
Memorandum

To: Jillian Savage, City of Ottawa

Date: 8 April 2019

From: Muna Awatta, P.Eng.

Project: 476906 - 01000

**Re: ByWard Market Public Realm Study
Technical Memorandum #1: Transportation Infrastructure**

1. INTRODUCTION

1.1. DOCUMENT PURPOSE

The City of Ottawa is undertaking the ByWard Market Public Realm Study in order to direct the renewal of the ByWard Market area and support the growth of its economy. The purpose of this memorandum is to provide a baseline assessment of existing transportation conditions within the ByWard Market in order to guide decisions regarding potential road network modifications. This memorandum addresses the following key items, as specified in the study Terms of Reference:

- An assessment of the existing pedestrian and cycling networks, transit routes, road and truck networks, and on-street and off-street parking.
- Assessment of existing curb-side uses, right-of-way (ROW) and underground utilities that will help determine the potential for future street renewal choices.
- Identification of further transportation and design analysis requirements.
- Commentary on the current and future role/opportunity of the two parking structures at 51 York Street and 145 Clarence Street.

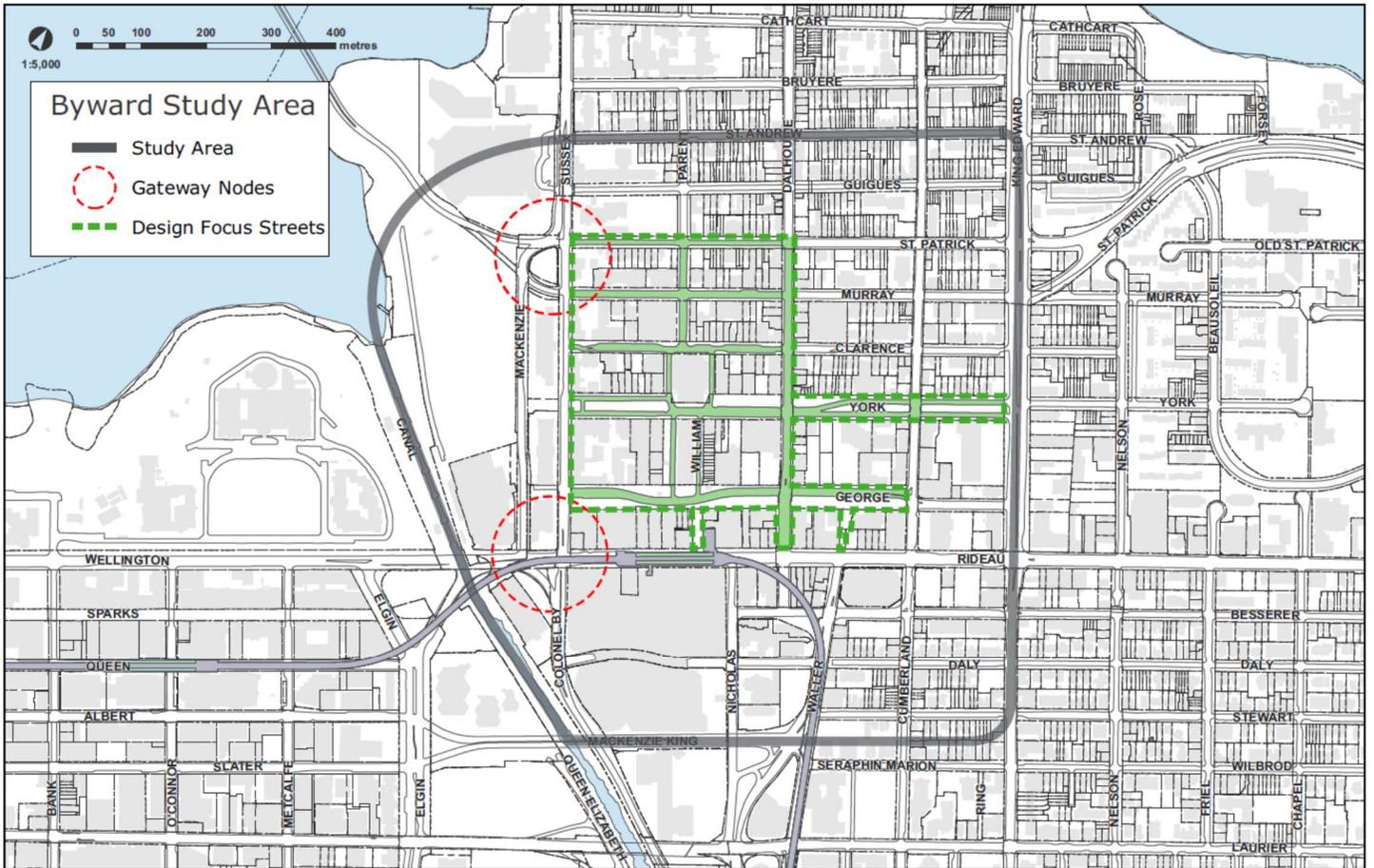
This memorandum will be proceeded by a second and final memorandum (*Technical Memorandum #2*), which will assess the multi-modal level of service of potential functional design recommendations, including alternative scenarios at the intersections of Sussex/Rideau/Colonel By and Sussex/Mackenzie/St. Patrick.

1.2. STUDY AREA

The study area for this baseline assessment is limited to the “Design Focus Area” streets illustrated in **Figure 1**, in addition to the two key gateways leading into the ByWard Market located at Sussex/Rideau/Colonel By, and Sussex/Mackenzie/St. Patrick. The Design Focus Area streets include: St. Patrick, Murray, Clarence, York, George, ByWard Market Square, William and Dalhousie.

For the purpose of the Public Realm study, a broader study area was also identified in order to assess the broader impacts of potential study recommendations. The broader study area includes adjoining residential neighborhoods and commercial areas, the Rideau Street BIA district as well as the Rideau/Arts precinct. The boundary of the boarder study area, as illustrated in **Figure 1**, is St. Andrews Street to the north, King Edward Avenue to the east, Mackenzie King Bridge to the south and Confederation Boulevard to the west.

Figure 1: Study Area

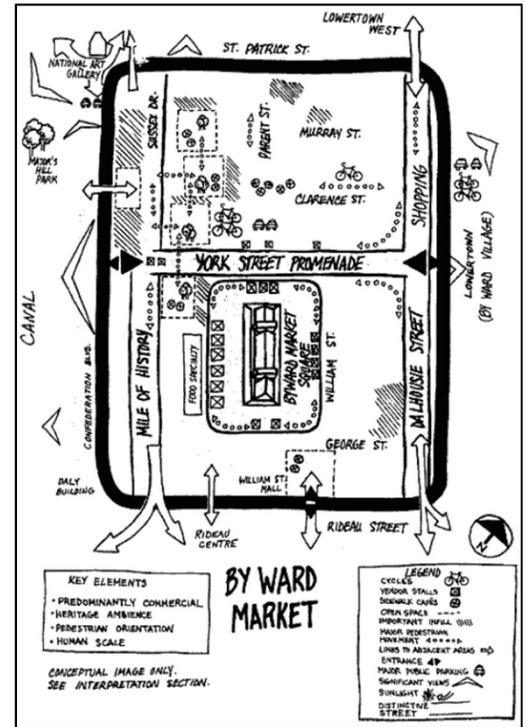


2. RELEVANT TRANSPORTATION PROJECTS/STUDIES

2.1. SECONDARY PLAN – CENTRAL AREA (2003)

The City's Secondary Policy Plan for the Central Area provides detailed area-based policy direction for the ByWard Market area, including transportation-related policies and objectives. As it relates to the ByWard Market Public Realm Study, the following considerations apply:

- Enhance main pedestrian corridors and at-grade pedestrian links in the Market area;
- Create “York Steps” as designate/enhance York Street as a “Distinctive Street”;
- Promote cycling to the area and provide adequate bicycle parking;
- Animate and enhance William Street Mall with a variety of pedestrian-oriented activities;
- Encourage cash-in-lieu of parking in the ByWard Market, except where the provision of on-site parking would retain pedestrian-oriented heritage character of the area;
- Parking to be provided primarily in mixed-use development along the edges of the area and ensure that the balance of existing on-street parking is retained within the area;
- Conversion/Removal/Remodeling of the ByWard Market Parking Garage with a potential “landmark public building”, while maintaining public parking on site;
- Introduce a coordinated program of traffic calming, tree planting, paving and street furniture along Murray and St. Patrick streets; and
- Redesign Parent Avenue to reduce the pavement width and landscape the boulevard areas.



2.2. DOWNTOWN OTTAWA URBAN DESIGN STRATEGY (2004)

The City's 2004 Downtown Ottawa Urban Design Strategy provides strategic, policy and design guidance and recommendations for downtown Ottawa developments. This document aims to establish a broad urban design framework that will help create an attractive and lively downtown for residents and visitors alike. As it relates to the ByWard Market and broader study area, key study recommendations include:

- Redevelopment of the parking garage at 70 Clarence Street as a major public building with underground parking;
- Pursuit of neighborhood character for St. Patrick and Murray streets;
- Two-way conversion of St. Patrick and Murray streets;
- Reinforcement of Dalhousie Street as a traditional mainstreet;
- Reimagining of York and George streets as garden streets; and
- Reconfiguration of the Sussex/Colonel By/Rideau node to address the barrier effect.



2.3. DOWNTOWN MOVES – TRANSFORMING OTTAWA’S STREETS (2013)

In 2013, the Downtown Moves Study identified ways to create more vibrant, inclusive, safe and accessible streets for residents, workers and visitors of all ages and abilities across Ottawa’s Central Business District (CBD). The overall aim of this urban design and transportation study was to ensure walking, cycling and transit use is more comfortable and convenient by redistributing and improving the streetscape environment.

The study identifies several streets within the ByWard Market Design Focus Area as “Shared Lanes” for motorists and cyclists (shown in pink in figure across). It is noted that the “Shared Lanes” identified in the Downtown Moves Study do not fully align with the current GeoOttawa cycling network.



In addition, the development of a ‘Bus-Confederation Line Interface Block’ is also recommended in front of the Rideau Station, including high quality transit-related services, such as widened sidewalks and bus platforms, real-time bus information, and functional street furniture.

2.4. RIDEAU AREA TRANSPORTATION NETWORK STUDY UPDATE (2011)

The Rideau Area Transportation Network Study Update was undertaken in 2011 for the following purposes:

- Review the Rideau Area Transportation Study conducted in 1995;
- Document current conditions and issues;
- Develop transportation priorities for the study area; and
- Identify opportunities.

The update provided 15 guiding priorities, and a list of over 200 issues to be proactively addressed by the City of Ottawa as the Rideau Area continues to develop and intensify. General priorities relevant to this study included:

- Elevating the conspicuity of pedestrian crossings at traffic signals, particularly along the truck route;
- Converting non-arterial roadways from one-way to two-way where safe and efficient parking availability and traffic circulation can be maintained for all appropriate modes of travel;
- Adding on-street parking spaces along roadways where they will be consistent with the findings of any Local Area Parking Studies;
- Providing priority for transit friendly initiatives that recognize the higher efficiencies of transit in the area over other modes of transportation; and
- Installing facilities, designations and/or signage to encourage continuous cycling routes through the area.

2.5. NCC URBAN DESIGN STRATEGY

The objectives for re-configuration of the node, as identified in the NCC's *Confederation Boulevard Sussex/Rideau/Colonel By Landmark Node - Urban Design Strategy*, include:

- Effectively balance pedestrian, bicycle and vehicular movement through the space in a manner that reduces conflicts, accommodates desired routes and creates a safe and attractive environment for all users
- Ensure that pedestrian circulation through and within the space is the highest priority and is safe, inviting, comfortable and universally accessible
- Improve the experience of travelling through the space while addressing congestion and primary travel patterns for motorists
- Allow for flexibility and changes in future traffic patterns

Currently, pedestrian circulation and safety is negatively impacted by the alignment and width of Mackenzie ramp, the lack of a sidewalk at street level along the south side of Rideau Street, the lack of year-round maintenance and accessibility standards at the pedestrian underpass beneath the ramp, and narrow sidewalks along Colonel By Drive.

2.6. SUSSEX-RIDEAU-COLONEL BY NODE TRANSPORTATION IMPACT STUDY (2012)

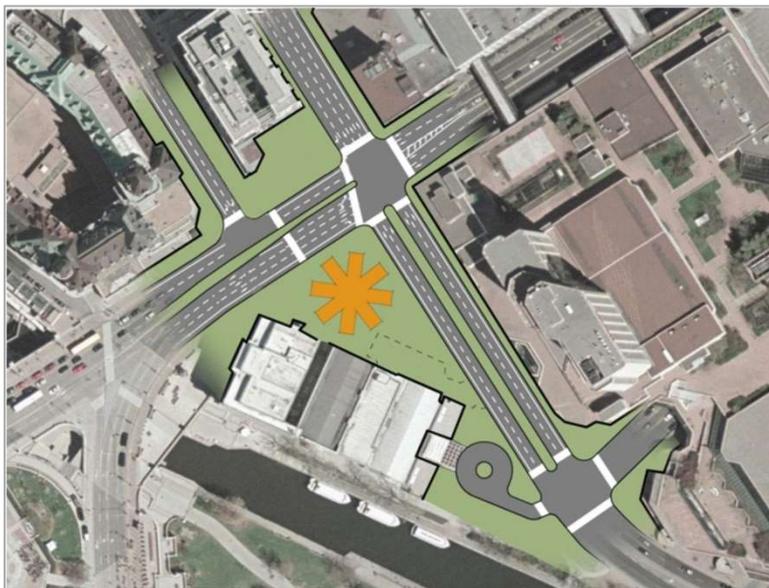
The purpose of the Sussex-Rideau-Colonel By Node Transportation Impact Study was to quantify the operational impacts of potential road network changes within the immediate vicinity of the Node. The study focused on vehicular conditions during the morning and afternoon peak hours and provided a review of the future travel demand projections. Pedestrian, cycling and transit modes were not included within the study scope.

The study proposed and reviewed a total of 11 candidate measures to address intersection performance and these were combined into a total of four redesign scenarios. A detailed traffic analysis was completed to assess the performance of each of the measures and alternative scenarios. The key objectives of the re-configuration were as follows:

- Results in a viable reconfiguration of the adjacent streets from a traffic operations perspective;
- Improves/enhances the pedestrian movement with an at-grade solution;
- Effectively balances the intersection's pedestrian, bicycle and vehicular requirements; and
- Results in sufficient space to provide the desired landmark features within a high-quality environment.

The preferred design scenario is illustrated in the figure across and includes the following:

- New at-grade pedestrian crossings on the east leg of the Rideau/MacKenzie intersection (i.e., no pedestrian crossing of the west leg);
- Convert Sussex Drive to two-way between York Street and St. Patrick Street.
- Elimination of MacKenzie ramp, as the southbound through movement onto Colonel By would be accommodated from the Sussex/Wellington intersection, leaving dual southbound right-turn lanes at MacKenzie Avenue; and
- On-street cycling lanes on study area roadways.

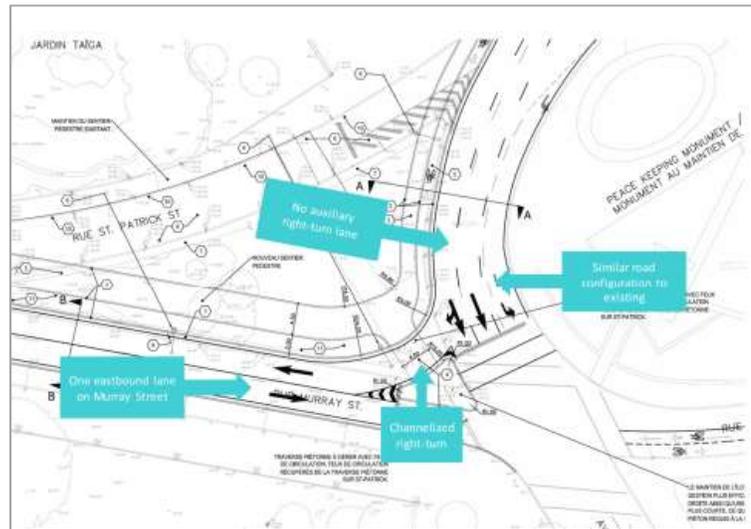


2.7. NEPEAN POINT PARK RE-DEVELOPMENT STUDY

The proposed design for the Nepean Point re-development, approved by the National Capital Commission's Board of Directors, envisions an inclusive space providing platforms, such as an amphitheatre and gathering circle where people can come together amongst a panoramic view of the City of Ottawa and River Valley.

As part of the design, the St. Patrick Street southbound and westbound channelized right-turns are proposed to be reclaimed in order to expand the public realm and improve pedestrian connectivity and safety. The proposed design is illustrated in the figure across. The main features of this design are:

- A similar configuration to existing conditions;
- No auxiliary southbound right-turn lane;
- A channelized right-turn; and
- A single eastbound lane on Murray Street.

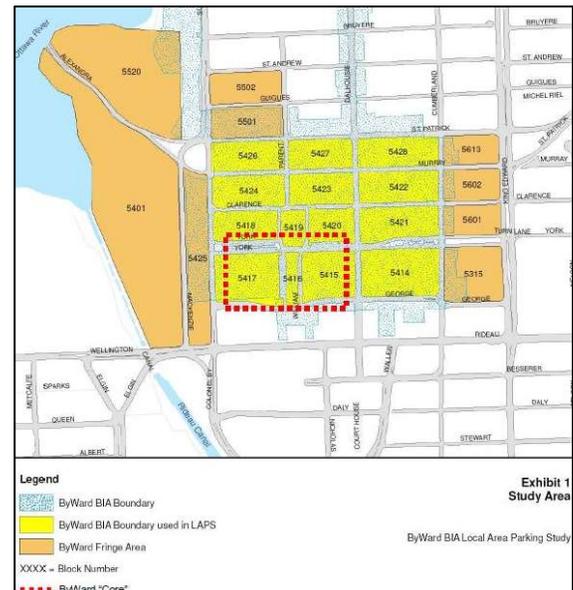


2.8. BYWARD MARKET LOCAL AREA PARKING STUDY (2011)

In 2011, the City of Ottawa completed the ByWard Market BIA Local Area Parking Study (LAPS) in order to analyze parking activity within the ByWard Market BIA area. The study included a complete parking inventory, an assessment of parking usage, stakeholder consultation, identification of major issues, and recommendations.

This study was completed as part of the City's 2009 Municipal Parking Management Strategy local area parking study (LAPS) program. Overall, the ByWard LAPS study concluded that on-street parking within the ByWard Market area is generally over capacity at peak times and days. However, off-street parking utilization was found to be moderate. This indicates that although on-street utilization is of concern, the overall short-term parking supply is sufficient to meet present levels of public parking demand.

It is noteworthy that the City's 2009 Municipal Parking Management Strategy is currently being updated, and is expected to be completed in June 2019.



2.9. DOWNTOWN OTTAWA (TRUCK) TUNNEL FEASIBILITY STUDY (2016)

Downtown communities have long expressed dissatisfaction with the existing truck movement along the King-Edward, Rideau, Waller and Nicolas corridor. Since all efforts towards a new interprovincial bridge halted in 2013 (including a new bridge linking Aviation Parkway/Kettle Island/Montée Paiement), focus moved towards a downtown bypass tunnel.

The Downtown Ottawa (Truck) Tunnel Feasibility Study was issued in 2016 and determined that a tunnel connecting Highway 417 to the existing Macdonald-Cartier bridge (not a tunnel under the Ottawa River) was technically a feasible option. The recommended route for a tunnel would locate its southern portal near the Vanier Parkway at Coventry Road and continue under the Rideau River, East Sandy Hill, East Lowertown with the northern portal at the southern end of the

Macdonald-Cartier bridge. The proposed tunnel would be 3.4km long and would be comprised of two separate tunnels (one for each direction of travel), with two-lanes in each tunnel.

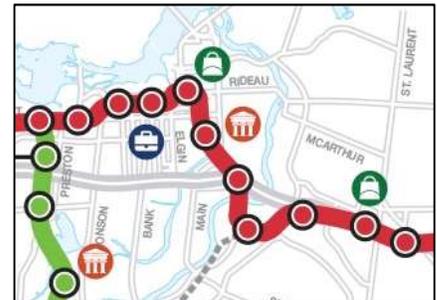
Ottawa City Council approved in September 2016 to set aside budget for a detailed environmental assessment for this tunnel in 2017, pending financial support from the provincial and federal governments to co-fund the study. As the Provinces of Ontario and Quebec have withdrawn participation in any further studies, no additional development has taken place since.

Although the King-Edward, Rideau, Waller and Nicolas corridor does not fall within the Design Focus Area identified for this Public Realm Plan, it is acknowledged that changes in nearby truck routes would potentially benefit the Design Focus Area in terms of reduced traffic, noise and air pollution, among others. It is important to note that due to the mixed-use nature of ByWard Market, including the large proportion of commercial and restaurant uses that require daily deliveries, truck access is a very important consideration and needs to be maintained.

2.10. FUTURE LIGHT RAIL TRANSIT – RIDEAU STATION

ByWard Market will be served by Rideau Station as part of the future Confederation Line LRT system. Rideau Station is located on the northeast corner of Rideau Street and William Street, generally situated between Sussex Drive and Dalhousie Street. Rideau Station will also provide two additional LRT accesses via the Rideau Centre Shopping Mall and at the corner of Rideau Street and Colonel By drive.

Rideau Station is an important stop of the Confederation Line as it will provide access to a significant number of pedestrians using the ByWard Market area, the Rideau Centre Shopping Centre, and various employment and residential buildings within the area. It will provide multi-modal connection between buses and light-rail transit as OC Transpo and STO buses will continue to run along Rideau Street. William Street is currently subject to a separate engineering and urban design process to address reconstruction of a one-block section of William Street (from Rideau to George streets) following completion of Rideau Station construction.



2.11. AREA IMPROVEMENTS/DEVELOPMENTS

The broader ByWard Market study area has been subject to a plethora of infrastructure renewal investments and private property redevelopment in preparation for the opening of Confederation Line. Some of the more significant redevelopments which have taken place recently include:

- Construction of bi-directional cycle tracks along the east side of Mackenzie Ave;
- Creation of the George Street plaza in 2017 by expanding an existing pedestrian space in front of the ByWard Market building, including landscaping and urban design considerations;
- Creation of the York Street plaza in 2017 by removing on-street parking spaces previously located within the median of York Street, and replacing with public art, landscaping and a public area comprised of chairs and tables for pedestrian comfort;
- Redevelopment and expansion of the Rideau Centre Shopping Mall and rehabilitation of properties along Rideau Street;
- Rideau Street Renewal, from Sussex Drive to Dalhousie Street, to include wider sidewalks and 2+1 vehicle lanes. This project is currently under way; and
- Completion of Ogilvy Square in 2017, a one-block pedestrian-friendly public space from Rideau to Besserer streets along what was previously Nicholas Street.

3. EXISTING CONDITIONS

3.1. DATA COLLECTION

In order to assess existing transportation conditions, counts, traffic signal timing plans, five-year collision history, transit data, and parking data was collected from the City of Ottawa. Several site surveys were also completed.

The specific data collected from the City included:

- The most recent counts for intersections along the Design Focus Area streets (21 intersections and 2 pedestrian signals). The counts provided generally ranged from 2014 to 2018, with the exception of a new 2019 intersection count at Mackenzie/Rideau that was commissioned as part of this study;
- Traffic Signal Timing Plans (2018);
- Five-year collision history (2013 to 2017, inclusive);
- Available operating speed surveys (limited information available on Design Focus Streets);
- Future LRT transit ridership (at Rideau Station);
- Future LRT service frequency;
- Future (post-LRT) changes in bus service;
- Bike parking inventory and occupancy data;
- On-Street and Off-Street parking inventory;
- Fall and Spring 2017 and Spring 2018 parking duration and occupancy surveys;
- Fall 2017 ByWard Market Consumer Survey; and
- CAD Base mapping;

3.2. PEDESTRIAN FACILITIES

The ByWard Market is considered a very walkable area as all streets have sidewalks, all intersections provide painted crossings, and blocks are generally short in length thus facilitating pedestrian permeability within the general area. Also noteworthy is the well-developed privately-owned network of mid-block courtyards that increase pedestrian accessibility throughout the area. These courtyards include Beaux Arts Court lane, Tin House Court lane, Jeanne D'Arc Court lane and Clarendon lane. Waller Mall is another lane which enhances pedestrian connectivity, although it is currently closed for redevelopment.

As there are currently sidewalks along all roadways within the study area, no sidewalks or pathways are recommended in the City of Ottawa Pedestrian Master Plan. The Pedestrian Master Plan indicates that the pedestrian network within the ByWard Market area is virtually complete and focus should be on improving the quality of the pedestrian environment.

The existing pedestrian facilities are illustrated in **Figure 2**. Intersections with high pedestrian activity in the ByWard Market are illustrated in **Figure 3** (8-hour weekday count). This figure was derived from traffic count data provided by the City of Ottawa. With the introduction of LRT service, pedestrian volumes in the vicinity of the LRT station are expected to increase significantly.

As part of the ByWard Market Public Realm Study, 80 Cities undertook a Public Life Study in the ByWard Market on Thursday September 20, 2018 and Saturday September 22, 2018 from 9:00am to 10:00pm. This study include pedestrian activity counts in specific areas within the market. Counts were conducted for 15 minutes every hour and results were extrapolated. The counted indicated that on weekends, foot/bike traffic increases by 40% to 155% across all locations for all locations except Clarence Street which only increases by 10%.

The Public Life Study identified the following locations to generally have the highest level of pedestrian activity:

- York Street/ByWard Market Square
- Clarence Street
- George Street/Sussex Drive
- William Street/George Street

Technical Memorandum #2 will include a zebra crossing warrant at high pedestrian intersections to identify locations where zebra crossings would be warranted. Sidewalks with sub-standard widths will also be identified.

Figure 2: Pedestrian Network

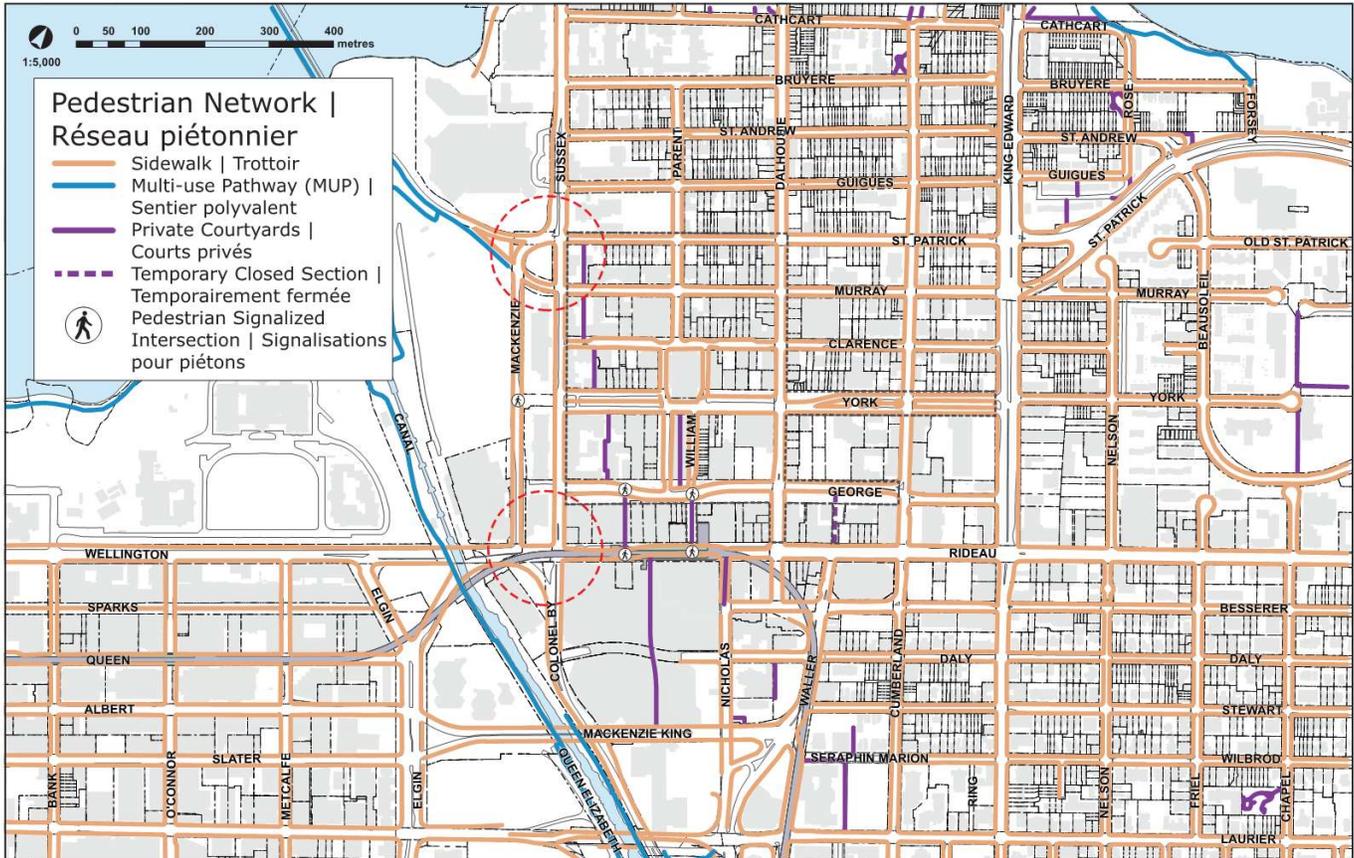
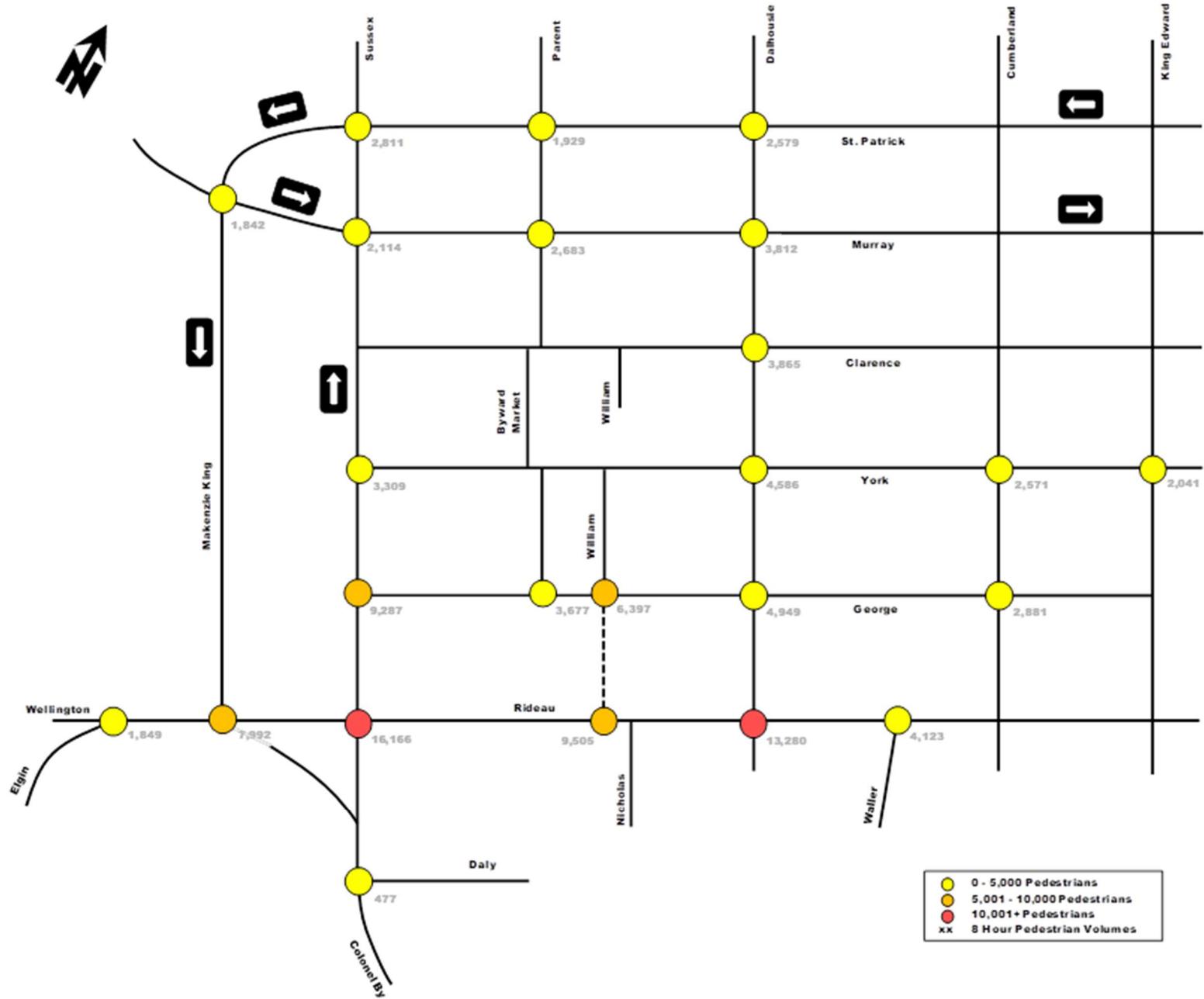


Figure 3: 8-hour Pedestrian Volumes



3.3. CYCLING FACILITIES

The existing cycling network within the study area, as detailed in GeoOttawa, is illustrated in **Figure 4**. The existing cycling network along “Design Focus Area” streets include the following:

- Dedicated westbound bicycle lane along St. Patrick Street between Sussex Avenue and Dalhousie Street; and
- “Suggested Route” along York Street.

In addition, planned cycling facilities identified in GeoOttawa include St. Patrick Street, Murray Street and ByWard Market Square between York Street and Clarence Street, all targeted for completion in 2019. Based on input from City staff, the cycling program is currently undertaking functional designs for the following cycling facilities:

- A contraflow bikeway on the west side of ByWard Market Square between York and Clarence;
- A bidirectional bikeway on the west side of the Mackenzie Ramp between Mackenzie and Daly; and
- A bidirectional bikeway on the south side of Murray between Mackenzie and Sussex.

Regarding the surrounding area, key cycling facilities include Mackenzie Avenue (bi-directional cycle tracks on east side of Mackenzie Avenue), Sussex Drive (northbound cycle lane north of George Street), Cumberland Street (southbound cycle lane between George Street And Besserer Street), Laurier Avenue (uni-directional cycle lanes) and the Alexandra Bridge (bi-directional cycle tracks).

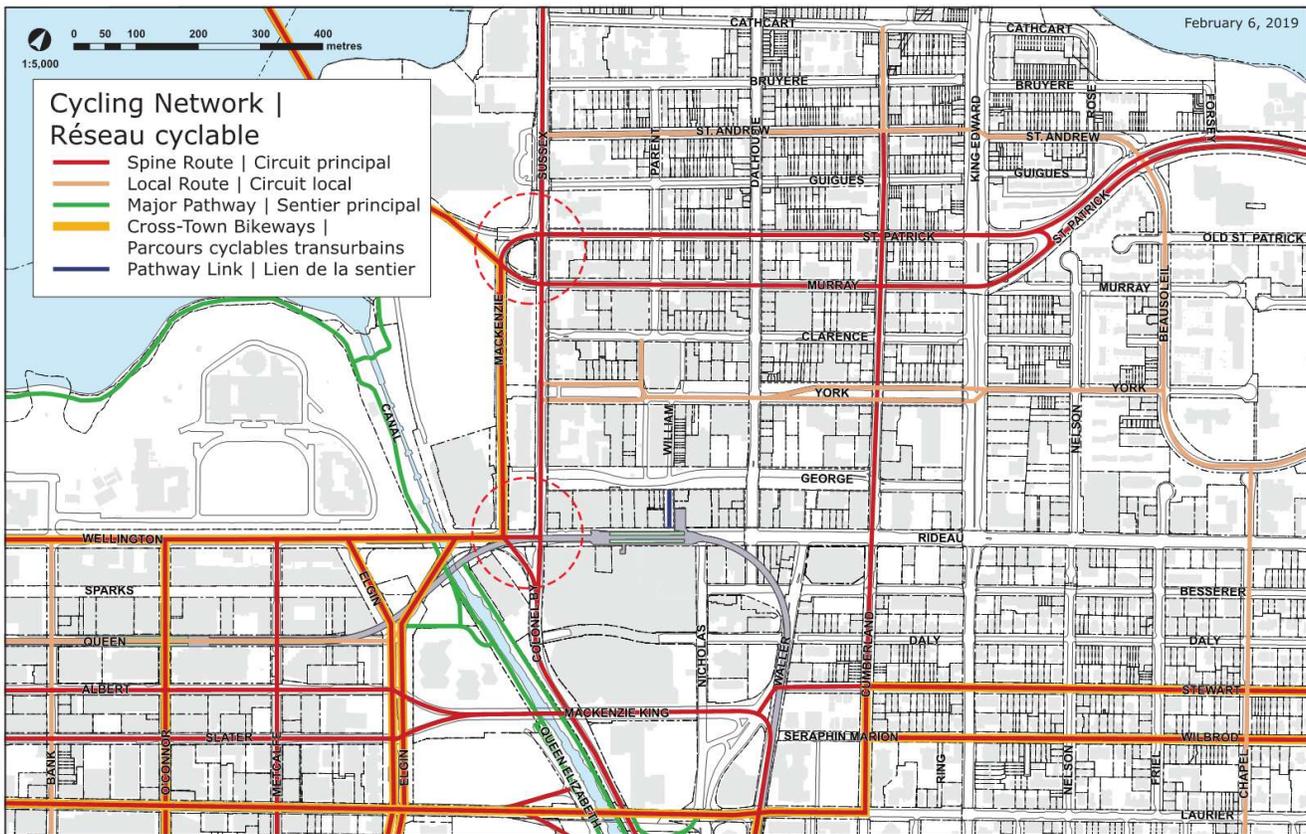
Figure 4: Existing Cycling Network



The Cycling Master Plan designations are illustrated in **Figure 5**. The following street designates are identified based on the OCP Ultimate Cycling Network:

- Mackenzie Avenue - designated Spine Route and Cross-Town bikeway;
- Sussex Drive - designated Spine Route;
- St. Patrick Street - designated Spine Route;
- Murray Street - designated Spine Route;
- Cumberland Street - designated Spine Routes; and
- York Street - designated Local Route.

Figure 5: Cycling Master Plan Designations



8-Hour cycling volumes at signalized intersections within the study area are illustrated in **Figure 6**. As shown in **Figure 6** there are generally fewer than 50 cyclists per direction travelling along Design Focus Area streets during an 8-hour period, with the exception of St. Patrick Street and specific blocks along George Street and Murray Street. The popularity of different routes amongst Ottawa cyclists who use Strava (an activity tracking service for smartphone users – see www.strava.com) is illustrated in **Figure 7**. This also indicates relatively high demand along the above-mentioned roadways, in addition to relatively high demand along Dalhousie Street.

Figure 6: 8 Hour Cyclist Volumes

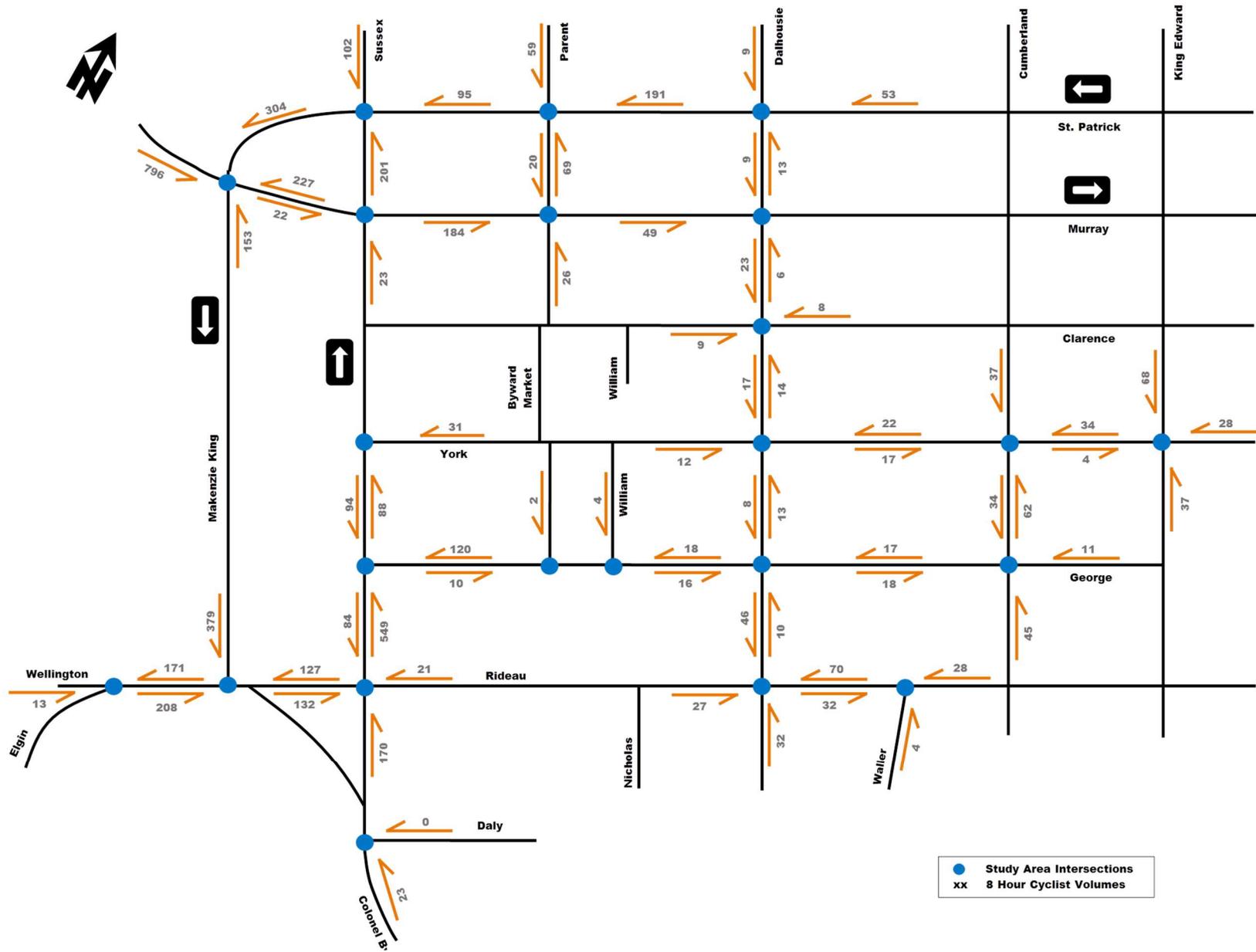
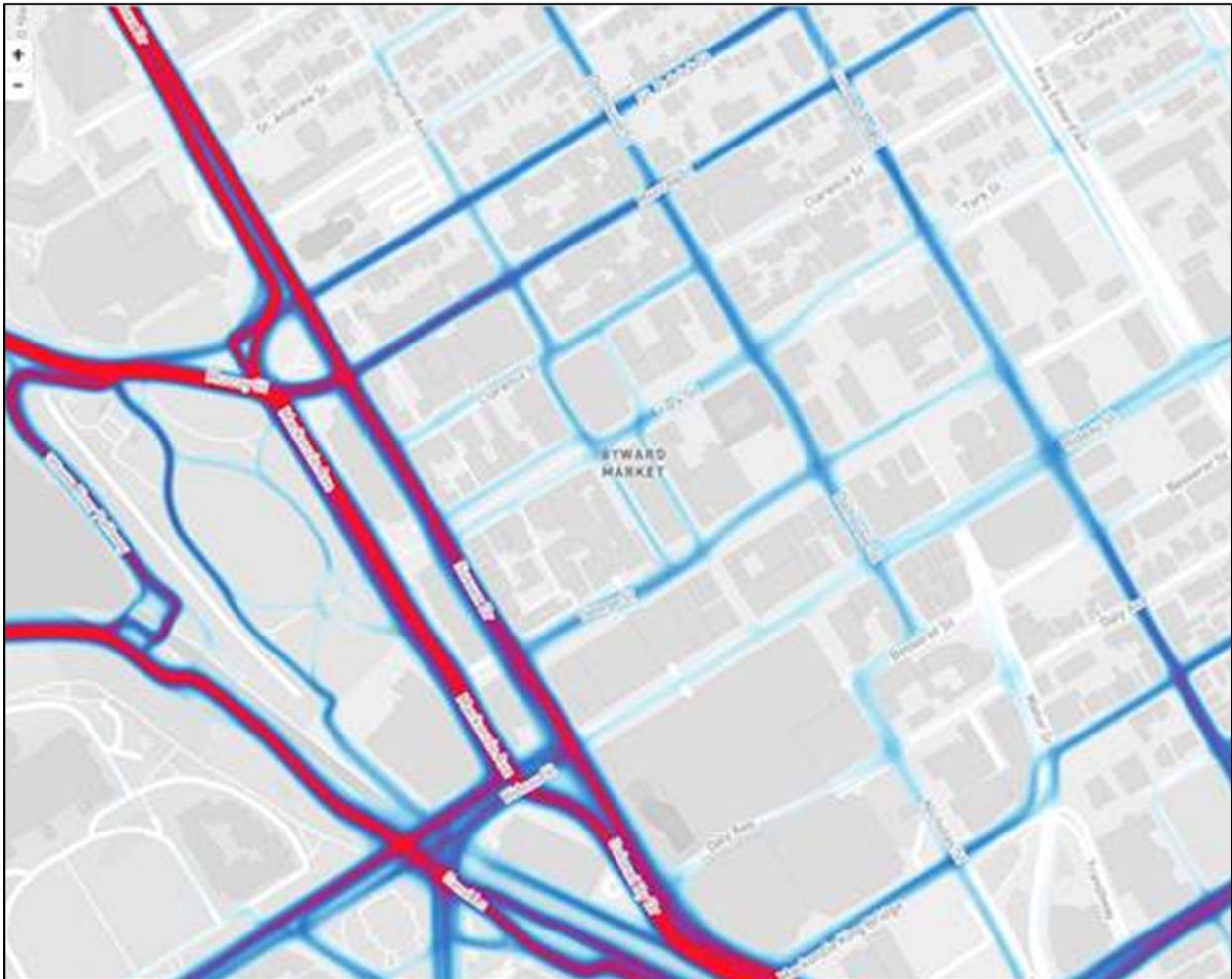


Figure 7: Cycling 'Heat Map' from the Strava Dataset



3.4. CYCLING AMENITIES

Providing sufficient bike parking within the ByWard Market area is critical to promoting the use of bicycles as a mode of transportation. Bike parking in the market mostly consists of post-and-ring structures, hoops, and some metal-rings attached to the exterior wall of the 70 Clarence Street parking structure that enables vertical bicycle storage. **Figure 8** illustrates the locations of bike parking. In addition, a bike stairway, which is a channel alongside steps to facilitate walking a bike up or down the stairs, are provided at the York Street Steps.

A total of approximately 950 bike parking spaces were estimated within the study area. An occupancy survey completed in Fall 2018 indicates that bike racks were approximately 30% utilized overall, which might indicate that bike parking is underutilized throughout most of the market. However, approximately 35% of bike racks were at least 50% utilized, which indicates that about a third of bike parking facilities are well utilized within market.

The survey also indicates that the following bike parking facilities in particular were fully utilized:

- ByWard Market Square between George Street and Clarence Street
- George Street between Cumberland Street and Dalhousie Street (in front of the Salvation Army Ottawa South Centre)

Thus, it is recommended that additional bike parking be provided at the above areas and at other strategic locations throughout the area.

Figure 8: Bicycle Parking Locations



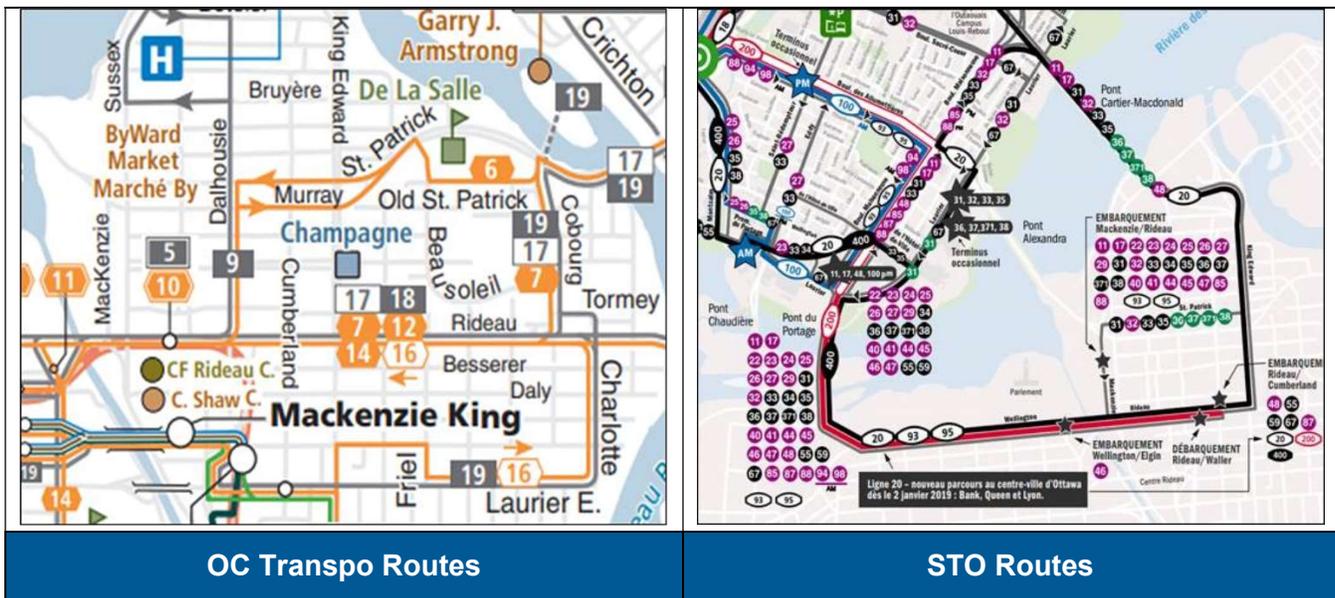
3.5. TRANSIT NETWORK

3.5.1. CURRENT TRANSIT SERVICE

Transit service within the ByWard Market area is currently provided by both OC Transpo and the Société de transport de l'Outaouais (STO). Current transit routes are illustrated in **Figure 9**.

- OC Transpo routes #6 and #9 currently provide service along Dalhousie Street and Rideau Street, as follows:
 - Route #6 (Rockcliffe <-> Greenboro): provides service every 15 minutes or less on weekdays (6am-6pm), every 20 to 30 minutes during most off-peak periods and every 12 minutes during Saturday peak periods.
 - Route #9 (Rideau Centre <-> Hurdman): provides service every 15 to 20 minutes on weekdays and every 30 minutes on weekends.
- OC Transpo routes #5, #7, #10, #12, #14, #16, #17 and #18 provide service along Rideau Street. These routes link the ByWard Market with destinations across the City of Ottawa, including Lincoln Fields (route 16), Orleans (route 12), South Keys/Greenboro (route 6) and Carleton University (route 7).
- STO routes #20, #48, #55, #59, #67, #87, #200 and #400 provide service to/from the ByWard Market via a bus stop located at Rideau/Cumberland. STO routes #31, #32, #33, #35, #36, #37 and #38 provide service to/from the ByWard Market via a stop located along Mackenzie Avenue. STO service is primarily focused in the eastbound direction during the morning peak hour and the westbound direction during the afternoon peak hour, serving residents who live in Gatineau and work in Ottawa.

Figure 9: Current Transit Routes



3.5.2. FUTURE TRANSIT SERVICE

Transit service through the downtown is expected to see considerable change after LRT service is in operation. When the Confederation Line is completed in 2019, transit capacity to and from the downtown core is expected to double, from 10,000 passengers per hour per direction to 18,000-24,000 passengers per hour per direction.

Based on preliminary information provided by OC Transpo, transit routes and service frequencies are expected to be quite different as changes are made to complement the new LRT service. OC Transpo is presently transforming the bus network to optimize connections with the LRT Station. Transit service through the study area can be characterized as follows:

- Transitway Service on Mackenzie King Bridge;
- Through service on Rideau Street, and
- Local service on Sussex Drive and Murray, St. Patrick, and Dalhousie Streets.

Below is an overview of current plans after LRT service is in operation. These plans may be subject to change.

Route Changes:

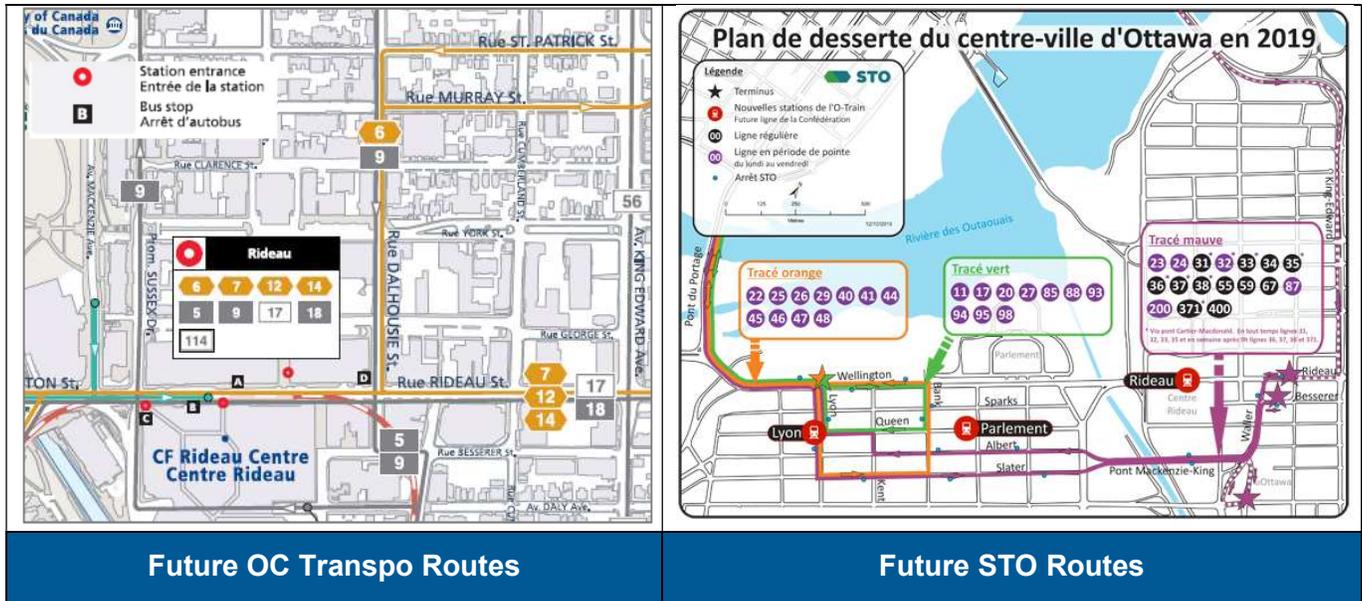
- **Transitway service** through the downtown core will be replaced by Line 1 at Rideau Station. This includes most service that presently uses Mackenzie King Bridge. Routes 16 and 19 will be the only routes that will continue to use Mackenzie King Bridge. The other routes will be shortened to connect to Line 1 at the other terminus stations (mainly, Tunney's Pasture, Hurdman and Blair).
- **Route 5:** This route presently terminates at Rideau Street. It will be extended to terminate at the service stop on Waller Street southbound (i.e. current Laurier Station).
- **Route 9:** The downtown leg of this route, west of the Rideau Canal, will be removed. Its new terminus will be located on Daly Avenue westbound west of Nicholas Street. Its routing will be modified through the ByWard Market and will no longer provide service on Rideau Street.
 - Service towards downtown will continue to operate southbound on Dalhousie Street. It will then use Besserer Street and Waller Street to access the new terminus on Daly Avenue.
 - Service towards Hurdman Station from the new terminus will use Daly Avenue and Sussex Drive and then continue its current route north of Bruyère Street.
- **Route 10:** The downtown terminus of this route will be modified to be Lyon Station instead of Rideau Centre. The portion between Lyon and Rideau Stations will be replaced by Line 1.
- **Route 16:** The 16X pattern on this route through the northern portion of Sandy Hill will be removed. Service in the northern portion of Sandy Hill and Lowertown will be provided by an extension of Route 56 along King Edward Ave to Union Street.
- **Route 114:** New Route 114 will provide select midday trips between Rideau Station and Carlington via Rideau Street, Elgin Street and Gladstone Avenue.

Frequency Changes: Frequency reductions for routes that will remain within the study area are considered as follows:

- **Route 5:** Afternoon peak period.
- **Route 6:** Early in the AM peak period and weekend midday.
- **Route 7:** Weekday peak periods and weekend midday.
- **Route 14:** Weekday evening eastbound and Sunday midday.
- **Route 16:** Weekday peak periods, evenings and late night.

On the other hand, information provided on the STO website indicates that STO operations within the ByWard Market area are generally expected to remain similar to today. However, mapping available on the website indicates that STO routes will no longer run along Mackenzie Avenue and St. Patrick Street. Future OC Transpo and STO transit routes after LRT service is in operation are provided in **Figure 10**.

Figure 10: Future Transit Routes



Ridership activity at the future Rideau LRT station was also collected from OC Transpo and a summary of the projected boardings and alightings at Rideau Station during the morning and afternoon peak periods for 2023 and 2031 is provided in **Table 1** below.

Table 1 Boardings and Alightings at Confederation Line - Rideau Station

Horizon	Eastbound		Westbound		Total	
	Boardings	Alightings	Boardings	Alightings	Boardings	Alightings
2023 AM Peak Hour	496	2,242	720	1,362	1,216	3,604
2023 PM Peak Hour	1,144	604	1,884	417	3,028	1,021
2031 AM Peak Hour	549	2,567	755	1,447	1,304	4,014
2031 PM Peak Hour	1,216	634	2,156	461	3,372	1,096

Based on the above, it is forecast that approximately 4,000 to 5,000 persons will exit or enter the Rideau LRT Station entrances during each weekday morning and afternoon peak period. On this basis, it is essential that sufficient amount and quality of sidewalk space be provided for pedestrians not only to circulate in the vicinity of the station, but also to walk in a radial pattern to or from their place of work, residence, or other origin/destination. Thus, it is recommended that opportunities to reduce vehicle lane capacity and/or on-street parking in order to widen sidewalks be considered.

Finally, as the potential impact of future LRT service on reducing parking demand depends to a large extent on LRT service frequency during the late evening, the schedule of the planned Confederation Line **overnight shutdowns** was requested from OC Transpo and is summarized below:

- Monday to Thursday night, 1:00 a.m. to 5:00 a.m. the next morning;
- Friday night, 2:00 a.m. to 6:00 a.m. Saturday morning;

- Saturday night, 2:00 a.m. to 8:00 a.m. Sunday morning; and
- Sunday night, 11:00 p.m. to 5:00 a.m. Monday morning.

During these times the train service will be replaced by select Rapid bus routes extended into downtown from the east, west and south parts of the city. As LRT service will be provided until 2:00 a.m. during the peak Friday and Saturday evenings, the future LRT service can be expected to result in a reduction in future parking demand.

3.6. EXISTING ROAD NETWORK

Sussex Drive is a north-south arterial roadway with a speed limit of 50km/h. Adjacent to the study area, Sussex Drive has a three-lane cross-section (2 lanes in the northbound direction + 1 lane in the southbound direction) between Rideau Street and George Street, which transitions to a two-lane one-way roadway with a bike lane in the northbound direction between George Street and St. Patrick Street. North of St. Patrick Street, Sussex Avenue has a two-way four-lane divided cross-section with a dedicated cycling lane on either side. Sussex Drive is designated as a Spine Route in the Ottawa Cycling Plan. Sussex Drive is also designated as a Truck Route, and no transit service is provided along the corridor.



Mackenzie Avenue is a north-south arterial roadway with a speed limit of 50km/h. Mackenzie Avenue is a one-way roadway in the southbound direction with a two-lane cross-section. A separated bi-directional cycling facility is provided along the east side of the roadway. Mackenzie Avenue is a designated Spine Route and Cross-Town bikeway, a designated Truck Route, and currently serves several STO bus routes.



It is noted that within the City of Ottawa’s Official Plan, Sussex Drive and Mackenzie Avenue are designated as part of the National Capital Commission (NCC) Confederation Boulevard, in addition to being designated as Distinctive streets.

St. Patrick Street is an east-west arterial roadway with a posted speed limit of 50 km/h. Within the study area, St. Patrick Street is a one-way roadway in the west-bound direction with a two-lane cross-section. St. Patrick Street forms a one-way couplet with Murray Street. Between Sussex Avenue and Dalhousie Street, a dedicated cycling lane is provided on the north side of the road. East of Dalhousie Street, on-street parking is provided on either side of the roadway and the dedicated cycling facility is discontinued. St. Patrick Street is a designated Spine Route for cycling, a designated Truck Route, and serves OC Transpo route #6.



Murray Street is an east-west arterial roadway with a posted speed limit of 50 km/h. Murray Street is a one-way roadway in the east-bound direction with a two-lane cross-section. On-street parking is provided on either side of the road for the majority of its length with the exception of the section between Cumberland Street and King Edward Avenue. Murray Street is a designated Spine Route for cycling, a designated Truck Route, and serves OC Transpo route #6.



Rideau Street is an east-west arterial roadway with a speed limit of 50km/h. Adjacent to the study area, Rideau Street has a two-way four-lane cross-section between King Edward Avenue and Dalhousie Street, and transitions to a two-way two-lane cross-section (with access currently limited to buses, taxis and construction vehicles as part of Stage 1 LRT construction) between Dalhousie Street and Sussex Drive. West of Sussex Drive, Rideau Street has a two-way four-lane cross-section. Rideau Street is designated as a Transit Priority Corridor (with continuous lanes) and serves several transit routes. The section of Rideau Street between Sussex Drive and Waller Street is designated as a Truck Route. Dedicated cycling facilities are not provided along Rideau Street.

Dalhousie Street is north-south collector roadway with a posted speed limit of 50 km/h. Dalhousie Street has a two-way two-lane cross section with parking available on both sides of the roadway, except for south of Rideau Street, where on-street parking is provided on the west side only. Dalhousie Street is designated as a Truck Route and serves OC Transpo routes #6 and #9. Cycling facilities are not provided along Dalhousie Street.



York Street is an east-west local roadway with an assumed speed limit of 40 km/h. Within the study area, York Street has a two-way, two-lane cross-section road. Parking is provided along York Street in the form of on-street parallel and 90° parking, as well as median parking.

York Street is designated as a Local Route in the City of Ottawa Cycling Plan. York Street is not designated as a Truck Route and no transit service or bike lanes are provided. The City's Official Plan designates York Street as a Distinctive street.



George Street is an east-west local roadway with an unposted speed limit of 50 km/h. George Street is a two-way, two-lane cross-section road with on-street parking on both sides of the street between King Edward Avenue and Sussex Drive. George Street is designated as a Truck Route between Dalhousie Street and Cumberland Street. No transit service or bike lanes are provided along this roadway.



ByWard Market Square is a north-south local roadway with an unposted speed limit of 50 km/h. ByWard Market Square is a one-way (north), one-lane roadway which runs between George Street and Clarence Street. On-street parking is provided on either side of the road. The roadway is located in the heart of the ByWard Market adjacent to the historic ByWard Market Building and market stands are located on either side of the road, and seasonal on-street patios normally replace on-street parking in the summer. No transit service or bike lanes are provided along this roadway.



William Street is a north-south local roadway with an unposted speed limit of 50 km/h. William Street is a one-way (south), one-lane road which runs between Rideau Street and Clarence Street, with the exception of a 30m section north of York Street which is open to pedestrian travel only. On-street parking is provided on the east side of the roadway and market stands are located on the west side of the roadway. No transit service or bike lanes are provided along this roadway.



Clarence Street is an east-west local road with an unposted speed limit of 50 km/h. Clarence Street is a two-way, two-lane roadway with on-street parking provided on the north side of the road throughout the corridor, and on-street parking on the south side of the road between Sussex Drive and Dalhousie Street. No transit service or bike lanes are provided along this roadway.

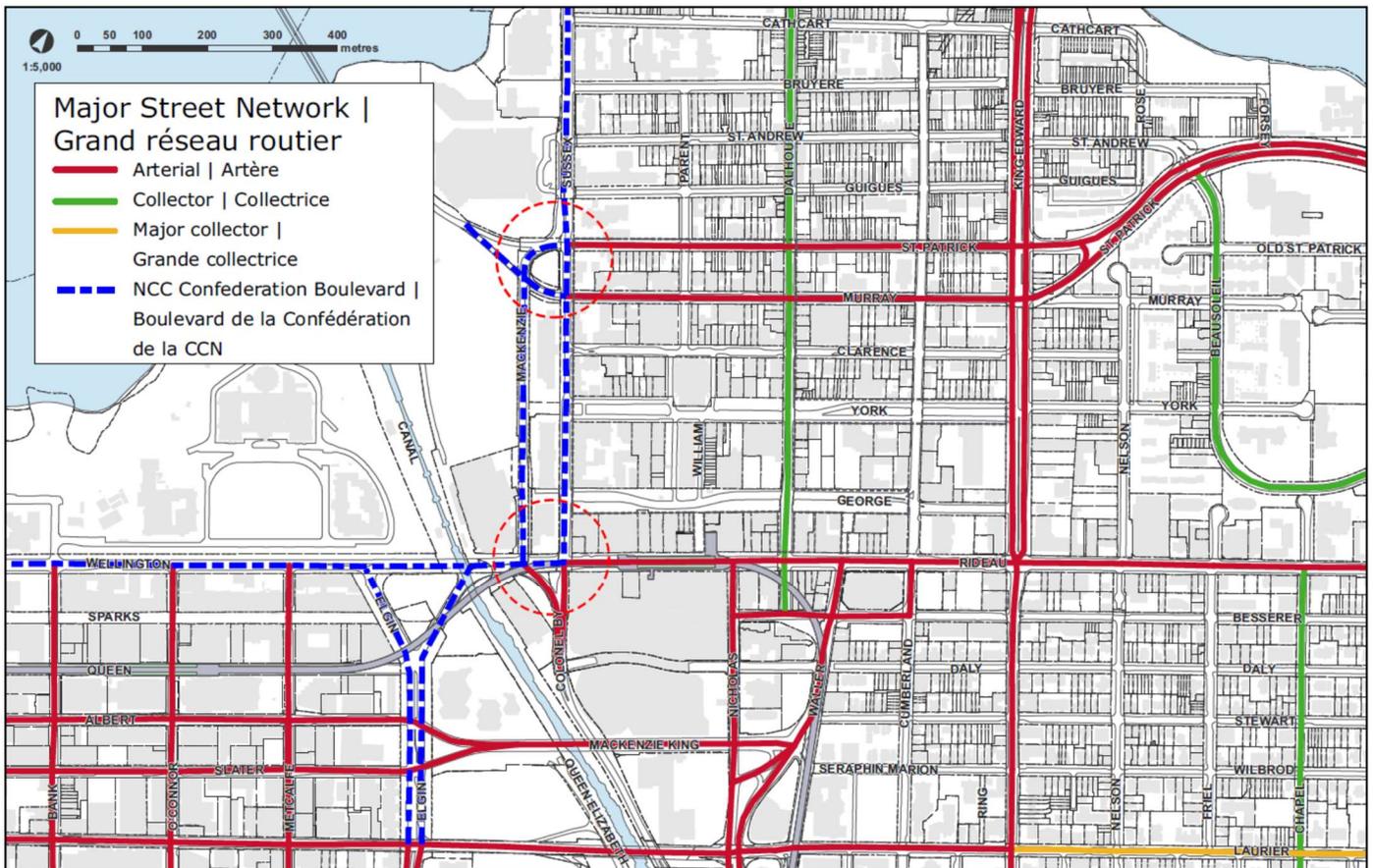


Parent Street is a north-south local road with an unposted speed limit of 50 km/h. Parent Street is a two-way, two-lane roadway with on-street parking provided on both sides of the road throughout the corridor. No transit service or bike lanes are provided along this roadway.



The existing roadway classifications are illustrated in **Figure 11**.

Figure 11: Existing Roadway Classifications



3.7. EXISTING TRAFFIC VOLUMES

The ByWard Market road network not only serves commuter and business-related traffic, but also accommodates significant tourist, shopping, and recreational activity. There is also a growing residential population in the downtown with a range of travel needs. These varying trip purposes impact vehicular activity and associated parking requirements.

The morning and afternoon peak hour traffic volumes within the study area were reviewed to gain an understanding of existing traffic demand patterns within the study area. The existing intersection counts and types of traffic control are illustrated in **Figure 12**.

The existing traffic volumes showed significant vehicular activity along Sussex Avenue, with approximately 1,200 vehicles over two lanes during the afternoon peak hour travelling in the northbound direction. Mackenzie King processes fewer vehicles in comparison, with approximately 750 vehicles over two lanes travelling in the southbound direction during the morning peak hour. St. Patrick Street and Murray Street, both designated as arterials, each process approximately 500 veh/hr over two lanes during the critical peak hour.

Dalhousie Street, designated as a collector road, processes approximately 600 veh/hr in the southbound direction during the morning peak hour, while the remaining local roads within the study area process approximately 100 to 200 veh/hr in the peak direction of travel, with the exception of Cumberland Street which processes approximately 450 veh/hr in the northbound direction during the afternoon peak hour.

In general, the current level of link traffic volumes along the various Design Focus Area streets are at or below roadway capacities, and there appears to be some potential to re-purpose select roadways to pedestrian/cycling facilities.

3.7.1. POTENTIAL WILLIAM STREET CLOSURE

The ByWard Market Public Realm Plan suggests closure of William Street in order to transform this area into a superior pedestrian environment. Time of day deliveries would be allowed (likely in the mornings before 10 am) and emergency vehicle access would be maintained.

The latest available traffic count at the William Street/George Street intersection was conducted on Tuesday December 9, 2014. This count indicates a daily traffic volume of approximately 750 vehicles per day. The peak hour traffic volumes along William Street were as follows:

- Morning peak hour: 52 vehicles
- Afternoon peak hour (peak of adjacent streets): 75 vehicles
- Mid-day peak hour: 106 vehicles

As the latest available traffic counts were completed in the winter when traffic volumes may be expected to be lower, the traffic volumes were adjusted to reflect average annual traffic conditions based on the City's Average Annual Daily Traffic (AADT) adjustment factor for a Tuesday in December (adjustment factor = 1.3). Based on this factor, the estimated traffic volumes along William Street are as follows:

- Morning peak hour: 67 vehicles
- Afternoon peak hour (peak of adjacent streets): 98 vehicles
- Mid-day peak hour: 138 vehicles

The above volumes were verified based on a comparison to previous counts at this intersection that were completed during the summer months and were found to be highly consistent.

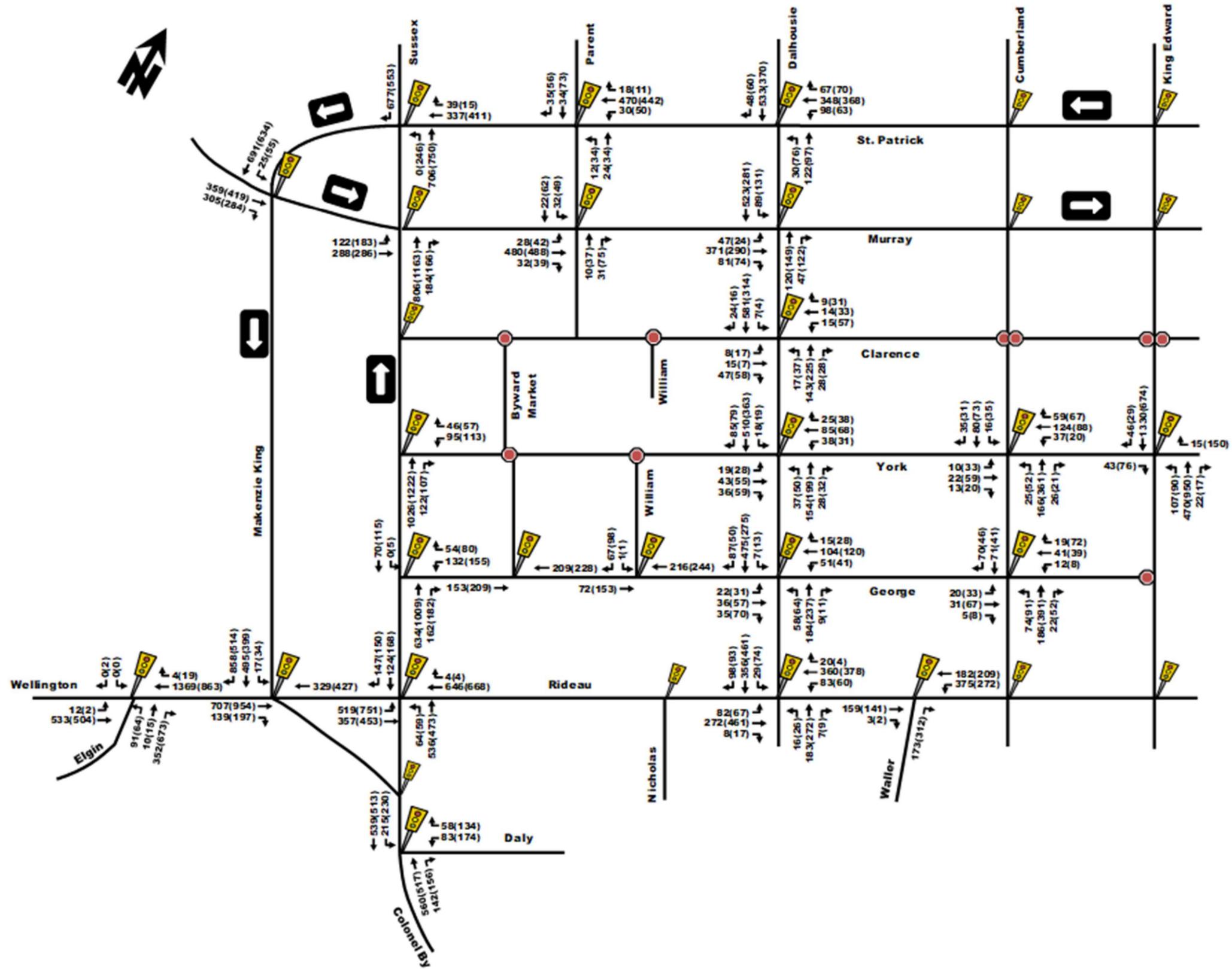
With regards to potential diversion routes associated with the William Street closure, it is expected that area traffic will make one of three additional movements in the ByWard Market area to access George Street:

- From York Street west of Dalhousie Street: an eastbound right-turn at Dalhousie followed by a southbound right-turn at George Street;

- From York Street east of Dalhousie Street: a westbound left-turn at Dalhousie followed by a southbound right-turn at George Street;
- From Dalhousie Street north of York Street: a southbound right-turn at George Street.

It is noted that southbound left-turns from Sussex Street onto George Street are currently prohibited. Preliminary analysis of traffic impacts indicates that there is sufficient capacity at the York Street/Dalhousie Street and Dalhousie Street/George Street intersections to accommodate the volume of diverted traffic.

Figure 12: Intersection Traffic Volumes - AM(PM)

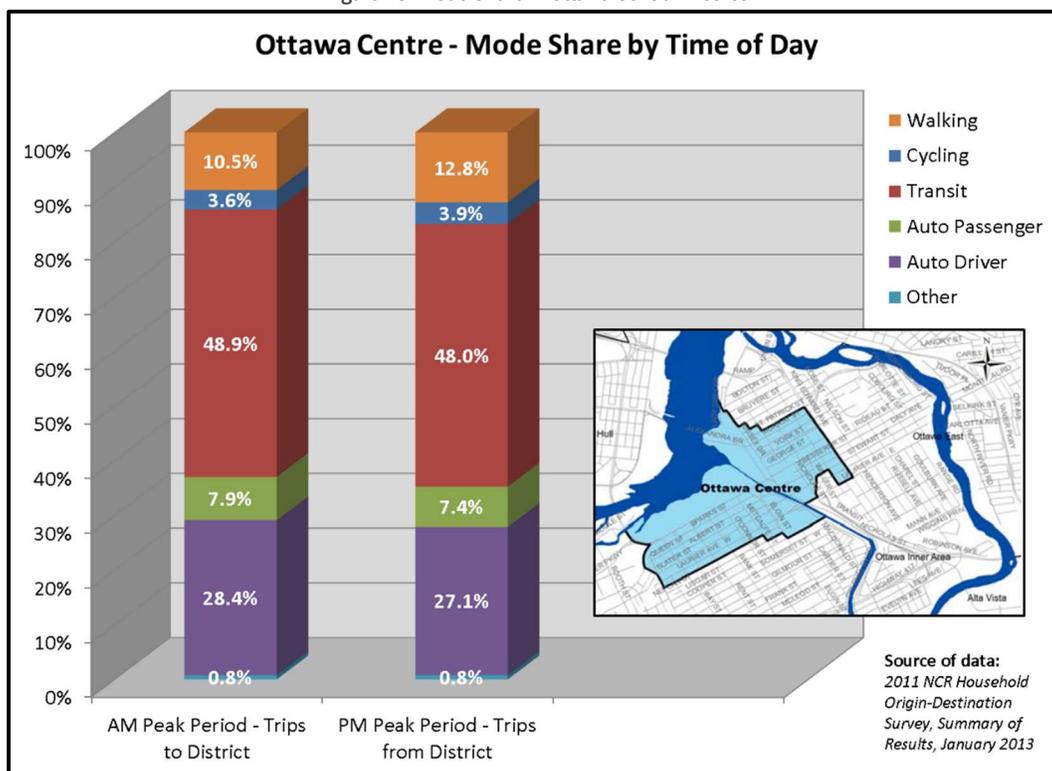


3.8. EXISTING AND FUTURE MODE SHARE

The 2011 Origin-Destination Survey suggests that 71% of trips to Ottawa’s Central District during the morning peak period use sustainable modes, including 49% transit (refer to **Figure 13**).

Although, the City’s 2013 Transportation Master Plan does not provide future mode share targets at a district level, mode split projections provided by City staff suggest that transit will account for 59% of motorized trips to the Central Business District during the 2031 AM peak period (compared to 57% in 2011). The result is a decline in auto driver and auto passenger trips to this area during the AM peak period (from 33% of motorized trips in 2011 to 27% in 2031). Active modes of travel (walking and cycling), are projected to account for 14% of trips in 2031.

Figure 13: Mode Share in Ottawa Central District



3.9. TRUCK ROUTES

During the first Working Group Meeting held November 14th, 2018, local stakeholders identified the location of truck routes within and surrounding the ByWard Market area as a key area of concern, particularly the large number of trucks travelling along King Edward Avenue. The existing truck routes within the study area are illustrated in **Figure 14**. The Heavy Vehicle turning movement counts and percentages of Heavy Vehicle movements are illustrated in **Figure 15**.

The main northbound truck route that connects Highway 417 in Ottawa and Autoroute 5 in Gatineau travels through one of the following two paths:

- Highway 417 / Nicholas Street / Waller Street / Rideau Street / King Edward Avenue / Macdonald Cartier Bridge / Autoroute 5
- Highway 417 / Nicholas Street / Waller Street / Besserer Street / Cumberland Street / Rideau Street / King Edward Avenue / Macdonald Cartier Bridge / Autoroute 5.

The main southbound truck route connecting Highway 417 in Ottawa and Autoroute 5 in Gatineau is as follows:

- King Edward Avenue / Rideau Street / Waller Street / Nicholas Street / Highway 417.

It is noted that trucks/buses are not permitted on Charlotte Street south of Rideau Street.

The existing percentages of heavy vehicles, which include buses, single-unit trucks and articulated trucks, along the main truck routes are provide below. It is noted that although there is a temporary ban of general traffic on Rideau Street between Sussex Drive and Dalhousie Street as part of Stage 1 LRT construction, this is not expected to significantly impact heavy vehicle volumes as the closed section is not designated as a Truck Route. However, the percentage of heavy vehicles along Rideau Street will likely drop as general traffic volumes increase and bus volumes decrease. It is also noted that this section of Rideau Street will be re-opened to general traffic after Stage 1 LRT is complete.

Northbound Truck Route:

- **Waller Street (NBRT):** 35% during the morning peak hour and 11% during the afternoon peak hour
- **Rideau Street (EB):** 50% during the morning peak hour and 20% during the afternoon peak hour
- **Cumberland Street (NB):** 9% during the morning peak hour and 0.7% during the afternoon peak hour
- **King Edward Avenue (NB):** 3.5% during the morning peak hour and 8% during the afternoon peak hour

Southbound Truck Route:

- **King Edward Avenue (SB):** 10% during the morning peak hour and 3% during the afternoon peak hour
- **Rideau Street (WB):** 27% during the morning peak hour and 20% during the afternoon peak hour
- **Waller Street (WBLT):** 25% during the morning peak hour and 15% during the afternoon peak hour

Figure 14: Truck Routes

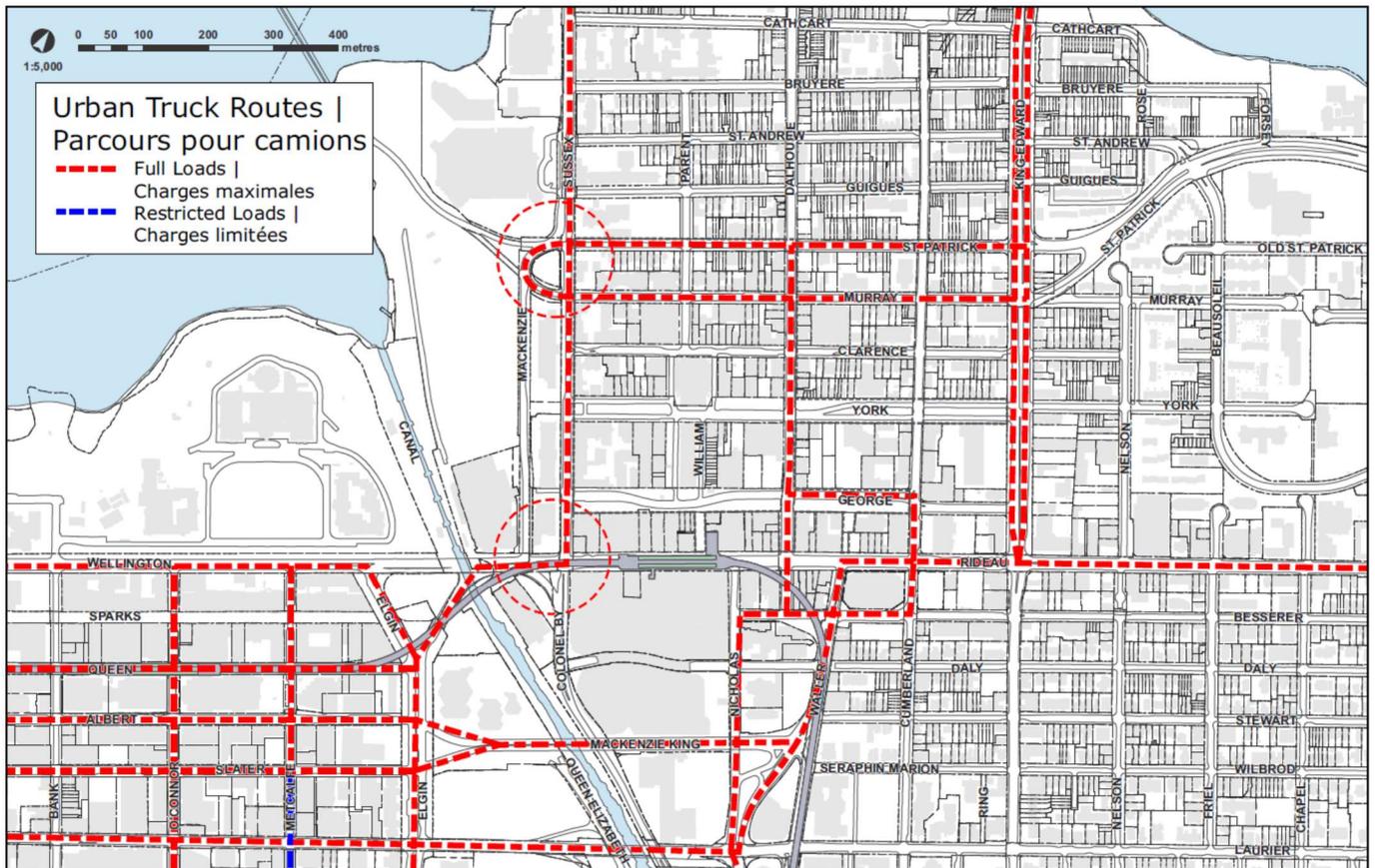
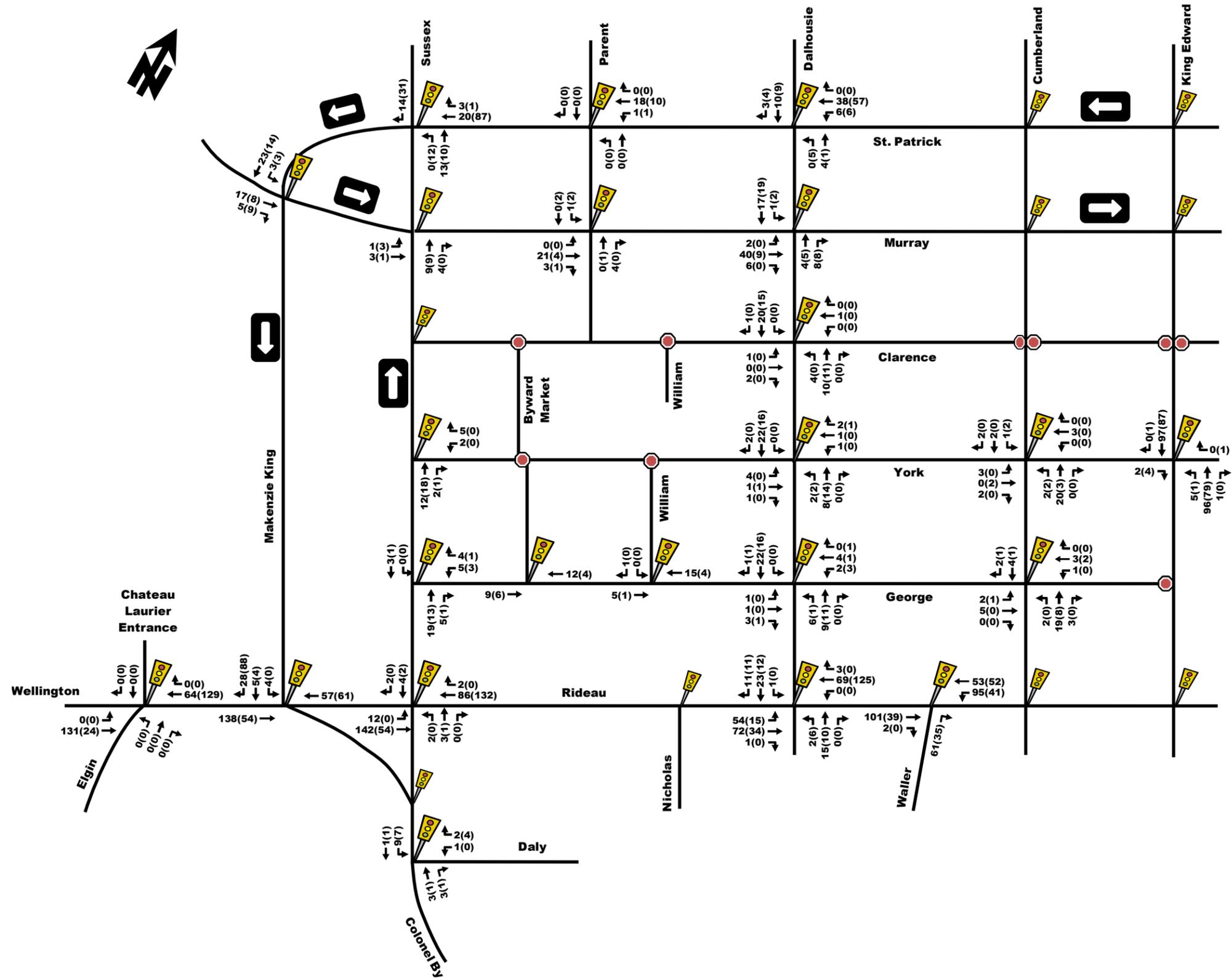


Figure 15: Heavy Vehicle Volumes AM(PM)



3.10. PARKING

As part of the City's LAPS program, parking demand within the ByWard Market has been monitored on a regular basis over the past several years. The latest available on-street parking surveys were completed in Spring and Fall of 2018, however the 2018 surveys did not include a survey of off-street parking spaces.

The latest available parking survey to include both on- and off-street parking spaces was completed in Fall 2017. The Fall 2017 survey also include a comprehensive inventory of on-street and off-street parking spaces and a consumer intercept survey. As such, the results of the Fall 2017 survey were reviewed and are summarized below.

3.10.1. PARKING INVENTORY

The parking supply within ByWard Market falls within the following main general categories:

- Municipally owned paid on-street parking (parking is free after 5 p.m. and on Sundays)
- Municipally owned off-street paid parking lots (70 Clarence and 141 Clarence Garages)
- Privately owned parking open to the public
- Privately owned reserved parking not open to the public (i.e. employee and residential parking)

An inventory of on-street parking spaces was provided by the City in ArcGIS format. Based on this information, there are a total of 656 on-street parking spaces and 4,569 off-street parking spaces, for a total of 5,225 parking spaces within the broader ByWard Market study area. A breakdown of the on- and off-street parking inventory is provided in **Table 2**. The location and capacity of on- and off-street parking spaces within the study area are illustrated in **Figures 16** and **Figure 17**, respectively.

It is noteworthy that a reasonable walking distance for parkers is often defined as a 5-minute walking distance, or approximately 400 m. As shown in **Figure 17**, the majority of the ByWard Market Design Focus Area is within a 5-minute walking distance of the ByWard Market Building, while the broader study area is within a 10-minute walking distance. Thus, it is expected that an excess parking supply in one area of the Market (e.g. a periphery off-street parking lot) may be an acceptable substitute to offset a parking deficiency in most, but not necessarily all, other areas of the Market (e.g. on-street parking spaces along York Street).

Table 2 Parking Supply

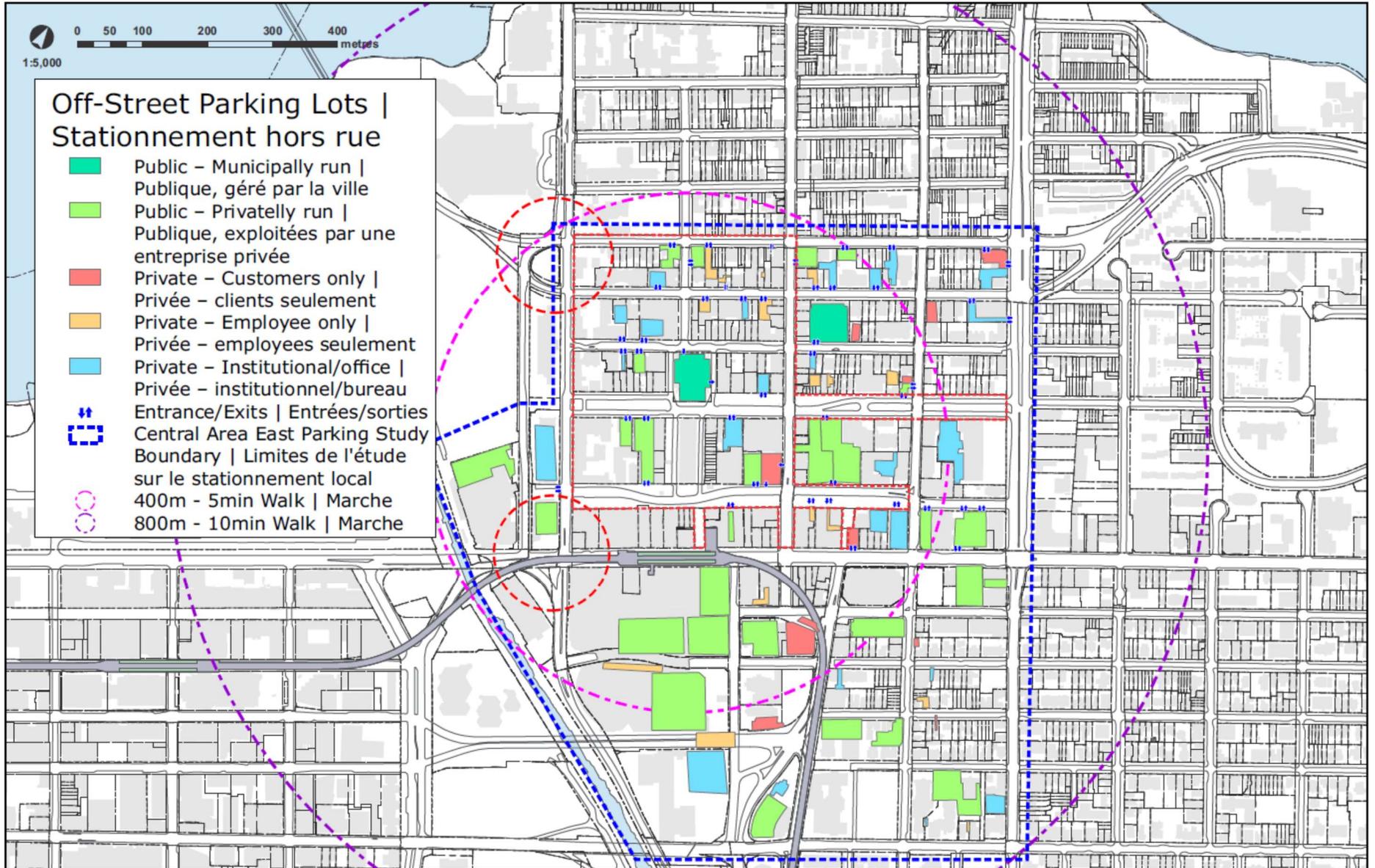
On-Street Parking	
Design Focus Streets	501
Other Study Area Streets	155
Sub-total On-Street Parking	656
Municipal Off-Street Parking	
70 Clarence Street garage (within Design Focus Streets)	289
141 Clarence Street garage (within Other Study Area Streets) ¹	461
Private Off-Street Parking	
Rideau Centre Red and Blue garage (within Other Study Area Streets)	1,130
Other private (within Design Focus Streets)	1,150
Other private (within Other Study Area Streets)	2,289
Sub-total Off-Street Parking	4,569
TOTAL Parking	5,225

¹ 45 parking spaces are reserved

Figure 16: On-street Inventory



Figure 17: Off-Street Inventory



3.10.2. PARKING OCCUPANCY

Parking occupancy surveys can be used to provide an understanding of the following:

- The utilization of the parking supply during different times of the day,
- The times of peak parking demand,
- How long the peak parking demand extends, and
- The areas with the highest parking demand.

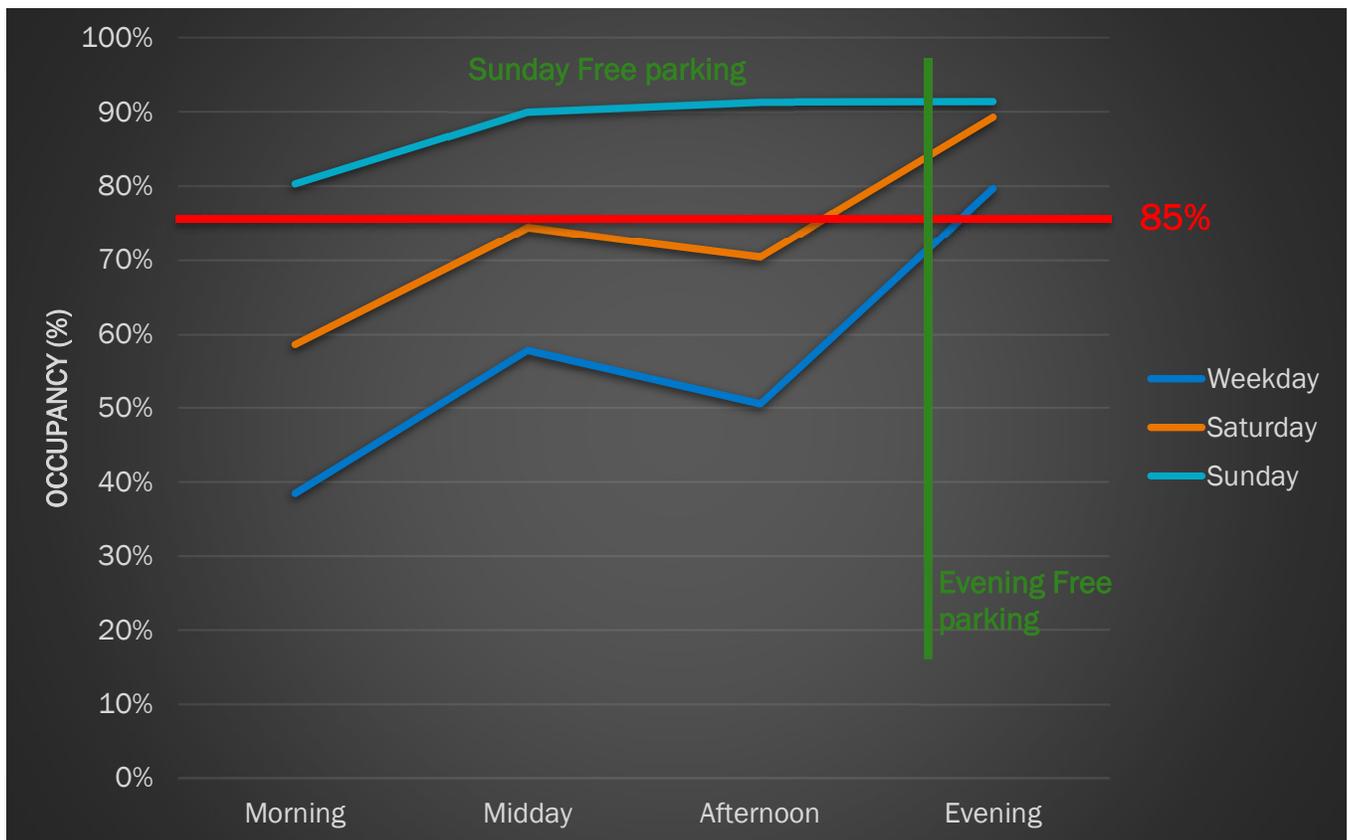
Data collection was completed during a typical weekday, Saturday and Sunday, and over the following four time intervals each day:

- 10:00 a.m. to 11:30 a.m.
- 12:00 p.m. to 1:30 p.m.
- 2:00 p.m. to 3:30 p.m.
- 6:30 p.m. to 8:00 p.m.

Following are the key observations from the City's parking occupancy survey.

The total average on-street parking occupancy rates within the ByWard Design Focus Area, for each of the survey days and times, are illustrated in **Figure 18**. **Figure 18** also illustrates an ideal parking occupancy rate of 85%.

Figure 18: On-street Parking Demand versus Supply



A summary of the survey findings is provided below.

- The weekday day-time on-street parking occupancy rate generally peaks at an occupancy of 58%.
 - *Interpretation:* The above occupancy rate indicates that drivers will generally perceive a high level of ease in finding a parking space on weekdays during the day.
- The weekday evening on-street parking occupancy rate is approximately 80% after 6:00 pm. This is attributed to the fact that parking is free on evenings.
 - *Interpretation:* The above occupancy rate indicates that drivers will generally begin to perceive a high level of difficulty in finding a parking space during weekday evenings.
- The weekend evening on-street parking occupancy rate is approximately 90% after 6:00 pm. This is attributed to the fact that parking is free on evenings.
 - *Interpretation:* The above occupancy rate indicates that drivers will generally perceive a high level of difficulty in finding an on-street parking space during Sundays. As the parking demand has exceeded practical capacity, it is recommended that parking management strategies be implemented.
- The Saturday mid-day and afternoon on-street parking occupancy rate generally ranged between 70% and 75%.
 - *Interpretation:* The above occupancy rate indicates that drivers may begin to perceive some level of difficulty in finding a parking space on Saturdays during the day.
- The Sunday on-street parking occupancy rate was consistently high during all survey time periods, ranging from approximately 80% to 90%. This is attributed to the fact that parking is free on Sundays.
 - *Interpretation:* The above occupancy rate indicates that drivers will generally perceive a high level of difficulty in finding an on-street parking space during Sundays. As the parking demand has exceeded practical capacity, it is highly recommended that parking management strategies be implemented.

Off-street Parking Demand:

The total average off-street public parking occupancy rates within the ByWard Market study area, including the two municipal parking garages located at 70 Clarence and 141 Clarence, are illustrated in **Figure 19**. More detailed information regarding off-street parking occupancy rates at the two municipal owned parking garages, including 8 different surveys between Winter 2016 and Spring 2018, is provided in **Table 3**.

Figure 19: Off-street Parking Demand versus Supply

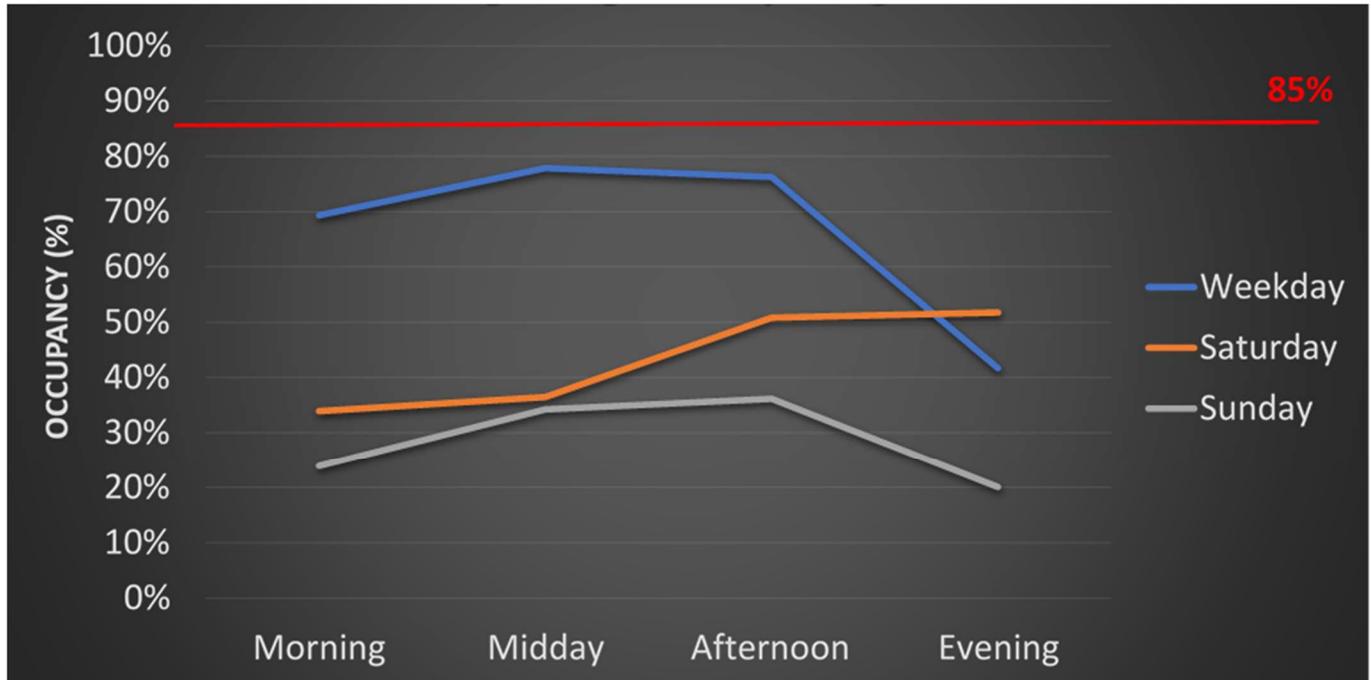


Table 3 - Municipal Parking Garage Occupancy Rates

Lot #	Facility Name	Address	Period	Supply				Occupancy												
				Public	Reserved	Accessible	Car-Share	Weekday Morning	Weekday Midday	Weekday Afternoon	Weekday Evening	Saturday Morning	Saturday Midday	Saturday Afternoon	Saturday Evening	Sunday Morning	Sunday Midday	Sunday Afternoon	Sunday Evening	
4	ByWard Market	70 Clarence	Spring 2018	280	3	6	0	67%	92%	88%	80%	34%	79%	97%	96%	33%	83%	98%	78%	
			Winter 2018	280	3	6	0	66%	85%	77%	35%	26%	43%	57%	70%	11%	35%	42%	21%	
			Fall 2017	281	3	6	0	68%	88%	79%	62%	33%	69%	92%	94%	18%	77%	90%	65%	
			Spring 2017	281	3	6	0	81%	95%	93%	61%	38%	61%	73%	77%	20%	71%	65%	36%	
			Winter 2017	281	3	6	0	83%	98%	88%	58%	29%	48%	54%	69%	9%	43%	47%	30%	
			Fall 2016	281	3	6	0	56%	88%	71%	59%	32%	67%	54%	70%	20%	73%	69%	27%	
			Spring 2016	281	3	6	0													
			Winter 2016	281	3	6	0	62%	85%	80%	45%	35%	44%	50%	60%	20%	39%	39%	43%	
5	Clarence/Dalhousie	141 Clarence	Spring 2018	409	45	6	1	75%	84%	94%	45%	36%	53%	83%	74%	30%	56%	78%	46%	
			Winter 2018	409	45	6	1	66%	74%	76%	37%	35%	42%	49%	45%	24%	29%	31%	25%	
			Fall 2017	409	45	6	1	81%	96%	95%	49%	34%	47%	64%	59%	25%	41%	66%	49%	
			Spring 2017	409	45	6	1	93%	94%	94%	38%	25%	35%	41%	30%	13%	22%	33%	24%	
			Winter 2017	409	45	6	1	94%	95%	88%	32%	28%	40%	40%	34%	14%	23%	22%	17%	
			Fall 2016	409	45	6	1	95%	94%	90%	29%	32%	40%	39%	34%	19%	36%	39%	25%	
			Spring 2016	409	45	6	1	96%	95%	91%	66%	33%	65%	59%	64%	19%	49%	49%	28%	
			Winter 2016	409	45	6	1	76%	86%	86%	28%	25%	30%	30%	26%	15%	15%	16%	17%	

A summary of the survey findings is provided below.

- Based on data provided by the City, there are 260-300k short-term visits per year at the 70 Clarence parking garage.
- **Table 3** indicates that the peak parking occupancy at both municipally owned parking garages on average, is 85-90% during weekdays. In addition, **Table 3** indicates that the peak parking occupancy rates exceed 90% in several surveys. In general, the average peak occupancies at both municipal lots were found to be fairly consistent.
 - *Interpretation:* The short-term affordable off-street parking provided by the two municipal parking garages is at capacity.
- On average, off-street parking lots within the ByWard Market area are approximately 75% utilized on weekdays during the day, and approximately 25-50% utilized on weekends and weekday evenings.
 - *Interpretation:* The excess parking supply at off-street parking garages within the ByWard Market area indicate that, overall, there is some excess parking capacity available in the ByWard Market during peak time periods.

However, although overall parking occupancies are part of the picture, an important distinction between municipal and private off-street parking is that the City’s mandate is to provide short-term, convenient and affordable off-street parking, while private parking lots provide/price their parking according to the market demand.

3.10.3. CONSUMER SURVEY

Consumer face-to-face public opinion surveys were undertaken as part of the Fall 2018 ByWard Market Parking Survey to gain an understanding of the general public perception regarding parking in the area. Within the ByWard Market BIA, a total of 462 surveys were undertaken across the four survey periods. An illustration of select key findings is provided below. The following summary of select findings is also provided:

- On average, approximately 50% of respondents arrived by car, and of those, approximately 50% used off-street parking while 30% used on-street parking.
- On average, approximately 40% of respondents find the parking supply to be adequate.
- The majority of respondents drive due to convenience.
- On average, approximately 50% of respondents find the parking cost to be reasonable.
- On average, approximately 30% of respondents find parking restrictions to be sufficient, while approximately 25% find restrictions to be excessive.

How did you get here today?



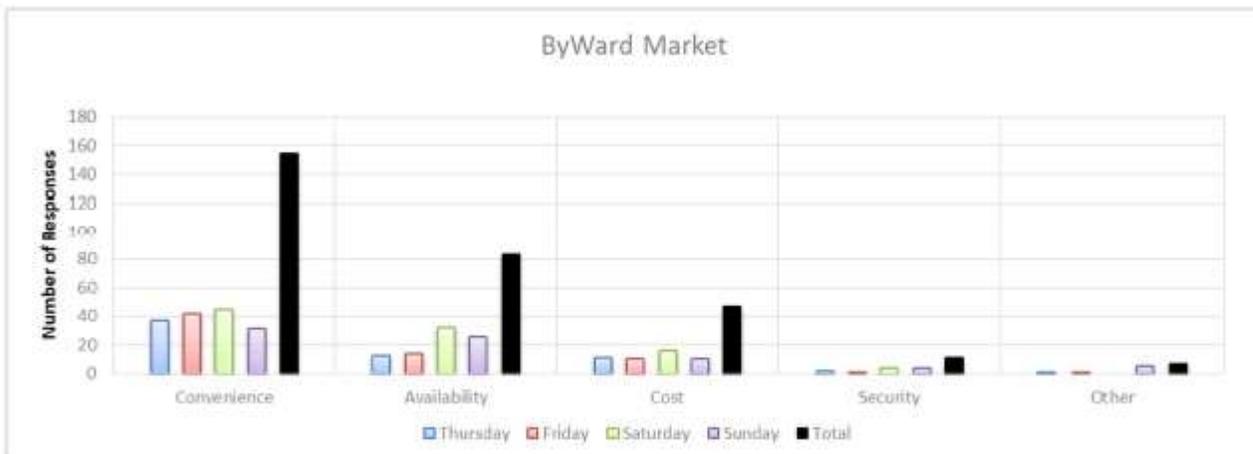
What kind of parking did you use?



Are the number of available parking spaces adequate?



Why did you choose to park here?



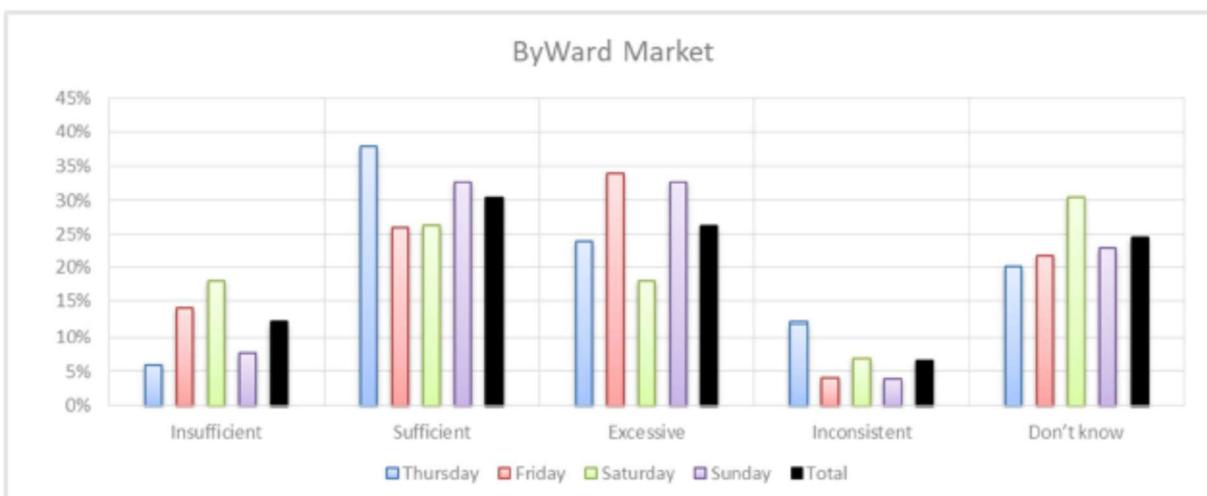
How long did it take you to find parking?



Is the cost of parking reasonable?



Are on-street parking restrictions reasonable?



3.10.4. 70 CLARENCE PARKING GARAGE

Based on the findings presented in the previous section, the potential implications of re—purposing the City's Municipal parking lot located at 70 Clarence is projected to be as follows:

- **Current peak off-street parking demand vs supply within the ByWard Market area :**
 - **Supply:** 4,569 parking spaces
 - **Peak Demand (Weekday afternoon):** 3,472 parking spaces
 - **Peak Occupancy:** 76%
- **Closing 70 Clarence Garage (289 spaces):**
 - **Resulting Supply:** 4,283 parking spaces
 - **Peak Demand (Weekday afternoon):** 3,472 parking spaces
 - **Resulting Peak Occupancy:** 81%

Based on the above, if the parking garage at 70 Clarence were to be removed from the supply, the peak parking occupancy at all off-street parking garages within the ByWard Market area, on average, would still be less than 85%. However, it should be noted that the parking at 70 Clarence is provided by the City of Ottawa as short-term parking very affordable rates ... more affordable perhaps than private sector choices in the area, which may explain its relatively high utilization. Should the parking garage be removed, the City should explore opportunities to replace the approximately 300 space supply, and this may include choices that result in short-term and affordable parking. If the garage is replaced on-site (such as in a below-grade structure), access should be provided on Clarence Street (opposite Parent Street), and/or perhaps on York Street (opposite William Street). If replaced elsewhere in the area, locations on Arterial or Collector streets would be favoured over those on local streets.

3.11. ROAD SAFETY

Five years of collision data for the study area network was obtained from the City of Ottawa (2013 to 2017, inclusive). Analysis showed that most collisions (79%) involved only property damage, which generally indicates low travel speeds at impact, while 20% involved personal injuries. The remaining 1% were identified as “non-reportable”, indicating the total damage to a vehicle was less than \$1,000. One fatality involving a pedestrian and Truck and trailer occurred at the Rideau/Waller intersection on February 21, 2014 (vehicle turning left).

The primary causes of collisions cited by police include; sideswipe (27%), rear end (23%), angle (18%), and turning movement (14%) type collisions. The source collision data as provided by the City of Ottawa and related analysis is provided as **Attachment 1**.

A standard unit of measure for assessing collisions at an intersection is based on the number collisions per million entering vehicles (MEV). At intersections within the study area, reported collisions have historically taken place at a rate of:

- 0.31/MEV at the ByWard Market/George intersection;
- 0.64/MEV at the Clarence/Dalhousie intersection;
- 0.50/MEV at the Colonel By/Mackenzie/Daly intersection;
- **1.15/MEV at the Colonel By-Sussex/Rideau intersection;**
- 0.86/MEV at the Cumberland/George intersection;
- **1.04/MEV at the Cumberland/York intersection;**
- **1.31/MEV at the Dalhousie/Murray intersection;**
- **1.46/MEV at the Dalhousie/Rideau intersection;**
- **1.08/MEV at the Dalhousie/St. Patrick intersection;**
- 0.98/MEV at the Dalhousie/York intersection;
- 0.44/MEV at the Elgin/Wellington/Rideau intersection.
- **1.68/MEV at the George/Dalhousie intersection;**
- 0.34/MEV at the George/Sussex intersection;
- 0.44/MEV at the George/William intersection;
- 0.28/MEV at the King Edward/York intersection;
- 0.33/MEV at the Mackenzie/Murray intersection;
- **1.16/MEV at the Mackenzie/Rideau intersection;**
- 0.52/MEV at the Murray/Parent intersection;
- 0.69/MEV at the Murray/Sussex intersection;
- **1.84/MEV at the Parent/St. Patrick intersection;**
- **2.09/MEV at the Rideau/Waller intersection;**
- 0.46/MEV at the St. Patrick/Sussex intersection;
- 0.26/MEV at the Sussex/York intersection; and,

Intersections where the collisions per million vehicles ratio exceeds 1.0 are generally identified as areas of concern. Based on the results presented above, there are nine (9) intersections where the collisions per million vehicles ratio exceed 1.0 during the past 5-years. The most frequent type of collisions at these intersections is summarized below in **Table 4**.

Table 4: High Collision Intersections

Location	Number of Collisions (5-year period)	Most Frequent Collision Type and Direction of Vehicle
Colonel By-Sussex/Rideau	65	Sideswipe, eastbound
Mackenzie/Rideau	51	Angle, south and eastbound
Dalhousie/Rideau	48	Turning Movement, westbound
Rideau/Waller	43	Sideswipe, westbound
George/Dalhousie	37	Rear End, northbound
Dalhousie/Murray	33	Sideswipe, eastbound
Dalhousie/St. Patrick	26	Turning Movement, westbound
Parent/St. Patrick	26	Turning Movement, westbound
Cumberland/York	16	Angle, southbound

Regarding pedestrian and cycling collisions within the 5-years of recorded collision data, there were 53 collisions involving pedestrians and 25 collisions involving cyclists, for a total of 78 collisions involving vulnerable road users. All of these accidents resulted in property damage only or non-fatal injuries, with the exception of the previously mentioned fatal injury involving a pedestrian at the Rideau/Waller intersection. The list below shows the number and location of collisions involving pedestrian and cyclists within the study area.

Collisions involving pedestrians

- Clarence/Dalhousie (4);
- Colonel By-Sussex/Rideau (3);
- Cumberland/George (2);
- Dalhousie/Murray (4);
- **Dalhousie/Rideau (12);**
- Dalhousie/St. Patrick (1);
- Dalhousie/York (3);
- **George/Dalhousie (7);**
- George/Sussex (1);
- King Edward/York (2);
- Mackenzie/Rideau (1);
- Murray/Parent (1);
- Murray/Sussex (2);
- Parent/St. Patrick (3); and,
- **Rideau/Waller (7 with 1 fatal).**

Collisions involving cyclists

- ByWard Market/George (1);
- Clarence/Dalhousie (1);
- Colonel By/Mackenzie/Daly (1);
- Colonel By-Sussex/Rideau (2);
- Cumberland/George (1);
- Cumberland/York (1);
- Dalhousie/Murray (1);
- Dalhousie/Rideau (2);
- Dalhousie/St. Patrick (2);
- Dalhousie/York (1);
- Elgin/Wellington/Rideau (1);
- George/William (1);
- Murray/Parent (2);
- Murray/Sussex (2);
- Parent/St. Patrick (1);
- St. Patrick/Sussex (2); and,
- Sussex/York (2).

The intersections with the highest number of collisions involving vulnerable road users are listed below. These intersections were also listed among the 9 intersections with the highest vehicle collision rates identified in **Table 3**.

- Dalhousie Street / Rideau Street
- George Street / Dalhousie Street
- Rideau Street / Waller Street

City staff are currently in the process of evaluating a number of intersections across the City for pedestrian safety, as part of the Pedestrian Safety Evaluation Program (PSEP). Locations that are being analyzed are intersections with 6+ pedestrian collisions (involving injuries) in the past 5 years, or a combination of a fatal collision plus 3 or more injury collisions. The above three listed intersections are currently being assessed as part of the PSEP.

It is also noteworthy that 38 out of the total 78 collisions involving pedestrians or cyclists within the most recent 5-year period (i.e. almost 50%) occurred along Dalhousie Street. Of these collisions, 25 occurred as a vehicle was turning left or right in any cardinal direction. As Dalhousie Street can be considered a transition zone from a more vehicle-focused environment to a pedestrian-focused environment, it is recommended that improvements be implemented to enhance the safety of active modes using this street. Measures to be considered should help reduce turning speeds at intersections.

3.12. CURB-SIDE USES

The curb-side uses along all Design Focus Streets are illustrated in **Figure 20** (following page).

Some observations regarding curb-side uses include:

- Taxi stands are positioned within close proximity to the York / Dalhousie intersection, in addition to the ByWard Market building entrance.
- Loading zones are mostly located around the ByWard Market building (i.e. along ByWard Market Street and William Street), and along York Street.
- An Emergency Medical Service Zone is centrally located along Clarence Street between ByWard Market Street and William Street.

Ride-sharing/Ride-hailing services also use curb-side space in an informal (i.e. unregulated) manner. Data from Uber was provided which illustrates existing activity (November, 2018) within the study area. Currently, Uber pick-up and drop-off activity occurs throughout the ByWard Market area, with George, York, Clarence and Dalhousie Streets appearing to see the greatest volume of activity. Although data on the specific number of pick-ups and drop-offs was not provided, volumes generally peak in the late evening and early overnight period (11 p.m. – 2 a.m.) on Fridays and Saturdays. This time period generally matches the operating hours of entertainment and bar/restaurant establishments in the ByWard Market area and reflects lack of alternative transportation options (e.g. public transit) available during this time period. **Figures 21** to **Figure 23** illustrate existing Uber pick-up and drop-off activity in the vicinity of the study area.

Figure 20: Curb-side Uses

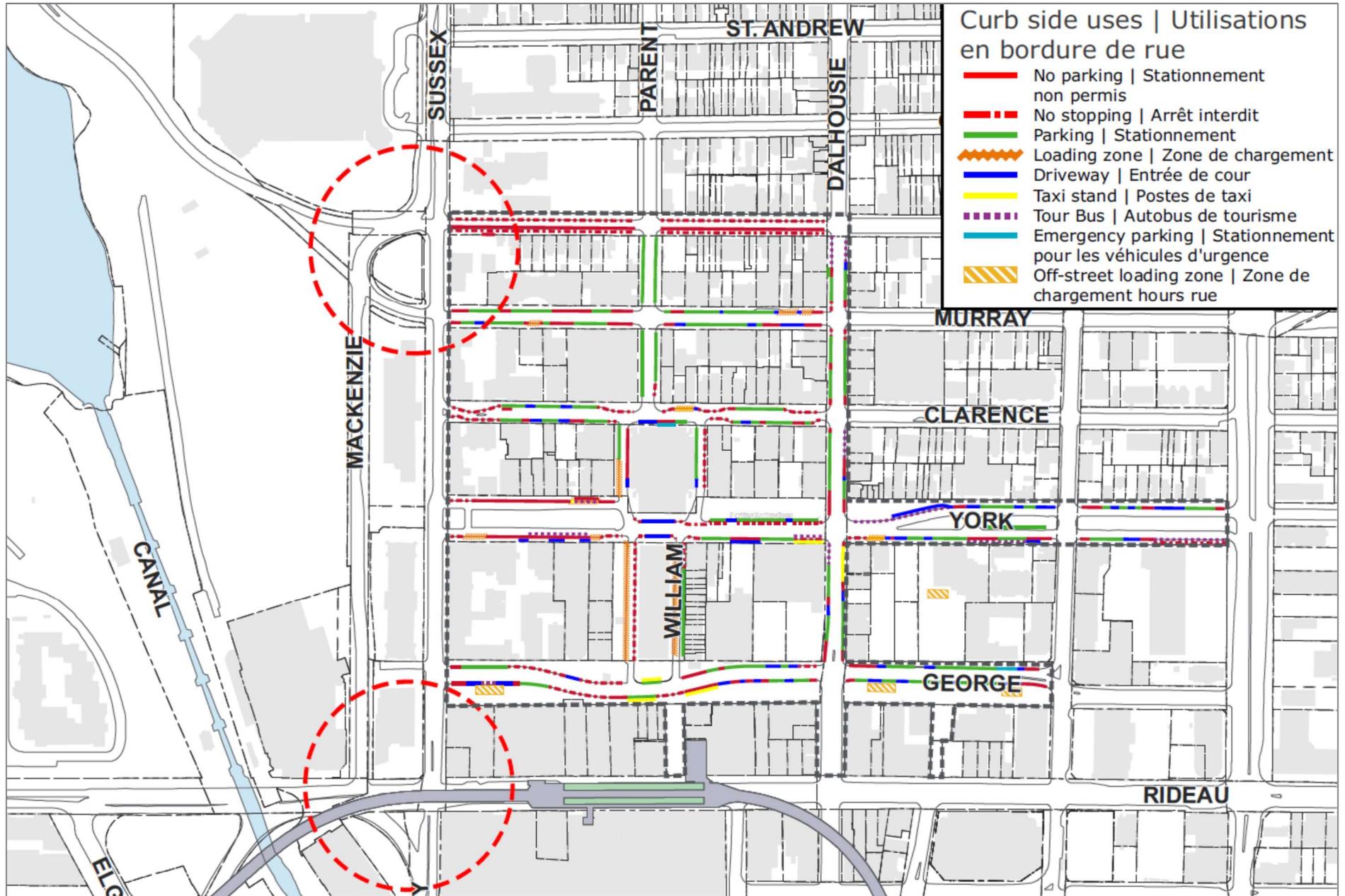


Figure 21: ByWard Market Uber Drop-off Activity

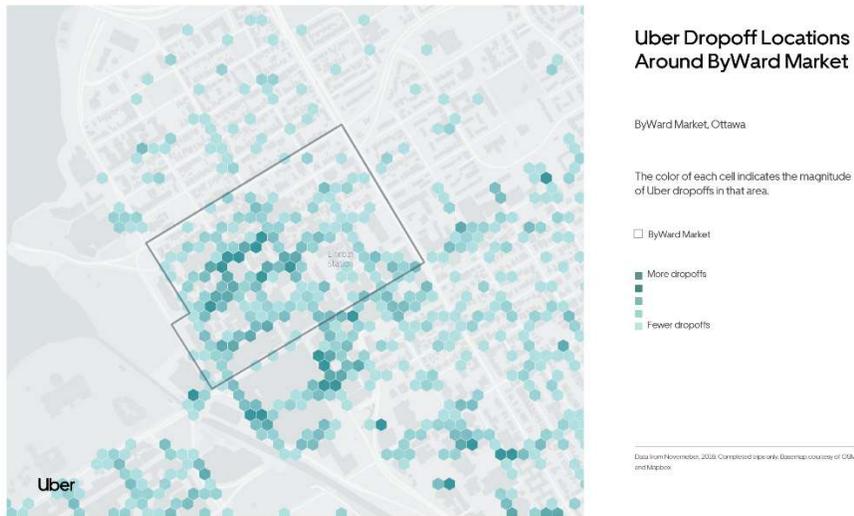


Figure 22: ByWard Market Uber Pick-up Activity

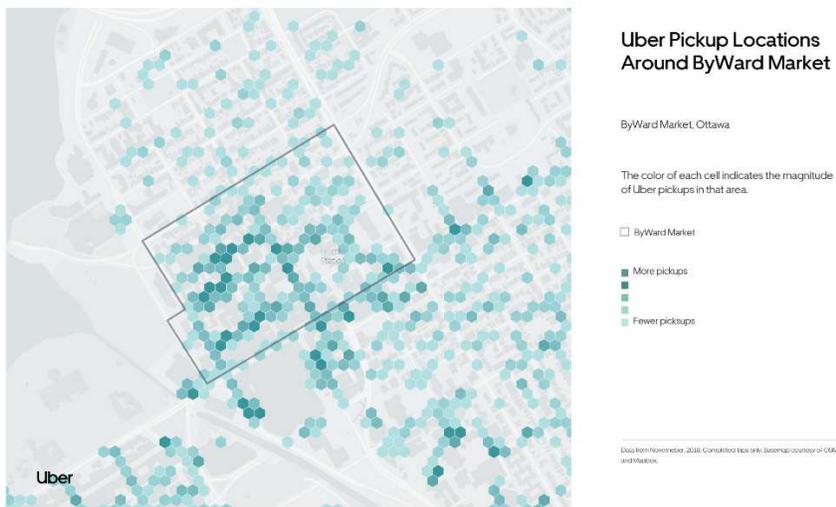
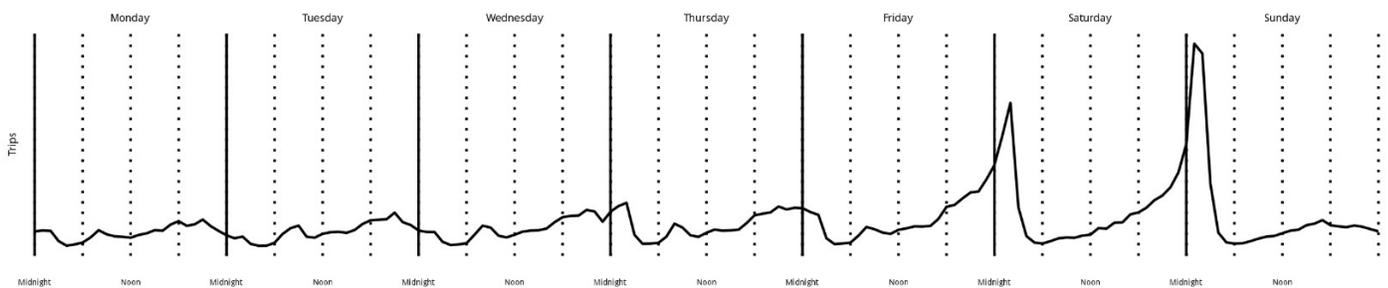


Figure 21: ByWard Market Uber Pick-ups/Drop-offs Per Hour



3.13. TOUR BUS STOPS

Tour bus parking in particular is a key requirement in downtown Ottawa. **Figure 24** presents a map of tour bus parking and pick-up/drop-off locations provided on the City’s website. As shown in both **Figure 20** and **Figure 24**, tour buses are mostly concentrated around the intersections of York / Dalhousie and York / Cumberland.

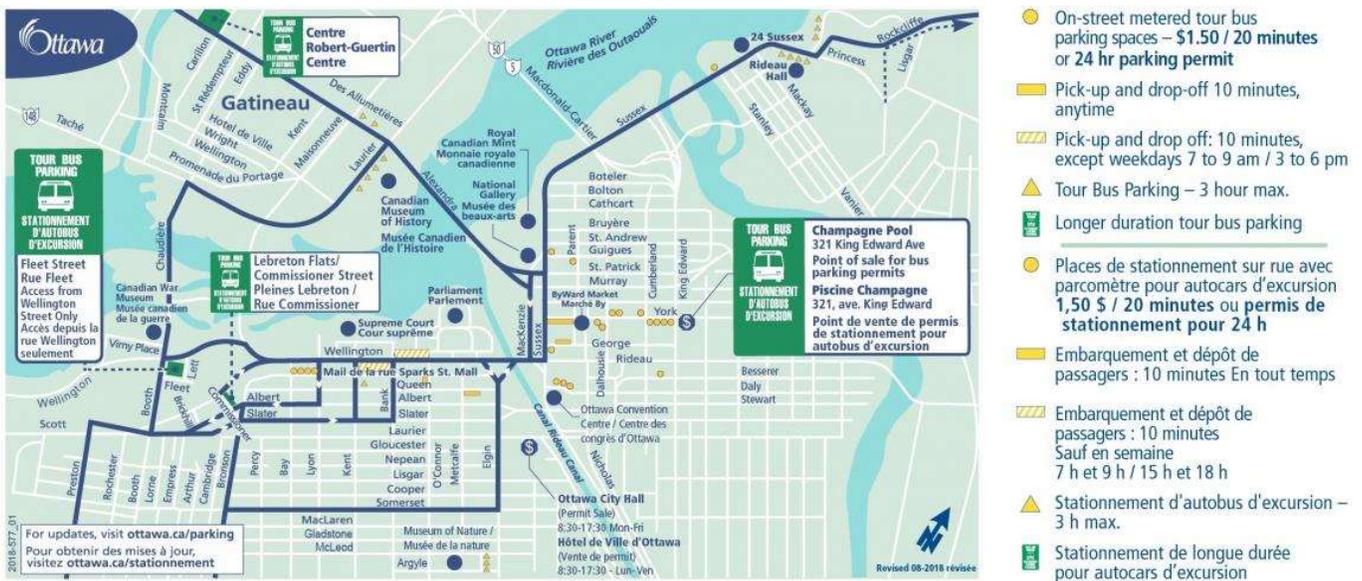
The 2013 version of the City’s Tour Bus Study analyzed the appropriateness of tour bus parking locations, their occupancy rates as well as pick-up/drop-off and excursion loading zones used by tour buses within the Ottawa/Gatineau area.

The Study concluded that the utilization of designated tour bus parking is generally below capacity. This is demonstrated through data collection and analysis of 31 tour bus parking, loading and pick-up/drop-off zones, from July to October 2012. This information contrasted with the common perception from tour bus drivers, as obtained from interviews, that there is a shortage of Tour Bus parking spaces, especially in the ByWard Market area.

The parking locations with the highest average occupancy rates were on Wellington Street near Parliament Hill, in the ByWard Market, and in Gatineau, Quebec. Some key considerations as it relates to the ByWard Market Public Realm Plan include:

- The tour bus pick-up/drop-off location at 35 George Street had the second highest average occupancy rate (44%). This location is immediately east of the Clarence Court pedestrian courtyard, not blocking pedestrian access. The Study concluded that eliminating this location should be carefully considered, and further investigation should be conducted.
- The study recommended further investigation to observe potential opportunities for shared use parking/curb side use between tour buses and taxis (for example, tour bus parking daytime, taxi zone at night) on York Street, between Dalhousie and Cumberland streets.
- Maintain the tour bus parking space along the south side of York Street, near Dalhousie, as it recorded the fourth highest average occupancy rate.

Figure 24: Tour Bus Parking Locations and Pick-up/Drop-off Locations



3.14. RIGHT-OF-WAY ASSESSMENT AND UNDERGROUND UTILITIES

Table 5 provides a breakdown of roadway right-of-way (ROW) for all Design Focus Area streets. Key observations are summarized below:

- The ROWs along St. Patrick, Murray, and Clarence streets are all generally just under 20m wide. This includes two travel lanes (usually under 11m in total) and sidewalks on both sides of the street which vary in size from 3m to almost 6m wide.
- Dalhousie Street's ROW is much wider at George Street (approximately 25m) when compared to its northerly cross-section (approximately 19m). Similar to other streets within the Design Focus Area, Dalhousie Street's sidewalks vary in width from 2.6m to 4.3m.
- George and York streets have the widest ROWs within the Design Focus Area, as follows:
 - York Street's ROW between Sussex Drive and King Edward Avenue is approximately 40m wide, with the exception of the section between ByWard Market Square and William Street which is 25 m. The 40m ROW segments are comprised of two travel lanes with a median which is used as a pedestrian area (close to the Sussex Drive intersection) and surface car parking. Sidewalks vary but are generally approximately 4.5m wide; and
 - George Street's ROW between Sussex Drive and King Edward Avenue ranges from approximately 36m to 40m wide and is comprised of two travel lanes with varying sidewalk widths as a result of off-street loading areas and public realm plazas / public gathering places.

Table 5 Roadway Right-of-way

Road	From	To	ROW	Classification	Sector
Rideau	Sussex	King Edward	30	Arterial	Urban
Dalhousie	St. Patrick	George	19	Collector	Urban
	George	Rideau	24	Collector	Urban
St. Patrick	Sussex	Dalhousie	20	Arterial	Urban
Murray	Sussex	Dalhousie	20	Arterial	Urban
Clarence	Sussex	Dalhousie	19	Local	Urban
York	Sussex	ByWard Market Square	40	Local	Urban
	ByWard Market Square	William	25		
	William	King Edward	40		
George	Sussex	ByWard Market Square	39	Local	Urban
	ByWard Market Square	Dalhousie	36		
	Dalhousie	Cumberland	38		
Parent	St. Patrick	Clarence	20	Local	Urban
William and ByWard Market Square	Clarence	York WB	79	Local	Urban
	York WB	York EB	59	Local	Urban
	York EB	George	62	Local	Urban

The location of underground utilities is presented in *Technical Memorandum #1 Part 2: Utility Infrastructure*. The location of underground utilities will be considered in the selection of the above-ground layout.

4. CYCLING FACILITY SELECTION

The Ottawa Cycling Plan includes a bicycle facility selection tool based on daily traffic volumes and 85th percentile operating speeds. The available average annual daily traffic volumes and estimated operating speeds (based on posted speed limits) along each of the Design Focus Streets is summarized in **Table 6** below. The implementation of the City of Ottawa selection tool is illustrated in **Figure 25**.

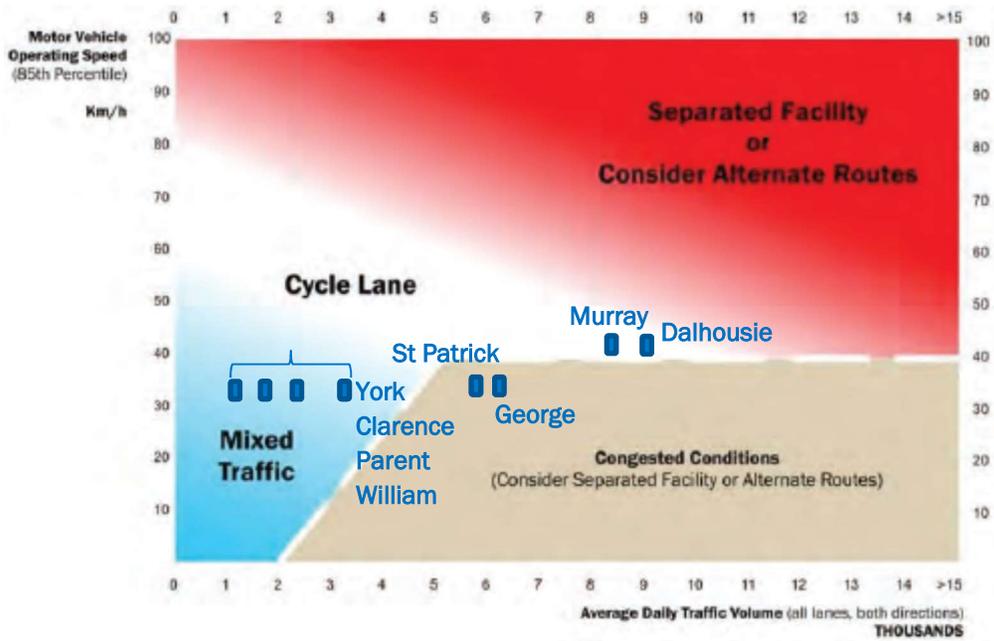
Based on the nomograph, separated cycling facilities or alternative routes may be considered at George Street, Murray Street, St. Patrick Street and Dalhousie Street as a result of congested conditions (as evidenced by low vehicle speeds). However, in the particular situation of the ByWard Market, separated cycling facilities are not considered warranted as low vehicle speeds are a desired outcome of the future intended design of ByWard Market streets. It is expected that the proposed designs will include measures to improve cycling conditions within a shared-use environment, other than St. Patrick and Murray Streets where uni-directional cycle tracks are envisioned along these designated Spine Routes. Uni-directional cycle tracks could also be evaluated as an option along York Street for one or two of the blocks east of Dalhousie Streets, considering the Local Route designation of this Street. This would be particularly relevant if the City was contemplating adding east-west bike-only connectivity across the intersection of York Street with King Edward Avenue (as opposed to the walk and dismount situation that exists).

In addition, a new southbound cycling route is being planned by the City along ByWard Market Square between Clarence Street and York Street. Today, ByWard Market Square is open for northbound movements only. Providing for the southbound movement on this short connecting street via a contra-flow bike lane would enable connectivity to the core of the ByWard Market for eastbound cyclists on Murray Street (and hence those originating from both Sussex Drive and the Alexandra Bridge). Otherwise, cyclists would need to walk and dismount along this portion of ByWard Market Square.

Table 6: Bicycle Facility Selection Tool Inputs

Roadway	AADT (veh/day)	Desired Operating Speed (km/h)
George St (Sussex to Cumberland)	6,157	30 km/h
York St (Sussex to King Edward)	3,176	30 km/h
Clarence St (at Dalhousie)	1,839	30 km/h
Murray St (Mackenzie to Dalhousie)	8,332	40 km/h
St. Patrick St (Sussex to Dalhousie)	5,823	40 km/h
Parent Ave (St. Patrick to Murray)	2,100	30 km/h
William St (at George)	1,290	30 km/h
Dalhousie St (St. Patrick to Rideau)	9,256	40 km/h

Figure 25: City of Ottawa Cycling Plan Bicycle Facility Selection Tool



5. TRAFFIC CALMING

The City of Ottawa’s Area Traffic Management (ATM) Guidelines provide screening criteria and thresholds for determining when an ATM study should be undertaken and when ATM improvements may be justified to address neighbourhood traffic concerns. Although the screening criteria are not intended as a warrant for traffic calming and do not imply that traffic calming would not be beneficial on streets that do not meet the criteria (e.g. locations designated as cycling routes without segregated facilities), the criteria were applied as a high-level tool to identify any areas within the market that are in particular need for speed management measures. The traffic related screening criteria specified in the ATM guidelines are presented in **Table 7**.

Table 7: Criteria for Assessing Project Need based on the City’s ATM Guidelines

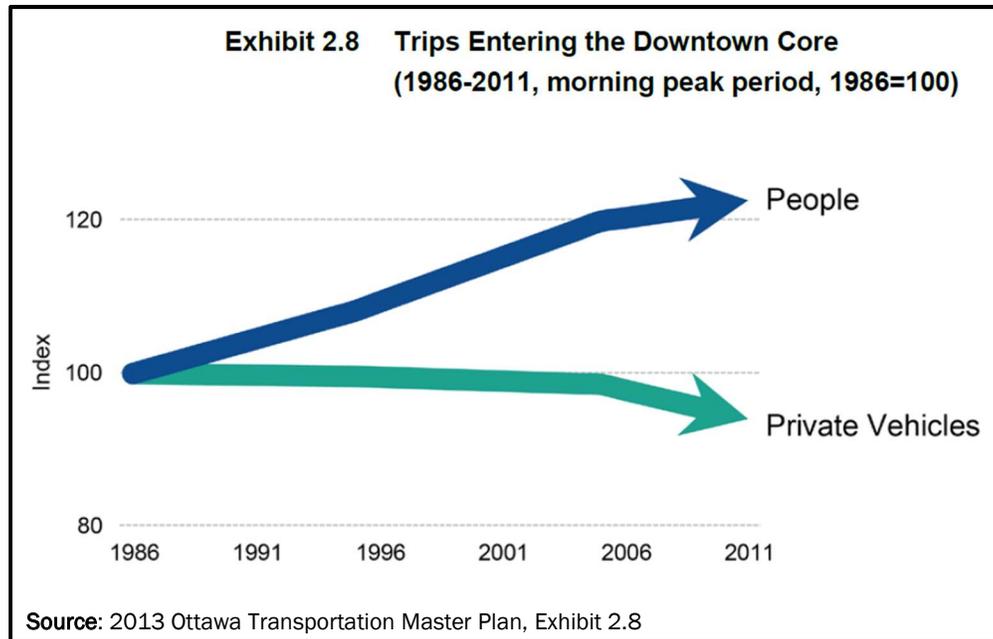
Criteria	Threshold <i>(Collector road, 50 km/hr posted speed limit)</i>
Traffic Volume	Exceeds 300 veh/hr during peak conditions
Through Traffic	Exceeds 20% of the total traffic volume
Traffic Speed	85 th percentile speed at or above 50 km/hr or 95 th percentile speed at or above 60 km/hr

Based on the Traffic Volume screening criterion, none of the Design Focus Street meet the ATM program traffic calming criteria as none of the local/collector roads have peak hour traffic volumes that exceed 300 veh/hr. Nonetheless, it is recommended that integrated speed management measures be considered in proposed designs in order to improve safety for all road users, particularly pedestrians and cyclists. It is also noted that although St. Patrick Street and Murray Street are designated as arterials, the Secondary Plan - Central Area (2003) had recommended the introduction of a coordinated program of traffic calming, tree planting, paving and street furniture along Murray and St. Patrick streets.

6. FUTURE TRAFFIC VOLUMES

The City of Ottawa Transportation Master Plan (2013) shows a reduction in vehicle trips to the downtown between 2006 and 2011 despite an increase in the number of people arriving downtown, as illustrated in **Figure 26**. This trend is supported by TMP policies and is expected to continue into the future. As such, a vehicular traffic growth rate of 0% will be applied for the purposes of the ByWard Public Realm study. This is consistent with the approach employed in the *Sussex-Rideau-Colonel By Node Transportation Impact Study*.

Figure 26: Trips Entering the Downtown Core (1986 to 2011)



7. SUMMARY AND ADDITIONAL ANALYSIS

A summary of recommendations to be considered within the ByWard Market area, as presented in this memorandum, is provided below:

- Consider potential opportunities to re-purpose select roadways to pedestrian/cycling facilities (e.g. William Street);
- Consider potential opportunities to reduce vehicle lane capacity and/or on-street parking within the vicinity of the LRT Station in order to widen sidewalks;
- Consider opportunities to improve the pedestrian and cycling environment along Dalhousie Street in order to enhance safety. Measures to be considered should help reduce turning speeds at intersections;
- Implement uni-directional cycle tracks on Murray Street and St. Patrick Street;
- Consider uni-directional cycle tracks on York Street east of Dalhousie Street;
- Implement a contra flow bike lane on ByWard Market Square between Clarence Street and York Street;
- Implement measures to enhance cycling conditions within a mixed-traffic environment on other streets;
- Implement integrated speed management measures as part of road design;
- Consider potential on-street parking management strategies (e.g. paid parking during Sundays);
- Identify opportunities to replace off-street parking spaces as a result of the potential re-purposing of the 70 Clarence Street municipal parking garage including the exploration of creative solutions with area private sector developments and redevelopments, if required; and
- Consider implementation of additional bike parking spaces in strategic areas including:
 - ByWard Market Square between George Street and Clarence Street, and
 - George Street between Cumberland Street and Dalhousie Street.

Technical Memorandum #2 will primarily focus on the assessment of existing and proposed road network scenarios at the two gateway nodes. Recommended road network scenarios to be assessed will include removal of the MacKenzie Ramp (Wellington to Colonel By), in addition to removal of the Sussex Drive/St. Patrick Street southbound-right and westbound-through slip lanes. *Technical Memorandum #2* will also include a zebra crossing warrant assessment at high-demand pedestrian crossing locations and identification of sidewalks with sub-standard widths.

Attachment 1
Collision Analysis

Total Area

Classification of Accident	Rear End	Turning Movement	Sideswipe	Angle	Approaching	Single Vehicle (other)	Single vehicle (Unattended vehicle)	Other	Total
P.D. only	103	64	137	78	0	18	10	13	423
Fatal injury	0	0	0	0	0	1	0	0	1
Non-fatal injury	20	13	6	16	0	52	0	2	109
Non-reportable	1	0	1	1	0	0	0	0	3
Total	124	77	144	95	0	71	10	15	536

79%
0%
20%
1%
100%

#2 or 23% #4 or 14% #1 or 27% #3 or 18% #8 or 0% #5 or 13% #7 or 2% #6 or 3%

BYWARD MARKET / GEORGE ST

Years	Total # Collisions	24 Hr AADT Veh Volume	Days	Collisions/MEV
2013-2017	3	5,355	1825	0.31

Classification of Accident	Rear End	Turning Movement	Sideswipe	Angle	Approaching	Single Vehicle (other)	Single vehicle (Unattended vehicle)	Other	Total
P.D. only	1	0	0	0	0	0	1	0	2
Non-fatal injury	0	1	0	0	0	0	0	0	1
Non-reportable	0	0	0	0	0	0	0	0	0
Total	1	1	0	0	0	0	1	0	3

67%
33%
0%
100%

33% 33% 0% 0% 0% 0% 33% 0%

CLARENCE ST / DALHOUSIE ST

Years	Total # Collisions	24 Hr AADT Veh Volume	Days	Collisions/MEV
2013-2017	12	10,328	1825	0.64

Classification of Accident	Rear End	Turning Movement	Sideswipe	Angle	Approaching	Single Vehicle (other)	Single vehicle (Unattended vehicle)	Other	Total
P.D. only	4	1	1	0	0	0	1	0	7
Non-fatal injury	0	0	1	0	0	4	0	0	5
Non-reportable	0	0	0	0	0	0	0	0	0
Total	4	1	2	0	0	4	1	0	12

58%
42%
0%
100%

33% 8% 17% 0% 0% 33% 8% 0%

COLONEL BY DR/MACKENZIE AVE / DALY AVE

Years	Total # Collisions	24 Hr AADT Veh Volume	Days	Collisions/MEV
2013-2017	20	22,002	1825	0.50

Classification of Accident	Rear End	Turning Movement	Sideswipe	Angle	Approaching	Single Vehicle (other)	Single vehicle (Unattended vehicle)	Other	Total
P.D. only	10	0	7	0	0	0	0	0	17
Non-fatal injury	2	1	0	0	0	0	0	0	3
Non-reportable	0	0	0	0	0	0	0	0	0
Total	12	1	7	0	0	0	0	0	20

85%
15%
0%
100%

60% 5% 35% 0% 0% 0% 0% 0%

COLONEL BY DR/SUSSEX DR / RIDEAU ST

Years	Total # Collisions	24 Hr AADT Veh Volume	Days	Collisions/MEV
2013-2017	65	31,038	1825	1.15

Classification of Accident	Rear End	Turning Movement	Sideswipe	Angle	Approaching	Single Vehicle (other)	Single vehicle (Unattended vehicle)	Other	Total
P.D. only	18	5	25	3	0	4	0	1	56
Non-fatal injury	2	0	0	2	0	3	0	0	7
Non-reportable	1	0	1	0	0	0	0	0	2
Total	21	5	26	5	0	7	0	1	65

86%
11%
3%
100%

32% 8% 40% 8% 0% 11% 0% 2%

CUMBERLAND ST / GEORGE ST

Years	Total # Collisions	24 Hr AADT Veh Volume	Days	Collisions/MEV
2013-2017	14	8,927	1825	0.86

Classification of Accident	Rear End	Turning Movement	Sideswipe	Angle	Approaching	Single Vehicle (other)	Single vehicle (Unattended vehicle)	Other	Total
P.D. only	0	1	1	2	0	5	1	0	10
Non-fatal injury	2	0	0	0	0	2	0	0	4
Non-reportable	0	0	0	0	0	0	0	0	0
Total	2	1	1	2	0	7	1	0	14

71%
29%
0%
100%

14% 7% 7% 14% 0% 50% 7% 0%

CUMBERLAND ST / YORK ST

Years	Total # Collisions	24 Hr AADT Veh Volume	Days	Collisions/MEV
2013-2017	16	8,421	1825	1.04

Classification of Accident	Rear End	Turning Movement	Sideswipe	Angle	Approaching	Single Vehicle (other)	Single vehicle (Unattended vehicle)	Other	Total
P.D. only	4	2	1	5	0	0	0	2	14
Non-fatal injury	1	0	0	0	0	0	0	1	2
Non-reportable	0	0	0	0	0	0	0	0	0
Total	5	2	1	5	0	0	0	3	16
	31%	13%	6%	31%	0%	0%	0%	19%	

88%
13%
0%
100%

DALHOUSIE ST / MURRAY ST

Years	Total # Collisions	24 Hr AADT Veh Volume	Days	Collisions/MEV
2013-2017	33	13,824	1825	1.31

Classification of Accident	Rear End	Turning Movement	Sideswipe	Angle	Approaching	Single Vehicle (other)	Single vehicle (Unattended vehicle)	Other	Total
P.D. only	3	5	11	4	0	0	0	2	25
Non-fatal injury	1	0	0	3	0	4	0	0	8
Non-reportable	0	0	0	0	0	0	0	0	0
Total	4	5	11	7	0	4	0	2	33
	12%	15%	33%	21%	0%	12%	0%	6%	

76%
24%
0%
100%

DALHOUSIE ST / RIDEAU ST

Years	Total # Collisions	24 Hr AADT Veh Volume	Days	Collisions/MEV
2013-2017	48	18,008	1825	1.46

Classification of Accident	Rear End	Turning Movement	Sideswipe	Angle	Approaching	Single Vehicle (other)	Single vehicle (Unattended vehicle)	Other	Total
P.D. only	7	9	8	3	0	0	2	3	32
Non-fatal injury	1	3	0	0	0	11	0	1	16
Non-reportable	0	0	0	0	0	0	0	0	0
Total	8	12	8	3	0	11	2	4	48
	17%	25%	17%	6%	0%	23%	4%	8%	

67%
33%
0%
100%

DALHOUSIE ST / ST. PATRICK ST

Years	Total # Collisions	24 Hr AADT Veh Volume	Days	Collisions/MEV
2013-2017	26	13,209	1825	1.08

Classification of Accident	Rear End	Turning Movement	Sideswipe	Angle	Approaching	Single Vehicle (other)	Single vehicle (Unattended vehicle)	Other	Total
P.D. only	2	8	6	4	0	0	1	0	21
Non-fatal injury	1	1	0	2	0	1	0	0	5
Non-reportable	0	0	0	0	0	0	0	0	0
Total	3	9	6	6	0	1	1	0	26
	12%	35%	23%	23%	0%	4%	4%	0%	

81%
19%
0%
100%

DALHOUSIE ST / YORK ST

Years	Total # Collisions	24 Hr AADT Veh Volume	Days	Collisions/MEV
2013-2017	22	12,362	1825	0.98

Classification of Accident	Rear End	Turning Movement	Sideswipe	Angle	Approaching	Single Vehicle (other)	Single vehicle (Unattended vehicle)	Other	Total
P.D. only	4	6	4	2	0	1	0	1	18
Non-fatal injury	1	0	0	0	0	3	0	0	4
Non-reportable	0	0	0	0	0	0	0	0	0
Total	5	6	4	2	0	4	0	1	22
	23%	27%	18%	9%	0%	18%	0%	5%	

82%
18%
0%
100%

ELGIN ST NB / WELLINGTON ST/RIDEAU ST

Years	Total # Collisions	24 Hr AADT Veh Volume	Days	Collisions/MEV
2013-2017	22	27,225	1825	0.44

Classification of Accident	Rear End	Turning Movement	Sideswipe	Angle	Approaching	Single Vehicle (other)	Single vehicle (Unattended vehicle)	Other	Total
P.D. only	6	0	7	3	0	2	0	0	18
Non-fatal injury	1	1	1	0	0	1	0	0	4
Non-reportable	0	0	0	0	0	0	0	0	0
Total	7	1	8	3	0	3	0	0	22
	32%	5%	36%	14%	0%	14%	0%	0%	

82%
18%
0%
100%

GEORGE ST / DALHOUSIE ST

Years	Total # Collisions	24 Hr AADT Veh Volume	Days	Collisions/MEV
2013-2017	37	12,057	1825	1.68

Classification of Accident	Rear End	Turning Movement	Sideswipe	Angle	Approaching	Single Vehicle (other)	Single vehicle (Unattended vehicle)	Other	Total
P.D. only	8	6	5	5	0	1	1	1	27
Non-fatal injury	2	0	0	0	0	8	0	0	10
Non-reportable	0	0	0	0	0	0	0	0	0
Total	10	6	5	5	0	9	1	1	37
	27%	16%	14%	14%	0%	24%	3%	3%	

73%
27%
0%
100%

GEORGE ST / SUSSEX DR

Years	Total # Collisions	24 Hr AADT Veh Volume	Days	Collisions/MEV
2013-2017	10	16,134	1825	0.34

Classification of Accident	Rear End	Turning Movement	Sideswipe	Angle	Approaching	Single Vehicle (other)	Single vehicle (Unattended vehicle)	Other	Total
P.D. only	4	1	2	1	0	0	0	0	8
Non-fatal injury	1	0	0	0	0	1	0	0	2
Non-reportable	0	0	0	0	0	0	0	0	0
Total	5	1	2	1	0	1	0	0	10
	50%	10%	20%	10%	0%	10%	0%	0%	

80%
20%
0%
100%

GEORGE ST / WILLIAM ST

Years	Total # Collisions	24 Hr AADT Veh Volume	Days	Collisions/MEV
2013-2017	6	7,447	1825	0.44

Classification of Accident	Rear End	Turning Movement	Sideswipe	Angle	Approaching	Single Vehicle (other)	Single vehicle (Unattended vehicle)	Other	Total
P.D. only	0	0	1	1	0	1	2	0	5
Non-fatal injury	0	0	1	0	0	0	0	0	1
Non-reportable	0	0	0	0	0	0	0	0	0
Total	0	0	2	1	0	1	2	0	6
	0%	0%	33%	17%	0%	17%	33%	0%	

83%
17%
0%
100%

KING EDWARD AVE / YORK ST

Years	Total # Collisions	24 Hr AADT Veh Volume	Days	Collisions/MEV
2013-2017	13	25,745	1825	0.28

Classification of Accident	Rear End	Turning Movement	Sideswipe	Angle	Approaching	Single Vehicle (other)	Single vehicle (Unattended vehicle)	Other	Total
P.D. only	7	0	2	1	0	0	0	0	10
Non-fatal injury	0	1	0	0	0	2	0	0	3
Non-reportable	0	0	0	0	0	0	0	0	0
Total	7	1	2	1	0	2	0	0	13
	54%	8%	15%	8%	0%	15%	0%	0%	

77%
23%
0%
100%

MACKENZIE AVE / MURRAY ST

Years	Total # Collisions	24 Hr AADT Veh Volume	Days	Collisions/MEV
2013-2017	10	16,467	1825	0.33

Classification of Accident	Rear End	Turning Movement	Sideswipe	Angle	Approaching	Single Vehicle (other)	Single vehicle (Unattended vehicle)	Other	Total
P.D. only	2	0	4	3	0	1	0	0	10
Non-fatal injury	0	0	0	0	0	0	0	0	0
Non-reportable	0	0	0	0	0	0	0	0	0
Total	2	0	4	3	0	1	0	0	10
	20%	0%	40%	30%	0%	10%	0%	0%	

100%
0%
0%
100%

MACKENZIE AVE / RIDEAU ST

Years	Total # Collisions	24 Hr AADT Veh Volume	Days	Collisions/MEV
2013-2017	51	24,070	1825	1.16

Classification of Accident	Rear End	Turning Movement	Sideswipe	Angle	Approaching	Single Vehicle (other)	Single vehicle (Unattended vehicle)	Other	Total
P.D. only	7	0	20	19	0	2	0	0	48
Non-fatal injury	1	0	0	1	0	1	0	0	3
Non-reportable	0	0	0	0	0	0	0	0	0
Total	8	0	20	20	0	3	0	0	51
	16%	0%	39%	39%	0%	6%	0%	0%	

94%
6%
0%
100%

MURRAY ST / PARENT AVE

Years	Total # Collisions	24 Hr AADT Veh Volume	Days	Collisions/MEV
2013-2017	8	8,368	1825	0.52

Classification of Accident	Rear End	Turning Movement	Sideswipe	Angle	Approaching	Single Vehicle (other)	Single vehicle (Unattended vehicle)	Other	Total
P.D. only	0	2	1	1	0	0	0	0	4
Non-fatal injury	2	1	0	0	0	1	0	0	4
Non-reportable	0	0	0	0	0	0	0	0	0
Total	2	3	1	1	0	1	0	0	8
	25%	38%	13%	13%	0%	13%	0%	0%	

50%
50%
0%
100%

MURRAY ST / SUSSEX DR

Years	Total # Collisions	24 Hr AADT Veh Volume	Days	Collisions/MEV
2013-2017	26	20,608	1825	0.69

Classification of Accident	Rear End	Turning Movement	Sideswipe	Angle	Approaching	Single Vehicle (other)	Single vehicle (Unattended vehicle)	Other	Total
P.D. only	1	1	4	10	0	0	0	0	16
Non-fatal injury	0	1	1	6	0	2	0	0	10
Non-reportable	0	0	0	0	0	0	0	0	0
Total	1	2	5	16	0	2	0	0	26
	4%	8%	19%	62%	0%	8%	0%	0%	

62%
38%
0%
100%

PARENT AVE / ST. PATRICK ST

Years	Total # Collisions	24 Hr AADT Veh Volume	Days	Collisions/MEV
2013-2017	26	7,752	1825	1.84

Classification of Accident	Rear End	Turning Movement	Sideswipe	Angle	Approaching	Single Vehicle (other)	Single vehicle (Unattended vehicle)	Other	Total
P.D. only	4	10	5	2	0	0	1	0	22
Non-fatal injury	0	0	1	1	0	2	0	0	4
Non-reportable	0	0	0	0	0	0	0	0	0
Total	4	10	6	3	0	2	1	0	26
	15%	38%	23%	12%	0%	8%	4%	0%	

85%
15%
0%
100%

RIDEAU ST / WALLER ST

Years	Total # Collisions	24 Hr AADT Veh Volume	Days	Collisions/MEV
2013-2017	43	11,250	1825	2.09

Classification of Accident	Rear End	Turning Movement	Sideswipe	Angle	Approaching	Single Vehicle (other)	Single vehicle (Unattended vehicle)	Other	Total
P.D. only	7	5	15	4	0	0	0	3	34
Fatal injury	0	0	0	0	0	1	0	0	1
Non-fatal injury	1	0	1	0	0	6	0	0	8
Non-reportable	0	0	0	0	0	0	0	0	0
Total	8	5	16	4	0	7	0	3	43
	19%	12%	37%	9%	0%	16%	0%	7%	

79%
2%
19%
0%
100%

ST. PATRICK ST / SUSSEX DR

Years	Total # Collisions	24 Hr AADT Veh Volume	Days	Collisions/MEV
2013-2017	17	20,172	1825	0.46

Classification of Accident	Rear End	Turning Movement	Sideswipe	Angle	Approaching	Single Vehicle (other)	Single vehicle (Unattended vehicle)	Other	Total
P.D. only	3	1	5	5	0	0	0	0	14
Non-fatal injury	1	1	0	1	0	0	0	0	3
Non-reportable	0	0	0	0	0	0	0	0	0
Total	4	2	5	6	0	0	0	0	17
	24%	12%	29%	35%	0%	0%	0%	0%	

82%
18%
0%
100%

SUSSEX DR / YORK ST

Years	Total # Collisions	24 Hr AADT Veh Volume	Days	Collisions/MEV
2013-2017	8	16,995	1825	0.26

Classification of Accident	Rear End	Turning Movement	Sideswipe	Angle	Approaching	Single Vehicle (other)	Single vehicle (Unattended vehicle)	Other	Total
P.D. only	1	1	2	0	0	1	0	0	5
Non-fatal injury	0	2	0	0	0	0	0	0	2
Non-reportable	0	0	0	1	0	0	0	0	1
Total	1	3	2	1	0	1	0	0	8
	13%	38%	25%	13%	0%	13%	0%	0%	

63%
25%
13%
100%