALBERT STREET
LIMIT OF CONTRACT TO STA. 30+040

C. DUCLOS, P.Eng. — *Director*
F. BONANNO, P.Eng. — *Project Manager*

PARSONS

LICENSED PROFESSIONAL ENGINEER
C. L. E. REDDEN
100134814
26/01/2022
PROVINCE OF ONTARIO

LICENSED PROFESSIONAL ENGINEER
K. P. McCAMBLEY
26/01/2022
PROVINCE OF ONTARIO

NOTE: The location of utilities is approximate only, the exact location should be determined by consulting the municipal authorities and utility companies concerned, The contractor shall prove the location of utilities and shall be responsible for adequate protection from damage.

REVISIONS

No.	Description	By	Date (dd/mm/yy)
1	ISSUED FOR TENDER	CLER	12/11/21
2	ISSUED FOR CONSTRUCTION	CLER	26/01/22

Ottawa

Contract No.	Dwg. No.
CP000322	024

Sheet 024 of 112

Asset No.

Asset Group: ISD

Des.	Chk'd.
JYN DDC	KPM CLER

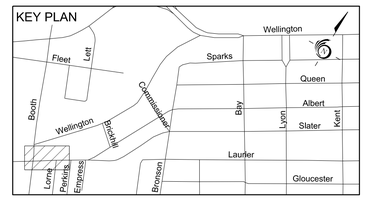
Dwn.	Chk'd.
JYN DDC	KPM CLER

Utility Circ. No.: CTY2110131
Index No.

Const. Inspector

Scale: HORIZONTAL 0m 2.5 5 10 / VERTICAL 0m 1 2

KEY PLAN



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ALBERT/QUEEN/SLATER RENEWAL
EMPRESS AVENUE TO BAY STREET
BRONSON RENEWAL
QUEEN STREET TO LAURIER AVENUE

GRADING & DRAINAGE 2
ALBERT STREET
STA. 30+040 TO STA. 30+190

C. DUCLOS, P.Eng. — *Director*
F. BONANNO, P.Eng. — *Project Manager*

PARSONS

LICENSED PROFESSIONAL ENGINEER — C. L. E. REDDEN — 100134814 — 26/01/2022 — PROVINCE OF ONTARIO
LICENSED PROFESSIONAL ENGINEER — K. P. McCAMBLEY — 26/01/2022 — PROVINCE OF ONTARIO

Ottawa

Contract No.	Dwg. No.
CP000322	025

Sheet 025 of 112

Asset No.

Asset Group: ISD

Des.	Chk'd.
JYN DDC	KPM CLER

Dwn.	Chk'd.
JYN DDC	KPM CLER

Utility Circ. No.: CTY2110131
Index No.

Const. Inspector

Scale: HORIZONTAL 0m 2.5 5 10 — VERTICAL 0m 1 2

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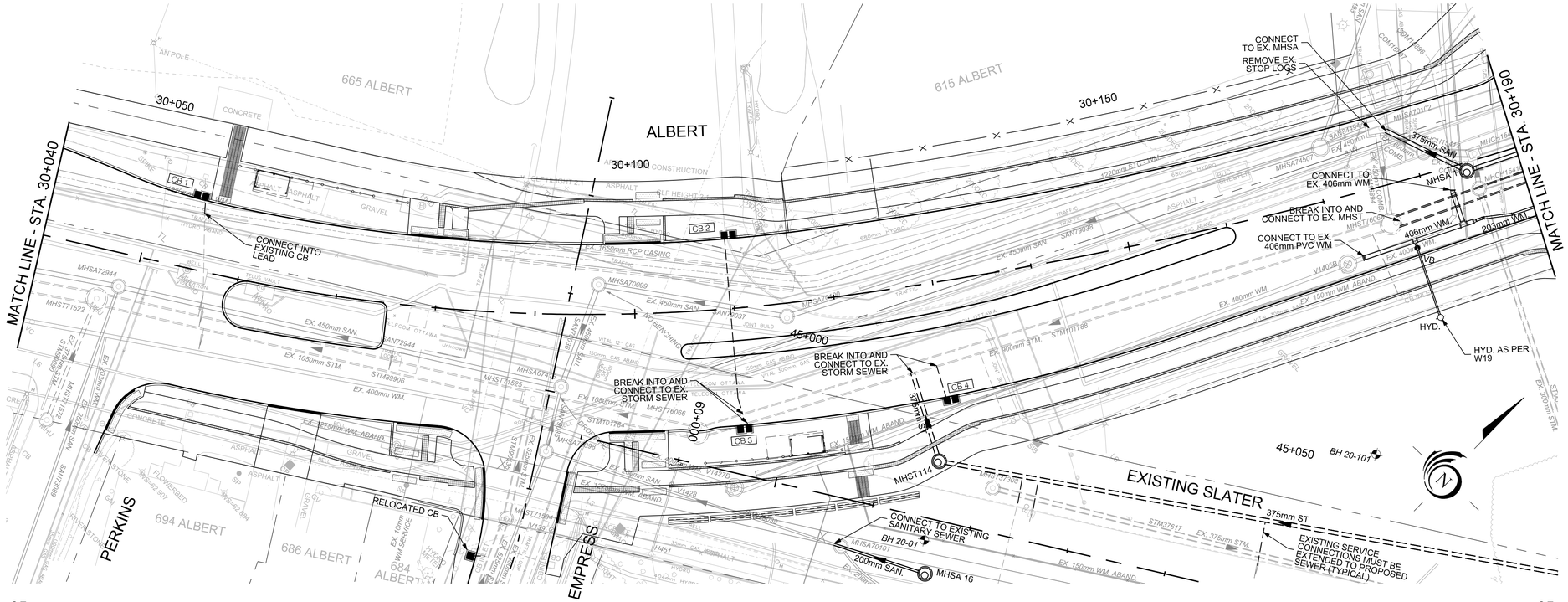
REVISIONS

No.	Description	By	Date (dd/mm/yy)
1	ISSUED FOR TENDER	CLER	12/11/21
2	ISSUED FOR CONSTRUCTION	CLER	26/01/22



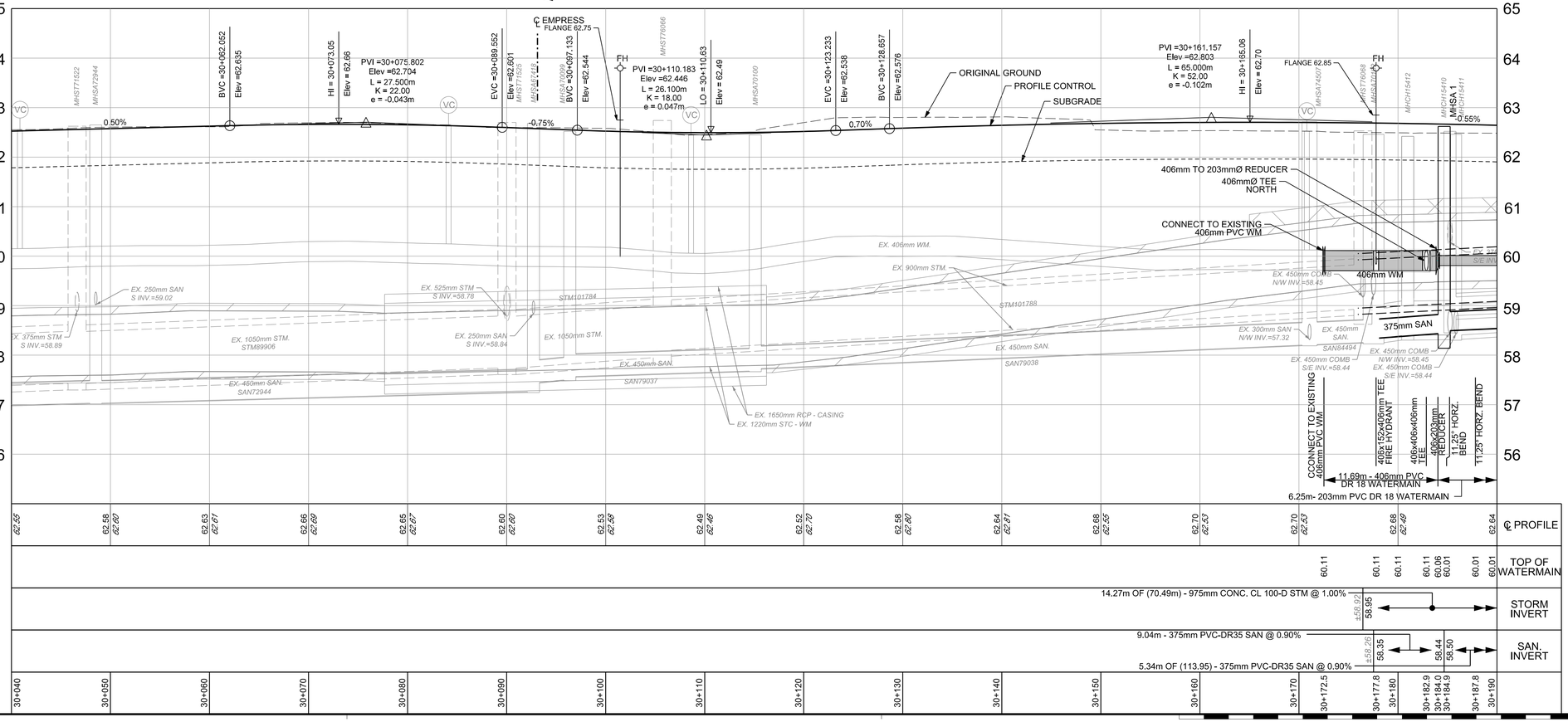
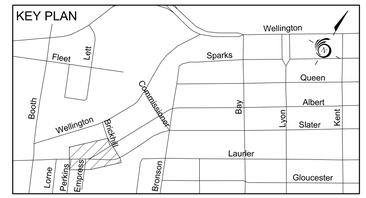


TABLE OF WATERMAIN FITTINGS

STATION	OFFSET	FITTING	TOP OF WATERMAIN ELEVATION
30+172.52	6.47 RT	CONNECT TO EX. 406mm PVC WM	60.11
30+177.79	6.15 RT	406 x 152 TEE HYD.	60.11
30+178.22	14.22 RT	HYDRANT	
30+182.86	5.90 RT	406 x 406 TEE	60.11
30+184.03	5.85 RT	406 x 203 REDUCER	60.06
30+184.91	5.82 RT	203 11.25° HORZ BEND	60.01
30+187.82	6.30 RT	203 11.25° HORZ BEND	60.01

KEY PLAN



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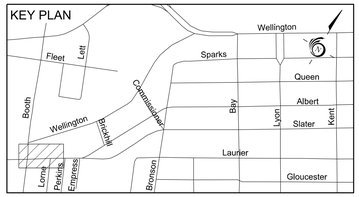

ALBERT/QUEEN/SLATER RENEWAL
EMPRESS AVENUE TO BAY STREET
BRONSON RENEWAL
QUEEN STREET TO LAURIER AVENUE

GEOMETRY & GENERAL LAYOUT 1
ALBERT STREET
LIMIT OF CONTRACT TO STA. 30+040

C. DUCLOS, P.Eng.	F. BONANNO, P.Eng.
Director	*Project Manager*

PARSONS

LICENSED PROFESSIONAL ENGINEER
C. L. E. REDDEN
100134814
26/01/2022
PROVINCE OF ONTARIO

Ottawa

Contract No.	Dwg. No.
CP000322	045

Sheet 045 of 112

Asset No.

Asset Group: ISD

Des.	Chk'd.
DDC	CLER
Dwn.	Chk'd.
DDC	CLER

Utility Circ. No. CTY2110131 | Index No.

Const. Inspector

Scale: HORIZONTAL
0m 2.5 5 10

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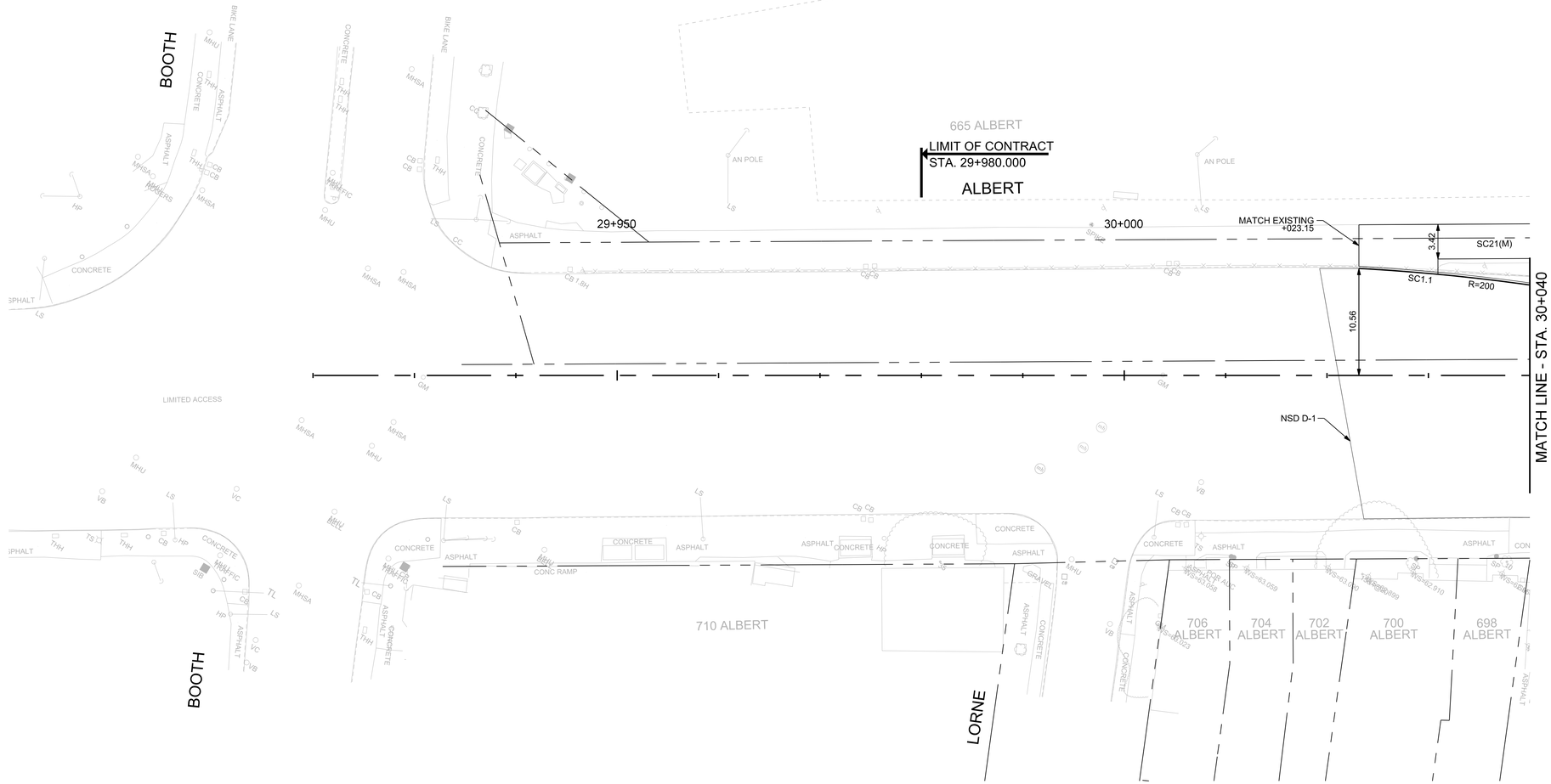
REVISIONS

No.	Description	By	Date (dd/mm/yy)
1	ISSUED FOR TENDER	CLER	12/11/21
2	ISSUED FOR CONSTRUCTION	CLER	26/01/22

NOTES:

1. REFER TO LANDSCAPE DRAWINGS FOR ADDITIONAL LAYOUT AND DETAILS OF CURBS, SIDEWALKS, ISLANDS, CROSS-WALK AND OTHER STREETSCAPING FEATURES.
2. REFER TO BUS PLATFORM DETAIL DRAWINGS FOR ADDITIONAL BUS PLATFORM INFORMATION.



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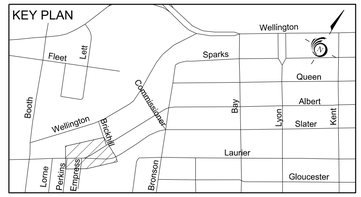

ALBERT/QUEEN/SLATER RENEWAL
EMPRESS AVENUE TO BAY STREET
BRONSON RENEWAL
QUEEN STREET TO LAURIER AVENUE

GEOMETRY & GENERAL LAYOUT 2
ALBERT STREET
STA. 30+040 TO STA. 30+190

C. DUCLOS, P.Eng.	F. BONANNO, P.Eng.
Director	*Project Manager*

PARSONS

LICENSED PROFESSIONAL ENGINEER
C. L. E. REDDEN
100134814
26/01/2022
PROVINCE OF ONTARIO

Ottawa

Contract No.	Dwg. No.
CP000322	046

Sheet 046 of 112

Asset No.

Asset Group: ISD

Des.	Chk'd.
DDC	CLER
Dwn.	Chk'd.
DDC	CLER

Utility Circ. No.: CTY2110131
Index No.:
Const. Inspector

Scale: HORIZONTAL
0m 2.5 5 10

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REVISIONS

No.	Description	By	Date (dd/mm/yy)
1	ISSUED FOR TENDER	CLER	12/11/21
2	ISSUED FOR CONSTRUCTION	CLER	26/01/22

NOTES:

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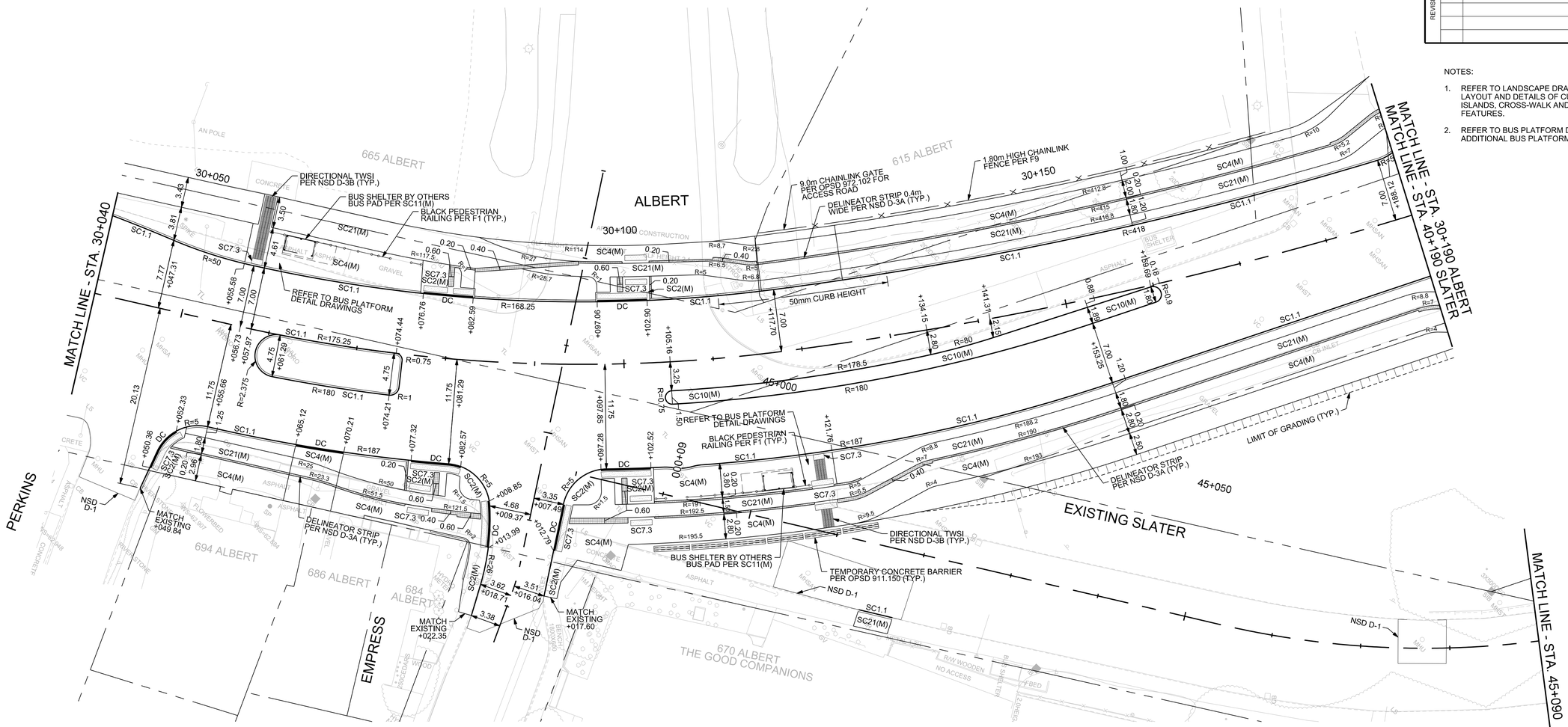
2. REFER TO BUS PLATFORM DETAIL DRAWINGS FOR ADDITIONAL BUS PLATFORM INFORMATION.



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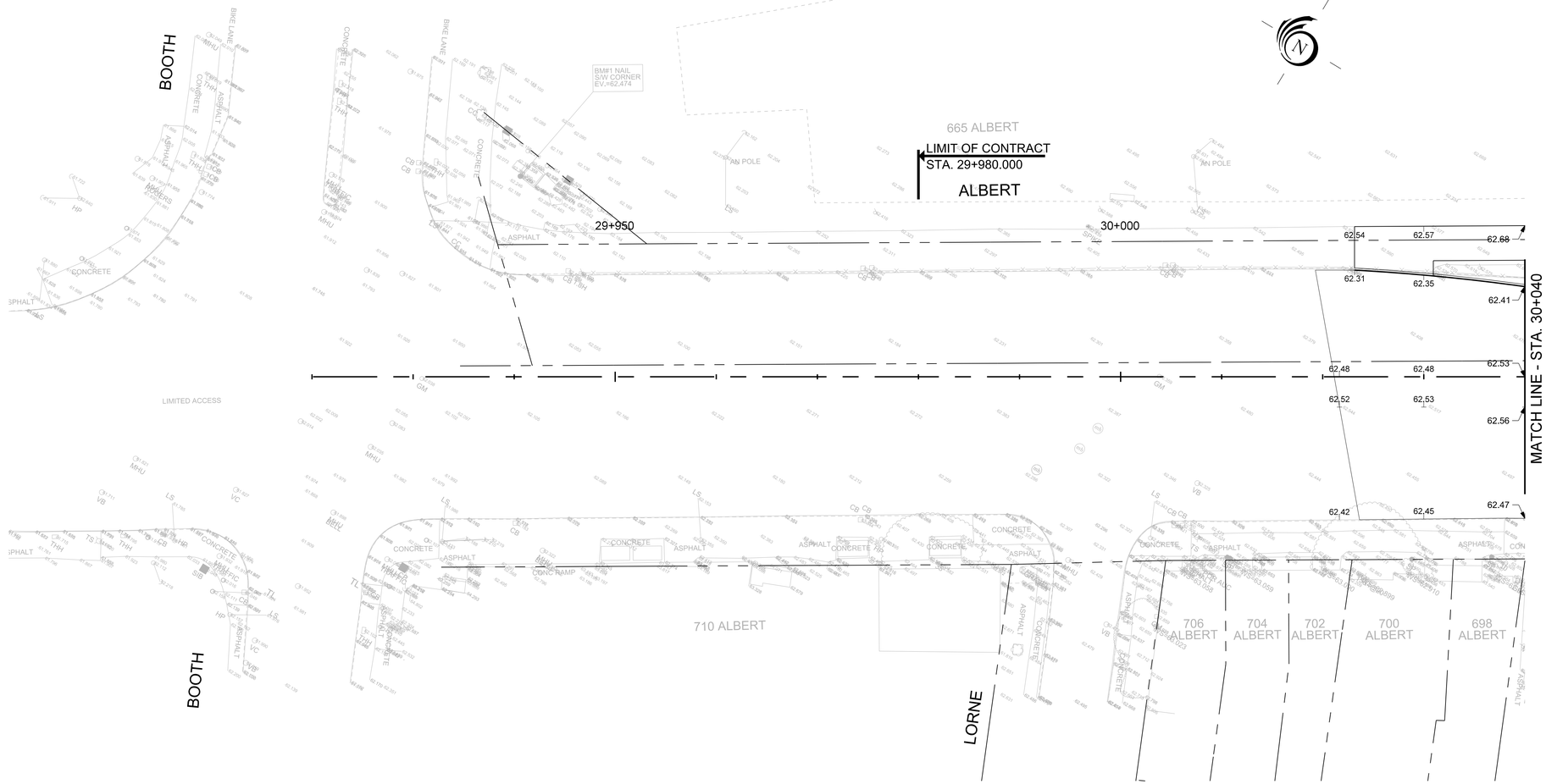

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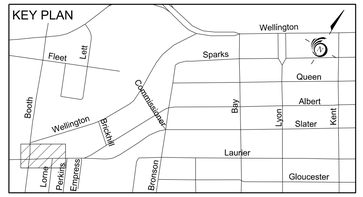

ALBERT/QUEEN/SLATER RENEWAL
EMPRESS AVENUE TO BAY STREET
BRONSON RENEWAL
QUEEN STREET TO LAURIER AVENUE

PAVEMENT ELEVATIONS 1
ALBERT STREET
LIMIT OF CONTRACT TO STA. 30+040

C. DUCLOS, P.Eng. *Director*	F. BONANNO, P.Eng. *Project Manager*

PARSONS

LICENSED PROFESSIONAL ENGINEER
C. L. E. REDDEN
100134814
26/01/2022
PROVINCE OF ONTARIO

Ottawa

Contract No. CP000322	Dwg. No. 060
Sheet 060 of 112	
Asset No.	
Asset Group ISD	
Des. DDC	Chk'd. CLER
Dwn. DDC	Chk'd. CLER
Utility Circ. No. CTY2110131	Index No.
Const. Inspector	

Scale: HORIZONTAL
0m 2.5 5 10

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REVISIONS

No.	Description	By	Date (dd/mm/yy)
1	ISSUED FOR TENDER	CLER	12/11/21
2	ISSUED FOR CONSTRUCTION	CLER	26/01/22

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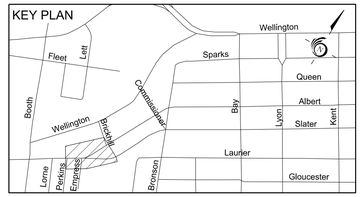

ALBERT/QUEEN/SLATER RENEWAL
EMPRESS AVENUE TO BAY STREET
BRONSON RENEWAL
QUEEN STREET TO LAURIER AVENUE

PAVEMENT ELEVATIONS 2
ALBERT STREET
STA. 30+040 TO STA. 30+190

C. DUCLOS, P.Eng. *Director*	F. BONANNO, P.Eng. *Project Manager*

PARSONS

LICENSED PROFESSIONAL ENGINEER
C. L. E. REDDEN
100134814
26/01/2022
PROVINCE OF ONTARIO

Ottawa

Contract No.	Dwg. No.
CP000322	061

Sheet 061 of 112

Asset No.

Asset Group: ISD

Des.	Chk'd.
DDC	CLER
Dwn.	**Chk'd.**
DDC	CLER

Utility Circ. No. CTY2110131

Index No.

Const. Inspector

Scale: HORIZONTAL
0m 2.5 5 10

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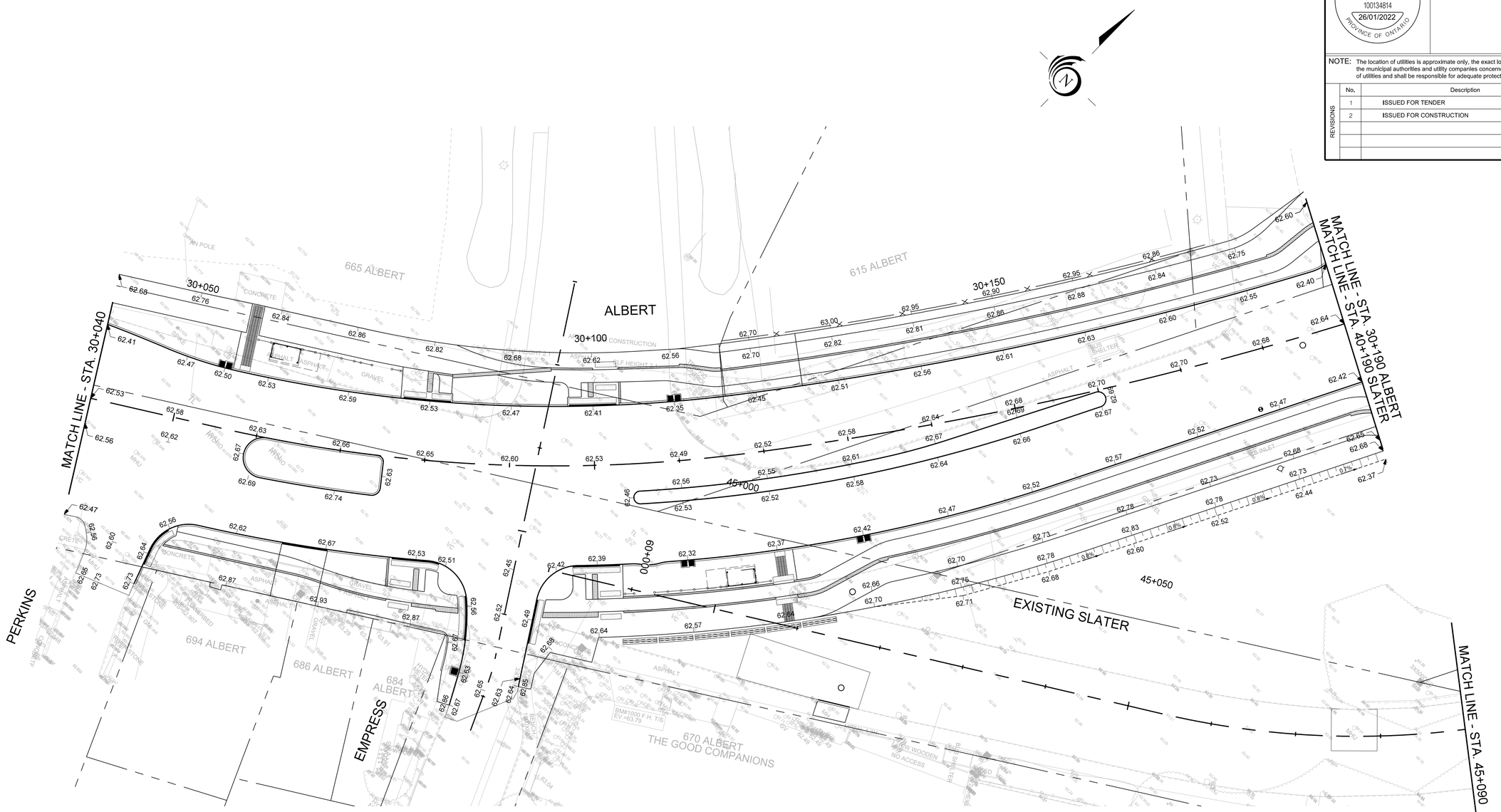
REVISIONS

No.	Description	By	Date (dd/mm/yy)
1	ISSUED FOR TENDER	CLER	12/11/21
2	ISSUED FOR CONSTRUCTION	CLER	26/01/22



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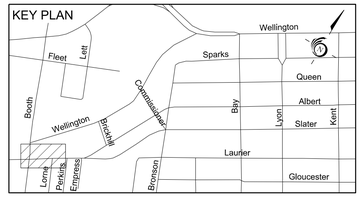

ALBERT/QUEEN/SLATER RENEWAL
EMPRESS AVENUE TO BAY STREET
BRONSON RENEWAL
QUEEN STREET TO LAURIER AVENUE

PAVEMENT MARKINGS 1
ALBERT STREET
LIMIT OF CONTRACT TO STA. 30+040

C. DUCLOS, P.Eng. *Director*	F. BONANNO, P.Eng. *Project Manager*

PARSONS

Ottawa

Contract No.	Dwg. No.
CP000322	084

Sheet 084 of 112

Asset No.

Asset Group: ISD

Des.	Chk'd.
DDC	CLER
Dwn.	Chk'd.
DDC	CLER
Utility Circ. No. CTY2110131	Index No.

Const. Inspector

Scale: HORIZONTAL
0m 2.5 5 10

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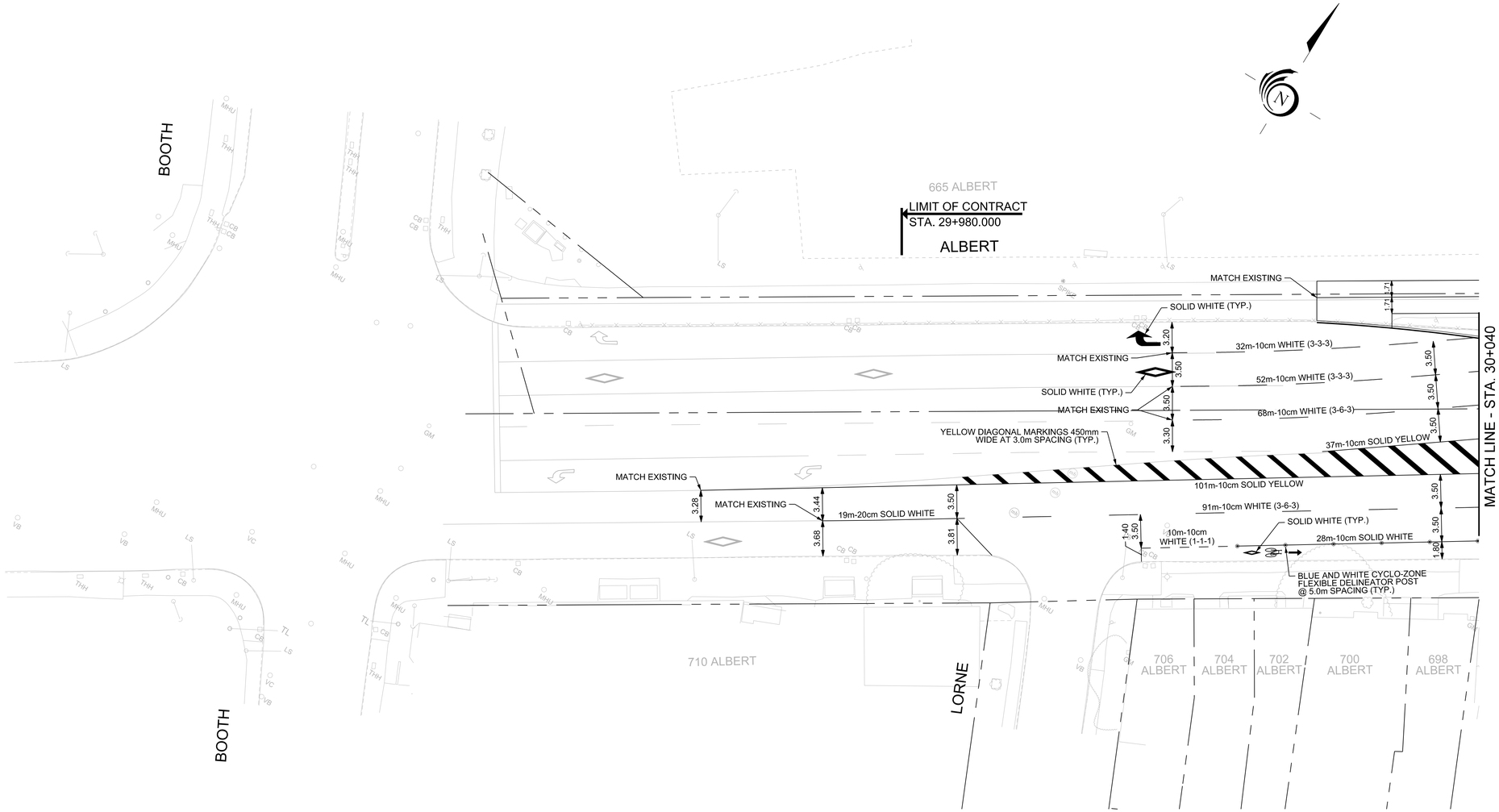
REVISIONS

No.	Description	By	Date (dd/mm/yy)
1	ISSUED FOR TENDER	CLER	12/11/21
2	ISSUED FOR CONSTRUCTION	CLER	26/01/22



NOTES:

1. REFER TO PAVEMENT MARKINGS DETAILS DRAWING FOR CYCLE TRACK AND ROADWAY SYMBOL DIMENSIONS.
2. REFER TO OTM BOOK 11 AND OTM BOOK 18 FOR ADDITIONAL DETAILS.
3. GREEN THERMOPLASTIC COATING BY OTHERS.

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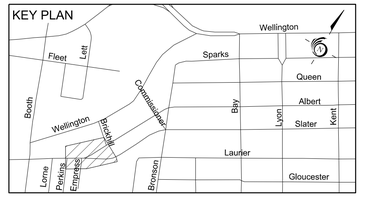

ALBERT/QUEEN/SLATER RENEWAL
EMPRESS AVENUE TO BAY STREET
BRONSON RENEWAL
QUEEN STREET TO LAURIER AVENUE

PAVEMENT MARKINGS 2
ALBERT STREET
STA. 30+040 TO STA. 30+190

C. DUCLOS, P.Eng. — *Director*
F. BONANNO, P.Eng. — *Project Manager*

PARSONS

Ottawa

Contract No.	Dwg. No.
CP000322	085

Sheet 085 of 112

Asset No.

Asset Group: ISD

Des.	Chk'd.
DDC	CLER
Dwn.	Chk'd.
DDC	CLER

Utility Circ. No. CTY2110131
Index No.
Const. Inspector

Scale: HORIZONTAL
0m 2.5 5 10

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REVISIONS

No.	Description	By	Date (dd/mm/yy)
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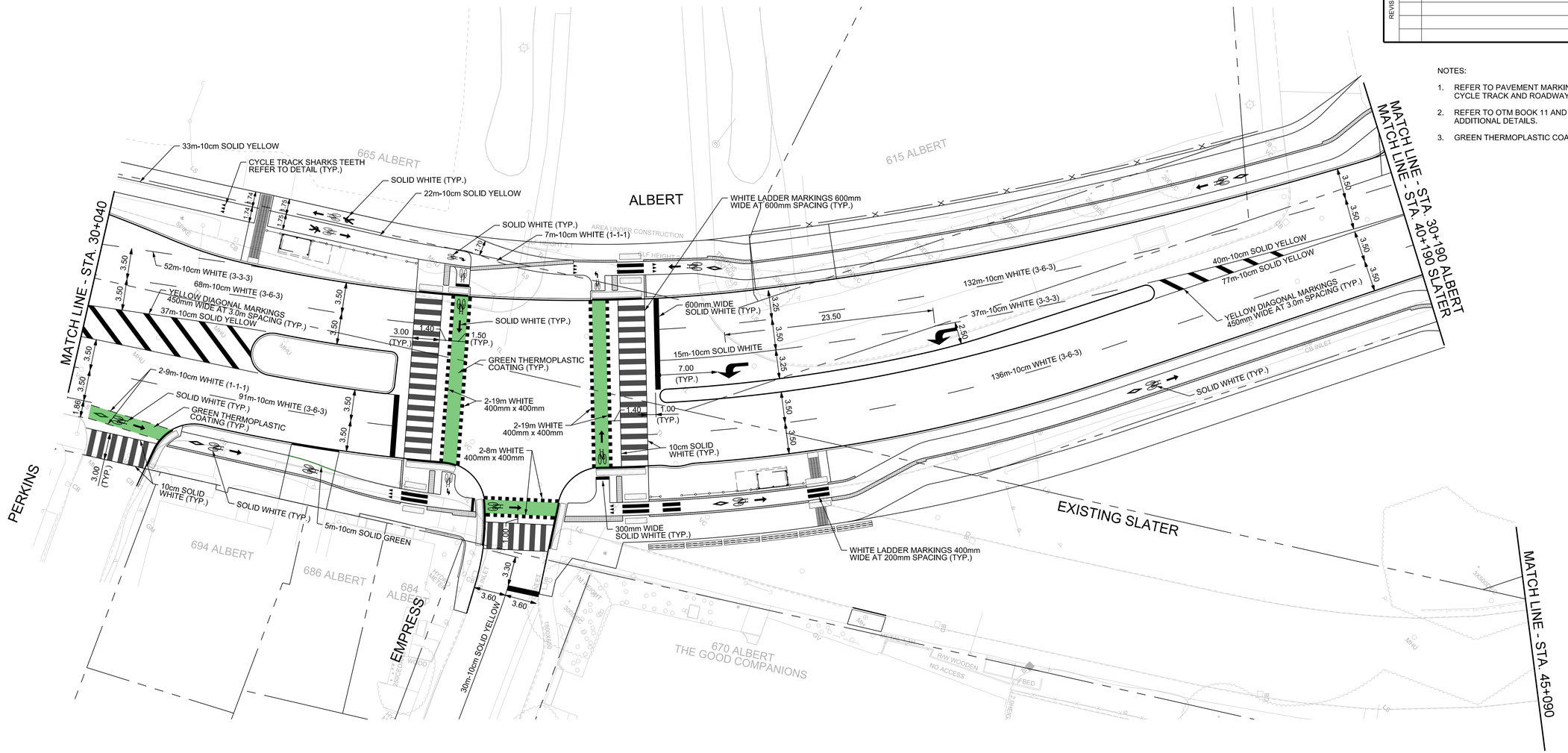
2	ISSUED FOR CONSTRUCTION	CLER	26/01/22



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2. REFER TO OTM BOOK 11 AND OTM BOOK 18 FOR ADDITIONAL DETAILS.
3. GREEN THERMOPLASTIC COATING BY OTHERS.

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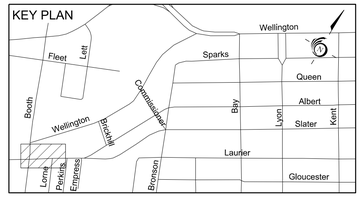

ALBERT/QUEEN/SLATER RENEWAL
EMPRESS AVENUE TO BAY STREET
BRONSON RENEWAL
QUEEN STREET TO LAURIER AVENUE

TRAFFIC PLANT 1
ALBERT STREET
LIMIT OF CONTRACT TO STA. 30+040

C. DUCLOS, P.Eng. *Director*	F. BONANNO, P.Eng. *Project Manager*

PARSONS

Ottawa

Contract No.	Dwg. No.
CP000322	100

Sheet 100 of 112

Asset No.

Asset Group: ISD

Des.	Chk'd.
DDC	CLER
Dwn.	Chk'd.
DDC	CLER

Utility Circ. No. CTY2110131

Index No.

Const. Inspector

Scale: HORIZONTAL
0m 2.5 5 10

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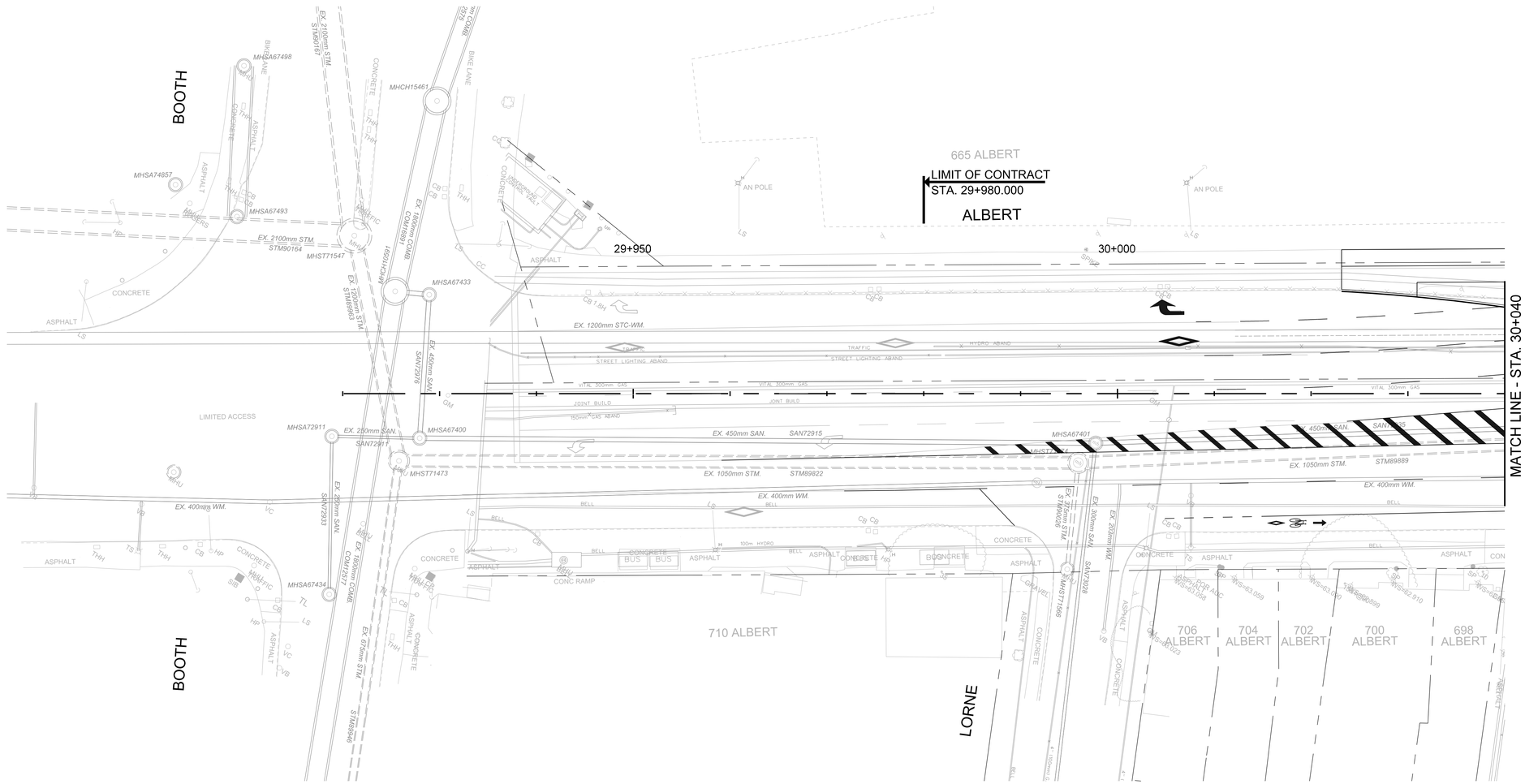
REVISIONS

No.	Description	By	Date (dd/mm/yy)
1	ISSUED FOR TENDER	CLER	12/11/21
2	ISSUED FOR CONSTRUCTION	CLER	26/01/22



TRAFFIC PLANT LEGEND

SYMBOL	DESCRIPTION
⊗	PEDESTAL FOUNDATION
□	TUBULAR FOUNDATION
⧈	OVERHEAD SIGN FOUNDATION
▭	TEMPORARY FOUNDATION
◎	JOINT USE FOUNDATION
⊙	MAST ARM FOUNDATION
⊛	MAST ARM FOUNDATION c/w SPECIAL RLC 1"Ø ANCHOR RODS
D	DISCONNECT FOUNDATION
D	DISCONNECT PAD FOUNDATION
C	CONTROLLER FOUNDATION
170	PADMOUNT CONTROLLER FOUNDATION
▪	BELL PEDESTAL
▪	HYDRO KIOSK
	STREET LIGHT FOUNDATION
	UTILITY POLE
●	TEMPORARTY WOOD POLE FOR SPAN WIRE INSTALLATION OPSD-2235.01 & 2238.01
COM	COMMUNICATION FOUNDATION
	SYNERTECH HANDHOLE
	TRAFFIC HANDHOLE
	TRAFFIC MANHOLE
	RED LIGHT CAMERA
	CAMERA FLASHER
	50mm RIGID CONDUIT
	76mm RIGID CONDUIT
	3x76mm RIGID CONDUIT
	100mm RIGID CONDUIT
	3x100mm RIGID CONDUIT
	125mm RIGID CONDUIT
	DIR. BURIED CABLE
	DETECTOR LOOP
	GROUND PLATE
	GROUND RODS (VERT.)
	GROUND RODS (HORIZ.)
	BELL SUPPLY
	HYDRO SUPPLY

TITLE FRAME: 790mm x 534mm City of Ottawa 2008

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Last Saved: 2021-10-14 9:07:03 PM

Consultant's Information: H:\ISO\477341\2000\DWGS\02-Detailed Design\CP000322-14-TP-002.Dgn

TRAFFIC PLANT DATA - MAINTENANCE HOLES

ID	STRUCTURE	NORTHING	EASTING
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MH 2	T4	5030727.19	366554.55
MH 3	T4	5030704.66	366567.30
MH 4	T4	5030708.37	366574.32
MH 5	T4	5030718.47	366585.78
MH 6	T4	5030725.83	366586.07
MH 7	T4	5030739.19	366584.92

TRAFFIC PLANT DATA - MAST ARMS

ID	STRUCTURE	NORTHING	EASTING
MA 1	T22	5030729.98	366556.99
MA 2	T22	5030709.34	366565.76
MA 3	T22	5030710.64	366575.65
MA 4	T22	5030717.66	366583.68
MA 5	T22	5030727.81	366587.06

TRAFFIC PLANT DATA DETECTOR LOOP

ID	NORTHING	EASTING
DL 1	5030729.84 5030730.48 5030728.94 5030728.30	366555.09 366555.86 366557.14 366556.37
DL 2	5030712.31 5030710.40 5030709.63 5030711.53	366574.54 366572.22 366572.86 366575.17
DL 3	5030710.21 5030709.40 5030701.38 5030702.19	366585.57 366583.96 366588.05 366589.65
DL 4	5030723.85 5030724.56 5030722.44 5030723.15	366582.61 366583.31 366584.03 366584.73
DL 5	5030744.01 5030737.26 5030736.07 5030742.82	366584.72 366578.76 366580.11 366586.07

TRAFFIC PLANT DATA - HAND HOLES

ID	STRUCTURE	NORTHING	EASTING
HH 1	T1	5030753.82	366576.49
HH 2	T1	5030758.65	366566.08
HH 3	T1	5030752.62	366573.11
HH 4	T1	5030715.48	366553.86
HH 5	T1	5030691.08	366547.64
HH 6	T1	5030712.44	366585.95
HH 7	T1	5030723.65	366585.20
HH 8	T1	5030800.37	366608.94

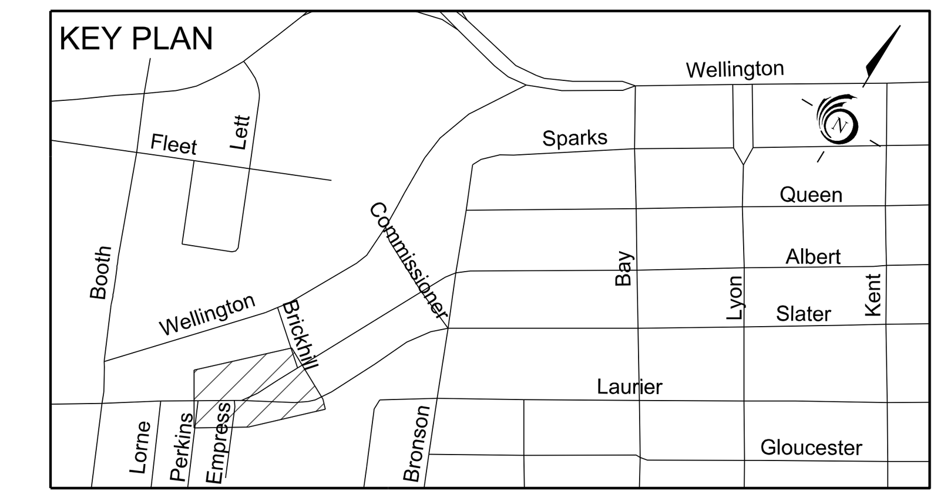
TRAFFIC PLANT DATA - JOINT USE POLES

ID	STRUCTURE	NORTHING	EASTING
JU 1	T23	5030741.14	366568.32
JU 2	T23	5030725.43	366552.32

TRAFFIC PLANT DATA - OTHER

ID	STRUCTURE	NORTHING	EASTING
TF 1	T21	5030743.09	366571.58
TF 2	T21	5030716.45	366555.63
TF 3	T21	5030737.40	366583.32
DF 1	T26	5030754.79	366576.01
CF 1	T24	5030717.94	366587.93
PP1	OPSD 2200.041M	5030722.71	366582.97

KEY PLAN



ALBERT/QUEEN/SLATER RENEWAL
EMPRESS AVENUE TO BAY STREET
BRONSON RENEWAL
QUEEN STREET TO LAURIER AVENUE

TRAFFIC PLANT 2
ALBERT STREET
STA. 30+040 TO STA. 30+190

C. DUCLOS, P.Eng. — *Director*
F. BONANNO, P.Eng. — *Project Manager*

PARSONS

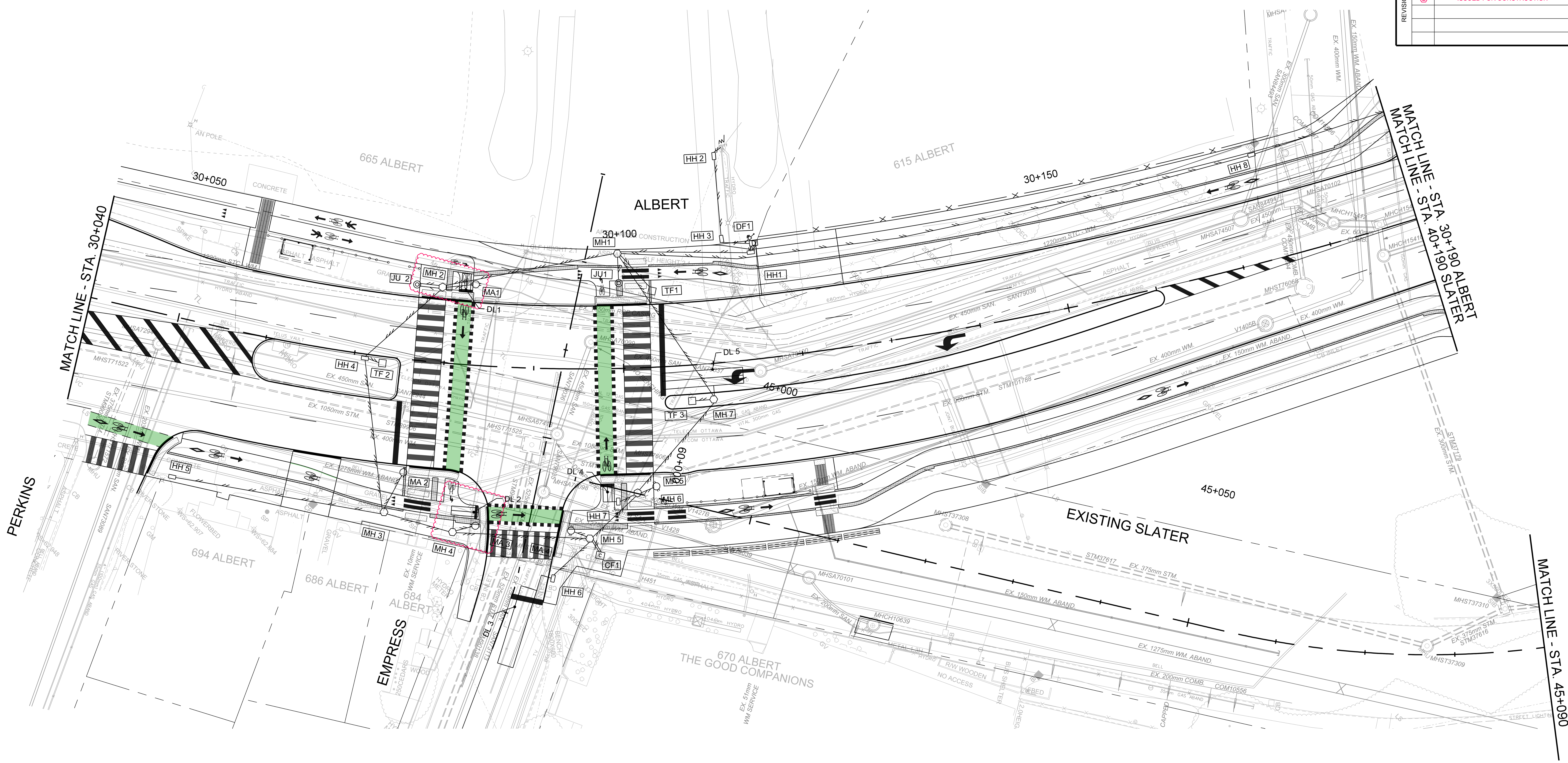
Ottawa

Contract No.	CP000322
Dwg. No.	101
Sheet	101 of 112
Asset No.	
Asset Group	ISD
Des.	DDC
Chk'd.	CLER
Dwn.	DDC
Chk'd.	CLER
Utility Circ. No.	CTY2110131
Index No.	
Const. Inspector	
Scale:	HORIZONTAL 0m 2.5 5 10

NOTE: The location of utilities is approximate only, the exact location should be determined by consulting the municipal authorities and utility companies concerned. The contractor shall prove the location of utilities and shall be responsible for adequate protection from damage.

REVISIONS

No.	Description	By	Date (dd/mm/yy)
1	ISSUED FOR TENDER	CLER	12/11/21
2	ISSUED FOR CONSTRUCTION	CLER	26/01/22



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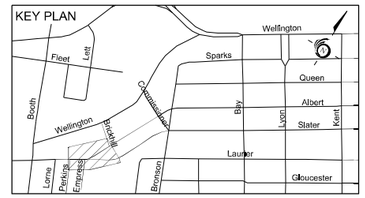

ALBERT/QUEEN/SLATER RENEWAL
EMPRESS AVENUE TO BAY STREET
BRONSON RENEWAL
QUEEN STREET TO LAURIER AVENUE

PAVEMENT ELEVATIONS 2
ALBERT STREET
STA. 30+040 TO STA. 30+190

C. DUCLOS, P.Eng.	F. BONANNO, P.Eng.
Director	*Project Manager*

PARSONS

LICENSED PROFESSIONAL ENGINEER
C. L. E. REDDEN
100134814
26/01/2022
PROVINCE OF ONTARIO

Ottawa

Contract No.	Dwg. No.
CP000322	061

Sheet 061 of 112

Asset No.

Asset Group: ISD

Des.	Chk'd.
DDC	CLER
Dwn.	Chk'd.
DDC	CLER

Utility Circ. No. CTY2110131
Index No.

Const. Inspector

Scale: HORIZONTAL
0m 2.5 5 10

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