LÉPINE

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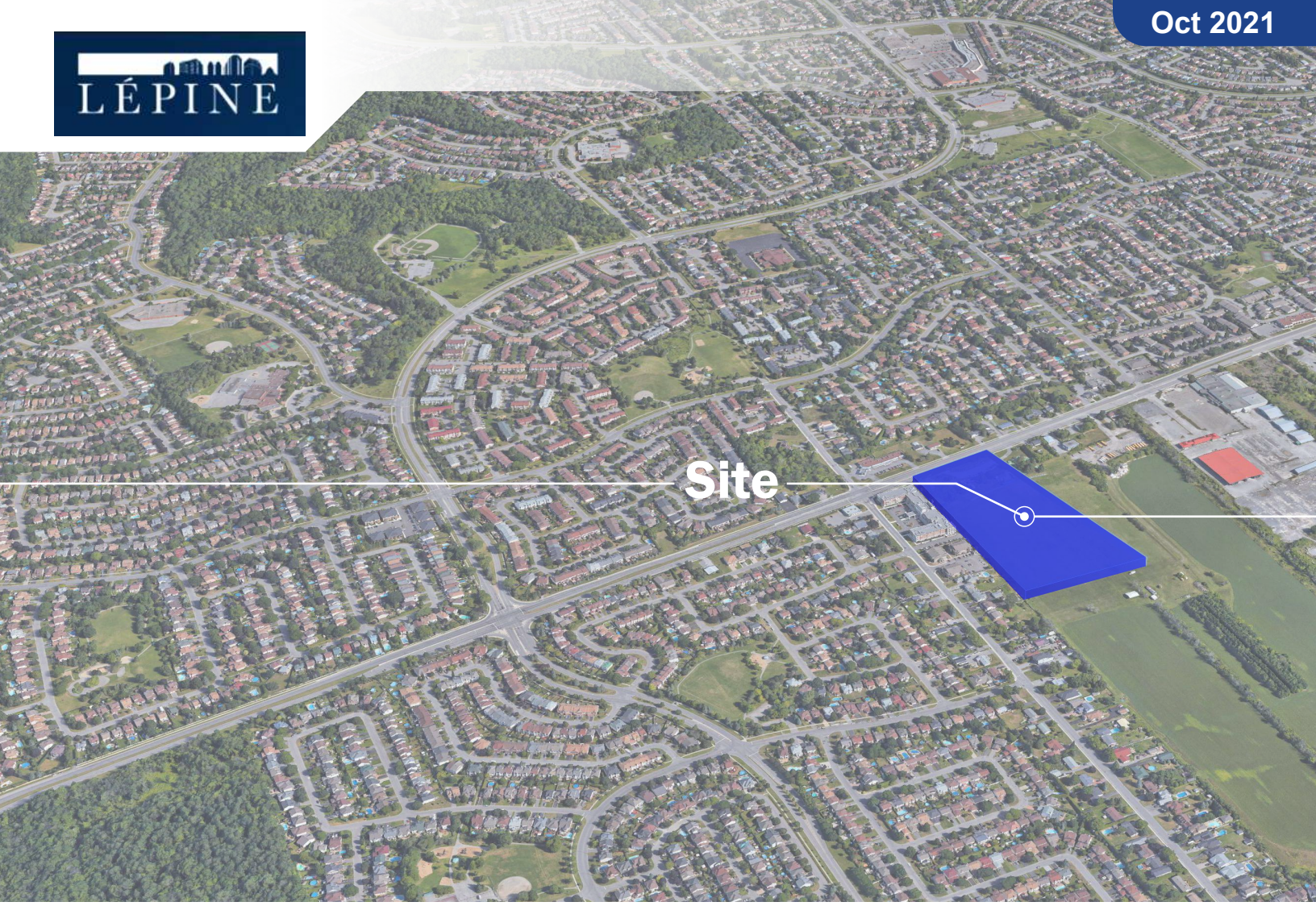
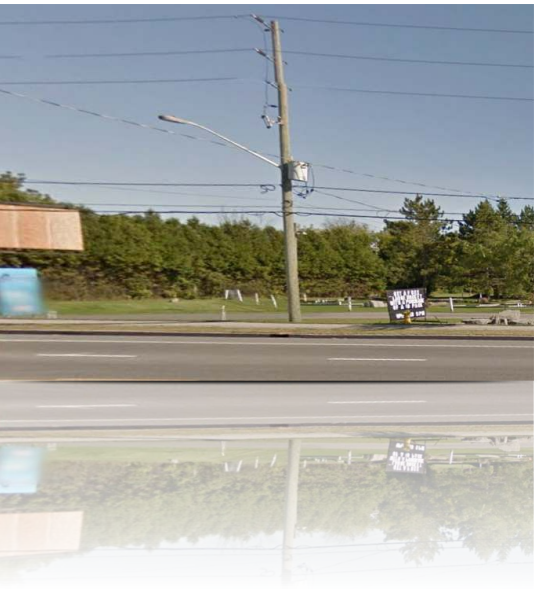
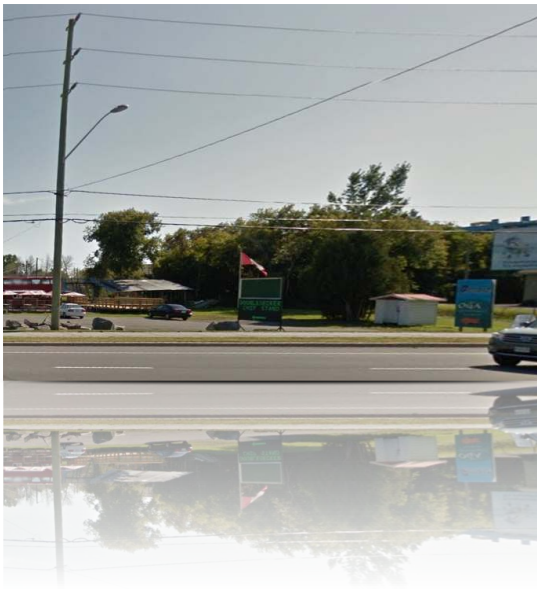


Transportation Impact Study

3490 Innes Road





PARSONS

3490 Innes Road

TIA Step 4 - Strategy Report

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477947 - 01000

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

1. 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;
2. 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;
3. 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
4. I am either a licensed[1] or registered[2] professional in good standing, whose field of expertise [check √ appropriate field(s)] 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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TIA Strategy Report

Parsons has been retained by Lépine Corp. (Lépine) to prepare a Transportation Impact Assessment (TIA) in support of a Zoning By-Law Amendment (ZBLA) and Plan of Subdivision Application for a new residential focused development located at 3490 Innes Road in the Orléans Ward. This document follows the new TIA process, as outlined in the City Transportation Impact Assessment (TIA) Guidelines (2017).

The applicant previously submitted a TIA in support of a ZBLA on February 13, 2020. Since that time, Lépine has developed four (4) different development proposals that significantly reduce the scale and density to better align with the ultimate vision for the property. This report represents Step 4 – Strategy Report that details the transportation implications related to these potential development proposals by Lépine.

1. Screening Form

The screening form confirmed the need for a TIA Report based on the Trip Generation trigger, given that the proposed development consists of more than 89 residential apartment units; the Location trigger given that the development is located within a future cycling spine route, transit priority corridor with isolated measures and is within the Innes Arterial Mainstreet Design Priority Area (DPA); and the Safety trigger given that the proposed driveway is within the influence of potential future signalized intersection at Lamarche/Innes and one of the development proposals includes a drive-thru facility. The Screening Form has been provided in **Appendix A**.

2. Scoping Report

2.1. Existing and Planned Conditions

2.1.1. PROPOSED DEVELOPMENT

The proposed development is located at the municipal addresses of 3490 Innes Road, on the southwest corner of the Lamarche/Innes intersection. The site is currently occupied by small scale commercial properties, including an insurance company, food truck, mini-put facility and driving range. The proposed study area includes the intersections of Orléans/Innes, Pagé/Innes, Lamarche/Innes, Boyer/Innes and roadway segments adjacent to site or between intersections as shown in **Figure 1**. More details regarding the study area elements can be found in **Section 2.1.2**.

Figure 1: Local Context

The subject site is currently zoned as a Developmental Reserve area (DR), which has a maximum buildable height of 11m, which triggers the re-zoning application to allow a higher maximum building height and development size.

Currently, there are four (4) development proposal options being considered by Lépine, which have been summarized below

Option 1:

Eight (8) residential buildings, 7-storeys high consisting of 873 residential units.

Option 2:

Five (5) residential buildings, 7-storeys high consisting of 525 residential units and commercial uses fronting Innes Road which could include a grocery store, a retail store, a gas station and drive-thru facilities.

Option 3:

Six (6) residential buildings, 7-storeys high consisting of 623 residential units and a long-term care facility with 325 chambers.

Option 4:

Three (3) residential buildings, 7-storeys high consisting of 275 residential units, commercial uses fronting Innes Road which could include a grocery store, a retail store, a gas station and drive-thru facilities, and a long-term care facility with 325 chambers.

For the purpose of this report, only the option(s) that were expected to have the greatest impact on the adjacent road network were assessed. A preliminary review of the four development proposals confirmed that either Option 1 or Option 2 would have the largest vehicular traffic impact on the adjacent road network in the AM and PM peak hours compared to Options 3 and 4.

For this reason, the adjacent road network and trip generation in ***Section 3.1.*** *was only assessed for Options 1 and 2.*

Full buildout of the proposed development is expected by 2031. Regardless of Option, the site is expected to be constructed in 3 phases (labelled Zones), from south to north. For the purposes of a ZBLA and Plan of Subdivision Application, the TIA will assess the transportation implications at full buildout only. The subsequent Site Plan Control Applications will trigger additional TIAs focusing on the individual Phases and corresponding road network implications.

The latest development proposals for Options 1 and 2 are shown in **Figure 2** and **Figure 3** respectively.

Figure 2: Proposed Site Plan – Option 1

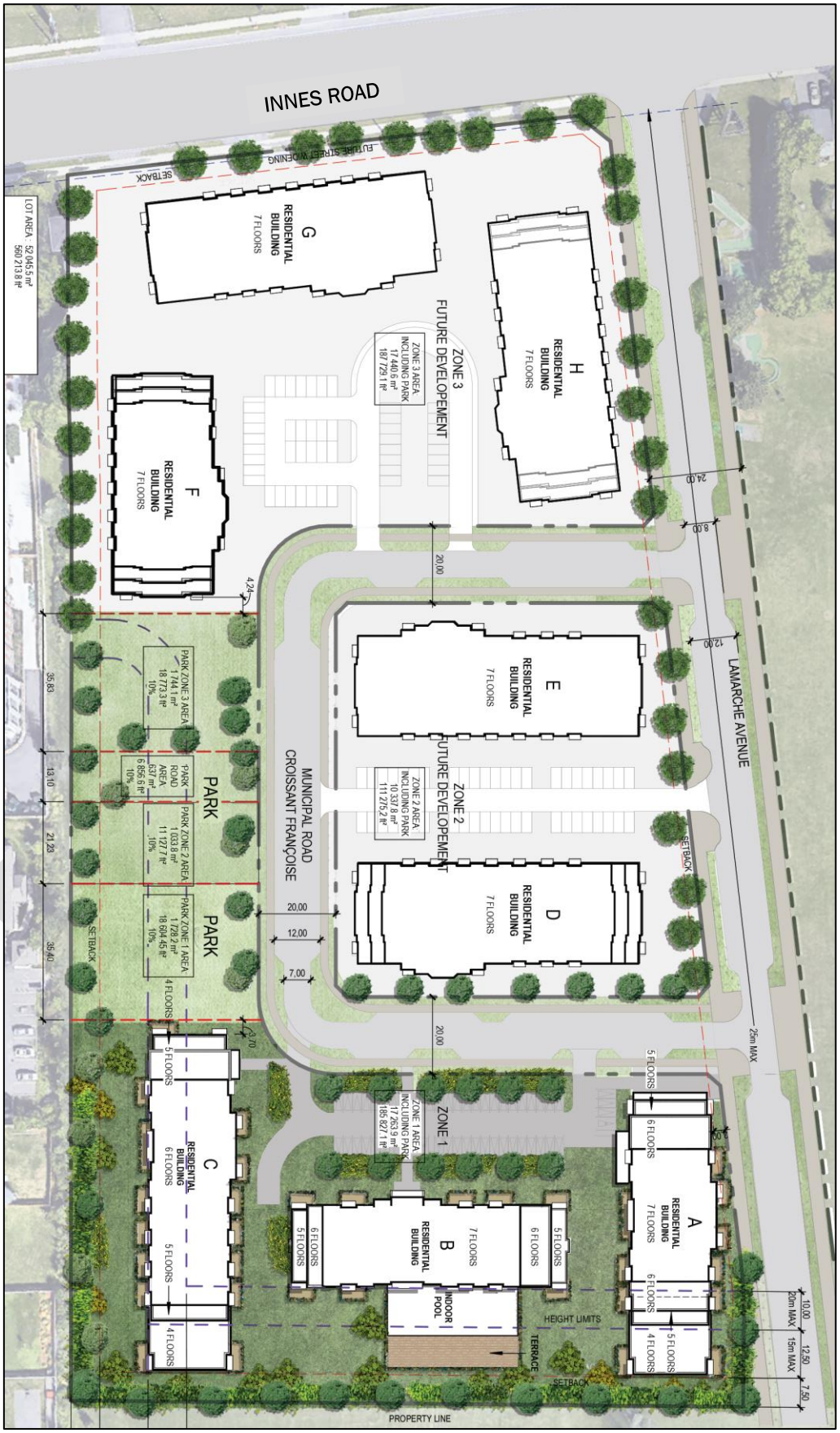


Figure 3: Proposed Site Plan – Option 2

2.1.2. EXISTING CONDITIONS

Area Road Network

Innes Road is an east-west arterial roadway with a 4-lane cross-section and auxiliary turn lanes at major intersections. It extends from St. Laurent Boulevard in the west to Dunning Road in the east. Beyond St. Laurent Boulevard, Innes Road continues as Industrial Avenue, and beyond Dunning Road, it continues as Beaton Road. Within the study area, the posted speed limit is 60 km/h.

Orléans Boulevard is a north-south arterial roadway that extends from Navan Road in the south to Cairine Wilson Secondary School in the north. The posted speed limit is 50 km/h south of Innes Road and 60 km/h north of Innes Road. Within the study area, Orléans Boulevard has a four-lane cross-section with auxiliary turn lanes provided at major intersections. South of Silverbirch Street, Orléans Boulevard has a two-lane cross-section.

Pagé Road is a north-south collector roadway south of Innes Road and a local roadway north of Innes Road. Within the study area, it has a two-lane cross-section with auxiliary turn lanes provided at major intersections. The posted speed limit is 40 km/h.

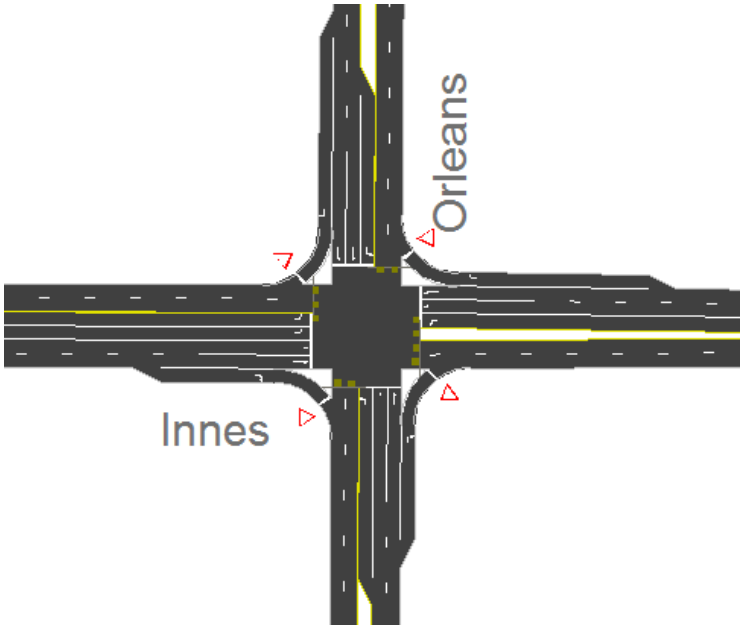
Lamarche Avenue is a north-south collector roadway that extends approximately 850m south from Innes Road. There is no other connection at this time to the wider municipal road network besides Innes Road. This roadway has been partially built with a two-lane cross-section with no auxiliary turn lanes provided at Innes Road. The posted speed limit is assumed 50 km/h.

Boyer Road is a north-south local roadway that has been segmented in multiple locations to prevent cut-through traffic. There is no connection to or from Boyer Road and Innes except for active transportation. South of Innes Road, it functions as a driveway to commercial stores such as U-Haul and a car wash.

Existing Study Area Intersections

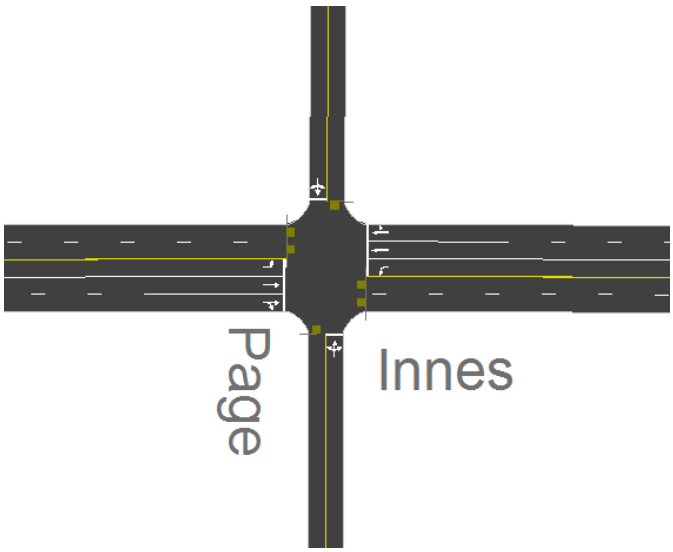
Orléans/Innes

The Orléans/ Innes intersection is a four-legged signalized intersection. The eastbound approach consists of dual left-turn lanes, two through lanes and a channelized right-turn lane. The westbound approach consists of a single left-turn lane, two through lanes, and a channelized right-turn lane. The north and southbound approaches both consist of a single left-turn lane, two through lanes and a channelized right-turn lane. All movements are permitted at this location.



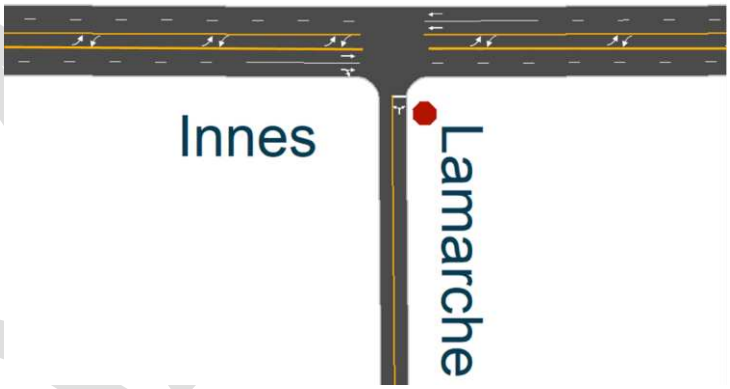
Pagé/Innes

The Pagé/Innes intersection is a four-legged signalized intersection. The west and eastbound approaches both consist of a single left-turn lane, a through lane and a shared through/right-turn lane. The north and southbound approaches both consist of a single full-movement lane. All movements are permitted at this location.



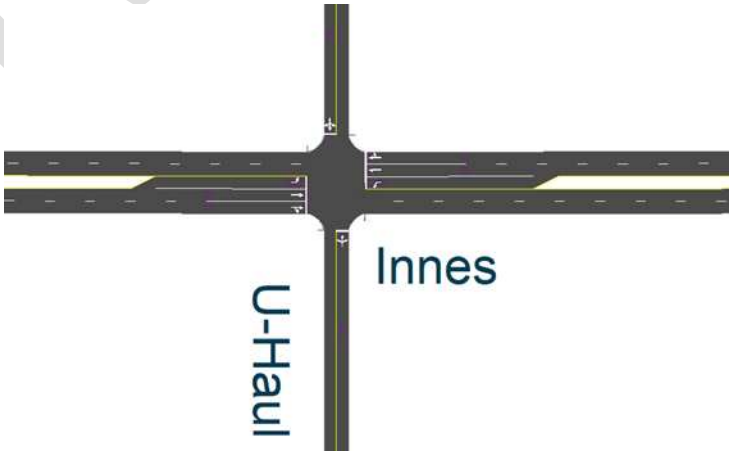
Lamarche/Innes

The Lamarche/Innes intersection is a three-legged unsignalized intersection with a STOP control on Lamarche. The eastbound approach consists of a through lane and a through-right lane. The westbound approach consists of a double through lane. The northbound approach consists of a single all movement lane. There is a two-way center left-turn lane for the east and westbound movements. All movements are permitted at this location.



U-Haul – Boyer/Innes

The U-Haul – Boyer/Innes access (former BMR access and referred to Boyer/Innes herein) intersection is a four-legged signalized intersection. The west and eastbound approaches both consist of a single left-turn lane, a through lane and a shared through/right-turn lane. The north and southbound approaches both consist of a single full-movement lane. All movements are permitted at this location.



Existing Driveways to Adjacent Developments

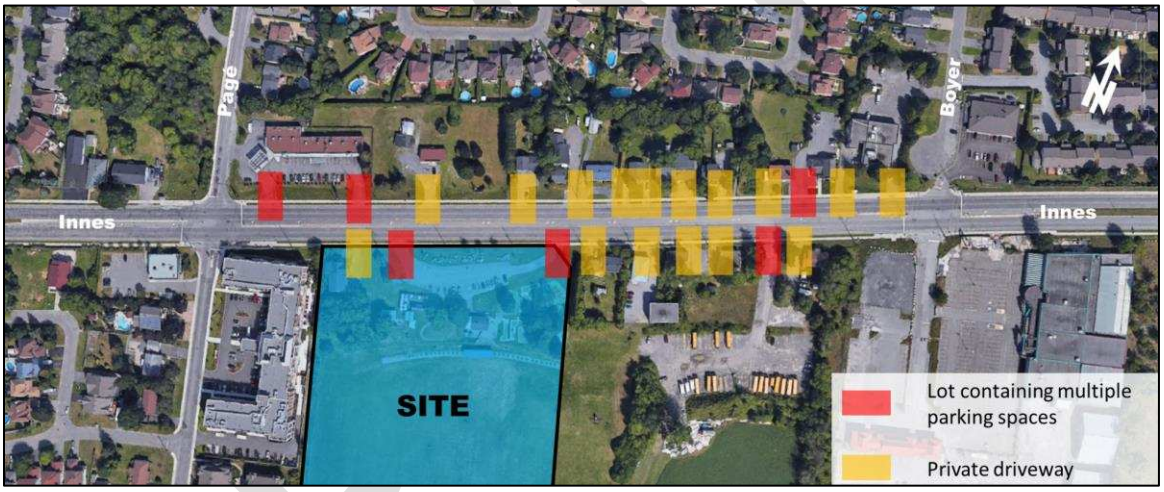
There are multiple existing driveways along Innes Road between Pagé Road and Boyer Road. The existing driveways as shown in **Figure 4** include:

- Access Driveways to Innes Road on north side:

- 3496 Innes – two accesses to a small shopping plaza with a gas bar and approximately 40 parking stalls (135m & 200m west of Lamarche/Innes)
- 3493 to 3581 Innes – private driveways to single detached homes (from 90m west of to 135m east of Lamarche/Innes intersection. 3523 Innes almost lines up with Lamarche)
- 3591 Innes – access to Lepage Osteopathic Clinic, which has parking for approximately 22 vehicles (155m east of Lamarche/Innes)
- 3605 Innes – two accesses to a Bell maintenance building. Though there is parking in the back, it is not normally accessible via Innes Road (180m & 210m east of Lamarche/Innes)

- Access Driveways to Innes Road on south side:
  - 3484 Innes –private driveway to single detached home (within site boundaries, site access will be removed with new development)
  - 3490 Innes – access to driving range, insurance company and food truck. Multiple parking accessible via two driveways (within site boundaries, site access will be removed with new development)
  - 3554 to 3564 Innes – private driveways to single detached homes (from just east of the site to 120m east of Lamarche/Innes intersection)
  - 245 Lamarche – access to a school bus storage facility with multiple parking stalls (135m east of Lamarche/Innes intersection)
  - 3592 Innes - private driveway to single detached home (155m east of Lamarche/Innes)

Figure 4: Existing Driveways Adjacent to Development



Existing Area Traffic Management Measures

Below are the known existing area traffic management measures within the study area:

- Sidewalk facilities with some crosswalks including high-visibility zebra stripes at the intersection of Orléans/Innes and share the road with cyclist sign (further details in following section);
- Red light camera at Orléans/Innes intersection;
- Channelized right-turns at Orléans/Innes intersection;
- On-street parking on Lamarche Avenue and Pagé Road;
- Cul-de-sac treatment on Boyer Road to prevent shortcutting; and,
- Speed bumps on Pagé Road;

Pedestrian/Cycling Network

Sidewalk facilities in the vicinity of the site are provided along both sides of Innes Road, Orléans Boulevard and Pagé Road (north of Innes Road, sidewalks are provided along the west side of Pagé Road only). A multi-use pathway exists on the west side of Lamarche Avenue, and an approved sidewalk is proposed on the east side of Lamarche Avenue.

According to the City's Existing Cycling Network, Pagé Road and Boyer Road are classified as suggested routes. Dedicated bicycle facilities are currently provided in the form of bike lanes in both directions along Innes Road.

Transit Network

The transit network for the study area is illustrated in **Figure 5** with nearby transit stops shown in **Figure 6**. The following OC Transpo routes currently operate within 600m walking distance to the site:

- **Route #25 (La Cité <-> Millennium)**: identified by OC Transpo as a "Frequent Route", this route operates at a frequency of every 15 minutes or less on weekdays and operates 7 days a week. Route #25 provides quick connection to the Confederation LRT Line at Blair Station and provides connection to La Cité Collegial. Bus stops for this route are available on both sides of Innes Road, less than 200m from the site to the east or the west of Lamarche/Innes as seen in **Figure 6**.
- **Route #231 (Blair <-> Hurdman)**: identified by OC Transpo as a "Connexion Route", this route provides convenient connection to the Confederation LRT Line during weekday peak periods only. Bus stops for this route are available on both sides of Meadowglen Drive, approximately 550m from the site.
- **Route #131 (Hurdman <-> Billings Bridge)**: identified by OC Transpo as a "Local Route", this route operates on customized routing and schedules, to serve local destinations with connection to the Confederation LRT Line at Hurdman and provides connection to the BRT Transitway at Billings Bridge. Route #46 operates at an average rate of every 30 minutes during weekdays. Bus stops for this route are available on both sides of Meadowglen Drive, approximately 550m from the site.

Figure 5: Area Transit Network

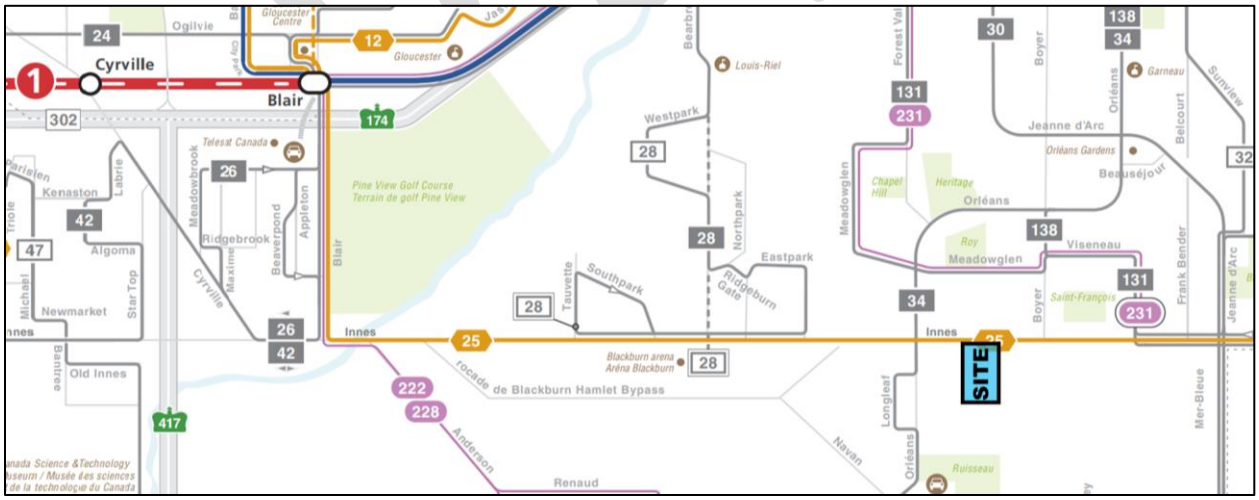
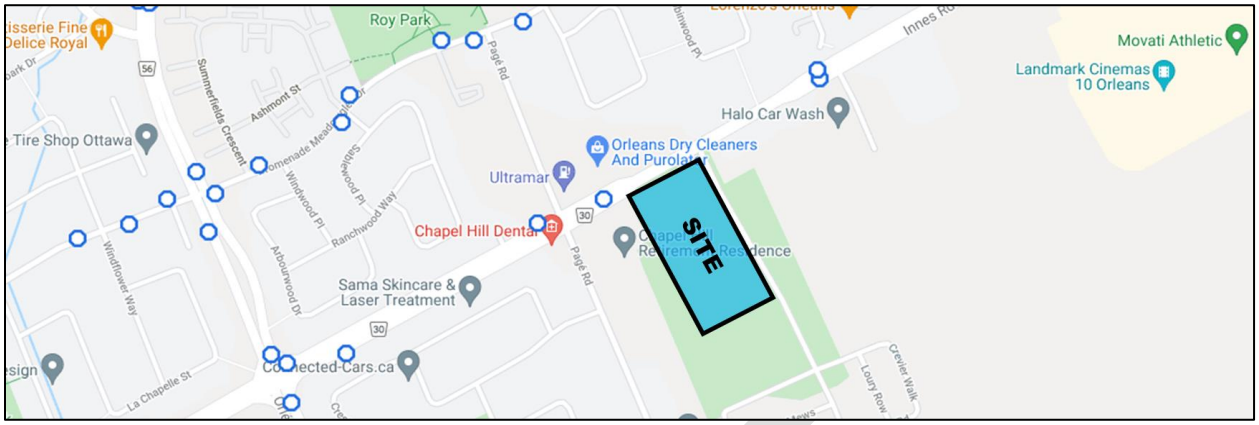


Figure 6: Nearby Transit Stops



Peak Hour Travel Demands

The existing peak hour vehicle traffic and active travel volumes within the study area are illustrated in **Figure 7** and **Figure 8** respectively. These volumes were obtained from the City of Ottawa (2017 and 2019 counts pre-COVID-19 conditions). Count data has been provided in **Appendix B**.

The City did not have peak hour turning movement data at the Lamarche/Innes intersection, despite recent residential development (Caivan Lands) south of the proposed site. A site visit confirmed that approximately 75% of the Caivan residences have been constructed and are occupied. Parsons completed a turning movement count at this intersection in August 2021, which was only used to inform the trip distribution/patterns, not the trip generation due to the ongoing COVID pandemic conditions that would underrepresent vehicle traffic volumes.

Therefore, the total number of trips generated by the Caivan Lands at full buildout were still based on trip generation estimates provided in the 2016 TIA Report by Parsons (more detail provided in **Section 2.1.3**). These estimates were then factored by 75% to represent the existing buildout of the Caivan Lands.

Historically, TIA's completed for adjacent developments have assumed a strong traffic draw to/from the west, based on the assumption that primary employment for local residents is downtown. The most recent counts at Lamarche/Innes suggested a more balanced traffic distribution east and west, which supports the 2011 NCR Household Origin-Destination Survey that reports approximately 46% of outbound trips and 78% of inbound trips stay within Orléans.

This more balanced trip distribution was applied to the Caivan Lands trip generation estimates to represent existing peak hour traffic volumes at the Lamarche/Innes intersection. This same trip distribution was also applied to the proposed development trip generation estimates, as discussed in **Section 3.1.2**.

Figure 7: Existing Peak Hour Traffic Volumes (Balanced)

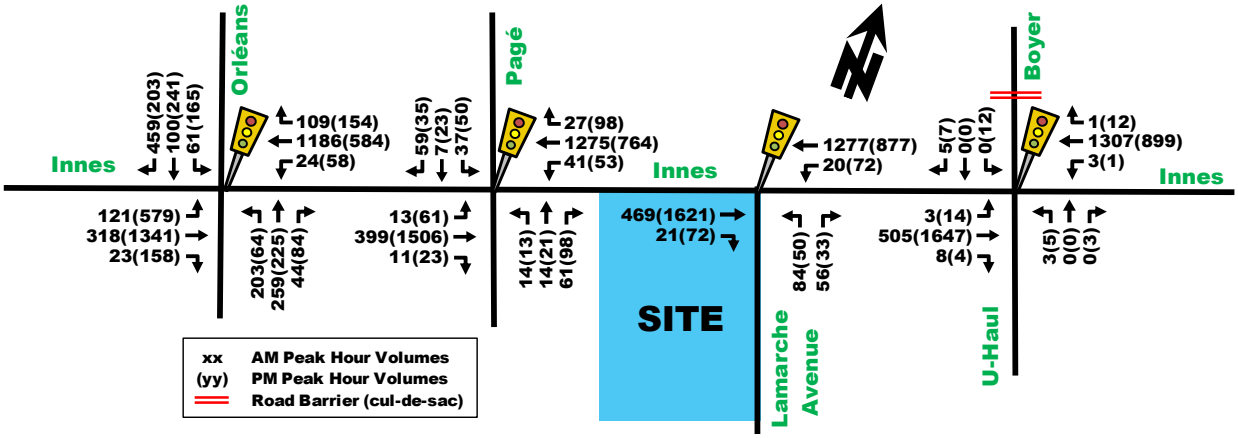
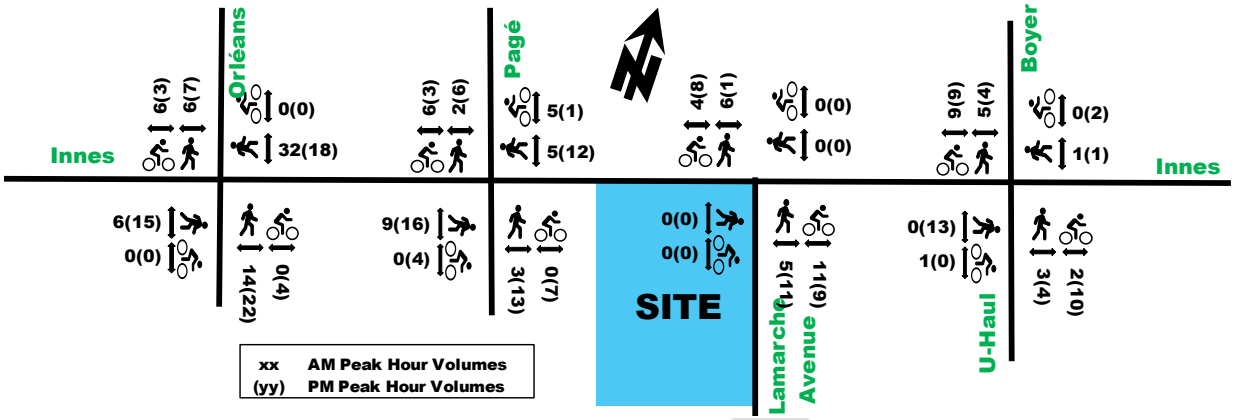


Figure 8: Existing Peak Hour Pedestrian/Cycling Volumes



Existing Road Safety Conditions

A five-year collision history data (2015-2019, inclusive) was requested and obtained from the City of Ottawa for all intersections and road segments within the study area. Upon analyzing the collision data, the total number of collisions observed within the study area was determined to be 136 collisions within the past five-years. Within the study area, the quantity of collisions at each location has occurred at a rate of:

- Orléans/Innes: 68
- Pagé/Innes: 31
- Lamarche/Innes: 0
- Boyer/Innes: 5
- Mid-Block Orléans-Innes: 9
- Mid-block Innes-Pagé: 8
- Mid-block Pagé-Boyer: 15

To help quantify the relative safety risk at intersections within the study area, an industry standard unit of measure for assessing collisions at an intersection was used based on the number collisions per million entering vehicles (MEV). An MEV value greater than 1.00 indicates a relatively high frequency of collisions; however, it does not explain the type or severity of collision. A secondary analysis is done to determine the severity of collision by representing the number of personal injuries as a percentage of the total number of collisions at a given intersection.

A high propensity (MEV > 1.00 or %PIR > 30%) would signal a potential intersection design deficiency or other contributing factor, such as poor intersection geometry, blind spots, poor lighting, excessive speeds, high amount of entry/exit driveways etc.

Intersections that met the MEV or PIR threshold include:

- Pagé/Innes – 0.60 Collisions/MEV with 32% causing injury. Total of 31 collisions with 11 (45%) of all collisions involving rear end, 6 (19%) of all collisions involving turning movements, 5 (16%) involving single motor vehicle other, 3 (10%) involving angle, 2 (6%) sideswipe and 1 (3%) other.

  Overall, Pagé/Innes does not have a high propensity to collisions (medium MEV of 0.6), but it was observed that of the 31 collisions, 3 involved pedestrians and 1 involved a cyclist, all which led to non-fatal injuries. Of the 4 collisions with active transportation modes, 3 of them occurred from motorists failing to yield to them and 1 was categorized as 'unknown'.

  This intersection does not have a contemporary design that meets AODA standards. The City may consider pedestrian and cycling enhancements as part of the life-cycle of this corridor – such as ladder crosswalks and TWSIs, which may help reduce the risk of pedestrian collisions.

Intersections that did not meet the MEV or PIR threshold and do not warrant further analysis include:

- Orléans/Innes – 0.93 Collisions/MEV with 28% causing injury. Total of 68 collisions with 35 (51%) of all collisions involving rear end. Of the 35 rear end collisions, 22 (63%) occurred from vehicles following

too close and 20 of 35 rear end collisions (57% occurred with vehicles travelling east or westbound on Innes Road

- Boyer/Innes – 0.10 Collisions/MEV with 20% causing injury. Total of 5 collisions with 3 (60%) of all collisions involving rear end
- Lamarche/Innes – No collision registered at this intersection

Other collisions within the study area include:

- There was a total of 32 collisions between intersections (mid-block segments), with the majority, 15 (47%) of them occurring on Innes Road between Pagé/Innes and Boyer/Innes. All mid-block segment collisions experienced PIR of less than 30% and none involved active transportation modes
- Out of all collisions, only 1 (<1%) involved cyclists and it occurred at the intersection of Pagé/Innes
- There was a total of 6 registered collisions with pedestrians (4% of all collisions), 3 occurring at Orléans/Innes and 3 at Pagé/Innes

Many of the collisions noted above are reflective of the sheer volume of vehicle traffic on Innes Road, to which there are limited mitigation options. Over time, the City should consider more contemporary designs along the entire corridor to meet AODA compliance and prioritize active modes (i.e. complete streets approach) to help reduce risks to pedestrians and cyclists.

The source collision data as provided by the City of Ottawa and related analysis is provided as **Appendix C**.

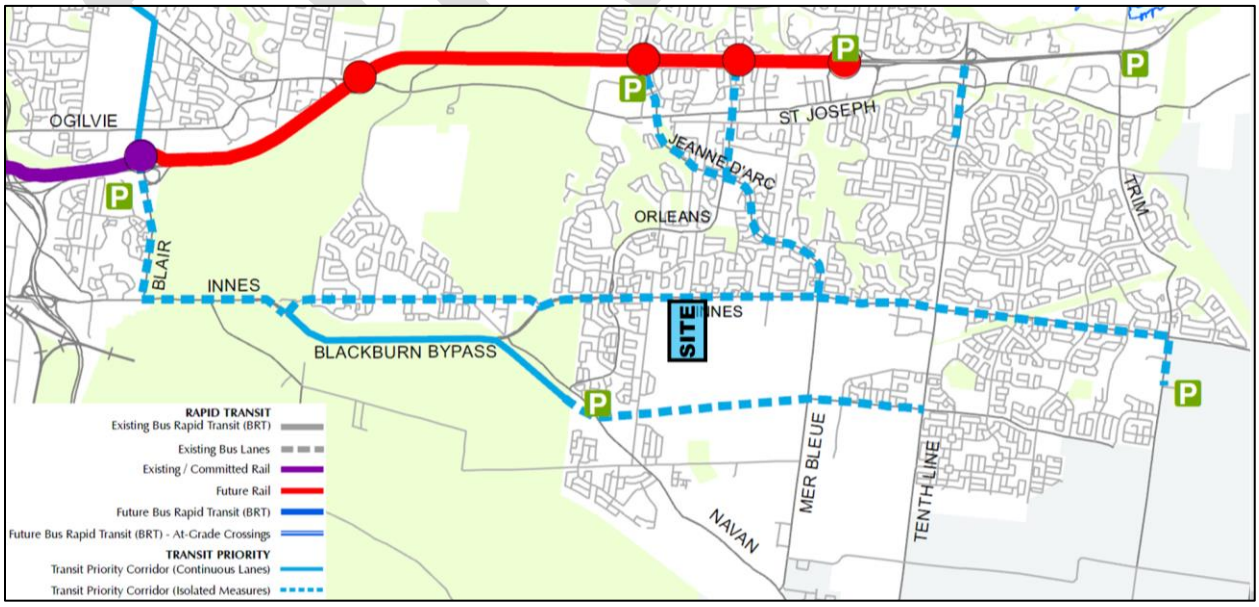
2.1.3. PLANNED CONDITIONS

Planned Study Area Transportation Network Changes

Transit Network

Within Ottawa's 2013 Transportation Master Plan (TMP) affordable network as shown in **Figure 9**, Innes Road is proposed a transit priority corridor with isolated measures between Blair Road and Millennium, passing through adjacent to the site. Blackburn Bypass is proposed as a continuous measure transit priority linking to the Brian Coburn isolated measure transit priority. Note that the most recent public consultation for the Brian Coburn BRT suggests an extension to Renaud Road and connecting to Innes Road near Anderson/Innes intersection. The projected timing for the implementation of the Blackburn Bypass is prior to 2024.

Figure 9: TMP Transit Affordable Network (Map 5)



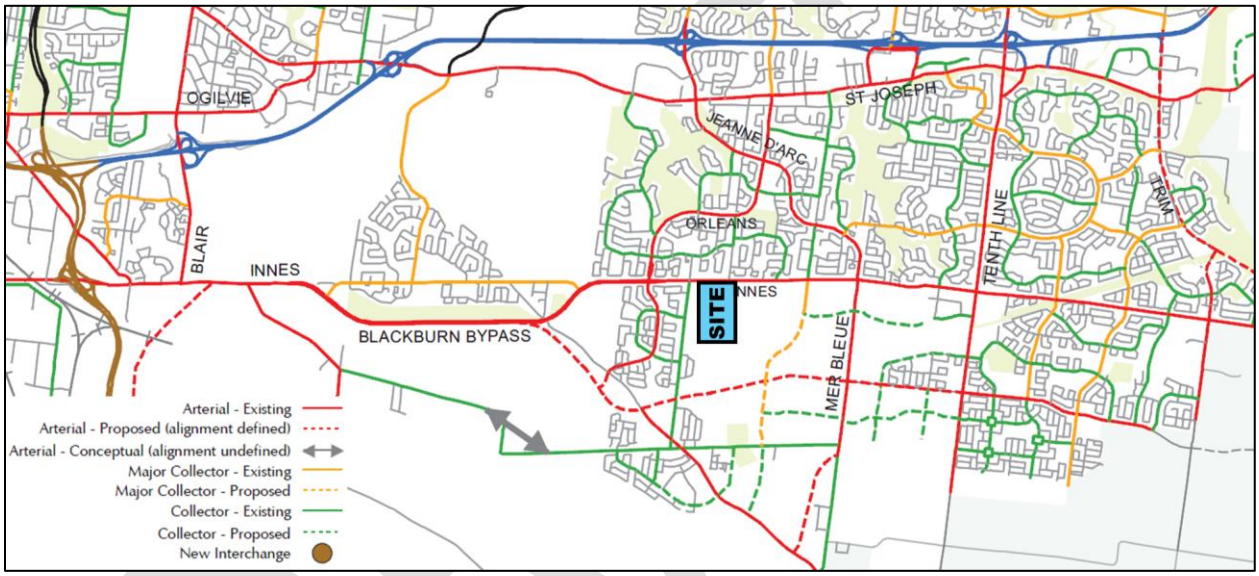
Road Network

Within Ottawa's 2013 Transportation Master Plan (TMP) road network as shown in **Figure 10**, new roads are proposed within the vicinity of the site. Some of the roadway expansions or new roadways proposed include Frank Bender Street (major north-south collector), Harvest Valley Avenue (east-west collector) extensions and the Blackburn Bypass connecting to Brian Coburn Boulevard.

Vanguard Drive is currently underway (east-west collector) which will extend from Lanthier Drive in the east to Mer Bleue Road in the west and will serve as one of the primary east-west collectors through the proposed Orléans Industrial Park.

Brian Coburn Boulevard has already been built since the writing of this report. The most recent draft site plans for 3604 Innes Road and the East Urban Community Mixed Use Centre (EUC) CDP propose road connections to Lamarche Avenue and the Boyer/Innes intersection. Further detail has been provided below within this section, in the **"Other Area Developments"** subsection.

Figure 10: TMP Road Network (Map 6)



Cycling Network

Within the Ottawa Ultimate Cycling Network, Innes Road and Pagé Road are classified as 'spine bike routes'. Orléans Boulevard, Boyer Road and Meadowglen Drive are classified as 'local bike routes'. There is a major pathway proposed east of the site connecting Innes Road to the major pathway on the north side of Brian Coburn Boulevard. **Figure 11** depicts the future cycling network.

Figure 11: Future 'Ultimate Cycling Network"

Other Area Developments

The following section outlines adjacent developments in the general area that were considered in the TIA. The criteria for inclusion of other area developments are either approved developments or developments that have an active planning application that are generally within a 1-km radius of the subject site. **Figure 12** illustrates the location and relative size of relevant other area developments.

Figure 12: Other Area Developments

1 – 3443 Innes

A 6-storey mixed use building is proposed at this location, with 35 residential units and ground floor commercial. A TIA prepared by Novatech in December 2017, projects approximately 30 new two-way trips. These trips will be layered on to background volume trips.

2 – 3490 Innes (Caivan Lands)

The Caivan Plan of Subdivision consists of approximately 534 residential units which have access to Innes Road via Lamarche Avenue, south of the proposed development. The majority of the Caivan Lands is already constructed and occupied (approximately 75%), which has been added to the existing traffic volumes.

The remaining 25% of forecasted traffic volumes based on the 2016 TIA Report will be added to the future background forecasts.

3 – 3604 Innes

A plan for subdivision, Glenview Residential Development, consisting of approximately 457 dwellings, including 180 single-detached homes, 109 townhouse units and 168 stacked townhouses. This development plans on having two road connections to Lamarche Avenue south of this proposed development and connects to future East Urban Community (see 'other area development #6').

A TIA prepared by Novatech in October 2019, projects approximately 200 to 260 new two-way trips for the AM and PM peak periods respectively. It is assumed that this development will be fully built out by 2028. These trips will be layered on to background volume trips.

4 – 3636 Innes

A self-storage building is proposed for this site. Given the low number of forecasted new vehicle trips and the new site uses having a lower trip generation than existing site uses, it is not anticipated to have any adverse effects on the study road network.

5 – 3817 Innes

Three apartment buildings ranging from 3 to 5-storeys high are proposed at this location with a combined 97 residential rental units. A TIA prepared by D.J Halpenny & Associates in March 2021, projects approximately 35 to 45 new two-way trips for the AM and PM peak hours respectively. These trips will be layered on to background volume trips.

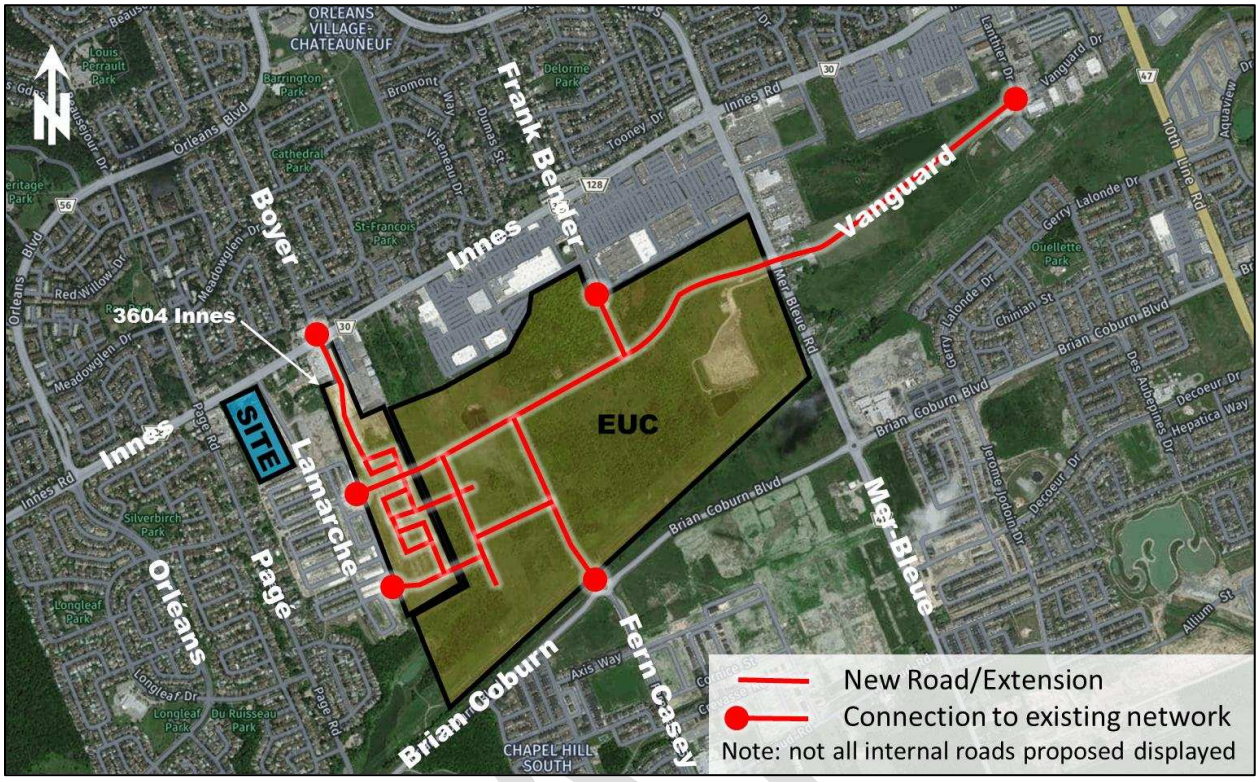
6 – East Urban Community Mixed Use Centre CDP

The City is in the process of completing the East Urban Community Mixed Use Centre Community Design Plan (EUC CDP) process. The CDP area is located between Mer Bleue Road, the hydro corridor, Brian Coburn Boulevard and 3604 Innes Road development. The aim of the CDP is to create a mixed used community with an area of approximately 570 hectares.

The latest site plan, provided in **Appendix D**, proposes approximately 2,040 dwellings (340 single homes, 529 townhomes, 114 back-to-back townhomes and 1,060 apartment units) along with an employment area consisting of approximately 830 new jobs. A TIA prepared by CastleGlenn Consultants in April 2021 (EUC TIA), projects approximately 2,120 new two-way trips, distributed to the surrounding road network via multiple new accesses, including connection to Vanguard Drive Extension/Mer Bleue, Fern Casey/Brian Coburn, Frank Bender/Innes and 3 local road connections to the 3604 Innes development which also connects to Lamarche Avenue as seen in **Figure 13**.

The first phase for this project was estimated by 2037, which is well beyond the analysis horizon set in this study. However, a high-level sensitivity analysis was completed in **Section 4.9.2** to identify potential impacts if the first phase of the EUC CDP lands were completed.

Figure 13: Proposed Road Connections Between Lamarche and Neighbouring Developments



2.2. Study Area and Time Periods

Full buildout of the proposed residential development is planned by 2031. Given that 2031 exceeds the TMP ultimate horizon, only this horizon year without a full buildout plus five years will be analyzed, using the weekday morning and afternoon peak hour time periods. Lamarche/Innes will also be considered with the East Urban Community Phase 1 anticipated by 2037.

Proposed study area intersections and boundary roads are outlined below and highlighted in **Figure 14**.

- Orléans/Innes intersection;
- Pagé/Innes intersection;
- Lamarche/Innes intersection;
- Boyer/Innes intersection;
- Along Innes Road adjacent to the site; and,
- Along Lamarche Ave adjacent to the site.

Figure 14: Study Area Boundaries and Intersections

2.3. Exemption Review

The following modules/elements of the TIA process recommended to be exempt in the subsequent steps of the TIA process, based on the City's TIA guidelines and the subject site:

Table 1: Exemptions Review Summary

Module	Element	Exemption Consideration
4.1 Development Design	4.1.2 Circulation and Access	Only required for Site Plan Application (SPA)
4.2 Parking	All elements	Only required for SPA. The parking is expected to meet By-Law requirements once a Site Plan Application (SPA) is submitted

3. Forecasting Report

3.1. Development Generated Travel Demand

3.1.1. TRIP GENERATION AND MODE SHARES

As discussed in **Section 2.1.1**, Lépine has prepared four (4) different development proposals. Among these four, Options 1 (all residential) and 2 (mixed-use: residential and commercial) were expected to be the highest vehicular trip generators. The following section completes trip generation process for Options 1 and 2.

Trip generation rates for Options 1 and 2 were obtained from the City's 2020 TRANS Trip Generation Manual Report for residential uses and ITE's Trip Generation Manual 10th edition for commercial uses. These rates have been summarized in **Table 2**.

Note that the Option 2 commercial uses were assumed to be general shopping centre type uses, unless otherwise advised. It was understood that Lépine envisioned a grocery store, gas station and a coffee shop to be the prominent commercial tenants on site.

Table 2: 2020 TRANS Residential Trip Generation Rates Options 1 & 2

Land Use	Data Source	Size	Trip Rates	
			AM Peak	PM Peak
Option 1				
High-Rise Apartments	TRANS 2020	873 units	T = 0.80(du)	T = 0.90(du)
Option 2				
High-Rise Apartments	TRANS 2020	525 units	T = 0.80(du)	T = 0.90(du)
Shopping Center	ITE 820	10,631 ft²	T = 0.94(x)	T = 3.81(x)
Grocery Store	ITE 850	26,905 ft²	T = 3.82(x)	Ln(T) = 0.75Ln(x) + 3.21
Coffee Shop with Drive-Thru	ITE 937	2,217 ft²	T = 88.99(x)	T = 43.38(x)
Gas Bar	ITE 945	1,550 ft²	T = 75.99(x)	T = 88.35(x)

Note: T = Average Vehicle Trip Ends; du = dwelling units; x = size of land use in 1,000 ft²

For this development, the Shopping Centre land use and rates were used to represent the small retail components within the site. The type of tenants has yet to be determined and there are no small-scale specialty retail land use types in ITE that were considered appropriate for this site. This should be considered a very conservative estimate given the typical vehicular draw for a shopping centre greatly exceed that of ancillary retail in a high-density mixed-use site.

The total number of person trips generated by the residential portion for Options 1 and 2 of the development during the morning and afternoon peak periods can be found in **Table 3**.

Table 3: Option 1 & 2 Residential Unit Peak Period Person Trip Generation

Land Use	Dwelling Units	AM Peak Period Person Trips	PM Peak Period Person Trips
Option 1 Residential	873	698	786
Option 2 Residential	525	420	473

Standard traffic analysis is usually conducted using the morning and afternoon peak hour trips as they represent a worst-case scenario. The 2020 TRANS Manual uses peak periods which can exceed the peak hours. Table 4 within the 2020 TRANS Manual includes factors for converting peak periods into peak hour traffic volumes as seen in **Table 4**. Note that conversion factors for passenger trips are assumed to be the same as auto driver.

Table 4: Peak Period to Peak Hour Conversion Factor (2020 TRANS Manual)

Travel Mode	Peak Period to Peak Hour Conversion Factors	
	AM	PM
Auto Driver	0.48	0.44
Passenger	0.48	0.44
Transit	0.55	0.47
Bike	0.58	0.48
Walk	0.58	0.52

Mode Share Assumptions

In both Options 1 and 2, the mode shares will be the same for residential uses. The mode shares within the TRANS 2020 Trip Generation Manual for residential land uses for Orléans district were considered too conservative given the site's location near transit and higher density as opposed to the greater Orléans district which is predominantly suburbia. The site's location is:

- TMP Affordable Network, transit priority (isolated measures) on Innes Road adjacent to the site
- TMP Affordable Network, transit priority (continuous measures) on Blackburn Bypass to Navan/Brian Coburn Park and Ride
- TMP Network Concept, the Cumberland Transitway (date and status uncertain)
- Mer-Bleue Expansion CDP suggests possible transit services connecting Innes Road to Vanguard Drive extension via Lamarche Avenue adjacent to the site

Therefore, the mode share assumptions for the proposed development in 2031 were adjusted to reflect lower auto-driver mode share, and higher transit mode share targets for residential uses compared to the TRANS model mode share assumptions as shown in **Table 5**. It is noteworthy that the target mode shares assumed are consistent with the mode shares within the Mer-Bleue Expansion CDP.

Table 5: Residential Mode Share Comparison Options 1 and 2– TRANS and Target Mode Share

Travel Mode	TRANS Residential Mode Shares		Target Residential Mode Share (AM & PM)	Target Rationale
	AM	PM		
Auto Driver	54%	61%	45%	Given the close proximity to transit and commercial services, the auto driver and passenger mode splits are forecasted to be lower than other areas of Orléans.
Auto Passenger	7%	12%	8%	
Transit	29%	21%	35%	Development is located in close proximity to major bus route #25 (former #94). Innes Road is in the TMP's affordable network for transit priority with major updates in transit services in the near future.
Cycling	0%	0%	2%	This is consistent with the 2020 TRANS active travel for High-Rise in Orléans (table 8).
Walking	10%	6%	10%	

In addition to residential uses, Option 2 also has commercial uses. Table 13 in the TRANS 2020 Manual suggests an auto-driver mode share of 77% in the AM peak and 71% in the PM peak for Orléans. Orléans is a large area, predominantly suburban which relies heavier on car travel compared to other areas in Ottawa. Given that this development will be located near transit and higher density communities compared to the rest of Orléans, then some reductions to driver mode share and increases to transit and active mode shares are appropriate as shown in **Table 6**.

Table 6: Option 2 Commercial Use Mode Share Assumptions

Land Use	Travel Mode	TRANS Mode Share		Target Mode Share	Rationale
		AM	PM		
Gas Bar	Driver	77%	71%	100%	It is assumed that all trips will be car oriented
Shopping Center, Grocery Store & Coffee Shop with Drive-Thru	Driver	77%	71%	70%	70% driver mode share is a slight reduction from TRANS for Orléans commercial to account for nearby transit and higher density
	Passenger	14%	20%	15%	Rounded average for AM and PM mode share
	Transit	3%	2%	7%	Increase due to nearby frequent transit route #25
	Non-Motorized	6%	6%	8%	Near Innes Road cycling facilities and generally higher density part of Orléans

Option 1 – Residential Focused

Option 1 proposes 873 residential units housed within 8 buildings varying between 6- and 7-storeys. **Table 3** projects approximately 700 and 785 new trips during the AM and PM peak periods. Using the mode shares from **Table 5**, the person trips can be divided into trips per travel modes based on TRANS mode shares for Orléans in **Table 7** and based on target mode shares in **Table 8**.

Table 7: Option 1 Residential Peak Period Trips using TRANS 2020 Mode Shares

Travel Mode	AM Peak Period		PM Peak Period	
	Mode Share	Person Trip	Mode Share	Person Trips
Auto Driver	54%	377	61%	479
Auto Passenger	7%	49	12%	94
Transit	29%	202	21%	165
Cycling	0%	0	0%	0
Walking	10%	70	6%	47
Total Person Trips	100%	698	100%	786

Table 8: Option 1 Residential Peak Period Trips using Target Mode Shares

Travel Mode	AM Peak Period		PM Peak Period	
	Mode Share	Person Trip	Mode Share	Person Trips
Auto Driver	45%	314	45%	354
Auto Passenger	8%	56	8%	63
Transit	35%	244	35%	275
Cycling	2%	14	2%	16
Walking	10%	70	10%	79
Total Person Trips	100%	698	100%	786

Using the conversion rates from **Table 4**, and the derived peak period trips by mode shares in **Table 7** and **Table 8**, the peak hour trip generation rates can be found. Table 9 within the TRANS 2020 Manual was also used to determine the inbound and outbound splits from the site during their respective peak hour. The residential peak hour trips generated by the site for TRANS 2020 Orléans mode share and target mode shares has been summarized in **Table 9** and **Table 10** respectively.

Table 9: Option 1 Residential Peak Hour Trips Generated using TRANS 2020 Mode Shares

Travel Mode	Mode Share	AM Peak (Person Trips/h)			Mode Share	PM Peak (Person Trips/h)		
		In	Out	Total		In	Out	Total
Auto Driver	54%	56	125	181	61%	122	89	211
Auto Passenger	7%	7	16	23	12%	24	17	42
Transit	29%	35	77	111	21%	45	33	78
Cycling	0%	0	0	0	0%	0	0	0
Walking	10%	13	28	40	6%	14	10	25
Total Person Trips	**100%**	**111**	**246**	**356**	**100%**	**205**	**149**	**355**
Total 'New' Residential Auto Trips		**56**	**125**	**181**	**-**	**122**	**89**	**211**

Table 10: Option 1 Residential Peak Hour Trips Generated using Target Mode Shares

Travel Mode	Mode Share	AM Peak (Person Trips/h)			Mode Share	PM Peak (Person Trips/h)		
		In	Out	Total		In	Out	Total
Auto Driver	45%	47	104	151	45%	90	65	156
Auto Passenger	8%	8	18	27	8%	16	12	28
Transit	35%	42	93	134	35%	75	54	129
Cycling	2%	3	6	8	2%	4	3	8
Walking	10%	13	28	40	10%	24	17	41
Total Person Trips	**100%**	**113**	**249**	**361**	**100%**	**209**	**151**	**361**
Total 'New' Residential Auto Trips		**47**	**104**	**151**	**-**	**90**	**66**	**156**

As shown in **Table 10**, Option 1 is expected to generate approximately 360 morning and afternoon peak hour total person trips.

Roughly 150 to 155 new vehicle trips are expected in the peak hours, with approximately 130 to 135 new transit trips and approximately 50 new active mode trips.

Option 2 – Mixed Use: Residential and Commercial Uses

Option 2 proposes 525 residential units housed within 5 buildings varying between 6 and 7-storeys, a 26,905 ft² grocery store, 10,631 ft² retail store (treated as a small shopping center), a 2,217 ft² drive-thru (assumed a coffee shop with drive-thru facilities as envisioned by developer) and a 1,550 ft² gas bar.

Table 3 projects approximately 420 and 475 new residential trips during the AM and PM peak periods. Using the mode shares from **Table 5**, the person trips can be divided into trips per travel modes based on TRANS mode shares for Orléans in **Table 11** and based on target mode shares in **Table 12**.

Table 11: Option 2 Residential Peak Period Trips using TRANS 2020 Mode Shares

Travel Mode	AM Peak Period		PM Peak Period	
	Mode Share	Person Trip	Mode Share	Person Trips
Auto Driver	54%	227	61%	289
Auto Passenger	7%	29	12%	57
Transit	29%	122	21%	99
Cycling	0%	0	0%	0
Walking	10%	42	6%	28
Total Person Trips	100%	420	100%	473

Table 12: Option 2 Residential Peak Period Trips using Target Mode Shares

Travel Mode	AM Peak Period		PM Peak Period	
	Mode Share	Person Trip	Mode Share	Person Trips
Auto Driver	45%	189	45%	213
Auto Passenger	8%	34	8%	38
Transit	35%	147	35%	166
Cycling	2%	8	2%	9
Walking	10%	42	10%	47
Total Person Trips	100%	420	100%	473

Given the mixture of land uses, an internal reduction rate was applied based on mixed-use parameters described in Section 6.5 of the ITE Trip Generation Manual 3rd Edition, to account for multi-purpose trips such as local resident stopping at the gas station or coffee shop prior to travelling to work. These trips may be reduced to reflect double counted trips, which has been incorporated in the trip generation tables that follow. The base calculation for determining the quantity of internal reductions has been provided in **Appendix E.** Note that there were no studies available for mixed-use interactions with a gas station.

Using the conversion rates from **Table 4**, and the derived peak period trips by mode shares in **Table 11** and **Table 12**, the peak hour trip generation rates can be calculated. Table 9 within the TRANS 2020 Manual was also used to determine the inbound and outbound splits from the site during their respective peak hour. The residential

peak hour trips generated by the site for TRANS 2020 Orléans mode share and target mode share has been summarized in **Table 13** and **Table 14** respectively.

Table 13: Option 2 Residential Peak Hour Trips Generated using TRANS 2020 Mode Shares

Travel Mode	Mode Share	AM Peak (Person Trips/h)			Mode Share	PM Peak (Person Trips/h)		
		In	Out	Total		In	Out	Total
Auto Driver	54%	31	59	90	61%	32	34	66
Pre-Internal Reduction		*34*	*75*	*109*		*74*	*53*	*127*
Vehicles Reduced		*-3*	*-16*	*-19*		*-42*	*-19*	*-61*
Auto Passenger	7%	4	10	14	12%	14	10	25
Transit	29%	21	46	67	21%	27	20	47
Cycling	0%	0	0	0	0%	0	0	0
Walking	10%	8	17	24	6%	9	6	15
Total Person Trips	**100%**	**67**	**148**	**214**	**100%**	**124**	**89**	**213**
Total 'New' Residential Auto Trips		**31**	**59**	**90**	**-**	**32**	**34**	**66**

Table 14: Option 2 Residential Peak Hour Trips Generated using Target Mode Shares

Travel Mode	Mode Share	AM Peak (Person Trips/h)			Mode Share	PM Peak (Person Trips/h)		
		In	Out	Total		In	Out	Total
Auto Driver	45%	26	49	75	45%	22	20	42
Pre-Internal Reduction		*28*	*63*	*91*		*55*	*39*	*94*
Vehicles Reduced		*-2*	*-14*	*-16*		*-33*	*-19*	*-52*
Auto Passenger	8%	5	11	16	8%	10	7	17
Transit	35%	25	56	81	35%	45	33	78
Cycling	2%	2	3	5	2%	3	2	5
Walking	10%	8	17	24	10%	14	10	25
Total Person Trips	**100%**	**68**	**150**	**217**	**100%**	**126**	**91**	**217**
Total 'New' Residential Auto Trips		**26**	**49**	**75**	**-**	**22**	**20**	**42**

The trip generation rates for commercial uses from **Table 2** were used along with the proposed sizes for each commercial land use and respective mode share as described in **Table 6** to estimate new commercial trips as shown in **Tables 15 to 18**.

Pass-by trips were also considered for commercial uses. Pass-by trips are trips that do not end at the location of question but are generated as a diverted trip on route to another location. Appendix E of the ITE Trip Generation Manual 3rd edition was used to determine pass-by rates.

Since there were no studies conducted for a coffee shop with sit down space available and a drive-thru facilities, a hybrid between a coffee shop with drive-thru with no sit-down facilities (89% pass-by AM and PM) and a fast-food restaurant with drive-thru facilities (49% AM and 50% PM pass-by) was used. Pass-by trips were calculated after the internal reduction factor was applied.

Table 15: Option 2 Shopping Center Peak Hour Trips Generated by Mode

Travel Mode	Mode Share	AM Peak (Person Trips/hr)			PM Peak (Person Trips/hr)		
		In	Out	Total	In	Out	Total
Auto Driver	70%	6	4	10	13	15	28
Pre-Internal Reduction		*6*	*4*	*10*	*17*	*20*	*37*
Vehicles Reduced		*0*	*0*	*0*	*-4*	*-5*	*-9*
Auto Passenger	15%	2	1	3	4	5	9
Transit	7%	0	0	0	2	1	3
Non-motorized	8%	0	0	0	1	2	3
Total Person Trips	100%	8	5	13	24	28	52
Less Pass-by 0% AM (34% PM)		0	0	0	-5	-5	-10
Total 'New' Shopping Auto Trips		**6**	**4**	**10**	**8**	**10**	**18**

Table 16: Option 2 Grocery Store Peak Hour Trips Generated by Mode

Travel Mode	Mode Share	AM Peak (Person Trips/hr)			PM Peak (Person Trips/hr)		
		In	Out	Total	In	Out	Total
Auto Driver	70%	42	38	80	106	97	203
Pre-Internal Reduction		*47*	*46*	*93*	*134*	*129*	*263*
Vehicles Reduced		*-5*	*-8*	*-13*	*-28*	*-32*	*-60*
Auto Passenger	15%	11	10	21	29	28	57
Transit	7%	4	4	8	13	13	26
Non-motorized	8%	5	5	10	15	14	29
Total Person Trips	100%	67	65	132	191	184	375
Less Pass-by 0% AM (36% PM)		0	0	0	-37	-37	-74
Total 'New' Grocery Auto Trips		**42**	**38**	**80**	**69**	**60**	**129**

Table 17: Option 2 Coffee Shop with Drive-Thru Peak Hour Trips Generated by Mode

Travel Mode	Mode Share	AM Peak (Person Trips/hr)			PM Peak (Person Trips/hr)		
		In	Out	Total	In	Out	Total
Auto Driver	70%	71	82	153	26	18	44
Pre-Internal Reduction		*91*	*87*	*178*	*43*	*44*	*87*
Vehicles Reduced		*-20*	*-5*	*-25*	*-17*	*-26*	*-43*
Auto Passenger	15%	19	19	38	10	10	20
Transit	7%	9	9	18	4	4	8
Non-motorized	8%	10	9	19	4	4	8
Total Person Trips	100%	129	124	253	61	62	123
Less Pass-by 75% AM (75% PM)		-57	-57	-114	-17	-17	-34
Total 'New' Coffee Shop Auto Trips		**14**	**25**	**39**	**9**	**1**	**10**

Table 18: Option 2 Gas Bar Peak Hour Trips Generated by Mode

Travel Mode	Mode Share	AM Peak (Person Trips/hr)			PM Peak (Person Trips/hr)		
		In	Out	Total	In	Out	Total
Auto Driver	100%	90	61	151	89	86	175
Auto Passenger	0%	0	0	0	0	0	0
Transit	0%	0	0	0	0	0	0
Non-motorized	0%	0	0	0	0	0	0
Total Person Trips	100%	90	61	151	89	86	175
Less Pass-by 62% AM (56% PM)		-47	-47	-94	-49	-49	-98
Total 'New' Gas Bar Auto Trips		**43**	**14**	**57**	**40**	**37**	**77**

The combined trip generation of all commercial uses (**Tables 15 to 18**) has been summarized in **Table 19**.

Table 19: Option 2 Peak Hour Trip Generated by Mode – All Commercial Uses Combined

Travel Mode	AM Peak (Person Trips/hr)			PM Peak (Person Trips/hr)		
	In	Out	Total	In	Out	Total
Auto Driver	209	185	394	234	216	450
Pre-Internal Reduction	*234*	*198*	*432*	*283*	*279*	*562*
Vehicles Reduced	*-25*	*-13*	*-38*	*-49*	*-63*	*-112*
Auto Passenger	32	30	62	43	43	86
Transit	13	13	26	19	18	37
Non-motorized	15	14	29	20	20	40
Total Person Trips	294	255	549	365	360	725
Less Pass-by	-104	-104	-208	-108	-108	-216
Total 'New' Commercial Auto Trips	**105**	**81**	**186**	**126**	**108**	**234**

The total site generated trips (combining residential and commercial trip generation) based on TRANS 2020 mode share projections and the target mode share projections are provided in **Table 20** and **Table 21** respectively.

Table 20: Total Option 2 Peak Hour Trips Generated using TRANS 2020 Mode Shares

Travel Mode	AM Peak (Person Trips/hr)			PM Peak (Person Trips/hr)		
	In	Out	Total	In	Out	Total
Auto Driver	238	243	481	266	241	507
Pre-Internal Reduction	*265*	*257*	*607*	*315*	*313*	*854*
Vehicles Reduced	*-30*	*-30*	*-92*	*-91*	*-91*	*-224*
Auto Passenger	36	40	76	57	53	111
Transit	34	59	93	46	38	84
Cycling	7	7	14	10	10	20
Walking	16	24	39	19	16	35
Total Person Trips	361	403	763	489	449	938
Less Pass-by	-104	-104	-208	-108	-108	-216
Total 'New' Combined Auto Trips	**134**	**139**	**273**	**158**	**133**	**291**

Table 21: Total Option 2 Peak Hour Trips Generated using Target Mode Shares

Travel Mode	AM Peak (Person Trips/hr)			PM Peak (Person Trips/hr)		
	In	Out	Total	In	Out	Total
Auto Driver	235	234	469	256	236	492
Pre-Internal Reduction	*262*	*261*	*523*	*338*	*318*	*656*
Vehicles Reduced	*-27*	*-27*	*-54*	*-82*	*-82*	*-164*
Auto Passenger	37	41	78	53	50	103
Transit	38	69	107	64	51	115
Cycling	9	10	19	13	12	25
Walking	16	24	39	24	20	45
Total Person Trips	362	405	766	491	451	942
Less Pass-by	-104	-104	-208	-108	-108	-216
Total 'New' Combined Auto Trips	**131**	**130**	**261**	**148**	**128**	**276**

If the target mode shares are achieved, Option 2 is expected to generate approximately 765 and 940 new person trips during the morning and afternoon peak hours respectively. Among these, approximately 260 to 275 new vehicle trips, approximately 110 to 115 new transit trips, and approximately 60 to 70 new active mode trips.

Trip Generation Comparison – Option 1 vs Option 2

Overall, Option 2 is expected to generate more peak hour vehicle trips than Option 1. For this reason, **only Option 2 will be analyzed in the upcoming analysis**, as it represents the most conservative Option.

3.1.2. TRIP DISTRIBUTION

The estimated traffic distribution was based on a variation of the August 2021 turning movement count at Lamarche/Innes and the 2011 OD-Survey for Orléans as discussed in **Section 2.1.2: Peak Hour Travel Demands**. A more balanced distribution was developed that reflects these two sources, as outlined below:

Inbound vehicles to Lamarche Avenue

- 50% from Innes Road West;
- 50% from Innes Road East;

Outbound vehicles from Lamarche Avenue

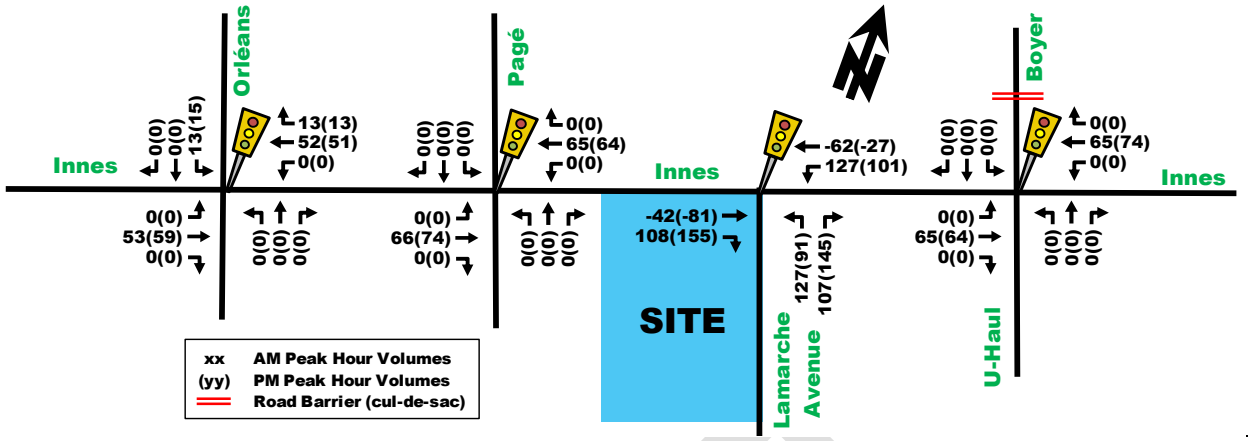
- 60% to Innes Road West;
- 40% to Innes Road East;

Pass-by trips were assumed to be more likely to originate from the west on Innes Road compared to the east, as the former consists mostly of right-turn movements, while the latter requires two separate left turns to/from Innes Road, making it less desirable.

3.1.3. TRIP ASSIGNMENT

The 'new' site-generated vehicle trips outlined in **Table 21** were assigned to the study area network based on the trip distribution discussed above and are illustrated as **Figure 15**.

Figure 15: 'New' Site-Generated Peak Hour Traffic



Note that negative trips reflect pass-by deviated trips

3.2. Background Network Travel Demands

3.2.1. TRANSPORTATION NETWORK PLANS

Refer to section 2.1.3 Planned Conditions – Planned Study Area Transportation Network Changes.

3.2.2. BACKGROUND GROWTH

The background traffic growth through the immediate study area, summarized in **Table 22,** was calculated based on historical traffic count data (years 2003, 2004, 2014, and 2017) provided by the City of Ottawa at the Orléans/Innes intersection. Detailed analysis of the background growth is included in **Appendix F**.

Table 22: Orléans/Innes Historical Background Growth (2003 – 2017)

Time Period	Percent Annual Change				
	North Leg	South Leg	East Leg	West Leg	Overall
8 hrs	1.35%	-0.20%	4.38%	2.53%	**2.70%**
AM Peak	0.69%	0.14%	3.81%	1.75%	**2.08%**
PM Peak	0.01%	-0.68%	3.45%	1.60%	**1.66%**

As shown in **Table 22,** in past years Innes Road and Orléans Boulevard has experienced an average annual growth ranging from +1.66% to +2.70%. Overall, minimal growth was observed on north-south movement and growth rates ranging from +1.6% to +4.38% were observed on Innes Road on east-west travel. These high traffic growth rates were a direct result of urban expansion along the Innes corridor towards Trim Road since 2003. Today, there are few undeveloped areas left along Innes Road to fuel significant traffic growth. The few nearby developments that are expected to contribute traffic within the study area were accounted for independently. This process is discussed in further detail in the following section.

Additionally, the City is planning to construct and has already constructed some adjacent road network connections (e.g. to Brian Coburn) and alternate mode infrastructure (e.g. transit priority measures and pedestrian/cycling facilities) to reduce the reliance and traffic pressures on Innes Road. Therefore, a 1% annual growth rate for traffic on Innes Road east-west through movement was considered appropriate to estimate future traffic growth.

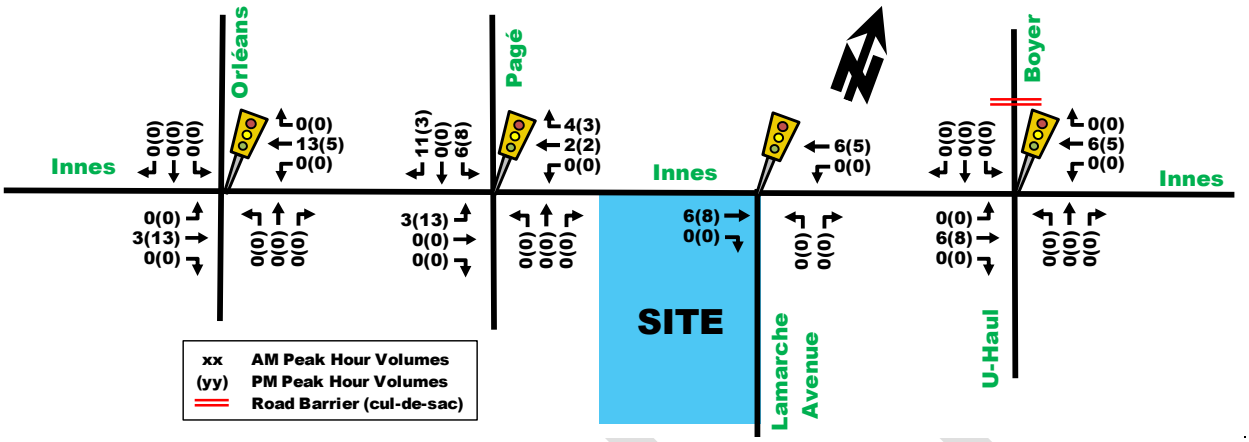
3.2.3. OTHER AREA DEVELOPMENTS

Trips generated by other area developments were accounted within the study area. A summary of each development was provided in **Section 2.1.3**.

3443 Innes

Figure 16 illustrates the projected traffic volumes for 3443 Innes Road at full build-out, obtained from the TIA Report completed by Novatech. This 35-unit residential mixed-use building is expected to be built prior to the horizon year 2031.

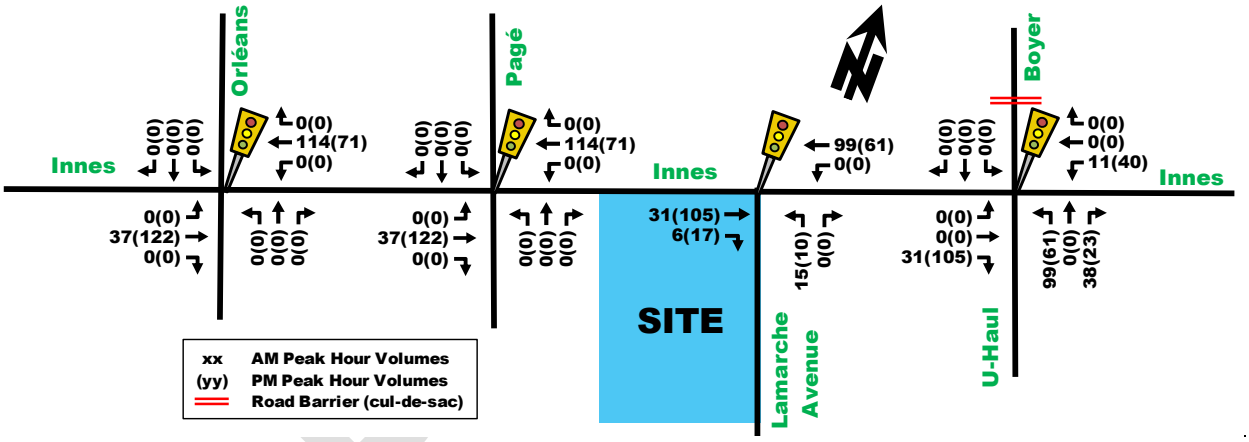
Figure 16: 3443 Innes Road Projected Peak Hour Traffic Volumes – Full Build Out



3604 Innes

Figure 17 illustrates the projected traffic volumes for 3604 Innes Road at full build-out, obtained from the TIA Report completed by Novatech. This plan of subdivision consisting of approximately 457 residential dwellings is expected to be built prior to the horizon year 2031 and will provide connection to Lamarche Avenue.

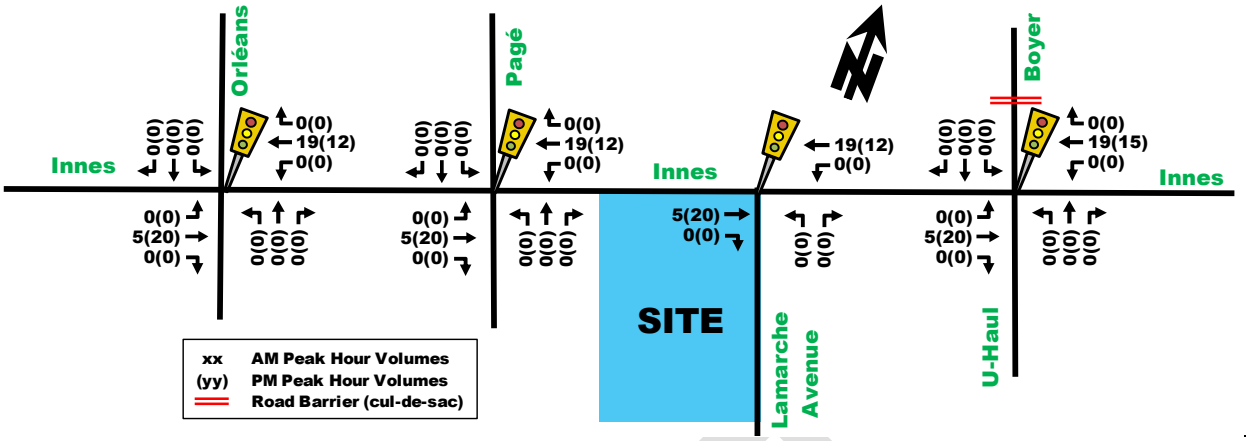
Figure 17: 3604 Innes Road Projected Peak Hour Traffic Volumes – Full Build Out



3817 Innes

Figure 18 illustrates the projected traffic volumes for 3817 Innes Road at full build-out, obtained from the TIA Report completed by D.J Halpenny & Associates. This 97-unit residential dwelling building is expected to be built prior to the horizon year 2031.

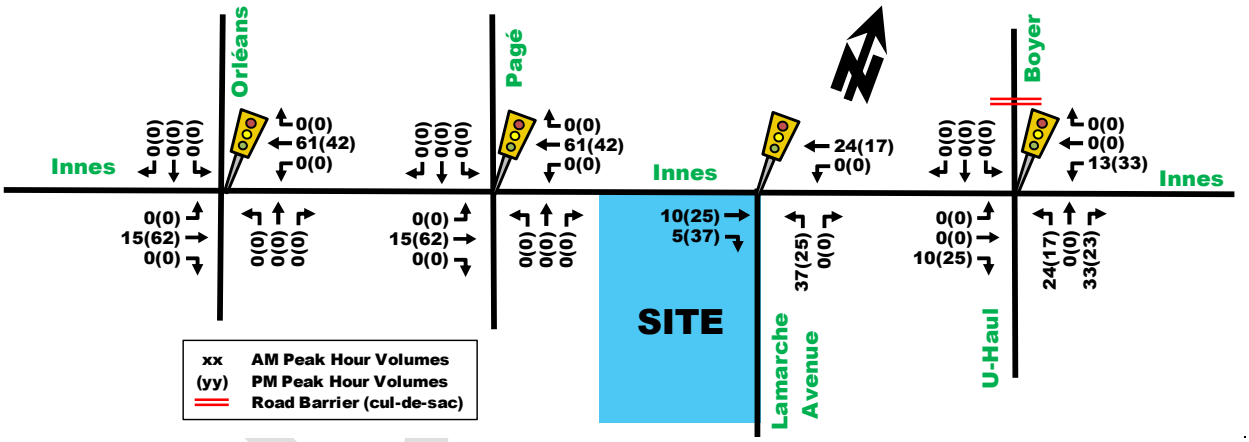
Figure 18: 3817 Innes Road Projected Traffic Volumes – Full Build Out



East Urban Community

Figure 19 illustrates the projected traffic volumes for the East Urban Community at phase 1, obtained from the TIA Report completed by CastleGlenn Consultants. This plan of subdivision consisting of approximately 2,040 residential dwellings and location for approximately 830 new jobs is expected to be built after the horizon year 2031. Phase 1 is anticipated by 2037. These volumes were not added to the background volumes for 2031 analysis but were added to 2037 sensitivity analysis for Lamarche/Innes as this development will have direct connection to Lamarche Avenue south of the proposed development.

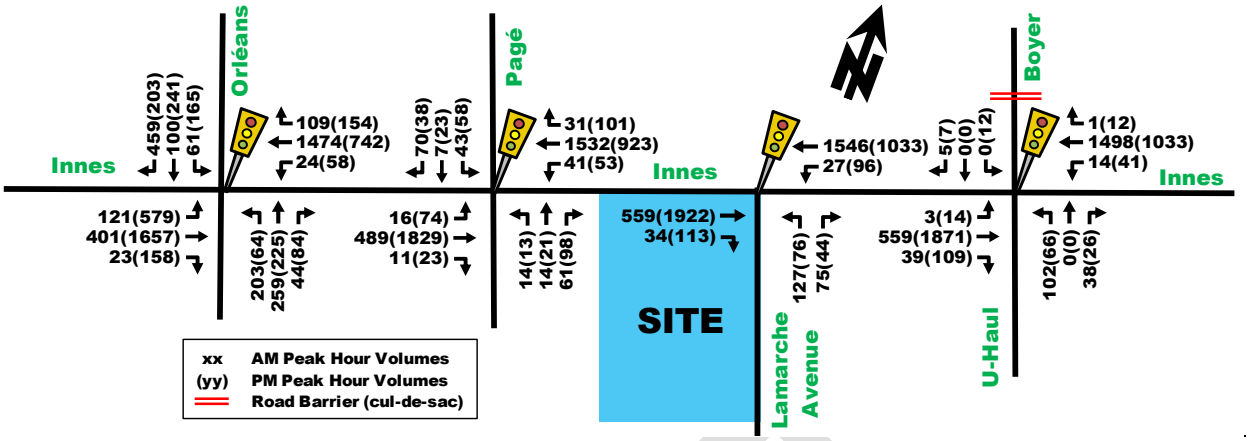
Figure 19: East Urban Community Road Projected Peak Hour Traffic Volumes – Phase 1



3.3. Demand Rationalization

Based on the assumptions from **Section 3.2**, the future background 2031 volumes are shown in **Figure 20**, including the remaining 25% of Caivan Lands not accounted for in the existing traffic volumes.

Figure 20: 2031 Background Peak Hour Traffic Volumes



Considering the location of the site on major bus route #25 (former #94) with frequent service and planned transit investments in the future, the mode shares from the OD-Survey 2011 for Orléans and TRANS 2020 demonstrate a relatively conservative transit assumption for local residents by the 2031 horizon. Within the TMP Affordable Network, transit priority (isolated measures) is proposed along Innes Road and the future Brian Coburn Boulevard extension, plus continuous lanes along the Blackburn Bypass west of the site.

The TMP Network Concept includes the Cumberland Transitway that would provide fully exclusive bus rapid transit between Blair Station and Frank Kenny Road by 2031, however funding and actual implementation dates are uncertain at this time.

From a capacity perspective, Innes Road is not expected to be widened by 2031, so potential traffic will be constrained and eventually plateau. Some vehicles will likely choose alternate arterials proposed to be built or widened, such as Brian Coburn Boulevard, the Brian Coburn Bypass and Vanguard Drive extension.

It is unlikely that future growth along the Innes Road corridor will maintain the existing mode share, particularly with the City's focus on investing in alternate modes, as described above.

The East Urban Community report by CastleGlenn Consultants forecasts approximately 30% of trips to and from Glenview and Caivan Lands using Lamarche/Innes and Boyer/Innes (3604 Innes and 3490 Innes developments) to change their travel routes and utilize Brian Coburn Boulevard once the Vanguard Drive extension is built. It also forecasts a potential 5% reduction in overall existing auto demand trips (excluding new proposed developments) and proposes a reduced background growth rate from 1% annual growth to a lesser 0.25% annual growth rate to reflect forecasted impacts of transit improvements, changes to travel route choices, and changes in travel trip times.

To better understand the implications of these demand rationalizations triggered by the EUC. Thus, additional analysis based on the assumptions from the EUC TIA at 2037 (Phase 1) was completed in **Section 4.9**, including full buildout of the proposed and other area developments as described in **Sections 3.1 – 3.2**.

4. Strategy Report

4.1. Development Design

4.1.1. DESIGN FOR SUSTAINABLE MODES

Location of Transit Facilities

Innes Road is envisioned as a transit priority corridor with isolated measures as shown in **Figure 9**. There are existing bus stops on Innes Road near the Pagé/Innes and Boyer/Innes intersections as shown in **Figure 6**. The farthest buildings from OC-Transpo frequent bus route #25 bus-stop on Innes Road are Buildings A, B and C which are located approximately 350m walking distance from existing stops. All other buildings, including possible residential, commercial or retirement home are located less than 350m walking distance. For Development Options including commercial uses, they are all located along the Innes frontage, closest to existing transit stops.

Pedestrian/Cycling Routes and Facilities

All Development Options envision a municipal loop road off Lamarche Avenue to service the development. Sidewalks will be provided on both sides of the municipal loop road and pedestrian facilities will permeate the site to connect to the municipal loop road.

The approved and nearly completed Caivan Lands proposes a 3m wide multi-use pathway (MUP) on the west side of Lamarche Avenue, which has already been built, and a 2m wide concrete sidewalk on the east side of Lamarche Avenue, which has yet to be built at the time of this report. The proposed pavement markings and signage plan from the Caivan Lands has been provided in **Appendix G.**

The existing 3m wide MUP on the west side of Lamarche Avenue provides direct connectivity for cyclists and pedestrians from the municipal loop road to Innes Road, which also has cycling facilities and sidewalks on both sides of the road.

Preliminary design considerations for Innes Road include a unidirectional cycle track along development frontage, augmenting the existing on-street facility. Potential driveway conflicts have been identified at the future signalized Innes/Lamarche intersection, across Lamarche Avenue at 3523 Innes Road. This driveway would conflict with potential east crossings for pedestrians and cyclists. Therefore, crosswalks and bi-directional cycle facilities should be considered on the south and west legs of the future signalized Lamarche/Innes intersection.

The future design implications and considerations for pedestrian and cyclist facilities will be reviewed as part of the Site Plan Control Application (SPA) for individual phases of the proposed development.

Bicycle Parking

Bicycle parking has not yet been determined. It is assumed that the majority of bicycle parking will be located indoors, in a secure, well-lit area and will meet the minimum City of Ottawa Parking By-Law regulations. Bicycle parking will be confirmed during the SPA for each zone.

4.1.2. CIRCULATION AND ACCESS

Exempt. See **Table 1**.

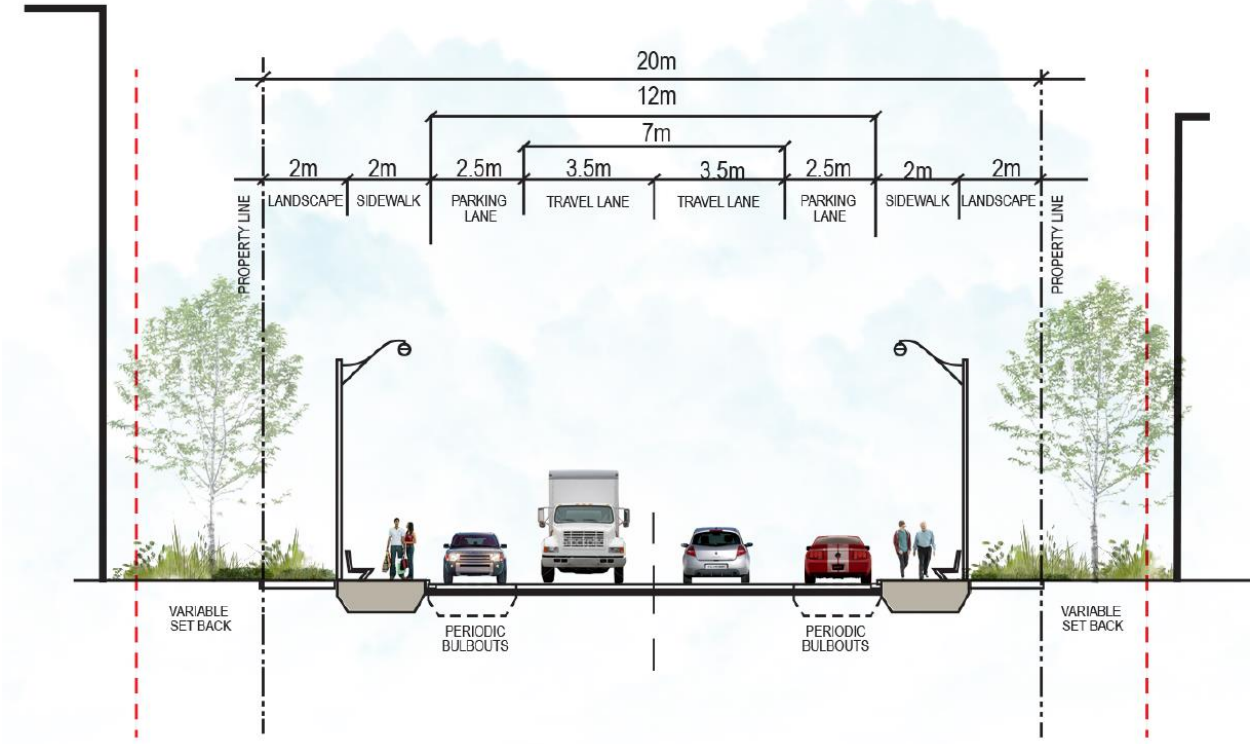
4.1.3. NEW STREETS NETWORK

Municipal Loop Road

The development proposes a municipal loop road which connects to Lamarche Avenue approximately 120m and 240m south of Innes Road. Private driveway accesses to surface parking and underground parking are proposed to connect to the municipal loop at various locations and are subject to change. The loop envisions a single travel lane per direction with periodic bulbouts for loading or parking. The plan also proposes 2m sidewalks on both

sides of the road. The internal street will be classified municipal local road. A sample street cross-section has been provided in **Figure 21**.

Figure 21: Proposed Street Section at Future Municipal Loop Road



EUC MUC CDP Street Network

Additionally, there will be future road connections to Lamarche Avenue from other developments such as Glenview (located at 3604 Innes Road) and the East Urban Community, as illustrated in **Figure 13**. It is envisioned that Lamarche Avenue will function as a collector road from Innes Road to Vanguard Drive extension. Vanguard Drive will function as a major collector once the Glenview and EUC developments reach maturity, providing new connections to Brian Coburn Boulevard at Fern Casey Street, Mer-Bleue Road via Vanguard Drive and new Innes Road connections at Frank Bender Street and Boyer/Innes. The latest site plans for Glenview and the East Urban Community have been provided in **Appendix D.**

4.2. Parking

Exempt, to be confirmed during the SPA for each zone. See **Table 1**.

4.3. Boundary Street Design

4.3.1. EXISTING CONDITIONS

The boundary streets for the development are Innes Road, Lamarche Avenue, and the municipal loop road.

Lamarche Avenue has been recently constructed as part of the Caivan Lands just south of the site. For this evaluation, Lamarche Avenue was evaluated based on the proposed design from the Caivan Lands Plan of Subdivision, as shown in **Appendix L**. The analysis also reviewed the proposed cross-section design for the municipal loop road.

- *Innes Road:*
  - 2 vehicle travel lanes in each direction;

- 1.8m sidewalks with 1.5m boulevard on both sides of roadway;
- More than 3,000 vehicles per day;
- Posted speed 60km/h (used 70km/h) with no parking on side of road;
- Classified as arterial main-street roadway;
- Classified as a spine bike route; and,
- Identified as a Truck Route.

- *Lamarche Avenue (Caivan design):*
  - 1 vehicle travel lane in each direction;
  - >2m MUP on west side of road, 2m sidewalk on east side of road, both with 2m boulevards;
  - Less than 3,000 vehicles per day;
  - Assumed unposted speed 50km/h (used 60km/h) with parking on both sides of road;
  - Classified as collector roadway;
  - Not a bike route, has a 3m wide MUP on west side of road; and,
  - Not identified as a Truck Route.

- *Municipal Loop Road (Proposed design):*
  - 1 vehicle travel lane in each direction;
  - 2m sidewalk with a 2m boulevard or periodic bulbout on both sides;
  - Less than 3,000 vehicles per day;
  - Assumed unposted speed 40km/h (used 50km/h) with parking on both sides of road;
  - Classified as local roadway;
  - Not a bike route; and,
  - Not identified as a Truck Route.

The proposed site is not located within 600m of a rapid transit and not within 300m of a school. Multi-modal Level of Service analysis for the subject road segments adjacent to the site is summarized in **Table 23** with detail analysis provided in **Appendix H**.

Table 23: MMLOS – Boundary Street Segments Existing and Future Proposed

Road Segment	Level of Service							
	Pedestrian		Bicycle (BLoS)		Transit (TLoS)		Truck (TkLoS)	
	PLoS	Target	BLoS	Target	TLoS	Target	TkLoS	Target
Innes Rd between Pagé Road & Boyer Road	E	C	C	C	D	D	A	D
Lamarche Ave between Innes & Caivan Lands west side of road	A	C	A	D	D	D	-	N/A
Lamarche Ave between Innes & Caivan Lands east side of road	B	C	D	D	D	D	-	N/A
Municipal Loop Site Access to/from Lamarche Ave	B	C	A	D	-	N/A	-	N/A

<u>Pedestrian</u>

- ***Innes Road*** does not meet pedestrian PLoS desirable targets. Increasing the sidewalk width to greater than 2m wide with a greater than 2m boulevard, plus confirming the actual driven speeds on Innes Road to be 60km/h would meet the desirable pedestrian level of service.
- ***Lamarche Avenue*** will meet the PLoS on both sides of the road once the east sidewalk is constructed.
- ***Municipal Loop Road*** will meet the pedestrian PLoS desirable targets as proposed.

<u>Bicycle</u>

- The cycling BLoS desirable targets were met for all road segments.

Transit

- The transit TLoS desirable targets were met for all applicable road segments. Lamarche Avenue does not currently have public transit services, but it is envisioned that once the East Urban Community and Vanguard Drive are built, that transit services will likely be provided using Lamarche Avenue.

Truck

- Only Innes Road is a truck route, and the TkLoS desirable targets were met.

4.4. Access Intersection Design

4.4.1. LOCATION AND DESIGN OF ACCESS

The latest site plans for all Options envision a municipal loop road which connects to Lamarche Avenue approximately 120m and 240m south of Innes Road. Private driveway accesses to surface parking and underground parking are proposed to connect to the municipal loop at various locations and are subject to change. The municipal loop accesses will function as STOP-controlled on the minor (the municipal loop) and free flow on Lamarche Avenue.

The nearest intersecting street to the municipal loop is Lamarche/Innes, which is located approximately 120m north of the loop access. This distance adheres to the By-law (No. 2003-447) Section 24(m)(ii), which suggests a separation between the site access and nearest intersection of 60m for a site with more than 300 parking spaces. The distance between the two loop accesses is also satisfactory, at a separation of approximately 120m and minimum suggested separation of 75m.

Option 4 shows a potential access to Lamarche Avenue, approximately 30m south of Lamarche/Innes. The design is preliminary and subject to change, including its location and type (e.g. left-turns permitted or not). The Site Plan Application for Phase/Zone 3 will address the final proposed development and accesses for that quadrant, including the possibility of this access.

4.4.2. INTERSECTION CONTROL

A traffic signal warrant at Lamarche/Innes was completed and the need for traffic signals at this location was confirmed. According to TAC Chapter 9, Section 9.4.2.1, a minimum signalized to signalized intersection separation of 200m is recommended. The nearest signalized intersection is Pagé/Innes and it is located further than 200m, thus meeting the minimum recommended separation distance.

An all-way stop control (AWSC) warrant for the municipal loop/Lamarche was completed. For most options (all except for Option 4, which is proposed to have at least 3 accesses), there will only be two access points to Lamarche Avenue from the site, one at the north and one at the south ends of the municipal loop road. For sensitivity purposes, the amount of total projected site traffic was gradually increased to determine what percentage of the overall site generated traffic is required to use a single access until an AWSC is triggered.

It was determined that approximately 65% of all site generated traffic would need to use a single municipal loop/Lamarche access to trigger an AWSC. The conservative approach in the trip generation and future influence of the EUC Phase 1 on area traffic patterns suggests this outcome is unlikely. However, the need for an AWSC will be reviewed as part of each individual Site Plan Control Application for subsequent phases.

Option 1 and remaining options are forecasted to generate fewer site generated trips than Option 2 and are even less likely to trigger the requirements for an AWSC. Based on the above, it is anticipated that an AWSC is not required for the site access loop/Lamarche intersections.

All warrant analysis has been provided in **Appendix I**.

4.4.3. INTERSECTION DESIGN

The proposed municipal loop road, to be designed to a local road standard, will provide two-way vehicular access via Lamarche Avenue. TAC Chapter 8, Section 8.9.10 suggests a minimum clear throat length for driveways on to collector and arterial roads. Since the municipal loop will be a local road, there are no minimum clear throat lengths suggested.

The Lamarche/Innes intersection will need to be retrofitted from an unsignalized intersection into a signalized intersection. Given the large number of northbound left-turning movements, westbound left-turning movements, and eastbound right-turning movements, auxiliary left- or right-turn lanes will be considered on all approaches.

The ultimate Lamarche/Innes intersection envisions a contemporary protected intersection design, that prioritizes pedestrian and cycling movements. Crosswalks and bi-directional cycle facilities have been considered on the south and west legs of the future signalized intersection, which would require time separated crossings and turning restrictions such as no-right-on-red turns for eastbound and northbound movements.

Once the East Urban Community is built, it will trigger significant changes in local travel patterns as new connections from the local community will become available, such as connectivity from Lamarche Avenue to Brian Coburn Boulevard, Vanguard Drive and Frank Bender Street. The potential capacity implications will be reviewed as part of the 2037 sensitivity analysis.

A conceptual protected intersection design based on the most conservative auxiliary lane requirements has been provided in **Appendix L**, which includes double northbound left-turn lanes and two bi-directional crossrides. The outcome of the intersection capacity results in this study (**Section 4.9**) will confirm the auxiliary lane requirements.

The implications related to driveway access, truck movements, onsite circulation, ramp design and site-specific details will be reviewed during the Site Plan Control Application for each individual phase of development.

4.5. Transportation Demand Management

4.5.1. CONTEXT FOR TDM

For Option 1, it was assumed that most trips generated by the proposed site will be residents leaving the site in the AM peak to go to work and returning from work in the PM peak. For Option 2, more balanced inbound and outbound trips are expected, with residents departing the site in the AM and returning in the PM while commercial uses are anticipated to come and go throughout the day, with more activity in the afternoon peak period.

Sections 3.1.1 and **3.1.2** describe how many trips are anticipated per travel mode and anticipates the likely locations that they will travel to and from based on the OD-Survey 2011 for Orléans. The site is located adjacent to Innes Road transit priority with isolated measures, making it a good candidate to promote transit use for residential trips. Additionally, shared parking provisions for residential/commercial uses could reduce the overall need for quantity of parking provided, given that commercial parking likely occurs at different times than residential visitor parking.

4.5.2. NEED AND OPPORTUNITY

The proposed development will predominantly be accessed by Innes Road, which is currently operating near capacity. With investments planned for transit priority on Innes Road, new opportunities for travel are immerging adjacent to the site. A strong focus on TDM measures to encourage sustainable active mode shares is recommended, both to relieve stress on an already congested Innes Road and to promote environmentally conscious ways of commuting. Such measures are described in more detail in **Section 4.5.3** below, but can include, more aggressive Multi-Modal Levels of Service (MMLOS) as described in **Section 4.3** and **4.9** and safe and efficient connectivity to public transit as described in **Section 4.7**, to name a few.

4.5.3. TDM PROGRAM

The TDM infrastructure and measures checklist has been completed as a recommended draft list given that this is a zoning by-law application and not a full site plan application. The draft measures have been provided in Appendix J. Some of the potential TDM measures that will be considered include:

- Offer Presto cards pre-loaded to new tenants
- TDM coordinator
- On-site carshare program
- Unbundled car parking spot from monthly rent
- Shared commercial/residential parking provisions
- Personalized trip planning to new residents
- Easy and direct connection to sidewalks and Lamarche MUP

4.6. Neighborhood Traffic Management

4.6.1. ADJACENT NEIGHBORHOODS

The future projected 2031 volumes along Lamarche Avenue are anticipated to be approximately 350 to 400 peak hour volumes per direction during the AM and PM peak hours respectively which is consistent with a collector road. Major collector roadways have a recommended capacity up to 600 peak hour volumes, based on City of Ottawa TIA Guidelines. It is not anticipated that this development will impact Lamarche Avenue's envisioned roadway classification as a collector road.

4.7. Transit

4.7.1. ROUTE CAPACITY

Option 1 is anticipated to produce more transit trips per hour compared to Option 2. It is projected that approximately 135 'new' two-way transit for Option 1 will be generated for the AM and PM peak hours. The site will be located less than 400m away from transit stops at the furthers location from site to high frequency route #25 (former #94). Route 25 operates at approximately 5-minute intervals during peak hours and approximately 15-minute intervals during non-peak hours with service from as early as 4:33am until midnight.

Given the high frequency of route #25, planned transit priority measures on Innes Road and the additional transit capacity added to parallel transit routes on both the future Confederation LRT Line expansion to Orléans anticipated for 2024 (north of Innes Road) and new Brian Coburn Transitway (south of Innes Road), there is expected sufficient capacity for route #25.

4.7.2. TRANSIT PRIORITY

As discussed in Section 2.1.3, there are transit priority with isolated measures planned on Innes Road, however a design for these measures has yet to be completed. Considerations for transit priority measures along the corridor may include:

- Queue jumps if space is available
- Provide signal priority at intersections such as green extensions or red truncations

Potential transit priority opportunities will be reviewed as part of future Site Plan Control Applications for subsequent phases of development.

4.8. Review of Network Concept

The proposed site is currently zoned as DR (developmental reserve) which allow buildings up to 3-storeys or 11m high. The residential towers are proposed to be 7-storeys high which is 4-storeys above permissible zoning. Assuming that approximately 60% of the proposed residential person trips were above current zoning allowances, then both Options 1 and 2 would produce more than 200 peak hour person trips than the equivalent volume permitted by the established zoning.

Although there will be an increase in people trips from the new development, as described in **Section 3.3**, there are notable network changes anticipated by the time that the East Urban Community's Phase 1 is complete. Changes such as improvements to transit facilities and new collector road connections which will further distribute loads off Innes Road, will be some examples of how added capacity will be provided on Innes Road. Within **Section 4.9**, sensitivity analysis will be performed to determine intersection performance with TRANS suggested mode shares for Orléans as well as the influence of the EUC development and surrounding network forecasted changes.

4.9. Intersection Design

4.9.1. INTERSECTION CONTROL

See **Section 4.4.2**.

4.9.2. INTERSECTION DESIGN

For the purpose of this evaluation, the double northbound left-turn protected intersection concept design was assumed for the Lamarche/Innes intersection, as illustrated in **Appendix L**. The forthcoming analysis will ultimately confirm the need for a double northbound left-turn. This design will be revisited and confirmed as part of the Site Plan Control Application for Phase/Zone 1 of the proposed development.

Multi-Modal Level of Service

As stated in the MMLOS Guidelines, only signalized intersections are considered for the intersection Level of Service measures. All intersections within the study area are signalized or are planned to be signalized. The MMLOS analysis is summarized in **Table 24**, with detailed analyses provided in **Appendix K**.

Table 24: MMLOS – Existing and Future Intersections

Road Segment	Level of Service							
	Pedestrian		Bicycle (BLoS)		Transit (TLoS)		Truck (TkLoS)	
	PLoS	Target	BLoS	Target	TLoS	Target	TkLoS	Target
Orléans/Innes intersection	F	C	F	C	F	D	A	D
Pagé/Innes intersection	F	C	D	C	B	D	-	N/A
Boyer/Innes intersection	F	C	D	C	C	D	-	N/A
Lamarche/Innes intersection[1]	F	C	C	C	E	D	-	N/A

1.) Based on most conservative protected intersection design (double northbound left-turn lanes) - refer to Appendix L.

Pedestrian

- No intersection met the pedestrian minimum desirable target of PLoS 'C'. All intersections had a PLoS of 'F' predominantly based on the number of lanes that would need to be crossed for pedestrians crossing Innes Road (note that the number of lanes was determined from dividing the crossing distance by 3.5m and not by actual visible lanes). No mitigation would lower the PLoS to a level close to the desired MMLOS target without significantly reducing the vehicle capacity.

Bicycle

- Lamarche Avenue, as proposed, is expected to meet BLoS targets.

- The remainder intersections have mixed traffic facilities on the minor approaches, resulting in a BLoS inferior to the desired target.

  Providing cycling facilities on minor approaches and assuming cyclists cross Innes Road at the crosswalks would meet the BLoS desired target for all intersections with the exception of Orléans/Innes.

- The Orléans/Innes intersection could meet BLoS targets if cycling facilities were added to all approaches and the introduction of right-turn lanes is less than 50m long from the start of pocket bike lanes.

Transit

- Transit TLoS targets were met at Pagé/Innes and Boyer/Innes due to modest intersection delays for east-westbound through movement.
- Orléans/Innes and Lamarche/Innes had certain movements used by buses which surpassed 30 second delays and triggers the TLoS of 'E' or worse, exceeding the desired TLoS target of 'D' or better. Possible transit priority measures, such as a queue jump could reduce bus delays and improve the TLoS.

Truck

- Only Orléans/Innes intersection has a truck route with possible turning movements. The TkLoS was met.

Existing Conditions

The following **Table 25** provides a summary of the existing traffic operations at the study area intersection based on volumes from **Figure 7** and Synchro (V10) traffic analysis software. The subject intersections were assessed in terms of the volume-to-capacity (v/c) ratio and the corresponding Level of Service (LoS) for the critical movement(s). The Synchro model outputs of existing conditions are provided within **Appendix M**.

Table 25: Existing Intersection Performance

Intersection	Weekday AM Peak (PM Peak)					
	Critical Movement			Intersection		
	LoS	max. v/c or avg. delay (s)	Movement	Delay (s)	LoS	v/c
Orléans/Innes	C(F)	0.79(1.13)	WBT(EBT)	28.6(58.0)	C(E)	0.73(0.97)
Pagé/Innes	A(B)	0.56(0.69)	WBT(EBT)	8.0(11.5)	A(B)	0.55(0.67)
Lamarche/Innes (unsig.)	F(F)	53(1,266)	NB(NB)	4(39)	A(F)	-
Boyer/Innes	A(B)	0.46(0.64)	WBT(EBT)	3.0(4.8)	A(B)	0.46(0.63)
Note: Analysis of signalized intersections assumes a PHF of 0.90 and a saturation flow rate of 1800 veh/h/lane.						

As shown in **Table 25**, all the intersections within the subject area are currently operating 'as a whole' at acceptable LoS 'E' or better during the AM and PM peak hours with the exception of Lamarche/Innes. Most of the 'critical movements' at study area intersections are currently operating at a good LoS 'C' or better during both peak hours with the exception of Orléans/Innes which has a critical movement of 'F' in the PM peak and Lamarche/Innes which is operating at capacity for the AM and PM peaks.

The volumes used at the Lamarche/Innes intersection reflects through movements prior to the decrease in vehicular volumes due to the COVID-19 pandemic but turning movements reflective of 75% buildout of the Caivan Lands south of the site (based on trip generations from 2016 TIA by Parsons), as discussed in **Section 2.1.2**. The Lamarche/Innes intersection is currently unsignalized, but will be signalized as part of this development, improving circulation for vehicles performing turns to and from Lamarche Avenue to Innes Road.

It is also important to note that the side street volumes at the Orléans/Innes intersection correspond to 2017 counts completed prior to the opening of Brian Coburn Boulevard in 2018, which may lead to higher traffic volume estimates at this intersection.

Background Conditions

As discussed in **Section 3.2**, a conservative 1% annual growth up to year 2031 on through movements on Innes Road was assumed and other area developments were individually layered on top.

Figure 20 shows the projected background volumes for the full buildout horizon year, 2031. The projected operation outputs are displayed in Table 26. The detailed Synchro results can be found in Appendix N. Note that Lamarche/Innes is anticipated and was modelled as a signalized intersection by this horizon year.

Table 26: 2031 Background Intersection Performance

Intersection	Weekday AM Peak (PM Peak)					
	Critical Movement			Intersection		
	LoS	max. v/c or avg. delay (s)	Movement	Delay (s)	LoS	v/c
Orléans/Innes	D(F)	0.85(1.26)	WBT(EBT)	29.4(80.3)	C(F)	0.78(1.09)
Pagé/Innes	B(C)	0.61(0.75)	WBT(EBT)	8.8(11.2)	A(C)	0.59(0.72)
Lamarche/Innes	B(E)	0.61(0.92)	WBT(EBT)	7.9(27.2)	A(D)	0.60(0.88)
U-Haul/Innes	B(C)	0.67(0.73)	NBT(EBT)	9.7(15.8)	A(C)	0.59(0.71)
Note: Analysis of signalized intersections assumes a PHF of 1.0 and a saturation flow rate of 1800 veh/h/lane.						

As seen in Table 26, all intersections operate overall at good LoS 'D' with critical movements operating at LoS 'E' or better during the 2031 background volumes, with the exception of Orléans/Innes which operated overall at capacity in the PM peak hour. The largest factor in worsening conditions is the background growth assumed at 1% annually for 10 plus years at some intersections, a growth that may be too conservative and unrealistic of what actual growth may occur, if any at all on the Innes Road corridor. Lamarche/Innes operates better than today as it was modelled as proposed future signalized intersection.

Future Conditions at Full-Buildout

The future projected full-buildout volumes are illustrated in Figure 22, which assumes the layering of site generated traffic volumes on to the 2031 background volumes.

The Lamarche/Innes intersection has been modelled as follows:

- Northbound approach has auxiliary left- and right-turn lanes;
- Auxiliary eastbound right-turn and a westbound left-turn lanes;
- No-right-on-red for eastbound right-turns and northbound right-turn movements, to accommodate the bidirectional cycling facilities; and,
- 15s time separated phase for crossing Innes Road on the west leg and a 5s time separated phase for crossing Lamarche Avenue on the south leg.

The projected traffic volumes are summarized in Table 27, with detailed Synchro results provided in Appendix O.

Figure 22: Full-Buildout Total Projected Peak Hour Traffic Volumes

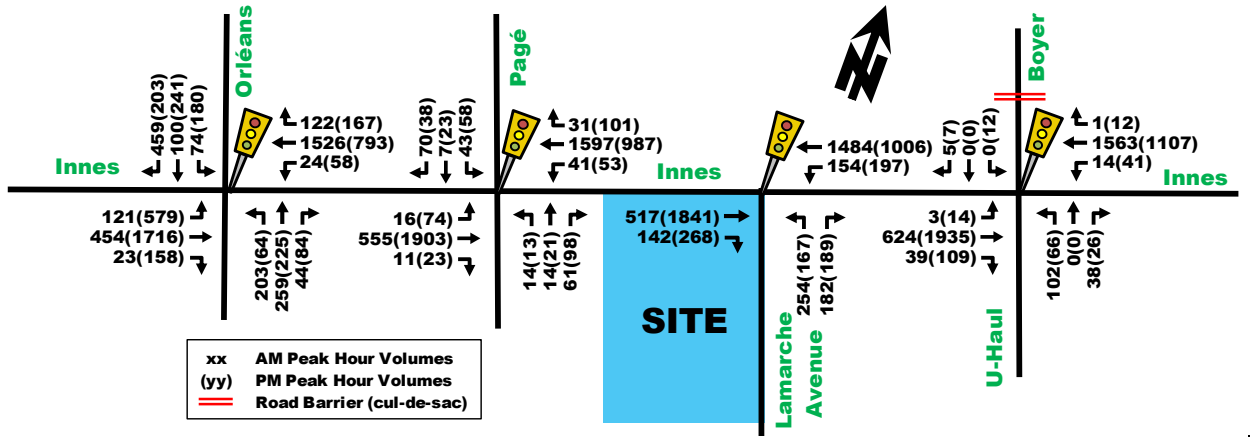


Table 27: Full-Buildout Intersection Performance

Intersection	Weekday AM Peak (PM Peak)					
	Critical Movement			Intersection		
	LoS	max. v/c or avg. delay (s)	Movement	Delay (s)	LoS	v/c
Orléans/Innes	D(F)	0.85(1.16)	WBT(EBT)	28.8(65.0)	C(F)	0.79(1.02)
Pagé/Innes	B(C)	0.63(0.78)	WBT(EBT)	9.3(9.3)	B(C)	0.61(0.75)
Lamarche/Innes	C(E)	0.78(0.91)	NBL(EBT)	18.0(27.6)	B(D)	0.70(0.88)
U-Haul/Innes	B(C)	0.67(0.76)	NBT(EBT)	9.6(15.1)	B(C)	0.61(0.74)
Note: Analysis of signalized intersections assumes a PHF of 1.0 and a saturation flow rate of 1800 veh/h/lane.						

As seen in **Table 27**, all study area intersections are expected to operate similarly to background conditions. Note that the timing plan for Orléans/Innes was optimized to improve performance while maintaining the same cycle length and protected phasing. The addition of time separated phases and no-right-on-red reduces effective green time for all vehicular movements, but greatly improves active transportation priority.

Overall, no modifications are recommended.

It is worth noting that providing double northbound left-turn lanes at Lamarche/Innes was not shown to be needed at full buildout of the subject site if mode share targets are met.

Future Conditions Assuming TRANS Mode Shares

The trips generated based on 2020 TRANS mode shares for Orléans are shown in **Figure 23** in the event that the target mode shares (that favour increased transit, walking and cycling usage) are not met. The projected intersection performance is shown in **Table 28** with detailed output in **Appendix P**.

Figure 23: Full-Buildout Total Projected Peak Hour Traffic Volumes Using Target Mode Shares

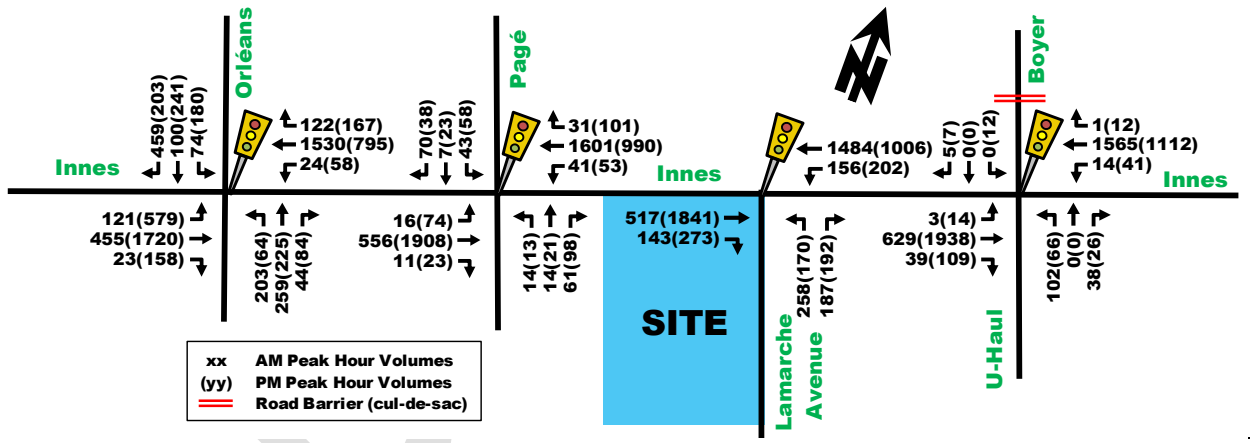


Table 28: Intersection Performance if Target Mode Shares Not Met

Intersection	Weekday AM Peak (PM Peak)					
	Critical Movement			Intersection		
	LoS	max. v/c or avg. delay (s)	Movement	Delay (s)	LoS	v/c
Orléans/Innes	D(F)	0.85(1.16)	WBT(EBT)	28.9(66.4)	C(F)	0.79(1.02)
Pagé/Innes	B(C)	0.64(0.78)	WBT(EBT)	9.2(9.3)	B(C)	0.62(0.75)
Lamarche/Innes	C(E)	0.78(0.96)	NBL(EBT)	18.3(38.7)	B(E)	0.70(0.94)
U-Haul/Innes	B(C)	0.67(0.76)	NBT(EBT)	9.6(13.8)	B(C)	0.61(0.74)
Note: Analysis of signalized intersections assumes a PHF of 1.0 and a saturation flow rate of 1800 veh/h/lane.						

As seen in **Table 28**, the traffic impacts from the proposed development using the mode shares suggested in TRANS 2020 were minimal to negligible throughout the overall network.

The intersection of Lamarche/Innes will experience greater congestion with the increase in auto-driver mode share, but still operates within acceptable limits (v/c ratio <1.0 for intersections along major urban arterial corridors). Adding a second northbound left-turn lane would reduce vehicle queues on Lamarche Avenue, although the 95th percentile queue was still a reasonable 80m with a single left-turn lane. It is also worth considering that an additional left-turn lane would increase pedestrian and cycling crossing distances at the intersection, impacting their level of service.

Therefore, a double northbound left-turn lane at the Lamarche/Innes intersection was not demonstrated to be required to support the development proposal. No additional modifications are recommended under this scenario.

Future Conditions with EUC Sensitivity Analysis Year 2037

As described in **Section 3.3**, there are notable transportation network changes forecasted when Phase 1 of the East Urban Community is constructed, currently anticipated by the year 2037. The assumptions made within the EUC TIA by CastleGlenn were adopted for this scenario, which includes:

- A reduction in background growth rate from 1% to 0.25% annually,
- The overall reduction in traffic volumes by 5%, and
- Travel route changes for Caivan and Glenview developments in response to new road connections (primarily a new connection to Brian Coburn Boulevard via Lamarche Avenue to the south).

The estimated future 2037 peak hour traffic volumes (based on the EUC TIA) are illustrated in **Figure 24** with a summary of intersection performance in **Table 29**. Detailed Synchro results have been provided in **Appendix Q**.

Figure 24: 2037 Peak Hour Traffic Volumes Using Assumptions from EUC Report by CastleGlenn

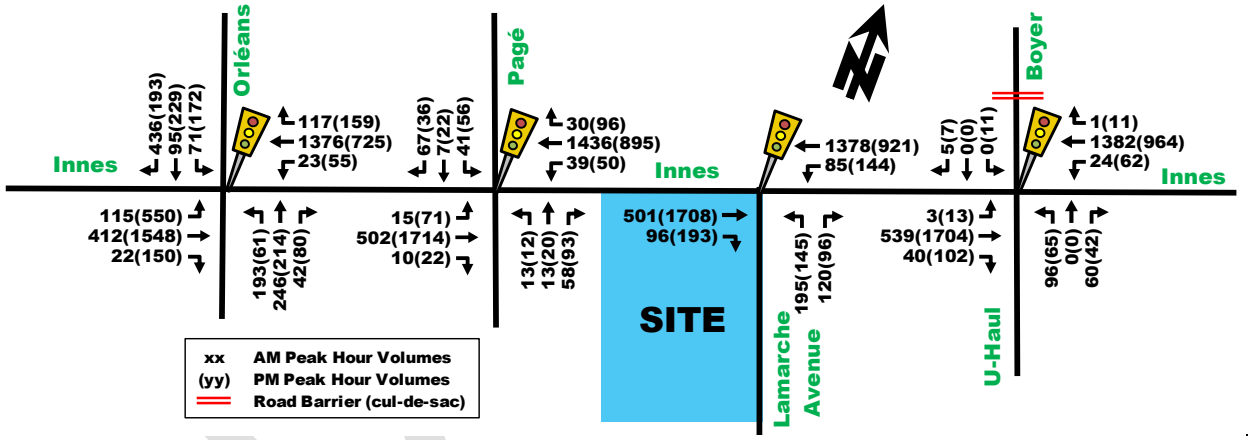


Table 29: 2037 Performance Using Assumptions from EUC Report by CastleGlenn

Intersection	Weekday AM Peak (PM Peak)					
	Critical Movement			Intersection		
	LoS	max. v/c or avg. delay (s)	Movement	Delay (s)	LoS	v/c
Orléans/Innes	C(F)	0.77(1.04)	WBT(EBT)	27.0(46.6)	C(E)	0.71(0.91)
Pagé/Innes	A(B)	0.57(0.69)	WBT(EBT)	9.4(8.4)	A(B)	0.55(0.67)
Lamarche/Innes	C(C)	0.72(0.80)	NBL(EBT)	13.6(20.2)	B(C)	0.61(0.76)
U-Haul/Innes	C(C)	0.71(0.71)	NBT(EBT)	10.1(14.9)	A(B)	0.56(0.69)
Note: Analysis of signalized intersections assumes a PHF of 1.0 and a saturation flow rate of 1800 veh/h/lane.						

The assumptions within the EUC TIA by CastleGlenn result in an overall improvement to the study area intersection performance. Orléans/Innes continues to experience congestion on the EB approach, but significant improvement to the overall intersection itself.

The Lamarche/Innes intersection showed great improvement in overall performance, mainly due to the new Brian Coburn Boulevard connection that will draw significant traffic from the Caivan Lands that would only have access to Lamarche Avenue prior to Phase 1 of the EUC.

Therefore, the addition of a double northbound left-turn is not expected to be required in the fullness of time. Overall, there is expected to be sufficient capacity in the adjacent road network to accommodate the development proposal.

Queueing Analysis

Estimated vehicle queues at the Lamarche/Innes intersection was assessed to determine the length of storage lanes required as well as the requirements for a double northbound left-turn versus a single left-turn noted in the EUC TIA. The queueing results were based on Synchro outputs, the same analysis program used to generate the preceding intersection operational analysis.

The three analysis scenarios for Option 2 at full buildout were evaluated:

1. Based on the TRANS mode share assumptions (if target mode shares are not met),
2. Based on the target mode share assumptions, and
3. Based on the EUC TIA 2037 horizon.

The following **Table 30** summarizes queuing results for various scenarios at Lamarche/Innes.

Table 30: Queueing Analysis for Lamarche/Innes by Horizon and Mode Share Assumption

Movement	Approx. Storage Length	Horizon Year & Mode Share Scenario – 95th Percentile Queue AM (PM) (m)		
		TRANS 2031	Target 2031	EUC 2037
Eastbound Through	220 m	35 (263)	35 (250)	30 (166)
Eastbound Right-Turn	-	23 (39)	23 (34)	14 (28)
Northbound Left-Turn	-	81 (54)	80 (51)	62 (43)
Northbound Right-Turn	-	60 (61)	59 (58)	40 (31)
Westbound Left-Turn	135 m[1]	9 (69)	11 (64)	2 (23)

1.) Westbound left-turn is currently a two way left turn lane (TWLTL)

As seen in **Table 29** and **Table 30**, over time there is expected to be a reduction in queue lengths (a reflection of congestion) as the transportation network evolves with gradual improvements to transit facilities and future alternative road connections. Phase 1 of the EUC will provide new connections to Brian Coburn Boulevard that will reduce demand on Innes Road by local communities such as Caivan Lands and Glenview Developments.

To reduce chances of spillback from storage turn lanes, while maintaining active transportation priority, recommended storage lengths are as follow at the Lamarche/Innes intersection:

- Eastbound right-turn: 40m
- Northbound left-turn: 80m
- Westbound left-turn: 80m

The need for a double northbound left-turn lane that was noted in the EUC TIA is no longer required. The updated development proposal represents a significant reduction in scale and density from what was assumed in the EUC TIA. There is expected to be adequate intersection capacity at this location to accommodate the development proposal with a single northbound left-turn lane. The proposed design of the Lamarche/Innes will also be reviewed and finalized during the Site Plan Control Application for Phase/Zone 1 of this development.

5. Findings and Recommendations

Based on the results summarized herein the following findings and recommendations are provided:

Existing Conditions

- The site is currently occupied by small scale commercial properties, including an insurance company, food truck, mini-put facility and driving range.
- Bus stops for frequent transit route #25 is located less than 300-meter walk from the subject site.
- Historical collision records confirm elevated incident typical of major urban arterial corridors in the City. The Pagé/Innes intersection was noted as a sensitive location, which is likely contributed to not having a contemporary design that meets AODA standards. The City may consider pedestrian and cycling enhancements as part of the life-cycle of the corridor – such as ladder crosswalks and TWSIs, which may help reduce the risk of pedestrian collisions.
- Most existing study area intersections operate at very good levels of service, overall LoS 'B' with critical movements LoS 'C' or better. The Orléans/Innes intersection does experience additional congestion in the afternoon peak hour based on the level of traffic along the corridor. The Lamarche/Innes is also shown to experience peak hour congestion with its current unsignalized design.

Proposed Development

- Lépine is proposing 4 different options as part of their Zoning By-Law Amendment and Plan of Subdivision Application, as summarized below:
    - **Option 1:** Eight (8) residential buildings, 7-storeys high consisting of 873 residential units.
    - **Option 2:** Five (5) residential buildings, 7-storeys high consisting of 525 residential units and commercial uses fronting Innes Road which could include a grocery store, a retail store, a gas station and drive-thru facilities.
    - **Option 3:** Six (6) residential buildings, 7-storeys high consisting of 623 residential units and a long-term care facility with 325 chambers.
    - **Option 4:** Three (3) residential buildings, 7-storeys high consisting of 275 residential units, commercial uses fronting Innes Road which could include a grocery store, a retail store, a gas station and drive-thru facilities, and a long-term care facility with 325 chambers.
- The highest trip generator among the listed options was Option 2. It is projected to generate approximately 260 to 275 'new' vehicle trips during the weekday morning and afternoon peak hours.
- The proposed development is expected to be a three-phased development with a 2031 buildout year. An additional scenario including 2037 horizon year and the implementation of the East Urban Community was analyzed.
- Option 2 is projected to generate approximately 110 to 115 'new' transit trips during the AM and PM peak hour periods respectively, which is expected to be accommodated by existing frequent transit route #25. The City's TMP Affordable Network Plan identifies Innes Road and Brian Coburn Boulevard as target corridors for isolated transit priority measures, with continuous measures on Blackburn Hamlet Bypass, connecting to Blair LRT Station.
- Lamarche/Innes intersection will be upgraded from an unsignalized STOP-controlled intersection to a signalized protected intersection design. Due to conflicts with the opposing driveway, pedestrian and cycling crossings will be provided on the south and west legs of the intersection. Time separated timings are also proposed on the cycling crossing movements, to increase cycling priority at the intersection
- The site proposes a new municipal loop road connecting to Lamarche Avenue that will be classified a local road. The loop proposes 2m wide sidewalks on both sides as well as periodic bulbouts for parking and loading.

- TDM measures are encouraged for the site, including but not limited to preloaded Presto cards for new tenants, TDM coordinator, unbundled car parking from monthly rent, shared commercial/residential visitor parking provisions, etc. TDM measures will be confirmed in each Site Plan Application.

Future Conditions

- Peak hour traffic volumes from nearby adjacent developments were incorporated into the future traffic volume projections. A background growth rate of 1% on Innes Road was applied.
- Pedestrian and cycling facilities are proposed within the site which connect to existing facilities on the west side of Lamarche Avenue and future facilities on the east side of Lamarche Avenue. The Lamarche facilities will connect to existing facilities on Innes Road.
- The MMLOS road segment analysis confirmed boundary streets conditions did not meet MMLOS area targets for pedestrians on Innes Road due to the narrow existing sidewalk and posted speeds.

  The east side of Lamarche Avenue does not currently meet PLoS as no facilities have been built as of the time of this report writing, however a sidewalk has been approved and will be built in the near future, meeting the PLoS for both sides of Lamarche Avenue. All other MMLOS road segment categories were met.
- The MMLOS intersection analysis showed that all truck target goals were met. Transit targets were met at Pagé and Boyer intersections with Innes given the estimated delays.

  Bicycle targets were only met at Lamarche/Innes based on the proposed design concept, which promotes a protected intersection design. The remaining cycling targets were not met due to minor streets not having cycling facilities, the introduction of pocket bike lanes being too long (on Orléans Boulevard) or operating speeds being too high.

  The pedestrian targets were not met at any intersection due to the quantity of lanes required to cross on Innes Road.
- All study area intersections were shown to operate acceptably by the 2031 planning horizon including full buildout of the proposed and other area developments, and even if the target mode shares are not met (i.e. the average Orléans mode share assumptions were applied). The Orléans/Innes intersection will continue to experience congestion during the peak hour periods similar to existing conditions.
- The East Urban Community Mixed Use Centre Community Design Plan (EUC) proposes new road connections to Lamarche Avenue. At Phase 1, a new road connection to Brian Coburn Boulevard will be established, and ultimately a connection to the future Vanguard Drive extension further east. Lamarche Avenue is expected to operate within its designated classification of a collector road.
- By 2037 and completion of Phase 1 of the EUC, the study area intersections will improve in operations, including the Orléans/Innes intersection, due to a new road connection established between Lamarche Avenue and Brian Coburn Boulevard that will draw significant traffic away from the Caivan Lands that currently use the Lamarche/Innes intersection to access/egress their community.
- At the 2031 planning horizon, the queuing analysis confirmed the need for the following auxiliary turn lanes at the Lamarche/Innes intersection:
  - A 40m for eastbound right-turn,
  - An 80m for northbound left-turn lane, and
  - An 80m for westbound left-turn lanes.
- The need for a double northbound left-turn lane on Lamarche/Innes is not required at this time as intersection performs sufficiently well with a single northbound left-turn lane in all future analysis scenarios.

- The traffic implications will be revisited, and proposed design of the Lamarche/Innes intersection be refined in future Site Plan Control Applications for subsequent phases of development.

Based on the preceding report, the proposed Lépine Development located at 3490 Innes Road is recommended from a transportation perspective.

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