MORRISON HERSHFIELD

FINAL REPORT

LeBreton Flats
Transportation Impact Assessment

Ottawa, Ontario

Presented to:

National Capital Commission
202-40 Elgin Street, Ottawa ON, K1P 1C7

May 10, 2023

Certification Form for TIA Study PM

TIA Plan Reports

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

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

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

CERTIFICATION

- ☑ I have reviewed and have a sound understanding of the objectives, needs and requirements of the City of Ottawa's Official Plan, Transportation Master Plan and the Transportation Impact Assessment (2017) Guidelines;
- ☑ I have a sound knowledge of industry standard practice with respect to the preparation of transportation impact assessment reports, including multi modal level of service review;
- ☑ I have substantial experience (more than 5 years) in undertaking and delivering transportation impact studies (analysis, reporting and geometric design) with strong background knowledge in transportation planning, engineering or traffic operations; and
- ☑ I am either a licensed[1] or registered[2] professional in good standing, whose field of expertise
  - ☑ is either transportation engineering
  - ☑ or transportation planning .

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

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Stamp

1. PLANNING RATIONALE EXECUTIVE SUMMARY

Ottawa's new Official Plan and updated Transportation Master Plan will guide Ottawa to become the most liveable mid-sized city in North America. The City's Official Plan vision for walkable 15-minute neighbourhoods can be realized at LeBreton Flats though implementation of the LeBreton Flats Master Concept Plan (MCP).

Key to the MCP's success is the prioritization of active modes by creating a safe, segregated and direct pedestrian and cycling network that offers the most convenient and direct routes to people who use transit and active modes. At the same time, the success of this vision relies on the discouragement of fast and facilitated automobile movement through the plan area and instead prioritizes a connected grid of local streets, made possible by avoiding the grade differences the Preston Street Extension would introduce. The embedded incentives and disincentives in this filtered permeability approach are key to enable the outcomes envisioned in the MCP and the OP.

However, the outdated intent to divide LeBreton Flats with an expensive new arterial roadway and bridge, the Preston Street Extension, would create a grade-separation issue that would severely compromise the success of the redevelopment of LeBreton Flats. The bridge required for the Preston Street Extension would be nearly twice as long as the Booth Street Bridge (between Albert and Wellington Streets) and, similarly, would repeat the undesirable conditions and impacts created by the Booth Street bridge on active transportation, local access, the area of parks and open space, developability, noise, air pollution, and sustainability. Instead, the MCP proposes to make the best use of the O-Train LRT system by focusing on active mobility and places for people by providing an active-mobility only bridge in the Preston corridor to cross the Confederation Line tracks and the aqueducts, linking two at-grade local streets that can connect to a local street network.

The construction of the Preston Street Extension as an arterial road bridge would dramatically impact the developability of adjoining parcels, reducing the ability of LeBreton Flats to achieve density goals and requirements as a designated Hub (500 persons and jobs per hectare) and transit-oriented development area in the new Official Plan. The MCP vision for LeBreton Flats is of a tight-knit dense urban district, where streets are prioritized for active modes users. Fundamentally, the Preston Street Extension would impact the overall character, reduce developability and therefore overall densities, and limit the development and design potential of the area.

The NCC's application to amend the Official Plan to remove the proposed Preston Street Extension in favour of an active-modes bridge supports provincial objectives and City of Ottawa planning policies and priorities as detailed in the following policy documents:

- Ontario Planning Act (1990)
- Ontario Provincial Policy Statement (2020)
- City of Ottawa Official Plan (2013), including Central Area Secondary Plan
- City of Ottawa Official Plan (2021), including the West Downtown Core Secondary Plan
- City of Ottawa Transportation Master Plan (2013)
- City of Ottawa Transportation Master Plan Part 1 – Policy (2023)

Approval of the requested amendment represents good planning and is essential to:

- Make bold and progressive infrastructure decisions that help the City achieve its stated policy objectives;
- Support the sustainable transportation infrastructure investments of the City within the area;
- Increase the share of trips by sustainable modes of transportation to meet the City's climate change goals;
- Create a healthier, more equitable and inclusive city, where anyone can get to work, school and daily activities without needing a private vehicle;
- Build a truly visionary and inspiring new community at LeBreton Flats;
- Capitalize on the vast park space and recreational potential of LeBreton Flats; and
- Make decisions today that align with the trajectory of urban development and support the future of Ottawa.

Urban planning has evolved significantly since the Preston Street Extension was originally conceived in the 1970s and incorporated into the previous plan for LeBreton Flats in 1997. In line with the City's new Official Plan's Five Big Moves and the recently approved policies of the new Transportation Master Plan, the LeBreton Flats MCP proposes a new community that is unlike any other in Ottawa (or Canada) today, and one which will become a leader for Canadian urbanism. The MCP is a blueprint for a new type of community, built on principles of sustainability, accessibility, and community wellbeing. Through the MCP, LeBreton Flats is poised to deliver on the ambitions the City has articulated in its OP. Both the OP and the MCP posit a new approach to urban planning in Ottawa, one which reflects the global best practice of prioritizing space and investment in places for people rather than ceding precious urban space to automobiles.

2. TIA EXECUTIVE SUMMARY

LeBreton Flats is a large and unique site in the heart of the Nation's Capital. In many respects, the site is truly a one-of-a-kind gem. The site is located just 1.5 kilometres west of the Capital's Parliamentary Precinct and central business district, and is anchored by two LRT stations, along with aqueduct water features and access to the Ottawa River. The future community of LeBreton Flats has the potential to be a showcase for urban development in Canada.

A complete understanding of the transportation needs and implications of the site is necessary to guide and inform the movement from vision to reality. The Transportation Impact Assessment (TIA) has been prepared in accordance with the City of Ottawa's 2017 TIA Guidelines, as required by the City of Ottawa in support of an application to amend the Official Plan. Many high-level assumptions and findings are documented within the report. The TIA report aims to provide the necessary analysis and insight at this stage of the planning process but will not be the last transportation analysis. Detailed TIA studies will be prepared for each future development phase within the LeBreton Flats Master Concept Plan area, including the potential major events centre, as details and specifics of such developments become known during implementation.

The foundation of the TIA is an analysis of the trips expected to be generated from the developments proposed in the Master Concept Plan. The Master Concept Plan provides a vision for a future community, with a likely range of development yield scenarios. To help decision makers assess the potential traffic impacts of the Master Concept Plan, four land use scenarios were reviewed, and **Scenario 4 was selected for evaluation**, as it is the most ambitious development scenario, with the highest predicted trip generation. The City's TRANS Trip Generation Manual was used to calculate residential trips, with the ITE Trip Generation Manual used for all other trips. The LeBreton Flats development is expected to generate approximately **4,800 person trips in the weekday morning peak hour, and 8,100 person trips in the weekday afternoon peak hour**. Aggressive mode share splits are targeted, with **15% auto driver, 5% auto passenger, 60% transit and 20% walking and cycling**. These mode share targets are comparable with similar Transit Oriented Developments in Ottawa, such as 900 Albert Street, the Zibi development, and Wateridge Village.

The LeBreton Flats Master Concept Plan proposes the elimination of the planned vehicular connection of Preston Street between Albert Street and the Sir John A. Macdonald Parkway. This connecting roadway has been part of previous versions of the City of Ottawa Official Plan and Transportation Master Plan, but there has been no plans or studies to date initiating this as a future City project. Modelling and analysis in the TIA shows that **the drawbacks of the Preston extension far outweigh the benefits**.

- Constructing the Preston extension would divert additional traffic to the area, worsening traffic conditions around LeBreton Flats. The Preston extension would draw traffic away from roads that are well beyond the influence area of LeBreton Flats and result in an increase in traffic in both directions on Preston Street, Rochester Street and Booth Street.
- The removal of the Preston extension avoids the need to designate Wellington Street as a Truck Route, which is consistent with the prohibition of heavy vehicles on the SJAMP,
- The removal of the Preston extension increases pedestrian and cyclist accessibility to the LRT stations to ensure achievement of the high transit mode share targets set as part of the development.
- **For these reasons, the deletion of the Preston vehicular extension from the City's Official Plan is recommended.**

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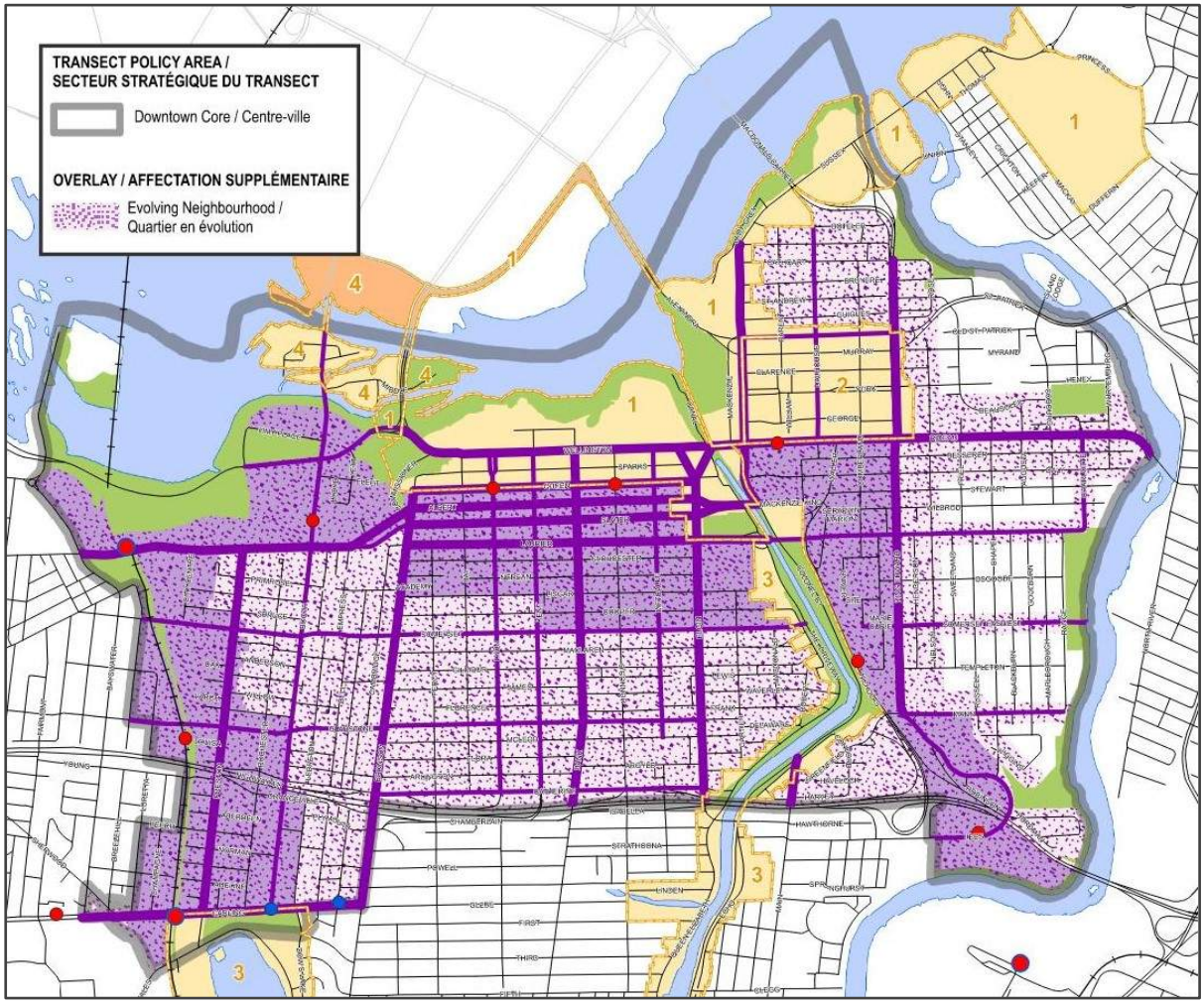
1. INTRODUCTION

LeBreton Flats is a large and unique site in the heart of the Nation's Capital. In many respects, the site is truly a rare one-of-a-kind gem. The site is approximately 29 hectares in size and is located just 1.5 kilometres west of the Capital's Parliamentary Precinct and central business district. The site is anchored by two LRT stations at Pimisi and Bayview, aqueduct water features, and Nepean Inlet, with access to the Ottawa River. The future community of LeBreton Flats has the potential to be a showcase for future urban development in Canada. As with any urban development of this caliber, along with its enormous potential comes significant challenges. Understanding the value of the site as well as the nature and significance of the challenges facing its development is necessary. Failure to do so may unreasonably deem some challenges as development constraints and, in doing so, sadly miss the opportunity to undertake proper trade-offs analysis and unnecessarily compromise the full potential of the site.

A complete understanding of the transportation needs and implications of the site is necessary to guide and inform the movement from vision to reality. This report aims to provide the necessary analysis and insight, but certainly will not be the last. Our world continues to change and preparing this report during the pandemic highlights the fact that we could very well be embarking on a new era in transportation, which will require us to revisit our past assumptions about travel needs and expectations. Regardless, as required by the City's TIA guidelines, this report uses past experience to predict future outcomes. There are many high-level assumptions and findings, which are documented within the report, as are the details that are important to transportation professionals.

The immediate surrounding roadway network, consisting of Albert Street, Booth Street, and Wellington Street exhibit varying degrees of congestion today. Expanding the capacity of these roadways is not foreseen, as LeBreton Flats and the roads that surrounds it fall within the City's Downtown Core (refer to **Figure 1**). The City of Ottawa Transportation Master Plan and New Official Plan do not support roadway expansion in this constrained urban area of the City. Therefore, additional roadway capacity has not been proposed as part of this development, other than new local roads provided as part of the development access/egress. Providing a supportive environment for pedestrians and cyclists will improve the capacity of the active transportation network and help to improve active mode share.

Figure 1: Downtown Core Transect Policy Area (Source: City of Ottawa Official Plan 2021)



This report has been prepared in accordance with the City of Ottawa's 2017 Transportation Impact Assessment Guidelines, as required by the City of Ottawa in support of the Master Concept Planning process. Additionally, it is acknowledged that detailed TIA studies will be prepared in the future for each individual development phase associated with the LeBreton Flats lands, as details and specifics of such developments become more known closer to implementation time.

In addition to the above, the following should also be noted:

- **Baseline Conditions:** Study area intersections and roadways surrounding LeBreton Flats have been influenced by the LRT construction activities (e.g., transitway detours, the construction of Booth Street over the LRT corridor, etc.). With respect to the timelines associated with the Master Concept Planning process, City Staff agreed to using historical traffic count data from the year 2014, as this is a time that likely best represents normal travel patterns and volumes. It should be noted that LRT opening delays and the COVID-19 pandemic during the spring of 2020 further complicated any potential efforts to collect more recent traffic data that could be viewed as being representative of "typical" conditions.
- **Network Modifications:** The LeBreton Flats Master Concept Plan proposes the elimination of the planned vehicular connection of Preston Street between Albert Street and the Sir John A. Macdonald Parkway. This connecting roadway has been part of previous versions of the City

of Ottawa Official Plan and Transportation Master Plan but has not been scheduled to be built. The Planning Rationale supporting the removal of the Preston Street extension is submitted under separate cover. The implications of the removal of the Preston Street extension from the future road network are explored in ***Section 4.4*** of this report. This was informed by regional level modelling using the City's EMME/3 Travel Demand Model and an assessment of operational impacts on the surrounding road network.

- **Mode Share Targets:** LeBreton Flats currently has exceptional active transportation facilities, and the Master Concept Plan will build on this by creating world-class facilities to support active transportation and transit modes. Future residents and businesses that will call LeBreton Flats home, will be exceptionally well located geographically and supported by the existing transportation system to easily access Ottawa and Gatineau's downtown cores, and some of the other great amenities the Nation's Capital has to offer. As such, and as detailed in this report, it is reasonable to expect an aggressive reduction in the degree to which private vehicles are relied upon. The mode share targets set in this TIS are comparable to those of similar Transit Oriented Developments, including 900 Albert Street, the Zibi development, and Wateridge Village.

- **Trip Generation:** The foundation of the analysis in this report is the trip generation expected to be realized from the developments proposed in the Master Concept Plan. The Master Concept Plan provides a vision for a future community, with a likely range of development yield scenarios. To help decision makers assess the potential traffic impacts of the Master Concept Plan, the scenario that results in the highest predicted trip generation has been evaluated. It is likely that the proposed development will evolve over time, at which point, updated traffic studies will be completed with more precise predictions.

- **Preston Street Extension:** Given that the Preston extension from Albert Street to Wellington Street has been part of the City's Transportation Master Plan and Official Plan for many years, additional analysis was undertaken to justify its proposed removal from the future road network. The removal of the Preston extension from the Official Plan has many benefits, explored in Section 4.4, including maximizing the accessibility to the LRT stations by minimizing walking distances; this ensures that the high transit mode share target set for the development is in fact achieved.

- **Future Opportunities for City Input:** This TIA is focused on the Master Concept Plan for LeBreton Flats, and is the first step in the ultimate development of LeBreton Flats. In addition to the comments received on this TIA, City staff will have additional opportunities for input on the development as part of future Plans of Subdivision, Site Plan Applications, and Transportation Impact Assessments are submitted for each development parcel, including the potential major events centre.

2. STEP 1 – SCREENING FORM

As required by the City of Ottawa's 2017 Transportation Impact Assessment (TIA) Guidelines, a Screening Form was completed for the proposed development (described below in ***Section 3.1***). The Screening Form triggered the trip generation, location and safety criteria outlined in the City's TIA Step 1 – Screening Form. Since all triggers were met, a formal TIA (i.e., TIA encompassing Steps 1 through 5) is required to accompany the development application. The Screening Form is provided in **Appendix A**.

3. STEP 2 – SCOPING

3.1 Existing and Planned Conditions

3.1.1 Description of Proposed Development

The subject development lands (i.e., LeBreton Flats) are generally situated within the area bound by Booth Street to the east, Wellington Street / Ottawa River Parkway to the north, Albert Street to the south and the Trillium Pathway to the west. Several development scenarios were provided, and the scenario that is likely to result in the highest trip generation has been evaluated.

Based on the information provided, the proposed redevelopment of LeBreton Flats is planned to include a mix of high-density residential, office and retail type land uses, as well as approximately 12.7 hectares of parks and open spaces. It should also be noted that the Master Concept Plan includes an option to host a new major event centre. Given the size of LeBreton Flats, market demand will ultimately dictate the rate of development.

The Master Concept Plan depicts thirteen access points, including six access points to Albert Street, five access points to Wellington Street, and two access points to Booth Street. All new internal streets within LeBreton Flats are intended to be designed to be slow speed and relatively narrow shared spaces (e.g., no raised curbs). Almost all parking will be provided in underground lots with access/egress located near the edge of the Flats.

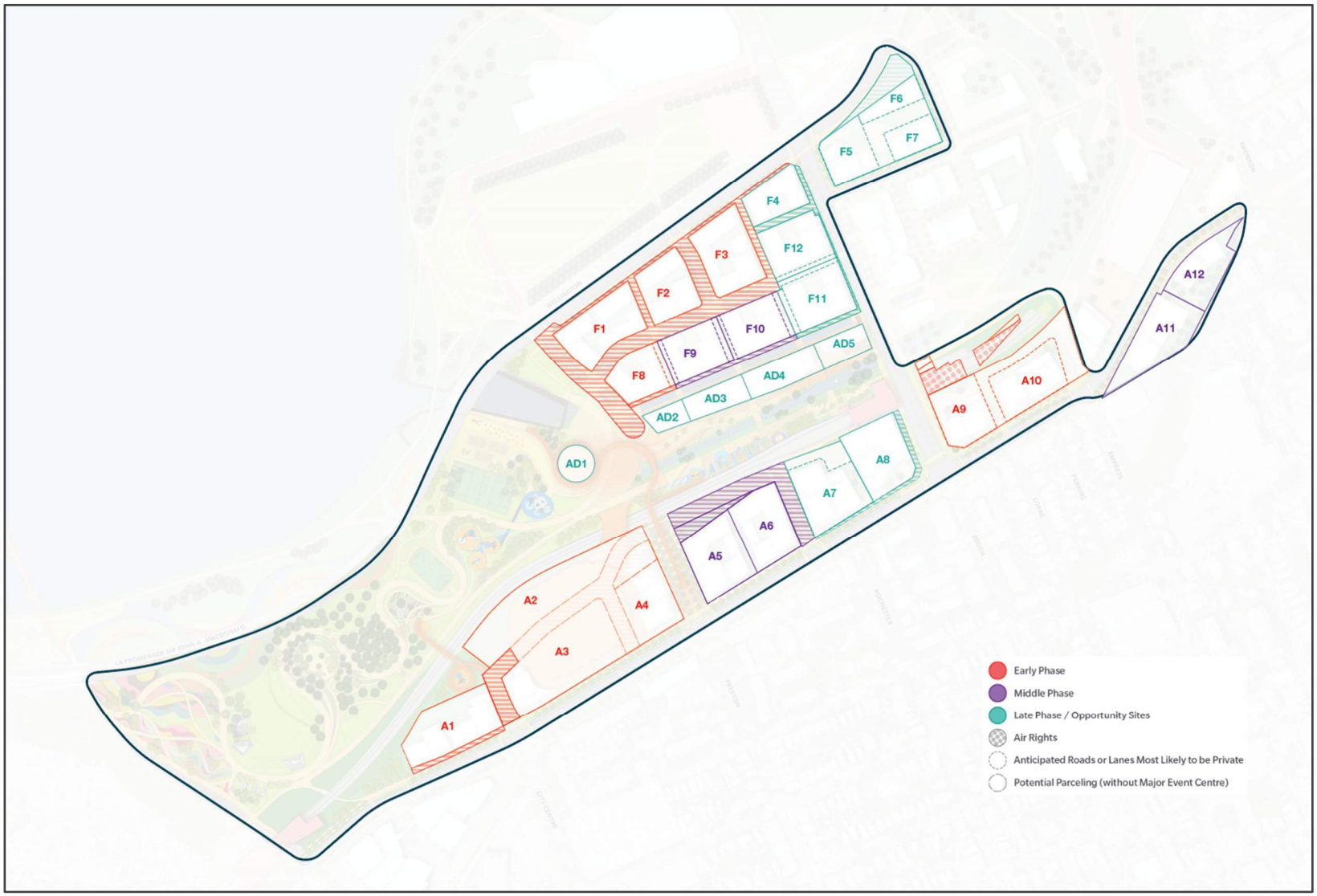
Internal multi-use pathways will be provided to support active mobility, which will enhance access to parks, provide connectivity between on-site facilities, and will be fully integrated with the Capital Pathway network and the City's extensive pedestrian/cycling network. This active network will also include two new multi-use pathway structures over Ottawa's LRT Confederation Line that will provide convenient and direct access to the highest order public transit via existing LRT stations at Pimisi and Bayview, as well as regular OC Transpo bus service provided along Booth Street and Albert Street.

The local context of the subject site is provided in **Figure 2**, the proposed Master Concept Plan is provided in **Figure 3**, and the proposed development phasing is provided in **Figure 4**.

Figure 2: Local Context

Figure 3: Proposed Master Concept Plan

Figure 4: Development Parcels & Phasing



3.1.2 Existing Conditions

The transportation network surrounding LeBreton Flats has undergone significant changes over the past several years, mainly because of LRT construction that required temporary detouring of transitway bus traffic onto study area roadways. With respect to the City's TIA Guidelines, the following describes the study area network as it is in its current capacity.

Area Road Network

Wellington Street is a four-lane Arterial roadway (i.e., a two-lane per direction) with sidewalks on both sides, that extends from Sussex Drive in the east to Vimy Place in the west. Beyond Sussex Drive and Vimy Place, Wellington Street continues as Rideau Street and the Sir John A. Macdonald Parkway, respectively. Within the vicinity of the subject site, the speed limit is 60 km/h and on-street parking is provided along both sides of the roadway between Booth Street and Vimy Place.

Bay Street is a two-lane, one-way northbound Local roadway with a bike lane and sidewalks on both sides, located within the vicinity of the subject development. It extends from Catherine Street in the south to Wellington Street in the north. The cycling facility on Bay Street was recently upgraded to provide uni-directional northbound and southbound cycle tracks between Laurier Avenue and Wellington Street. Within the vicinity of the subject site, the posted speed limit is 50 km/h and on-street parking is permitted on the west side of the roadway between Catherine Street and Laurier Avenue.

Lyon Street North is a three-lane, one-way southbound Arterial roadway with sidewalks on both sides, located within the vicinity of the subject development. It extends from Highway 417 in the south to Wellington Street in the north. South of Somerset Street, this roadway is reduced to two lanes. Within the vicinity of the subject site, the posted speed limit is 50 km/h and on-street parking is permitted on the west side of the roadway between Slater Street and Catherine Street. There is a southbound bike lane on the segment south of Albert Street.

Albert Street is a five-lane Arterial roadway (i.e., two eastbound lanes and three westbound travel lanes, with east and westbound shoulder lanes reserved for transit only) along the southern frontage of the subject site. This roadway continues as Mackenzie King Bridge east of Elgin Street and as Scott Street west of Bayview Station Road. East of Empress Avenue, two-way traffic on Albert Street is split into two one-way roadways (i.e., eastbound, Albert Street continues one-way as Slater Street, between Bronson Avenue and Elgin Street; and westbound, Albert Street operates as one-way between Bronson Avenue and Elgin Street). There is a bidirectional multi-use pathway on the north side of Albert Street from Commissioner Street in the east to Bayview Station. Within the vicinity of the subject site, the posted speed limit is 50 km/h and Albert Street is designated as a Full Loads truck route with respect to the City's Urban Truck Routes network.

Slater Street is a three-lane, one-way Arterial roadway within the vicinity of the subject site. It develops/merges with Albert Street and the Mackenzie King Bridge at Empress Avenue in the west and Elgin Street in the east, respectively. Within the vicinity of the subject site, the posted speed limit is 50 km/h, and on street parking is permitted on both sides of the roadway during nonpeak periods and weekends (with the exception of along the southern frontage of the subject site, parking is prohibited), and Slater Street is designated as a Full Loads truck route with respect to the City's Urban Truck Routes network.

Bronson Avenue is a four-lane Arterial roadway (i.e., two travel lanes per direction) with sidewalks on both sides, located within the vicinity of the subject development. It extends from Sparks Street in the north and continues as the Airport Parkway, south of the Rideau River. Within the vicinity of the subject site, the posted speed limit is 50 km/h and it is designated as a Full Loads truck route south of Albert Street with respect to the City's Urban Truck Routes network.

Booth Street is a four-lane Arterial roadway (i.e., two travel lanes per direction), which passes through the subject development site. It extends from Carling Avenue in the south, crossing the Confederation Line LRT tracks as a bridge within the subject site, and continues north into Gatineau, where it becomes Eddy Street. Booth Street is designated as a Restricted Loads truck route with respect to the City's Urban Truck Routes network. Within the vicinity of the subject site, the posted speed limit is 50 km/h. There are raised cycle tracks and sidewalks on both sides of the roadway within the subject site area. However, south of Albert Street, Booth Street is reduced to a two-lane Major Collector Road with a posted speed limit of 40 km/h. Booth Street, south of Albert Street, supports residential land uses on both sides, sidewalks on both sides, with a narrow set-back and on-street parking on the west side of the roadway. This section of Booth Street is not part of the City's Urban Truck Routes network, and significant efforts have been undertaken to preserve the residential nature of this section of the road, including turning restrictions, speed humps and other traffic calming measures (refer to ***Section 3.1.2*** for more details).

Sir John A. Macdonald Parkway is a four-lane federally owned divided Parkway (i.e., two travel lanes per direction) within the vicinity of the subject development. It extends from Vimy Place in the east and continues west where it merges into Carling Avenue (near the Lincoln Fields transit station). Within the vicinity of the subject site, the posted speed limit is 60 km/h and on-street parking is not permitted. A multi-use pathway runs along the Ottawa River parallel to the Parkway.

Scott Street is a four-lane Arterial roadway (i.e., two travel lanes per direction) within the vicinity of the subject development. It extends from Churchill Avenue in the west and continues as Albert Street, east of Bayview Station Road. Within the vicinity of the subject site, the posted speed limit is 50 km/h and it is designated as a Full Loads truck route with respect to the City's Urban Truck Routes network. It features a multi-use pathway along its north side, from Bayview Station Road to Churchill Avenue, with a sidewalk and bike lane along its south side.

Bayview Station Road is a two-lane Collector roadway (i.e., one travel lane per direction) with sidewalks within the vicinity of the development. It extends between Albert Street in the south and Burnside Avenue in the north. The posted speed limit is 50 km/h and on-street parking is permitted on both sides of the roadway.

Slidell Street is a two-lane Collector roadway (i.e., one travel lane per direction) with one discontinuous sidewalk within the vicinity of the subject development. It extends between Burnside Avenue in the south and the Sir John A. Macdonald Parkway in the north, where it continues north as Onigam Street. The posted speed limit is 40 km/h and on-street parking is prohibited.

Preston Street is two-lane Arterial roadway (i.e., one travel lane per direction) within the vicinity of the subject development. It extends between Albert Street in the north and Queen Elizabeth Driveway in the south. Within the vicinity of the subject site, there are sidewalks on both sides, the posted speed limit is 50 km/h and on-street parking is permitted on the east side of the roadway only, and it is designated as a Full Loads truck route with respect to the City's Urban Truck Routes network.

City Centre Avenue is two-lane Local roadway (i.e., one travel lane per direction) with partial sidewalks within the vicinity of the subject development. It extends between Albert Street in the north and Somerset Street in the south. Within the vicinity of the subject site, the posted speed limit is 50 km/h and on-street parking is permitted on both sides of the roadway.

Parkdale Avenue is a two-lane Arterial roadway (i.e., one travel lanes per direction) within the vicinity of the subject development. It extends between Carling Avenue in the south and the Sir John A. Macdonald Parkway in the north. The posted speed limit is 50 km/h within the vicinity of the subject site and there are sidewalks on both sides.

Vimy Place is a private two-lane Local roadway (i.e., one travel lanes per direction). It extends between the Sir John A. Macdonald Parkway and Booth Street. The posted speed limit is 40km/h and on-street parking is permitted on the south side of the roadway, along the Canadian War Museum frontage.

Study Area Intersections

Wellington/Portage Bridge - The Wellington/Portage Bridge intersection is a signalized, three-legged intersection. The north approach (Portage Bridge) consists of three left turn lanes (including one bus/taxi/HOV lane) and one channelized right-turn lane. The west approach (Wellington Street) consists of three right-turn lanes, and two left turn lanes. The east approach (Wellington Street) consists of two left-turn lanes, and three right-turn lanes (including one transit exclusive lane).

There are no prohibited vehicular movements at this intersection. There is a separate active-modes network at a lower level below the road network.

Booth/Chaudière - The Booth/Chaudière intersection is a signalized, three-legged intersection. The west approach (Chaudière) consists of one shared left-right turn lane exiting from privately-owned Zibi development lands. The north approach (Booth Street) consists of one shared through-right lane and one exclusive through lane. The south approach (Booth Street) consists of one left-turn lane and two through lanes.

There are no prohibited movements at this intersection. As part of the Zibi development project, this intersection is being reconstructed to accommodate a shared through-right lane and a short left-turn lane on all approaches.

Booth/War Museum - The Booth/War Museum intersection is a signalized three-legged intersection. The south approach (Booth Street) consists of one left turn lane and two through lanes. The north approach (Booth Street) consists of two shared lanes for all movements. The west approach (War Museum) consists of one shared lane for all movements. The primary function of this intersection is to provide signalized crossing for users of the Ottawa River Pathway MUP.

Booth/Wellington - The Booth/Wellington intersection is a signalized four-legged intersection. The south approach (Booth Street) consists of one shared right turn-through lane and one through lane. The north approach (Booth Street) consists of two through lanes, one left turn lane, and one right turn lane. The east approach (Wellington Street) consists of one right turn lane and two through lanes. The west approach (Wellington Street) consists of two through lanes. This intersection was recently reconstructed as a protected intersection with cycling lanes separated from vehicular traffic.

Left and right turns are prohibited at the west approach. Left turns are prohibited at the east approach except on Sundays from 7am-1pm in order to facilitate Sunday closures of the SJAM. Left turns are prohibited at the south approach.

Albert/Booth - The Albert/Booth intersection is a signalized four-legged intersection. The north approach (Booth Street) consists of one through lane, one left turn and one right turn lane. The south approach (Booth Street) consists of one shared left-through lane and one shared through-right lane. The east approach (Albert Street) consists of one left turn lane, one right turn lane and three through lanes, including one transit exclusive lane. The west approach (Albert Street) consists of one left turn lane, one through lane and one transit exclusive through lane, which acts as a right turn lane for non-transit vehicles.

Left turns are prohibited at the east approach during 7-9AM and 3:30 - 5:30PM on weekdays. Right-Turn-On-Red movements are prohibited from 7AM-9PM on weekdays for the north and east approaches. Through traffic is prohibited from 11PM to 6AM on the north approach.

Trucks are directed to turn left or right on the north approach. Signage indicates that trucks and buses are prohibited from traveling southbound on Booth Street from the Booth/Albert intersection.

Albert/Preston - The Albert/Preston intersection is a signalized, three-legged intersection. The south approach (Preston Street) consists of one left turn, and one right turn lane. The west approach (Albert Street) consists of one through lane and one transit exclusive through lane, which acts as a right turn lane for non-transit vehicles. The east approach (Albert Street) consists of three through lanes, including one transit exclusive lane, and one left turn lane.

There are no prohibited movements at this intersection.

Wellington/Vimy - The Wellington/Vimy intersection is a signalized, three-legged intersection. The north approach (Vimy Pl) consists of one shared lane for all movements. The west approach (Sir John A. Macdonald Parkway) consists of two through lanes, and one left turn lane. The east approach (Wellington Street) consists of one through lane and one shared through-right lane.

There are no prohibited movements at this intersection.

Sir John A. Macdonald/Slidell - The Sir John A. Macdonald/Slidell intersection is a signalized, four-legged, intersection. The north approach (Onigam Street) consists of one shared through-right lane. The south approach (Slidell Street) consists of one through lane. The west and east approaches (Sir John A. Macdonald Parkway) each consists of one shared left-through lane and one shared through-right lane.

Left turns and right turns are prohibited at the west and east approaches from 7-9AM and 4-6PM. Left turns are prohibited at the north approach. Additionally, both left and right turns are prohibited at the south approach.

Sir John A. Macdonald/Parkdale - The Sir John A. Macdonald/Parkdale is an unsignalized interchange connecting Sir John A. Macdonald Parkway and Parkdale Avenue. Two through lanes are maintained in each direction on Sir John A. Macdonald Parkway through the interchange. There are no ramp terminal intersections since all possible movements are accommodated through free-flowing merge and diverge ramps.

Albert/City Centre - The Albert/City Centre intersection is a signalized four-legged intersection. The south approach (City Centre Avenue) consists of one left turn lane and one shared through-right lane. The north approach (OC Transpo Access) consists of one shared lane for all bus movements. The east approach (Albert Street) consists of one left turn lane, two through lanes (including one transit exclusive lane), and a transit exclusive right turn lane. The west approach (Albert Street) consists of one transit exclusive left turn lane and two through lanes (including one transit exclusive lane that facilitates right-turn movements for non-transit vehicles).

Non-transit vehicles are prohibited from entering the north approach of the intersection.

Albert/Bayview Station - The Albert/Bayview Station intersection is a signalized four-legged intersection. The south approach (Bayview Station Road) consists of one through lane, one left turn lane, and one channelized right turn lane. The north approach (Bayview Station Road) consists of one shared through-right lane and one left turn lane. The east approach (Albert Street) consists of one left turn lane, one through lane, and one transit exclusive through lane that facilitates right-turn movements for non-transit vehicles. The west approach (Scott Street) consists of one shared left turn-through lane and one transit exclusive through lane that facilitates right-turn movements for non-transit vehicles.

There are no prohibited movements at this intersection.

Scott/Parkdale - The Scott/Parkdale intersection is a signalized four-legged intersection. The north approach (Parkdale Avenue) consists of one shared right turn-through lane, and one left turn lane. The south approach (Parkdale Avenue) consists of one shared right turn-through lane, and one left turn lane. The east approach (Scott Street) consists of two through lanes (including one transit exclusive lane that facilitates right-turn movements for non-transit vehicles), and one left turn lane. The west approach (Scott Street) consists of two through lanes (including one transit exclusive lane that facilitates right-turn movements for non-transit vehicles), and one left turn lane.

There are no prohibited movements at this intersection.

Existing Driveways to Adjacent Developments

There are 19 driveways that fall within a 200m boundary of the site. These exclude driveways that only serve a single private dwelling.

- 12 driveways are located near the south perimeter of the site
    - 1 driveway on Empress Avenue that is 40m south of Albert Street, connecting to a seniors' centre and spiritual centre parking lot.
    - 3 driveways on Booth Street. Two of which are approximately 50m south of Albert Street, connecting to office buildings and a townhouse complex. The third driveway is approximately 90m south of Albert Street, connecting to a separate townhouse complex.
    - 3 driveways on Rochester Street, all located at the cul-de-sac at the north end of the street, connecting to townhouse complexes.
    - 3 driveways on Primrose Avenue. Two are located 40m east of the intersection while the remaining driveway is located 100m west of the intersection. All driveways provide connections to separate townhouse complexes; and,
    - 2 driveways on City Centre Avenue, located approximately 50m and 150m south of Albert Street. Both driveways provide connections to an office and retail complex.
- 6 driveways are located near the east perimeter of the site
    - 4 driveways on Lett Street, ranging from approximately 70m south of Wellington Street to approximately 220m south of Wellington Street. All four driveways connect to apartment complexes.
    - 1 driveway is located on Fleet Street, approximately 50m east of Booth Street, providing connection to an apartment show room/office, and
    - 1 driveway is located on Lloyd Street, approximately 90m south of Fleet Street. This driveway provides connection to a surface parking lot.
- 1 driveway is located near the north perimeter of the site
    - This driveway is located on Vimy Place, approximately 260m west of Booth Street, serving the parking lot of the Canadian War Museum.

Pedestrian/Cycling Network

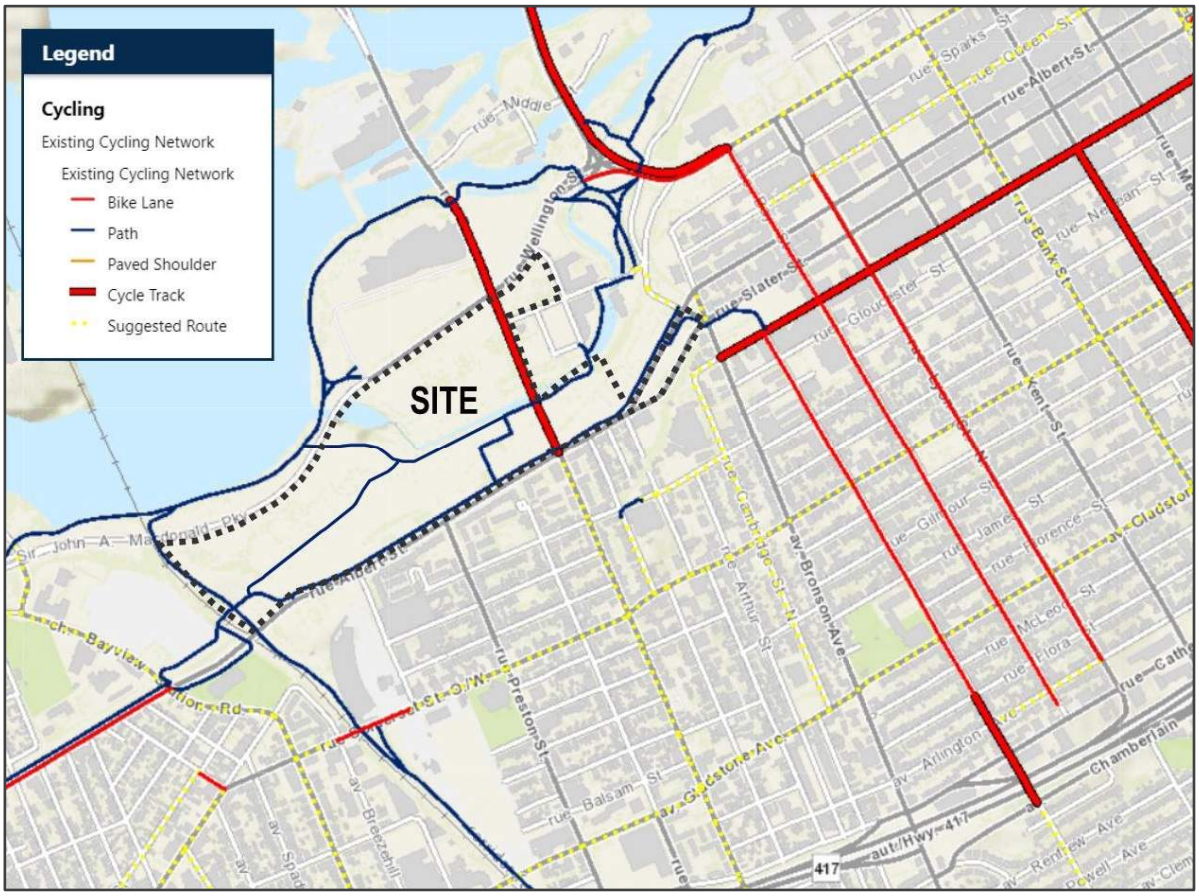
The pedestrian network in the vicinity of the site is well developed and offers a number of convenient and scenic routes, such as the expansive Capital Pathway and Trans Canada Trail (along the Ottawa River), the Trillium Pathway (along the Trillium LRT line), and the aforementioned multi-use pathway along the north side of Albert Street / Scott Street, all of which are in close proximity to LeBreton Flats and will have direct connectivity to the development.

Sidewalks are also provided along both sides of study area roadways, in most cases. Exceptions can be found on select local streets accommodating low vehicle speeds, where sidewalks are either

reduced to one side only or terminate midblock, such as City Centre Avenue. It should also be noted that Sir John A. Macdonald Parkway and portions of Slater Street do not have sidewalks (e.g., currently, Slater Street between Empress Street and Bronson Avenue has little to no sidewalks available for pedestrians).

With regard to cycling facilities, the study area is bisected by two cycling spine routes (Albert Street and Booth Street) as defined by the Ottawa Cycling Plan 2013; additional spine routes in the area include Wellington Street from the Portage Bridge to Vimy Place, and Slater Street east of the split with Albert Street. Additionally, the study area is surrounded by various pathway networks (NCC Capital Pathway, Trillium Pathway, and Albert Street multi-use pathway). The existing multi-use path/cycling network within the vicinity of the subject site, as sourced from GeoOttawa, is shown in the following **Figure 5**.

Figure 5: Existing Multi-Use Path/Cycling Network



As shown in Figure 5, there are currently multi-use pathways directly adjacent to LeBreton Flats along Albert Street, which feed directly into bike lanes on Scott Street to the west, and dedicated cycle tracks on Laurier Avenue to the east. Based on field observations and local area knowledge, cycling activity is considered to be high within the vicinity of the subject development lands.

Transit Network

OC Transpo currently provides the highest order transit service through the heart of LeBreton Flats. The site will benefit from direct access to both of OC Transpo's O-Train Lines: Confederation Line and Trillium Line. The Bayview LRT Station is located along the western limit of LeBreton Flats, which serves as a transfer station between the east-west Confederation Line (Line 1) and north-south Trillium Line (Line 2). The Pimisi LRT Station is located closer to the eastern limit of LeBreton Flats and provides service for the east-west Confederation Line (Line 1).

Additionally, 11 OC Transpo bus stops are located within walking distance to/from LeBreton Flats. The following **Table 1** summarizes existing stops, their associated routes and direction of travel. In addition to OC Transpo, STO also provides service between downtown Ottawa and Hull. STO provides service through the study area via Portage Bridge and Wellington Street; however, there are currently no stops within a reasonable walking distance to/from the subject development site.

Table 1: Transit Information

Stop #	Location	Route Identifier	Direction
#0433	120m north of Booth/Wellington	61, 63, 66, 75, 85	Southbound
#1877	Immediately south of Booth/Wellington	61, 63, 66, 75, 85	Southbound
#1876	Immediately south of Booth/Wellington	61, 63, 66, 75, 85	Northbound
#2371	Immediately south of Preston/Albert	85	Southbound
#2392	Immediately east of Albert/Empress	16,57,61,75	Westbound
#2396	Immediately east of Albert/Empress	16,57,61,75	Eastbound
#3010	Pimisi LRT Station	Confederation Line	East/Westbound
#3010A	Pimisi Station, Upper Level	61, 63, 66, 75, 85	Northbound
#3010B	Pimisi Station, Upper Level	61, 63, 66, 75, 85	Southbound
#3010C	Immediately west of Booth/Albert	16,57,61,75	Westbound
#3010D	Immediately east of Booth/Albert	16,57,61,75	Eastbound
#3060	Bayview LRT Station	Confederation & Trillium Line	East/Westbound & Southbound
#3060A	150m west of City Centre/Albert	16,57,61,63,66,75	Westbound
#5684	100m east of Preston/Albert	16,57,61,75,85	Eastbound
#5722	120m north of Booth/Wellington	61, 63, 66, 75, 85	Northbound
#6659	70m west of Preston/Albert	16,57,61,75	Westbound
#8005	Immediately south of Preston/Albert	85	Northbound
#8048	Immediately east of City Centre/Albert	16,57,61,75	Eastbound

The following **Figure 6** depicts the OC Transpo routes within the vicinity of the LeBreton Flats, and **Table 2** provides additional information with respect OC Transpo service identified in Table 1.

Figure 6: Transit Routes Within Study Area *(Source: OC Transpo System Map)*

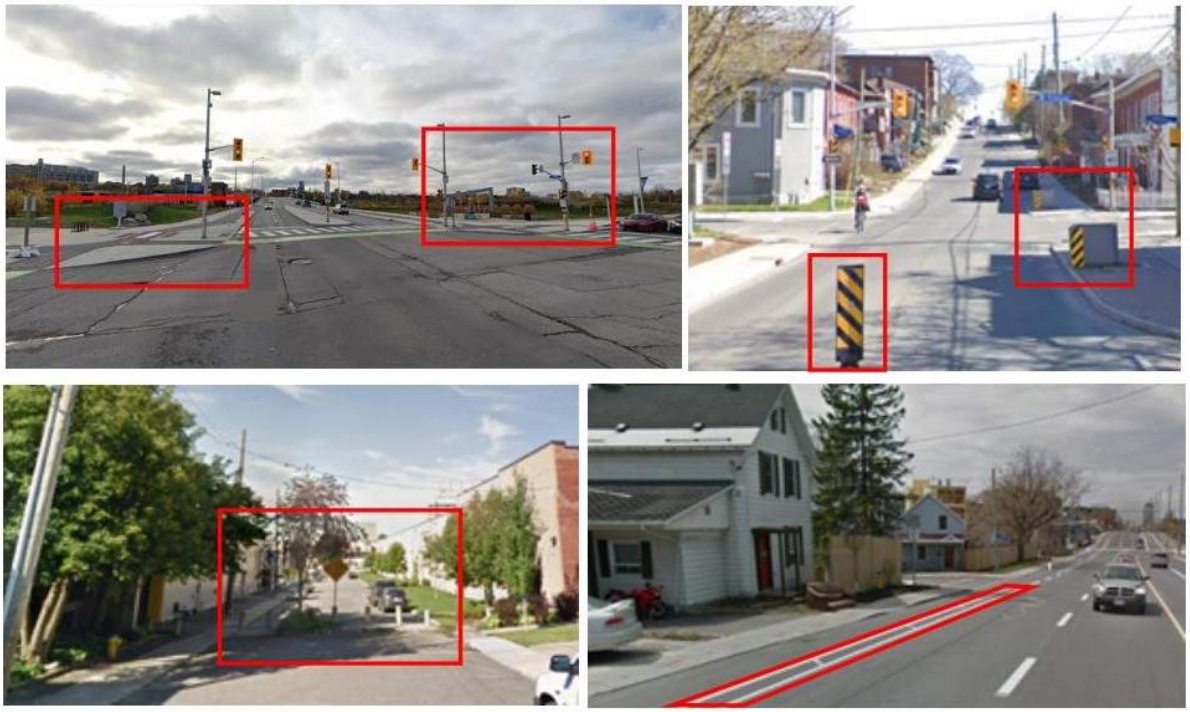
Table 2: OC Transpo Route Information

Route	Origin/Destination	Service Type	Peak Hour Headway
1	Confederation Line (Tunney's Pasture ↔ Blair)	LRT	5 min
2	Trillium Line (Bayview ↔ Greenboro)	LRT	12 min
16	Tunney's Pasture/Westboro ↔ Main Street	Local	30 min
57	Tunney's Pasture ↔ Bells Corners	Rapid & Night Route	15 min *(20 -30 min on Night Route)*
61	Tunney's Pasture/Gatineau ↔ Stittsville	Rapid & Night Route	5 min, *(30 min on Night Route)*
63	Briarbrook ↔ Tunney's Pasture	Rapid	15 min
66	Gatineau ↔ Kanata-Solandt	Limited Local	15 min, AM-out/PM-inbound only
75	Barrhaven Centre ↔ Tunney's Pasture/Gatineau	Rapid & Night Route	10 min, *(20 -30 min on Night Route)*
85	Gatineau ↔ Bayshore	Frequent	15 min

Area Traffic Management Measures

The following **Figure 7** highlights the various area traffic management measures implemented within the vicinity of LeBreton Flats. The top left corner of the figure shows bulb-outs, deflectors, and turning restrictions on Wellington/Booth. The top right corner of the figure shows bulb-outs, planter, and vertical centreline treatments on Booth Street, south of the Booth/Albert intersection. It should also be noted that there are speed humps on Booth between Albert Street and Primrose Avenue. The bottom left corner shows on-street plazas/vehicle access closure on Elm St. W (vehicle access closures are also present on Spruce St. W). The bottom right corner shows road dieting measures on Scott Street in the form of a bike lane with buffer.

Figure 7: Area Traffic Management



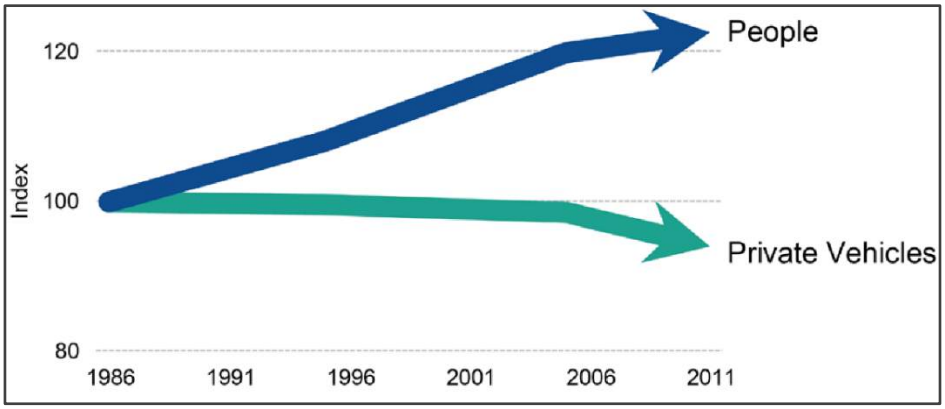
Peak Hour Travel Demands

For the purpose of this assessment and based on the initial study, the following study area intersections have been identified for intersection capacity analysis (traffic count date included in parentheses):

- Portage Bridge/Wellington (June 2014)
- Booth/Chaudière
- Booth/Wellington (May 2013)
- Booth/Albert (April 2014)
- Booth/War Museum (July 2013)
- Albert/Preston (April 2014)
- Vimy/Wellington (January 2020)
- Slidell/Sir John A. Macdonald Parkway (April 2017)
- Albert-Scott/Bayview Station (April 2014)
- Albert/City Centre (April 2014)
- Parkdale/Sir John A. Macdonald Parkway (February 2020)
- Parkdale/Scott (April 2014)

It is noted in the City's 2013 TMP that reliance on vehicles to enter and exit the downtown has been diminishing for some time now. **Figure 8** below, from the TMP, illustrates this graphically. The exhibit makes it clear that between 1986 and 2011, the number of vehicles arriving downtown in the morning peak period has decreased while the number of people arriving downtown has increased. An Origin-Destination Travel Survey that was planned for 2021 has been delayed due to the COVID-19 pandemic, but the trend is expected to have continued from 2011 onwards due to the increased residential development in the downtown, improved transit service, and limited roadway capacity to enter the downtown.

Figure 8: Trips Entering the Downtown Core, Morning Peak Period, 1986 – 2011



According to the City of Ottawa's New Official Plan (2021), LeBreton Flats falls within the Downtown Core Transect (formerly known as Ottawa's Central Area in older versions of the Official Plan), which encompasses a large portion of the downtown area. Therefore, for the purposes of this study, no background traffic growth (i.e., background traffic growth of 0%) was assumed.

In addition to the lack of growth in background traffic, the study area roadways have been impacted by LRT related construction activities for a considerable time (2015-2020) which reduced the attractiveness of relying on private vehicles and prompted some to change their trip time, forego their trips, or change routes/destinations in an effort to avoid congestion. Additionally, the COVID-19 crisis that started in March 2020 further impacted travel patterns, making more recent traffic counts post LRT implementation not beneficial or representative of "typical" conditions. Therefore, and as agreed to by City Staff, historical traffic count data from the year 2014 (where available) was used for analysis purposes. It should be noted that due to certain data gaps (i.e., not every study area intersection was counted during the year 2014), a volume balancing exercise was conducted (i.e., traffic volumes were appropriately adjusted to minimize large volume imbalances between study area intersections).

The following **Figure 9** depicts observed weekday morning and afternoon peak hour vehicle volumes at the study area intersections and **Figure 10** illustrates pedestrian and cyclist volumes over the same peak hour periods. It should be noted that two of the counts were taken during winter, and six of the counts were taken in early spring, which may result in artificially lower cycling volumes due to poor cycling conditions. Additionally, City staff indicate that cycling volumes have greatly increased since 2014, which means cycling volumes below may be underreported for current conditions. Detailed traffic count data is included in **Appendix B**.

Existing Road Safety Conditions

Available collision data for the years 2015 – 2019 was obtained from the City of Ottawa's Open Data Catalogue and provided in **Appendix C**. The collision data includes all collisions occurring at the intersections and the roadway segments within the area surrounding the subject development site, including intersections and segments along Albert Street, Booth Street, Parkdale Avenue, Scott Street, Wellington Street and Sir John A. Macdonald Parkway.

Based on the most recent available historical collision data, the 5-year total number of recorded collisions within the study area is 552. Most collisions within the study area (441 incidents or 80%) resulted in property damage only, and the remaining collisions result in either personal injuries (109 incidents or 20%) or fatalities (2 incidents or <1%). Both fatalities occurred outside the development area, at the intersection of Sir John A Macdonald Parkway (SJAMP) with Slidell. The most frequent types of collisions, as cited by police, were rear ends (217 incidents or 39%) and sideswipes (100 incidents or 18%).

It is noteworthy that within the five years of recorded collision data, there were 10 collisions involving pedestrians. Fortunately, all the reported collisions involving pedestrians were non-fatal; however, personal injuries were reported.

There were 20 collisions involving cyclists within the five years of recorded data, 19 of which were at intersections and 1 which was on a roadway segment. It is notable that 4 of the 20 collisions occurred at the intersection of Albert Street and Booth Street.

Figure 9: Turning Movement Counts, AM Peak (PM Peak)

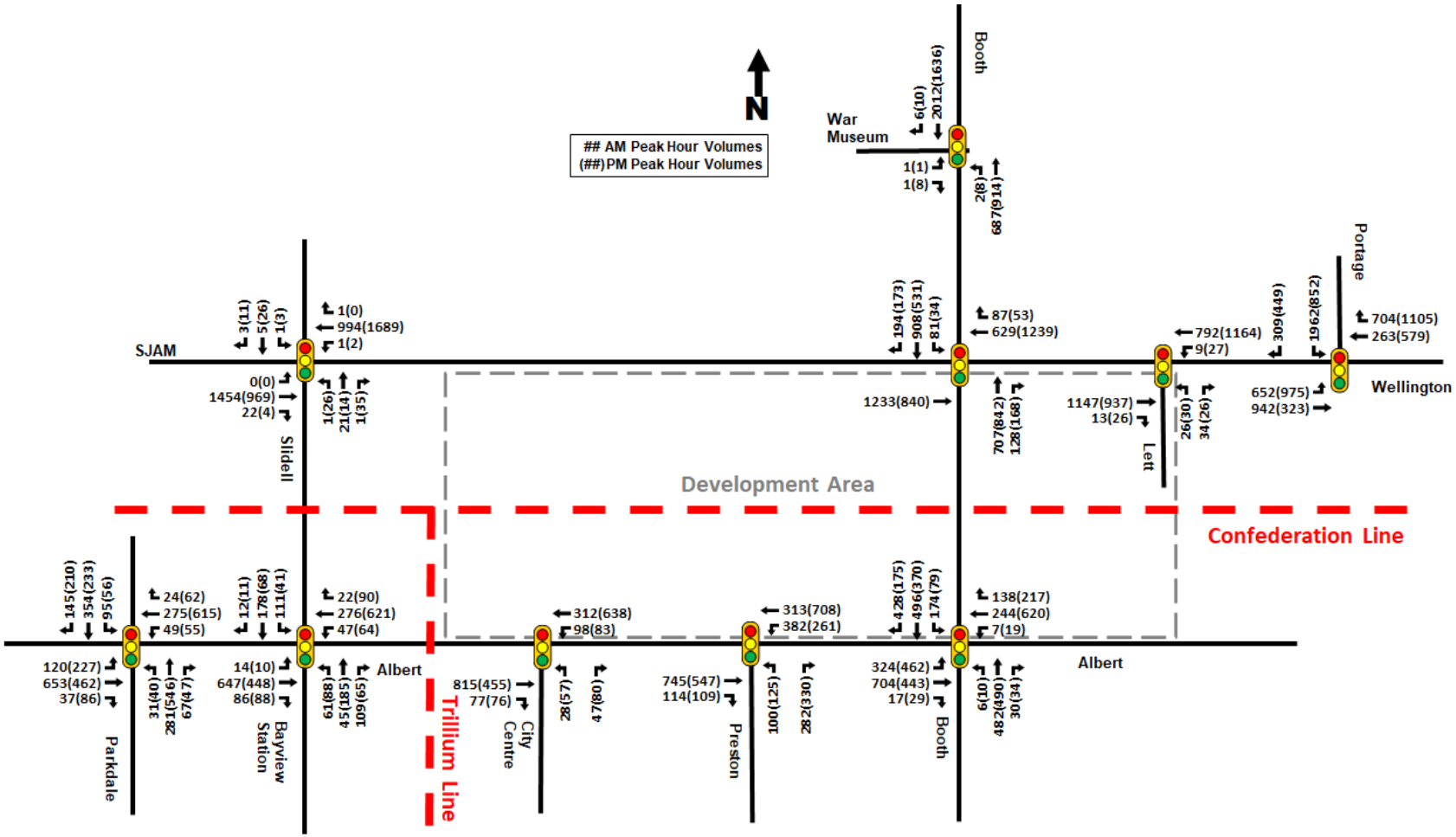
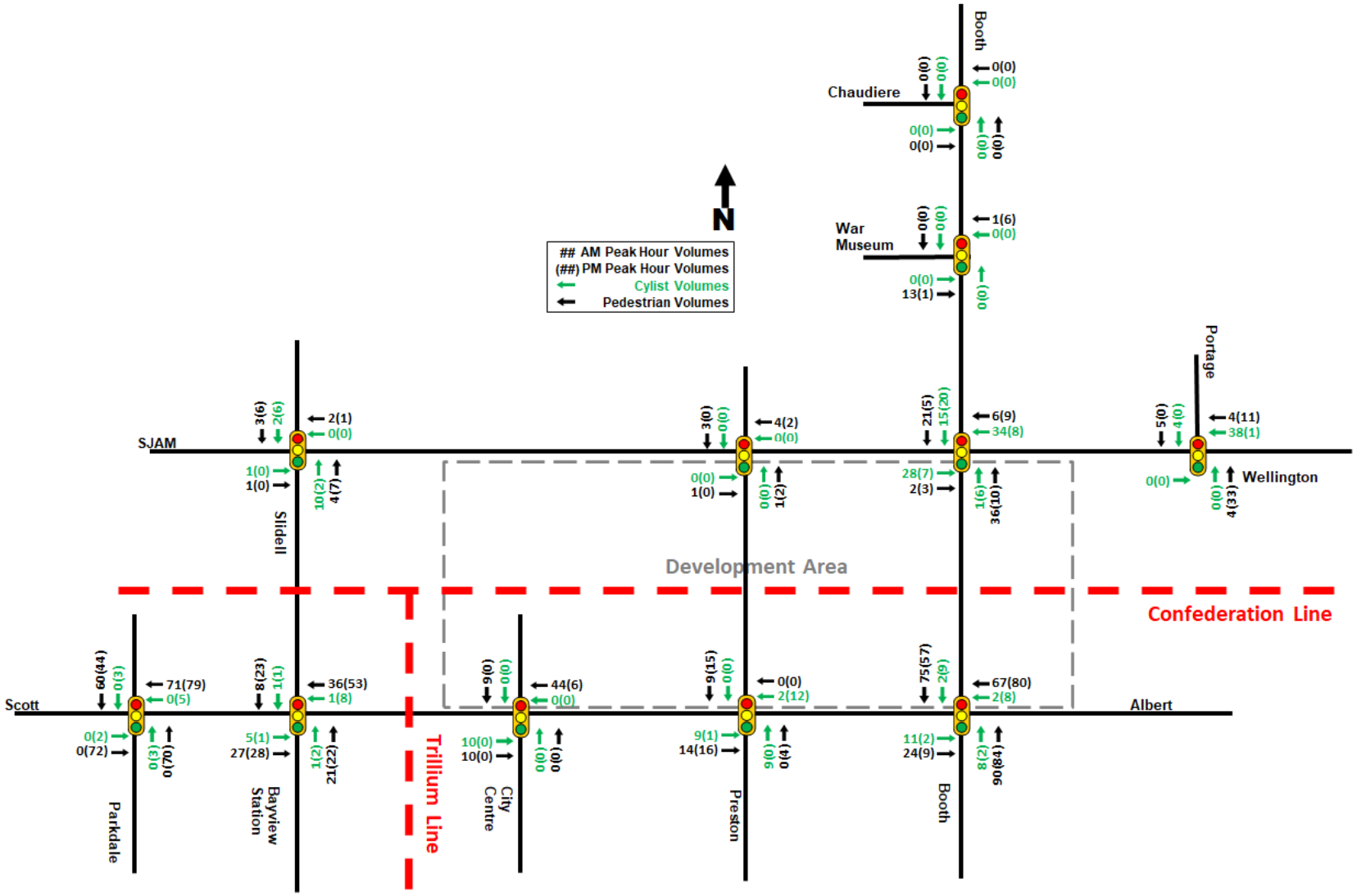


Figure 10: Existing Pedestrian and Cyclist Volumes, AM Peak (PM Peak)



3.1.3 Planned Conditions

Active Transportation Projects

Cycling projects underway or planned in the area include:

- Approximately one kilometer of multi-use pathway was recently built in LeBreton Flats. This pathway links existing multi-use pathways at Pimisi LRT Station with the Trillium Pathway and the Ottawa River Pathway.
- Uni-directional cycle tracks on Bay Street, from Wellington Street to Laurier Avenue, were completed in 2021, providing connectivity between Wellington Street and the Laurier Avenue bike lanes.
- Uni-directional cycle tracks on Booth Street north of Wellington Street, providing connectivity between Wellington Street and the Ottawa River Pathway. These cycle tracks will connect to the cycling facilities being provided across the Chaudière Crossing as part of the Zibi development, which in turn will connect to Gatineau and NCC cycling facilities on the Quebec side of the Ottawa River.
- A segregated bike facility on Wellington Street providing connectivity between Portage Bridge and Mackenzie Avenue.
- Eastbound cycle tracks along Albert Street through the study area, from City Centre Avenue in the west to Empress Avenue in the east, as part of the Albert Street Cycling / Pedestrian Modifications project. As part of this project some sections of the existing multi-use pathway on the north side of Albert Street will be maintained, while others will be converted to uni-directional westbound cycle tracks. Protected intersections at City Centre Avenue, Preston Street and Booth Street will also be implemented as part of this project.
- Uni-directional cycle tracks along Albert Street east of the study area as part of various improvement projects along Albert Street and Slater Street[1], extending from Empress Avenue in the west to the Mackenzie King Bridge in the east.
- Uni-directional cycle tracks intermittently along Scott Street, extending from Holland Avenue to Bayview Station Road and includes protected intersections at Parkdale Avenue, Carruthers Avenue, and Bayview Station Road. The cross-section will be reduced to two through lanes (i.e., one in each direction), with auxiliary turn lanes at select intersections.
- A multi-use pathway across the Chief William Commanda Bridge (formerly the Prince of Wales Bridge), as part of the Chief William Commanda Bridge rehabilitation project.

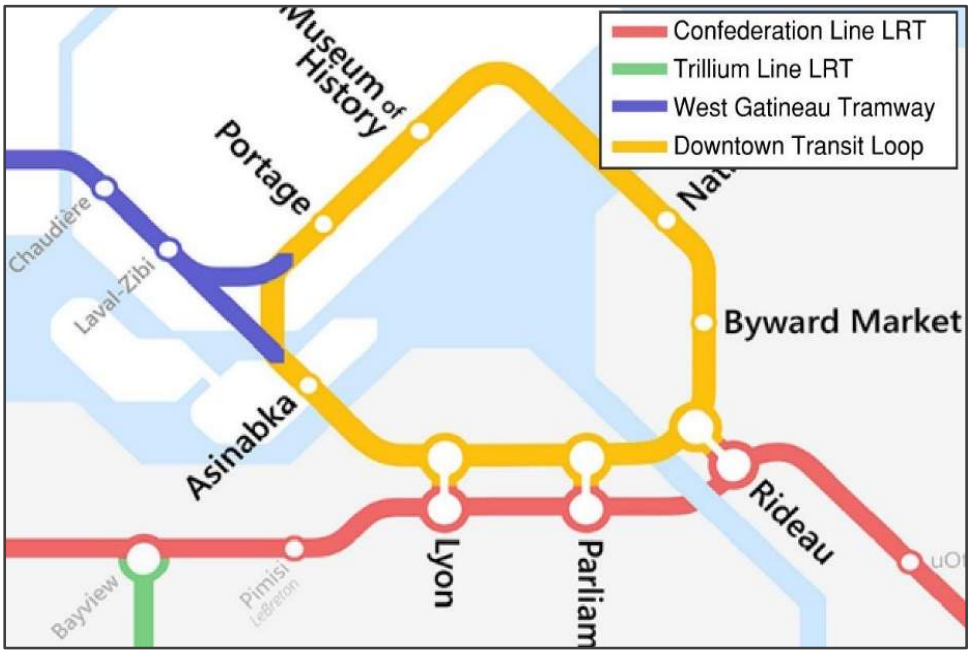
[1] Reconstruction Of Albert Street, Queen Street, Slater Street And Bronson Avenue - Draft Design Roll Plan, January, 2021

Transit Projects

With the completion of Ottawa's Confederation LRT line in 2019, there are no proposed or ongoing transit projects within the vicinity of the site identified in the City of Ottawa's Transportation Master Plan (TMP). Construction work for the Stage 2 LRT extension of the Confederation Line is ongoing at the time of this study; while no construction on Stage 2 is located within the study area, the extension of the line will increase the usage of the Confederation Line, which bisects the LeBreton Flats site. In the coming years, the transit only lanes along Albert and Slater Streets will be removed as part of the various upgrades to pedestrian and cycling facilities, identified in the section above.

The City of Gatineau has recently released plans for a tramway connecting the growing area of Aylmer to downtown Ottawa, including potential connections to the Confederation Line. The system would traverse the Portage Bridge into Ottawa, likely replacing the existing bus-only lanes on the Portage Bridge. The tramway would terminate near Elgin Street, with an alignment either along Wellington Street or a tunnel under Sparks Street. The City of Ottawa has shown a preference for the Sparks Street alignment, while the NCC has shown a preference for the Wellington Street alignment. The closest the West Gatineau Tramway would be to LeBreton Flats is at the intersection of Wellington/Portage Bridge, which is approximately 270m from the northeast corner of the development site. There are currently no projections for OC Transpo and STO ridership changes, although it can be expected that there may be fewer trips on bus routes crossing into Gatineau on Booth Street, such as OC Transpo Route 85. Additionally, the NCC has indicated an interest in pursuing a "Downtown Transit Loop" dating back to 2020, connecting the downtowns of Ottawa and Gatineau[2]. **Figure 11** below shows all existing and proposed rapid transit networks in the downtown area.

Figure 11: Proposed Downtown Rapid Transit Network



[2] https://ncc-ccn.gc.ca/news/national-capital-region-loop-the-idea-whose-time-has-come

Road Projects

Referencing the City of Ottawa's Construction and Infrastructure Projects website, construction is anticipated to impact the following roadways within the study area. These construction projects may relate to road resurfacing, watermains, sewers, multi-use pathways, and bike facilities, which are all opportunities to change roadway characteristics/functionality:

- This year (2023-2024)
  - Re-alignment of Albert Street and Slater Street, between Empress Avenue to Bay Street, as well as construction on Queen Street.
  - Albert Street Cycling / Pedestrian Modifications project, between City Centre Avenue and Empress Avenue.
  - Scott Street Protected Intersections project, between Holland Avenue and Bayview Station Road.
  - Wellington Street resurfacing, from Booth to O'Connor.
- 2-5 years
  - Scott Street streetscaping, from Parkdale Avenue to Bayview Station Road.
  - Road, sewer and water on City Centre Avenue, and Elm Street between Albert and Preston.
- 5+ years (or construction start yet to be determined)
  - Albert Street and Slater Street, Bay Street to Elgin Street.

Other Area Development

Planned developments within the study area have been identified using the City's Development Application Search Tool. The following **Table 3** below summarizes planned and active developments within the vicinity of the subject development lands.

Table 3: Area Development

Location	Description	Size	Type
3-4 Booth	Zibi Project, Chaudière and Albert Islands Redevelopment	(Ottawa Sector) - 1,202 condo units - 51,954 ft^2 retail - 184,045 ft^2 office - 160 suite hotel	Mixed-use community
133 Booth	East LeBreton Flats Redevelopment	- 592 residential units - 5,190 ft^2 daycare - 3,265 ft^2 ground floor commercial	Mixed-use community
900 Albert	Three high-rise residential buildings with commercial	- 1,232 condo units - 150 suite hotel - 128,370 ft^2 retail - 197,324 ft^2 office	Mixed-use residential buildings

It should be noted that the projected impact of the developments summarized in Table 3 are included in the subsequent analysis.

3.2 Study Area and Time Periods

3.2.1 Study Area

The following study area intersections were agreed to be assessed through discussions with City staff:

- Portage Bridge/Wellington
- Booth/Chaudière
- Booth/Wellington
- Booth/Albert
- Booth/War Museum
- Albert/Preston
- Vimy/Wellington
- Slidell/ Sir John A. Macdonald Parkway
- Bayview Station/Albert
- Albert/City Centre
- Parkdale/Scott

The defined study area is considered to be relatively large and should capture the majority of the projected traffic generated by the proposed development lands. Traffic impacts outside the defined study area should be relatively small. However, shifts in demand may occur outside of the study area due to the currently saturated road network. Such changes in travel behaviour may be captured by the City's regional macroscopic transportation demand model, which is currently being updated to help assess future infrastructure needs.

3.2.2 Time Periods

Given the surrounding road network (e.g., Albert Street, Wellington Street) typically experience the heaviest traffic volumes during the weekday morning and afternoon peak hours, this assessment considered weekday morning and afternoon peak hours for analysis purposes only.

3.2.3 Horizon Years

As noted in the TIA Guidelines, when a development will proceed in phases, TIA analysis must be completed for each development phase. Due to the scope of the development, it is difficult to select an exact year for full build-out of each phase, however through discussions with the NCC and O2 Planning + Design (consultants of the Master Concept Plan), the following horizons were agreed to for assessment.

- 2030: Phase 1 build-out
- 2040: Phase 2 build-out
- 2050: Phase 3 build-out

It is noted in the TIA Guidelines that a "build-out plus five years horizon" is also required. It is also noted that the City may waive the need to analyze a "build-out plus five years horizon". It is proposed here that due to the numerous stages to this development along with the lack of background traffic growth, that no "build-out plus five years horizon" be required.

3.3 Exemptions Review

Given the size and nature of the proposed development lands, and following discussion with City Staff, the following TIA analysis modules have been exempted from this TIA analysis: Modules 4.1, 4.2, 4.3 and 4.4. It is our understanding that the City will request that these modules be included in future development applications for individual parcels of land. The following **Table 4** summarizes the modules that were considered for exemption.

Table 4: Module Exemption Review

Module	Element	Exemption Criteria	Exemption Status
Design Review			
4.1 Development Design	4.1.2 Circulation and Access	Required for Site Plans	**Exempt**
	4.1.3 New Street Network	Required for Plans of Subdivision	**Exempt**
4.2 Parking	4.2.1 Parking Supply	Required for Site Plans	**Exempt**
	4.2.2 Spillover Parking	Required for Site Plans where parking supply will be 15% below unconstrained demand	**Exempt**
4.3 Boundary Streets	Mobility	Exempt through discussions with City has noted above.	**Exempt**
	Road Safety		
	Neighbourhood Traffic Management		
4.4 Access Intersections	4.4.1 Location and Design of Access		**Exempt**
	4.4.2 Intersection Control		
	4.4.3 Intersection Design		
Network Impact			
4.5 Transportation Demand Management	All Elements	Not required for non-residential Site Plans expected to have fewer than 60 employees and/or students on location at any given time	**Not Exempt**
4.6 Neighbourhood Traffic Management	All Elements	Required when the development relies on local or collector streets for access and total volumes exceed ATM capacity thresholds	**Not Exempt**
4.8 Network Concept	All Elements	Required when development is projected to generate more than 200 person-trips during the peak hour, in excess of the equivalent volume permitted by the established zoning	**Not Exempt**

4. STEP 3 – FORECASTING

4.1 Development-Generated Travel Demand

4.1.1 Land Use Scenarios

As previously described, the Master Concept Plan of LeBreton Flats is planned to include a mix of high-density residential, office, retail and hotel type land uses, as well as approximately 12.7 hectares of parks and open spaces. It should also be noted that the current Master Concept Plan includes an option to host a major event centre. Based on a land use planning exercise by O2 Planning + Design, four potential development scenarios were envisioned for LeBreton Flats – all of which are summarized in **Table 5** below.

Table 5: Potential Development Scenarios

Scenario	Description	Townhome (units)	Mid-Rise (units)	High-Rise (units)	Retail (ft^2)	Office (ft^2)	Hotel (ft^2)
1	Major Event Centre & Mixed-use	379	1,076	2,626	195,382	523,126	216,418
2	Mixed-use Only	473	1,242	2,735	183,617	535,483	85,638
3	Major Event Centre & Predominantly Office	95	1,174	3,069	194,866	949,378	230,950
4	**Major Event Centre & Highest Density**	301	1397	2419	261,035	508,734	154,419

Of the four scenarios listed above, Scenario 4 has the highest density and therefore, is considered to exhibit the highest potential trip generation. As such, the **subsequent analysis will only consider Scenario 4, as it reflects the "worst case scenario" from a trip generation perspective**. That being said, Scenario 4 is considered to be the most ambitious development scenario.

For analysis purposes, the Master Concept Plan has been assumed to be built-out in the following phases:

Phase 1: Early Stages (approximately 2023-2030)

Land Sales + Development

- Albert District (east of Booth Street, North of Albert Street) {parcels A9, A10}
- Flats North (+associated new streets/lanes) {parcels F1, F2, F3, F8}
- Albert District West: Major events centre development (major event centre site) {parcels A1, A2, A3, A4}
    - If no major event centre is developed (or other special uses): NCC will proceed with Alternate Site option (+associated streets)

Infrastructure & Open Space Investments

- Cave Creek Sewer
- Urban Playground
- Inlet area
- Ph1. City Park (East)
- Preston (between Albert & LRT)
- Preston Pedestrian/Bike Bridge
- Connecting pathway to Bayview station
- Potential for limited improvements for interim uses in the Aqueduct District

Phase 2: Middle Stages (2030-2040)

Land Sales + Development

- Flats South (+associated streets) {F4, F9, F10, F11, F12}
- Albert District West, between Preston and Broad (+associated streets) {A5, A6}

Infrastructure & Open Space Investments

- Covered Aqueduct enhancements
- Aqueduct District Open Spaces
- Ph2. City Park (west)
- Capital Park
- City Centre Pedestrian/Bike Bridge

Phase 3: Later Stages (2040+)

Land Sales + Development

- Aqueduct District {AD1, AD2, AD3, AD4, AD5}
- Albert District East (south of Albert Street) {A11, A12}
- Albert District West, between Broad and Booth (+associated streets) {A7, A8}
- Flats (Pindigen Park Site) {F5, F6, F7}

The following **Table 6** summarizes the size and type of land uses for each development block per planned phase of development for Scenario 4.

Table 6: Scenario 4 Land Use Build-out by Block/Phase

Block	Land Use					
	Low-Rise Housing (units)	Mid-Rise Housing (units)	High-Rise Housing (units)	Shopping Center (ft^2)	General Office (ft^2)	Hotel (ft^2)
Phase 1 (2023-2030)						
A1	-	120	364	14,951	-	-
A2-4 (Major Event Centre)	-	-	257	25,510	-	101,719 (201 rooms)
A9	-	59	128	10,333	-	-
A10	-	114	256	20,333	-	-
F1	74	-	-	-	-	-
F2	56	-	-	-	-	-
F3	76	-	-	-	-	-
F8	-	86	-	9,515	-	52,700 (104 rooms)
Phase 1 Total	*206*	*379*	*1005*	*80,643*	-	*154,419 (305 rooms)*
Phase 2 (2030-2040)						
A5	10	132	81	-	-	-
A6	10	145	122	9,020	-	-
A11	0	178	61	11,259	-	-
A12	0	60	41	6,458	-	-
F9	14	81	94	5,533	-	-
F10	14	86	135	5,877	-	-
Phase 2 Total	*48*	*682*	*534*	*38,147*	-	-
Phase 3 (2040+)						
A7	-	-	150	21,905	144,139	-
A8	-	-	230	30,257	117,563	-
F4	47	-	-	-	-	-
F5	-	56	95	-	-	-
F6	-	49	68	-	-	-
F7	-	55	-	-	-	-
F11	-	110	175	30,785	-	-
F12	-	66	162	19,289	-	-
AD1-5	-	-	-	40,009	247,032	-
Phase 3 Total	*47*	*336*	*880*	*142,245*	*508,734*	-
Total	**301**	**1397**	**2419**	**261,035**	**508,734**	**154,419 (305 rooms)**

4.1.2 Trip Generation

For the purpose of this assessment, projected residential site-generated traffic was estimated using the City of Ottawa TRANS Trip Generation Manual (2020). Projected retail, office and hotel traffic was estimated using the trip generation rates from the 10th Edition of the Institute of Transportation Engineers (ITE) Trip Generation Manual. This method of predicting trip generation is considered industry best practice, is the method required as part of a formal Traffic Impact Assessment Study for the City of Ottawa, and is the method agreed to specifically for this project through discussions with the City of Ottawa.

Based on the foregoing and the information provided, the following **Table 7** summarizes appropriate vehicle trip generation rates for estimating projected site-generated traffic by land use. It should be noted that the first listed equation is an average person trip generation rate, and the second equation is a "line of best fit" equation that more accurately represents the trend of person trip generation based on land use size. Typical industry practice is to use the "line of best fit" equation for site-generated traffic projections, if available.

Table 7: Trip Generation Rates

Land Use	Land Use Code (TRANS / ITE)	AM Peak Hour	PM Peak Hour
Low-Rise Multi-family Housing *(X = Units)*	TRANS Multi-Unit (Low-Rise)	T = 0.68(X)	T = 0.70(X)
Mid-Rise Multi-family Housing *(X = Dwelling Units)*	TRANS Multi-Unit (High-Rise)	T = 0.4(X)	T = 0.4(X)
High-Rise Multi-family Housing *(X = Dwelling Units)*	TRANS Multi-Unit (High-Rise)		
Shopping Center *(X = 1,000 ft² GFA)*	ITE 820 General Urban/Suburban	T = 5.03(X); or Ln(T) = 0.86(X) + 2.53	T = 7.49(X); or Ln(T) = 0.66(X) + 4.04
General Office Building *(X = 1,000 ft² GFA)*	ITE 710 General Urban/Suburban	T = 1.25(X); or T = 1.23(X) + 6.01	T = 1.35(X); or T = 1.32(X) + 6.07
Hotel *(X = Rooms)*	ITE 310 General Urban/Suburban	T = 0.47(X); or T = 0.5(X) – 5.34	T = 0.60(X); or T = 0.75(X) - 26.02

Note: T = Average Person Trip Ends

With respect to TRANS residential trip generation rates, the TRANS Trip Generation Manual provides a person trip rate for the AM and PM peak periods. Adjustment factors are also provided in the TRANS Trip Generation Manual to convert the person peak period trip rates into vehicular, transit, cycling and walking peak hour trip rates.

With respect to ITE Trip Generation rates, the data used to develop these rates in the 10th Edition of the Trip Generation Manual provides person trips for certain development types, including Shopping Center (ITE Land Use Code 820) and General Office Building (ITE Land Use Code 710). These person trips were calculated for each land use, and then broken down into trips for different modes (vehicle, transit, cycling and walking) by using the mode split agreed upon with the City for this development (refer to Travel Mode Shares below).

The Hotel Land Use Code (ITE Code 310) only includes vehicular trip generation, with the data collection surveys used to develop the trip generation typically conducted in highly suburban locations with limited access to transit and dedicated non-motorized facilities (e.g., sidewalks, bike lanes, etc. are generally limited). To properly consider the multi-modal trips generated by the Hotel land use, projected site-generated traffic (estimated using ITE trip generation rates) is converted to projected site-generated person trips. To convert projected ITE vehicle trips to person trips, an auto occupancy factor and non-auto trip factor is applied to the ITE trip generation rates. According to the City's TIA Guidelines, and based on available American Census data, the typical modal share of non-auto person

trips is approximately 10% and the typical auto occupancy is 1.15. When combined/solving for "person trips" (i.e., Persons = 1.15xAutos + 0.10xPersons), a factor of 1.28 is used to convert vehicle trips to person trips. These person trips are then broken down into trips for different modes (vehicle, transit, cycling and walking) by using the mode split agreed upon with the City for this development (refer to Travel Mode Shares below).

The following **Table 8** and **Table 9** summarizes the resulting projected two-way person site trip generation for each phase of development, by development block and by land use type, respectively.

Table 8: Projected Site Person Trip Generation by Block / Parcel

Block	AM Peak Hour			PM Peak Hour		
	In	Out	Total	In	Out	Total
Phase 1 (2023-2030)						
A1	130	193	323	282	250	532
A2-4 (Major Event Centre)	214	214	428	394	350	744
A9	74	95	169	176	164	340
A10	136	179	315	293	269	562
F1	15	35	50	29	22	51
F2	11	27	38	22	17	39
F3	15	36	51	30	23	53
F8	93	88	181	185	167	352
Phase 1 Total	*688*	*867*	*1555*	*1411*	*1262*	*2673*
Phase 2 (2030-2040)						
A5	28	64	92	53	38	91
A6	80	117	197	187	169	356
A11	84	112	196	196	180	376
A12	45	57	102	121	115	236
F9	55	79	134	134	121	255
F10	62	93	155	149	132	281
Phase 2 Total	*354*	*522*	*876*	*840*	*755*	*1595*
Phase 3 (2040+)						
A7	299	155	454	297	422	719
A8	310	199	509	362	464	826
F4	10	22	32	18	15	33
F5	19	41	60	35	25	60
F6	14	33	47	27	19	46
F7	7	15	22	13	9	22
F11	165	188	353	339	320	659
F12	114	137	251	253	239	492
AD1-5	460	191	651	392	595	987
Phase 3 Total	*1398*	*981*	*2379*	*1736*	*2108*	*3844*
Total Person Trips	**2440**	**2370**	**4810**	**3987**	**4125**	**8112**

Table 9: Projected Site Person Trip Generation by Land Use Type

Block	AM Peak Hour			PM Peak Hour		
	In	Out	Total	In	Out	Total
Phase 1 (2023-2030)						
Residential	213	480	693	400	291	691
Retail	368	312	680	878	878	1756
Office	0	0	0	0	0	0
Hotel	107	75	182	133	93	226
Phase 1 Total	*688*	*867*	*1555*	*1411*	*1262*	*2673*
Phase 2 (2030-2040)						
Residential	160	357	517	299	214	513
Retail	194	165	359	541	541	1082
Office	0	0	0	0	0	0
Hotel	0	0	0	0	0	0
Phase 2 Total	*354*	*522*	*876*	*840*	*755*	*1595*
Phase 3 (2040+)						
Residential	162	356	518	298	216	514
Retail	600	513	1113	1287	1287	2574
Office	636	112	748	151	605	756
Hotel	0	0	0	0	0	0
Phase 3 Total	*1398*	*981*	*2379*	*1736*	*2108*	*3844*
Total Person Trips	**2440**	**2370**	**4810**	**3987**	**4125**	**8112**

As shown in Tables 8 and 9, the full build-out of LeBreton Flats is ultimately projected to generate an approximate two-way total of 4,810 and 8,110 person trips per hour during weekday morning and afternoon peak hours, respectively.

It should be noted that a percentage of projected site-generated trips can be attributed to 'pass-by' traffic (i.e., a quick stopover at LeBreton Flats on someone's normal daily commute), which does not impact overall network capacity, as a 'pass-by' trip is traffic already using the adjacent transportation network. Additionally, a percentage of projected site-generated trips could theoretically be further reduced, as a certain percentage of trips will be 'internal' trips (i.e., originate from and be destined to LeBreton Flats, such as individuals who live, work and shop all within LeBreton Flats). A high-level estimate of internal trip capture rate was calculated using the methodology outlined in the *National Cooperative Highway Research Program (NCHRP) Report 684 – Enhancing Internal Trip Capture Estimate for Mixed-Use Developments*. The calculation showed that a person trip reduction for LeBreton Flats due to internal capture could range from 5% to 13% (approximately 260 to 1060 trips in the peak hours).

Given that these potential reductions to projected site-generated trips will largely impact walking/cycling trips (because these are the likely mode choices for internal trips at LeBreton Flats), these reductions were not considered in the subsequent analysis, in order to provide a conservative estimate in this higher-level study. Future TIAs for individual parcels of land should take into account internal trip generation for their site-specific studies.

4.1.3 Travel Mode Shares

In order to determine the number of person trips arriving/departing by travel mode, total projected person trips are subdivided by mode share values, derived from the 2011 TRANS National Capital Region (NCR) Origin-Destination (OD) survey data, the nature/context of the proposed development and local area knowledge. Key factors that are taken into consideration, beyond NCR OD survey data, include: proximity and quality of transit, pedestrian and cycling facilities, purpose of trips, etc.

Based on discussions with City Staff and remaining consistent with assumptions used for TIA studies prepared for other area development sites, such as 900 Albert Street (25-30% driver, 5-10% passenger, 45-55% transit, 15% active), the Zibi development (25-30% driver, 5% passenger, 45-55% transit, 20% active), and Wateridge Village (45-55% driver, 10% passenger, 30-35% transit, 20% active). LeBreton Flats is considered to be a Transit Oriented Development (TOD) site, given its proximity/connectivity to the highest order transit service. The TRANS Trip Generation Manual identifies this area (i.e., in close proximity to Pimisi and Bayview Stations) as up to 70% of trips being sustainable modes. As such, the following summarizes the projected modal split of site-generated traffic for the subject development:

- **15%** **Auto Driver**
- **5%** **Auto Passenger**
- **60%** **Transit**
- **20%** **Walking and Cycling**

Based on the foregoing, the resulting projected vehicle, transit, and active transportation trips generated by the proposed development are summarized in **Table 10**, **Table 11,** and **Table 12**, respectively. It is worth noting that the actual transit mode share will differ by parcel, depending on the distance from the LRT station. However, for simplicity a blended mode share was carried for the entire site.

Table 10: Projected Site Vehicle Trip Generation

Block	AM Peak Hour			PM Peak Hour		
	In	Out	Total	In	Out	Total
Phase 1 (2023-2030)						
A1	20	29	48	43	38	80
A2-4 (Major Event Centre)	33	32	64	59	52	111
A9	11	14	25	26	25	51
A10	21	27	47	44	40	84
F1	2	5	7	4	3	7
F2	2	4	6	3	3	6
F3	2	5	7	5	3	8
F8	14	13	27	28	25	53
Phase 1 Total	*105*	*129*	*231*	*212*	*189*	*400*
Phase 2 (2030-2040)						
A5	4	10	14	8	6	14
A6	12	18	29	28	25	54
A11	12	17	29	29	27	56
A12	7	8	15	18	18	35
F9	9	12	20	20	18	38
F10	10	14	24	23	20	43
Phase 2 Total	*54*	*79*	*131*	*126*	*114*	*240*
Phase 3 (2040+)						
A7	45	23	69	45	64	108
A8	46	29	75	55	70	124
F4	2	3	5	3	2	5
F5	3	6	9	5	4	9
F6	2	5	7	4	3	7
F7	1	2	3	2	1	3
F11	24	29	53	51	48	99
F12	17	20	37	38	36	74
AD1-5	69	29	98	59	89	148
Phase 3 Total	209	146	356	262	317	577
Total 'New' Vehicle Trips	**368**	**354**	**718**	**600**	**620**	**1217**

As shown in Table 10, the full build-out of LeBreton Flats is projected to generate approximate two-way vehicle volumes of 720 veh/h and 1,220 veh/h during weekday morning and afternoon peak hours, respectively.

Table 11: Projected Site Transit Trip Generation

Block	AM Peak Hour			PM Peak Hour		
	In	Out	Total	In	Out	Total
Phase 1 (2023-2030)						
A1	78	115	193	169	150	319
A2-4 (Major Event Centre)	128	129	257	229	218	446
A9	45	57	101	106	99	205
A10	82	107	189	176	162	338
F1	9	21	30	17	13	30
F2	7	16	23	13	10	23
F3	9	22	31	18	14	32
F8	56	53	109	108	104	211
Phase 1 Total	*414*	*520*	*933*	*836*	*770*	*1604*
Phase 2 (2030-2040)						
A5	17	38	55	32	23	55
A6	48	70	118	112	101	213
A11	50	68	118	118	108	225
A12	27	34	61	73	69	142
F9	33	47	80	81	73	154
F10	38	56	94	89	79	168
Phase 2 Total	*213*	*313*	*526*	*505*	*453*	*957*
Phase 3 (2040+)						
A7	179	93	272	178	254	432
A8	185	119	305	217	279	496
F4	6	13	19	11	9	20
F5	11	25	36	21	15	36
F6	8	20	28	16	11	27
F7	4	9	13	8	5	13
F11	99	113	212	204	192	396
F12	69	82	151	152	144	295
AD1-5	276	115	391	235	357	592
Phase 3 Total	837	589	1427	1042	1266	2307
Total 'New' Transit Trips	**1464**	**1422**	**2886**	**2383**	**2489**	**4868**

As shown in Table 11, the full build-out of LeBreton Flats is projected to generate approximate two-way transit trip volumes of 2,890 trips/h and 4,870 trips/h during weekday morning and afternoon peak hours, respectively.

Table 12: Projected Site Active Trip Generation

Block	AM Peak Hour			PM Peak Hour		
	In	Out	Total	In	Out	Total
Phase 1 (2023-2030)						
A1	27	39	66	58	51	109
A2-4 (Major Event Centre)	45	43	88	76	73	149
A9	16	19	35	36	34	70
A10	29	37	66	59	54	113
F1	3	7	10	6	5	11
F2	3	6	9	5	4	9
F3	3	7	10	7	5	12
F8	19	18	37	36	35	71
Phase 1 Total	*145*	*176*	*321*	*283*	*261*	*544*
Phase 2 (2030-2040)						
A5	6	14	20	11	8	19
A6	16	24	40	38	34	72
A11	17	23	40	39	36	75
A12	10	11	21	25	24	49
F9	13	16	29	27	24	51
F10	14	19	33	31	27	58
Phase 2 Total	*76*	*107*	*183*	*171*	*153*	*324*
Phase 3 (2040+)						
A7	60	32	92	60	86	146
A8	62	39	101	74	94	168
F4	3	5	8	4	3	7
F5	4	9	13	7	6	13
F6	3	7	10	6	4	10
F7	2	3	5	3	2	5
F11	32	39	71	69	65	134
F12	23	28	51	51	48	99
AD1-5	92	39	131	78	118	196
Phase 3 Total	281	201	482	352	426	778
Total 'New' Active Trips	**502**	**484**	**986**	**806**	**840**	**1646**

As shown in Table 12, the full build-out of LeBreton Flats is projected to generate approximate two-way active trip volumes of 990 trips/h and 1,650 trips/h during weekday morning and afternoon peak hours, respectively.

It should be noted that given most transit trips begin or end as an active mode, it can be expected that approximately 3,880 trips/h and 6,520 trips/h will be made to/from/within LeBreton Flats as an active mode during weekday morning and afternoon peak hours, respectively. Given this relatively high projected volume of site-generated trips made by active modes, special consideration should be given to sidewalk/pathway capacity during design. Additional discussion on proposed roadway cross sections is provided in the subsequent **Step 4 - Analysis** section.

4.1.4 Trip Distribution and Assignment

The projected distribution of site-generated vehicular traffic was derived based on existing travel patterns, the site's connections to/from the surrounding road network, and local area knowledge. (e.g., the location and proximity of other employment areas, residential communities, entertainment, etc.). For analysis purposes, the following approximate distribution of projected site-generated traffic was assumed, which is consistent with data from the most recent 2011 TRANS Origin-Destination (OD) travel survey (i.e., "existing travel patterns"), consistent with the assumptions used for TIA studies prepared for other area development sites (e.g., Zibi, 900 Albert, etc.), and has been agreed to with the City of Ottawa for use in this study.

Departure

- 60% to the east via Wellington Street and Albert Street
- 15% to the west via Sir John A. Macdonald Parkway and Albert Street
- 5% to the north via Chaudière Crossing and Portage Bridge
- 20% to the south via Booth Street, Preston Street, Parkdale Avenue and Lyon Street.

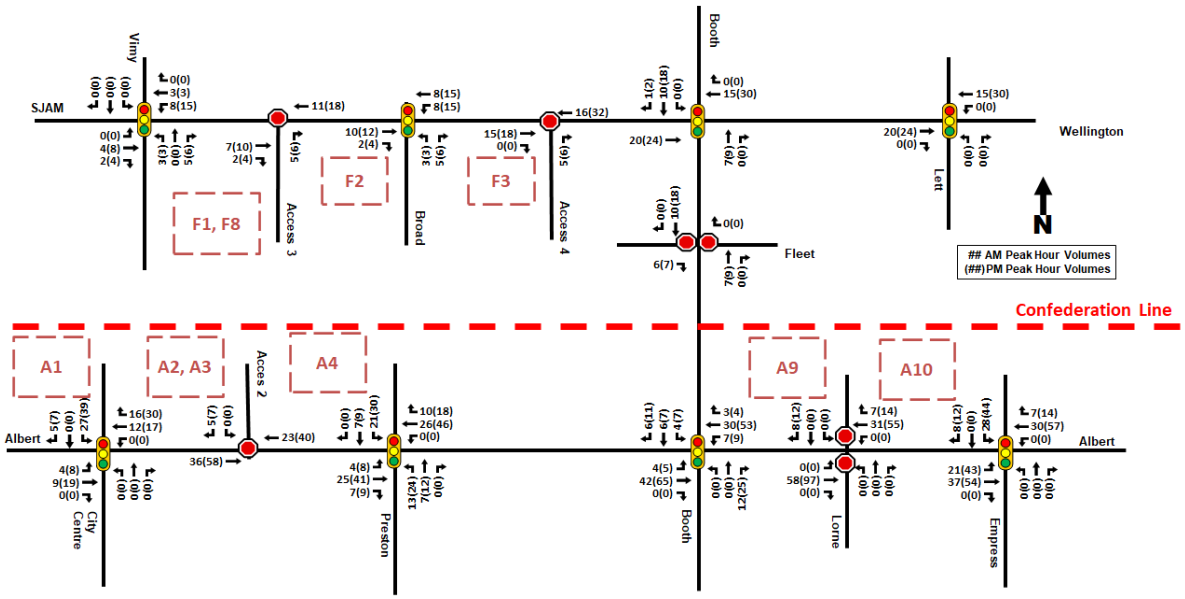
Arrival

- 40% from the east via Wellington Street and Albert Street
- 15% from the west via Sir John A. Macdonald Parkway and Albert Street
- 10% from the north via Chaudière Crossing and Portage Bridge
- 35% from the south via Booth Street, Preston Street, Parkdale Avenue and Bay Street.

Based on the above assumed distribution, projected site-generated traffic was assigned to the study area network, which is depicted as the following **Figure 12** to **Figure 15**. Site traffic was assigned individually according to each development parcel; this was done to account for the unique situation for parcels north of the Confederation Line (i.e., Flats District), where the turning restrictions at Booth Street make access to these parcels difficult.

It should be noted that given size of the study area network and the number of study area intersections, each phase of site-generated traffic is subsequently depicted as two separate figures. The first figure for each phase depicts the assignment of site-generated traffic to the greater study area network, and the second figure for each phase depicts the assignment of site-generated traffic to site driveway connections and the immediate road network surrounding the subject development lands.

Figure 12: Projected Site-Generated Traffic – Phase 1



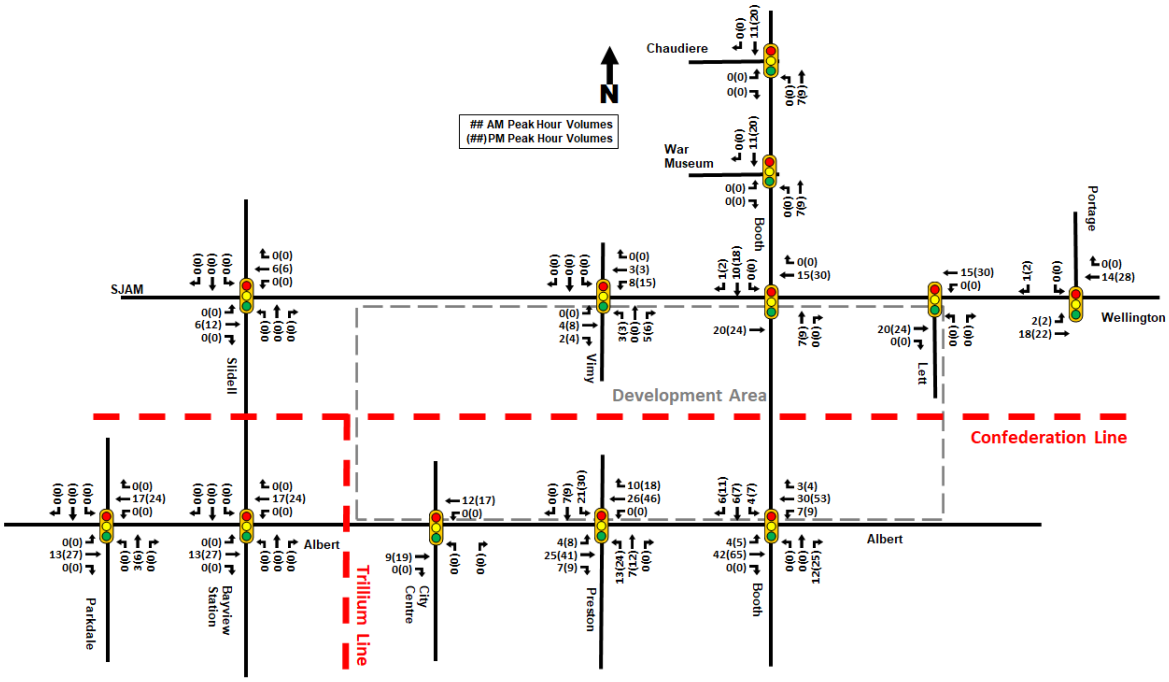


Figure 13: Projected Site-Generated Traffic – Phase 2

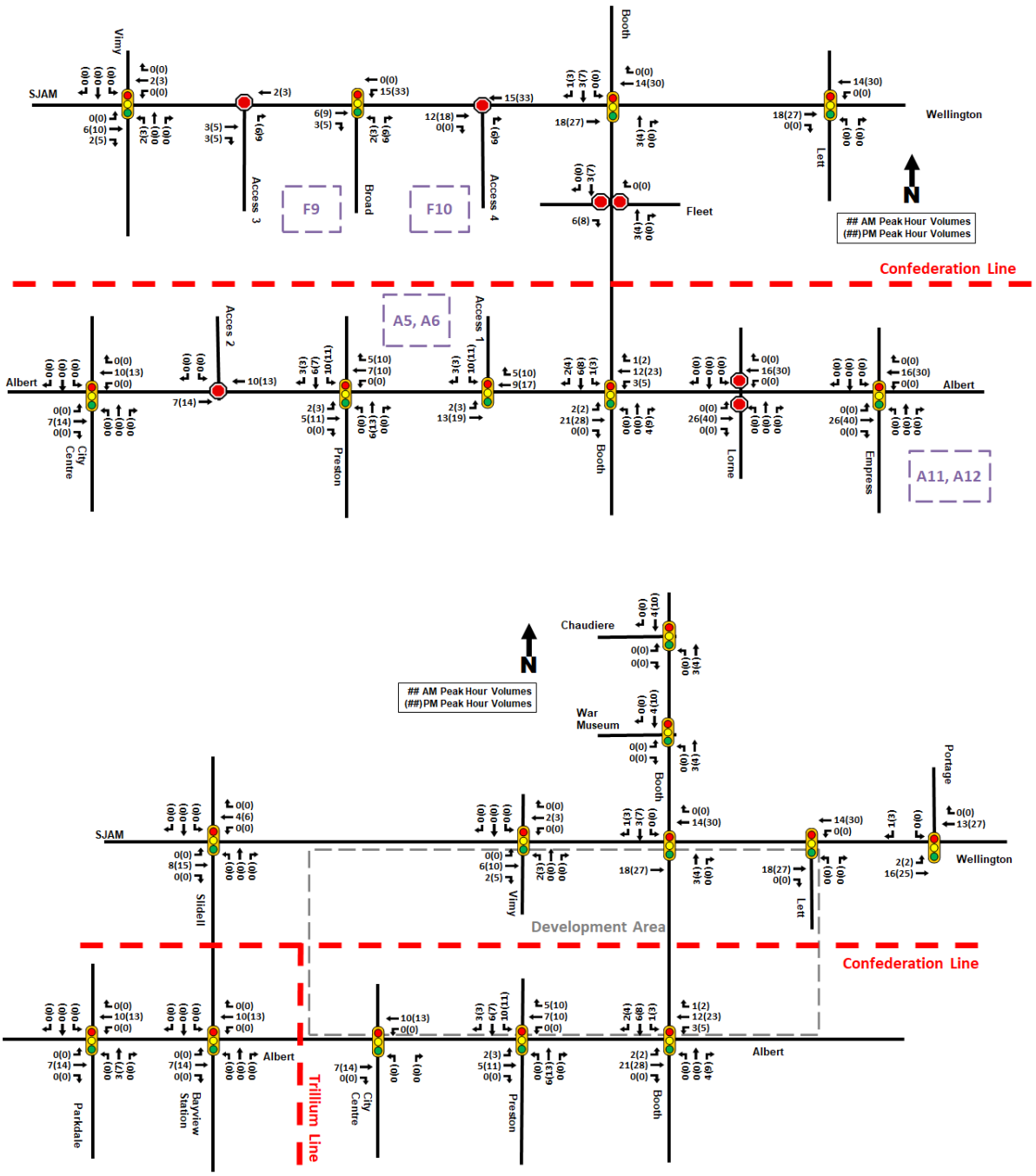


Figure 14: Projected Site-Generated Traffic – Phase 3

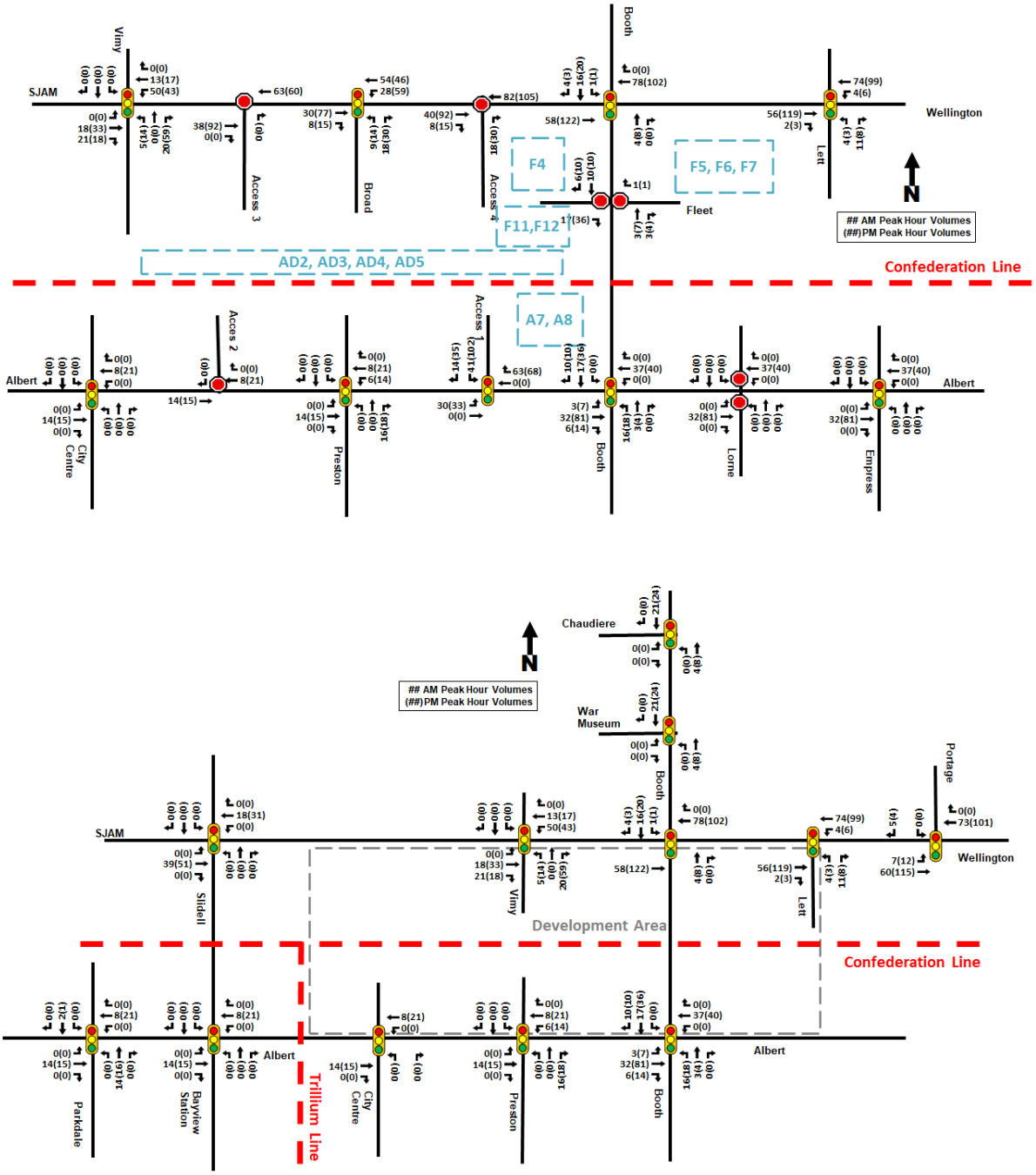
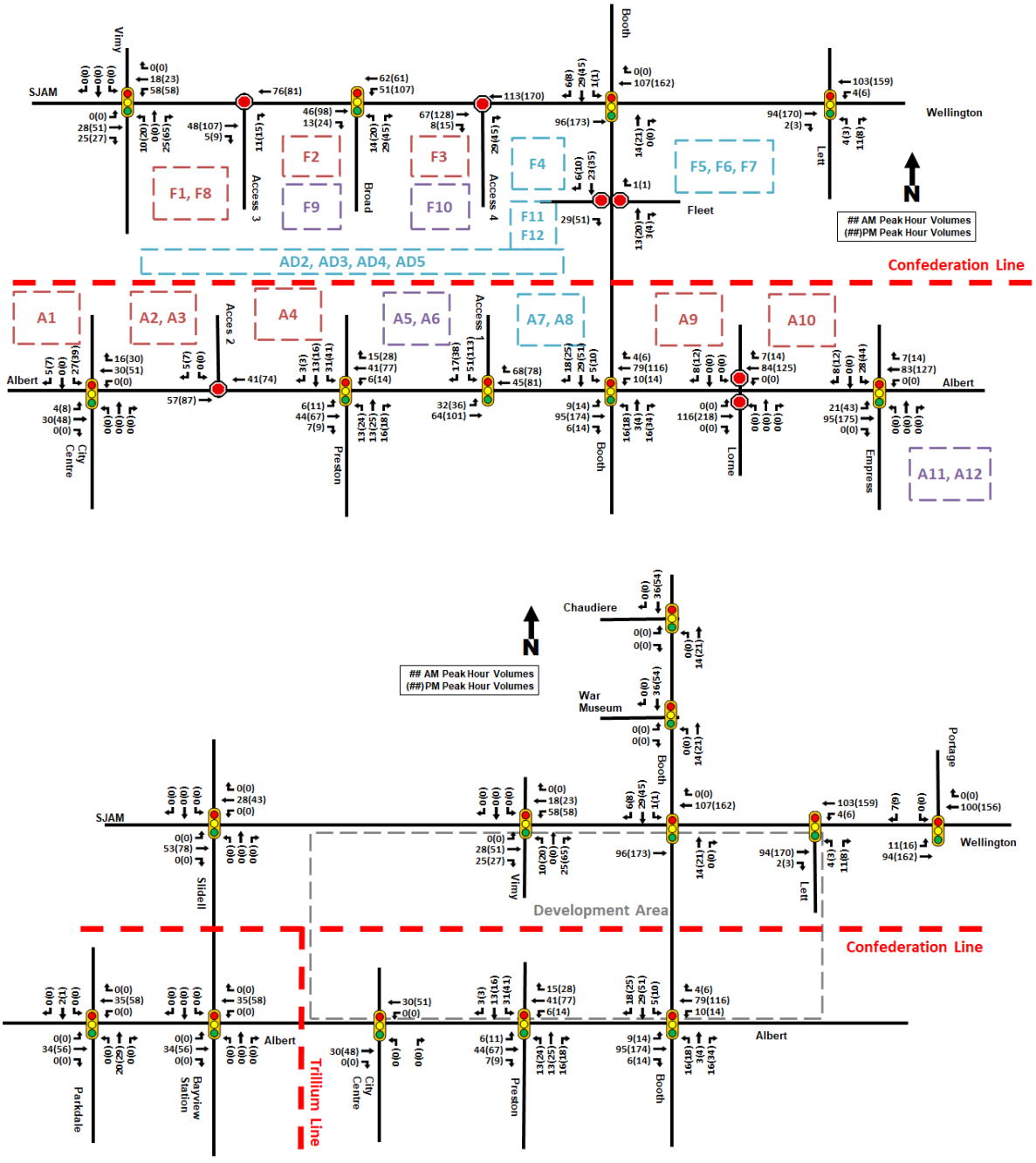


Figure 15: Projected Site-Generated Traffic – Full Build-Out



4.1.5 Major Events Centre

For the purposes of this TIA analysis, it is worth noting that Table 6 above reflects the uncertainty surrounding the potential of a major events centre being constructed at the LeBreton Flats site, specifically on parcels A2-4. At the commencement of this TIA study, the previous plan to develop an events centre had been cancelled and was only brought back on the table late in the study (i.e., spring 2022). Therefore, for the bulk of this TIA report it is assumed that parcels A2-4 consist of high-rise residential units and commercial space, as the details regarding the events centre were not detailed enough to provide analysis, and the scenario with residential and commercial space will provide a more conservative analysis of the potential daily transportation impacts of the LeBreton Flats development. It is acknowledged that if an events centre is constructed on site, transportation impacts at the time of any events (e.g., concert, sporting event, etc.) will likely be higher than during the average daily commuting hours, however the goal of this TIA is to analyze the worst-case scenario for average weekday conditions. It is understood by the NCC, and agreed to with the City, that if a development application is submitted for the construction of a major event centre (or any other type of development) within LeBreton Flats, a formal TIA will be prepared, which will include a TDM plan that will outline commitments to strategies that will reduce the reliance on the private automobile, as well as provide trip generation calculations for trips related to the events centre, including trips generated by pre-event activities nearby. The following section seeks to provide a high-level overview of what can be expected in any aforementioned TIA or TDM studies for the events centre.

Trip Generation Estimate

The National Capital Region's Special Generator Survey (SGS) in 2016 undertook detailed survey of numerous event centres in the National Capital Region (NCR), including the Canadian Tire Centre, TD Place Stadium and Ottawa Convention Centre in Ottawa, and the Centre Robert-Guertin and Casino du Lac-Leamy in Gatineau. The subsequent discussion draws heavily on the results of the survey for two of these venues: the Canadian Tire Centre (CTC) and TD Place Stadium (TD Place). The CTC is key to the analysis as the proposed events centre would likely be replacing many of the major events that currently take place at the CTC, including Ottawa Senators hockey games and large concerts. TD Place is key to the analysis given its urban context in central Ottawa, with better access to the site via transit, walking and cycling, which are not as appealing at the CTC given its location in western Kanata along Highway 417. The following tables summarize key data provided in the SGS.

Table 13: Special Generators Survey – Canadian Tire Centre and TD Place Information

Venue	Survey Dates	Event Start Times	Capacity	Average Weekday Attendance	Average Capacity Percentage
CTC	November – December 2013	6:00 – 7:30 PM	19,153	14,673	77%
TD Place	September – October 2014	6:30 – 7:30 PM	24,000	21,717	90%

It is notable that both locations have events that generally start outside of the PM peak period when spare network capacity is available, although this does not preclude attendees from arriving at the events earlier. TD Place has the higher capacity and higher average capacity percentage when compared to the CTC. This may be attributed to numerous factors, including: its more central location; the lower frequency of major events as there are only 9 home games for the Ottawa Redblacks every year compared to 41 home games for the Ottawa Senators; or, the fact that all events took place on Friday nights as opposed to the CTC where events took place on all weekdays.

It should be noted that the average capacity percentage for Ottawa Senators games for the most recent pre-COVID season in 2018-2019 was 76%, whereas the average for the entire NHL was 95%.

Table 14: Special Generators Survey – Estimated Arrival Time[3]

Venue	12:00 PM	1:00 PM	2:00 PM	3:00 PM	4:00 PM	5:00 PM	6:00 PM	7:00 PM	8:00 PM
CTC	1%	1%	1%	1%	2%	14%	47%	34%	1%
TD Place	0%	0%	0%	1%	2%	29%	53%	14%	0%

While events at TD Place tend to start later than those at CTC, it has a higher percentage of trips arriving during the PM peak period. This is likely due to the on-site amenities around TD Place, which has the potential to draw trips to the site prior to the event begins.

Table 15: Special Generators Survey – Arrival Mode of Transportation[4]

Venue	Driver	Passenger	Transit	Shuttle	Walk	Intercity Transit	Taxi	Bike	Other
CTC	49%	33%	11%	0%	0%	4%	1%	0%	2%
TD Place	15%	12%	26%	23%	14%	2%	4%	4%	0%

As expected, the CTC sees a high percentage of trips arriving via personal vehicle, where as TD Place sees a spread of trips across various modes of transportation, including approximately 51% of trips taken by some form of transit (e.g., OC Transpo, park and ride shuttles, intercity or private buses, etc.). It is notable that the driver, transit (when considering the various forms of transit) and active transportation modes are comparable to the mode shares assumed for the entire LeBreton Flats site as part of this TIA.

A high-level estimate of trip generation for the potential major events centre at LeBreton Flats was undertaken based on the Special Generators Survey, with some conservative assumptions:

- The capacity of the major events centre could be 16,500, as noted in a National Post article from September 2022[5]. The most recent information as of March 2023 is that the major events centre is likely to have a capacity of 17,000.
- The average capacity of a weekday event will be comparable to the average capacity percentage between the CTC and TD Place: 84%, or approximately 14,300 attendees. This is to account for the more central location of the major events centre, while still considering the frequency and days of the week that events would be held when compared to TD Place.
    - Notwithstanding the above, direction from the City was provided that 100% capacity should be assumed at this point in time, therefore it is assumed that 17,000 attendees will be present for any given event at the major events centre.
- Transportation mode share for arrival to a LeBreton Flats events centre may be comparable to the mode share observed at TD Place, given its more central location compared to the CTC.

[3] It should be noted that the arrival time data is presented in graphs in the SGS, therefore the percentages presented here are an estimate based off of said graphs.

[4] It should be noted that while different surveys were undertaken for arrival and departure transportation modes, the results were largely the same. Only the arrival mode is presented here, as that is the more concerning time given its proximity to the PM peak.

[5] https://nationalpost.com/sports/hockey/nhl/ottawa-senators/snapshots-lots-of-work-happening-behind-the-scenes-to-build-at-lebreton

- This is likely a conservative estimate on the low side given that the proposed major events centre would be located in close proximity to both the Confederation Line LRT and Trillium Line LRT (extended to Moodie, Trim and Limebank Stations), whereas TD Place relies mainly on OC Transpo bus service and park-and-ride shuttles run by Ottawa Sports and Entertainment Group (OSEG).

- Arrival times will be comparable to the average arrival time between CTC and TD Place. This provides a balance between the earlier arrivals observed at TD Place due to on-site amenities (which would also be present at the events centre), while also accounting for the later arrival times observed at the CTC.

Table 16 summarizes the estimated trips by different modes of transportation to a potential major events centre at LeBreton Flats. For simplicity, the various forms of transit were combined into a single transit mode share (i.e., municipal transit, shuttle bus and intercity transit). The taxi mode share was left separate from drivers, as it was unclear the average number of passengers in a single taxi, and the drop-off location for attendees who took a taxi. While there is a designated taxi drop-off zone for Capital Taxi in the Lansdowne site, some users may have been dropped off further from the site to avoid traffic.

Table 16: Estimated Trips by Different Modes at Potential Major Events Centre

	Driver	Passenger	Transit[6]	Walk	Taxi	Bike
Percentage	15%	12%	51%	14%	4%	4%
Trips	2550	2040	8670	2380	680	680

Table 17 summarizes the estimated vehicular trips made for different hours of the day, starting at 12:00 PM and continuing until 8:00 PM. It should be noted that a given hour includes all trips arriving during that hour (i.e., 12:00 PM encompasses all vehicles arriving between 12:00 PM and 12:59 PM).

Table 17: Estimated Vehicular Trips by Arrival Time

	12:00 PM	1:00 PM	2:00 PM	3:00 PM	4:00 PM	5:00 PM	6:00 PM	7:00 PM	8:00 PM
Percentage	0%	0%	0%	1%	2%	21%	50%	24%	1%
Trips	9	9	9	24	52	540	1278	616	15

The results of the trip generation estimate for the potential major events centre show that the highest volume hour during the PM peak period is expected to be 5:00 – 6:00 PM, when approximately 540 vehicular trips will be made to events. The highest volume hour for vehicles accessing the site is expected to be 6:00 – 7:00 PM, with approximately 1280 vehicular trips being made. Not necessarily all these trips will be arriving directly at the LeBreton Flats site, as some may be parking on nearby streets where parking is available, similar to attendees at TD Place who park on residential streets due to the parking garage being closed for Ottawa Redblacks games. It is our understanding as of March 2023 that the anticipated entrance to and from any potential parking garage at the major events centre is likely to be accessed via the Albert Street / City Centre Avenue intersection. It is still unclear at this point how much parking will be provided at the major events centre, and who would be allowed access during events. This will be confirmed as part of the TIA for the major events centre.

[6] As noted above, transit trips are combined to include trips on municipal transit (i.e., OC Transpo and STO) as well as shuttle buses for the event (e.g., from park and rides) and intercity buses (e.g., from fans of visiting sports teams)

It is worth noting that existing events at LeBreton Flats regularly see higher attendance than the estimated attendance at the major events centre, such as RBC Bluesfest which has shows starting at 6:00 PM on weekdays. Estimated daily attendance at the 2022 Bluesfest was 20,000 people per day, with peak days being estimated at 30,000 attendees[7]. There is no parking provided on-site for Bluesfest, as most attendees take transit, walk, cycle or park on nearby streets where available. During Bluesfest, vehicular access is restricted on a number of streets in the area, including Booth Street between Albert Street and Wellington Street, as well as parts of the Sir John A Macdonald Parkway and Wellington Street[8].

Transportation Demand Management

Similar to TD Place, existing events at LeBreton Flats such as RBC Bluesfest, and downtown major event centres in other cities, it is anticipated that an aggressive Transportation Demand Management plan will be implemented for any special event scheduled at the potential major events centre at LeBreton Flats, which will mitigate the reliance on the private automobile. Some examples of TDM that are already in use at TD Place and LeBreton Flats today are outlined below. It is assumed that similar measures to those identified below will be in place and will be further developed at the appropriate time in coordination with the City of Ottawa, OC Transpo and other stakeholders.

TD Place:

- Free public transit on all OC Transpo routes servicing TD Place, starting three hours before the event and ending three hours after the event.
- Free OC Transpo service from 15 park-and-shuttle locations across the NCR, including five in Gatineau and ten in Ottawa.
    - Six of the park-and-shuttle locations in use today for TD Place are located at stations along the Stage 2 Confederation and Trillium Lines: Trim Station, Place d'Orleans Station, Greenboro Station, Mooney's Bay Station (Canada Post), Baseline Station and Confederation Station (City Hall).
    - Four of the park-and-shuttle locations are located at stations along the potential Kanata and Barrhaven LRT alignments: Terry Fox Station, March/Eagleson Station, Fallowfield Station and Strandherd Station.
    - These locations, in addition to other parking locations along the LRT (e.g., RCGT Park, St. Laurent Station, Blair Station, South Keys Station, Leitrim Station, Bowesville Station, Lincoln Fields Station, Bayshore Station) are prime candidates to be used for a major events centre at LeBreton Flats and would likely see increased usage given that the LRT would not be required to travel in mixed traffic like the existing shuttle buses to TD Place.
- Free OSEG Shuttle Bus from specific park-and-shuttle locations for events over 15,000 people from City Hall on Laurier Avenue and the Canada Post complex on Riverside Drive.
- A list of parking lots on the TD Place website that are within a 20-minute walk of the venue.
    - Existing and proposed parking lots or structures that are within a 20-minute walk of the proposed events centre site include: Canadian War Museum, Ottawa Public Library and Library and Archives Canada Joint Facility, Tunney's Pasture and numerous parking lots in the downtown core, Chinatown and Little Italy.

[7] https://ottawacitizen.com/entertainment/bluesfest-wraps-up-after-successful-run-of-great-weather-crowds-and-music
[8] https://ottawa.ca/en/city-hall/city-news/newsroom/rbc-bluesfest-back-plan-ahead-traffic-impacts-and-take-transit-festival

- Secure bike parking on-site, as well as complimentary bike valet service and standard bike racks.
- Para Transpo service directly to a designated Accessible Support Entrance location at Gate 1 of TD Place.

RBC Bluesfest:

- Free public transit on all OC Transpo routes, starting three hours before the event and three hours after the event.
- Secure bike parking on-site in addition to standard bike racks in the area.
- Para Transpo service drop-off location on Booth Street next to the War Museum.
- Street closure of Sir John A Macdonald Parkway westbound between Booth Street and Slidell Street, and eastbound between Parkdale Avenue and Booth Street.
- Street closure of Booth Street between Wellington Street and Albert Street.

4.2 Background Network Travel Demands

4.2.1 Transportation Network Plans

As previously mentioned in Section 3.1.3, the current transit-only lanes along Albert Street will be decommissioned and returned to general traffic use and/or active modes, as part of various projects between Holland Avenue in the west and Mackenzie King Bridge in the east. The roadway cross-section from Holland Avenue to Bayview Station Road will have a single through lane in each direction, while the cross-section from City Centre Avenue to Empress Avenue will have two through lanes in each direction.

As part of the Zibi development, the vehicular capacity of the Booth-Eddy Street corridor has been reduced and has been rededicated to cycling/pedestrian facilities. This has resulted in a single vehicular travel lane in each direction across the Chaudière Crossing.

As part of the LeBreton Flats Master Concept Plan, it is proposed that a bridge dedicated to serving pedestrians and cyclists only be extended over the Confederation Line in the Preston Street corridor between Albert Street and the SJAM/Wellington Street. Although this link currently does not exist, it has been identified in the City's current and previous Transportation Master Plans as a new arterial roadway link to serve all travel modes.

As noted in Section 3.1.3, the City of Gatineau has released plans for a tramway connecting the growing area of Aylmer to downtown Ottawa, via the Portage Bridge. The closest the West Gatineau Tramway would be to LeBreton Flats is at the intersection of Wellington/Portage Bridge, which is approximately 270m from the northeast corner of the development site. Although there are currently no projections for OC Transpo and STO ridership changes, it can be expected that there may be fewer trips on bus routes crossing into Gatineau on Booth Street, such as OC Transpo Route 85.

With the exception of a new interprovincial bridge between Ottawa and Gatineau, these future transportation network plans have been included/assumed in the subsequent analysis.

4.2.2 Background Growth and Traffic Volume Balancing

Due to certain data gaps (i.e., not every study area intersection was counted during the year 2014), a volume balancing exercise was conducted, which resulted in the following modifications to peak hour vehicular volumes at study area intersections (note, the following negative values indicate veh/h that were removed, and positive values indicate veh/h that were added):

- Booth/War Museum[9]: SB [-730(AM), -810(PM)]
- Booth/Wellington: NB [-10(AM)]
- Albert/Booth: SB [-90(AM)]; WB [+70(PM)]
- Albert/Preston: EB (-20(PM)]
- Albert/City Centre: WB [+10(PM)]
- SJAM/Slidell: WB [-50(AM), -30(PM)]
- Wellington/Vimy: EB [+20(AM)]; WB [-40(PM)]
- Wellington/Lett: EB [+180(AM)]; WB [-130(AM), -70(PM)]
- Wellington/Portage: EB [-140 (AM), -240(PM)]

[9] It is noted that the turning movement count at Booth Street / War Museum on July 18, 2013, was flagged as an anomaly in the Zibi development 2014 TIS. Because of this, the Booth Street corridor was balanced according to the counts at its intersections with Wellington Street and Albert Street. The discrepancy between Booth Street / Wellington Street and Booth Street / War Museum was fully addressed in the adjustments at the Booth Street / War Museum intersection

Based on the foregoing volume balancing assumptions, **Figure 16** on the following page depicts the resulting baseline existing conditions.

As previously mentioned in Section 3.1.2, Ottawa's downtown arterial network is generally accepted to operate at capacity during peak hours; additionally, the City's TMP notes that the number of cars arriving downtown in the morning peak period has been decreasing since 1986. Therefore, background traffic volumes have exhibited negligible growth.

In addition to negligible background traffic growth, study area roadways have been impacted by the extended LRT related construction which have prompted some travelers to forego tips altogether, make different mode choices, take different travel routes, or change trip times to avoid increased congestion brought by detours. Therefore, and as agreed to by City Staff, historical traffic count data from the year 2014 (where available) was used for analysis purposes and zero background growth (i.e., background growth rate of 0%) was applied.

4.2.3 Current and Anticipated Area Developments

Using the City's online Development Application Tool, planned developments including 900 Albert, East Flats and Zibi were identified to have impacts on the study area. As such, the projected site-generated traffic from these developments was included in the subsequent analysis. Excerpts from the TIA study reports for 900 Albert, LeBreton East Flats and Zibi are included as **Appendix D**, depicting projected site-generated traffic for these developments. Trips generated by these developments were carried through all study area intersections for this report, regardless of where the study area terminated for each individual development.

Given that the TIA studies prepared for the identified area developments did not include some of the intersections located within the LeBreton study area, projected site-generated traffic from such area developments was appropriately distributed/assigned throughout the LeBreton study area as described in Step 2 - Scoping. The resulting assignment of projected site-generated traffic from other area developments is depicted in **Figure 17**, while **Figure 18** depicts the total background traffic volumes for this analysis, including existing conditions, background growth (0%) and traffic volumes from other area developments.

Figure 16: Existing Volumes, AM Peak (PM Peak)

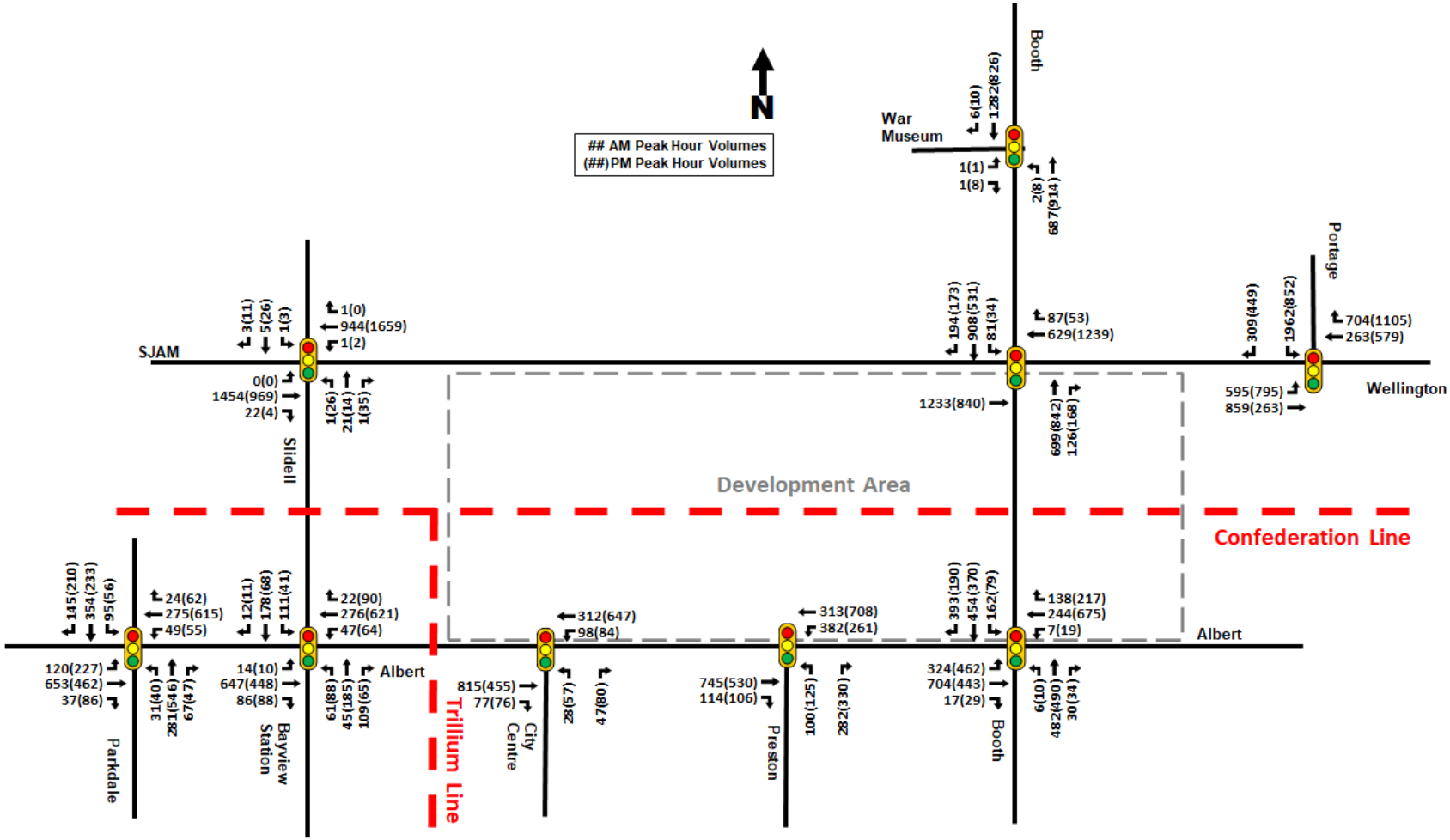


Figure 17: Trips Generated by Area Developments, AM Peak (PM Peak)

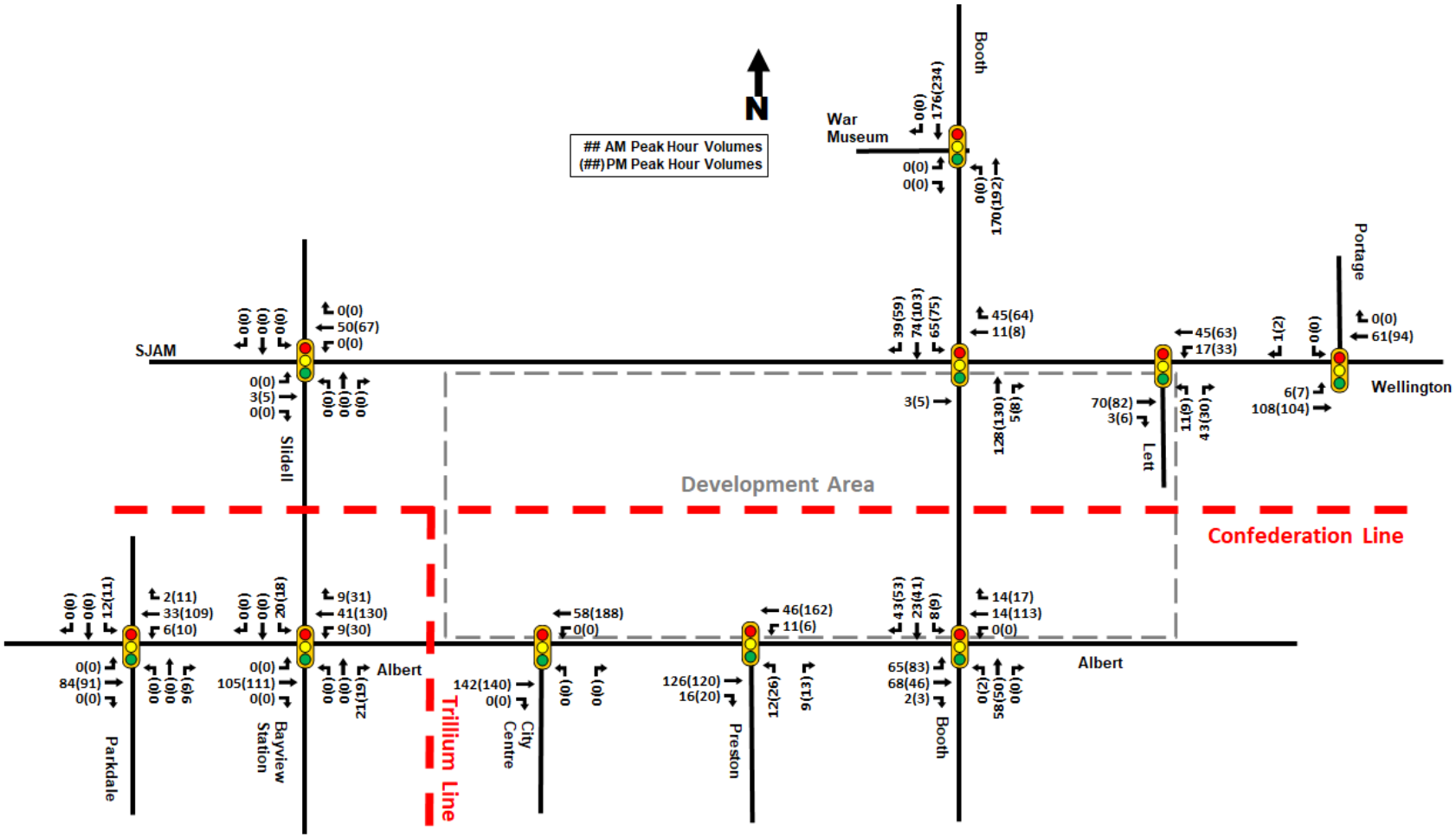
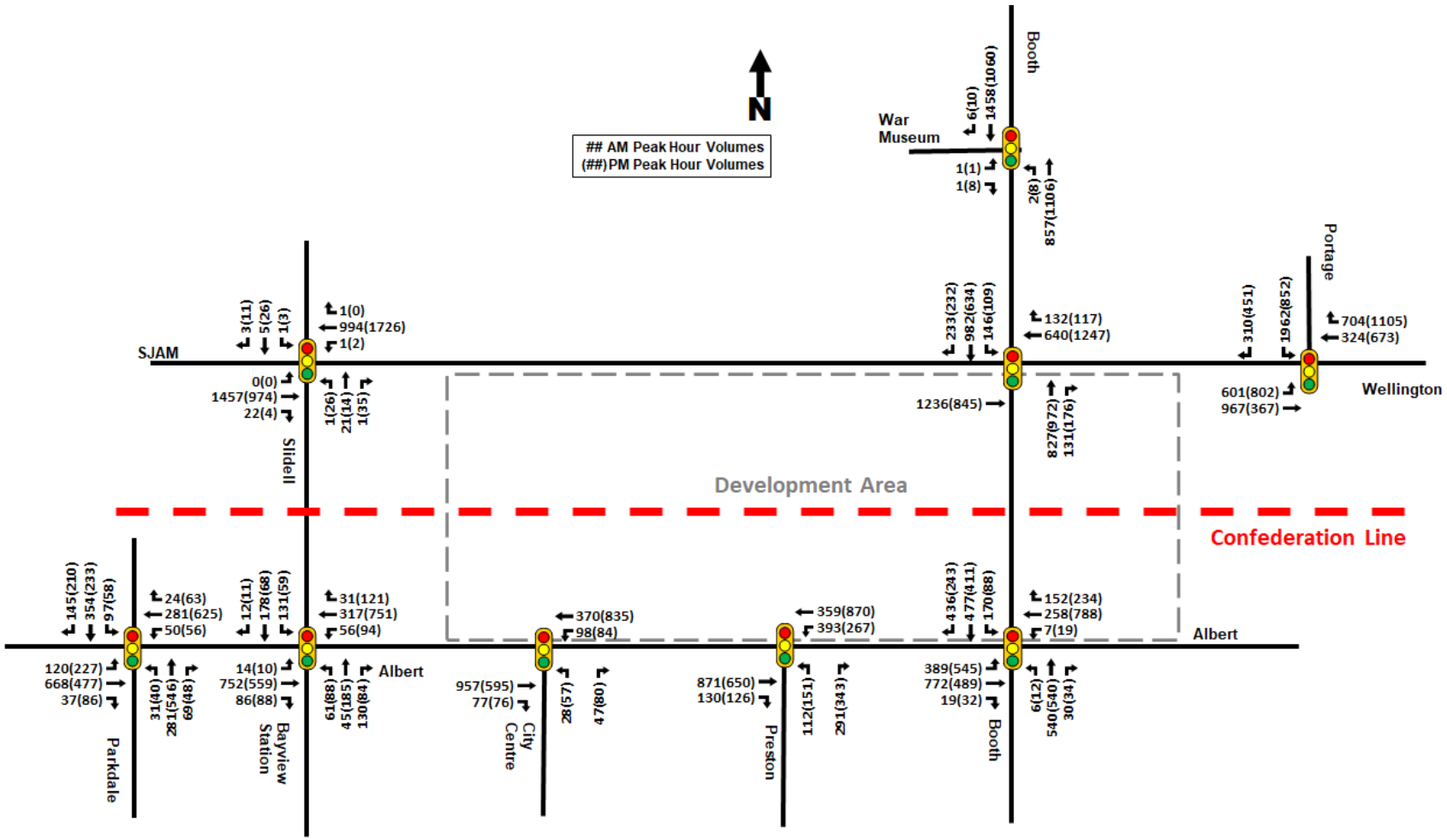


Figure 18: Future Background Turning Movement Volumes, AM Peak (PM Peak)



4.3 Demand Rationalization

The following section summarizes the study area intersection capacity analysis for Existing, Future Background and Future Total Volume scenarios. For analysis purposes, the Existing Conditions scenario is considered to be 2022, the Future Background scenario is considered to be 2030 and the Future Total Volume scenario is 2030 for Phase 1, 2040 for Phase 2 and 2050 for Phase 3.

Using the intersection capacity analysis software Synchro (v11), study area intersections were assessed in terms of vehicle delay, volume-to-capacity ratio (v/c) and the corresponding Level of Service (LOS). It should be noted that the overall performance of a signalized intersection is calculated as a weighted v/c ratio and assigned a corresponding LOS, with critical movements assigned a LOS based on their respective v/c ratio. The overall performance of an unsignalized intersection is a LOS output from Synchro, which is based on an Intersection Capacity Utilization (ICU) method, and critical movements are assigned a LOS based on delay. **Table 18** shows the vehicular level of service that corresponds to each v/c ratio.

Table 18: Level of Service vs. V/C Ratio

Level of Service	Volume to Capacity Ratio
A	0 to 0.60
B	0.61 to 0.70
C	0.71 to 0.80
D	0.81 to 0.90
E	0.91 to 1.00
F	> 1.00

Given the number of study area intersections, the general proximity between intersections/driveways within the study area, the level of existing network saturation, and the level of variability with respect to developing a Master Concept Plan for a large area such as LeBreton Flats, estimated 95th percentile queues at study area intersections were not explicitly assessed as part of this TIA study report. For the purpose of this assessment, study area intersections with a LOS at, or over capacity (i.e., LOS ‘E’ or ‘F’) and long delays (i.e., delays greater than 35s), it is reasonable to conclude that 95th percentile queues are also problematic (e.g. problematic queues spill back and block driveways and/or adjacent intersections, extend beyond provided turn lane storage, etc.) and therefore, provide limited to no additional value for analysis/decision purposes.

The City of Ottawa follows a Multi-Modal Level of Service (MMLOS) policy, which evaluates all modes of transportation, including pedestrians, cyclists, transit, trucks, and vehicles. The MMLOS analysis allows for trade-offs between the different modes of transportation, prioritizing different modes depending on the location within the City. The City’s MMLOS Guidelines define the LOS targets for each mode of transportation based on the Official Plan Designation / Policy Area, as well as roadway classification, cycling facilities, transit priority and truck route status. These targets are presented in **Table 19** for each major roadway within the study area.

Table 19: Minimum Desirable MMLOS Targets by Official Plan Policy/Designation & Road Classification (Source: City of Ottawa MMLOS Guidelines)

OP Designation (Roadway Characteristics)	Street	Pedestrian LOS	Bike LOS	Transit LOS	Truck LOS	Auto LOS
within 600m of Rapid Transit Station (Arterial, Cross-Town Bikeway, Truck Route)	Albert/Scott	A	A	D	D	E
within 600m of Rapid Transit Station (Arterial, Spine Route, Truck Route)	Booth	A	C	D	D	E
Central Area (Arterial, Spine Route, No Trucks)	Wellington	A	C	D	E	E

Due to the central location of the study area, all roadways and intersections within the study area have a Pedestrian LOS (PLOS) target of LOS 'A', and an Auto LOS target of LOS 'E', indicating the focus on pedestrians. The cross-town bikeway along Albert Street and Scott Street requires that that corridor meet the Bike LOS (BLOS) target of LOS 'A', while Booth Street and Wellington Street both have BLOS targets of LOS 'C'. There are no plans for transit priority above and beyond isolated measures, therefore the Transit LOS (TLOS) target is LOS 'D' for all intersections. Wellington Street is the only major roadway not designated as a truck route; therefore, its Truck LOS (TrLOS) target is LOS 'E', with the rest of the study area targeting LOS 'D'.

4.3.1 Existing and Future Background Conditions

Based on existing volumes depicted in Figure 16 and existing signal timing plans provided by the City, the following **Table 20** summarizes the existing performance of study area intersections. Detailed Synchro output data for Existing and Future Background Conditions are provided in **Appendix E**.

Table 20: Study Area Intersection Operations - Existing Conditions

Intersections	Overall			Critical Movement			
	Delay (s)	v/c Ratio	v/c LOS	Mvmt	Delay (s)	v/c Ratio	v/c LOS
Booth & Chaudière	2 (1)	0.75 (0.54)	C (A)	SBTR	3 (1)	0.75 (0.49)	C (A)
Booth & War Museum	4 (5)	0.44 (0.31)	A (A)	SBTR	7 (5)	0.44 (0.29)	A (A)
Booth & Wellington	33 (31)	0.86 (0.85)	D (D)	EBT	34 (27)	0.90 (0.61)	D (B)
Booth & Albert	37 (40)	0.83 (0.80)	D (C)	EBL	28 (60)	0.66 (0.98)	B (E)
Albert & Empress	4 (4)	0.25 (0.33)	A (A)	WBLT	2 (2)	0.13 (0.33)	A (A)
Albert & Preston	29 (14)	0.86 (0.57)	D (A)	EBT	41 (15)	0.93 (0.51)	E (A)
Albert & City Centre	8 (9)	0.53 (0.49)	A (A)	EBT	8 (5)	0.58 (0.34)	A (A)
Albert/Scott & Bayview	16 (19)	0.61 (0.53)	B (A)	EBTR	8 (19)	0.65 (0.48)	B (A)
Scott & Parkdale	29 (56)	0.79 (0.95)	C (E)	WBT	15 (126)	0.33 (1.18)	A (F)
SJAMP & Slidell	3 (7)	0.50 (0.69)	A (B)	WBT	3 (8)	0.34 (0.69)	A (B)
Wellington/SJAMP & Vimy	2 (3)	0.46 (0.51)	A (A)	WBT	2 (4)	0.30 (0.52)	A (A)
Wellington & Lett	15 (4)	0.52 (0.40)	A (A)	EBTR	20 (2)	0.54 (0.36)	A (A)
Wellington & Portage	111 (39)	1.21 (0.83)	F (D)	SBL	230 (53)	1.44 (0.88)	F (D)

As shown in Table 20, the intersection of Wellington Street at Portage Bridge is operating over capacity in the weekday morning peak hour, with a LOS 'F'. This is mainly driven by the southbound left turn volume, which has a v/c ratio of 1.44. It should be noted that the southbound left turn has three lanes, one of which is a bus/taxi/HOV lane. However, since HOV vehicle data was not available at this intersection, the southbound left turn approach was modelled with only two lanes, therefore this analysis can be considered conservative. This assumption will be carried forward to future analyses as well. All other movements at this intersection operate with acceptable LOS. There is minimal opportunity for improvement in LOS for the southbound left turn movement, as reassigning green time from other conflicting movements is not possible as it either violates the minimum green time (i.e., pedestrian crossing time) or it results in further deterioration in overall intersection operations. When the future West Gatineau Tramway is in place across the Portage Bridge it may encourage a shift in mode of transportation to transit, reducing the volume of vehicles crossing the bridge from Gatineau and improving the LOS of the intersection.

The intersection of Scott Street at Parkdale Avenue is approaching capacity (LOS 'E') in the weekday afternoon peak hour. The westbound through movement has a v/c ratio of 1.18 in the PM peak hour. Changes along Scott Street to provide transit priority in curbside lanes has resulted in a single through lane in each direction at this intersection, increasing the v/c ratio for this movement. Optimization of the signal timing at this intersection would reduce the v/c ratio of the westbound through movement to 1.01, at the expense of the northbound through movement, which would increase in v/c ratio from 0.95 to 1.08.

The following **Table 21** summarizes the projected study area intersection performance based on Future Background volumes, assuming no significant changes to existing signal timing plans (i.e., slight tweaks to optimize phases, but not cycle lengths). One exception is in the Albert Street corridor, where signal timing had to be adjusted to provide fully protected left and right turn phases depending on volumes, as required by the City of Ottawa's Protected Intersection Design Guidelines (PIDG). Future Background volumes were derived by summing together existing traffic volumes and projected site-generated traffic from the other area developments (i.e., summing volumes together from Figure 16 and Figure 17, resulting in Figure 18). Given an annual background traffic growth rate was assumed to be zero and assuming other area development will be fully built-out by the year 2030, Table 21 summarizes the study area intersection performance for all the Future Background scenario.

Table 21: Study Area Intersection Operations – Future Background Conditions

Intersections	Overall			Critical Movement			
	Delay (s)	v/c Ratio	v/c LOS	Mvmt	Delay (s)	v/c Ratio	v/c LOS
Booth & Chaudière	13 (12)	0.91 (0.76)	E (C)	SBTR	18 (12)	0.93 (0.74)	E (C)
Booth & War Museum	5 (6)	0.50 (0.38)	A (A)	SBTR	8 (6)	0.50 (0.37)	A (A)
Booth & Wellington	46 (38)	0.93 (0.95)	E (E)	NBTR	87 (50)	0.98 (1.01)	E (F)
Booth & Albert	97 (109)	1.06 (1.21)	F (F)	EBL	126 (278)	1.15 (1.53)	F (F)
Albert & Empress	1 (4)	0.31 (0.35)	A (A)	WBT	2 (3)	0.13 (0.35)	A (A)
Albert & Preston	36 (24)	0.78 (0.66)	C (B)	WBL	35 (23)	0.87 (0.52)	D (A)
Albert & City Centre	15 (12)	0.50 (0.35)	A (A)	EBTR	15 (11)	0.52 (0.34)	A (A)
Albert/Scott & Bayview	19 (18)	0.68 (0.61)	B (B)	EBTR	15 (16)	0.74 (0.57)	C (A)

Intersections	Overall			Critical Movement			
	Delay (s)	v/c Ratio	v/c LOS	Mvmt	Delay (s)	v/c Ratio	v/c LOS
Scott & Parkdale	35 (60)	0.83 (1.02)	D (F)	WBT	28 (123)	0.51 (1.17)	A (F)
SJAMP & Slidell	3 (8)	0.50 (0.72)	A (C)	WBT	3 (9)	0.36 (0.72)	A (C)
Wellington/SJAMP & Vimy	2 (3)	0.46 (0.54)	A (A)	WBT	2 (4)	0.32 (0.55)	A (A)
Wellington & Lett	21 (5)	0.59 (0.46)	A (A)	EBTR	28 (3)	0.61 (0.42)	B (A)
Wellington & Portage	109 (40)	1.21 (0.87)	F (D)	SBL	232 (53)	1.45 (0.88)	F (D)

As expected, delays and v/c ratios increase within the study area due to an increase in future background traffic. The intersection of Wellington Street at Portage Bridge, which was over capacity in the morning peak hour for Existing Conditions, continues to be over capacity in the Future Background Conditions.

The implementation of protected intersections and cycle tracks on Scott Street and Albert Street, along with the decommissioning of bus-only lanes into general traffic lanes will have an impact on traffic operations at many intersections:

- The intersection of Scott Street and Parkdale Avenue is over capacity in the PM peak hour, as the eastbound left turn movement is fully protected due to the westbound crossride. This results in less green time for the westbound through movement. As identified in the Existing Conditions, it is possible to optimize the signal timing at this intersection to improve the westbound through at the expense of the northbound through, however that optimization has not been undertaken here.
- The intersection of Albert Street and City Centre Avenue will have improved operations, as there will be two eastbound and two westbound through lanes. The westbound left turn movement is now fully protected due to the eastbound cycling movements.
- The intersection of Albert Street and Preston Street will have improved operations, as there will be two eastbound and two westbound through lanes. The westbound left turn movement will be fully protected due to the eastbound crossride. In addition, the northbound right turn movement can be on an overlap phase with the westbound left turn, with No Right Turn on Red (RTOR) restrictions in place, as per the PIDG.
- There will be a significant impact to traffic operations at Booth Street and Albert Street, as the protected intersection requires the eastbound left turn and southbound left turn be fully protected, and the southbound right turn to operate on an overlap phase with the eastbound left turn and No RTOR. The result will be long delays, and v/c ratios over 1.0 for both peak hours, with the eastbound left turn operating very poorly. Other over capacity movements at this intersection include the westbound through/right in the PM peak hour, the northbound through/right in both peak hours, and the southbound left and right in the AM peak hour. Mitigation measures are explored on subsequent pages.

Two intersections that operated acceptably in the Existing Conditions are approaching capacity in the Future Background Conditions: Booth Street at Chaudière (AM peak), and Booth Street at Wellington Street (AM and PM peaks).

- The southbound through movement at Booth Street and Chaudière is the heaviest movement in the AM peak hour, approaching capacity with a v/c ratio of 0.93. With single lanes on each

approach there are minimal opportunities to improve the operations of the southbound through movement at this intersection.

- The northbound through/right movement is the heaviest movement at Booth Street and Wellington Street in both peak hours: it is approaching capacity in the AM peak hour (v/c ratio of 0.98) and over capacity in the PM peak hour (v/c ratio of 1.01). The southbound left turn movement is also approaching capacity in the PM peak hour, with a v/c ratio of 0.99. Similar to the intersection of Scott Street at Parkdale Avenue, it is possible to optimize the signal timing to improve intersection operations, however it increases the delay on the heaviest volume movements (eastbound through in AM peak, westbound through in PM peak). Therefore, the optimization has not been included in this assessment, but it is recommended that this intersection be monitored moving forward.

Potential Mitigation Measures

Notwithstanding the exemplary existing and planned measures to accommodate and promote active/sustainable modes of transportation within the study area, the following are potential measures to improve the performance of study area intersections operating at, or over capacity from a vehicular operations perspective only. In some cases, these potential mitigation measures may contradict with policy direction, decisions or investments in infrastructure, and should not be considered requirements as conditions of development approval unless otherwise stipulated by the City. Therefore, mitigation measures have been separated into two groups – a primary group of preferred measures that supports the City's TMP by improving conditions for all modes of transportations, and a secondary group of alternatives that improves operating conditions for vehicles only, with potential negative impacts on other modes of transportation.

It should be noted that although the network modifications listed below are all technically possible, they may not be feasible due to physical/economical constraints and/or they may not satisfy or support policy/political/planning objectives. Therefore, the possible measures to improve the performance of study area intersections are only provided for information/decision making purposes only. If any of these possible measures are deemed to be desirable, further analysis may be required to support their justification.

Group A – Preferred Mitigation Measures

The following mitigation measures are the most preferred due to their prioritization for all modes of transportation, not just motorized modes. Further improvements to vehicular LOS may be observed as trips are shifted to alternative modes of transportation or alternative corridors as major projects within the National Capital Region are completed.

Transit Projects

- When the future West Gatineau Tramway is in place across the Portage Bridge in 2028, trips across the Portage Bridge may be shifted away from the vehicular mode and towards the transit mode. It is recommended that the City monitor traffic volumes at the intersection of Wellington Street and Portage Bridge and respond to a reduction in vehicular traffic accordingly.
- Confederation Line Stage 2 LRT (with improved reliability extension drawing additional trips when open in 2026)

Active Mobility Projects

Projects that may reduce the vehicular demand in the study area include:

- Improvements to cycling facilities throughout LeBreton Flats and along Albert Street into downtown (mode shift to cycling)
- The Chief William Commanda multi-use pathway interprovincial bridge (mode shift to cycling and walking)
- These measures would improve operations at most intersections in the study area, with a specific benefit to Booth Street at Albert Street, Albert Street at Preston Street and Parkdale Avenue at Scott Street.

Group B – Alternative Mitigation Measures

The following mitigation measures are less preferred due to their prioritization for vehicular modes only, and not benefitting active transportation and transit modes.

Ottawa River Sixth Crossing

- The NCC recently completed a Long-Term Integrated Crossings Plan; a potential future additional crossing of the Ottawa River may result in a vehicular shift to alternative corridors.

Wellington Street at Portage Bridge

- Re-designate southbound through and westbound through HOV lanes for general purpose traffic. This would prioritize single occupancy vehicles over high occupancy vehicles, including buses and carpool vehicles, running contrary to the City's stated goals for reducing vehicular traffic.
- Widen both the Portage Bridge and Wellington Street to accommodate additional southbound and westbound through lanes. The cost would likely make this measure unfeasible, would potentially induce demand resulting in a shift from active modes to vehicles, and would restrict the ability to provide the West Gatineau Tramway connection across the Portage Bridge in the future.

Booth Street at Albert Street

- Redesign the proposed Albert Street plans to accommodate dual eastbound left-turn lanes at Booth Street by converting an eastbound through lane to an eastbound left turn lane. The updated signal timing for the protected intersection already requires the eastbound left turn be a fully protected movement, which is consistent with what would be required if it were a double eastbound left turn. **Table 22** outlines the intersection operations of Booth Street at Albert Street with a single eastbound left and with a double eastbound left.

Table 22: Booth at Albert – Double Eastbound Left Turn Analysis, AM Peak (PM Peak)

Scenario	Mvmt	Volume (vph)	Delay (s)	v/c Ratio	v/c LOS	95th Queue (m)
Single EBL	EBL	390 (545)	126 (278)	1.15 (1.53)	F (F)	#180 (#267)
	EBTR	770 (490)	9 (19)	0.50 (0.31)	A (A)	41 (66)
	Overall	-	97 (109)	1.06 (1.21)	F (F)	-
Double EBL	EBL	390 (545)	39 (73)	0.57 (1.02)	A (F)	52 (#112)
	EBTR	770 (490)	32 (33)	0.95 (0.62)	E (B)	#291 (180)
	Overall	-	90 (68)	1.10 (1.03)	F (F)	-

- It is clear that the implementation of a double eastbound left would provide a significant improvement on eastbound left turn operations, which comes with the tradeoff of worse eastbound through operations.
- The overall intersection with a double eastbound left turn operates better in the PM peak hour and worse in the AM peak hour, therefore it is difficult to draw a conclusion on which option is preferred. Given this, **it is recommended that a single eastbound left turn lane be maintained in the Albert Street proposed design, however the intersection should be designed to accommodate a double eastbound left turn movement**. Given that the turning movement counts for this analysis come from 2014, prior to the opening of the Confederation Line LRT (which runs parallel to Albert Street), it is possible that eastbound through traffic on Albert Street is lower than it was in 2014. Therefore, when turning movement counts are updated in the future, it may support implementation of a double eastbound left as a single eastbound through lane will not be over capacity.

Parkdale Avenue at Scott Street

- Widen Scott Street from two to four lanes (i.e., two travel lanes per direction for general purpose traffic). This would increase the footprint of the intersection, forcing pedestrians and cyclists to cross a wider intersection and reducing their respective LOS.

4.3.2 Total Projected Conditions

The following section summarizes the study area intersection capacity analysis for total projected volume scenarios for the 2030, 2040 and 2050 horizon years. Total projected volumes depicted in **Figure 19**, **Figure 20** and **Figure 21** were derived by superimposing LeBreton Flats site-generated traffic volumes onto projected background traffic volumes. It should be noted that given the size of the study area network and the number of study area intersections, each horizon year is subsequently depicted as two separate figures. The first figure for each horizon year depicts the total projected traffic volumes for site driveway connections / immediate road network surrounding the subject development lands and the second figure depicts the total projected traffic volumes for the greater study area network.

Figure 19: Total Projected Traffic Volumes – 2030 (Phase One), AM Peak (PM Peak)

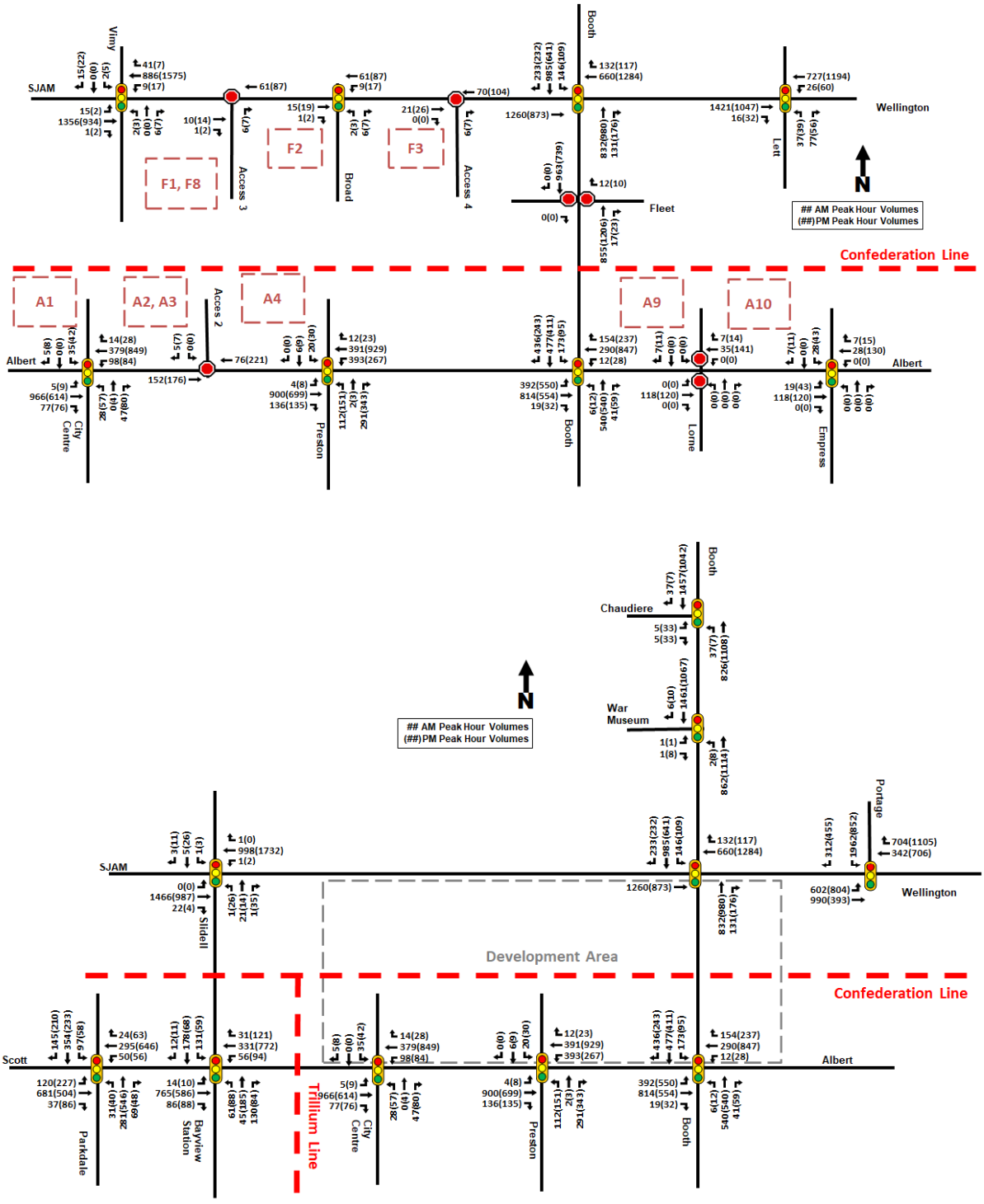


Figure 20: Total Projected Traffic Volumes – 2040 (Phase One & Two), AM Peak (PM Peak)

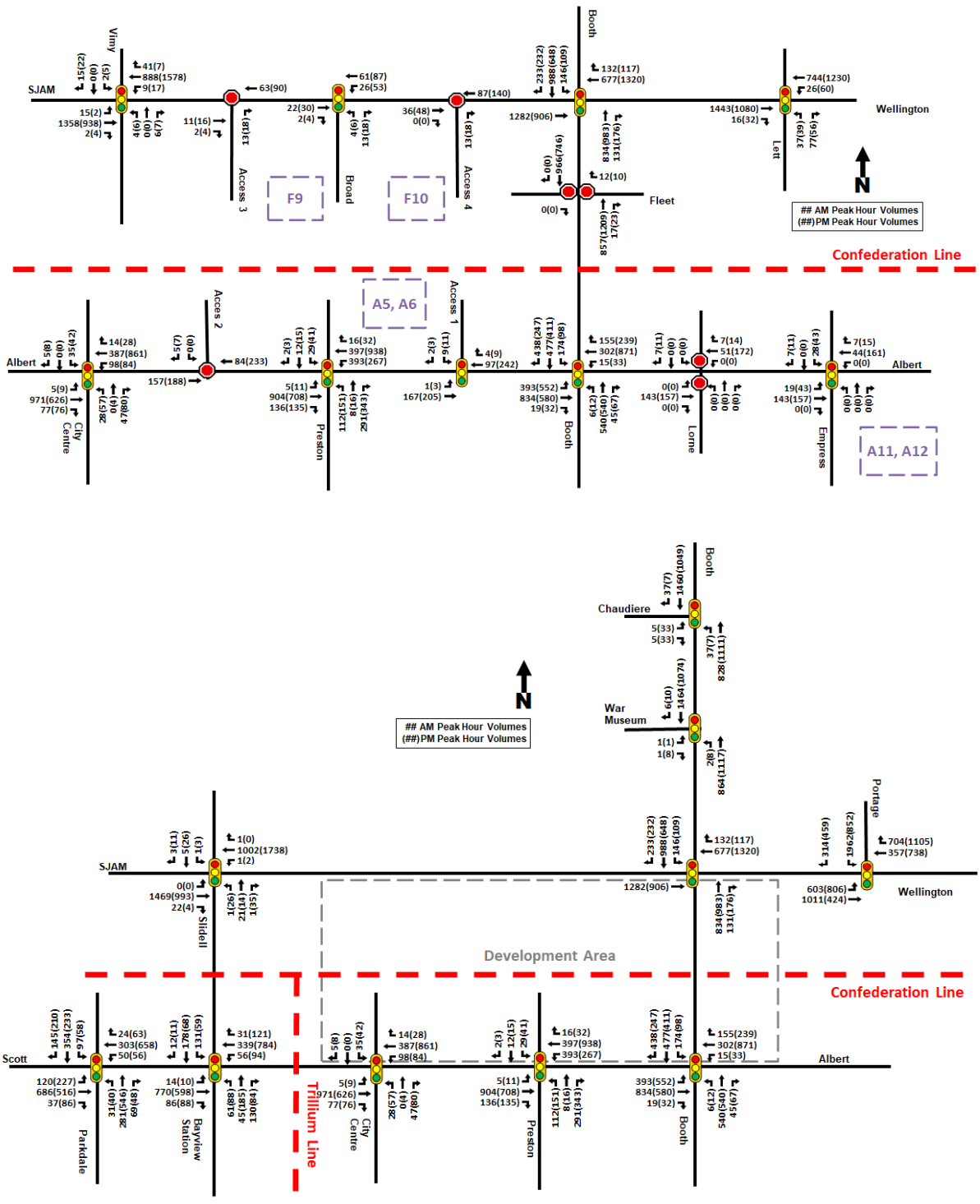
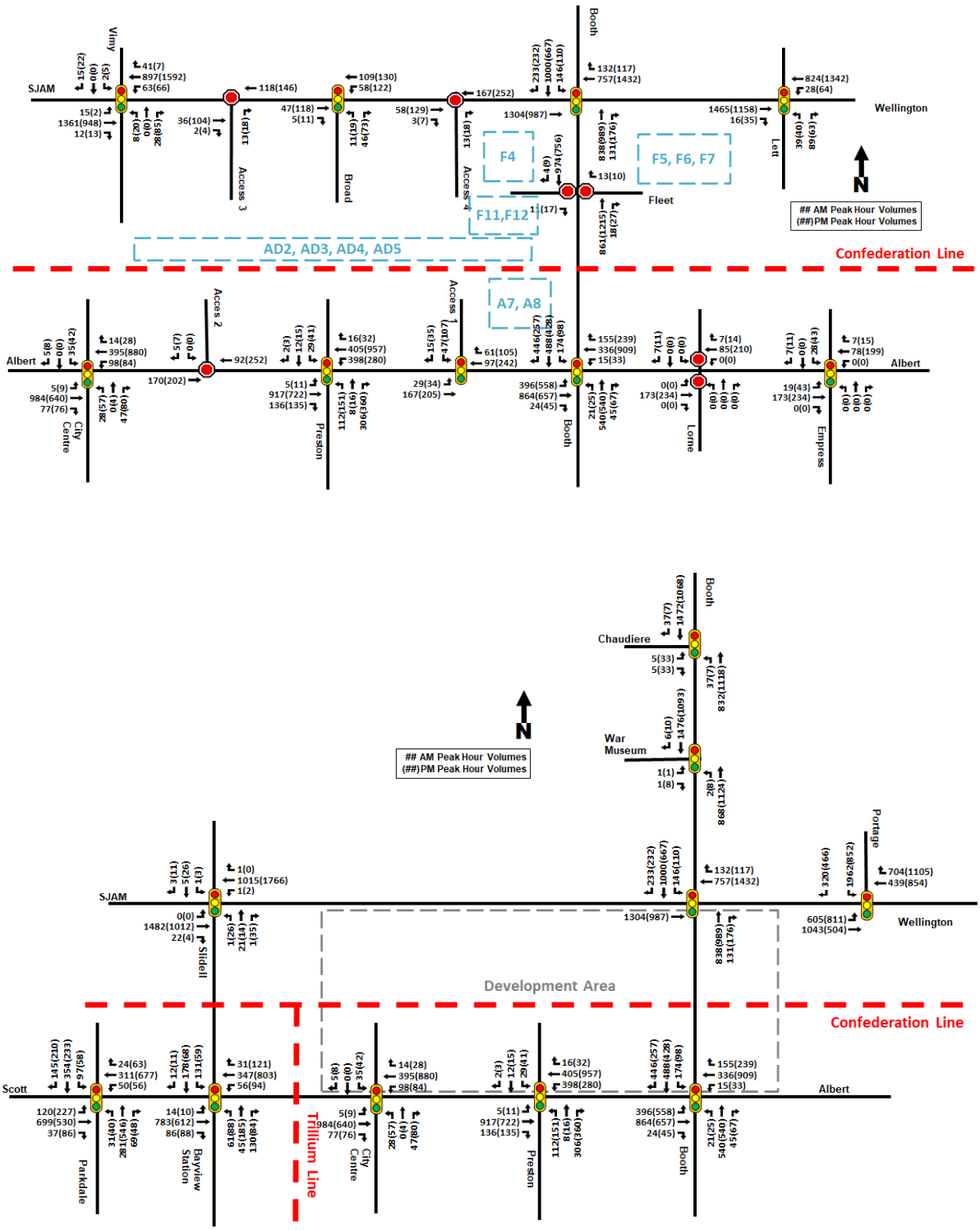


Figure 21: Total Projected Traffic Volumes – 2050 (Phase One, Two & Three), AM Peak (PM Peak)



Similar to existing baseline and background conditions, total projected conditions were assessed using the intersection capacity analysis software Synchro (v11) and using the same metrics such as v/c and delay. The following network modifications were included in the analysis (i.e., existing signal timing plans were not modified, unless otherwise specified below) for the three horizon scenarios, based on the changes to the road network shown in the Master Concept Plan:

Network Modifications from Master Concept Plan

Preston Street at Albert Street

- Modified to include eastbound left-turn lane with 30m of storage and southbound left turn lane with 15m of storage.

Albert Street at Lorne Avenue

- Modified to include north leg with stop control on the minor approach, permitting right-in/right-out movements only.

Albert Street at Empress Avenue

- Modified to include north leg and eastbound left-turn lane, actuated-coordinated signal control with a 120s signal cycle.

Booth Street at Fleet Street

- Modified to include west leg with stop control on the minor approach, permitting right-in/right-out movements only.

Wellington Street at Broad Street

- Modified existing traffic signal which currently serves major pedestrian pathway to Canadian War Museum (east of Vimy Place, west of Booth Street) to include a south leg, actuated-coordinated signal control with a 95s AM, 120s PM signal cycles and a fully protected westbound left-turn phase.

New Intersections from Master Concept Plan

Albert Street at Access 1

- Actuated-coordinated signal control with a 120s signal cycle during AM and PM peaks.
- It is noted that this proposed signal is located approximately 150m away from both the Albert Street / Booth Street traffic signal and the Albert Street / Preston Street traffic signal. Ideally signalized crossings and/or intersections would be located further apart, however the location of this signal is shown in the *City of Ottawa's Official Plan Schedule P – Pimisi Station and LeBreton Flats District – Mobility Network*. The location of this signal helps to prioritize active modes by enabling pedestrians and cyclists to cross Albert Street (in particular, to reach Pimisi O-Train Station) without travelling ~300m upstream or downstream to adjacent signals, as well as distribute vehicular trips to/from the development across numerous intersections. There is precedence elsewhere in the City in urbanized areas for traffic signals to be spaced closer than 150m apart (e.g., Elgin Street, Bank Street, Somerset Street, etc.). Additional details are provided in Table 26 below.

Albert Street at Access 2

- Right-in/right-out with stop control on the minor approach only.

Wellington Street at Access 3

- Right-in/right-out with stop control on the minor approach only.

Wellington Street at Access 4

- Right-in/right-out with stop control on the minor approach only.

Operational analysis for all key intersections was conducted based on total projected volumes depicted in Figures 19 to 21, existing signal timing plans and the previously described network modifications. **Tables 23 - 25** summarizes the projected performance of study area intersections for the 2030, 2040

and 2050 horizon years. Detailed Synchro output data for total projected conditions is provided as **Appendix F.**

Table 23: Study Area Intersection Operations - 2030 Phase 1 Total Projected Conditions

Intersections	Overall			Critical Movement			
	Delay (s)	v/c Ratio	v/c LOS	Mvmt	Delay (s)	v/c Ratio	v/c LOS
Booth & Chaudière	13 (13)	0.92 (0.77)	E (C)	SBTR	19 (12)	0.94 (0.76)	E (C)
Booth & War Museum	1 (2)	0.47 (0.36)	A (A)	SBTR	2 (2)	0.47 (0.35)	A (A)
Booth & Wellington	49 (39)	0.95 (0.95)	E (E)	NBTR	97 (61)	1.01 (1.03)	F (F)
Booth & Albert	103 (121)	1.08 (1.26)	F (F)	EBL	141 (290)	1.16 (1.55)	F (F)
Albert & Empress	3 (4)	0.34 (0.38)	A (A)	WBTR	3 (4)	0.15 (0.40)	A (A)
Albert & Preston	42 (28)	0.85 (0.66)	D (B)	WBL	52 (66)	0.88 (0.80)	D (C)
Albert & City Centre	14 (12)	0.51 (0.36)	A (A)	EBTR	15 (12)	0.53 (0.35)	A (A)
Albert/Scott & Bayview Station	19 (18)	0.69 (0.63)	B (B)	EBTR	14 (15)	0.75 (0.60)	C (A)
Scott & Parkdale	40 (89)	0.89 (1.15)	D (F)	WBT	30 (218)	0.59 (1.40)	A (F)
SJAMP & Slidell	3 (8)	0.49 (0.72)	A (C)	WBT	2 (9)	0.36 (0.72)	A (C)
Wellington/SJAMP & Vimy	2 (4)	0.45 (0.54)	A (A)	WBTR	3 (5)	0.32 (0.55)	A (A)
Wellington & Lett	20 (5)	0.60 (0.47)	A (A)	EBTR	27 (3)	0.62 (0.43)	B (A)
Wellington & Portage	110 (40)	1.21 (0.88)	F (D)	SBL	234 (53)	1.45 (0.88)	F (D)
Wellington & Broad	4 (3)	0.42 (0.48)	A (A)	WBT	3 (4)	0.29 (0.48)	A (A)

As shown in Table 23, the Booth Street at Albert Street, Wellington Street at Portage Bridge and Scott Street at Parkdale Avenue intersections are projected to continue operating over capacity during weekday morning or afternoon peak hours.

The only other noticeable change to intersection operations is the northbound through movement at the intersection of Booth Street at Wellington Street, which increases from a v/c ratio of 0.98 to 1.01 due to growth from the LeBreton Flats development. All other study area intersections are projected to continue operating similar to future background conditions, with only minor increases in volumes and delays.

Table 24: Study Area Intersection Operations - 2040 Phase 2 Total Projected Conditions

Intersections	Overall			Critical Movement			
	Delay (s)	v/c Ratio	v/c LOS	Mvmt	Delay (s)	v/c Ratio	v/c LOS
Booth & Chaudière	13 (13)	0.92 (0.77)	E (C)	SBTR	19 (13)	0.94 (0.76)	E (C)
Booth & War Museum	1 (2)	0.48 (0.36)	A (A)	SBTR	2 (2)	0.48 (0.36)	A (A)
Booth & Wellington	51 (55)	0.96 (0.97)	E (E)	NBTR	97 (62)	1.02 (1.04)	F (F)
Booth & Albert	104 (126)	1.09 (1.27)	F (F)	EBL	137 (320)	1.17 (1.61)	F (F)
Albert & Empress	4 (6)	0.36 (0.43)	A (A)	WBTR	3 (8)	0.17 (0.45)	A (A)
Albert & Preston	42 (29)	0.88 (0.69)	D (B)	NBL	116 (92)	0.94 (0.89)	E (D)
Albert & City Centre	14 (12)	0.51 (0.37)	A (A)	EBTR	15 (12)	0.53 (0.36)	A (A)
Albert/Scott & Bayview Station	19 (18)	0.69 (0.64)	B (B)	EBTR	14 (16)	0.76 (0.61)	C (B)
Scott & Parkdale	41 (93)	0.90 (1.17)	D (F)	WBT	30 (229)	0.61 (1.43)	B (F)
SJAMP & Slidell	3 (8)	0.50 (0.72)	A (C)	WBT	3 (9)	0.36 (0.72)	A (C)
Wellington/SJAMP & Vimy	3 (3)	0.45 (0.54)	A (A)	WBTR	4 (4)	0.32 (0.55)	A (A)
Wellington & Lett	22 (9)	0.61 (0.47)	B (A)	EBTR	30 (10)	0.63 (0.49)	B (A)
Wellington & Portage	139 (46)	1.30 (0.86)	F (D)	SBL	309 (64)	1.62 (0.93)	F (E)
Wellington & Broad	6 (5)	0.45 (0.50)	A (A)	WBT	5 (6)	0.30 (0.50)	A (A)
Albert & Access 1	8 (5)	0.43 (0.40)	A (A)	EBT	6 (6)	0.43 (0.39)	A (A)

As shown in Table 24, study area intersections are projected to continue operating similar in the year 2040 when compared to the projected conditions for the 2030 horizon year. With the exception of previously identified problematic intersections, all study area intersections are projected to operate acceptably, at LOS ‘E’ or better.

Table 25: Study Area Intersection Operations - 2050 Phase 3 Total Projected Conditions

Intersections	Overall			Critical Movement			
	Delay (s)	v/c Ratio	v/c LOS	Mvmt	Delay (s)	v/c Ratio	v/c LOS
Booth & Chaudière	14 (13)	0.93 (0.78)	E (C)	SBTR	21 (13)	0.95 (0.78)	E (C)
Booth & War Museum	1 (2)	0.48 (0.36)	A (A)	SBTR	2 (2)	0.48 (0.36)	A (A)
Booth & Wellington	63 (58)	1.00 (1.00)	E (E)	NBTR	95 (65)	1.09 (1.04)	F (F)
Booth & Albert	111 (132)	1.13 (1.31)	F (F)	EBL	156 (390)	1.22 (1.77)	F (F)
Albert & Empress	4 (6)	0.32 (0.44)	A (A)	WBTR	3 (8)	0.18 (0.47)	A (A)
Albert & Preston	53 (30)	0.90 (0.71)	D (C)	EBTR	90 (42)	1.03 (0.64)	F (B)
Albert & City Centre	14 (11)	0.51 (0.37)	A (A)	EBTR	15 (12)	0.53 (0.36)	A (A)
Albert/Scott & Bayview Station	19 (18)	0.70 (0.65)	B (B)	EBTR	14 (15)	0.77 (0.62)	C (B)
Scott & Parkdale	41 (70)	0.90 (1.10)	D (F)	NBTR	31 (111)	0.62 (1.13)	B (F)
SJAMP & Slidell	3 (8)	0.51 (0.73)	A (C)	WBT	3 (9)	0.37 (0.73)	A (C)
Wellington/SJAMP & Vimy	7 (6)	0.58 (0.59)	A (A)	EBTR	10 (8)	0.61 (0.43)	B (A)
Wellington & Lett	29 (11)	0.64 (0.52)	B (A)	EBTR	42 (13)	0.66 (0.54)	B (A)
Wellington & Portage	135 (51)	1.29 (0.91)	F (E)	SBL	304 (64)	1.60 (0.93)	F (E)
Wellington & Broad	9 (9)	0.52 (0.55)	A (A)	EBTR	12 (6)	0.54 (0.42)	A (A)
Albert & Access 1	22 (32)	0.84 (0.85)	D (D)	EBT	34 (52)	0.87 (0.88)	D (D)

As shown in Table 25, operational conditions at key study area intersections in the year 2050 are expected to be slightly worse than those in the 2040 horizon year. The following intersections operated acceptably in the 2040 horizon year and will continue to operate acceptably in the 2050 horizon year:

- Booth Street and Chaudière
- Booth Street and War Museum
- Booth Street and Wellington
- Albert Street and Empress Avenue
- Albert Street and City Centre Avenue
- Albert Street / Scott Street and Bayview Station Road
- Sir John A. Macdonald Parkway and Slidell Street
- Wellington Street / Sir John A. Macdonald Parkway and Vimy Place
- Wellington Street and Lett Street
- Wellington Street and Broad Street
- Albert Street and Access 1

The following intersections were over capacity in at least one peak hour in the 2040 horizon year, and continue to be over capacity in at least one peak hour in the 2050 horizon year, with minimal increase to the v/c ratio:

- Albert Street and Booth Street (both peak hours)

- Scott Street and Parkdale Avenue (PM peak hour)
- Wellington Street and Portage Bridge (AM peak hour)

As previously noted, due to the implementation of a protected intersection at Booth Street and Albert Street as part of the Albert Street Cycling / Pedestrian Modifications, the intersection is projected to be over capacity in the Future Background Conditions in 2030. As noted in Section 4.3.1, one mitigation measure worth considering in the proposed design for Albert Street is the implementation of a double eastbound left turn in order to provide relief to one of the heaviest volume movements at the intersection, while still maintain the principles of a protected intersection. The intersection operations at Booth Street and Albert Street for the 2050 Phase 3 Horizon are shown in **Table 26** for a single eastbound left and a double eastbound left. It should be noted that since this mitigation measure is recommended in the Future Background Conditions as part of the Albert Street Cycling / Pedestrian Modifications, not the LeBreton Flats development, it is not expected that the cost of this upgrade be attributed to the LeBreton Flats development.

Table 26: Booth at Albert – 2050 Phase 3 Horizon Double EBL, AM Peak (PM Peak)

Scenario	Mvmt	Volume (vph)	Delay (s)	v/c Ratio	v/c LOS	95th Queue (m)
Single EBL	EBL	400 (560)	156 (390)	1.22 (1.77)	F (F)	#189 (#294)
	EBTR	870 (660)	19 (19)	0.56 (0.43)	A (A)	147 (63)
	Overall	-	111 (133)	1.13 (1.31)	F (F)	-
Double EBL	EBL	390 (545)	39 (138)	0.63 (1.16)	B (F)	54 (#127)
	EBTR	770 (490)	19 (20)	0.56 (0.45)	A (A)	147 (59)
	Overall	-	98 (90)	0.96 (1.12)	E (F)	-

As previously noted, the proposed signalized intersection of Albert Street at Access 1 is located approximately 150m away from the busy traffic signals of Albert Street at Booth Street and Albert Street at Preston Street. While ideally signalized crossings and/or intersections would be located further apart, the location of this signal helps to prioritize active modes by enabling pedestrians and cyclists to cross Albert Street to access Pimisi O-Train station, pathways and future amenities within LeBreton without travelling ~300m upstream or downstream to adjacent signals. There is precedence elsewhere in the City for intersections located on pedestrianized streets to be closer than 150m apart. Notwithstanding the above, an alternative intersection operations analysis was undertaken to determine the impacts of converting Access 1 at Albert Street to a right-in, right-out stop-control access, with all left turn movements reallocated to the intersection of Albert Street at Preston Street. The results of this analysis are shown in **Table 27**.

Table 27: 2050 Phase 3 Intersection Operations – Access 1 Right-In, Right-Out

Intersections	Overall			Critical Movement			
	Delay (s)	v/c Ratio	v/c LOS	Mvmt	Delay (s)	v/c Ratio	v/c LOS
Booth & Albert	107 (139)	1.13 (1.33)	F (F)	EBL	151 (385)	1.22 (1.77)	F (F)
Albert & Preston	60 (33)	0.93 (0.77)	E (C)	SBL	173 (82)	1.06 (0.81)	F (D)
Albert & City Centre	14 (11)	0.51 (0.37)	A (A)	EBTR	15 (12)	0.53 (0.36)	A (A)

When modeled without a traffic signal at Albert Street and Access 1, operations at the intersection of Albert Street and Preston Street would deteriorate in the AM peak hour, with the LOS decreasing from LOS 'D' to LOS 'E'. The most significant change is that the southbound left turn decreases from LOS 'A' in the AM and PM peak hours, to LOS 'F' and LOS 'D', respectively. Due to the impact to traffic operations at Albert Street and Preston Street, the reduction in connectivity for pedestrians and cyclists to cross Albert Street, as well as the fact that this signal is included in the *City of Ottawa's Official Plan Schedule P – Pimisi Station and LeBreton Flats District – Mobility Network,* **the removal of the traffic signal at Access 1 is not recommended**.

4.3.3 Adjustments to Travel Demand

Adjusting modal splits away from projected auto trips further is difficult to justify, as certain individuals will ultimately be required to travel by vehicle for one reason or another (e.g., distance between origin/destination is too great, travel is a requirement for employment, physical disabilities limit travel options, etc.). Additionally, adjusting the auto modal share for site-generated traffic much lower will have a negligible effect on the performance of study area network.

With the opening of the Confederation LRT line and the coming expansion of both the Confederation LRT line and the Trillium LRT line, it is anticipated that there will be an increased number of transit users, which is likely to alleviate the vehicular demand on study area intersections. As noted above, there is also the future West Gatineau Tramway and downtown transit loops project that has the potential to reduce interprovincial vehicular travel, including along the Booth Street corridor. Furthermore, with the planned improvements to active transportation facilities as identified in Section 3.1.3 and as proposed active transportation facilities as part of the Master Concept Plan, there may be a shift to more active modes in the study area in the future. In addition to a shift to alternative modes, peak network demand may also be further spread beyond peak hours with individuals able to modify their working hours (e.g., individuals choosing to leave for work earlier or later to avoid the most congested network conditions) or working remotely (or telecommuting) from their homes.

Telecommuting has become a more common trend since the start of the COVID-19 pandemic in March 2020. A Statistics Canada report[10] indicates that as of May 2020 almost one-third (32.6%) of businesses had 10% or more of their workforce telecommuting. This is a significant increase over the numbers from February 2020 that indicated only 16.6% of businesses had 10% or more of their workforce telecommuting. The report also indicates that close to one quarter (22.5%) of businesses expect that 10% or more of their workforce will continue to telecommute once the COVID-19 pandemic is over. Rapid technological advancement in network security, accessibility and remote monitoring holds much promise in addressing long standing concerns with telecommuting. A paper presented at the Transportation Association of Canada (TAC) conference in 2004 titled Development of Modal Share Targets for Ottawa's Transportation Master Plan estimated that 5% of Ottawa workers telecommute. The same paper estimated that in the future this number could grow from 5% to 8%.

Based on the foregoing, no adjustments to background or site-generated network demand were considered for the purposes of this TIA study. However, it should be noted that new traffic data will be collected for each development application related to LeBreton Flats to feed into TIA studies for each application. The updated data collected with each study should more accurately reflect the benefits of Ottawa's new LRT service, which may potentially alleviate vehicular demand on study area intersections.

[10] https://www150.statcan.gc.ca/n1/pub/36-28-0001/2021010/article/00001-eng.htm

4.4 Preston Street Extension

The LeBreton Flats Master Concept Plan proposes a shift in function of the planned Preston Street extension and bridge between Albert Street and the SJAMP/Wellington Street from a vehicular focus to an active transportation focus more in line with the City's new Transportation Master Plan. The Preston Street arterial extension has been previously identified in the City of Ottawa's Official Plan and Transportation Master Plan. The Master Concept Plan proposes to replace this planned roadway, including a vehicular bridge, with an active transportation bridge. This is addressed in the Planning Rationale, detailing the policy alignment and qualitative considerations for an active-modes Preston extension to support this change.

Through discussions with the City, it was agreed that an analysis of the removal of the Preston extension and bridge should be included in this TIA, as there are potential regional implications of its removal.

A list of high-level concerns from the City regarding the potential removal of the Preston Street extension are provided below. The balance of the following sections aims to address the stated concerns from the City of Ottawa with the removal of the Preston extension. This has been informed and grounded using various methodologies including: a network assessment using the City's EMME Travel Demand Model; a screenline analysis; intersection operations analysis; and a review of impacts to pedestrians, cyclists, heavy vehicles, transit, and emergency vehicles.

4.4.1 EMME Models

Through discussions with City of Ottawa staff, a number of modelling scenarios were developed and tested. All scenarios for the EMME models:

- Are based on the City's 2013 Transportation Master Plan, which assumes a higher mode share for car trips than the current EMME model in development at the City for the new TMP. This will result in a more conservative analysis, as a greater number of trips will be assigned to the vehicular mode.
- Assumed full build-out of the LeBreton Flats lands even though the full buildout is not expected to occur until the year 2050.
- Assumed that the Tunney's Pasture Complex will be redeveloped to add 3,718 persons and increase employment from 11,440 jobs to 13,091. The redevelopment of the Tunney's Pasture Complex, a federal government office complex located approximately 2.0 km to the west, is the largest planned adjacent development that does not yet have a TIA completed (as previously mentioned, 900 Albert Street and Zibi have TIAs already completed). It is expected that at its ultimate completion, the redevelopment will employee somewhere between 22,000 and 25,000[11] people.

It should be noted that there are some slight differences between the AM peak and PM peak EMME models: the AM peak model uses the City's 2031 Network Concept Plan per the City's 2013 Transportation Master Plan, while the PM peak model uses the City's 2031 Affordable Network Plan. Therefore, the AM peak model includes the Barrhaven and Kanata LRT projects, as well as the West Gatineau Tramway, but the PM peak model does not include these projects. A description of each scenario along with associated assumptions is presented below.

[11] https://www.tpsgc-pwgsc.gc.ca/biens-property/construction/tunneyspasture-eng.html

- **Scenario 1 (Baseline Scenario, No Preston extension)** – 2013 TMP Network Concept model (for AM peak), 2013 TMP Affordable Network (for PM peak) without Preston extension, with the following changes made to the network[12]:
    - Barrhaven LRT (AM peak only)
    - Kanata LRT (AM peak only)
    - Baseline BRT
    - Blackburn Hamlet Bypass (AM peak only)
    - New Gatineau Road Network
    - New STO Routes
    - West Gatineau Tramway (AM peak only)
    - Discussions were held regarding the potential inclusion of a sixth crossing of the Ottawa River between Ottawa and Gatineau, however the City staff maintained that the analysis of the Preston extension should be based on currently planned projects. With no specific timeline, location or budget, the sixth crossing does not fall into this category.
- **Scenario 2A** - Baseline scenario (no Preston Street extension), with all turning movements permitted at the intersection of Booth Street / Wellington Street (i.e., northbound left, eastbound left, eastbound right and westbound left turns permitted).
- **Scenario 2B** - Baseline scenario (no Preston Street extension), with northbound left turns permitted at the intersection of Booth Street / Wellington Street.
- **Scenario 3 (Preston extension)** - Baseline scenario, Preston Street extension in place, current turning movement restrictions in place at Booth Street / Wellington Street.

The full EMME models for the Preston extension analysis are included in **Appendix G**, with snapshots provided below from each scenario, including an image showing the volume of traffic diverted to Preston Street from other corridors when the extension is in place.

4.4.2 Local Impacts

Figures 22 and **23** on the subsequent page show the volume to capacity ratio (v/c ratio) for Scenario 1 (No Preston extension) and Scenario 3 (Preston extension) projected by the EMME model. An acceptable v/c ratio is shown in green, approaching capacity is shown in orange, and over capacity is shown in red. Some takeaways from these figures are noted below:

- It is notable that the volume relief in the model for the westbound SJAMP in the AM peak hour is for a section already operating well (i.e., west of Preston Street).
- The addition of the Preston extension **appears to further deteriorate operations on Wellington Street** east of Preston Street (i.e., between Preston Street and Booth Street).
- The Preston extension **does not appear to relieve Booth Street south of Albert Street**.
- The model shows that **the Preston extension seems to draw traffic away from roads that are well beyond the influence area of LeBreton Flats**. This exhibits the potential for the Preston extension to create induced demand, by providing a more attractive vehicular facility and attracting trips away from other modes of transportation such as transit and active modes, which runs contrary to the City's new Transportation Master Plan.

[12] It should be noted that the City of Ottawa's Transportation Master Plan is currently being revised. While the exact list of projects noted here may not be completed by the 2050 timeframe, it can be expected that an equivalent list of network improvements (as prioritized by the new TMP) will be completed by that time.

Figure 22: AM Peak Hour EMME Model v/c Ratio

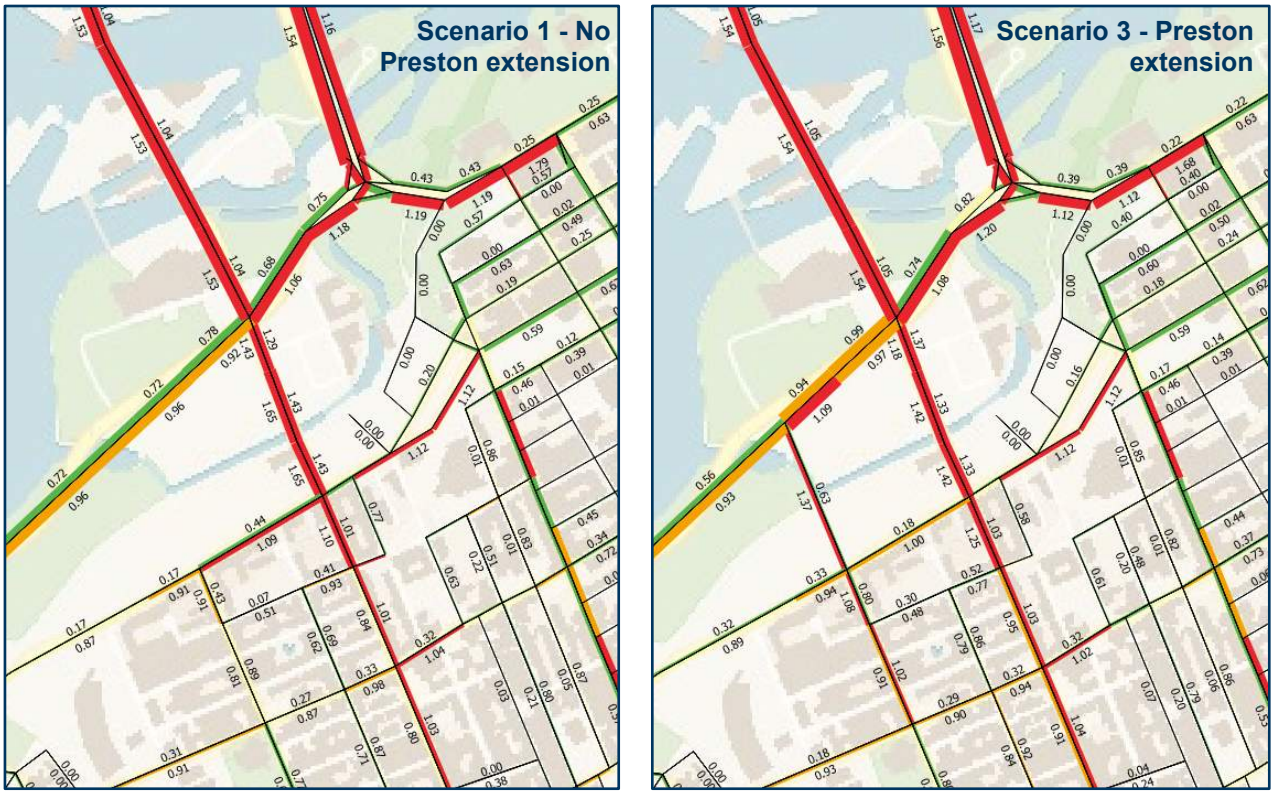
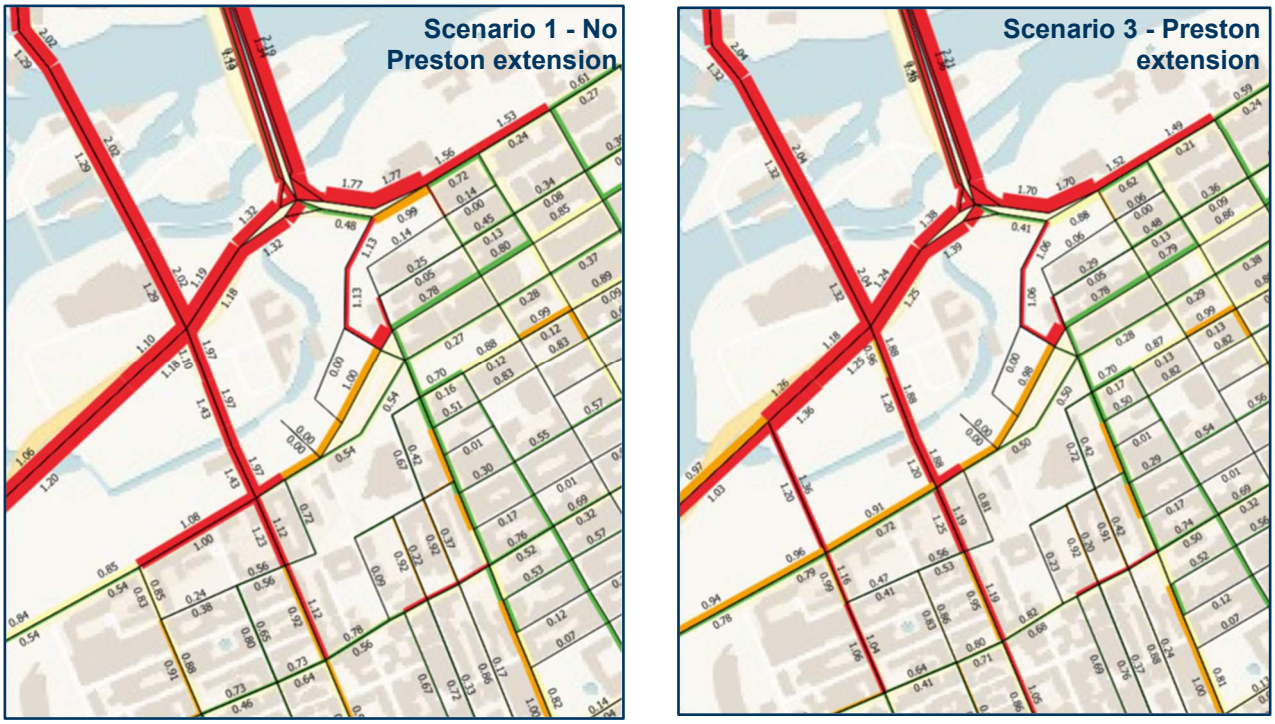


Figure 23: PM Peak Hour EMME Model v/c Ratio



4.4.3 Traffic Diversion

Figures 24 through **27** display the volume of diverted traffic from the EMME model when the Preston extension is in place. An increase in volume is shown in red, while a decrease in volume is shown in green. Figures 24 and 25 show the AM peak hour, while Figures 26 and 27[13] show the PM peak hour. Figures 24 and 26 focus on the area around LeBreton Flats, while Figures 25 and 27 show the larger road network. Some takeaways from the modelling demonstrated in these figures are noted below:

- A significant reduction in volumes to/from the SJAMP west of Preston Street is observed in the modelling with the introduction of the Preston extension. This reduction in volumes appears to extend further west than originally anticipated, as there are vehicle reductions as far west as Pinecrest Road and Richmond Road.
- There are **minimal changes in downtown traffic volumes** (i.e., east of Bronson Avenue) from the introduction of Preston Street into the model.
- The **traffic increase shown in the model on Preston Street is well in excess of the traffic reduction observed on Booth Street**, resulting in an overall net increase in traffic within the study area.
- The increase of traffic shown in the model in both directions on Preston Street, Rochester Street and Booth Street **would impact local residents living in the Centretown West neighbourhood**. This modelled increase in traffic is likely due to an increase in commuters connecting between Gatineau and Highway 417.
- The model shows that vehicles to/from the Tunney's Pasture complex (i.e., westbound in AM peak, eastbound in PM peak) shift from the SJAMP to Albert Street with the Preston extension in place.
- Between Carling Avenue and Baseline Road, the model shows that the Preston extension reduces traffic on Fisher Avenue and increases traffic on Prince of Wales Drive.
- The model shows that the Preston extension reduces traffic on SJAMP and increases traffic on Highway 417 between Rochester Street and Pinecrest Road.

[13] It should be noted that the large differences shown within the vicinity of the Preston / Wellington intersection is due to the need to create a new intersection for the Preston extension, resulting in new links between the two scenarios and a much larger difference in volumes.

Figure 24: Preston Extension Traffic Diversion – LeBreton Flats Area, AM Peak Hour

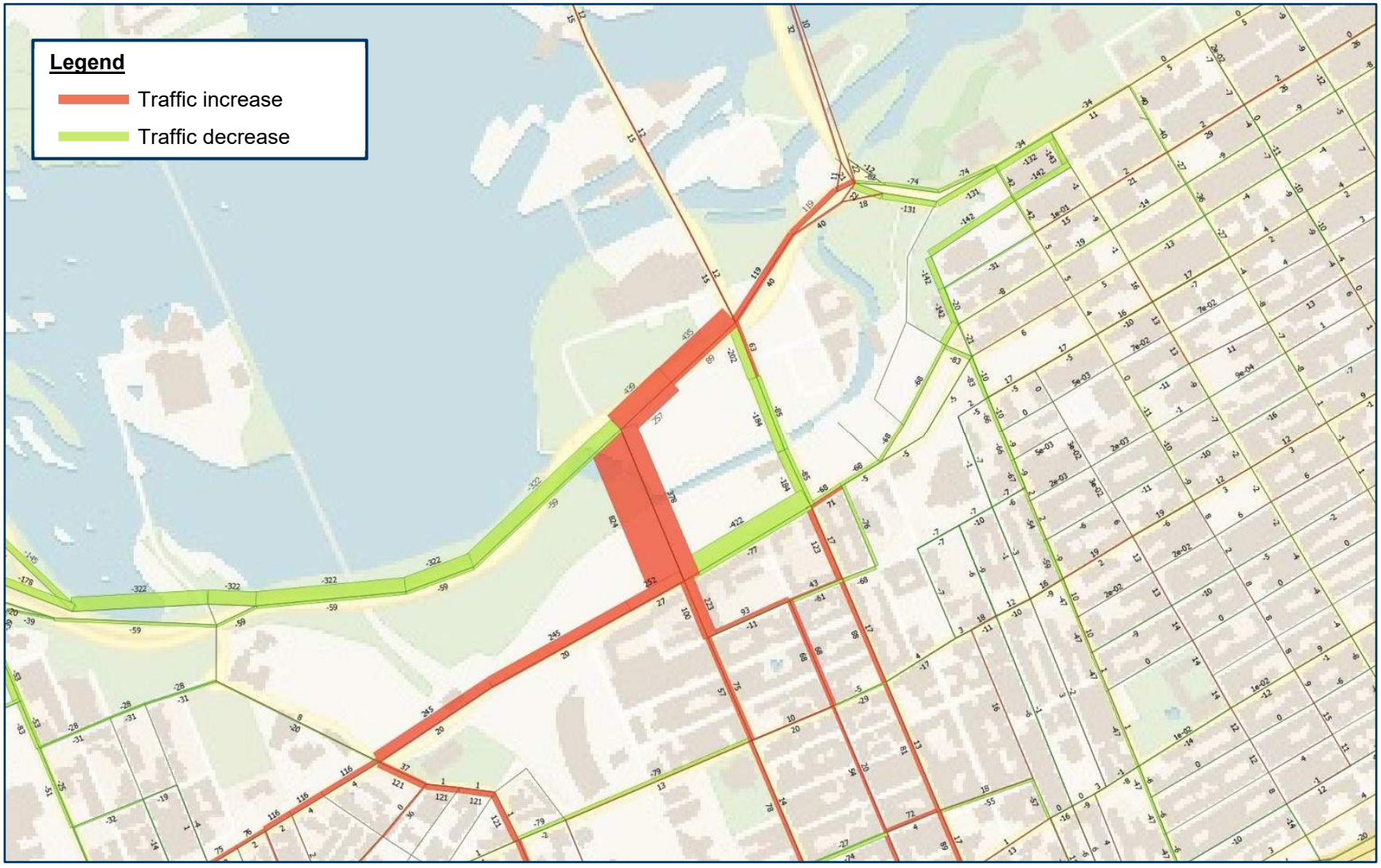


Figure 25: Preston Extension Traffic Diversion – Road Network, AM Peak Hour

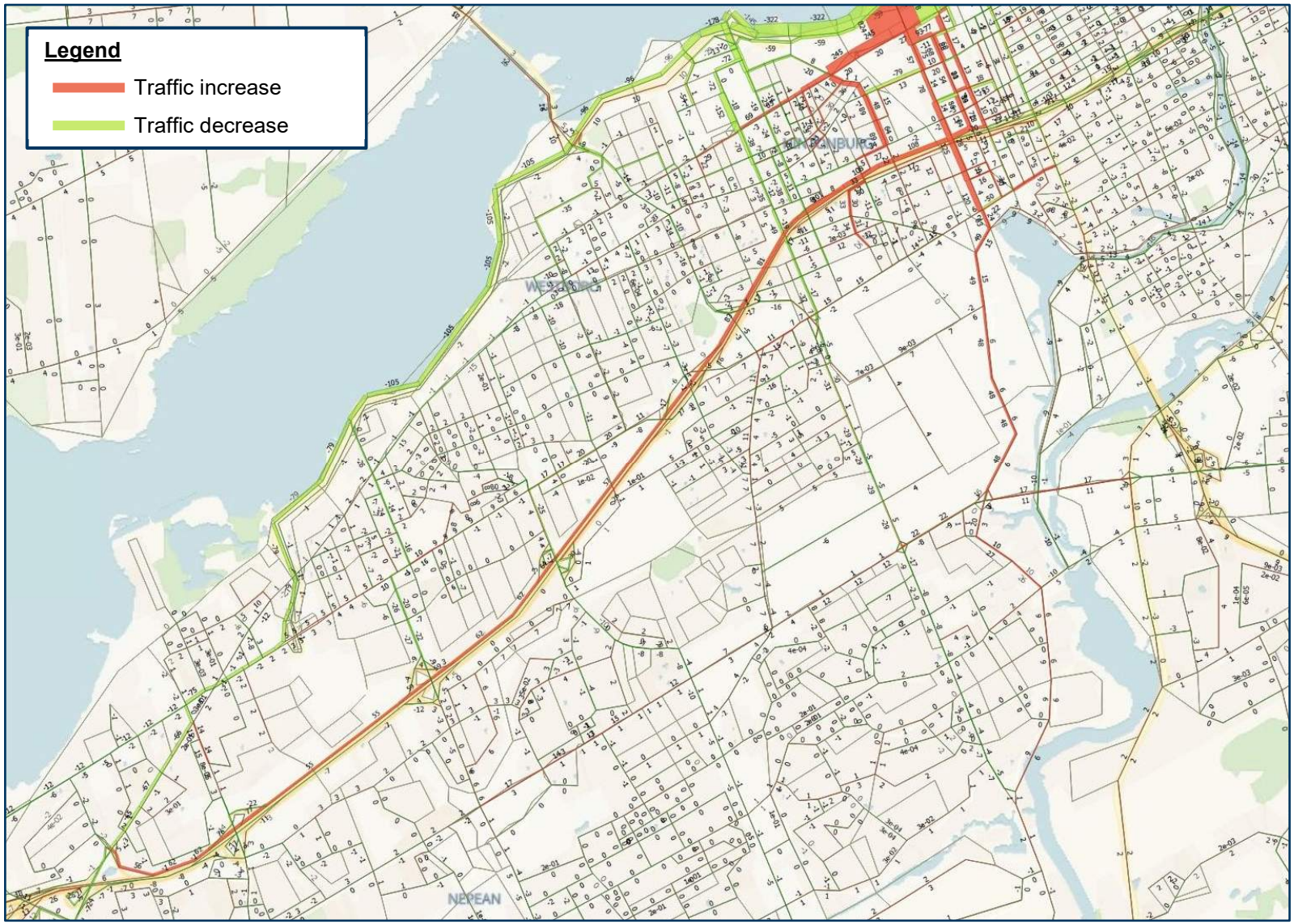
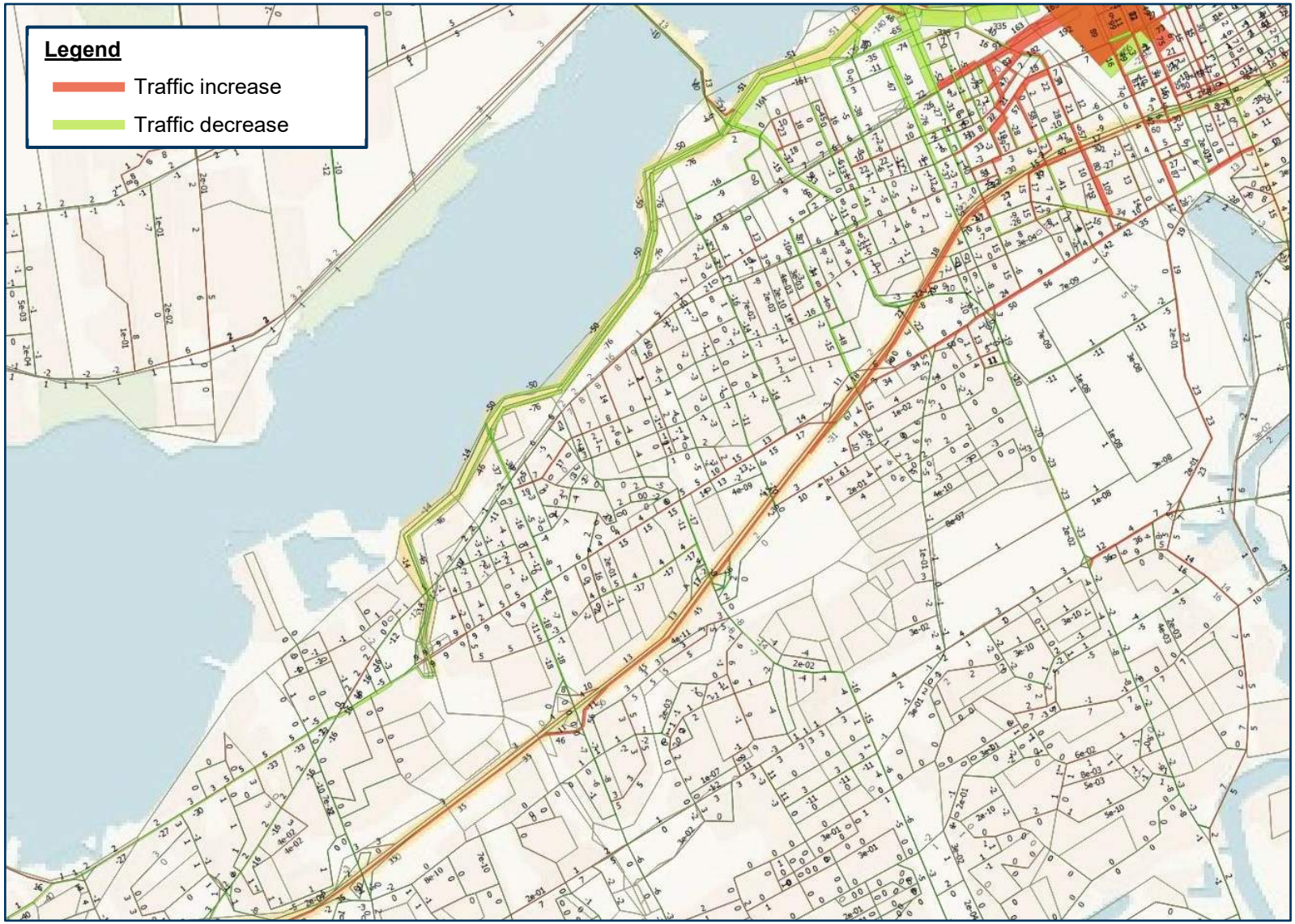


Figure 26: Preston Extension Traffic Diversion – LeBreton Flats Area, PM Peak Hour

Figure 27: Preston Extension Traffic Diversion – Road Network, PM Peak Hour



4.4.4 Screenline Analysis

It is notable that the model appears to show an overall increase in traffic volumes in and around LeBreton Flats with the Preston extension in place. This would indicate that **the implementation of the Preston extension diverts traffic away from other corridors by drawing additional traffic from outside of the study area that was not previously in the area**. This can be confirmed by the use of a Screenline Analysis, as shown in **Table 28** below. For this analysis, the selected screenline is the general alignment of the Confederation Line LRT, just north of Albert Street.

Table 28: Confederation Line Screenline Analysis (No Preston vs Preston)

Street	Section	AM		PM	
		Northbound	Southbound	Northbound	Southbound
SJAMP	Transitway	-20	-61	-76	-50
Island Park	SJAMP - Scott	-6	-16	-37	-15
Tunney's Pasture	Yarrow - Scott	-27	-135	-93	-67
Parkdale	Lyndale - Scott	-72	-225	-139	-161
Bayview Station	Burnside - Scott	+1	0	-41	+16
Preston	SJAMP – Albert	+409	+908	+813	+723
Booth	Fleet – Albert	-57	-176	-74	-178
Bronson	Queen – Albert	-20	-142	+3	-15
Bay	Queen – Albert	+12	-	-22	-
Lyon	Queen – Albert	-	-11	-	-57
Kent	Queen – Albert	-57	-	-18	-
Bank	Queen – Albert	0	-12	-1	+1
Total	**-**	**+163**	**+130**	**+315**	**+197**

While the model shows an obvious increase in traffic volumes on Preston Street, one of the general ideas for the extension is to divert vehicles off of Booth Street, spreading traffic across both roadways. As shown in the City's EMME model this is not the case, as **the reduction in vehicles on Booth Street and other parallel corridors would not balance out the increase in traffic on Preston Street caused by the Preston extension**. This indicates that the Preston extension would draw in additional traffic that was not previously in the area, increasing the amount of traffic in the area, especially in the existing neighbourhood south of LeBreton Flats. This can be further confirmed by using a screenline further south, just north of Somerset Street aligning with Spruce Street, as shown in **Table 29**.

Table 29: Spruce Street Screenline Analysis (No Preston vs Preston)

Street	Section	AM		PM	
		Northbound	Southbound	Northbound	Southbound
Bayview Station	Scott - Somerset	-23	+89	+63	-33
Preston	Primrose - Somerset	+73	+78	+99	+89
Rochester	Primrose - Somerset	+79	+85	+83	+11
Booth	Primrose - Somerset	+20	+125	+49	+23
Bronson	Cooper - Somerset	-10	-114	-19	-1
Total	**-**	**+139**	**+263**	**+275**	**+89**

It is worth noting that for this screenline, the model shows that north-south traffic would increase on Preston Street, Rochester Street and Booth Street. This further confirms that while the implementation of the Preston extension would divert some traffic away from Booth Street between Wellington Street and Albert Street, **it would attract additional traffic to Booth Street between Albert Street and Somerset Street, as well as Preston Street, Rochester Street and Bayview Station Road**. This section of Booth Street already features traffic calming measures to address the heavy traffic volumes and speeds, and drawing additional traffic to the neighbourhood would likely not be welcomed by the surrounding residential neighbourhood.

The final screenline to be used is the Ottawa River in order to confirm the change in volumes on the bridges between Ottawa and Gatineau. The results of this screenline analysis are shown in **Table 30**.

Table 30: Ottawa River Screenline Analysis (No Preston vs Preston)

Section	AM		PM	
	Northbound	Southbound	Northbound	Southbound
Portage Bridge	+21	+25	+32	+19
Chaudiere Bridge	-9	+18	+19	+33
Champlain Bridge	+2	-3	+13	-10
Total	**+14**	**+40**	**+64**	**+42**

It should be noted that the EMME plots provided don't include the Alexandra Bridge or the Macdonald-Cartier Bridge. Notwithstanding, the screenline shows that the implementation of the Preston extension would see a general increase in traffic across the bridges within the vicinity of the study area.

4.4.5 Flats District Access

City of Ottawa comment: *The Flats District that is north of the Confederation Line and west of Booth Street makes up approximately 33% of all the site's peak hour trip generation and as currently proposed cannot be accessed from the south via Booth Street. This access issue may cause deliveries, taxis, and other necessary motor vehicle trips to use Parkdale Avenue (~2 km west) or Bay Street (~1 km east) to reach the development. The Preston extension would alleviate this concern.*

The Flats District is the area of LeBreton Flats west of Booth Street and north of the Confederation Line. Booth Street would not be able to be used for vehicles to access the Flats District from the south due to the northbound left turn restriction in place at Booth Street and Wellington Street, unless the turn restriction was removed/changed. As noted by the City, with the Preston extension in place, vehicles from the south would be able to use Preston Street to access Wellington Street and enter the Flats District; however, it is important to note that due to the site grades and the type of bridge infrastructure that would be required in order to provide the Preston extension, it would not be possible for vehicles to directly access future local streets within the Flats District from Preston Street.

The City's concern that 33% of all vehicular trips generated by the LeBreton Flats development would not be able to enter and exit the Flats District is somewhat misguided; this figure assumes that all vehicular trips into and out of the Flats District would not be able to connect with the Flats District. However, access and egress to the Flats District would be possible for all vehicular trips from the north, east and west – only inbound vehicular trips from the south would be unable to access the Flats District, due to the existing northbound left turn restriction at Booth Street and Wellington Street. **These trips (i.e., inbound trips from the south) amount to only 14% of all inbound vehicular trips (3% of all person trips) to LeBreton Flats**, approximately 50 vph in the AM peak hour and 80 vph in the PM peak hour. Additionally, if this access remains a concern, there is potential for the removal of the northbound left turn restriction at the intersection of Booth Street and Wellington Street.

The diverted traffic volumes in the AM peak hour shown above in Figure 24 provide some insight on access routes into the Flats District for vehicles from the south without the Preston extension in place. It appears that the model shows the routes of choice to access the Flats District from the south would be:

- Via Parkdale Avenue / SJAMP (approximately 40%)
- Via Kent Street / Bank Street / Wellington Street (approximately 30%)
- Via Bay Street / Bronson Avenue / Wellington Street (approximately 30%)

Kent Street would be a strong contender for accessing the Flats District from the south as it is a northbound street with an off-ramp access from Highway 417 and has some connectivity further south via Bank Street. Bay Street would be another contender for access from the south, due to its connection to Bronson Avenue, which has access to Highway 417 and further south of the highway.

Bayswater Avenue / Bayview Station Road / Slidell Street could be a contender for access to the Flats District if the northbound right turn restrictions at the intersection of Slidell Street and SJAMP were removed. This scenario was modelled in EMME to review the potential upstream impacts from this change. The results of the model show the following changes to traffic volumes in the area:

- Increase of 50 vph northbound on Bayswater Avenue between Carling Avenue and Gladstone Avenue. This section of Bayswater Avenue is classified as a Local Street.
- Increase of 70 vph northbound on Bayswater Avenue / Bayview Station Road between Gladstone Avenue and Albert Street / Scott Street. This section of Bayswater Avenue / Bayview Station Road is classified as a Collector Street.
- Increase of 140 vph northbound on Bayview Station Road north of Albert Street / Scott Street. This section of Bayview Station Road is classified as a Collector Street.
- Increase of 110 vph northbound through Mechanicsville neighbourhood; all streets classified as Local Streets.
- Decrease of 200 vph on Parkdale Avenue north of Scott Street. Parkdale Avenue is classified as an Arterial Street on this section.

Given that the impacts this change would present in terms of an increase in traffic volumes on lower order facilities, specifically south of Somerset Street where there are already traffic calming measures in place, **the removal of the northbound right turn restriction from Slidell Street onto the SJAMP is not recommended**. However, it is worth noting that this movement could be permitted for other traffic, such as transit or emergency vehicles, if desired.

Without the Preston extension, 97% of all person trips would have direct access to the Flats District, with only 3% of person trips (and 14% of vehicular trips) requiring the use of an alternative corridor such as Parkdale Avenue, Kent Street or Bay Street. Given the strong connection provided to the Flats District for all non-vehicular modes, access to the Flats District is not felt to be a strong concern with the removal of the Preston extension.

4.4.6 Intersection Operations

City of Ottawa comment: *The increase in network capacity from the addition of 400 m of roadway in the Preston Street corridor would be nominal and would be limited by area bottle necks (e.g., Chaudière interprovincial crossing is and will continue to operate at capacity).*

The City's EMME models identified in Section 4.4.1 were used as the basis for developing turning movement volumes for the Preston extension 2050 Full Build-Out that are used in the Synchro analysis in **Table 31**. The changes in traffic volume on each corridor were manually adjusted since the EMME model tends to overrepresent traffic volumes when compared against turning movement counts (this is consistent across both the existing EMME models and the future EMME models). Once the adjustment was made, traffic was diverted as outlined in Figures 24 and 26, with adjustments made to the turning movement volumes using the percentage of diverted traffic along each corridor. **Figure 28** below shows the adjustments made to the No Preston extension 2050 Full Build-Out turning movement volumes (i.e., those shown in Figure 21), while **Figure 29** shows the turning movement volumes to be used in the Preston extension 2050 Full Build-Out analysis.

Figure 28: Changes to 2050 Full Build-Out Volumes from No Preston Extension Scenario

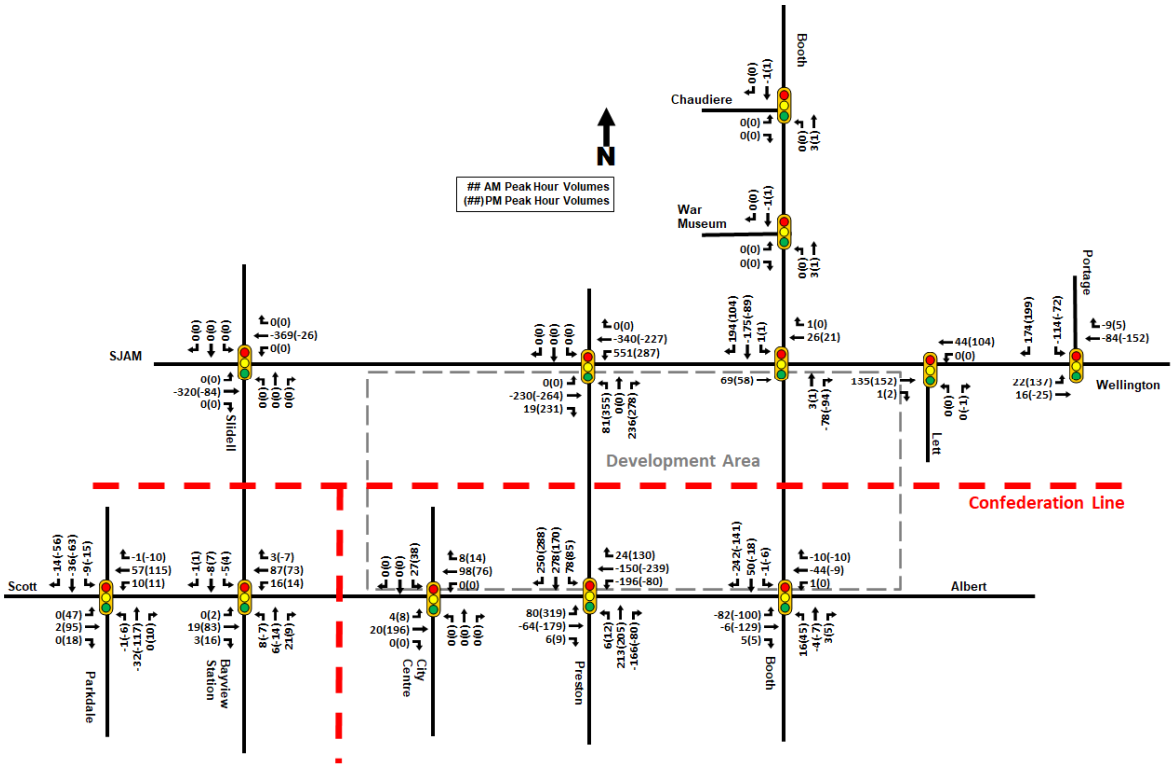
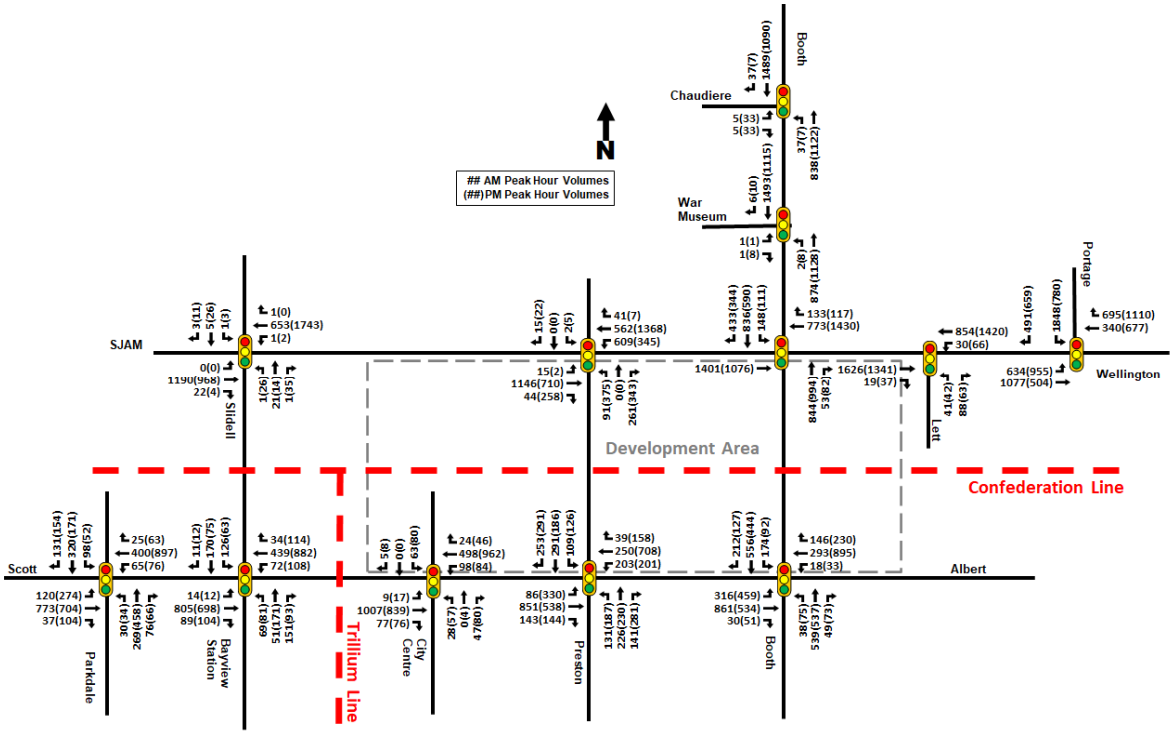


Figure 29: Preston Extension –Turning Movement Volumes, AM Peak (PM Peak)



The following Table 31 summarizes the projected study area intersection performance based on the Preston extension 2050 Full Build-Out Scenario, assuming no significant changes to signal timing plans from the No Preston extension 2050 Full Build-Out Scenario (i.e., slight tweaks to optimize phases, but not cycle lengths).

Table 31: Study Area Intersection Operations – Preston Extension, AM Peak (PM Peak)

Intersections	Overall			Critical Movement			
	Delay (s)	v/c Ratio	v/c LOS	Mvmt	Delay (s)	v/c Ratio	v/c LOS
Booth & Chaudière	14 (13)	0.93 (0.78)	E (C)	SBTR	21 (13)	0.95 (0.78)	E (C)
Booth & War Museum	1 (2)	0.48 (0.36)	A (A)	SBTR	2 (2)	0.48 (0.36)	A (A)
Booth & Wellington	66 (59)	1.00 (0.97)	E (E)	WBT	31 (98)	0.57 (0.99)	A (E)
Booth & Albert	70 (108)	0.99 (1.22)	E (F)	EBL	138 (212)	1.16 (1.34)	F (F)
Albert & Empress	4 (6)	0.37 (0.45)	A (A)	WBTR	3 (8)	0.18 (0.47)	A (A)
Albert & Preston	69 (65)	0.91 (0.96)	E (E)	NBTR	81 (73)	0.96 (0.99)	E (E)
Albert & City Centre	15 (12)	0.52 (0.45)	A (A)	EBTR	15 (14)	0.54 (0.46)	A (A)
Albert/Scott & Bayview Station	18 (19)	0.71 (0.69)	C (B)	EBTR	15 (15)	0.78 (0.70)	C (B)
Scott & Parkdale	41 (75)	0.88 (1.10)	D (F)	WBT	33 (144)	0.73 (1.24)	C (F)
SJAMP & Slidell	4 (8)	0.41 (0.72)	A (C)	WBT	5 (9)	0.23 (0.72)	A (C)

Intersections	Overall			Critical Movement			
	Delay (s)	v/c Ratio	v/c LOS	Mvmt	Delay (s)	v/c Ratio	v/c LOS
Wellington/SJAMP & Vimy/Preston	59 (51)	1.03 (0.98)	F (E)	EBTR	90 (67)	1.10 (0.99)	F (E)
Wellington & Lett	49 (16)	0.70 (0.58)	B (A)	EBTR	72 (18)	0.72 (0.61)	C (B)
Wellington & Portage	111 (50)	1.20 (0.92)	F (E)	SBL	256 (55)	1.49 (0.85)	F (D)
Wellington & Broad	21 (11)	0.57 (0.58)	A (A)	NBLR	120 (50)	0.35 (0.61)	A (B)
Albert & Access 1	21 (34)	0.83 (0.86)	D (D)	EBT	33 (53)	0.86 (0.88)	D (D)

The intersections of Booth Street at Albert Street, Albert Street at Preston Street, Scott Street at Parkdale Avenue and Wellington Street at Portage Bridge continue to operate poorly in at least one peak hour with the Preston extension in place, consistent with all other analysis. There is a deterioration in LOS from LOS 'B' to LOS 'C' at the intersections of Albert Street at City Centre Avenue and Albert Street / Scott Street at Bayview Station Road.

The removal of the Preston extension does not noticeably impact the level of service of any intersections outside of the four key intersections identified below. The following section focuses on the intersections that are most impacted by the Preston extension: Booth Street at Wellington Street, Booth Street at Albert Street, Preston Street at Sir John A. Macdonald Parkway and Preston Street at Albert Street. The benefits and impacts of each scenario are summarized after each Synchro summary table.

Booth Street at Wellington Street

Table 32: Booth Street at Wellington Street – No Preston Extension vs Preston Extension

Intersections	Movements	Delay (s)	v/c Ratio	v/c LOS
Scenario 1 – No Preston Extension	EBT	91 (26)	0.95 (0.71)	E (C)
	WBT	29 (97)	0.54 (0.98)	A (E)
	WBR	23 (23)	0.21 (0.17)	A (A)
	NBTR	95 (54)	1.09 (1.04)	F (F)
	SBL	141 (87)	0.89 (0.91)	D (E)
	SBT	27 (26)	0.77 (0.51)	C (A)
	SBR	12 (19)	0.36 (0.35)	A (A)
	Overall	**63 (55)**	**1.00 (1.00)**	**E (E)**
Scenario 3 – Preston Extension	EBT	101 (22)	1.02 (0.75)	F (C)
	WBT	31 (98)	0.57 (0.99)	A (E)
	WBR	23 (22)	0.22 (0.17)	A (A)
	NBTR	97 (74)	0.97 (0.95)	E (E)
	SBL	152 (116)	0.92 (0.92)	E (E)
	SBT	23 (25)	0.63 (0.44)	B (A)
	SBR	21 (23)	0.64 (0.50)	B (A)
	Overall	**66 (59)**	**1.00 (0.97)**	**E (E)**

The overall intersection of Booth Street at Wellington Street operates comparably in both scenarios, with a LOS 'E' in both peak hours and similar overall intersection delays. The northbound approach is over capacity in both peak hours without the Preston extension, while with the Preston extension the northbound approach is almost at capacity. With the Preston extension the eastbound through movement is over capacity, while it is approaching capacity without Preston extension. Overall, this intersection operates very similarly between the two scenarios.

Booth Street at Albert Street

Table 33: Booth Street at Albert Street – No Preston Extension vs Preston Extension

Intersections	Movements	Delay (s)	v/c Ratio	v/c LOS
Scenario 1 – No Preston Extension	EBL	156 (390)	1.22 (1.77)	F (F)
	EBTR	19 (18)	0.56 (0.43)	A (A)
	WBL	43 (34)	0.12 (0.18)	A (A)
	WBTR	48 (118)	0.66 (1.16)	B (F)
	NBL	38 (38)	0.16 (0.20)	A (A)
	NBTR	154 (163)	1.22 (1.25)	F (F)
	SBL	226 (60)	1.31 (0.78)	F (C)
	SBT	42 (38)	0.77 (0.74)	C (C)
	SBR	306 (106)	1.57 (0.94)	F (E)
	Overall	**111 (132)**	**1.13 (1.31)**	**F (F)**
Scenario 3 – Preston Extension	EBL	138 (212)	1.16 (1.34)	F (F)
	EBTR	22 (12)	0.60 (0.35)	A (A)
	WBL	43 (35)	0.13 (0.16)	A (A)
	WBTR	46 (123)	0.59 (1.17)	A (F)
	NBL	40 (49)	0.26 (0.48)	A (A)
	NBTR	128 (176)	1.15 (1.28)	F (F)
	SBL	156 (56)	1.12 (0.74)	F (C)
	SBT	39 (38)	0.78 (0.72)	C (C)
	SBR	82 (69)	0.88 (0.47)	D (A)
	Overall	**70 (108)**	**0.99 (1.22)**	**E (F)**

The intersection of Booth Street at Albert Street is projected to operate with a LOS 'F' in both peak hours without the Preston extension. With the Preston extension, it is projected to operate with a LOS 'E' in the AM peak hour and a LOS 'F' in the PM peak hour. In both scenarios, the eastbound left turn (both peak hours), northbound through/right (both peak hours), and southbound left turn (AM peak hour) movements are over capacity. Without the Preston extension, the southbound right turn is also projected to be over capacity, as the Preston extension spreads this turning movement volume across Booth Street and Preston Street. Overall, the intersection of Booth Street at Albert Street is expected to operate better in the scenario with the Preston extension, however there are numerous over capacity movements in both scenarios.

Preston Street at Albert Street

The intersection of Preston Street at Albert Street is within 600m of the Pimisi LRT station, and is included in the Albert Street Cycling / Pedestrian Modifications project to improve pedestrian and cycling facilities on Albert Street. Therefore, for the Preston extension scenario, the only improvement assumed for this intersection to accommodate additional traffic volumes is a separate southbound right turn lane. This allows the southbound right turn movement to operate on an overlap phase with the eastbound left turn movement, separating the 250+ southbound right turning vehicles in each peak hour from pedestrians and cyclists crossing the west leg of the intersection.

Table 34: Preston Street at Albert Street – No Preston Extension vs Preston Extension

Intersections	Movements	Delay (s)	v/c Ratio	v/c LOS
Scenario 1 – No Preston Extension	EBL	42 (50)	0.07 (0.13)	A (A)
	EBTR	90 (42)	1.03 (0.64)	F (B)
	WBL	27 (71)	0.69 (0.81)	B (D)
	WBTR	5 (3)	0.19 (0.47)	A (A)
	NBL	78 (67)	0.75 (0.73)	C (C)
	NBTR	19 (20)	0.76 (0.80)	C (C)
	SBL	71 (80)	0.41 (0.53)	A (A)
	SBTR	44 (44)	0.10 (0.12)	A (A)
	Overall	**53 (30)**	**0.90 (0.71)**	**D (C)**
Scenario 3 – Preston Extension	EBL	33 (91)	0.27 (0.97)	A (E)
	EBTR	74 (54)	0.94 (0.75)	E (C)
	WBL	79 (69)	0.88 (0.83)	D (D)
	WBTR	25 (49)	0.34 (0.95)	A (E)
	NBL	104 (90)	0.90 (0.90)	D (D)
	NBTR	81 (73)	0.96 (0.99)	E (E)
	SBL	85 (81)	0.77 (0.94)	C (E)
	SBT	58 (71)	0.77 (0.52)	C (A)
	SBR	76 (67)	0.88 (0.96)	D (E)
	Overall	**69 (65)**	**0.91 (0.96)**	**E (E)**

Both scenarios operate comparably in the AM peak hour, with the Preston extension scenario having a higher delay and comparable v/c ratio. The difference in v/c ratio between the two scenarios results in a LOS 'E' in the AM peak hour with the Preston extension in place. The scenario without the Preston extension is projected to have the eastbound through/right movement over capacity in the AM peak hour, however no other movements operate worse than a LOS 'C'. In the scenario with the Preston extension, no movements are over capacity in the AM peak hour, but the eastbound through/right and northbound through/right movements are approaching capacity.

In the PM peak hour, the scenario with the Preston extension operates significantly worse than the scenario without the Preston extension. The Preston extension scenario has an overall LOS of LOS 'E', 35 seconds more of delay, and five individual movements approaching capacity (eastbound left, westbound through/right, northbound left, northbound through/right, southbound left, southbound right). The scenario without the Preston extension has no movement operating worse than LOS 'D'. Overall,

the scenario with no Preston extension in place is better from a traffic operations perspective at Preston Street and Albert Street, especially in the PM peak hour.

Preston Street at Wellington Street

The intersection of Preston Street at Wellington Street is within 600m of the Pimisi LRT station, therefore for the Preston extension scenario, the only improvement assumed for this intersection to accommodate additional traffic volumes is a separate northbound right turn lane. This allows the northbound right turn movement to operate on an overlap phase with the westbound left turn movement, separating the 250+ northbound right turning vehicles in each peak hour from pedestrians and cyclists crossing the east leg of the intersection.

Table 35: Preston Street at Wellington Street – No Preston Extension vs Preston Extension

Intersections	Movements	Delay (s)	v/c Ratio	v/c LOS
Scenario 1 – No Preston Extension	EBL	6 (6)	0.04 (0.01)	A (A)
	EBTR	10 (8)	0.61 (0.43)	B (A)
	WBL	54 (2)	0.37 (0.15)	A (A)
	WBTR	2 (5)	0.34 (0.61)	A (B)
	NBLTR	2 (21)	0.15 (0.45)	A (A)
	SBLTR	1 (2)	0.07 (0.14)	A (A)
	Overall	**7 (6)**	**0.58 (0.59)**	**A (A)**
Scenario 3 – Preston Extension	EBL	24 (29)	0.07 (0.02)	A (A)
	EBTR	90 (67)	1.10 (0.99)	F (E)
	WBL	68 (62)	1.00 (0.91)	E (E)
	WBTR	9 (28)	0.24 (0.71)	A (C)
	NBL	49 (59)	0.53 (1.00)	A (E)
	NBR	29 (84)	0.48 (1.01)	A (F)
	SBLTR	1 (1)	0.06 (0.07)	A (A)
	Overall	**59 (51)**	**1.03 (0.98)**	**F (E)**

While the intersection of Preston Street at Wellington Street operates with a LOS ‘A’ without the Preston extension, it is over capacity in the AM peak hour with the Preston extension in place and approaching capacity in the PM peak hour. The heavy westbound left turn movement that has to be accommodated due to the Preston extension opposes the eastbound through movement, resulting in the eastbound through movement being LOS ‘F’ and the westbound left turn being LOS ‘E’ in the AM peak hour and the eastbound through and westbound left being LOS ‘E’ in the PM peak hour. Additionally, the northbound left and northbound right operate with LOS ‘E’ and LOS ‘F’, respectively. The scenario without the Preston extension in place is much better from a traffic operations perspective at this intersection.

From the intersection operations analysis we can see that **the Preston extension causes a deterioration in intersection operations on the Preston Street corridor that are not offset by an improvement in intersection operations along Booth Street corridor**.

4.4.7 Network Modifications

Due to the limited number of north-south connections between Wellington Street / SJAMP and Albert Street, there appear to be limited opportunities for network modifications that would improve vehicular capacity while still prioritizing non-vehicular modes of transportation. An example of this is the aforementioned potential for permitting northbound right turns at the intersection of Slidell Street at SJAMP, which would result in an increase of cut-through traffic through the residential section of Bayswater Avenue. Bayswater Avenue is classified as a local street from Carling Avenue to Gladstone Street. Furthermore, due to requests from residents, speed humps and flex posts were implemented in recent years as traffic calming measures. These two factors show that while allowing the northbound right turn at Slidell Street / SJAMP may improve traffic operations in the study area, there are other reasons that it wouldn't be an acceptable network modification solution.

The only modification that has merit at this time is allowing the northbound left turn movement at the Booth Street and Wellington Street intersection, making it accessible to all traffic. This movement was previously allowed for transit only, but with the recent reconstruction of the intersection to provide protected intersection elements, it has been removed. The City provided an EMME model for the scenario with the northbound left turn being implemented at the intersection of Booth Street and Wellington Street, which indicated that 112 vehicles would make a northbound left turn movement during the AM peak hour. This has been modelled in Synchro software (assumed to operate with protected phasing due to crossing the southbound cycle track, and minimum green time). This option is compared against the default Scenario 1 (No Preston Extension) in the table below.

Table 36: Booth Street at Wellington Street – Permitted Northbound Left Turn, Scenario 1

Scenario	Movements	Delay (s)	v/c Ratio	v/c LOS
No Northbound Left Turn	EBT	91 (26)	0.95 (0.71)	E (C)
	WBT	29 (97)	0.54 (0.98)	A (E)
	WBR	23 (23)	0.21 (0.17)	A (A)
	NBTR	95 (65)	1.09 (1.04)	F (F)
	SBL	141 (87)	0.89 (0.91)	D (E)
	SBT	27 (26)	0.77 (0.51)	C (A)
	SBR	12 (19)	0.36 (0.35)	A (A)
	Overall	**63 (58)**	**1.00 (1.00)**	**E (E)**
Northbound Left Turn Permitted	EBT	91 (26)	0.95 (0.71)	E (C)
	WBT	29 (97)	0.54 (0.98)	A (E)
	WBR	23 (23)	0.21 (0.17)	A (A)
	NBL	192 (140)	1.19 (1.16)	F (F)
	NBTR	95 (65)	1.09 (1.04)	F (F)
	SBL	135 (90)	0.89 (0.92)	D (E)
	SBT	96 (37)	1.11 (0.65)	F (B)
	SBR	16 (20)	0.47 (0.41)	A (A)
	Overall	**81 (61)**	**1.03 (1.00)**	**F (E)**

While implementing a northbound left turn movement at the intersection of Booth Street at Wellington Street doesn't impact the overall v/c ratio or LOS, it increases the delay for the intersection during the AM peak hour. Specifically, the delay for the southbound through movement increases by approximately 70 seconds, and the v/c ratio increases from 0.77 to 1.11. In addition to operational concerns, implementing the northbound left turn would require a reconstruction of the recently built protected intersection to provide space for the additional lane. This indicates that **a northbound left**

turn movement is not recommended at the intersection of Booth Street and Wellington Street and should only be considered if the City continues to be concerned with the lack of vehicular access to the Flats District from the south.

The other potential mitigation measure is the provision of a sixth crossing of the Ottawa River. The NCC recently completed a Long-Term Integrated Crossings Plan; some key items that may benefit the transportation network around LeBreton Flats are highlighted below:

- There are limited opportunities to enhance vehicular capacity of existing crossings in the central core, however increasing people-moving capacity through sustainable transportation initiatives is possible.
- A new eastern crossing shows a higher potential to divert truck traffic away from the downtown crossings than a western one (15% diversion vs 8% diversion).
- A truck tunnel from Highway 417 to Macdonald-Cartier Bridge diverts the greatest volume of trucks from the downtown crossings (35%).
- The planned West Gatineau Tramway and downtown transit loop (shown previously in Figure 11) has significant potential to meet the needs of interprovincial travel. It is worth noting that the EMME model used in this analysis includes only the West Gatineau Tramway, and not the downtown transit loop. The West Gatineau Tramway is assumed to not lead to a reduction in vehicle lanes, as it would be accommodated through the addition of a new bridge crossing or replacement of the bus lanes currently on the Portage Bridge.

4.4.8 Pedestrian and Cycling Safety

City of Ottawa comment: *The intersection of Booth/Albert has a lot of responsibilities to transit, pedestrians and cyclists due to its proximity to OC Transpo's LRT Pimisi Station. The ability to shift freight transport away from the Albert Street / Booth Street intersection will reduce the number of turning trucks at both the Albert Street / Booth Street and Preston Street / Albert Street intersections, which would improve the pedestrian experience and more importantly, pedestrian safety at these two intersections. Truck turning would still be required at the Preston Street / Wellington Street and Wellington Street / Booth Street intersections; however, the Wellington Street corridor does not have the physical constraints, nor the pedestrian volumes that the Albert Street corridor does and would. Conflicts between pedestrians and turning trucks (as currently seen on the northern leg of the Albert Street / Booth Street intersection) are typically unwelcomed from a road safety perspective, and should be considered carefully, with the understanding that both corridors are not without their risks.*

Concerns with the mixing of heavy left turn movements (including heavy trucks) and pedestrians/cyclists at the intersection of Albert Street and Booth Street are justified. It is worth noting that diverting traffic and heavy trucks to the Preston extension helps alleviate safety issues in the Booth Street corridor, however it shifts the problem to the Preston Street corridor.

Figure 30: Existing Cycling Facilities at Booth Street / Albert Street

The Master Concept Plan proposes multi-use pathways on both sides of the aqueduct (i.e., north of the Confederation Line) as shown in **Figure 31**, which will permit pedestrians and cyclists to avoid using Albert Street if desired. The proposed MUPs will be attractive to trips originating or destined to LeBreton Flats, as well as cut through trips, such as active transportation users along the Ottawa River Pathway, or to and from downtown. At the time of this report, the multi-use pathway on the north side of the Confederation Line (south of the aqueduct) has been recently built between Pimisi and Bayview LRT stations with a connection to the Ottawa River Pathway and since its opening in December 2021, it has received more than 12,000 trips by pedestrians and cyclists. This will reduce the reliance of active transportation users on the Albert Street corridor, reducing vehicular conflicts with pedestrians and cyclists. Pedestrians and cyclists travelling north-south will still need to cross the Albert Street corridor (i.e., to/from Gatineau via the Chaudière Crossing). Further improvements to pedestrian and cyclist safety at the intersection of Albert Street/Booth Street will be observed with the implementation of a protected intersection as part of the Albert Street Cycling / Pedestrian Modifications project. This will require a fully protected eastbound left turn phase, which will minimize vehicular-pedestrian/cyclist conflicts on the north leg.

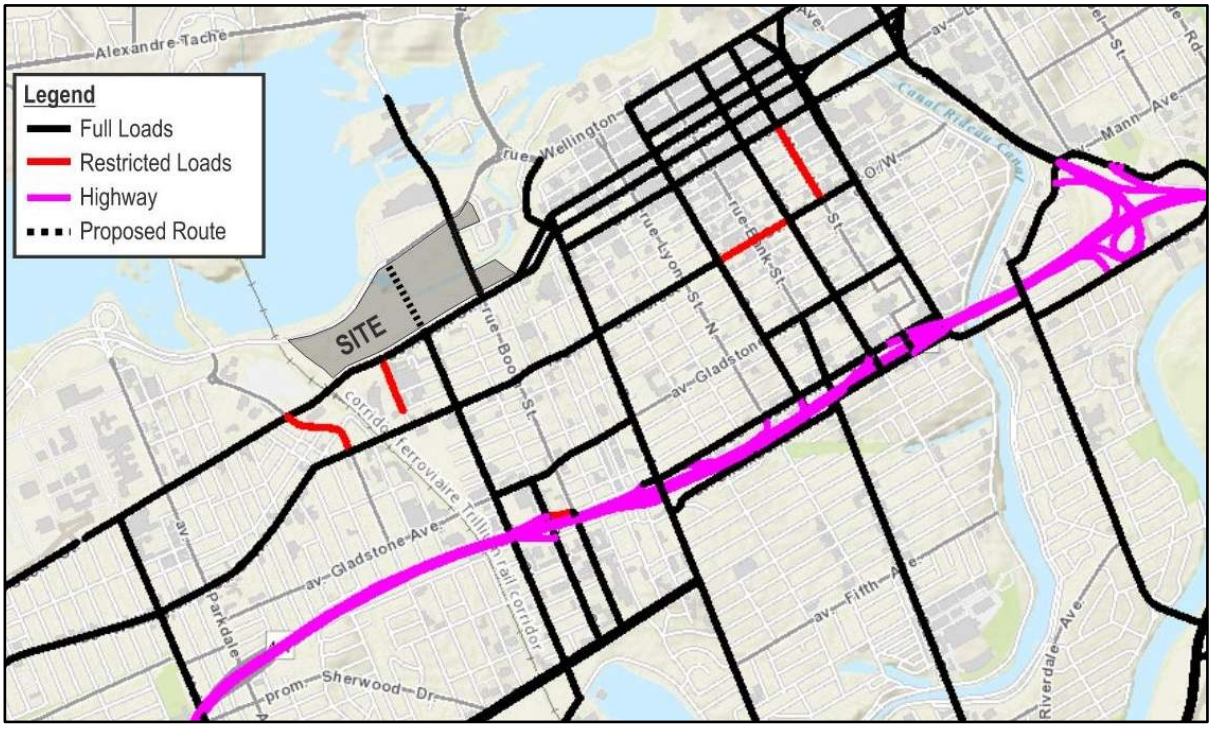
Figure 31: Proposed Multi-Use Pathways

4.4.9 Freight Movements

City of Ottawa comment: *Preston Street is a designated truck route, which provides freight transportation (e.g., between Highway 417 and Quebec). There are only two Interprovincial freight crossings in the region, and neither can support the addition of the other's load. At a future date, if freight can be relocated to another crossing location, this issue may be significantly mitigated. Note that the cities of Ottawa and Gatineau and the NCC recognize the less-than-ideal freight crossing routes and have been actively planning alternatives.*

The utility of designating Preston extension as a Truck Route is compromised by the fact that **Wellington Street is not currently designated as a Truck Route between Preston Street and Booth Street** in the City of Ottawa's Truck Route Network. This is reflected in **Figure 32**, showing the current and planned truck route network. Additionally, utilizing the Preston extension to connect freight to the Chaudière Crossing **would require the reconstruction of the intersection of Booth Street and Wellington Street to provide an eastbound left turn lane** that would accommodate heavy vehicles– a movement which is currently prohibited.

Figure 32: City of Ottawa Truck Route Network



It is worth noting that the NCC's study for the *Long-Term Integrated Interprovincial Crossings Plan for Canada's Capital Region* indicates that a new crossing of the Ottawa River east of downtown has the potential to divert 15% of truck traffic away from the downtown core, while a new crossing west of downtown has the potential to divert 8% of truck traffic away. A truck tunnel connecting Highway 417 to Macdonald-Cartier Bridge has the highest potential for diverting trucks away from downtown, at 35% diversion. The merit of making a significant and potentially contentious change to the truck route network to capitalize on the Preston extension is questionable if there is going to be fewer trucks in the Core Area in the future.

4.4.10 Transit Services

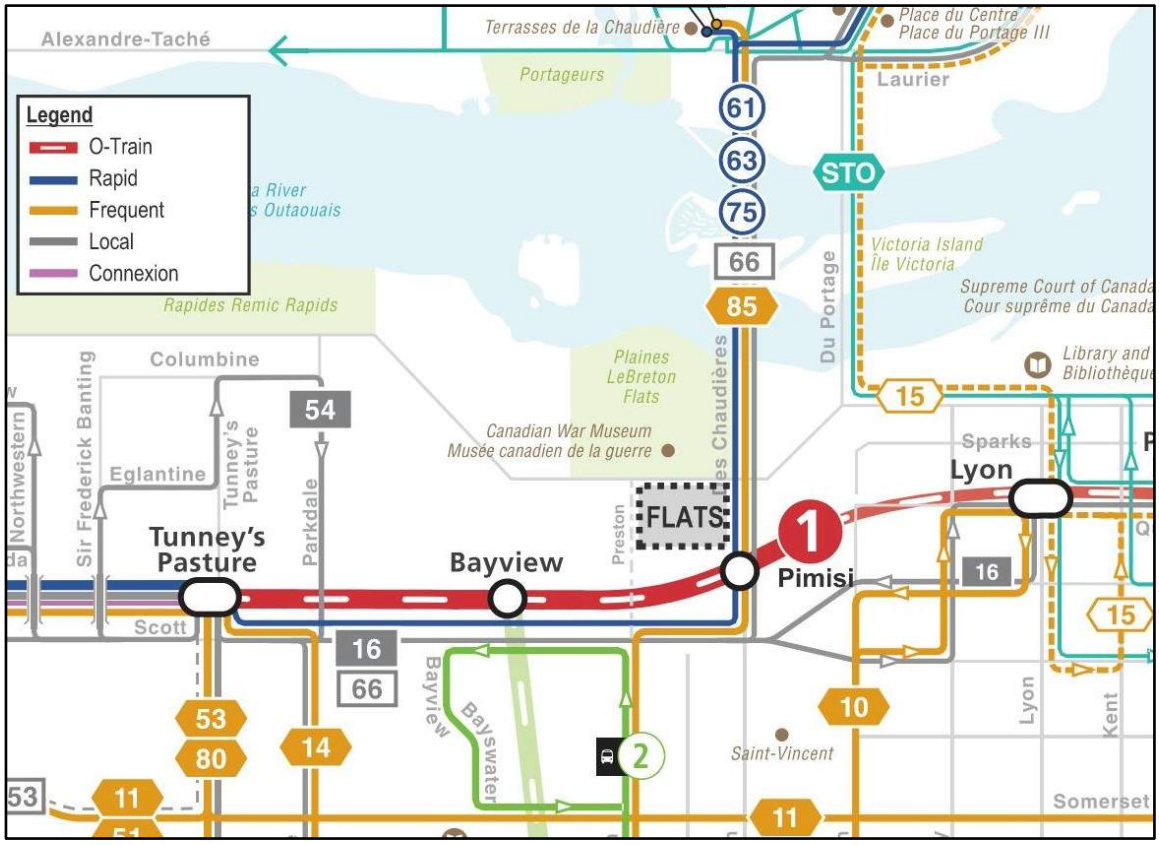
City of Ottawa comment: *The Preston extension would allow for more flexible routing and staging of transit routes, such as looping around Preston-Wellington-Booth to end a bus route at LeBreton Flats without having to cross to Gatineau. This routing may also help with staging for large events such as Bluesfest or for other events at the potential events centre.*

The Preston extension is not a preferred alternative to Booth Street for fixed (i.e., standard day to day) transit routing. The potential benefits of transit routing onto Preston extension cannot be realized for the following reasons:

- There is no connectivity to Pimisi or Bayview LRT Stations, and connectivity from any Preston extension to LRT stations would be difficult due to the structure required to cross the aqueduct and the Confederation Line.
- There are no transit priority facilities on Wellington Street in the study area.
- There are no eastbound right or left turn lanes onto Booth Street from Wellington Street eastbound to allow buses to continue along the Booth Street corridor.

It is worth noting that the Preston extension would provide value for operational flexibility and redundancy during temporary transit routing (i.e., event or incident driven routing changes), but this redundancy could be replicated by allowing transit to use Slidell Street and the SJAMP during major events or incidents, or exempting transit from the turn restrictions at the Booth Street / Wellington Street intersection.

Figure 33: OC Transpo Route Network

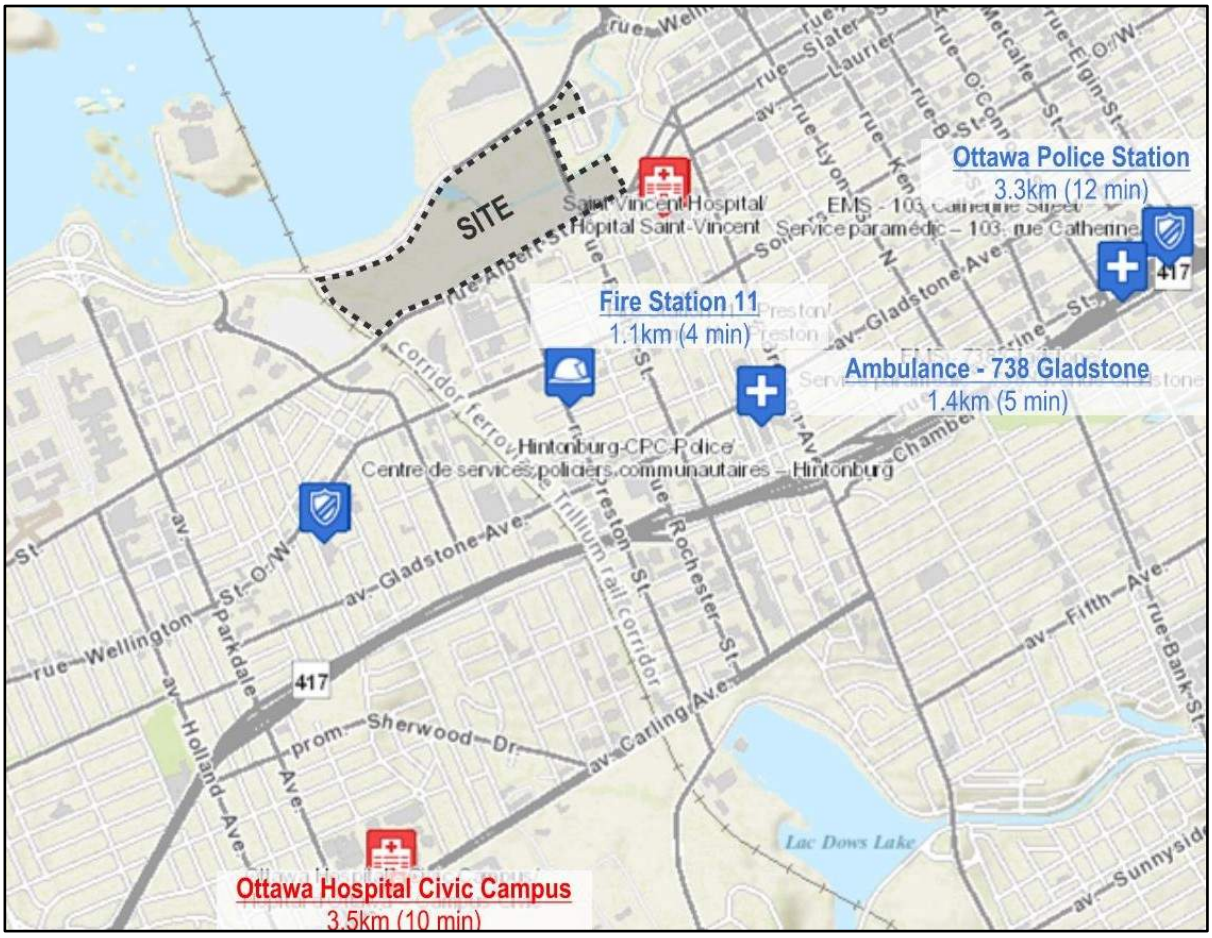


4.4.11 Emergency Services

City of Ottawa comment: *The City has mandated response time requirements. If adequate response times cannot be met, additional resources would be required.*

A high-level review of nearby emergency services, as shown in **Figure 34**, indicates that all emergency services are less than 15 minutes away. If additional access for emergency vehicles to LeBreton Flats, or more specifically the Flats District, is a concern then it should be noted that **emergency vehicles would not have to abide by turning restrictions at intersections**, such as those at Booth Street, Wellington Street and Slidell Street. Additionally, **the City could choose to provide emergency services on-site at LeBreton Flats**.

Figure 34: Emergency Services



4.4.12 Additional City Concerns with Removal of Preston Extension

The following are a list of additional concerns regarding the potential removal of the proposed Preston extension provided by City of Ottawa staff (in italics).

***Past Commitments**: The City has made past commitments to stakeholders, including those involved in the East Flats development, regarding the proposed extension of Preston Street.*

It is felt by the study team that the analysis contained within this TIA study indicate that there will be minimal impacts on adjacent stakeholders due to the removal of the Preston extension from the OP and TMP, and that **there are more benefits to stakeholders with the removal of the proposed Preston extension than there are negative impacts**.

***Network Resilience** - The arterial road network is a critical component within a transportation system. An arterial network not only supports travel to/from the development area, but it also supports through traffic unrelated to the development. Due to the specific geographical constraints of LeBreton Flats, as well as the existing surrounding arterial network, Booth Street is currently the only arterial connecting Wellington Street and Albert Street. If Booth Street becomes disabled, in either the existing or future conditions, for reasons such as a collision, construction, or general maintenance, traffic accessing Wellington Street would need to detour through downtown or to Parkdale Avenue, adding 2 to 5 km of additional travel on routes that already experience at, or near capacity conditions. This would not only have an impact on daily commuters, but would potentially also impact emergency response time, supply chain efficiency and construction vehicles that require access to/from and through LeBreton Flats. The proposed Preston extension is intended to provide network redundancy within this area, which allows for some added network resilience.*

It is important to note that the above scenario regarding potential impacts due to Booth Street becoming disabled is an existing condition, as there hasn't previously been an alternative corridor to provide network resiliency for Booth Street. **The LeBreton Flats development will be maintaining the status quo and will not be removing network resiliency**.

***Greenhouse Gases** - Any potential increase in pollution due to the addition of approximately 400 m of roadway, including construction of a structure over the Confederation Line and aqueduct, may be nullified by the additional travel distance required to use alternate routes.*

It is felt by the study team that the analysis contained within this TIA study indicate that the removal of the proposed Preston extension will not require alternate routes for the majority of vehicles accessing the development, with the exception of 3% of all person trips, as identified in Section 4.4.5. Furthermore, the active transportation connections proposed as part of the Master Concept Plan in lieu of the Preston extension provide improved facilities for users of active modes of transportation.

4.4.13 Additional Benefits of the Removal of the Preston Extension

The following are high-level concerns that the LeBreton Flats study team have identified with the proposed Preston extension, which need to be taken into consideration and discussed alongside the concerns identified by the City.

Construction Cost - Previous plans for the proposed Preston extension did not detail how the sectional and grading complexities could be accommodated, from either a design or financial perspective. Due to the position of the Confederation Line, a Preston Street arterial bridge would have to be over 150 metres in length, which would be twice the length of the Booth Street bridge. The cost to the City of constructing such a large arterial bridge would be significant (estimated somewhere in the order of $35 million in 2020 dollars by O2 Planning + Design), which is a significant increase compared to the $14.2 million cost estimated for the Preston extension carried in the City's Development Charge Background Study.

Connectivity within LeBreton Flats - A Preston Street arterial bridge would reduce road and pathway connectivity within LeBreton Flats. Due to the elevated nature of the bridge, new internal roads and paths within LeBreton Flats could not be sloped to connect with the bridge (refer to Section 4 of the Planning Rationale for further details). The construction of a Preston extension could cause the open aqueduct to be isolated behind a retaining wall or steep embankment. Designing the bridge structure in a way that maintains maintenance vehicle access to this essential infrastructure would likely require a longer bridge span with higher clearance than previously anticipated. This reality would impose significant additional infrastructure costs and cause significant detrimental impacts to the public realm and desirability of the neighbourhood adjacent to this critical infrastructure, as a large vehicle access route would have to snake through the area, compromising the ability to achieve a pleasant, safe, and human-scaled urban condition.

While pathways would still be able to get beneath a bridge, they would be constricted to the opening beneath the bridge. There would be no connections between the west end of the Flats and the City's municipal park, making the space between the inlet and the Preston extension very isolated. Retaining walls would separate the municipal park from the Flats and Aqueduct Districts, reducing the internal connectivity of the Flats since the Preston extension would not be able to connect to the internal roads. The road network would have to be redesigned to allow for adequate access to the Waterworks facility, the municipal park and LeBreton Place.

Reduction in Greenspace - Additional roads in the development would be required to create vehicle access to the Parks District and LeBreton Place for maintenance and accessible parking, reducing the amount of greenspace provided in LeBreton Flats.

Reduction in Density - It is expected that the bridge would require extensive retaining walls along lands slated as part of the LeBreton Flats development area. This would significantly reduce development potential (by approximately 2,000 m^2 of land) and compromise the ability of the district to meet the density targets outlined in the new Official Plan.

Filtered Permeability - The inclusion of a pedestrian and cycling bridge in place of the potential Preston Street bridge is a prime example of the principle of filtered permeability in action in a local context, benefitting users who choose active transportation modes over those who choose the vehicular mode.

Public Realm Design – The additional space provided by the removal of the vehicular bridge will contribute to more appealing public spaces in LeBreton Flats. This will allow for an improved design of the public realm, including safety improvements such as Crime Prevention Through Environmental Design (CPTED) and better lighting, which support the City's 2021 Woman and Gender Equity Strategy. Additional details on design of the public realm are available in the Planning Rationale.

4.4.14 Preston Street Extension Conclusions

Modelling and analysis show that the drawbacks of the Preston extension far outweigh the benefits. Constructing the Preston extension would divert and potentially induce additional traffic to the area, worsening traffic conditions around LeBreton Flats. The Preston extension would draw traffic away from roads that are well beyond the influence area of LeBreton Flats (i.e., as far west as Pinecrest Road), but would not relieve traffic on Booth Street south of Albert Street. It would also result in an increase in traffic in both directions on Preston Street, Rochester Street and Booth Street and cause a deterioration in intersection operations on the Preston Street corridor (including one intersection operating with a LOS 'E' and one with a LOS 'F') that are more significant than the marginal improvement in intersection operations along the Booth Street corridor. In addition, the removal of the Preston extension avoids the need to designate Wellington Street as a Truck Route, which is consistent with the prohibition of heavy vehicles on the SJAMP, and increases accessibility to the LRT stations to ensure the achievement of the high transit mode share targets set as part of the development. For these reasons, the deletion of the Preston vehicular extension from the City's Official Plan is recommended.

4.5 Step 3 Findings

The main objectives of Step 3 are to estimate projected site-generated trips based on the proposed development; identify potential impacts site-generated trips will impose on the surrounding transportation network; and to identify any potential modifications that would be required to achieve an acceptable Level of Service (LOS) for the surrounding transportation network. Based on the foregoing, the following findings are offered:

- A total of four potential development scenarios were envisioned for LeBreton Flats and based on an analysis of projected site trip generation, the ultimate build-out of Scenario 4 was projected to generate the most site-generated traffic, with an estimated two-way total of 4,810 and 8,112 person trips/h during weekday morning and afternoon peak hours, respectively.
- Based on discussions with City staff and to remain consistent with assumptions used for TIA studies prepared for other area development sites, the projected modal split of site-generated traffic for the subject development was assumed to be 15% auto driver; 5% auto passenger; 60% transit; and 20% walk/cycling.
- The resulting projected site-generated two-way vehicle volumes is approximately 718 veh/h during the AM and 1,211 veh/h during the PM.
- The resulting projected site-generated two-way transit trip volumes is approximately 2,886 trips/h during the AM and 4,868 trips/h during the PM.
- The resulting projected site-generated two-way trip volumes by active mode is approximately 986 trips/h during the AM and 1,646 trips/h during the PM.
- Given most transit trips begin or end as an active mode, it can be expected that approximately 3,872 trips/h and 6,514 trips/h will be made to/from/within LeBreton Flats as an active mode during weekday morning and afternoon peak hours, respectively.
    - The concept design for the site has maximized the width of pedestrian and cycling facilities wherever possible in order to accommodate the high volume of active trips. Additionally, Synchro analysis for the intersections has assumed that pedestrian phases are called every cycle at all intersections around the study area. ***Section 5.6*** below addresses additional improvements that can be made to City of Ottawa facilities

to improve the pedestrian and cycling LOS, such as leading pedestrian intervals and No Right Turn on Red at signalized intersections.

- Background traffic volumes have exhibited limited growth, as Ottawa's downtown arterial road network generally operates at capacity during peak hours. However, projected site-generated traffic from planned area developments were explicitly accounted for in the analysis of future conditions.
- Historical traffic count data from the year 2014 was used for analysis purposes, given recent network impacts related to LRT construction and travel pattern impacts due to COVID-19.
- A study area intersection performance assessment revealed that the Wellington Street / Portage Bridge intersection is currently operating over capacity during weekday morning peak hours. The Scott Street / Parkdale Avenue intersection is approaching capacity in the afternoon peak hour.
- Possible measures to improve the performance of study area intersections while prioritizing active modes include the construction of the West Gatineau Tramway, re-designating bus lanes as general traffic lanes, Stage 2 LRT extension and improvements to cycling facilities on Albert Street / Scott Street.

The Preston extension results in an increase in traffic in both directions on Preston Street, Rochester Street and Booth Street and causes a deterioration in intersection operations on the Preston Street corridor that do not justify the marginal improvement in intersection operations along Booth Street corridor. The potential impacts associated with the removal of the Preston extension are acceptable.

The results of this analysis indicate that there will be traffic challenges at some study area intersections, including Booth Street at Chaudière Crossing, Booth Street at Wellington Street, Booth Street at Albert Street, Scott Street at Parkdale Avenue and Wellington Street at Portage Bridge. Of these intersections, Booth Street at Albert Street, Scott Street at Parkdale Avenue and Wellington Street at Portage Bridge are over capacity, the others are approaching capacity. It will ultimately be up to the City of Ottawa to determine if the projected incremental changes in the performance of the road network will be acceptable, especially when considering that Booth Street at Albert Street, Scott Street at Parkdale Avenue, and Wellington Street at Portage Bridge are projected to be over capacity in the Future Background Conditions, and the intersections of Booth Street at Chaudière Crossing and Booth Street at Wellington Street are approaching capacity in the Future Background Conditions.

It is important to note that not all decisions need to be made at this time due to the size of the LeBreton Flats development (e.g., the City could consider development applications for phases within LeBreton Flats regardless of the status of the Preston extension in the Official Plan), as there will be ample opportunities for refinement to the transportation analysis as each parcel of land is developed and undergoes its own TIA process, including submission for approval. It should also be noted that given the significant timelines for the ultimate build-out of this project, it is important to recognize that travel patterns will change as projects like the Stage 2 Confederation Line LRT extension, West Gatineau Tramway, downtown transit loop and Ottawa River Sixth Crossing are designed and constructed, as well as City of Ottawa guidelines and targets.

5. STEP 4 – ANALYSIS

5.1 Exempted Modules

As noted in Section 3.3, the following modules have been exempted from this TIA after discussions with the City: 4.1 Development Design, 4.2 Parking, 4.3 Boundary Streets, 4.4 Access Intersections. These modules will be submitted in the future as part of the TIA analysis for individual development parcels.

5.2 Transportation Demand Management

5.2.1 Context for TDM

The proposed mode share of the development, as outlined in Section 4.1.1, is 15% auto driver, 5% auto passenger, 60% transit, and 20% walking and cycling. Comparatively, the mode share in the City's EMME model for TAZ 300 which is mostly made up of the LeBreton Flats development, is 42% auto driver, 10% auto passenger, 39% transit, and 9% walking and cycling. Through discussions with the City, it was agreed that the model is underrepresenting the potential level of transit usage in TAZ 300, especially for trips arriving to TAZ 300, which are shown as only 28% transit in the model.

With the LeBreton Flats location just west of downtown, it falls under the "Central Area" definition of the Official Plan, but with two LRT stations located within the site, it can also be considered a transit-oriented development (TOD). This allows the development to place a greater emphasis on non-auto modes, as there are no minimum parking requirements for the development. The ultimate decision for providing parking is up to each individual developer, however the Planning Rationale makes numerous mentions of a desire for minimal parking, and where required, implementing shared parking between land uses.

5.2.2 Need and Opportunity

It is clear that to meet the above noted mode share targets that an aggressive TDM program is required. The following are three key points to consider for the development of the TDM program for LeBreton Flats.

1. Other similar Transit-Oriented Developments in the City have had similar targets to what is being proposed for LeBreton Flats. Those developments are listed below along with a high-level summary of the proposed TDM measures for each development:
    - 900 Albert Street – 25 to 30% auto driver, 5 to 10% auto passenger, 45 to 55% transit, 15% active.
        - Enhanced sidewalks and lighting, ride-sharing programs, carpool incentives, preferential parking for hybrid/electric vehicles, on-site transit information booth, subsidized transit passes; additional shelter area for transit users; on-site change rooms/shower facilities.
    - Zibi – 25 to 30% auto driver, 5% auto passenger, 45 to 55% transit, 20% active.
        - Small development blocks with frequent intersections, pedestrian streets and woonerfs, secure bicycle parking, parking minimums with shared parking between buildings/land uses, car sharing programs/facilities, provide information/material to future residents and employees to educate them on sustainability objectives.

- CFB Wateridge Development – 45 to 50% auto driver, 10% auto passenger, 30 to 35% transit, 20% active.
    - Ride-sharing programs, carpool incentives, preferential parking for hybrid vehicles, on-site transit information booth, on-site change rooms/shower facilities

2. The City's continuous monitoring and interest of these types of developments as they are built confirms that the mode share targets are quite favorable compared to the rest of the City, but do fall short of the TOD targets.
3. Committing to an aggressive TDM program is necessary and prudent, with the recognition and understanding that some TDM measures will be attractive and effective from the outset, while others will become more attractive as the development progresses and nears completion.

The main opportunity for the LeBreton Flats lands is that the NCC is a willing and committed landowner, willing to put forth an attractive and aggressive TDM plan that will help to create the vision for LeBreton Flats being presented in this and other reports. Other opportunities to be considered as part of the LeBreton Flats development are:

- The NCC is **committed to working with OC Transpo** to pursue strategies that boost transit mode share to and from LeBreton flats, including methods to encourage/incentivize developers and future residents to use transit. This would provide a great jump-start to encourage transit usage and could be supported by transit fare incentives for non-residential developments at LeBreton Flats.
- According to Section 101 of the City's Zoning By-law, **no off-street motor vehicle parking is required** to be provided on the entire site, given the proximity of the development to LRT stations.
    - According to Section 103 of the City's Zoning By-law, there is a maximum number of motor vehicle parking permitted at the LeBreton Flats site, due to its proximity to LRT stations. These numbers equivalent to 1.5 parking spaces per dwelling unit and 1.0 per 100m^2 of GFA for office land uses and retail stores. This would translate to a **maximum allowable number of parking spaces on-site of approximately 7,000**.
    - This is significantly higher than the number of vehicular trips expected to be generated by the site (approximately 1930 entering and exiting during the AM and PM peak hours) indicating that it is important that **maximum parking provisions on-site be more stringent than those outlined in the City's Zoning By-law**.
- The minimum number of bicycle parking spaces as required by Section 111 of the City's Zoning By-law are 0.5 per dwelling unit and 1 per 250m2 GFA for an office or retail store. This would result in **approximately 2,400 bike parking spaces** on-site.
    - Given that 15% of trips are expected to be made by auto drivers, and 20% of trips are expected to be made by active modes, it would be worthwhile to **provide an equivalent or greater number of bicycle parking spaces on-site when compared to vehicular parking spaces**.

5.2.3 TDM Program

According to the City's TIA Guidelines, an analysis of Transportation Demand Management (TDM) measures is required when a proposed development is projected to have more than 60 employees on-site at any given time. It is understood that the City generally prefers a post-occupancy TDM program be in place ahead of site plan approval; however, with different parcels of land likely to have different owners or developers, it is difficult to project which TDM measures will be used by each owner. The proposed design of the LeBreton Flats site encourages active modes of transportation as much as possible, as outlined in detail in this TIA, by using measures such as filtered permeability, numerous multi-use pathways and sidewalks, and woonerf or slow streets design.

It is expected that a TDM strategy will be established for each individual development application at the time of development approval. Given that this TIA is for the entire site, and that individual TIAs will be required for each individual development, it is recommended that the City take a closer review of TDM programs at that stage of the planning process. Many of the TDM programs are specifically related to operations of a specific company or developer, such as offering discounted transit passes or flexible working hours, which cannot be captured in this TIA. That being said, some potential TDM-supportive measures that can be considered for LeBreton Flats are listed below:

- **Travel Surveys** – The NCC could commission travel surveys / monitoring programs to be undertaken at intervals throughout the development of LeBreton Flats in order to gauge the mode share and make adjustments to requirements accordingly. For example, such surveys could be undertaken at 20% completion intervals (i.e., a 20-year development would be undertaken every 4 years).
- **Enhanced Public Transit Service** – Given the existing presence of OC Transpo routes on Booth Street, Albert Street and Preston Street, as well as the Confederation and Trillium Lines, it is expected that OC Transpo will be monitoring transit usage in and around LeBreton Flats throughout the development process. ***Section 5.4*** of this TIA provides additional discussion on transit capacity in and around LeBreton Flats.
- **On-Site Amenities** – The mixed-use nature of the LeBreton Flats development suggests that a variety of amenities and services will be available on-site, which will reduce need for and dependency on personal vehicles.
- **Parking-Related Strategies** – The following are some TDM measures specifically related to vehicular parking management.
    - A **maximum limit** on parking supply (either a per unit rate or maximum stalls per development) more aggressive than the City's Zoning By-law.
    - **Charge for all parking** (i.e., short-term, and long-term parking), with short-term parking being charged at a higher parking rate.
    - Provide **carpool and carshare vehicles with discounts** on parking costs and/or provide more of them with more convenient parking locations.
    - **Unbundle parking cost** from commercial/office lease rates, residential purchase prices and monthly rent. Alternatively, the NCC (or another entity, such as a private company) could maintain control of all parking on-site.
- In addition to the above, there are numerous TDM measures that can be included as a requirement for each individual development as part of the procurement process. These measures tend to be physical measures that would have to be constructed / installed as part of each development. They include:

- **Displaying local area maps** with walking/cycling access routes, key destinations, transit schedules and route maps at major entrances.
- Provide **real-time transit arrival information** display at entrances to buildings in LeBreton Flats.
- **Install on-site bikeshare stations** for use by commuters and visitors.
- Generous provisions for **secure bike parking.**
- Minimum **sidewalk widths above and beyond** City standards.
- **Curb management accommodation** (e.g., percentage of curb space dedicated to pick-up/drop-off activity).
- **Minimum bicycle parking provisions** that are higher than the City standard (e.g., 2+ bike parking stalls per residential unit)
- Mandating **bicycle maintenance and repair facilities and end-of-trip amenities** (e.g., showers and change rooms).

The formal TDM Checklist, provided by the City, has been attached as **Appendix H** and is filled out for measures that may be applicable to the LeBreton Flats site. It is worth reiterating that it is difficult to project which specific measures will be utilized by individual developments.

5.3 Neighbourhood Traffic Management

With respect to the City's TIA guidelines, this module reviews significant access routes to the development and identifies any required neighbourhood traffic management (NTM) measures to mitigate impacts on collector and local roads.

5.3.1 Adjacent Neighbourhoods

Given projected traffic volume on Wellington Street, Booth Street, Albert Street and SJAMP are currently, and are anticipated to continue to exceed the major arterial capacity thresholds (i.e. 600 veh/h per lane during peak hours), the City's TIA Guidelines requires a review of potential neighbourhood traffic management strategies for the adjacent neighbourhoods, including West Centretown (generally bounded by Albert Street to the north, Carling Avenue to the south, Bronson Avenue to the east and the Trillium Line to the west), Centretown (generally bounded by the Ottawa River to the north, Highway 417 to the south, the Rideau Canal to the east and Bronson Avenue to the west) and Hintonburg (generally bounded by the Ottawa River to the north, Highway 417 to the south, the Trillium Line to the east and Parkdale Avenue to the west).

The Master Concept Plan carefully and deliberately minimizes the need for neighbourhood traffic management strategies within the LeBreton Flats site. The residential neighbourhoods south of the development site will feel some additional pressure from the additional traffic generated by vehicles to/from LeBreton Flats, especially if the Preston extension is implemented. These neighbourhoods already experience streets with long queues of traffic during peak hours and have existing area traffic management measures in place to reduce the potential for cut-through traffic. There is the potential for peak period spreading, which means that the queues of traffic will start earlier and/or finish later in the day, albeit with less pronounced peaks in traffic. Surrounding residential streets are for the most part already protected against cut-through traffic issues as outlined in Section 3.1.2.

The arterial roads surrounding the development site are the most likely to experience off peak speeding due to their alignment and width. Currently, the primary function of these roads is mobility, and therefore, the design elements prioritize the efficient movement of motor vehicles. For example, intersections need to facilitate truck turning, which can result in wider crossing distances for pedestrians. Some intersections require vehicle turning lanes, which increase the crossing distances

for pedestrians. That being said, there are many strategies that can be employed to promote the comfort and security of other road users. Albert Street is expected to undergo significant design changes that will include segregated facilities for pedestrians and cyclists.

5.4 Transit

With respect to the City's TIA Guidelines, this module reviews the potential impacts on existing and planned transit networks and service to ensure that level of service is not unacceptably impacted.

5.4.1 Route Capacity

The transit routes that serve the subject site were previously summarized in Table 2. It is expected that 60 percent of the trips generated by the site will be accommodated by transit, and that the majority of transit usage for people accessing the development site will be completed by LRT (either Confederation Line or Trillium Line). It is expected that Bayview Station on the western edge of the development site will service the Park District and the western portion of the Albert District, including the major event centre (if constructed). The Flats District and Aqueduct District will be well served by Pimisi Station on Booth Street.

Based upon the analysis provided in Step 3, and summarized in the table below, it is expected that the number of transit trips generated during each of the three phases of the LeBreton Flats development will range from 1,500 to 3,700 additional transit trips in both peak hours. This will result in an approximate total of 7,750 additional transit passengers generated by the LeBreton Flats development during the peak hours.

Table 37: Peak Hour Transit Trips by Development Phase

Block	AM Peak Hour			PM Peak Hour			Total Peak Hour
	In	Out	Total	In	Out	Total	
Phase 1 Total	414	520	933	836	770	1604	2537
Phase 2 Total	213	313	526	505	453	957	1483
Phase 3 Total	837	589	1427	1042	1266	2307	3734
Total 'New' Transit Trips	**1464**	**1422**	**2886**	**2383**	**2489**	**4868**	**7754**

Using information from the City of Ottawa's EMME model, the following breakdown was calculated for transit users around the study area in order to assume a distribution to various LRT or bus routes. It should be noted that the numbers in **Table 38** include all transit users, not just those from LeBreton Flats.

Table 38: EMME 2031 Transit Trip Distribution – AM Peak Hour

Transit Mode	Eastbound		Westbound	
	Volume	Percentage	Volume	Percentage
LRT	28,146	97%	9557	95%
Bus	930	3%	543	5%
Total	**29,076**	**100%**	**10,100**	**100%**

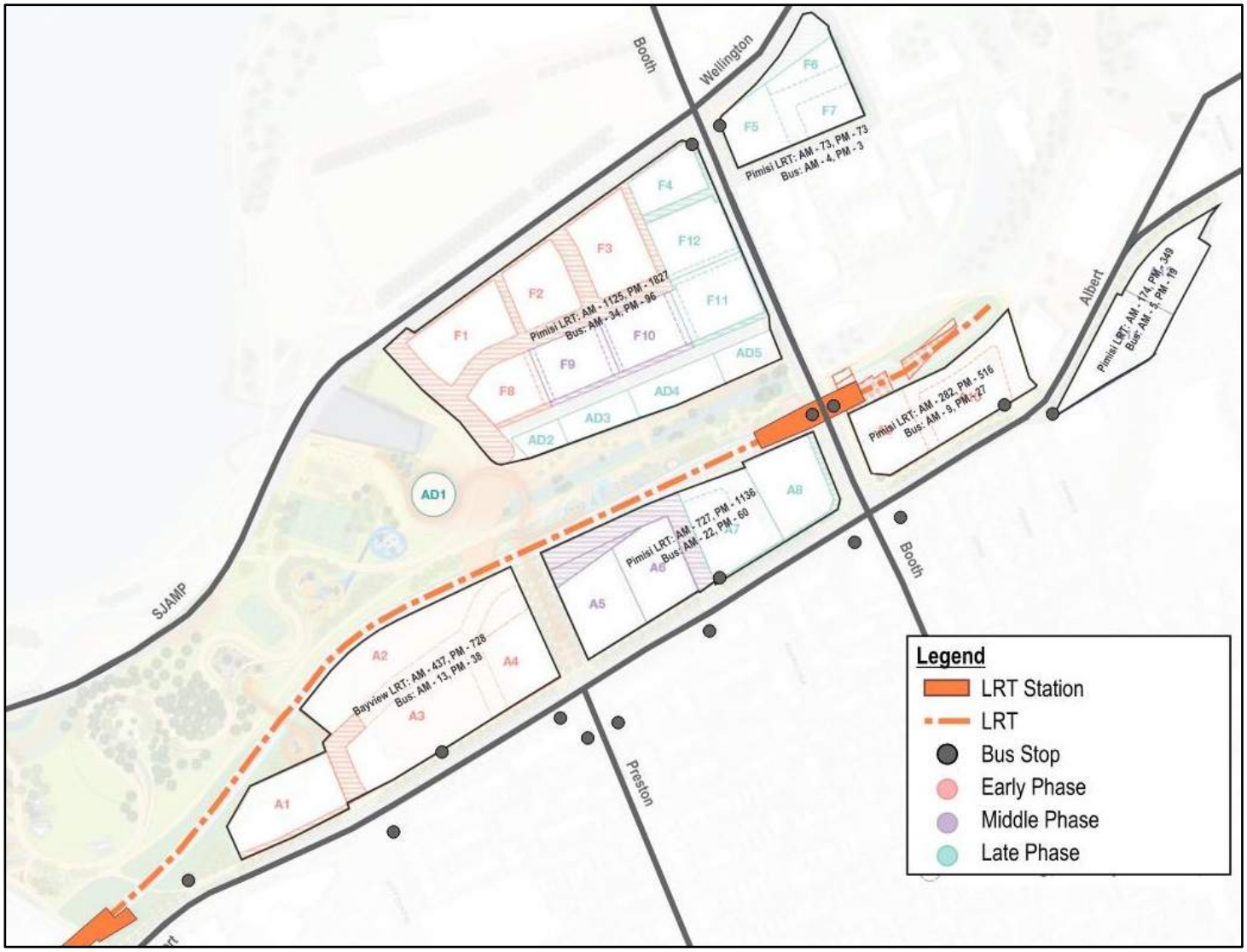
The data provided in Table 38 indicates that of all eastbound transit trips in the AM peak hour, 97% are made by LRT and 3% are made by bus. 95% of all westbound transit trips are made by LRT and 5% are made by bus. Of all LRT trips, 67% are headed eastbound and 33% are headed westbound, while bus trips see 65% of trips headed eastbound and 35% of trips headed westbound. This information allows for the assignment of transit trips to stations and bus stops in the area as shown in **Table 39** and **Figure 35** below.

Table 39: Projected LeBreton Flats Transit Trip Distribution – Full Buildout

Block	AM Peak Hour						PM Peak Hour					
	In			Out			In			Out		
	Total	EB	WB	Total	EB	WB	Total	EB	WB	Total	EB	WB
A1-4 (Major Events Centre)	206	138	68	244	163	81	398	132	266	368	122	246
LRT (Bayview)	200	134	66	237	159	78	378	125	253	350	115	235
Bus	6	4	2	7	4	3	20	7	13	18	7	11
A9-10	127	85	42	164	110	52	282	93	189	261	87	174
LRT (Pimisi)	123	82	41	159	107	52	268	88	180	248	82	166
Bus	4	3	1	5	3	2	14	5	9	13	5	8
Flats District (F1-4, 8-12, AD 1-5)	605	404	201	538	360	178	928	308	620	995	330	665
LRT (Pimisi)	587	393	194	522	350	172	882	291	591	945	312	633
Bus	18	11	7	16	10	6	46	17	29	50	18	32
A5-6	**65**	**43**	**22**	**108**	**72**	**36**	**144**	**48**	**96**	**124**	**41**	**83**
LRT (Pimisi)	63	42	21	105	70	35	137	45	92	118	39	79
Bus	2	1	1	3	2	1	7	3	4	6	2	4
A11-12	77	51	26	102	68	34	191	64	127	177	58	119
LRT (Pimisi)	75	50	25	99	66	33	181	60	121	168	55	113
Bus	2	1	1	3	2	1	10	4	6	9	3	6
A7-8	**364**	**244**	**120**	**212**	**142**	**70**	**395**	**131**	**264**	**533**	**177**	**356**
LRT (Pimisi)	353	237	116	206	138	68	375	124	251	506	167	339
Bus	11	7	4	6	4	2	20	7	13	27	10	17
F5-7	23	16	7	54	36	18	45	15	30	31	11	20
LRT (Pimisi)	22	15	7	51	34	17	44	15	29	29	10	19
Bus	1	1	0	3	2	1	1	0	1	2	1	1
LRT	**1300**	**871**	**429**	**1379**	**924**	**455**	**2265**	**748**	**1517**	**2364**	**780**	**1584**
Bus	**41**	**25**	**16**	**43**	**27**	**16**	**118**	**43**	**75**	**125**	**46**	**79**

Based on the City's EMME model, it is estimated that 12% of the eastbound LRT trips originate from the Trillium Line, and 12% of the westbound LRT trips are destined to the Trillium Line, transferring at Bayview Station. Based on the trips in the above table, 105 trips would arrive from and 55 trips would depart to the Trillium Line in the AM peak hour, while in the PM peak hour 90 trips would arrive from and 190 trips would depart to the Trillium Line.

Figure 35: Projected LeBreton Flats Transit Trip Distribution – Full Buildout



The full build-out of the LeBreton Flats development is expected to generate approximately 2,680 LRT trips in the AM peak hour and 4,630 trips in the PM peak hour. These trips are weighted slightly more towards trips leaving LeBreton Flats than trips entering LeBreton Flats. It is important to note that not all new riders will be on the Confederation Line LRT at the same time. For example, in the morning peak hour at LeBreton Flats there will be 871 new eastbound riders boarding the LRT, and 924 new eastbound riders departing the LRT. Therefore, the net increase in LRT riders is not 1,785 riders, it is somewhere between 871 and 924 riders depending which section of the LRT is reviewed. With the current Confederation Line capacity of 10,700 passengers per hour one way, the trips generated by LeBreton Flats would represent approximately 9% of eastbound and 4% of westbound capacity in the morning, and 7% of eastbound and 15% of westbound capacity in the afternoon. It is worth noting the City is expecting an increase in planned capacity of the Confederation Line to 36,000 passengers per hour by 2031, and 48,000 passengers per hour at ultimate build out[14], and that at the time of the development of the Confederation Line Environmental Assessment the LeBreton Flats redevelopment was a known entity and our understanding is that it was included in the development of the planned future Confederation Line capacity. The City's 2031 EMME model projects 28,146 eastbound passengers on the Confederation Line in the morning peak hour, which includes riders from LeBreton Flats. With a capacity of 36,000 passengers per hour, 28,146 passengers would be at 78% capacity, indicating the Confederation Line can comfortably accommodate the increases in passengers from the full build-out of the LeBreton Flats development.

The full build-out of the LeBreton Flats development is expected to generate approximately 105 northbound and 55 southbound Trillium Line trips in the AM peak hour, and 90 northbound and 190 southbound trips in the PM peak hour. With an estimated capacity of 2,100 passengers per hour per direction, the trips generated by LeBreton Flats would represent approximately 5% of northbound capacity and 3% of southbound capacity in the morning, and 4% of northbound capacity and 9% of southbound capacity in the afternoon.

The full build-out of the LeBreton Flats development is expected to generate approximately 80 bus trips in the AM peak hour and 240 in the PM peak hour. These trips are split between trips into LeBreton Flats and trips out of LeBreton Flats. Assuming a similar transit plan and bus routings to the existing plan shown in Table 2, it can be expected that the additional trips to buses will be distributed as follows:

- Eastbound AM (includes buses to Gatineau): 32 buses per hour = 1 new rider per bus.
- Westbound AM (includes buses from Gatineau): 47 buses per hour = 1 new rider per 3 buses.
- Eastbound PM: 47 buses per hour = 1 new rider per bus.
- Westbound PM: 32 buses per hour = 2 new riders per bus.

5.4.2 Transit Priority

Given that the fully grade separated Confederation Line bisects the LeBreton Flats development lands transit travel times should be unimpeded. Additionally, both the Trillium Line and the proposed West Gatineau Tramway are approximately a 10-minute walk from the centre of the LeBreton Flats development lands. Therefore, additional bus transit priority measures are not required as part of this study.

[14] https://www.octranspo.com/en/ready-for-rail/o_train_confederation_line_system_faqs

5.5 Review of Network Concept

With respect to the City's TIA Guidelines, this module determines if changes to the Transportation Master Plan (TMP) concepts for auto or transit networks are required to accommodate the development-generated travel demands.

The purpose of this section of the TIA is to outline any changes to the existing or planned transportation network that are required due to added traffic from a new development. It is important to recognize that the existing arterial road network, serving the area of LeBreton Flats, is generally approaching or over capacity during the peak periods. The LeBreton Master Concept Plan proposes a plan that will rely heavily on active modes and the transit network to service the community's transportation needs. Nonetheless, there will be an additional automotive burden placed on the surrounding arterial network as a result of the proposed development.

Creating additional roadway capacity within the central area of Ottawa is not considered a priority for the Transportation Master Plan, nor is it practical in a constrained urban environment such as in the vicinity of LeBreton Flats. Therefore, the assumption is that additional roadway capacity will not be provided as part of this development. That being said, the addition of a vibrant central urban community as proposed in the Master Concept Plan will increase the City's active and transit mode share statistics, helping to achieve TMP mode share objectives. Further, the Master Concept Plan supports the City's objectives of increasing the number of roadways that can be defined as "Complete Streets". Providing a supportive environment for pedestrians and cyclists will improve the capacity of the active transportation network and help to improve active mode share.

The Master Concept Plan does deviate from the TMP in that it has eliminated the proposed Preston Street extension between Albert Street and Wellington Street for auto modes. The link is proposed to remain for active modes only. This deviation is described in detail in the Planning Rationale (prepared by O2 Planning + Design and submitted under separate cover). From a transportation perspective, the elimination of this link has several implications which are explored in Section 4.4.

5.6 Intersection Design

This module determines the design elements of study area intersections required to accommodate the proposed development, consistent with the City's Complete Streets philosophy and MMLOS practices.

5.6.1 Intersection Control

All study area intersections are currently traffic signal controlled and are more or less fully built out. Based on the City's policies, goals and objectives, additional road widenings or intersection control is not supported. However, several area intersections will continue to operate over capacity. The following are some possible measures, previously identified in Section 4.3.2. that may provide a reduction in vehicular demand at these intersections, without requiring additional roadway infrastructure:

Potential Mitigation Measures that Prioritize all Modes of Transportation

Transit Projects

- When the future West Gatineau Tramway is in place across the Portage Bridge in 2028, trips across the Portage Bridge may be shifted away from the vehicular mode and towards the transit mode. It is recommended that the City monitor traffic volumes at the intersection of **Wellington Street and Portage Bridge** and respond to a reduction in vehicular traffic accordingly.
- Confederation Line Stage 2 LRT (with improved reliability extension drawing additional trips when open in 2026)

Active Mobility Projects

Further improvements to vehicular LOS may be observed as trips are shifted to alternative modes of transportation or alternative corridors as major projects within the National Capital Region are completed. Projects that may reduce the vehicular demand in the study area include:

- Improvements to cycling facilities within LeBreton Flats and along Albert Street into downtown (mode shift to cycling).This would improve operations at most intersections in the study area, with a specific benefit to **Booth Street at Albert Street, Albert Street at Preston Street and Parkdale Avenue at Scott Street**.
- Construction of the **Chief William Commanda multi-use pathway interprovincial bridge** (mode shift to walking and cycling), which will provide an attractive alternative route for pedestrians and cyclists to travel between Ottawa and Gatineau.

5.6.2 Intersection Design

Intersection details are typically not part of master concept plans; however, it is expected that connections to the boundary road network will be designed to the latest standards/guidelines (e.g., adequate turning radii will be provided for trucks, sufficiently long driveway clear throat lengths will be provided, etc.). Intersections are shown to be located at appropriate distances from existing intersections, and signalization is suggested at a minimal number of locations to provide for protected movements to/from the LeBreton Flats development. The approximate location and design of new driveway connections will be refined during the development application process. Nevertheless, the following is a MMLOS analysis for the planned signalized access intersections to/from LeBreton Flats.

Intersection MMLOS Summary

A Multi-Modal Level of Service (MMLOS) assessment was conducted for the subject site's boundary intersections, to gauge the extent of risk, comfort and stress for active modes and gauge the extent of impedance, delay and reliability for trucks/buses. **Table 40** provides an MMLOS summary for existing conditions for all modes, including Pedestrian (PLOS), Bike (BLOS), Transit (TLOS) and Truck (TrLOS) at signalized intersections. Target MMLOS values were identified in Table 19 and are identified at the bottom of each street in the table. **Table 41** summarizes the projected background intersection MMLOS with planned network improvements, as outlined in Section 3.1.3. **Table 42** summarizes the intersection MMLOS with the full build-out of the LeBreton Flats development. This includes minimal changes to the roadway cross-sections, however it does involve the addition of new approaches to intersections on the north side of Albert Street and south side of Wellington Street. The detailed assessment is included as **Appendix I**.

One important note regarding the PLOS and BLOS is that this review focuses on existing city streets, and planned improvements, such as the Albert Street Cycling / Pedestrian Modifications. Therefore, it does not accurately reflect the robust segregated pathway network that is included as part of the Master Concept Plan, as shown in Figure 31. This pathway network will allow active transportation users to avoid travelling on busy vehicular corridors such as Wellington Street and Booth Street, **providing them with a level of risk, comfort and stress that would be comparable to a LOS 'A'**.

Table 40: Intersection MMLOS – Existing LOS

Major Street	Cross Street	PLOS	BLOS	TLOS	TkLOS	AutoLOS
Wellington	Vimy Place	D	F	-	-	A
	Booth	D	A	F	D	D
	Lett	F	F	-	-	A
	Target	*A*	*C*	*D*	*D*	*E*

Albert	Booth	F	F	F	F	E
	Preston	E	F	E	F	E
	City Centre	F	F	B	E	A
	Target	*A*	*A*	*C*	*D*	*E*

Table 41: Intersection MMLOS – Background LOS

Major Street	Cross Street	PLOS	BLOS	TLOS	TkLOS	AutoLOS
Wellington	Vimy Place	D	F	-	-	A
	Booth	F	A	F	D	F
	Lett	F	F	-	-	B
	Target	*A*	*C*	*D*	*D*	*E*
Albert	Booth	E	D	F	F	F
	Preston	E	D	F	D	D
	City Centre	E	B	C	E	A
	Target	*A*	*A*	*C*	*D*	*E*

Table 42: Intersection MMLOS – Future LOS

Major Street	Cross Street	PLOS	BLOS	TLOS	TkLOS	AutoLOS
Wellington	Vimy Place	D	F	-	-	B
	Broad	E	F	-	-	A
	Booth	F	A	F	D	F
	Lett	F	F	-	-	B
	Target	*A*	*C*	*D*	*D*	*E*
Albert	Booth	E	D	F	F	F
	Access 1	E	B	D	-	D
	Preston	E	D	F	D	F
	City Centre	E	B	C	E	A
	Target	*A*	*A*	*C*	*D*	*E*

As shown in Table 40, outside of AutoLOS, study area intersections currently do not meet LOS targets with a few exceptions. Table 41 shows the projected background intersection MMLOS, including the Albert Street Cycling / Pedestrian Modifications project. Takeaways regarding the Intersection MMLOS are noted below.

Pedestrian LOS

- The reconstruction of Albert Street reduces the crossing distance for pedestrians, improving the overall PLOS at Albert Street and Booth Street, and Albert Street and City Centre Avenue.
    - The removal of the existing parking lanes on Wellington Street between Vimy Place and Portage Bridge would also benefit pedestrians as it reduces their crossing distance.
- The only existing intersections without zebra stripe hi-visibility markings are Wellington Street at Vimy Place and Wellington Street at Broad Street. It is recommended that this be rectified once Vimy Place and Broad Street are extended to the south side of Wellington Street as part of the development.
- Any new intersections, such as Albert Street at Access 1, should implement zebra stripe hi-vis markings.
- The implementation of leading pedestrian intervals (LPIs) at intersections that operate well is recommended, such as at Booth Street at Chaudière, Wellington Street at Vimy Place, Albert

Street / Scott Street at Bayview Station Road, Albert Street at City Centre Avenue and Wellington Street at Lett Street.

- The implementation of No Right-Turn-on-Red provisions at intersection that operate well is also recommended.
- As an example, if all the above recommendations (i.e., remove parking lanes, zebra stripe markings, leading pedestrian intervals and no RTOR) are implemented at the intersection of Wellington Street / Lett Street, the PLOS will improve from LOS 'F' to LOS 'D'.
- As noted above, a robust network of multi-use pathways is proposed as part of the Master Concept Plan, including a recently-built east-west pathway along the north side of the Confederation Line. This pathway provides pedestrians with a more comfortable, safer route through the area, and will ultimately connect to facilities further east on Wellington Street and Albert Street.

Bicycle LOS

- The reconstruction of Albert Street improves the BLOS from LOS 'F' to LOS 'D'. Although this will not meet the target LOS 'A', this is a significant improvement over the existing conditions. This also reflects the limitations of the MMLOS scoring, as protected intersections are proposed along Albert Street, and do not score higher than LOS 'D' by the current scoring.
- Although not scored in the MMLOS, where protected intersections are provided, and intersection operations allow for it, leading bike intervals should be provided alongside the LPIs.
- As noted above, a robust network of multi-use pathways is proposed as part of the Master Concept Plan, including a recently built east-west pathway along the north side of the Confederation Line. This pathway provides cyclists with a more comfortable, safer route through the area, and will ultimately connect to facilities further east on Wellington Street and Albert Street.

Transit LOS

- Transit LOS is projected to worsen due to the removal of temporary dedicated transit facilities along Albert Street. However, LRT access along this corridor should help supersede the need for improvements to increase transit LOS targets.
- Low TLOS is mainly attributed to vehicle movements experiencing long delays, which impact bus travel time/reliability.

Truck LOS

- Truck LOS is generally guided by corner radii and the number of receiving lanes.
- As corner radii increases - truck LOS improves; however, this negatively impacts the pedestrian LOS. As the pedestrian target LOS is higher for this study area the pedestrian LOS should take precedence in this case, unless compromising the accommodation for trucks will result in a reduction in safety for pedestrians.
- Long-term improvements to this Truck LOS in this area may be possible with the implementation of a sixth crossing of the Ottawa River, allowing the full removal of truck routing across Booth Street and the Chaudière Crossing.

6. CONCLUSION AND RECOMMENDATION

The future community of LeBreton Flats has the potential to be a showcase for future urban development in Canada. As with any urban development of this caliber, there is both enormous potential and significant challenges. It is important to understand the value of the site, as failure to do so may unreasonably deem some elements as challenges and miss the opportunity to undertake proper trade-off analysis, therefore unnecessarily compromising the full potential of the site.

This Transportation Impact Assessment followed the City of Ottawa TIA Guidelines to assess and evaluate the potential benefits and impacts that are anticipated to City of Ottawa roadways as part of the LeBreton Flats development. The full development is anticipated to generate approximately 4,800 person trips in the weekday morning peak hour, and 8,100 person trips in the weekday afternoon peak hour. The development is targeting aggressive modal splits for site generated traffic, including 15% auto driver trips, 5% auto passenger, 60% transit trips and 20% active transportation trips. This results in an expected increase in peak hour vehicle traffic onto adjacent roadways in the order of 700 vehicles per hour in the morning and 1200 vehicles per hour in the afternoon.

Potential measures that may improve the performance of study area intersections while prioritizing active modes include the construction of the West Gatineau Tramway, completion of the Stage 2 LRT extension and improvements to cycling facilities on Albert Street / Scott Street. The proposed Preston Street extension from the City's Transportation Master Plan is expected to result in an increase in traffic in both directions on Preston Street, Rochester Street and Booth Street and causes a deterioration in intersection operations on the Preston Street corridor that do not justify the marginal improvement in intersection operations along Booth Street corridor. The drawbacks of the Preston extension far outweigh the benefits, therefore the deletion of the Preston vehicular extension from the City's Official Plan is recommended.

A high-level trip generation estimate for the potential major events centre at LeBreton Flats was undertaken using conservative assumptions: A full analysis of the major events centre will be undertaken as part of the site-specific TIA. The results of the trip generation estimate for the potential major events centre show that the highest volume hour during the PM peak period is expected to be 5:00 – 6:00 PM, when approximately 540 vehicular trips will be made to events. Not necessarily all these trips will be arriving directly at the LeBreton Flats site, as some may be parking on nearby streets where parking is available, similar to attendees at TD Place who park on residential streets due to the parking garage being closed for Ottawa Redblacks games.

It is important to note that not all decisions related to this development need to be made at this time due to the size of the LeBreton Flats development (e.g., "conditional approval" can be offered), as there will be ample opportunities for refinement to the transportation analysis as each parcel of land is developed and undergoes its own TIA process, including submission for approval. It should also be noted that given the significant timelines for the ultimate build-out of this project, it is important to recognize that travel patterns will change as projects like the Stage 2 Confederation Line LRT extension, West Gatineau Tramway and the downtown transit loop (and potentially other projects, such as a sixth crossing of the Ottawa River) are designed and constructed.

While it is difficult to provide a detailed TDM Implementation Program at this time given that this TIA is for the entire site, it is recommended that specific TDM initiatives be given further consideration as each development phase or site move forward. That being said, potential TDM measures that can be implemented across LeBreton Flats have been identified in Section 5.2 and are recommended for consideration, which includes some physical measures, travel surveys, and monitoring programs.