DILLON CONSULTING

IRONCLAD DEVELOPMENTS INC. (ICD)

‘Lot 4’ Residential Development - 1001 Noella Leclair Way Transportation Impact Assessment (Analysis)

June 2023 – 23-5792

Certification

1. I have reviewed and have a sound understanding of the objectives, needs, and requirements of the City of Ottawa's Official Plan and the Transportation Impact Assessment (2017) Guidelines;
2. I have a sound knowledge of industry standard practice with respect to the presentation of transportation impact assessment reports, including multimodal 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 or registered professional in good standing, whose field of expertise is either transportation engineering or transportation planning.

Signature of individual certifier that s/he meets the above four criteria.

Doug Green P.Eng.
Project Manager
101-177 Colonnade Road
Nepean, ON K2E 7J4

Phone: (613) 745.6338 ext. 3052
dgreen@dillon.ca

Table of Contents

Figures

Tables

Appendices

1.0 Screening

1.1 Description of Proposed Development

Municipal Address	1001 Noella Leclair Way, Ottawa, ON K4A 3W9
Description of Location	Southeast corner of Noella Leclair Way and Lady Pellatt Street
Land Use Classification	AM[2414] H(40)-h The purpose of the AM – Arterial Mainstreet Zone is to: 1. Accommodate a broad range of uses including retail, service commercial, offices, residential and institutional uses in mixed-use buildings or side by side in separate buildings in areas designated Arterial Mainstreet in the Official Plan; and 2. Impose development standards that will promote intensification while ensuring that they are compatible with the surrounding uses.
Development Size	ICD is proposing to construct two, six-storey, high-rise residential buildings, providing approximately 157 rental dwelling units and 195 parking spaces on Lot 4 of the Smart Centres Subdivision Plan. The original subdivision plan for Lot 4 included the development of two ten-storey high-rise residential buildings, with a total of 200,000 sq. ft. of floor space. The ICD plan may result in fewer dwelling units as compared to the subdivision plan, and thus reduced transportation impacts. It is acknowledged that the ICD plan may require a variance from the zoning regulations to allow for a possible decrease in parking supply.
Number of accesses and locations	Two access, one to the west (Noella Leclair Way) and one to the north (Lady Pellatt Street)
Phases of development	Single Phase
Build-out year	2025

1.2 Trip Generation Trigger

Land Use Type	Minimum Development Size	Yes	No
Single-family homes	40 units		X
Townhomes or apartments	90 units	X	
Office	3,500 sq.m.		X
Industrial	5,000 sq.m.		X
Fast-food restaurant or coffee shop	100 sq.m.		X
Destination retail	1,000 sq.m.		X
Gas station or convenience market	75 sq.m.		X
Other	60 person trips or more during weekday peak hours	X	

1.3 Location Triggers

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

1.4 Safety Triggers

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

1.5 Summary

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

The development is anticipated to generate more than 60-person trips and therefore meets the Trip Generation Trigger as well as the Location Trigger, and a traffic impact study is required. However, Dillon has obtained authorization from the City to proceed with a reduced scope for this TIA, given a previous TIA was completed for the overall lands in 2022. The reduced scope of this TIA is noted in **Section 2.0**.

Figure 1 illustrates the site location, which is located in Orleans, south of Innes Road located generally to the south of the Winners & Home Sense, or east of the Orleans Toyota site.

Figure 1: Site Location

Background image source: geoOttawa, accessed February 28, 2023

2.0 Scoping

TIA Scope Reduction

In July 2022, a traffic impact assessment (TIA) report was prepared in support of the Smart Centres subdivision, which was provided to Dillon by ICD. The TIA contains the typical transportation analysis required by the City for a plan of subdivision. In view of this, Dillon has obtained authorization from the City to proceed with a reduced scope for this TIA; this authorization was obtained by email and can be found in **Appendix A**. The Smart Centres TIA reviewed all of the typical elements of a TIA, including the network impacts within 1 km of the site, and included a Concept Traffic Calming Plan for Noella Leclair Way Extension and the future internal road connection to the future Vanguard Drive extension. This report details the site related aspects and documents a comparison to the Smart Centres TIA.

The proposed development site is identified as Lot 4 within the Smart Centres TIA and was assumed to develop as two 10-floor apartment towers providing a total of 200,000 sq. ft. of residential space. The current ICD proposal results in fewer storeys as well as fewer dwelling units as compared to the previous study's land use assumptions.

The reduced scope of this TIA is as follows:

Step 1 Screening:

- Provide screening document

Step 2 Scoping:

- Provide a very limited Step 2 Scoping Document. The recently completed Smart Centres TIA documented all of the background conditions.
- Module 2.1: This TIA documents the proposed development as per Element 2.1.1 Proposed Development. This TIA does not document Element 2.1.2 Existing Conditions or Element 2.1.3 Planned Conditions.
- Module 2.2: Element 2.2.1 Study Area, this TIA focuses on a study area that is limited to the site driveways only (network impacts were examined in the Smart Centres TIA). Element 2.2.2 Time Periods, this TIA reviews the AM and PM peak commuter hours at the site driveways only. Element 2.2.3 Horizon Year examines the total buildout year only.

Step 3 Forecasting:

- This scoped TIA forecasts the number of person and vehicle trips to be generated by the proposed site and provides a comparison to the Smart Centres subdivision TIA. The forecast peak hour turning movements at the site driveways are summarized. Background traffic volumes were obtained from the Smart Centres subdivision TIA. Module 3.2.1 Transportation Network Plans has been limited to the roadways connecting to the site driveways (the network impacts are identified by the Smart Centres TIA).

Step 4: Analysis

The following modules are included:

- **4.1 Development Design**
  - Review sustainable transportation mode facilities on site and connecting to the site
  - Review circulation and access for service vehicles.
- **4.2 Parking**
  - Confirm site parking supply meets bylaw requirements
  - Estimate Magnitude of Spillover Parking Demand and Identify Mitigation Strategy, to include parking variance discussion.
- **4.3 Boundary Street Design**
  - Limited to the roadways immediately adjacent the site (based on the Smart Centres TIA recommended traffic calming plan or other design drawings that may be provided by the City)
- **4.4 Access Intersection Design**
  - Review proposed location and design of site access
  - Comment on access/driveway intersection control
  - The analysis includes a Synchro analysis of the driveway operation at the local street network and MMLOS of the adjacent street network.
- **4.5 TDM**
  - Provide the Context for TDM, including the various unit sizes by bedroom and age restrictions. Discuss proximity to the future transit station.
  - Identify the Need and Opportunity and possible negative effects of failure to meet the proposed mode share targets
  - Complete City of Ottawa's Transportation Demand Management (TDM) Post-Occupancy Checklists
- **4.7 Transit**
  - We will review the number of transit person trips anticipated to be generated by the site and identify any operational concerns with the service provider. Note that Transit impacts, route capacity, transit priority were previously assessed in the Smart Centres TIA.

The following modules are not included as they have been covered within the Smart Centres TIA:

- **4.6 Neighbourhood Traffic Management**
- **4.8 Review of Network Concepts**
- **4.9 External Intersection Design**

2.1 Existing and Planned Conditions

2.1.1 Proposed Development

The proposed development is located at 1001 Noella Leclair Way, located in the community of Orleans, in the City of Ottawa. The subject lands are part of a Master Planned subdivision by Smart Centres. A traffic impact assessment (TIA) report was completed by CGH Transportation Consulting in July 2022 in support of the Smart Centres subdivision. The Smart Centres TIA contains the typical transportation analysis required by the City for a subdivision plan. This report can be found in **Appendix G**.

ICD is proposing to construct two, six-storey, mid-rise residential buildings, providing approximately 157 rental dwelling units and 195 parking spaces on Lot 4 of the Smart Centres Subdivision Plan. The 157 dwelling units include:

- 48 one bedroom units;
- 75 two bedroom units;
- 22 three bedroom units; and,
- 12 bachelor apartments.

The original subdivision plan for Lot 4 proposed the development of two ten-storey high-rise residential buildings, with a total of 200,000 sq. ft. of floor space; however, the report did not identify the number of planned dwelling units. Based on the anticipated land use and number of units provided for Phase 1 of the Smart Centres TIA, it was identified that each dwelling unit for Lot 4 is expected to average 758 sq. ft., a conservative estimate, with the buildings containing approximately 264 units. The ICD plan may result in fewer dwelling units as compared to the Smart Centres TIA land use assumption, and thus reduced transportation impacts. It is acknowledged that ICD may need to seek a variance from the zoning regulations to allow for a decrease in parking as compared to the zoning bylaw requirement.

The site plan is shown in **Figure 2**. The Smart Centres TIA concept plan is shown in **Figure 3**. This site is accessed from Noella Leclair Way to the west or from Lady Pellatt Street to the north.

The following intersections have been evaluated within this transportation analysis:

- Access Intersections:
  - Site Driveway and Noella Leclair Way (proposed unsignalized); and
  - Site Driveway and Lady Pellatt Street (proposed unsignalized).

Figure 2: Site Plan

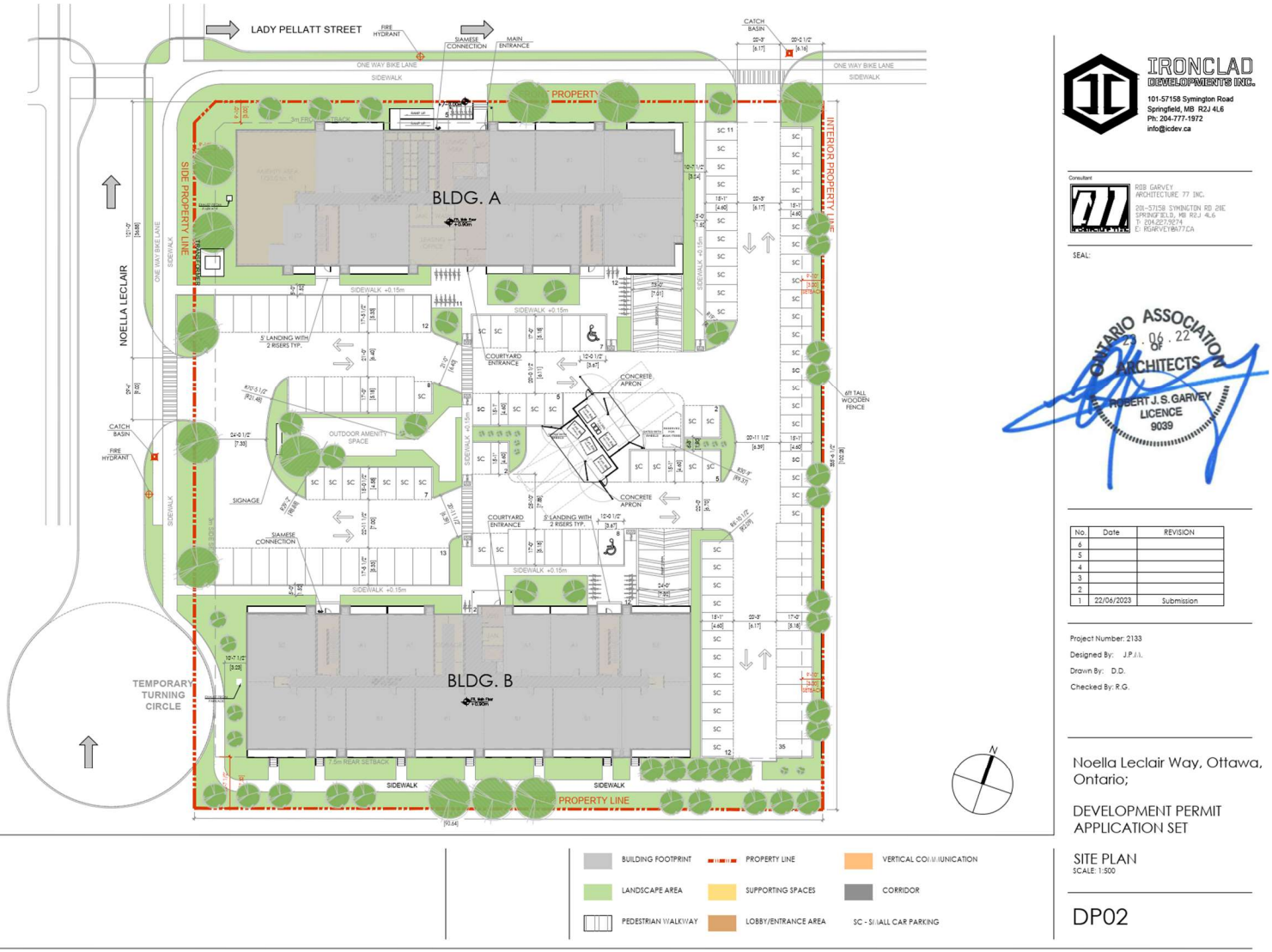
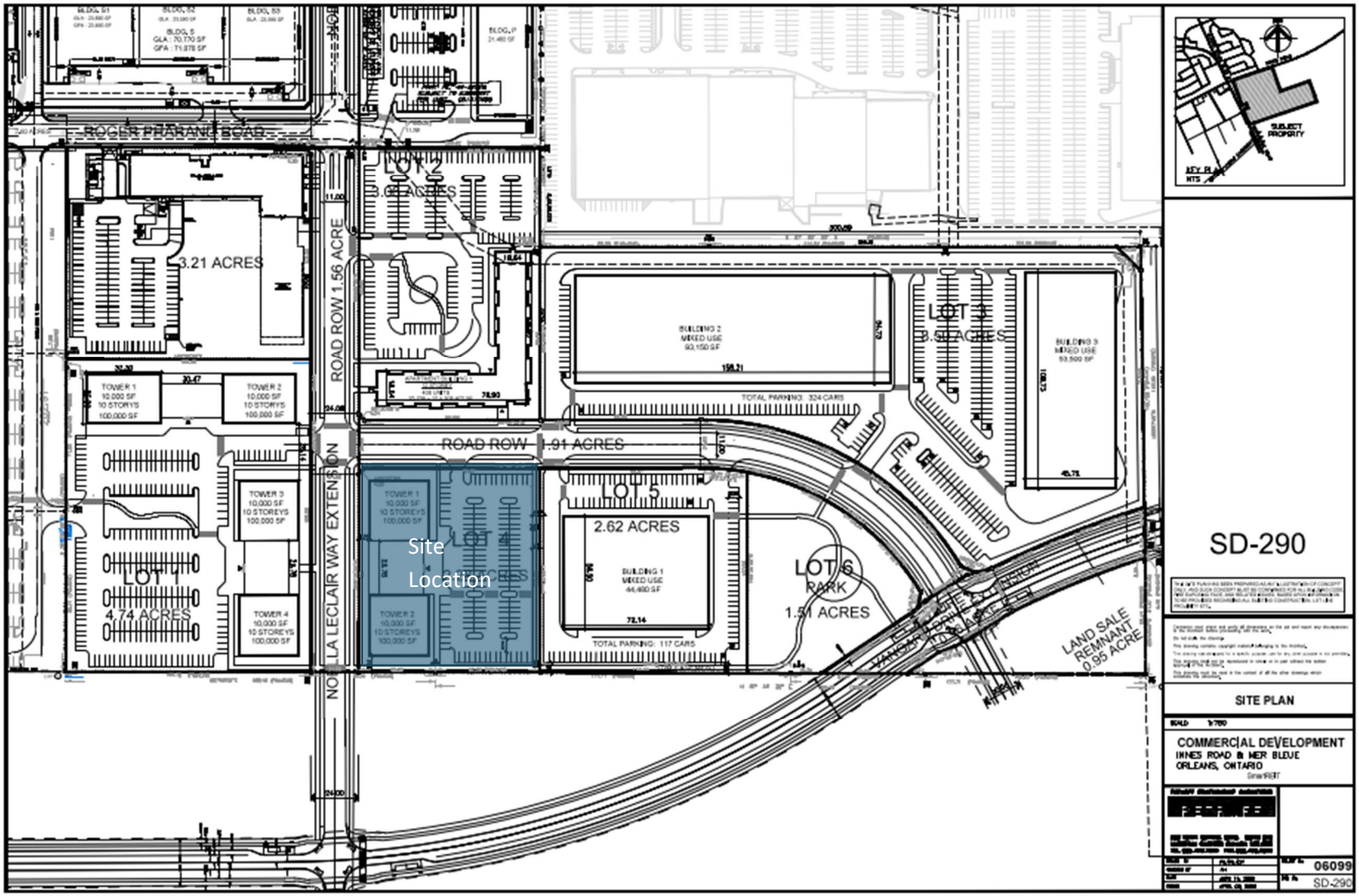


Figure 3: Concept Plan from the Smart Centres TIA



2.1.2 Existing Conditions

Existing conditions are provided in the Smart Centres TIA, contained in Appendix G. It should be noted that Noella Leclair Way is not yet open to public traffic.

2.1.3 Planned Conditions

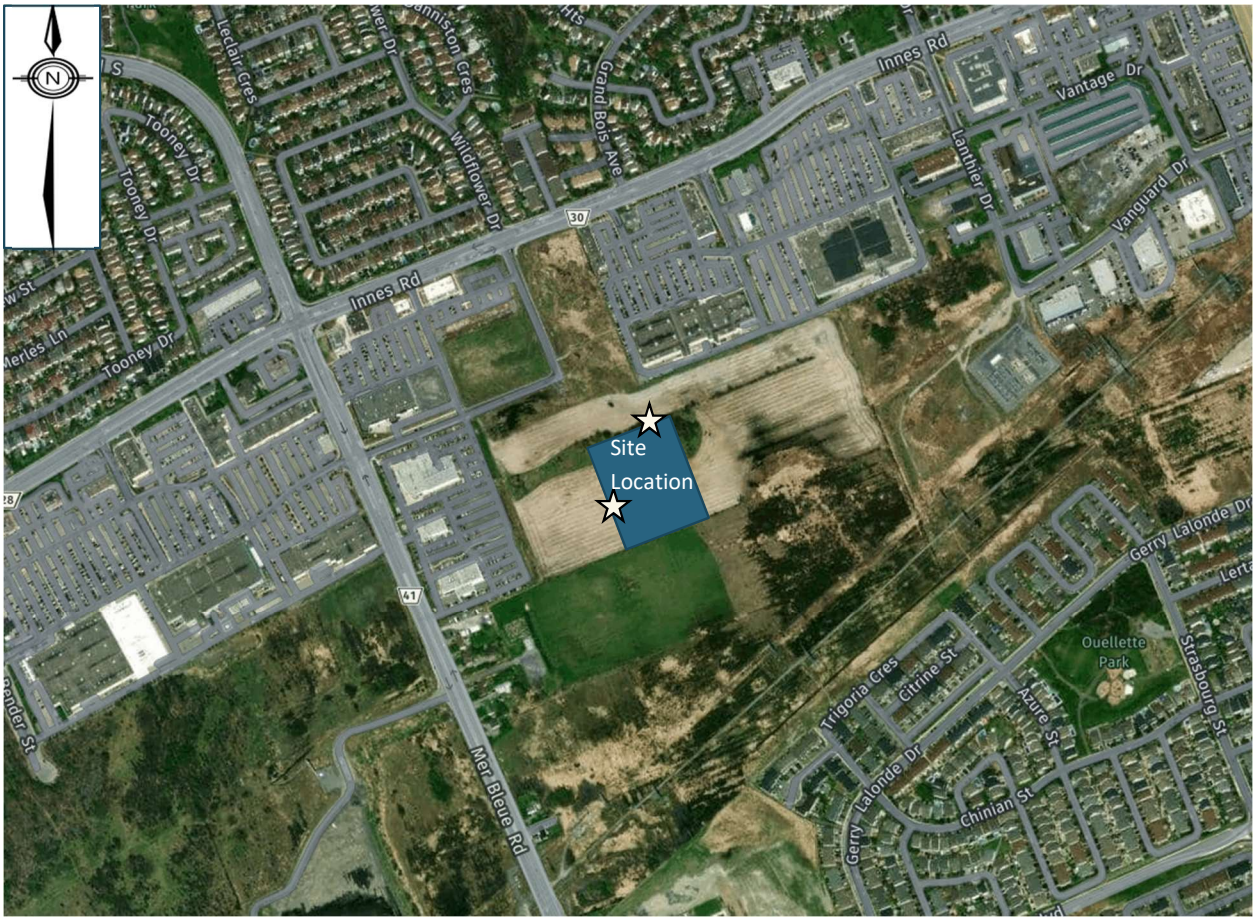
Planned conditions are provided in the Smart Centres TIA, contained in Appendix G.

2.2 Study Parameters

2.2.1 Study Area

The study area will be limited to the two proposed site driveways only, as the network impacts were evaluated in the previously completed Smart Centres TIA. **Figure 4** illustrates the proposed study area and study area intersections. The site is shown in blue. The white stars denote the site accesses to be included within the analysis.

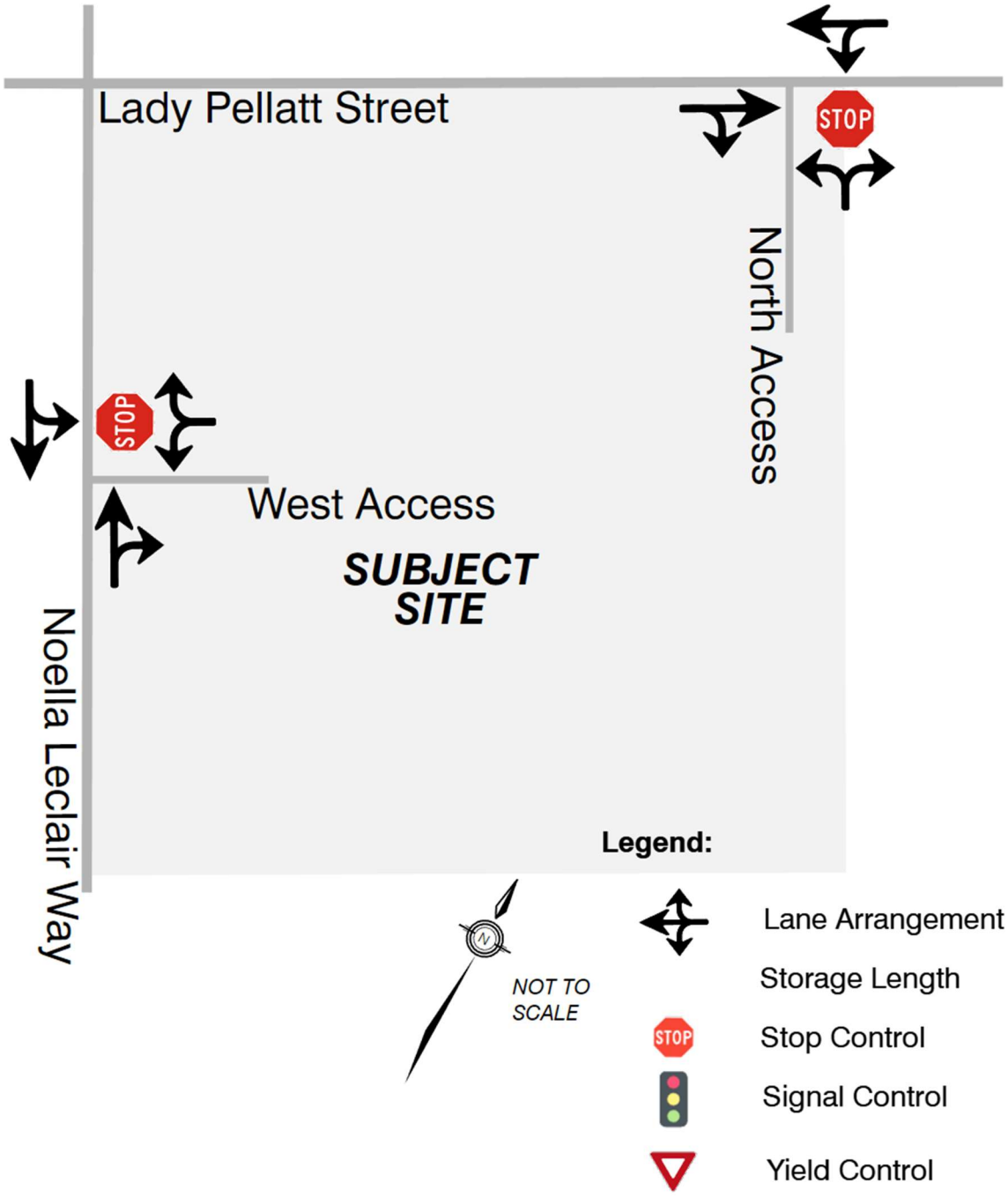
Figure 4: Study Area and Study Area Intersections



Background image source: HERE Wego, accessed February 28, 2023.

Figure 5 illustrates the anticipated lane geometry and traffic control at the site access driveways.

Figure 5: Lane Geometry and Traffic Control



2.2.2 Time Periods

The AM and PM peak commuter hours will be reviewed at the site driveways.

2.2.3 Horizon Years

The analysis assesses transportation conditions for a single buildout year, which has been identified as 2025.

2.3 Exemptions Review

Refer to Section 2.0 TIA Scope Reduction. This TIA focuses on the localized site impacts only and does not include an evaluation of the network impacts, which were considered within the recently completed Smart Centres TIA, contained in Appendix G.

3.0 Forecasting

This section is limited to identifying the trip generation and trip assignment of the site for each mode share based on the rates from the TRANS Trip Generation Manual Summary Report (2020) for the Orleans traffic assessment zone.

3.1 Development-Generated Travel Demand

Traffic volumes within the study area will consist of trips generated by the site residents and will be compared to the site-generated trips from the previously completed Smart Centres TIA.

3.1.1 Trip Generation and Mode Shares

Residential person trips and mode shares were determined using the TRANS *Trip Generation Manual Summary Report (2020)*. The TRANS Manual is the recommended source as per the City's TIA Guidelines (2017) with established residential trip generation rates specific to the City of Ottawa. Applicable tables used from the TRANS *Trip Generation Manual Summary Report (2020)* can be found in **Appendix B**.

The *Trans Trip Generation Manual* defines high-rise multifamily housing as: any building that houses multiple families that is three or more storeys (e.g., apartments and condo buildings). Based on the definition, the proposed ICD site is classified as high-rise housing within this transportation planning context.

3.1.1.1 Residential Trip Rates

Residential person trips were determined using Table 3 from the TRANS *Trip Generation Manual Summary Report (2020)*. Residential mode shares for high-rise multifamily housing were determined using Table 8 from the TRANS Manual (the site is located in Orleans district). Directional splits were determined using Table 9. Peak hour adjustments were applied using Table 4 of the report.

Table 1 summarizes the residential person-trip generation rates for the peak period. Note that numbers may vary slightly due to rounding.

Table 1: Peak Period Residential Person-Trips

Land Use Code/Land Use	Source	Dwelling Units	Trans Person Trip-Rate (Peak Period)		Peak Period Trips	
			AM	PM	AM	PM
Multi-Unit (High-Rise)	TRANS 2020	157	0.8	0.9	126	141

The AM and PM peak period person-trips were used to estimate peak hour trips by multiplying the number of person-trips by the appropriate mode share, and adjusting to the peak hour using the appropriate peak hour adjustment factors for each transportation mode, as shown in **Table 2.**

Table 2: Peak Hour Trips by Mode

LUC 221 & 222 – Multi-Unit (High-Rise)	Mode Share		Peak Period Person Trips Generated		Peak Hour Adjustment		Peak Hour Trips	
	AM	PM	AM	PM	AM	PM	AM	PM
Auto Mode Share	54%	61%	68	86	0.48	0.44	33	38
Auto Passenger	7%	13%	8	18	0.48	0.44	4	8
Transit	29%	21%	37	29	0.55	0.47	20	14
Cycling	0%	0%	0	0	0.58	0.48	0	0
Walking	10%	6%	13	8	0.58	0.52	8	4
Total	**100%**	**100%**	**126**	**141**	**-**	**-**	**65**	**64**

Peak hour trips were multiplied by appropriate directional splits to determine total site generated residential trips during the AM and PM peak hours to/from the site, as shown in **Table 3**.

Table 3: Site Generated Residential Trips

RESIDENTIAL								
Travel Mode	Directional Split		AM Peak Hour			PM Peak Hour		
	AM IN %	PM IN %	Total	In	Out	Total	In	Out
Auto Driver	31%	58%	33	10	23	38	22	16
Auto Passenger			4	1	3	8	5	3
Transit			20	6	14	14	8	6
Cycling			0	0	0	0	0	0
Walking			8	2	6	4	2	2
Total Residential Trips			***65***	***19***	***46***	***64***	***37***	***27***

In comparison to the assumed Smart Centres TIA site trip generation, the ICD site represents a trip reduction of 41% (i.e. 59% of original Lot 4 trips) compared to the Smart Centres TIA Lot 4 site trip forecast.

3.1.2 Trip Distribution

Table 4 summarizes the trip distribution applied to the site generated trips, based on Origin/Destination survey data and is consistent with the Smart Centres TIA distribution.

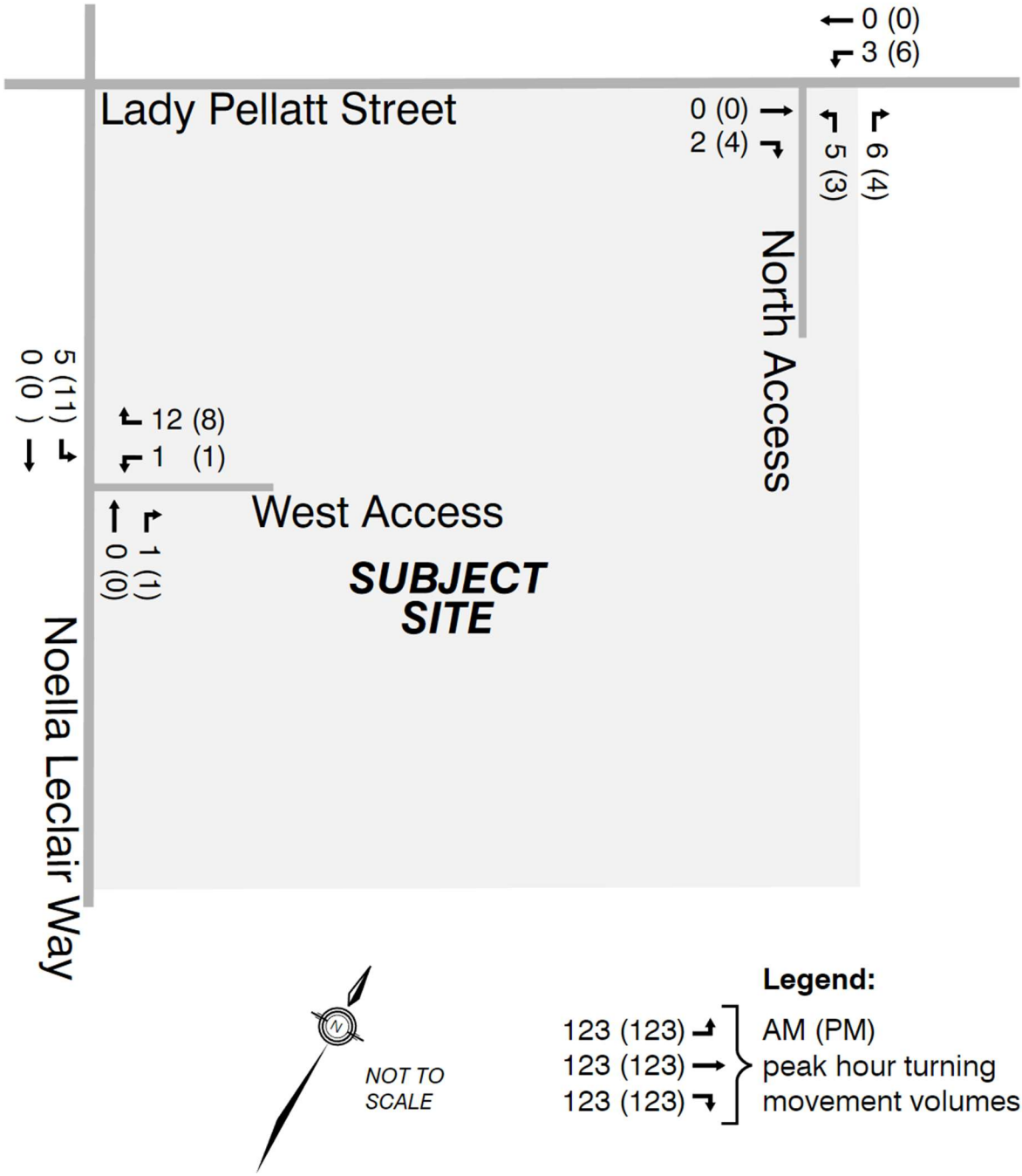
Table 4: Site Trip Distribution

Direction	Distributed % of Trips
to/from the north – Lady Pellatt Street	20%
to/from the south - Noella Leclair Way	5%
to/from the east - Lady Pellatt Street	25%
to/from the west - Noella Leclair Way	50%
Total	***100%***

3.1.3 Trip Assignment

Trips were assigned via the two access driveways based on the above distribution. **Figure 6** illustrates the assignment of the site generated traffic volumes for the buildout year 2025. Note that some trips have been assigned to the South on Noella Leclair Way based on the planned connection to the Vanguard Drive Extension.

Figure 6: Site Generated Traffic Volumes (2025)



3.2 Background Network Travel Demand

3.2.1 Transportation Network Plans

This section is limited to the local roadways connecting to the site driveways (the network impacts are identified by the Smart Centres TIA).

Lady Pellatt Street on the north edge of the subject site (Lot 4) will eventually extend east from Noella Leclair Way to connect with the planned Vanguard Drive Extension. Noella Leclair Way will be extended south from Innes Road to connect with the Vanguard Drive Extension.

The following information relating to the Vanguard Drive Extension is presented in the Smart Centres TIA. The recommended plan for the Vanguard Drive Extension can be found in Appendix E of that TIA. Further details can also be found within that report:

> *The Vanguard Drive Extension (Lanthier Drive to Mer-Bleue Road) Environmental Assessment Study Environmental Study Report (IBI, 2021) assumed the completion of the extension by 2031, dependent on developer driven growth requiring the additional collector road. The intersection of Mer-Bleue Road and Vanguard Drive will be a City funded project. The functional design of Vanguard Drive outlines a 24-metre right of way, including sidewalks and cycle tracks on both sides, one travel lane in each direction and a parking lane that permits bus stop locations.*

3.2.2 Background Growth

The Smart Centres TIA provides a detailed overview of background growth for each of the study area roadways. The 2025 total traffic volumes used within this report were calculated by taking the projected 2025 volumes from the Smart Centres TIA, and replacing the previous land use for Lot 4 with the ICD site-generated trips.

3.2.3 Background Developments

Specific background developments were previously included in the projected 2025 traffic volumes, and are detailed within Smart Centres TIA. No adjustments to the background conditions were made for purpose of this report.

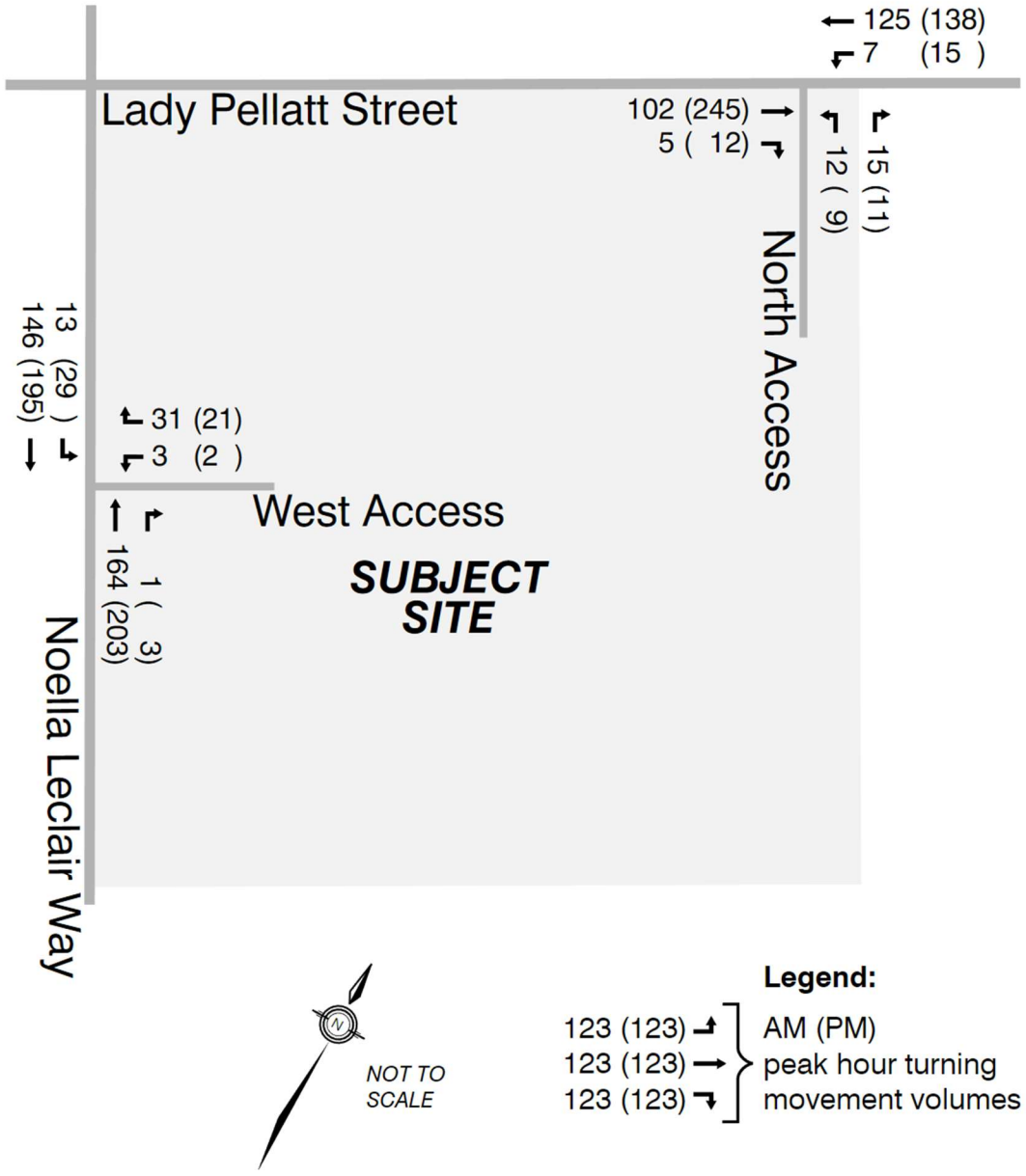
3.3 Demand Rationalization

This section is not included in the TIA, as Demand Rationalization was included in the Smart Centres TIA.

3.4 Total Traffic

The total traffic volumes were calculated by taking the projected 2025 volumes from the Smart Centres TIA, and replacing the previous land use for Lot 4 with the new site trips. **Figure 7** illustrates the subject 2025 total traffic volumes.

Figure 7: 2025 Total Traffic Volumes



4.0 Analysis

4.1 Development Design

4.1.1 Design for Sustainable Modes

The following summarizes the sustainable transportation aspects of the proposed residential site. The reader is encouraged to also review Section 4.5 Transportation Demand Management for additional items that can reduce the transportation and parking demands of the site.

Bicycle facilities – A total of 82 bicycling parking spaces will be provided at the site. 42 bicycle parking spaces are located on the surface, while 40 are located in the underground parkades. Direct and convenient paved surfaces are provided between the roadway, the building access, and the bike parking areas. Cycling connections to/from the site can be made using planned unidirectional cycle tracks along Noella Leclair Way and Lady Pellatt Street to the North. Connections can be made to bike lanes along both sides of Innes Road, Mer Bleue Road, and Tenth Line Road south of Innes Road. Innes Road, Mer Bleue Road, Jeanne D'Arc Boulevard, and Tenth Line Road are spine routes, and Prestwick Drive is a local route. Tenth Line Road north of Innes Road and Innes Road are cross-town bikeways. A major pathway is planned to be provided to connect Innes Road and Trans-Orleans pathway.

Pedestrian access and circulation – Sidewalks will be provided along both sides of Noella Leclair Way and Lady Pellatt Street, connecting the residential site to the surrounding area.

Transit facilities – No specific routes or stop locations are planned for either Noella Leclair Way or Lady Pellatt Street in the short-term. The following information was taken from the Smart Centres TIA relating to planned transit facilities in the surrounding area.

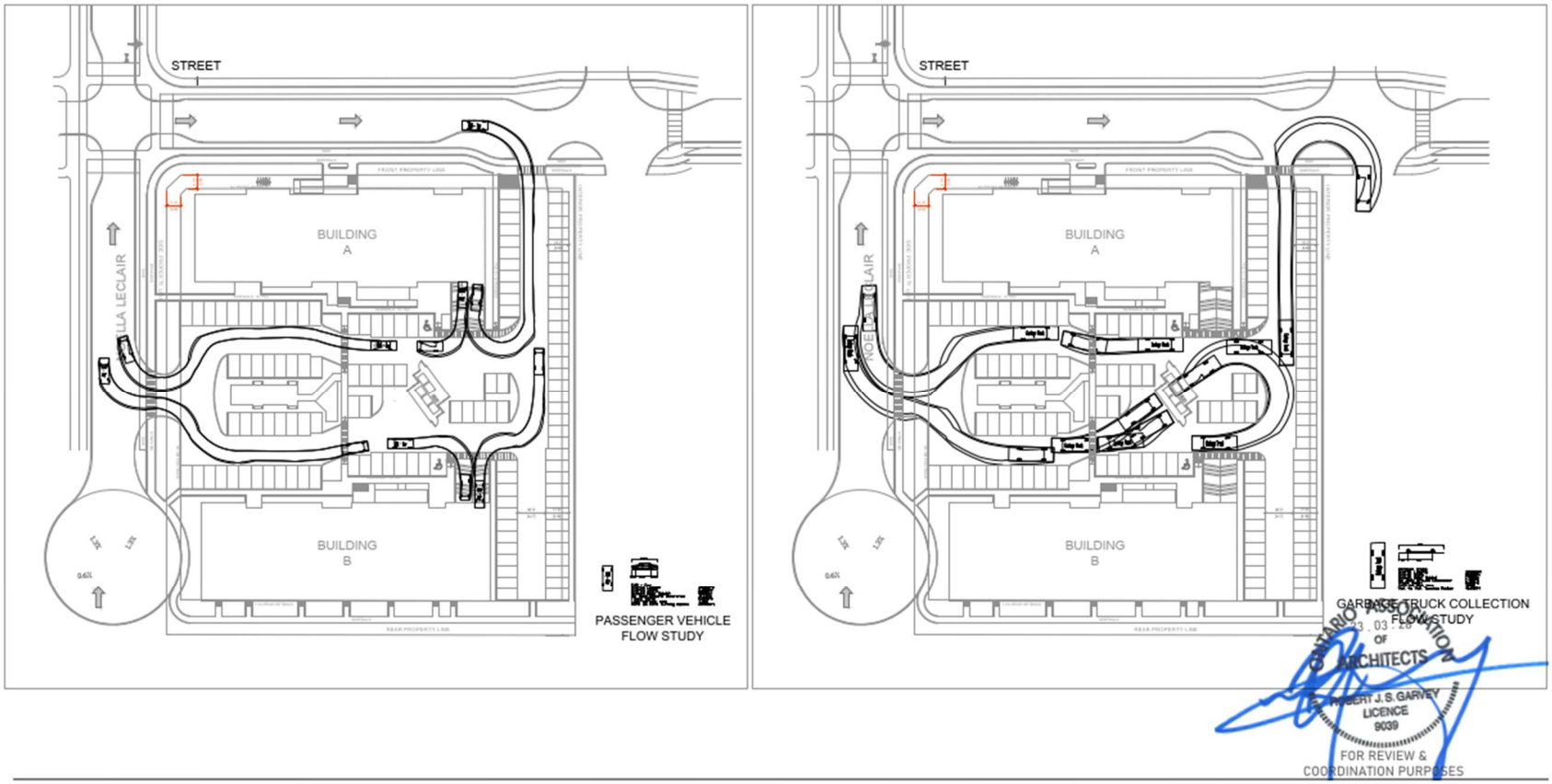
> *The subject development is within the East Urban Community Design Plan area. As such, it is subject to the planning policies outlined in the CDP. The CDP proposes a future rapid transit corridor to be located south of the hydro corridor, and the pedestrian and cycling link is anticipated to be connected to the future BRT corridor. Within the Transportation Master Plan (TMP), the Rapid Transit and Transit Priority (RTTP) Network's Network Concept diagram shows a continuous lane along Jeanne D'Arc Boulevard South and isolated transit priority measures along Innes Road and Mer-Bleue between Innes Road and Brian Coburn Boulevard. However, only isolated transit priority measures along Jeanne D'Arc Boulevard South and Innes Road are currently within the Affordable Network.*

Specific information on existing and planned transit facilities in the surrounding area can be found in the Smart Centres TIA

4.1.2 Circulation and Access

Five garbage and recycling bins are to be located in between the two buildings, adjacent to the sidewalk and designated outdoor amenity space. The site was assessed in order to determine if appropriate spacing was provided for both passenger vehicles and garbage trucks to access municipal services. The turning movement path of the design vehicles is shown in **Figure 8**. All required turning movements can be accommodated for the design vehicles. **Appendix C** contains the full Development Permit Set Application, including the turning movement drawing. It is noted that this drawing set will be refined and updated; however, no modifications are anticipated that will affect the analysis herein.

Figure 8: Design Vehicles - Turning Paths



4.1.3 New Street Networks

This section is not included in the TIA, as New Street Networks evaluation was included in the previously completed Smart Centres TIA.

4.2 Parking

4.2.1 Parking Supply

Automobile Parking – As per City of Ottawa Zoning By-law 2008-250 (Sections 101 and 102), the minimum parking space rate is 1.2 dedicated parking spaces per unit for residents plus 0.2 spaces per unit for visitor parking. Given that the proposed development consists of 157 dwelling units, the developer is required to provide a minimum of 188 dedicated parking spaces for residents and 31 visitor spaces, for a total of 219 parking spaces. The site plan provides 195 total parking spaces, with 16 parking spaces being allocated to visitors and 179 to residents - a shortfall of ~11%, or 24 spaces. Of the 195 parking spaces being provided:

- 16 are visitor spaces (min 31 required);
- 4 are accessible spaces (min 4 required);
- 71 are small car spaces (max 78 permitted)

The site plan does not meet the zoning by-law parking space requirements, refer to Section 4.2.2.

Bicycle Parking – As per City of Ottawa Zoning By-law 2016-249 (Section 111), the minimum bicycle parking rate is 0.5 bicycle parking spaces per dwelling unit. Therefore, 79 bicycle parking spaces are required, the site plan provides 82 spaces.

The site plan meets the zoning by-law bicycle parking space requirements.

4.2.2 Spillover Parking

This section estimates the magnitude of spillover parking demand and identifies a mitigation strategy, and includes the need for a parking space variance.

A minor variance will be required for the residential and visitor parking space reduction. It is proposed that 16 visitor parking spaces be provided, and that 179 resident parking spaces be provided, a potential shortfall of 24 spaces relative to the zoning bylaw. It is anticipated that the site will accommodate all of its parking demand on-site and that the following rationale supports the minor variance.

The City should support the minor based on the following:

- If the site were located in a rural area, the residential parking rate would be 1.0 spaces per dwelling unit and the subject site would have sufficient parking spaces. The subject site has very good existing transit access and is located in a walkable area when compared to a rural area which would be more likely to require a personal vehicle;

- The City is trying to improve the transit mode share to achieve a 29% mode share during the AM peak period and 21% during the PM Peak period, reducing the number of parking spaces on the site will assist in achieving these targets;
- The site is located in close proximity to both the Innes Road and Brian Coburn Transit Priority corridors as identified in the 2013 Transportation Master Plan, Map 5 - 2031 Affordable Transit Network. The 2031 Network Concept, Map 4 indicates that a future bus rapid transitway is to be constructed along the Hydro corridor from east of Tenth Line Road to west of Navan Road with a new station located within 600 metres of the site as illustrated in **Figure 9**. It is likely that in the future when the transit station is constructed, this area will be classified as 'Area Z: Near Major LRT Stations' in the Zoning bylaw. Section 101 (2) of the bylaw states that "within the area shown as Area Z on Schedule 1A, no off-street motor vehicle parking is required to be provided under this section."
- There are options for residents to use other modes of travel, including Uber and other ridesharing services;
- The developer is reviewing the potential of permitting a car sharing services access to the site for its residents use which could also reduce the overall site parking demand and encourage residents to reduce car ownership; and,
- The Smart Centres TIA proposed a parking bay on Lady Pellatt Street that is able to accommodate up to 9 visitors of the site[1]. It noted that these additional spaces could effectively increase the visitor parking capacity. This is shown in **Figure 2**.

Figure 9: 2031 Network Concept Rapid Transit and Transit Priority Network

[1] Number of parking spaces is based on Site Plan dimensions and assuming an average of 6.0 metres per parking space

4.3 Boundary Street Design

The analysis within this section is limited to the roadways immediately adjacent the site; analysis assumptions are based on the previously completed Smart Centres TIA recommended traffic calming plan and related design drawings. Further information regarding more detailed MMLOS analysis can be found in Section 9.0 of the Smart Centres TIA.

4.3.1 Mobility

The City of Ottawa's 2015 Multi-Modal Level of Service (MMLOS) guidelines were used to evaluate the future 2025 conditions on Noella Leclair Way and Lady Pellatt Street. The boundary street analysis is based on the land-use designation of "General Urban Area". The MMLOS worksheet has been provided in **Appendix D**. Transit LOS has not been evaluated per the City of Ottawa MMLOS Guidelines, as transit targets are intended only to be applied for streets with a proposed or existing transit route. Truck LOS has also not been evaluated.

Table 5 presents the MMLOS conditions for roadway segments adjacent to the residential development on Noella Leclair Way and Lady Pellatt Street. This MMLOS analysis is based on the planned conditions of the roadways.

Table 5: MMLOS Conditions - Segments

Travel Mode	Criteria	Target	Noella Leclair Way Local Street	Lady Pellatt Street Local Street
Pedestrian LOS	Sidewalk width	C	2 metres	2 metres
	Boulevard width		0.5 – 2 metres	0.5 – 2 metres
	AADT > 3000		Yes (assume 12x multiplier for AM peak hour volumes)	No (assume 12x multiplier for AM peak hour volumes)
	On-Street Parking		No	Yes
	Operating Speed		50 km/h	50 km/h
	Level of Service		C	A
Cycling LOS	Type of facility	D	Physically Separated	Physically Separated
	Number of travel lanes/direction		2	2
	Operating speed		50 km/h	50 km/h
	Level of Service		A	A

The analysis shows that all MMLOS targets are anticipated to be easily met for pedestrian and cycling modes on Noella Leclair Way and Lady Pellatt Street.

4.4 Access Intersection Design

4.4.1 Location and Design of Access

The site driveways are located on Noella Leclair Way and Lady Pellatt Street (local streets). The west site driveway is proposed to be 9.0 metres wide while the north driveway is proposed 6.17 metres wide. Both driveways are anticipated to operate with clear sightlines and low speeds, and are designed per the standard drawing SC37.1. Appendix C contains the full Development Permit Set Application, which includes additional design parameters that meet the requirements of the TAC Geometric Design Guide.

Chapter 8 of TAC's Geometric Design Guide: Access, indicates that an apartment building with between 100 and 200 units should provide a minimum clear throat length of 15 metres for a connection to a Collector roadway. The current access design does not meet this requirement; however, over 10 metres (approximately 10.3 metres) of clear throat distance will be provided. Given the nature of the development, and since Noella Leclair Way and Lady Pellatt Street are both designated as local streets, it is anticipated that this throat distance will be appropriate for the development.

4.4.2 Intersection Control

The proposed site driveways will be located on a lower-volume roadway within a Master Planned subdivision by Smart Centres, as part of 1001 Noella Leclair Way. These roads are designed to primarily serve the access needs of adjacent land uses. Traffic control measures are not required as the law requires motorists to stop prior to crossing the sidewalks; however, it may be appropriate to implement Stop signs for traffic exiting the site driveways to ensure safe and efficient traffic flow.

4.4.3 Access Intersection Design

The following section provides a review of the traffic operations for the access intersections. The 2025 forecast total future traffic conditions have been analysed using Synchro 10 software.

Table 6 summarizes the traffic operations for the North access on Lady Pellatt Street for the weekday AM and PM peak hours in the future 2025 horizon year. **Appendix E** contains the intersection performance worksheets.

Table 6: North Access and Lady Pellatt Street Intersection Operations - AM (PM) Peak Hour

Total Future 2025				
Approach/Movement	**Delay (s)**	**LOS**	**V/C**	**Q95th (m)**
EBTR	0.0 (0.0)	A (A)	0.07 (0.16)	0.0 (0.0)
WBLT	0.5 (0.9)	A (A)	0.01 (0.01)	0.1 (0.3)
NBLR	9.5 (10.7)	A (B)	0.04 (0.03)	0.9 (0.8)

Note: Results are presented in the format AM (PM) peak hour; Q95th (m) indicates the 95th percentile queues, LOS is an abbreviation for Level-of-Service, EB = eastbound, WB = westbound, SB = southbound; LTR = left, through, right movements for single lane

All movements at this proposed driveway access are forecast to operate at LOS B or better with minimal delay.

Table 7 summarizes the traffic operations for the West access on Noella Leclair Way for the weekday AM and PM peak hours in the future 2025 horizon year. **Appendix E** contains the intersection performance worksheets.

Table 7: West Access and Noella Leclair Way Intersection Operations - AM (PM) Peak Hour

Total Future 2025				
Approach/ Movement	**Delay (s)**	**LOS**	**V/C**	**Q95th (m)**
WBLR	9.5 (9.8)	A (A)	0.04 (0.03)	1.1 (0.8)
NBTR	0.0 (0.0)	A (A)	0.11 (0.13)	0.0 (0.0)
SBLT	0.7 (1.2)	A (A)	0.01 (0.02)	0.2 (0.6)

Note: Results are presented in the format AM (PM) peak hour; Q95th (m) indicates the 95th percentile queues, LOS is an abbreviation for Level-of-Service, EB = eastbound, WB = westbound, SB = southbound; LTR = left, through, right movements for single lane

All movements at this proposed driveway access are forecast to operate at a LOS A with minimal delay.

4.5 Transportation Demand Management (TDM)

Appendix F contains the TDM checklists. These TDM measures are consistent with the previously completed Smart Centres TIA but provide additional site-specific context. From the TDM checklists, some recommendations are as follows:

- Provide a designated drop-off area for residents;
- Reserve one visitor parking space for a car sharing service; and,
- Provide a multimodal travel option information package to new residents.

In order to promote other transportation modes, efforts will also be made to increase transit ridership through a combination of:

- Providing an updated map of transit routes and stops locations in the lobby;
- Unbundling parking costs from monthly rent; and,
- Inclusion of a 1-month Presto card for new occupants, with a set time frame for this offer (e.g. 6-months) from the initial opening of the site.

4.6 Neighbourhood Traffic Management

This section is not included as neighbourhood traffic management was assessed within the Smart Centres TIA. The adjacent roadways were previously assessed to confirm they are appropriate for the amount of traffic forecast. The need for traffic calming measures was previously assessed and recommendations were made.

4.7 Transit

This section provides a review of the number of transit trips anticipated to be generated by the site and identifies any operational concerns with the service provider. Note that Transit impacts, route capacity, and transit priority were previously assessed in the Smart Centres TIA; therefore, Route Capacity and Transit Priority measures are not included in this study.

Transit trips are detailed in Section 5.2 of the Smart Centres TIA, while transit capacity is detailed in Section 13.1. The Smart Centres TIA determined that projected ridership increases would require one additional single higher capacity bus (i.e., an articulated bus in place of a standard bus) each peak hour for routes 25, 30, 32 and 131. It is noted that this increase is not specific to Lot 4.

No additional capacity needs are required due to the land use adjustments to Lot 4, as detailed in this TIA, as the site trips generated represent a reduction of 41% (i.e. 59% of original Lot 4 trips) compared to the original number of Lot 4 site trips forecast in the Smart Centres TIA. As such, there are no operational concerns due to Lot 4 traffic. The adjustments to Lot 4 presented in this TIA are also expected to result in a reduction of 14 transit trips during the AM peak hour, and 10 trips during the PM peak hour, as compared to the anticipated number of trips identified in the Smart Centres TIA, as shown in **Table 8**. Note that numbers may vary slightly due to rounding.

Table 8: Transit Trip Reduction

Transit Trips by Land Use	AM Peak Hour			PM Peak Hour		
	Total	In	Out	Total	In	Out
Smart Centres TIA Phase 1	161	52	109	117	66	51
Smart Centres TIA Phase 2	189	83	106	143	62	81
Smart Centres TIA Lot 4	35	11	24	26	15	11
Revised Lot 4 (59% of trips)	21	7	14	16	9	7
Anticipated Transit Trip Reduction	***14***	***4***	***10***	***10***	***6***	***4***

4.8 Review of Network Concept

Not required; during the peak hours, the proposed development is not anticipated to generate more than 200-person trips in excess of the equivalent volume permitted by established zoning. The Network Concept was considered within the Smart Centres TIA.

4.9 Intersection Design

This section is not required per the reduced scope of work. Network intersection were analyzed in detail within the Smart Centres TIA.

5.0 Summary/Conclusions

ICD is proposing to construct two, six-storey, mid-rise residential buildings, providing approximately 157 rental dwelling units and 195 parking spaces on Lot 4 of the Smart Centres Subdivision Plan. The original subdivision plan for Lot 4 included the development of two ten-storey high-rise residential buildings, with a total of 200,000 sq. ft. of floor space. The ICD plan results in fewer dwelling units as compared to the original subdivision plan. 157 units are now being proposed, which represents a 41% reduction in dwelling units when considering the Smart Centres TIA forecast trips for this block. As a result, the associated transportation impacts will be reduced compared to what was originally considered in the previously completed Smart Centres TIA.

The site plan indicates a shortfall of 24 parking spaces relative to the zoning bylaw requirements. The site will require a minor variance for the parking reduction. The City should support the parking reduction based on the following:

- The site is located in close proximity to both the Innes Road and Brian Coburn Transit Priority corridors as identified in the 2013 Transportation Master Plan, Map 5 - 2031 Affordable Transit Network. The 2031 Network Concept, Map 4 indicates that a future bus rapid transitway is to be constructed along the Hydro corridor from east of Tenth Line Road to west of Navan Road with a new station located within 600 metres of the site as illustrated in **Figure 9**. It is likely that in the future when the transit station is constructed, this area will be classified as 'Area Z: Near Major LRT Stations' in the Zoning bylaw. Section 101 (2) of the bylaw states that "within the area shown as Area Z on Schedule 1A, no off-street motor vehicle parking is required to be provided under this section."
- If the site were located in a rural area, the residential parking rate would be 1.0 spaces per dwelling unit and the subject site would have sufficient parking spaces. The subject site has very good existing transit access and is located in a walkable area when compared to a rural area which would be more likely to require a personal vehicle;
- The City is trying to improve the transit mode share to achieve a 29% mode share during the AM peak period and 21% during the PM Peak period, reducing the number of parking spaces on the site will assist in achieving these targets;
- There are options for residents to use other modes of travel, including Uber and other ridesharing services;
- The developer is reviewing the potential of permitting a car sharing services access to the site for its residents use which could also reduce the overall site parking demand and encourage residents to reduce car ownership; and,
- The Smart Centres TIA proposed a parking bay on Lady Pellatt Street that is able to accommodate up to 9 visitors of the site[2]. It noted that these additional spaces could effectively increase the visitor parking capacity.

[2] Number of parking spaces is based on Site Plan dimensions and assuming an average of 6.0 metres per parking space

All MMLOS targets are anticipated to be easily met for pedestrian and cycling modes on both Noella Leclair Way and Lady Pellatt Street.

All movements at the two proposed driveway accesses are forecast to operate at LOS B or better with minimal delay under future 2025 conditions.

The following TDM measures are to be provided:

- Provide a designated drop-off area for residents;
- Reserve one visitor parking space for a car sharing service; and,
- Provide a multimodal travel option information package to new residents.

In order to promote other transportation modes, efforts will also be made to increase transit ridership through a combination of:

- Providing an updated map of transit routes and stops locations in the lobby;
- Unbundling parking costs from monthly rent; and,
- Inclusion of a 1-month Presto card for new occupants, with a set time frame for this offer (e.g. 6-months) from the initial opening of the site.

No additional transit capacity needs are required to accommodate the proposed land use as compared to Lot 4 of the approved Smart Centres TIA, as the site trips generated represent a reduction of 41%. The proposed site is anticipated to generate 14 fewer transit trips during the AM peak hour, and 10 trips during the PM peak hour, as compared to the previously assumptions of the Smart Centres TIA.

Appendix A

Confirmation of Reduced TIA Scope

DILLON CONSULTING

Probert, Jeff <jprobert@dillon.ca>

Ironclad Developments Inc. - 1001 Noella Leclair Way

12 messages

Green, Doug <DGreen@dillon.ca> Thu, Feb 23, 2023 at 12:14 PM
To: "Giampa, Mike" <Mike.Giampa@ottawa.ca>
Cc: "Michal Kubasiewicz, RPP MCIP MBA" <mkubasiewicz@icdev.ca>, Jeff Probert <jprobert@dillon.ca>

Good Morning Mike,

Dillon has been retained by Ironclade Developments Inc. to undertake a traffic impact study for their proposed residential site located at 1001 Noella Leclair Way in Orleans. The proposal is to provide two six-storey apartment buildings with approximately 160 dwelling units.

The site is part of a larger subdivision that was planned by SmartCentres REIT, with a traffic study being completed by CGH Transportation dated July 2022, see attached. The CGH traffic study reviewed all of the typical elements, including the network impacts within 1 km of the site, and included a Concept Traffic Calming Plan for Noella Leclair Way Extension and the future internal road connection to the future Vanguard Drive extension.

The Ironclad site is identified as Block 4 in the CGH TIS and was indicated to develop as two 10-floor apartment towers providing a total of 200,000 sq ft of residential space. The Ironclad development proposal is generally in keeping with the previous study's land use assumption and estimated number of dwelling units.

TIS Scope Reduction Proposal
Dillon is looking to negotiate a significantly reduced TIA scope of work for 1001 Noella Leclair Way. We acknowledge that our approach to this TIA is quite different compared to the typical TIA. We believe that our approach is justified given that a TIA for the overall site was recently completed and that the land use is generally in keeping with the previous TIS assumptions.

Dillon is proposing to reduce the scope to focus specifically on site-related aspects, and not to include the broader network transportation impact components. We are proposing to include the following:

- Provide the Step 1 Screening Document;
- Provide a very limited Step 2 Scoping Document. This document would not include all of the background development information as the CGH report covered all of the background documents.
    - Module 2.1, We will document the proposed development as per Element 2.1.1, We would not document Element 2.1.2 or Element 2.1.3.
    - Module 2.2, we are proposing to limit the study area to the site driveways only (network impacts were examined in the CGH report). Element 2.2.2 Time Periods, we are proposing to review the AM and PM peak commuter hours at the site driveway. Element 2.2.3 Horizon Year would examine the total buildout year only.
- Step 3 Forecasting would be limited to identifying the Trip Generation of the site for each mode share based on TRANS rates for the traffic assessment zone and assigned to the site driveways. Module 3.2.1 Transportation Network Plans would be limited to the roadways connecting to the site driveways (the network impacts are identified by the CGH study).
- Step 4 Analysis, we are proposing to include the following modules:
    - 4.1 Development Design
    - 4.2 Parking
    - 4.3 Boundary Street Design will be limited to the roadways immediately adjacent the site (based on the CGH recommended traffic calming plan or other design drawings that may be provided by the City)
    - 4.4 Access Intersection Design
    - 4.5 TDM
    - 4.6 Neighbourhood Traffic Management (not included as they were previously assessed within the CGH TIS)
    - 4.7 Transit - We will review the number of transit person trips anticipated to be generated by the site and identify any operational concerns with the service provider. Note that Transit impacts, route capacity, transit priority were previously assessed in the CGH report.
    - 4.8 Review of Network Concept (Not included)
    - 4.9 Intersection Design (Not included, network intersection analysis was completed by the CGH report.

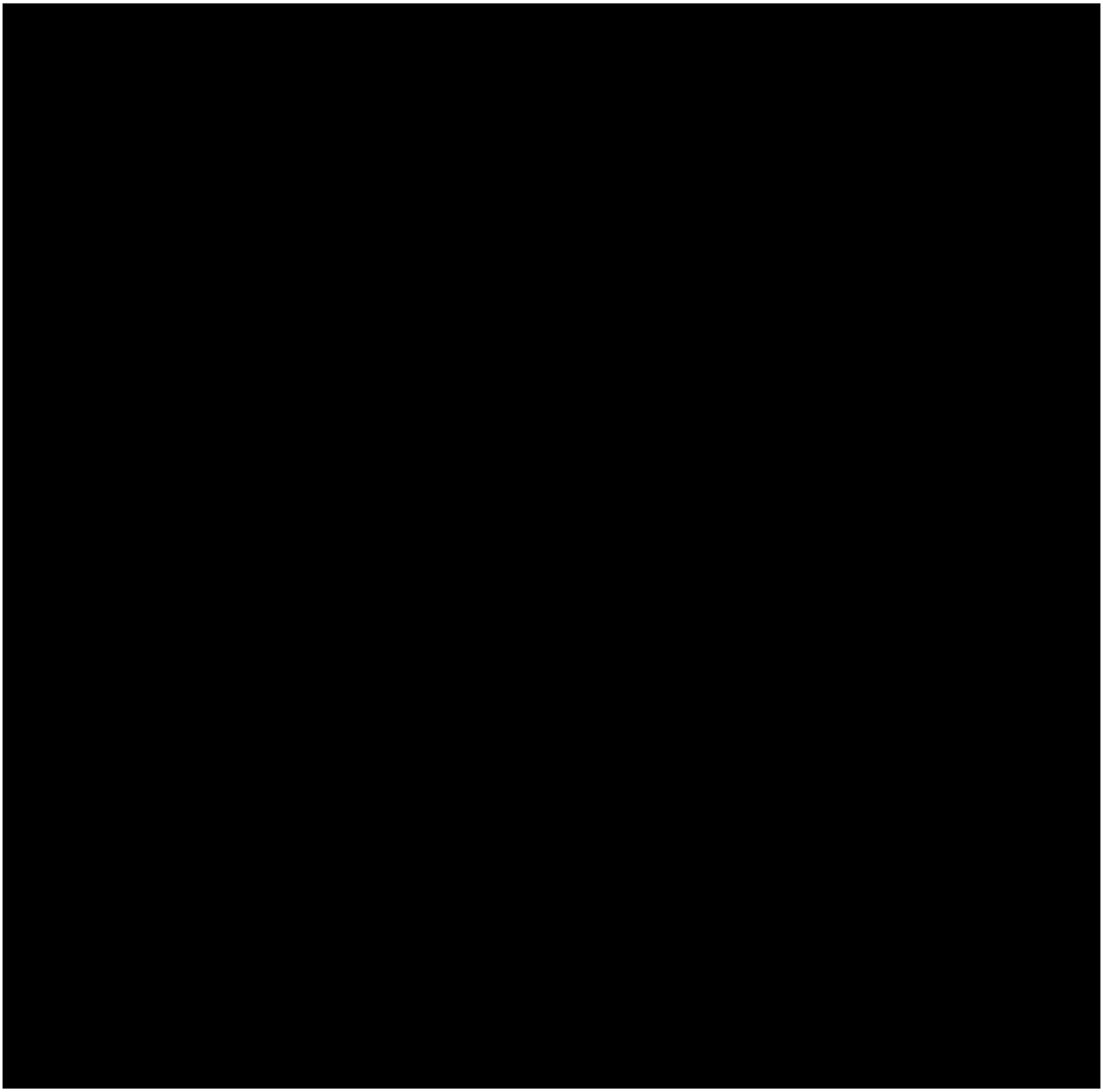
We appreciate that our proposed approach to this study is not typical however we believe that the background development and arterial road transportation impacts have recently been thoroughly reviewed by others and that our approach will reduce the amount of effort required by the developer, and the City, while achieving the original intent and goals of the TIA guidelines.

I am available to meet either by telephone, video conference, or in person if required to discuss our proposed reduced TIS scope, and look forward to your reply.

Yours sincerely,

Doug Green
Associate
Dillon Consulting Limited
177 Colonnade Rd South, Suite 101
Ottawa, Ontario, K2E 7J4
T - 613.745.6338 ext. 3052
F - 613.745.3491
M - 613.608.1778
DGreen@dillon.ca
www.dillon.ca

4200 Innes Rd TIA 2022-07-29 pgs 1-100 (1)_2.pdf
6488K



Giampa, Mike <Mike.Giampa@ottawa.ca> Tue, Feb 28, 2023 at 8:28 AM
To: "Green, Doug" <DGreen@dillon.ca>
Cc: "Michal Kubasiewicz, RPP MCIP MBA" <mkubasiewicz@icdev.ca>, Jeff Probert <jprobert@dillon.ca>

Hi Doug,

Your proposal for a reduced TIA is ok.

Mike

Probert, Jeff <jprobert@dillon.ca> Thu, Mar 2, 2023 at 1:55 PM
To: "Giampa, Mike" <Mike.Giampa@ottawa.ca>
Cc: "Green, Doug" <DGreen@dillon.ca>, "Michal Kubasiewicz, RPP MCIP MBA" <mkubasiewicz@icdev.ca>, Tim Kooistra <tkooistra@dillon.ca>

Hi Mike,

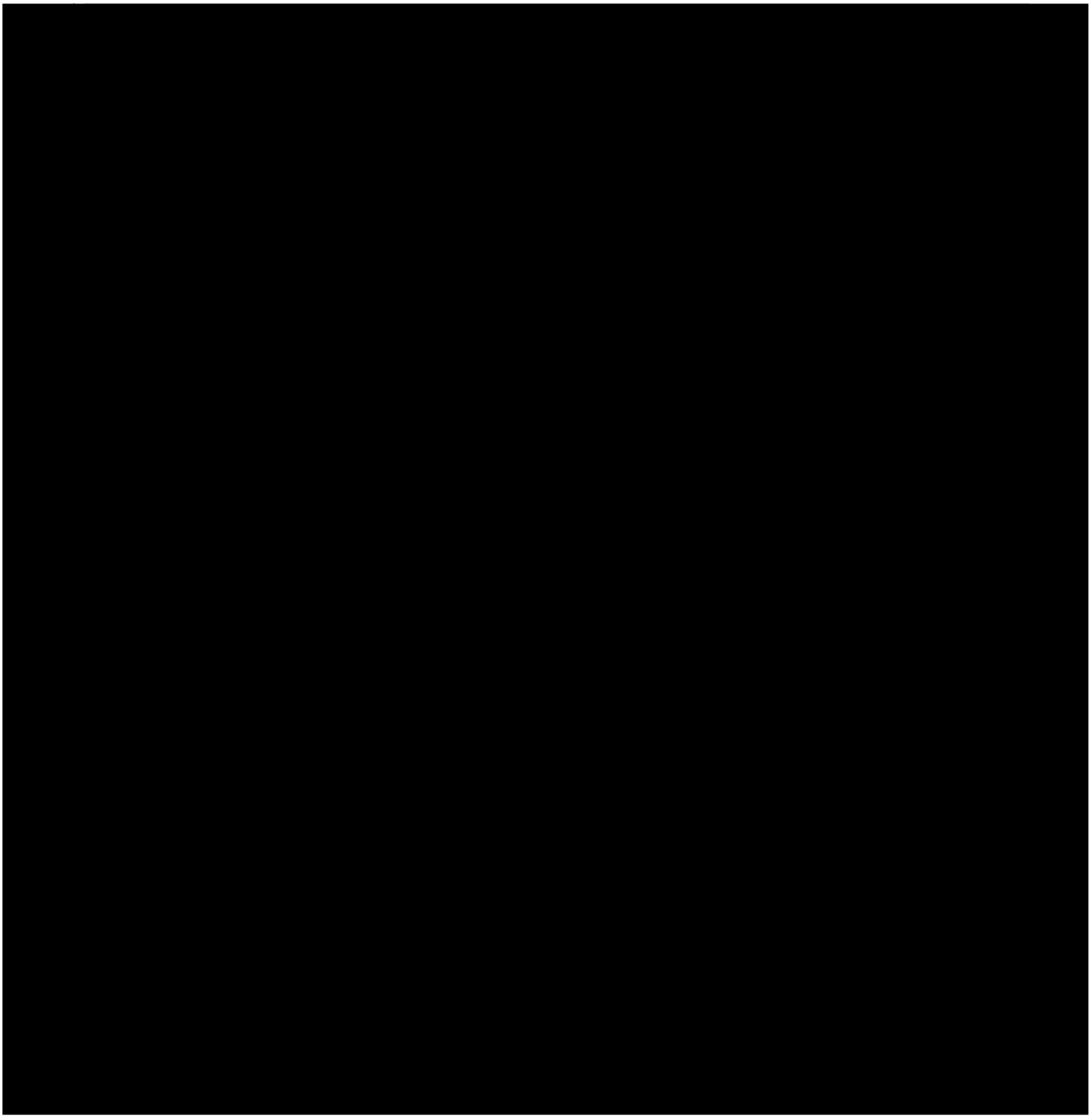
Thank you very much for the confirmation. Given the reduced scope, would it be acceptable to submit the entire TIA in one submission, with the understanding of course that we may receive comments back that may require alterations to the report?

Sincerely,

Jeff

Jeff Probert
Dillon Consulting Limited
177 Colonnade Rd South, Suite 101
Ottawa, Ontario, K2E 7J4
T - 613.745.2213 ext. 3015
M - 506.230.1432
F - 613.745.3491
JProbert@dillon.ca
www.dillon.ca

[Quoted text hidden]



From: Green, Doug <DGreen@dillon.ca>
Sent: Thursday, March 2, 2023 1:03:46 PM
To: Michal Kubasiewicz, RPP MCIP MBA <mkubasiewicz@icdev.ca>
Cc: Riley Court <rcourt@icdev.ca>; Tim Kooistra <tkooistra@dillon.ca>; Jeff Probert <jprobert@dillon.ca>
Subject: Re: [External Email] Ironclad Developments Inc. - 1001 Noella Leclair Way

[Quoted text hidden]

Giampa, Mike <Mike.Giampa@ottawa.ca> Fri, Mar 3, 2023 at 9:32 AM
To: "Probert, Jeff" <jprobert@dillon.ca>
Cc: "Green, Doug" <DGreen@dillon.ca>, "Michal Kubasiewicz, RPP MCIP MBA" <mkubasiewicz@icdev.ca>, Tim Kooistra <tkooistra@dillon.ca>

Hi Jeff, that is acceptable.

[Quoted text hidden]
[Quoted text hidden]

Green, Doug <DGreen@dillon.ca> Fri, Mar 3, 2023 at 10:40 AM
To: "Michal Kubasiewicz, RPP MCIP MBA" <mkubasiewicz@icdev.ca>
Cc: Riley Court <rcourt@icdev.ca>, Tim Kooistra <tkooistra@dillon.ca>, Jeff Probert <jprobert@dillon.ca>

Michal,

That sounds great. We look forward to hearing from you early next week.

Enjoy the weekend!

Yours sincerely,

DILLON CONSULTING

BEST MANAGED COMPANIES
Platinum member

Doug Green
Associate
Dillon Consulting Limited
177 Colonnade Rd South, Suite 101
Ottawa, Ontario, K2E 7J4
T - 613.745.6338 ext. 3052
F - 613.745.3491
M - 613.608.1778
DGreen@dillon.ca
www.dillon.ca

[Quoted text hidden]

Appendix B

TRANS Trip Generation Manual Summary Report Tables

DILLON CONSULTING

3.2 Recommended Residential Trip Generation Rates

A blended trip rate was developed from the three data sources through application of a rank-sum weighting process, considering the strengths and weaknesses of each dataset for the dwelling type in question. The recommended blended **residential person-trip rates** are presented in **Table 3**. All rates represent person-trips per dwelling unit and are to be applied to the **AM or PM peak period.**

Table 3: Recommended Residential Person-trip Rates

ITE Land Use Code	Dwelling Unit Type	Period	Person-Trip Rate
210	Single-detached	AM	2.05
		PM	2.48
220	Multi-Unit (Low-Rise)	AM	1.35
		PM	1.58
221 & 222	Multi-Unit (High-Rise)	AM	0.80
		PM	0.90

3.3 Adjustment Factors – Peak Period to Peak Hour

The various trip generation data sources require some adjustment to standardize the data for developing robust blended trip rates. The peak period conversion factor in **Table 4** may be used where applicable to develop trip generation rate estimates in the desired format.

Table 4: Adjustment Factors for Residential Trip Generation Rates

Factor	Application	Apply To	Period	Value
Peak Period Conversion Factor	**Peak period to peak hour conversion.** Because the 2020 TRANS Trip Generation Study reports trip generation rates by peak period, factors must be applied if the practitioner requires peak hour rates. In practice, the conversion to peak hour trip rates should occur **after** the application of modal shares.	Person-trip rates per peak period	AM	0.50
			PM	0.44
		Vehicle trip rates per peak period	AM	0.48
			PM	0.44
		Transit trip rates per peak period	AM	0.55
			PM	0.47
		Cycling trip rates per peak period	AM	0.58
			PM	0.48
		Walking trip rates per peak period	AM	0.58
			PM	0.52

Table 8: Residential Mode Share for High-Rise Multifamily Housing

District	Period	Mode				
		Auto Driver	Auto Pass.	Transit	Cycling	Walking
Ottawa Centre	AM	18%	2%	26%	1%	52%
	PM	17%	9%	21%	1%	52%
Ottawa Inner Area	AM	26%	6%	28%	5%	34%
	PM	25%	8%	21%	6%	39%
Île de Hull	AM	27%	3%	37%	12%	21%
	PM	26%	8%	27%	11%	28%
Ottawa East	AM	39%	7%	38%	2%	13%
	PM	40%	14%	28%	3%	15%
Beacon Hill	AM	48%	9%	30%	3%	10%
	PM	52%	16%	28%	0%	4%
Alta Vista	AM	38%	12%	42%	2%	7%
	PM	45%	16%	28%	2%	9%
Hunt Club	AM	39%	6%	44%	1%	9%
	PM	44%	11%	35%	2%	9%
Merivale	AM	41%	6%	42%	2%	8%
	PM	41%	11%	33%	2%	13%
Ottawa West	AM	28%	11%	41%	3%	16%
	PM	33%	11%	26%	7%	23%
Bayshore/Cedarview	AM	40%	12%	38%	2%	8%
	PM	40%	15%	33%	1%	11%
Hull Périphérie	AM	48%	11%	30%	1%	10%
	PM	47%	15%	23%	3%	13%
Orleans	AM	54%	7%	29%	0%	10%
	PM	61%	13%	21%	0%	6%
South Gloucester / Leitrim	AM	50%	15%	25%	1%	9%
	PM	53%	17%	21%	1%	9%
South Nepean	AM	58%	6%	30%	2%	4%
	PM	54%	15%	25%	0%	7%
Kanata - Stittsville	AM	43%	26%	28%	0%	4%
	PM	55%	19%	21%	0%	5%
Plateau	AM	53%	9%	35%	3%	1%
	PM	65%	7%	25%	2%	1%
Aylmer	AM	45%	17%	25%	0%	13%
	PM	31%	21%	23%	4%	20%
Pointe Gatineau	AM	44%	15%	24%	3%	14%
	PM	52%	15%	20%	2%	11%
Gatineau Est	AM	53%	10%	25%	0%	12%
	PM	61%	10%	25%	0%	4%
Masson-Angers	AM	63%	15%	19%	0%	3%
	PM	64%	18%	16%	0%	1%
Other Rural Districts	AM	63%	15%	19%	0%	3%
	PM	64%	18%	16%	0%	1%

5 RESIDENTIAL DIRECTIONAL SPLITS

After calculating the total person trips generated by the development and applying the appropriate modal shares, directional factors can be applied to estimate the number of inbound and outbound trips by vehicle. The vehicle trip directional splits were developed for both the AM and PM peak periods[2]. The vehicle trip directional splits, as shown in **Table 9**, have been developed for the NCR based on a review of the local trip generator surveys as well as the latest published data in the ITE *Trip Generation Manual* (10th Edition).

Table 9: Recommended Vehicle Trip Directional Splits (Peak Period)

ITE Land Use Code	Dwelling Unit Type	Period	Inbound	Outbound
210	Single-detached	AM	30%	70%
		PM	62%	38%
220	Multi-Unit (Low-Rise)	AM	30%	70%
		PM	56%	44%
221 & 222	Multi-Unit (High-Rise)	AM	31%	69%
		PM	58%	42%

Appendix C

Development Permit Set Application Drawings

DILLON CONSULTING

2133-Innes Road - Development Information

Zoning Summary

Zoning Classification	Existing	Proposed	O	X

Lot Area	Required	Provided	
Lot Area (Minimum)	N/A	99626.10 sq.ft	O
Lot Coverage (Maximum)	N/A	27%	O
Lot Depth (Maximum)	N/A	90.66m	O
Lot Frontage (Minimum)	N/A	90.68m	O
F.A.R (Density Maximum)	N/A	1.62	O
Building Height	40m	18.60m	O

Residential Component	Additional Notes	Required	Provided	
Front Setback		3.0m	3.0m	O
Side Setback		3.0m	3.0m	O
Rear Setback		7.5m	7.5m	O
Side Setback		N/A	19.0m	O

Parking			Required	Provided	
Total Combined Parking Spaces *	See below requirements		220	195	X
Visitor Parking Spaces	0.2 per 1	pkg spaces	31	16	X
Accessible Parking Spaces	3 per 200-299	pkg spaces	4	4	O
Small Car Stalls	40.0% of required parking		78	71	O
Bicycle Parking	0.5 per 1	unit	79	82	O
Loading Stall(s)	0 Varies				
Surface Parking	127				
Underground Parkade	68				

* Residential parking requirement

Bachelor	1.20	per unit
One Bedroom	1.20	per unit
Two Bedroom	1.20	per unit
Three Bedroom	1.20	per unit

Additional notes from Developments:

Developments Team

Michal Kubasiewicz, RPP
Director of Development

Development Summary

Amenity Area	Required		Total Provided		Comunal Amenity Areas	Total Provided		Private Balcony Amenity Areas	Total Provided		Notes:
	f2	m2	f2	m2		f2	m2		f2	m2	
Communal	5070	471.0	11650	1082.3	Indoor	1733	161.0	Bldg A	7721	717.3	
Private	N/A	N/A	15416	1432.2	Outdoor	9917	921.3	Bldg B	7695	714.9	
TOTAL	10140	942.0	27066	2514.5	TOTAL	11650	1082.3	TOTAL	15416	1432.2	

Suite Count	*Building A*			*Building B*				*Building C*				Suite	Suite Mix		
Suite Type	f2	m2	Qty.	Suite Type	f2	m2	Qty.	Suite Type	f2	m2	Qty.	Tally			
A1.0	651.6	60.54	15	A1.0	651.6	60.54	16	N/A	0	0.00	0	**31**	1 BR =	**48**	31%
A1.1	774	71.91	4	A1.1	774	71.91	8					**12**	2 BR =	**75**	48%
A2.0	788.9	73.29	0	A2.0	788.9	73.29	5					**5**	3 BR =	**22**	14%
B1.0	957.8	88.98	19	B1.0	957.8	88.98	24					**43**	Bach. =	**12**	8%
B1.1	876.23	81.40	4	B1.1	876.23	81.40	0					**4**			
B2.0	990.3	92.00	0	B2.0	990.4	92.01	24					**24**			
B2.1	1080.2	100.35	4	B2.1	1080.2	100.35	0					**4**			
C1.0	1119	103.96	22	C1.0	1119	103.96	0					**22**			
D1.0	426.2	39.60	5	D1.0	426.2	39.60	6					**11**			
D2.0	520.8	48.38	1	D2.0	520.8	48.38	0					**1**			
Total Suites												**157**		**157**	**100%**

Building Floor Areas	*Building A*		*Building B*		*Building C*	
	f2	m2	f2	m2	f2	m2
Main Floor	13464	1250.85	13501	1254.28	0	0.00
Second Floor	13464	1250.85	13455	1250.01	0	0.00
Third Floor	13464	1250.85	13455	1250.01	0	0.00
Fourth Floor	13464	1250.85	13455	1250.01	0	0.00
Fifth Floor	13464	1250.85	13455	1250.01	0	0.00
Sixth Floor	13464	1250.85	13455	1250.01	0	0.00
Total Areas	80784	7505	80776	7504	0	0
U/G Parking	17298	1607.04	17298	1607.04	0	0.00

Notes:
Project Efficiency: ***84.5%***

Design Team

Sen Musngi
Lead Conceptual Designer and Drafting Manager

Dario Dujakovic
Architectural Technologist

Prepared by:

Rob Garvey, OAA
Architect

Checked by:

NOTES:

IRONCLAD DEVELOPMENTS INC.
101-57158 Symington Road
Springfield, MB R2J 4L6
Ph: 204-777-1972
info@icdev.ca

Consultant
RDB GARVEY
ARCHITECTURE 77 INC.
201-57158 SYMINGTON RD 20E
SPRINGFIELD, MB R2J 4L6
T: 204.227.9274
E: RGARVEY@A77.CA

SEAL:

ONTARIO ASSOCIATION OF ARCHITECTS
23 . 06 . 22
ROBERT J. S. GARVEY
LICENCE
9039

No.	Date	REVISION
6		
5		
4		
3		
2		
1	22/06/2023	Submission

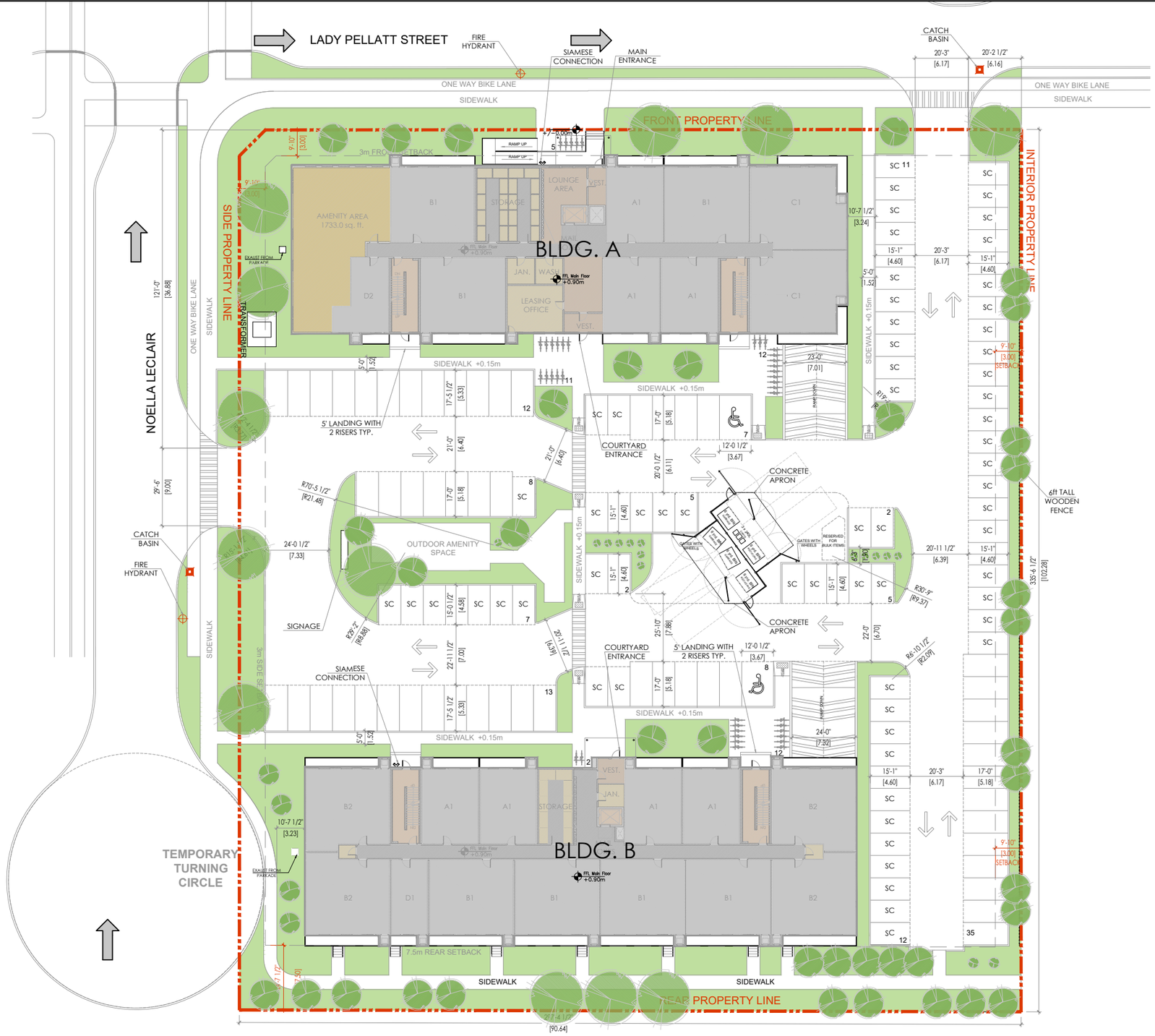
Project Number: 2133
Designed By: J.P.M.
Drawn By: D.D.
Checked By: R.G.

Noella Leclair Way, Ottawa, Ontario;

DEVELOPMENT PERMIT APPLICATION SET

GENERAL PROJECT INFO.
SCALE: N.T.S.

DP01



NOTES:

FOR LANDSCAPING DETAILS, PLEASE REFER TO LANDSCAPING PLAN.

FOR FIRE LANE AND GARBAGE TRUCK ROUTES PLEASE REFER TO SHEET DP18

BUILDING FOOTPRINT | PROPERTY LINE | VERTICAL COMMUNICATION

LANDSCAPE AREA | SUPPORTING SPACES | CORRIDOR

PEDESTRIAN WALKWAY | LOBBY/ENTRANCE AREA | SC - SMALL CAR PARKING

IRONCLAD DEVELOPMENTS INC.
101-57158 Symington Road
Springfield, MB R2J 4L6
Ph: 204-777-1972
info@icdev.ca

Consultant
RDB GARVEY ARCHITECTURE 77 INC.
201-57158 SYMINGTON RD 20E
SPRINGFIELD, MB R2J 4L6
T: 204.227.9274
E: RGARVEY@A77.CA

SEAL:

ONTARIO ASSOCIATION OF ARCHITECTS
23.06.22
ROBERT J. S. GARVEY
LICENCE
9039

No.	Date	REVISION
6		
5		
4		
3		
2		
1	22/06/2023	Submission

Project Number: 2133
Designed By: J.P.M.
Drawn By: D.D.
Checked By: R.G.

Noella Leclair Way, Ottawa, Ontario;

DEVELOPMENT PERMIT APPLICATION SET

SITE PLAN
SCALE: 1:500

DP02

IRONCLAD DEVELOPMENTS INC.
101-57158 Symington Road
Springfield, MB R2J 4L6
Ph: 204-777-1972
info@icdev.ca

Consultant
RDB GARVEY
ARCHITECTURE 77 INC.
201-57158 SYMINGTON RD 20E
SPRINGFIELD, MB R2J 4L6
T: 204.227.9274
E: RGARVEY@A77.CA

SEAL:

ONTARIO ASSOCIATION OF ARCHITECTS
23.06.22
ROBERT J. S. GARVEY
LICENCE
9039

No.	Date	REVISION
6		
5		
4		
3		
2		
1	22/06/2023	Submission

Project Number: 2133
Designed By: J.P.M.
Drawn By: D.D.
Checked By: R.G.

Noella Leclair Way, Ottawa, Ontario;

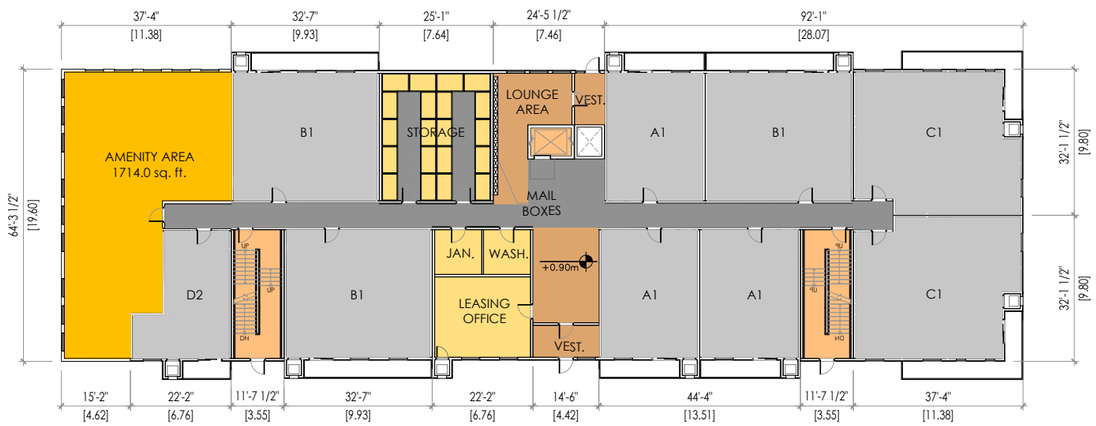
DEVELOPMENT PERMIT APPLICATION SET

PARKADE
SCALE: 1:500

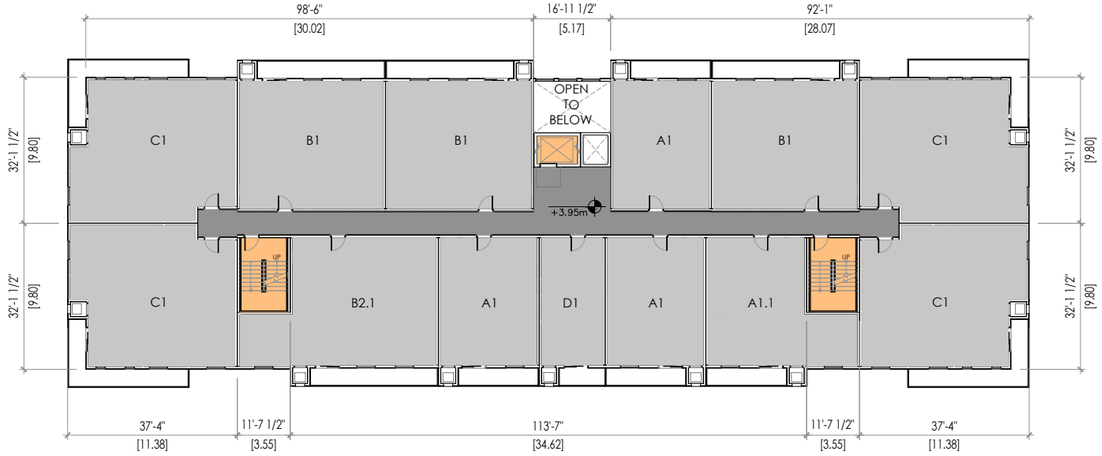
DP03

NOTES:

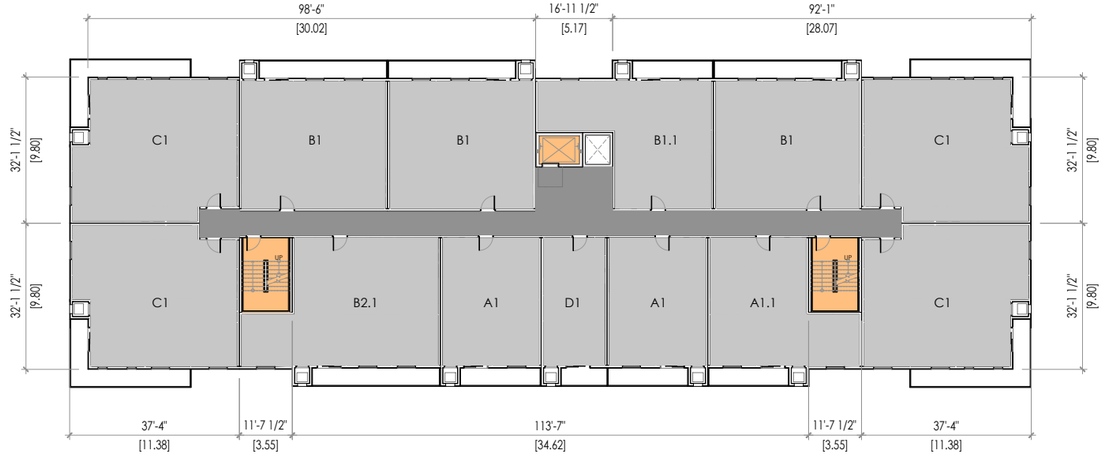
PAINTED PEDESTRIAN CROSSING
SUPPORTING SPACES
VERTICAL CIRCULATION
LOBBY/ENTRANCE AREA
PROPERTY LINE
S.C. - SMALL CAR PARKING



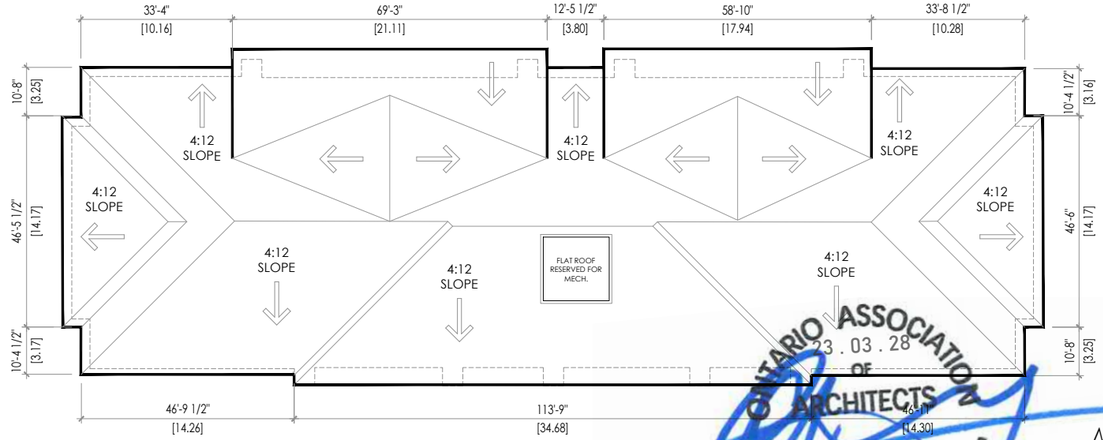
MAIN FLOOR



SECOND FLOOR



TYPICAL FLOOR



ROOF PLAN

IRONCLAD DEVELOPMENTS INC.
101-57158 Symington Road
Springfield, MB R2J 4L6
Ph: 204-777-1972
info@icdev.ca

Consultant
ROB GARVEY
ARCHITECTURE 77 INC.
201-57158 SYMINGTON RD 20E
SPRINGFIELD, MB R2J 4L6
T: 204.227.9274
E: RGARVEY@A77.CA

Project Number: 2133
Designed By: J.P.M.
Drawn By: D.D.
Checked By: R.G.
Date: 18th November 2022
Rev. Date: 28th March 2023

A

KEY PLAN

NOTES:

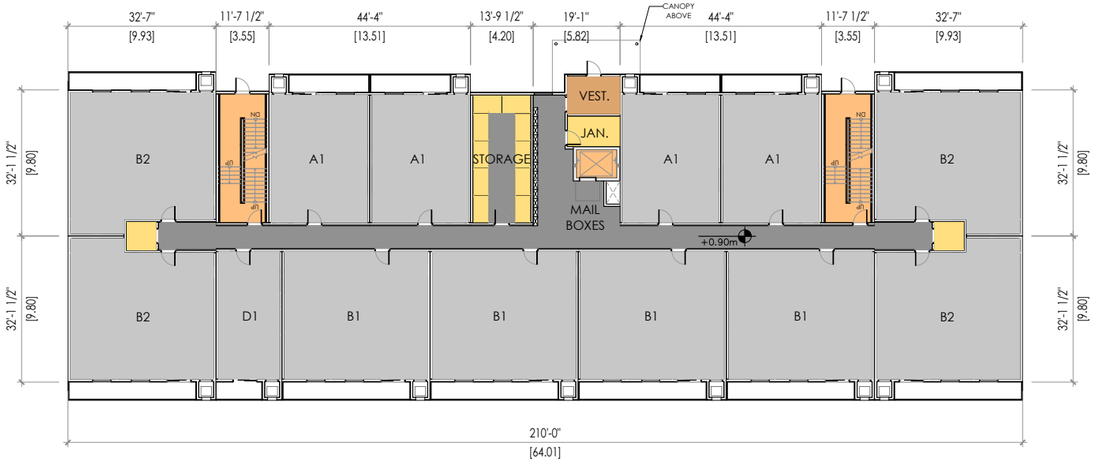
AMENITIES
COMMERCIAL
SUITES
PROPERTY LINE
SUPPORTING SPACES
LOBBY/ENTRANCE AREA
VERTICAL COMMUNICATION
CORRIDOR
SC - SMALL CAR PARKING

Innes Road, Ottawa, Ontario;

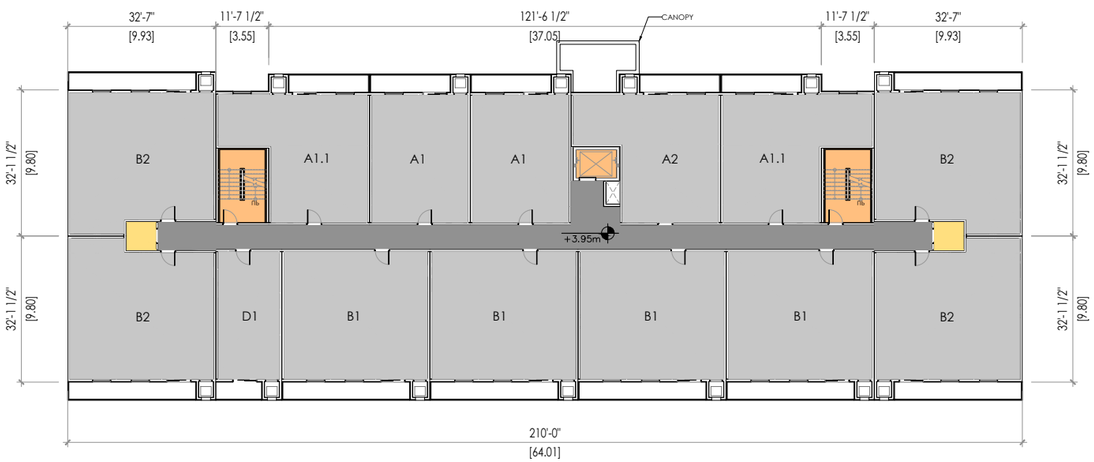
DEVELOPMENT PERMIT SET APPLICATION

BUILDING A

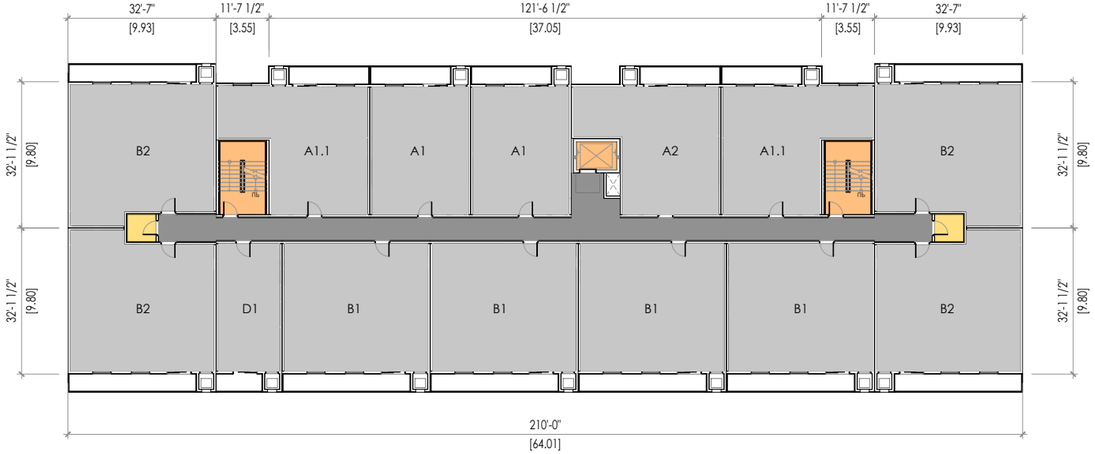
SCALE: 1:400



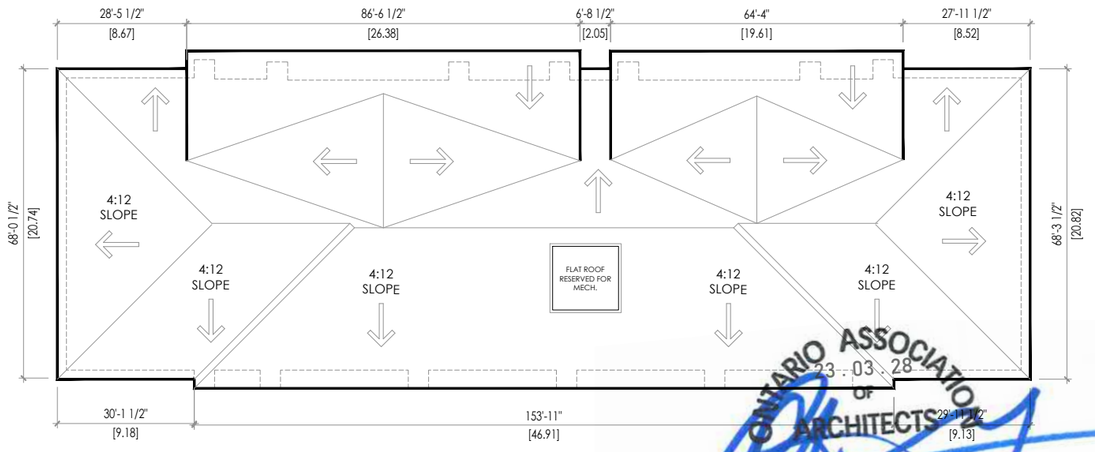
MAIN FLOOR



SECOND FLOOR



TYPICAL FLOOR



ROOF PLAN

IRONCLAD DEVELOPMENTS INC.
101-57158 Symington Road
Springfield, MB R2J 4L6
Ph: 204-777-1972
info@icdev.ca

Consultant
ROB GARVEY
ARCHITECTURE 77 INC.
201-57158 SYMINGTON RD 20E
SPRINGFIELD, MB R2J 4L6
T: 204.227.9274
E: RGARVEY@A77.CA

Project Number: 2133
Designed By: J.P.M.
Drawn By: D.D.
Checked By: R.G.
Date: 18th November 2022
Rev. Date: 28th March 2023

KEY PLAN

NOTES:

AMENITIES
COMMERCIAL
SUITES
PROPERTY LINE
SUPPORTING SPACES
LOBBY/ENTRANCE AREA
VERTICAL COMMUNICATION
CORRIDOR
SC - SMALL CAR PARKING

Innes Road, Ottawa, Ontario;

DEVELOPMENT PERMIT SET APPLICATION

BUILDING B
SCALE: 1:400

EAST ELEVATION

NORTH ELEVATION

SOUTH ELEVATION

WEST ELEVATION

ONTARIO ASSOCIATION OF ARCHITECTS
23.03.28
ROBERT J.S. GARVEY
LICENCE
9039
FOR REVIEW & COORDINATION PURPOSES

IRONCLAD DEVELOPMENTS INC.
101-57158 Symington Road
Springfield, MB R2J 4L6
Ph: 204-777-1972
info@icdev.ca

Consultant
ROB GARVEY
ARCHITECTURE 77 INC.
201-57158 SYMINGTON RD 20E
SPRINGFIELD, MB R2J 4L6
T: 204.227.9274
E: RGARVEY@A77.CA

Project Number: 2133
Designed By: J.P.M.
Drawn By: D.D.
Checked By: R.G.
Date: 18th November 2022
Rev. Date: 28th March 2023

A

KEY PLAN

NOTES:

LEGEND

- (A) HARDIE PLANK, LAP SIDING - ARCTIC WHITE
- (B) HARDIE PLANK, LAP SIDING - NIGHT GRAY
- (C) HARDIE PLANK, LAP SIDING - IRON GRAY
- (D) WESTMAN STEEL, HORIZONTAL METAL PANEL, ROYAL BLUE QC8790
- (E) HARDIE PLANK, LAP SIDING- CEDARTONE 2.0 (BY FISHER)
- (F) PVC FRAMED WINDOWS WITH CLEAR GLASS (COLOR TO MATCH ELEVATIONS)
- (G) ALUMINUM PICKET RAILING -BLACK
- (H) ASPHALT ROOF SHINGLES, MIDNIGHT BLACK
- (J) JAMES HARDIE, FASCIA AND SOFFIT - IRON GRAY

Innes Road, Ottawa, Ontario;

DEVELOPMENT PERMIT SET APPLICATION

BUILDING A- ELEVATIONS

SCALE: 1:300

EAST ELEVATION

NORTH ELEVATION

SOUTH ELEVATION

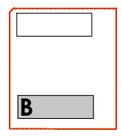
WEST ELEVATION

ONTARIO ASSOCIATION OF ARCHITECTS
23 . 03 . 28
ROBERT J. S. GARVEY
LICENCE
9039
FOR REVIEW & COORDINATION PURPOSES

IRONCLAD DEVELOPMENTS INC.
101-57158 Symington Road
Springfield, MB R2J 4L6
Ph: 204-777-1972
info@icdev.ca

Consultant
ROB GARVEY
ARCHITECTURE 77 INC.
201-57158 SYMINGTON RD 20E
SPRINGFIELD, MB R2J 4L6
T: 204.227.9274
E: RGARVEY@A77.CA

Project Number: 2133
Designed By: J.P.M.
Drawn By: D.D.
Checked By: R.G.
Date: 18th November 2022
Rev. Date: 28th March 2023



KEY PLAN

NOTES:

LEGEND

- (A) HARDIE PLANK, LAP SIDING - ARCTIC WHITE
- (B) HARDIE PLANK, LAP SIDING - NIGHT GRAY
- (C) HARDIE PLANK, LAP SIDING - IRON GRAY
- (D) WESTMAN STEEL, HORIZONTAL METAL PANEL, ROYAL BLUE QC8790
- (E) HARDIE PLANK, LAP SIDING- CEDARTONE 2.0 (BY FISHER)
- (F) PVC FRAMED WINDOWS WITH CLEAR GLASS (COLOR TO MATCH ELEVATIONS)
- (G) ALUMINUM PICKET RAILING -BLACK
- (H) ASPHALT ROOF SHINGLES, MIDNIGHT BLACK
- (J) JAMES HARDIE, FASCIA AND SOFFIT - IRON GRAY

Innes Road, Ottawa, Ontario;

DEVELOPMENT PERMIT SET APPLICATION

BUILDING B- ELEVATIONS

SCALE: 1:300

IRONCLAD
DEVELOPMENTS INC.

101-57158 Symington Road
Springfield, MB R2J 4L6
Ph: 204-777-1972
info@icdev.ca

Consultant

ROB GARVEY
ARCHITECTURE 77 INC.

201-57158 SYMINGTON RD 20E
SPRINGFIELD, MB R2J 4L6
T: 204.227.9274
E: RGARVEY@A77.CA

Project Number: 2133

Designed By: J.P.M.

Drawn By: D.D.

Checked By: R.G.

Date: 18th November 2022

Rev. Date: 28th March 2023

NOTES:

ONTARIO ASSOCIATION OF ARCHITECTS
ROBERT J. S. GARVEY
LICENCE
9039
FOR REVIEW & COORDINATION PURPOSES

Innes Road, Ottawa,
Ontario;

DEVELOPMENT PERMIT SET APPLICATION

3D MODEL

SCALE: N.T.S.

IRONCLAD DEVELOPMENTS INC.

101-57158 Symington Road
Springfield, MB R2J 4L6
Ph: 204-777-1972
info@icdev.ca

Consultant

ROB GARVEY
ARCHITECTURE 77 INC.

201-57158 SYMINGTON RD 20E
SPRINGFIELD, MB R2J 4L6
T: 204.227.9274
E: RGARVEY@A77.CA

Project Number: 2133

Designed By: J.P.M.

Drawn By: D.D.

Checked By: R.G.

Date: 18th November 2022

Rev. Date: 28th March 2023

NOTES:

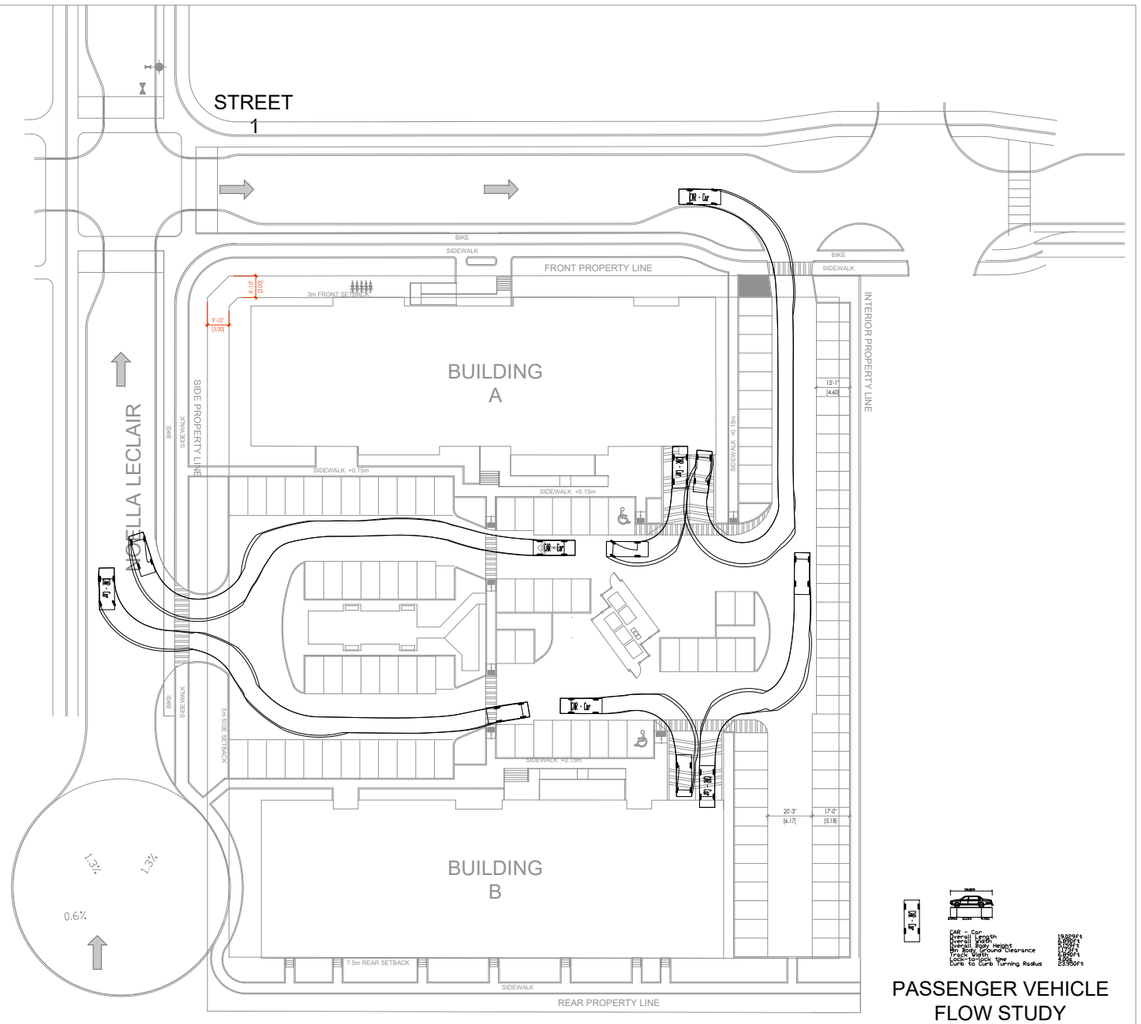
ONTARIO ASSOCIATION OF ARCHITECTS
2023.03.28
ROBERT J.S. GARVEY
LICENCE
9039
FOR REVIEW & COORDINATION PURPOSES

Innes Road, Ottawa, Ontario;

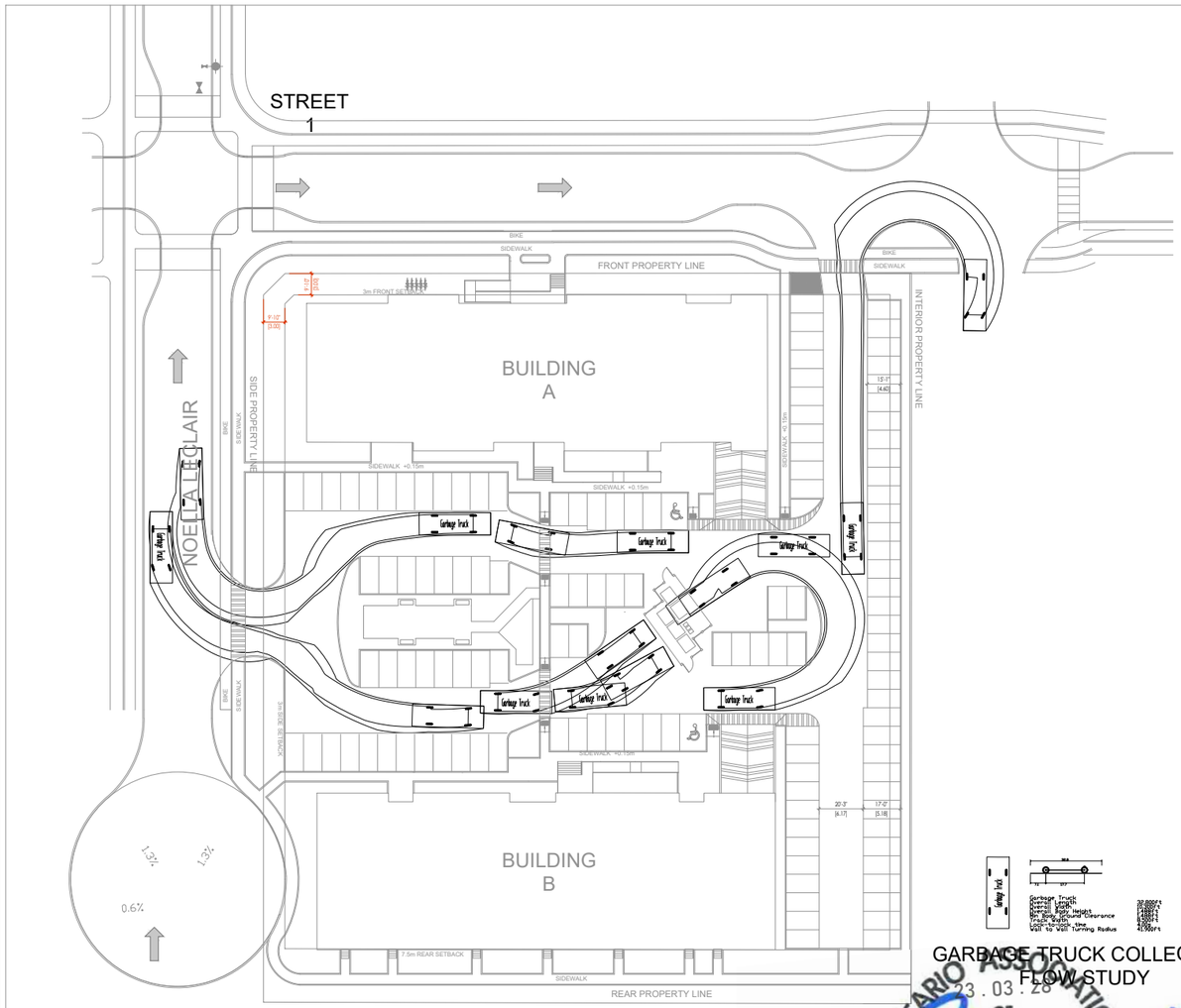
DEVELOPMENT PERMIT SET APPLICATION

3D MODEL

SCALE: N.T.S.



PASSENGER VEHICLE
FLOW STUDY



GARBAGE TRUCK COLLECTION
FLOW STUDY

2023.03.28

ONTARIO ASSOCIATION OF ARCHITECTS
ROBERT J. S. GARVEY
LICENCE
9039
FOR REVIEW & COORDINATION PURPOSES

IRONCLAD
DEVELOPMENTS INC.
101-57158 Symington Road
Springfield, MB R2J 4L6
Ph: 204-777-1972
info@icdev.ca

Consultant
ROB GARVEY
ARCHITECTURE 77 INC.
201-57158 SYMINGTON RD 20E
SPRINGFIELD, MB R2J 4L6
T: 204.227.9274
E: RGARVEY@A77.CA

Project Number: 2133
Designed By: J.P.M.
Drawn By: D.D.
Checked By: R.G.
Date: 18th November 2022
Rev. Date: 28th March 2023

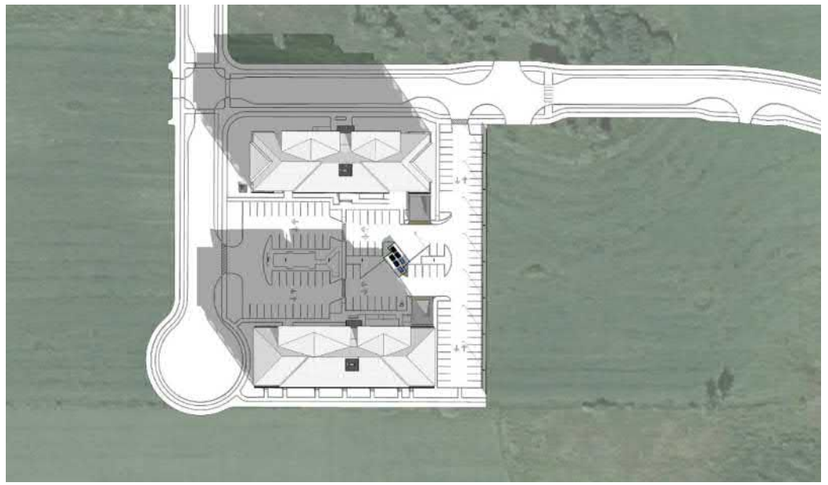
AMENITIES
COMMERCIAL
SUITES
PROPERTY LINE
SUPPORTING SPACES
LOBBY/ENTRANCE AREA
VERTICAL COMMUNICATION
CORRIDOR
SC - SMALL CAR PARKING

Innes Road, Ottawa, Ontario;

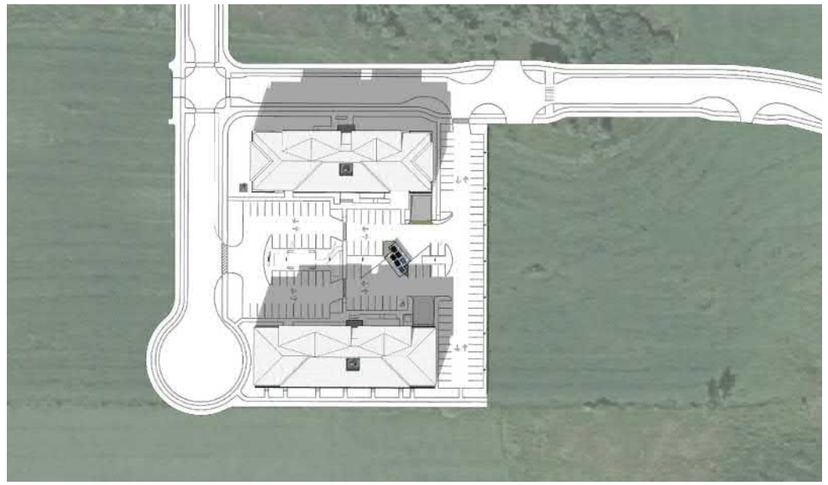
DEVELOPMENT PERMIT SET APPLICATION

Vehicular Flow Study

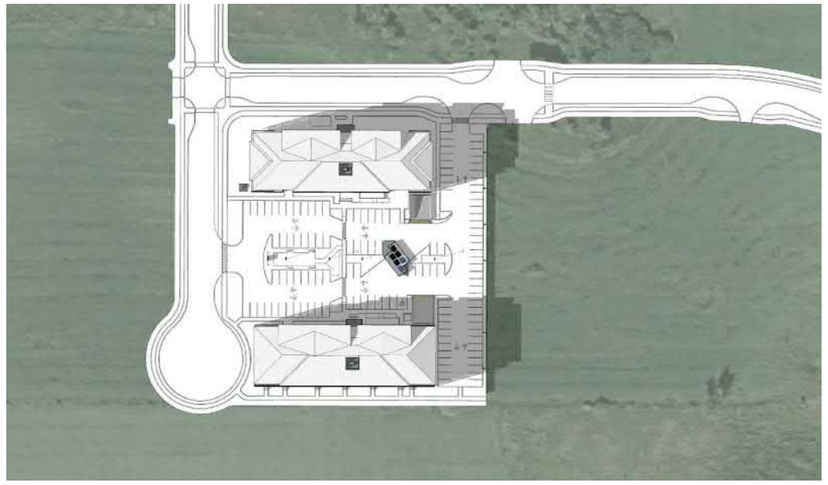
SCALE: N.T.S.



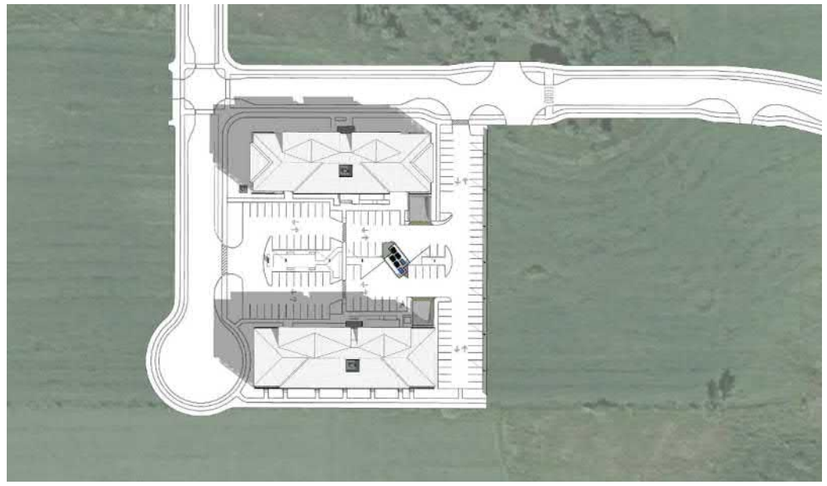
UTC-05:00 Innes Road, Ottawa, ON;
20th March 09AM



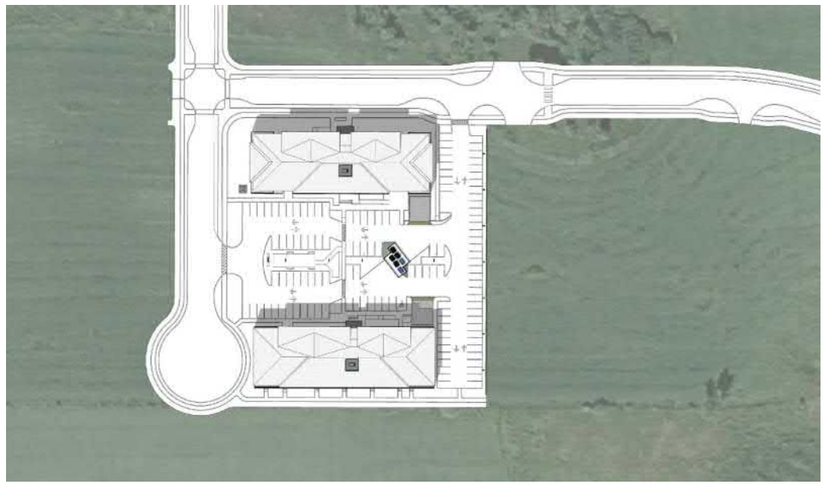
UTC-05:00 Innes Road, Ottawa, ON;
20th March 12PM



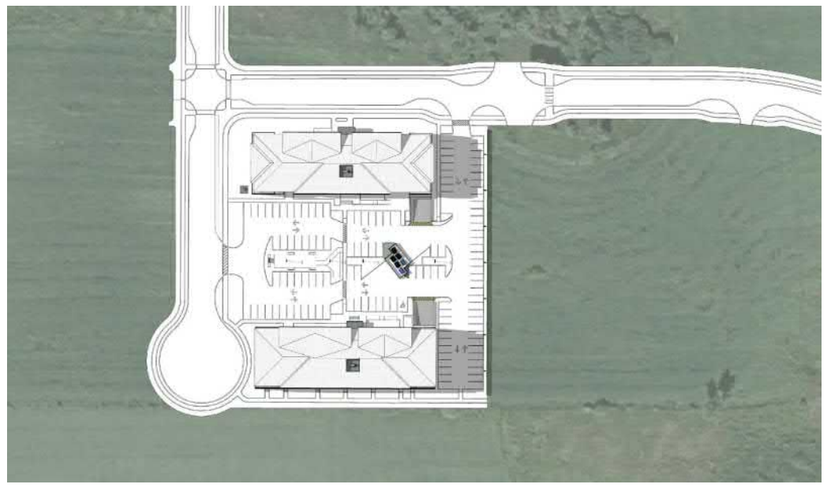
UTC-05:00 Innes Road, Ottawa, ON;
20th March 03PM



UTC-05:00 Innes Road, Ottawa, ON;
21st June 09AM



UTC-05:00 Innes Road, Ottawa, ON;
21st June 12PM



UTC-05:00 Innes Road, Ottawa, ON;
21st June 03PM

IRONCLAD
DEVELOPMENTS INC.
101-57158 Symington Road
Springfield, MB R2J 4L6
Ph: 204-777-1972
info@icdev.ca

Consultant
ROB GARVEY
ARCHITECTURE 77 INC.
201-57158 SYMINGTON RD 20E
SPRINGFIELD, MB R2J 4L6
T: 204.227.9274
E: RGARVEY@A77.CA

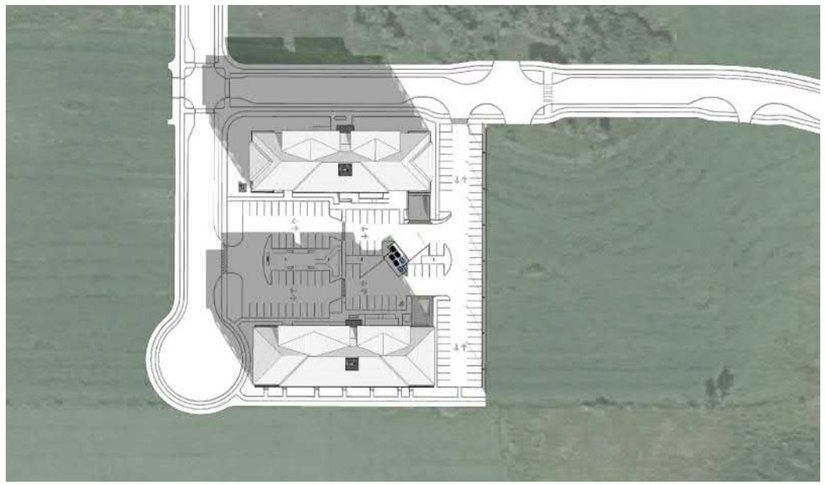
Project Number: 2133
Designed By: J.P.M.
Drawn By: D.D.
Checked By: R.G.
Date: 18th November 2022
Rev. Date: 28th March 2023

ONTARIO ASSOCIATION OF ARCHITECTS
23 . 03 . 28
ROBERT J. S. GARVEY
LICENCE
9039
FOR REVIEW & COORDINATION PURPOSES

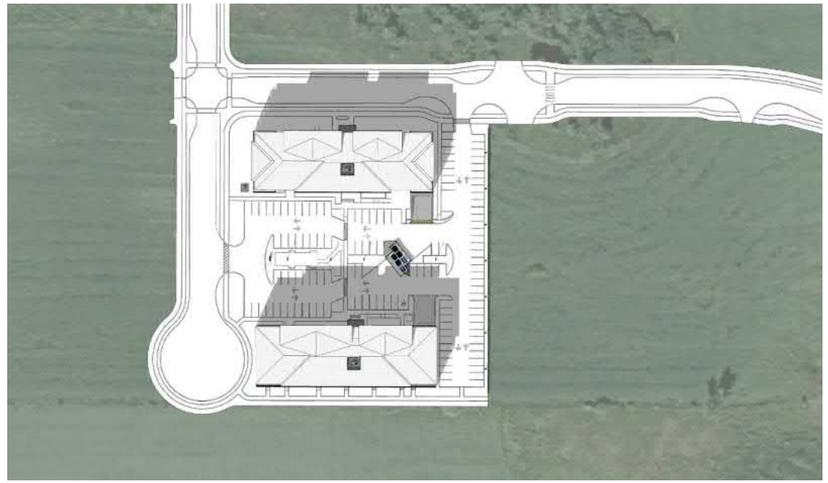
Innes Road, Ottawa,
Ontario;

DEVELOPMENT PERMIT SET APPLICATION

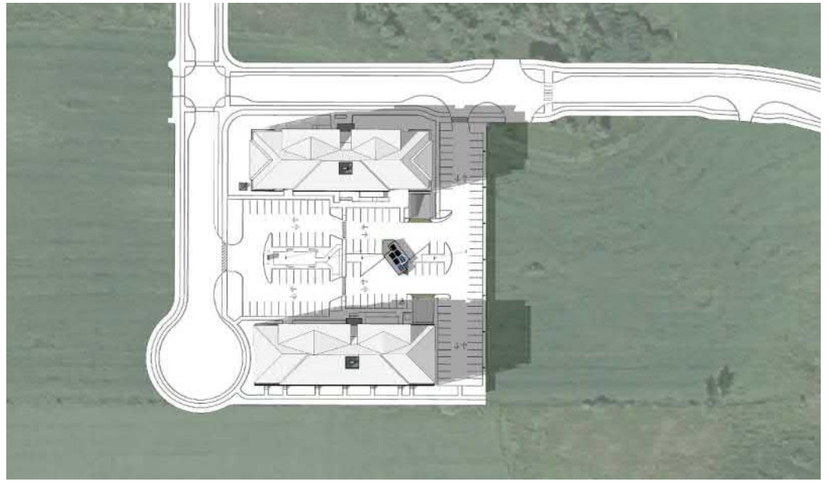
SHADOW STUDY 1
SCALE: N.T.S.



UTC-05:00 Innes Road, Ottawa, ON;
22nd September 09AM

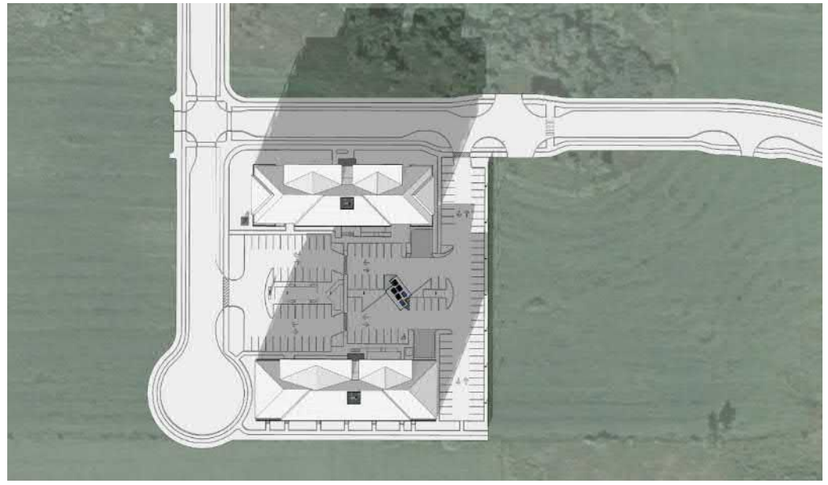


UTC-05:00 Innes Road, Ottawa, ON;
22nd September 12PM

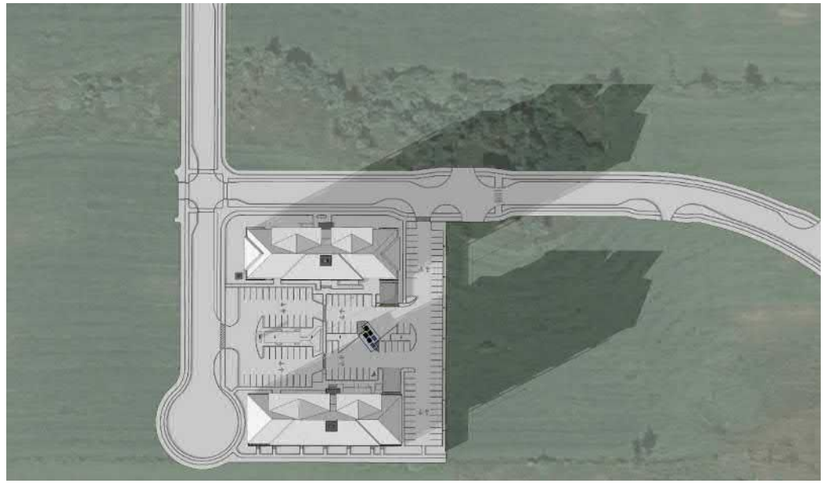


UTC-05:00 Innes Road, Ottawa, ON;
22nd September 03PM

UTC-05:00 Innes Road, Ottawa, ON;
21st December 09AM



UTC-05:00 Innes Road, Ottawa, ON;
21st December 12PM



UTC-05:00 Innes Road, Ottawa, ON;
21st December 03PM

IRONCLAD
DEVELOPMENTS INC.
101-57158 Symington Road
Springfield, MB R2J 4L6
Ph: 204-777-1972
info@icdev.ca

Consultant
ROB GARVEY
ARCHITECTURE 77 INC.
201-57158 SYMINGTON RD 20E
SPRINGFIELD, MB R2J 4L6
T: 204.227.9274
E: RGARVEY@A77.CA

Project Number: 2133
Designed By: J.P.M.
Drawn By: D.D.
Checked By: R.G.
Date: 18th November 2022
Rev. Date: 28th March 2023

ONTARIO ASSOCIATION OF ARCHITECTS
23 . 03 . 28
ROBERT J. S. GARVEY
LICENCE
9039
FOR REVIEW & COORDINATION PURPOSES

Innes Road, Ottawa,
Ontario;

DEVELOPMENT PERMIT SET APPLICATION

SHADOW STUDY 1
SCALE: N.T.S.

Appendix D

MMLOS Worksheets

Residential Development - Part of 1001 Noella Leclair Way

Multi-Modal Level of Service (MMLOS) Analysis

General Urban Area

Fri, Apr 21, 2023

					Noella Leclair Way		Lady Pellatt Street	
	Pedestrian 			Sidewalk width		2.0m+		2.0m+
				Boulevard width		0.5 to 2m		0.5 to 2m
				AADT		>3000		<=3000
				On-street parking		No		No
				Operating speed		30-50km/h		30-50km/h
				Level of Service		C		A
	Bicycle 			Number of travel lanes (mixed traffic = total, bike lanes = one direction)		2		2
				Classified as residential or no marked centreline		No		No
				Type of bikeway		Phys. Sep.		Phys. Sep.
				Bike lane width		>=1.5m to <1.8m		>=1.5m to <1.8m
				Bike lane + parking lane width (incl. marked buffer and paved gutter)		<=4.0m		<=4.0m
				Segment operating speed		50 km/h		50 km/h
				Frequency of bike lane blockages		N/A		N/A
				Unsignalized crossing - number lanes being crossed (no median)				
				Unsignalized crossing - number lanes being crossed (median > 1.8m)		0		0
				Operating speed of road being crossed		N/A		N/A
				Level of Service		A		A

Appendix E

Synchro Performance Worksheets

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	102	5	7	125	12	15
Future Volume (Veh/h)	102	5	7	125	12	15
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	111	5	8	136	13	16
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			116		266	114
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			116		266	114
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			99		98	98
cM capacity (veh/h)			1473		720	939

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	116	144	29
Volume Left	0	8	13
Volume Right	5	0	16
cSH	1700	1473	826
Volume to Capacity	0.07	0.01	0.04
Queue Length 95th (m)	0.0	0.1	0.9
Control Delay (s)	0.0	0.5	9.5
Lane LOS		A	A
Approach Delay (s)	0.0	0.5	9.5
Approach LOS			A

Intersection Summary			
Average Delay	1.2		
Intersection Capacity Utilization	23.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	3	31	164	1	13	146
Future Volume (Veh/h)	3	31	164	1	13	146
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	3	34	178	1	14	159
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	366	178			179	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	366	178			179	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	96			99	
cM capacity (veh/h)	628	864			1397	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	37	179	173
Volume Left	3	0	14
Volume Right	34	1	0
cSH	839	1700	1397
Volume to Capacity	0.04	0.11	0.01
Queue Length 95th (m)	1.1	0.0	0.2
Control Delay (s)	9.5	0.0	0.7
Lane LOS	A		A
Approach Delay (s)	9.5	0.0	0.7
Approach LOS	A		

Intersection Summary			
Average Delay	1.2		
Intersection Capacity Utilization	29.5%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	245	12	15	138	9	11
Future Volume (Veh/h)	245	12	15	138	9	11
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	266	13	16	150	10	12
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			279		454	272
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			279		454	272
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			99		98	98
cM capacity (veh/h)			1284		556	766

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	279	166	22
Volume Left	0	16	10
Volume Right	13	0	12
cSH	1700	1284	654
Volume to Capacity	0.16	0.01	0.03
Queue Length 95th (m)	0.0	0.3	0.8
Control Delay (s)	0.0	0.9	10.7
Lane LOS		A	B
Approach Delay (s)	0.0	0.9	10.7
Approach LOS			B

Intersection Summary			
Average Delay	0.8		
Intersection Capacity Utilization	30.9%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	2	21	203	3	29	195
Future Volume (Veh/h)	2	21	203	3	29	195
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	2	23	221	3	32	212
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	498	222			224	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	498	222			224	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	97			98	
cM capacity (veh/h)	519	817			1345	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	25	224	244
Volume Left	2	0	32
Volume Right	23	3	0
cSH	781	1700	1345
Volume to Capacity	0.03	0.13	0.02
Queue Length 95th (m)	0.8	0.0	0.6
Control Delay (s)	9.8	0.0	1.2
Lane LOS	A		A
Approach Delay (s)	9.8	0.0	1.2
Approach LOS	A		

Intersection Summary			
Average Delay	1.1		
Intersection Capacity Utilization	37.3%	ICU Level of Service	A
Analysis Period (min)	15		

Appendix F

TDM Checklists

Introduction

The City of Ottawa's *Transportation Impact Assessment (TIA) Guidelines* (specifically Module 4.1—Development Design) requires proponents of qualifying developments to use the City's **TDM-Supportive Development Design and Infrastructure Checklist** to assess the opportunity to implement design elements that are supportive of sustainable modes. The goal of this assessment is to ensure that the development provides safe and efficient access for all users, while creating an environment that encourages walking, cycling and transit use.

The remaining sections of this document are:

- Using the Checklist
- Glossary
- TDM-Supportive Development Design and Infrastructure Checklist: Non-Residential Developments
- TDM-Supportive Development Design and Infrastructure Checklist: Residential Developments

Readers are encouraged to contact the City of Ottawa's TDM Officer for any guidance and assistance they require to complete this checklist.

Using the Checklist

This **TDM-Supportive Development Design and Infrastructure Checklist** document includes two actual checklists, one for non-residential developments (office, institutional, retail or industrial) and one for residential developments (multi-family or condominium only; subdivisions are exempt). Readers may download the applicable checklist in electronic format and complete it electronically, or print it out and complete it by hand. As an alternative, they may create a freestanding document that lists the design and infrastructure measures being proposed and provides additional detail on them.

Each measure in the checklist is numbered for easy reference. Each measure is also flagged as:

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

Glossary

This glossary defines and describes the following measures that are identified in the **TDM-Supportive Development Design and Infrastructure Checklist**:

Walking & cycling: Routes
- Building location & access points
- Facilities for walking & cycling
- Amenities for walking & cycling

Walking & cycling: End-of-trip facilities
- Bicycle parking
- Secure bicycle parking
- Shower & change facilities
- Bicycle repair station

Transit
- Walking routes to transit
- Customer amenities

Ridesharing
- Pick-up & drop-off facilities
- Carpool parking

Carsharing & bikesharing
- Carshare parking spaces
- Bikeshare station location

Parking
- Number of parking spaces
- Separate long-term & short-term parking areas

Other
- On-site amenities to minimize off-site trips

In addition to specific references made in this glossary, readers should consult the City of Ottawa's design and planning guidelines for a variety of different land uses and contexts, available on the City's website at www.ottawa.ca. Readers may also find the following resources to be helpful:

- *Promoting Sustainable Transportation through Site Design*, Institute of Transportation Engineers, 2004 (www.cite7.org/wpdm-package/iterp-promoting-sustainable-transportation)
- *Bicycle End-of-Trip Facilities: A Guide for Canadian Municipalities and Employers*, Transport Canada, 2010 (www.fcm.ca/Documents/tools/GMF/Transport_Canada/BikeEndofTrip_EN.pdf)

▶ *Walking & cycling: Routes*

Building location & access points. Correctly positioning buildings and their entrances can help make walking convenient, comfortable and safe. Minimizing travel distances and maximizing visibility are key.

Facilities for walking & cycling. The Official Plan gives clear direction on the provision and design of walking and cycling facilities for both access and circulation. On larger, busier sites (e.g. multi-building campuses) the inclusion of sidewalks, pathways, marked crossings, stop signs and traffic calming features can create a safer and more supportive environment for active transportation.

Amenities for walking & cycling. Lighting, landscaping, benches and wayfinding can make walking and cycling safer and more secure, comfortable and accessible.

▶ *Walking & cycling: End-of-trip facilities*

Bicycle parking. The Official Plan and Zoning By-law both address the need for adequate bicycle parking at developments. Weather protection and theft prevention are major concerns for commuters who spend hundreds or thousands of dollars on a quality bicycle. Bicycle racks should have a design that enables secure locking while preventing damage to wheels. They should be located within sight of busy areas such as main building entrances or staffed parking kiosks.

Secure bicycle parking. Ottawa's Zoning By-law requires a secure area for bicycles at office or residential developments having more than 50 bicycle parking spaces. Lockable outdoor bike cages or indoor storage rooms that limit access to registered users are ideal.

Shower & change facilities. Longer-distance cyclists, joggers and even pedestrians can need a place to shower and change at work; the lack of such facilities is a major barrier to active commuting. Lockers and drying racks provide a place to store gear away from workspaces, and showers and grooming stations allow commuters to make themselves presentable for the office.

Bicycle repair station. Cycling commuters can experience maintenance issues that make the homeward trip difficult or impossible. A small supply of tools (e.g. air pump, Allen keys, wrenches) and supplies (e.g. inner tube patches, chain lubricant) in the workplace can help.

▶ *Transit*

Customer amenities. Larger developments that feature an on-site transit stop can make transit use more attractive by providing shelters, lighting and benches. Even better, they could integrate the passenger waiting area into a building entrance.

▶ *Ridesharing*

Pick-up & drop-off facilities. Having a safe place to load or unload passengers (for carpools as well as taxis and ride-hailing services) without obstructing pedestrians, cyclists or other vehicles can help make carpooling work.

Carpool parking. At destinations with large parking lots (or lots that regularly fill to capacity), signed priority carpool parking spaces can be an effective ridesharing incentive. Priority spaces are frequently abused by non-carpoolers, so a system to provide registered users with vehicle identification tags is recommended.

▶ *Carsharing & bikesharing*

Carshare parking spaces. For developments where carsharing could be an attractive option for employees, visitors or residents, ensuring an attractive location for future carshare parking spaces can avoid challenges associated with future retrofits.

Bikeshare station location. For developments where bikesharing could be an attractive option for employees, visitor or residents, ensuring an attractive location for a future bikeshare station can avoid challenges associated with future retrofits.

▶ *Parking*

Number of parking spaces. Parking capacity is an important variable in development design, as it can either support or subvert the mode share targets set during the transportation impact analysis (TIA). While the Zoning By-law establishes any minimum and/or maximum requirements for parking capacity, it also allows a reduction in any minimum to reflect the existence of on-site shower, change and locker rooms provided for cyclists.

Separate long-term & short-term parking areas. Because access to unused parking spaces can be a powerful incentive to drive, developments can better manage their parking supply and travel behaviours by separating long-term from short-term parking through the use of landscaping, gated controls or signs. Doing so makes it difficult for long-term parkers (e.g. commuters) to park in short-term areas (e.g. for visitors) as long as enforcement occurs; it also protects long-term parking capacity for its intended users.

▶ *Other*

On-site amenities to minimize off-site trips. Developments that offer facilities to limit employees' need for a car during their commute (e.g. to drop off children at daycare) or during their workday (e.g. to hit the gym) can free employees to make the commuting decision that otherwise works best for them.

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

Legend

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

		TDM-supportive design & infrastructure measures: *Residential developments*	Check if completed & add descriptions, explanations or plan/drawing references
	1.	**WALKING & CYCLING: ROUTES**	
	1.1	**Building location & access points**	
BASIC	1.1.1	Locate building close to the street, and do not locate parking areas between the street and building entrances	☒
BASIC	1.1.2	Locate building entrances in order to minimize walking distances to sidewalks and transit stops/stations	☒
BASIC	1.1.3	Locate building doors and windows to ensure visibility of pedestrians from the building, for their security and comfort	☒
	1.2	**Facilities for walking & cycling**	
REQUIRED	1.2.1	Provide convenient, direct access to stations or major stops along rapid transit routes within 600 metres; minimize walking distances from buildings to rapid transit; provide pedestrian-friendly, weather-protected (where possible) environment between rapid transit accesses and building entrances; ensure quality linkages from sidewalks through building entrances to integrated stops/stations *(see Official Plan policy 4.3.3)*	☐ No known bus stop location at this time
REQUIRED	1.2.2	Provide safe, direct and attractive pedestrian access from public sidewalks to building entrances through such measures as: reducing distances between public sidewalks and major building entrances; providing walkways from public streets to major building entrances; within a site, providing walkways along the front of adjoining buildings, between adjacent buildings, and connecting areas where people may congregate, such as courtyards and transit stops; and providing weather protection through canopies, colonnades, and other design elements wherever possible *(see Official Plan policy 4.3.12)*	☒

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

		TDM-supportive design & infrastructure measures: *Residential developments*	Check if completed & add descriptions, explanations or plan/drawing references
	2.	**WALKING & CYCLING: END-OF-TRIP FACILITIES**	
	2.1	**Bicycle parking**	
REQUIRED	2.1.1	Provide bicycle parking in highly visible and lighted areas, sheltered from the weather wherever possible *(see Official Plan policy 4.3.6)*	☒
REQUIRED	2.1.2	Provide the number of bicycle parking spaces specified for various land uses in different parts of Ottawa; provide convenient access to main entrances or well-used areas *(see Zoning By-law Section 111)*	☒
REQUIRED	2.1.3	Ensure that bicycle parking spaces and access aisles meet minimum dimensions; that no more than 50% of spaces are vertical spaces; and that parking racks are securely anchored *(see Zoning By-law Section 111)*	☒
BASIC	2.1.4	Provide bicycle parking spaces equivalent to the expected number of resident-owned bicycles, plus the expected peak number of visitor cyclists	☒
	2.2	**Secure bicycle parking**	
REQUIRED	2.2.1	Where more than 50 bicycle parking spaces are provided for a single residential building, locate at least 25% of spaces within a building/structure, a secure area (e.g. supervised parking lot or enclosure) or bicycle lockers *(see Zoning By-law Section 111)*	☒
BETTER	2.2.2	Provide secure bicycle parking spaces equivalent to at least the number of units at condominiums or multi-family residential developments	☐
	2.3	**Bicycle repair station**	
BETTER	2.3.1	Provide a permanent bike repair station, with commonly used tools and an air pump, adjacent to the main bicycle parking area (or secure bicycle parking area, if provided)	☐
	3.	**TRANSIT**	
	3.1	**Customer amenities**	
BASIC	3.1.1	Provide shelters, lighting and benches at any on-site transit stops	☐
BASIC	3.1.2	Where the site abuts an off-site transit stop and insufficient space exists for a transit shelter in the public right-of-way, protect land for a shelter and/or install a shelter	☐
BETTER	3.1.3	Provide a secure and comfortable interior waiting area by integrating any on-site transit stops into the building	☐

		TDM-supportive design & infrastructure measures: *Residential developments*	Check if completed & add descriptions, explanations or plan/drawing references
	4.	**RIDESHARING**	
	4.1	**Pick-up & drop-off facilities**	
BASIC	4.1.1	Provide a designated area for carpool drivers (plus taxis and ride-hailing services) to drop off or pick up passengers without using fire lanes or other no-stopping zones	☒ Convenient drop-off on street for north building and in courtyard for south building
	5.	**CARSHARING & BIKESHARING**	
	5.1	**Carshare parking spaces**	
BETTER	5.1.1	Provide up to three carshare parking spaces in an R3, R4 or R5 Zone for specified residential uses *(see Zoning By-law Section 94)*	☒ Reserving one visitor parking space for car share service
	5.2	**Bikeshare station location**	
BETTER	5.2.1	Provide a designated bikeshare station area near a major building entrance, preferably lighted and sheltered with a direct walkway connection	☐
	6.	**PARKING**	
	6.1	**Number of parking spaces**	
REQUIRED	6.1.1	Do not provide more parking than permitted by zoning, nor less than required by zoning, unless a variance is being applied for	☐ Requesting variance for parking reduction of 25 stalls or 11%.
BASIC	6.1.2	Provide parking for long-term and short-term users that is consistent with mode share targets, considering the potential for visitors to use off-site public parking	☐
BASIC	6.1.3	Where a site features more than one use, provide shared parking and reduce the cumulative number of parking spaces accordingly *(see Zoning By-law Section 104)*	☐ N/A. Project is entirely residential
BETTER	6.1.4	Reduce the minimum number of parking spaces required by zoning by one space for each 13 square metres of gross floor area provided as shower rooms, change rooms, locker rooms and other facilities for cyclists in conjunction with bicycle parking *(see Zoning By-law Section 111)*	☐
	6.2	**Separate long-term & short-term parking areas**	
BETTER	6.2.1	Provide separate areas for short-term and long-term parking (using signage or physical barriers) to permit access controls and simplify enforcement (i.e. to discourage residents from parking in visitor spaces, and vice versa)	☒ Separated by signage

Introduction

The City of Ottawa's *Transportation Impact Assessment (TIA) Guidelines* (specifically Module 4.3—Transportation Demand Management) requires proponents of qualifying developments to assess the context, need and opportunity for transportation demand management (TDM) measures at their development. The guidelines require that proponents complete the City's **TDM Measures Checklist**, at a minimum, to identify any TDM measures being proposed.

The remaining sections of this document are:

- Using the Checklist
- Glossary
- TDM Measures Checklist: Non-Residential Developments
- TDM Measures Checklist: Residential developments

Readers are encouraged to contact the City of Ottawa's TDM Officer for any guidance and assistance they require to complete this checklist.

Using the Checklist

The City's *TIA Guidelines* are designed so that *Module 3.1—Development-Generated Travel Demand*, *Module 4.1—Development Design*, and *Module 4.2—Parking* are complete before a proponent begins *Module 4.3—Transportation Demand Management*.

Within Module 4.3, *Element 4.3.1—Context for TDM* and *Element 4.3.2—Need and Opportunity* are intended to create an understanding of the need for any TDM measures, and of the results they are expected to achieve or support. Once those two elements are complete, proponents begin *Element 4.3.3—TDM Program* that requires proponents to identify proposed TDM measures using the **TDM Measures Checklist**, at a minimum. The *TIA Guidelines* note that the City may require additional analysis for large or complex development proposals, or those that represent a higher degree of performance risk; as well, proponents proposing TDM measures for a new development must also propose an implementation plan that addresses planning and coordination, funding and human resources, timelines for action, performance targets and monitoring requirements.

This **TDM Measures Checklist** document includes two actual checklists, one for non-residential developments (office, institutional, retail or industrial) and one for residential developments (multi-family, condominium or subdivision). Readers may download the applicable checklist in electronic format and complete it electronically, or print it out and complete it by hand. As an alternative, they may create a freestanding document that lists the TDM measures being proposed and provides additional detail on them, including an implementation plan as required by the City's *TIA Guidelines*.

Each measure in the checklist is numbered for easy reference. Each measure is also flagged as:

- BASIC —The measure is generally feasible and effective, and in most cases would benefit the development and its users.
- BETTER —The measure could maximize support for users of sustainable modes, and optimize development performance.
- ★ —The measure is one of the most dependably effective tools to encourage the use of sustainable modes.

Glossary

This glossary defines and describes the following measures that are identified in the **TDM Measures Checklist**:

TDM program management
- Program coordinator
- Travel surveys

Parking
- Priced parking

Walking & cycling
- Information on walking/cycling routes & destinations
- Bicycle skills training
- Valet bike parking

Transit
- Transit information
- Transit fare incentives
- Enhanced public transit service
- Private transit service

Ridesharing
- Ridematching service
- Carpool parking price incentives
- Vanpool service

Carsharing & bikesharing
- Bikeshare stations & memberships
- Carshare vehicles & memberships

TDM marketing & communications
- Multimodal travel information
- Personalized trip planning
- Promotions

Other incentives & amenities
- Emergency ride home
- Alternative work arrangements
- Local business travel options
- Commuter incentives
- On-site amenities

For further information on selecting and implementing TDM measures (particularly as they apply to non-residential developments, with a focus on workplaces), readers may find it helpful to consult Transport Canada's *Workplace Travel Plans: Guidance for Canadian Employers*, which can be

downloaded in English and French from the ACT Canada website at www.actcanada.com/resources/act-resources.

▶ *TDM program management*

While some TDM measures can be implemented with a minimum of effort through routine channels (e.g. parking or human resources), more complex measures or a larger development site may warrant assigning responsibility for TDM program coordination to a designated person either inside or outside the implementing organization. Similarly, some TDM measures are more effective if they are targeted or customized for specific audiences, and would benefit from the collection of related information.

Program coordinator. This person is charged with day-to-day TDM program development and implementation. Only in very large employers with thousands of workers is this likely to be a full-time, dedicated position. Usually, it is added to an existing role in parking, real estate, human resources or environmental management. In practice, this role may be called TDM coordinator, commute trip reduction coordinator or employee transportation coordinator. The City of Ottawa can identify external resources (e.g. non-profit organizations or consultants) that could provide these services.

Travel surveys. Travel surveys are most commonly conducted at workplaces, but can be helpful in other settings. They identify how and why people travel the way they do, and what barriers and opportunities exist for different behaviours. They usually capture the following information:

- *Personal data* including home address or postal code, destination, job type or function, employment status (full-time, part-time and/or teleworker), gender, age and hours of work
- *Commute information* including distance or time for the trip between home and work, usual methods of commuting, and reasons for choosing them
- *Barriers and opportunities* including why other commuting methods are unattractive, willingness to consider other options, and what improvements to other options could make them more attractive

▶ *Parking*

Priced parking. Charging for parking is typically among the most effective ways of getting drivers to consider other travel options. While drivers may not support parking fees, they can be more accepting if the revenues are used to improve other travel options (e.g. new showers and change rooms, improved bicycle parking or subsidized transit passes). At workplaces or daytime destinations, parking discounts (e.g. early bird specials, daily passes that cost significantly less than the equivalent hourly charge, monthly passes that cost significantly less than the equivalent daily charge) encourage long-term parking and discourage the use of other travel options. For residential uses, unbundling parking costs from dwelling purchase, lease or rental costs provides an incentive for residents to own fewer cars, and can reduce car use and the costs of parking provision.

▶ *Walking & cycling*

Active transportation options like cycling and walking are particularly attractive for short trips (typically up to 5 km and 2 km, respectively). Other supportive factors include an active, health-conscious audience, and development proximity to high-quality walking and cycling networks. Common challenges to active transportation include rain, darkness, snowy or icy conditions, personal safety concerns, the potential for bicycle theft, and a lack of shower and change facilities for those making longer trips.

Information on walking/cycling routes & destinations. Ottawa, Gatineau and the National Capital Commission all publish maps to help people identify the most convenient and comfortable walking or cycling routes.

Bicycle skills training. Potential cyclists can be intimidated by the need to ride on roads shared with motor vehicles. This barrier can be reduced or eliminated by offering cycling skills training to interested cyclists (e.g. CAN-BIKE certification courses).

Valet bike parking. For large events, temporary “valet parking” areas can be easily set up to maximize convenience and security for cyclists. Experienced local non-profit groups can help.

▶ *Transit*

Transit information. Difficulty in finding or understanding basic information on transit fares, routes and schedules can prevent people from trying transit. Employers can help by providing online links to OC Transpo and STO websites. Transit users also appreciate visible maps and schedules of transit routes that serve the site; even better, a screen that shows real-time transit arrival information is particularly useful at sites with many transit users and an adjacent transit stop or station.

Transit fare incentives. Free or subsidized transit fares are an attractive incentive for non-transit riders to try transit. Many non-users are unsure of how to pay a fare, and providing tickets or a preloaded PRESTO card (or, for special events, pre-arranging with OC Transpo that transit fares are included with event tickets) overcome that barrier.

Enhanced public transit service. OC Transpo may adjust transit routes, stop locations, service hours or frequencies for an agreed fee under contract, or at no cost where warranted by the potential ridership increase. Information provided by a survey of people who travel to a given development can support these decisions.

Private transit service. At remote suburban or rural workplaces, a poor transit connection to the nearest rapid transit station can be an obstacle for potential transit users, and an employer in this situation could initiate a private shuttle service to make transit use more feasible or attractive. Other circumstances where a shuttle makes sense include large special events, or a residential development for people with limited independent mobility who still require regular access to shops and services.

▶ *Ridesharing*

Ridesharing's potential is greatest in situations where transit ridership is low, where parking costs are high, and/or where large numbers of car commuters (e.g. employees or full-time students) live reasonably far from the workplace.

Ridematching service. Potential carpoolers in Ottawa are served by www.OttawaRideMatch.com, an online service to help people find carpool partners. Employers can arrange for a dedicated portal where their employees can search for potential carpool partners only among their colleagues, if they desire. Some very large employers may establish internal ridematching services, to maximize employee uptake and corporate control. Ridematching service providers typically include a waiver to relieve employers of liability when their employees start carpooling through a ridematching service. Ridesharing with co-workers also tends to eliminate security concerns.

Carpool parking price incentives. Discounted parking fees for carpools can be an extra incentive to rideshare.

Vanpool service. Vanpools operate in the Toronto and Vancouver metropolitan areas, where vans that carry up to about ten occupants are driven by one of the vanpool members. Vanpools tend to operate on a cost-recovery basis, and are most practical for long-distance commutes where transit is not an option. Current legislation in Ontario does not permit third-party (i.e. private or non-profit) vanpool services, but does permit employers to operate internal vanpools.

▶ *Carsharing & bikesharing*

Bikeshare station & memberships. VeloGO Bike Share and Right Bike both operate bikesharing services in Ottawa. Developments that would benefit from having a bikeshare station installed at or near their development may negotiate directly with either service provider.

Carshare vehicles & memberships. VRTUCAR and Zipcar both operate carsharing services in Ottawa, for use by the general public or by businesses as an alternative to corporate fleets. Carsharing services offer 24-hour access, self-serve reservation systems, itemized monthly billings, and outsourcing of all financing, insurance, maintenance and administrative responsibilities.

▶ *TDM marketing & communications*

Multimodal travel information. Aside from mode-specific information discussed elsewhere in this document, multimodal information that identifies and explains the full range of travel options available to people can be very influential—especially when provided at times and locations where individuals are actively choosing among those options. Examples include: employees when their employer is relocating, or when they are joining a new employer; students when they are starting a program at a new institution; visitors or customers travelling to an unfamiliar destination, or when faced with new options (e.g. shuttle services or parking restrictions); and residents when they purchase or occupy a residence that is new to them.

Personalized trip planning. As an extension to the simple provision of information, this technique (also known as *individualized marketing*) is effective in helping people make more sustainable travel choices. The approach involves identifying who is most likely to change their travel choices (notably relocating employees, students or residents) giving them customized information, training and incentives to support them in making that change. It may be conducted with assistance from an external service provider with the necessary skills, and delivered in a variety of settings including workplaces and homes.

Promotions. Special events and incentives can raise awareness and encourage individuals to examine and try new travel options.

- *Special events* can help attract attention, build participation and celebrate successes. Events that have been held in Ottawa include Earth Day (in April) Bike to Work Month (in May), Environment Week (early June), International Car Free Day (September 22), and Canadian Ridesharing Week (October). At workplaces or educational institutions, similarly effective internal events could include workshops, lunch-and-learns, inter-departmental challenges, pancake breakfasts, and so on.
- *Incentives* can encourage trial of sustainable modes, and might include loyalty rewards for duration or consistency of activity (e.g. 1,000 km commuted by bicycle), participation prizes (e.g. for completing a survey or joining a special event), or personal recognition that highlights individual accomplishments.

▶ *Other incentives & amenities*

Emergency ride home. This measure assures non-driving commuters that they will be able to get home quickly and conveniently in case of family emergency (or in some workplaces, in case of unexpected overtime, severe weather conditions, or the early departure of a carpool driver) by offering a chit or reimbursement for taxi, carshare or rental car usage. Limits on annual usage or cost per employee may be set, although across North America the actual rates of usage are typically very low.

Alternative work arrangements. A number of alternatives to the standard 9-to-5, Monday-to-Friday workweek can support sustainable commuting (and work-life balance) at workplaces:

- *Flexible working hours* allow transit commuters to take advantage of the fastest and most convenient transit services, and allow potential carpoolers to include people who work slightly different schedules in their search for carpool partners. They also allow active commuters to travel at least one direction in daylight, either in the morning or the afternoon, during the winter.
- *Compressed workweeks* allow employees to work their required hours over fewer days (e.g. five days in four, or ten days in nine), eliminating the need to commute on certain days. For employees, this can promote work-life balance and gives flexibility for appointments. For employers, this can permit extended service hours as well as reduced parking demands if employees stagger their days off.
- *Telework* is a normal part of many workplaces. It helps reduce commuting activity, and can lead to significant cost savings through workspace sharing. Telework initiatives involve many stakeholders, and may face as much resistance as support within an organization. Consultation, education and training are helpful.

Local business travel options. A common obstacle for people who might prefer to not drive to work is that their employer requires them to bring a car to work so they can make business trips during the day. Giving employees convenient alternatives to private cars for local business travel during the workday makes walking, cycling, transit or carpooling in someone else's car more practical.

- *Walking and cycling*—Active transportation can be a convenient and enjoyable way to make short business trips. They can also reduce employer expenses, although they may require extra travel time. Providing a fleet of shared bikes, or reimbursing cyclists for the kilometres they ride, are inexpensive ways to validate their choice.
- *Public transit*—Transit can be convenient and inexpensive compared to driving. OC Transpo's PRESTO cards are transferable among employees and automatically reloadable, making them the perfect tool for enabling transit use during the day.
- *Ridesharin*g—When multiple employees attend the same off-site meeting or event, they can be reminded to carpool whenever possible.
- *Taxis or ride-hailing*—Taxis and ride-hailing can eliminate parking costs, save time and eliminate collision liability concerns. Taxi chits eliminate cash transactions and minimize paperwork.
    - *Fleet vehicles or carsharing*—Fleet vehicles can be cost-effective for high travel volumes, while carsharing is a great option for less frequent trips.
    - *Interoffice shuttles*—Employers with multiple worksites in the region could use a shuttle service to move people as well as mail or supplies.
    - *Videoconferencing*—New technologies mean that staying in the office to hold meetings electronically is more viable, affordable and productive than ever.

Commuter incentives. Financial incentives can help create a level playing field and support commuting by sustainable modes. A "commuting allowance" given to all employees as a taxable benefit is one such incentive; employees who choose to drive could then be charged for parking, while other employees could use the allowance for transit fares or cycling equipment, or for spending or saving. (Note that in the United States this practice is known as "parking cash-out," and is popular because commuting allowances are not taxable up to a certain limit). Alternatively, a monthly commuting allowance for non-driving employees would give drivers an incentive to choose a different commuting mode. Another practical incentive for active commuters or transit users is to offer them discounted "rainy day" parking passes for a small number of days each month.

On-site amenities. Developments that offer services to limit employees' need for a car during their commute (e.g. to drop off clothing at the dry cleaners) or during their workday (e.g. to buy lunch) can free employees to make the commuting decision that otherwise works best for them.

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

Legend

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

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

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

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

		TDM measures: *Residential developments*	Check if proposed & add descriptions
		3. TRANSIT	
		3.1 Transit information	
BASIC		3.1.1 Display relevant transit schedules and route maps at entrances *(multi-family, condominium)*	☒
BETTER		3.1.2 Provide real-time arrival information display at entrances *(multi-family, condominium)*	☐
		3.2 Transit fare incentives	
BASIC	★	3.2.1 Offer PRESTO cards preloaded with one monthly transit pass on residence purchase/move-in, to encourage residents to use transit	☒
BETTER		3.2.2 Offer at least one year of free monthly transit passes on residence purchase/move-in	☐
		3.3 Enhanced public transit service	
BETTER	★	3.3.1 Contract with OC Transpo to provide early transit services until regular services are warranted by occupancy levels *(subdivision)*	☐
		3.4 Private transit service	
BETTER		3.4.1 Provide shuttle service for seniors homes or lifestyle communities (e.g. scheduled mall or supermarket runs)	☐
		4. CARSHARING & BIKESHARING	
		4.1 Bikeshare stations & memberships	
BETTER		4.1.1 Contract with provider to install on-site bikeshare station (*multi-family)*	☐
BETTER		4.1.2 Provide residents with bikeshare memberships, either free or subsidized *(multi-family)*	☐
		4.2 Carshare vehicles & memberships	
BETTER		4.2.1 Contract with provider to install on-site carshare vehicles and promote their use by residents	☐ Will allocate 1 space to be used for carsharing, but will not provide a subsidy
BETTER		4.2.2 Provide residents with carshare memberships, either free or subsidized	☐
		5. PARKING	
		5.1 Priced parking	
BASIC	★	5.1.1 Unbundle parking cost from purchase price *(condominium)*	☐
BASIC	★	5.1.2 Unbundle parking cost from monthly rent *(multi-family)*	☒

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

Appendix G

Smart Centres TIA (no appendices)

DILLON CONSULTING

4200 Innes Road

Transportation Impact Assessment

Step 1 Screening Report

Step 2 Scoping Report

Step 3 Forecasting Report

Step 4 Strategy Report

Prepared for:

SmartCentres REIT
3200 Highway 7
Vaughan, Ontario, L4K 5Z5

Prepared by:

CGH TRANSPORTATION

6 Plaza Court
Ottawa, ON K2H 7W1

July 2022

PN: 2022-047

Table of Contents

List of Figures

Table of Tables

List of Appendices

1 Screening

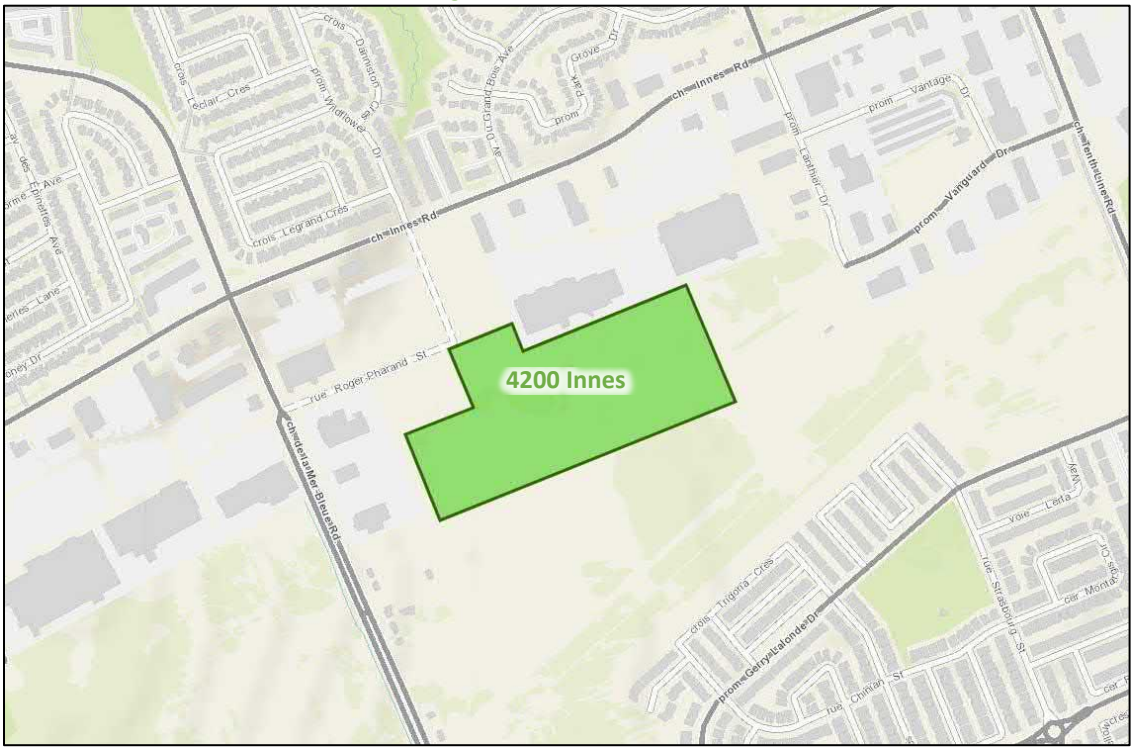
This study has been prepared according to the City of Ottawa's 2017 Transportation Impact Assessment (TIA) Guidelines. Accordingly, a Step 1 Screening Form has been prepared and is included in Appendix A, along with the Certification Form for the TIA Study PM. As shown in the Screening Form, a TIA is required including the Design Review component and the Network Impact Component. This study has been prepared to support the plan of subdivision application.

2 Existing and Planned Conditions

2.1 Proposed Development

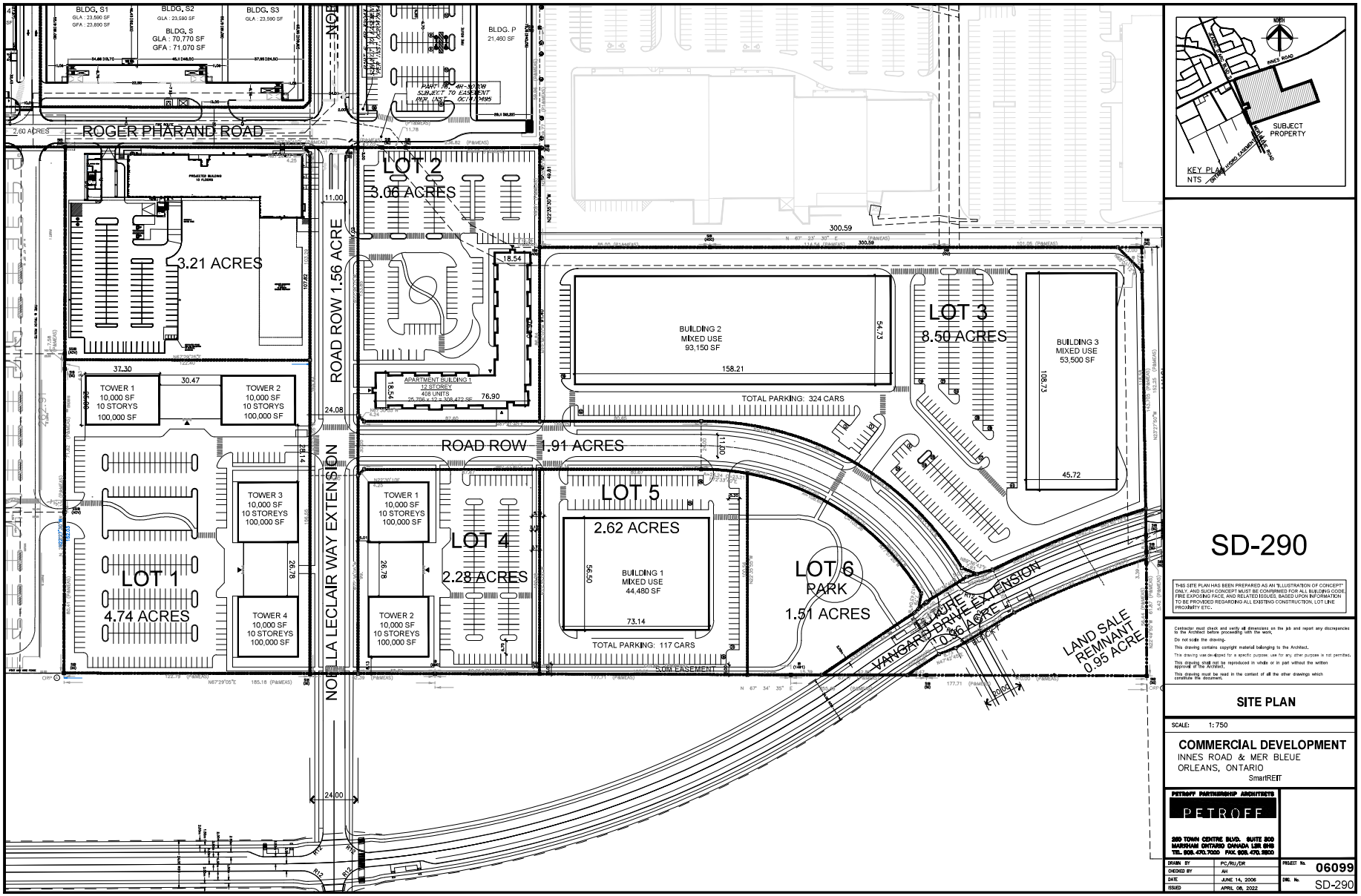
The existing area, located at 4200 Innes Road, is zoned as Arterial Mainstreet Zone (AM[2414] H(40)-h) and General Industrial Zone (IG[1608] H(21)-h). The proposed development consists of a total of 2,340 high-rise residential units, 238,650 sq. ft. of employment space, a long-term care facility, and a 1.51-hectare park. The initial phase of the development will include the Noella Leclair Street extension for Blocks 1, 2 and 4 (1,200 high-rise residential units and a long-term care facility), which is anticipated to be build-out in 2025, and the remaining development (Blocks 3 and 5) will be completed in Phase Two in 2030. The subdivision will connect to Roger Pharand Street, Noella Leclair Street, and the future Vanguard Drive extension. The subdivision is located within the East Urban Community Design Plan area. Figure 1 illustrates the study area context. Figure 2 illustrates the proposed concept plan.

Figure 1: Area Context Plan



Source: http://maps.ottawa.ca/geoOttawa/ Accessed: April 11, 2022

Figure 2: Concept Plan



2.2 Existing Conditions

2.2.1 Area Road Network

Innes Road: Innes Road is a City of Ottawa arterial road. It has a divided four-lane cross-section. Bike lanes and sidewalks are provided on both sides of the road. The posted speed limit is 60 km/h within the study area. The city-protected right-of-way is 40.0 metres between 250 metres west of Prestwick Drive and Tenth Line, and 37.5 metres west of 250 metres west of Prestwick Drive within the study area. Innes Road is designated as a truck route.

Mer Bleue Road: Mer Bleue Road is a City of Ottawa arterial road with a divided four-lane cross-section. Sidewalks and bicycle lanes are provided along both sides of the road. The posted speed limit is 60 km/h within the study area. The city-protected right-of-way is 37.5 metres within the study area. Mer Bleue Road is designated as a truck route.

Jeanne D'Arc Boulevard South: Jeanne D'Arc Boulevard South is a City of Ottawa arterial road with a divided four-lane cross-section. Sidewalks are provided along both sides of the road. The posted speed limit is 60 km/h within the study area. The city-protected right-of-way is 37.5 metres within the study area.

Tenth Line Road: Tenth Line Road is a City of Ottawa arterial road with a divided four-lane cross-section. Within the study area, a sidewalk is provided along the east side of the road and an asphalt pathway is provided on the west side of the road. South of Innes Road, bike lanes are provided on both sides of the road within the study area. The posted speed limit is 60 km/h within the study area. The city-protected right-of-way is 37.5 metres north of Innes Road and 44.5 metres south of Innes Road within the study area.

Prestwick Drive: Prestwick Drive is a City of Ottawa collector road with a two-lane cross-section. A sidewalk is provided along the west side of the road. The posted speed limit is 40 km/h and the city-protected right-of-way is 26.0 metres within the study area.

Vanguard Drive: Vanguard Drive is a City of Ottawa collector road with a two-lane cross-section. Sidewalks are provided along both sides of the road. The unposted speed limit is assumed to be 50 km/h and the existing right-of-way is 23.0 metres along the existing section of the roadway.

Wildflower Drive: Wildflower Drive is a City of Ottawa local road with a two-lane cross-section. A sidewalk is provided along the west side of the road. The posted speed limit is 40 km/h, and the existing right-of-way is 24.0 metres. On-street parking is permitted on both sides of the road within the study area.

Noella Leclair Street: Noella Leclair Street is a City of Ottawa local road with a two-lane cross-section. A 40.0 metres sidewalk is provided on the west side of the road. The unposted speed limit is assumed to be 50 km/h, and the existing right-of-way is 24.0 metres.

Lanthier Drive: Lanthier Drive is a City of Ottawa local road with a two-lane cross-section. Sidewalks are provided on both sides of the road between Innes Road and Vantage Drive. The unposted speed limit is assumed to be 50 km/h, and the existing right-of-way is 20.0 metres.

Roger Pharand Street: Roger Pharand Street is a City of Ottawa local road with a two-lane cross-section. West of Mer Bleue Road, 150-meter sidewalks are provided on both sides of the road. The unposted speed limit is assumed to be 50 km/h, and the existing right-of-way is 20.0 metres. On-street parking is permitted on both sides of the road.

2.2.2 Existing Intersections

The existing signalized area key intersections within one kilometre of the site have been summarized below:

Innes Road at Walmart SC	The intersection of Innes Road at Walmart SC is a signalized intersection. The northbound approach consists of a left-turn lane and a right-turn lane. The eastbound approach consists of a through lane, a shared through/right-turn lane, and a bike lane, and a westbound approach consists of an auxiliary left-turn lane, two through lanes, and a bike lane. No turn restrictions are noted.
Innes Road at Jeanne D'Arc Boulevard South/Mer Bleue Road	The intersection of Innes Road at Jeanne D'Arc Boulevard South/Mer Bleue Road is a signalized intersection. The northbound and southbound approaches each consist of two auxiliary left-turn lanes, a through lane, a bike lane, and a shared through/ channelized right-turn lane. The eastbound and west approaches each consist of an auxiliary left-turn lane, two through lanes, a floating bike lane, and an auxiliary channelized right-turn lane. No turn restrictions are noted.
Innes Road at Wildflower Drive/ Noella Leclair Street	The intersection of Innes Road at Wildflower Drive/Noella Leclair Street is a signalized intersection. The northbound and southbound approaches each consist of an auxiliary left-turn lane and a shared through/right-turn lane. The eastbound and westbound approaches each consist of an auxiliary left-turn lane, a through lane, a shared through/right-turn lane, and a bike lane. No turn restrictions are noted.
Innes Road at 4220/4270 Innes Road	The intersection of Innes Road at 4220/4270 Innes Road is a signalized intersection. The northbound approach consists of two auxiliary left-turn lanes and a right-turn lane. The eastbound approach consists of two through lanes, a floating bike lane, and an auxiliary right-turn lane, and the westbound approach consists of an auxiliary left-turn lane, two through lanes, and a bike lane. No turn restrictions are noted.
Innes Road at Prestwick Drive/Lanthier Drive	The intersection of Innes Road at Prestwick Drive/Lanthier Drive is a signalized intersection. The northbound and southbound approaches each consist of an auxiliary left-turn lane and a shared through/right-turn lane. The eastbound approach consists of an auxiliary left-turn lane, two through lanes, a floating bike lane, and an auxiliary channelized right-turn lane, and the westbound approach consists of an auxiliary left-turn lane, a through lane, a shared through/right-turn lane, and a bike lane. No turn restrictions are noted.
Roger Pharand Street at Mer Bleue Road	The intersection of Roger Pharand Street at Mer Bleue Road is a signalized intersection. The northbound and southbound approaches each consist of an auxiliary left-turn lane, two through lanes, a bike lane, and an auxiliary right-turn lane. The eastbound and the westbound approaches each consist of an auxiliary left-turn lane and a shared through/right-turn lane. No turn restrictions are noted. The northbound and southbound approaches have reserved space for future expansion to dual left-turn lanes.
Vanguard Drive at Lanthier Drive	The intersection of Vanguard Drive at Lanthier Drive operates in a free flow configuration through a 90-degree bend between the north and

east legs. This location will be a future intersection once Vanguard is extended westerly.

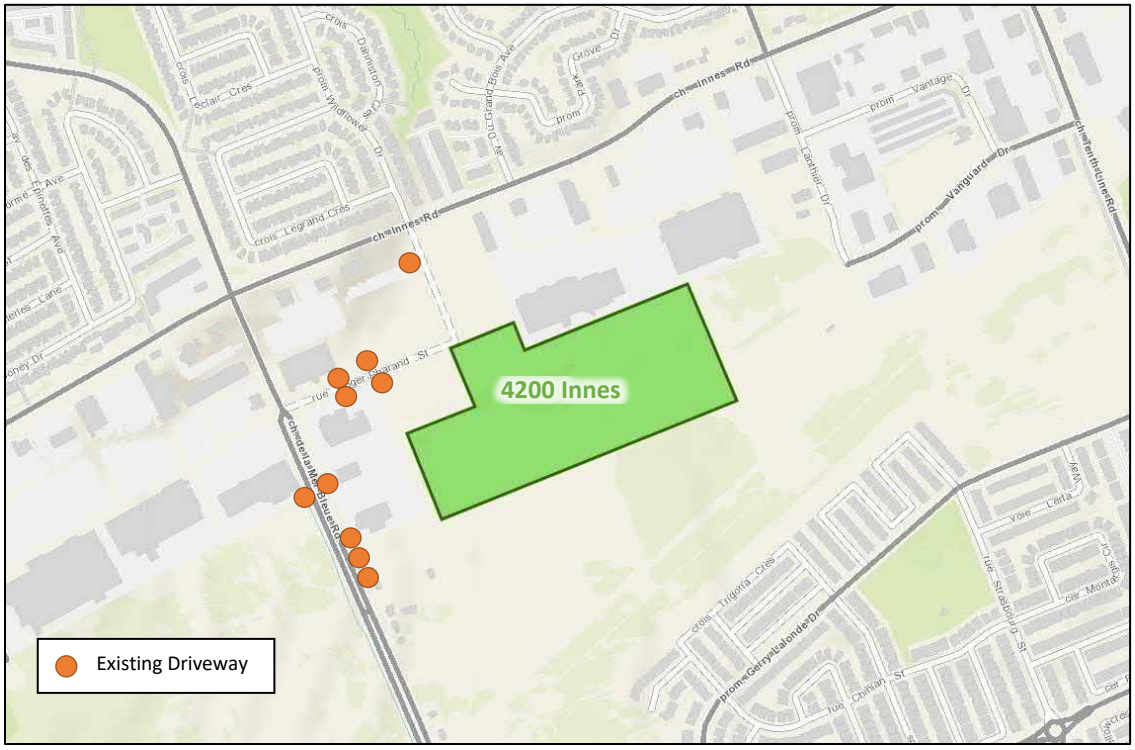
Vanguard Drive at Tenth Line Road

The intersection of Vanguard Drive at Tenth Line Road is a signalized intersection. The northbound and southbound approaches each consist of an auxiliary left-turn lane, two through lanes, a floating bike lane, and an auxiliary right-turn lane. The eastbound and westbound approaches each consist of an auxiliary left-turn lane and a shared through/right-turn lane. No turn restrictions are noted.

2.2.3 Existing Driveways

Within 200 metres of the site accesses, two driveways to the retail plaza and two driveways to dealerships are located on Roger Pharand Street. One driveway to the retail plaza is located on Noella Leclair Street. Two driveways to dealerships, one to the retail plaza, one to the storage rental, and one to residential dwelling are located on Mer Bleue Road. Figure 3 illustrates the existing driveways.

Figure 3: Existing Driveways



Source: http://maps.ottawa.ca/geoOttawa/ Accessed: March 21, 2022

2.2.4 Cycling and Pedestrian Facilities

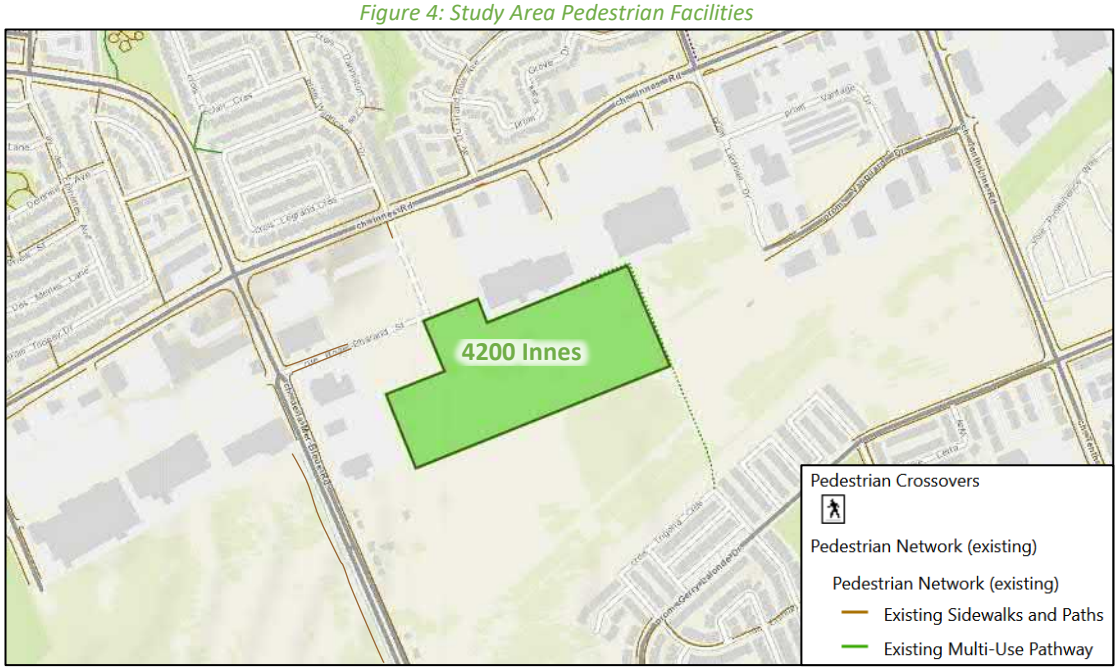
Figure 4 illustrates the pedestrian facilities in the study area and Figure 5 illustrates the cycling facilities.

Sidewalks are provided on both sides along Innes Road, Mer Bleue Road, Jeanne D'Arc Boulevard, Vanguard Drive, and along Lanthier Drive between Innes Road and Vantage Drive, on the east side of Tenth Line Road, and the west side of Prestwick Drive and Wildflower Drive. Sidewalks are also provided on the west side of Noella Leclair Street for approximately 40.0 metres and both sides of Roger Pharand Street for about 150 meters. An asphalt pathway is provided on the west side of Tenth Line Road.

Cycling facilities include bike lanes along both sides of Innes Road, Mer Bleue Road, and Tenth Line Road south of Innes Road.

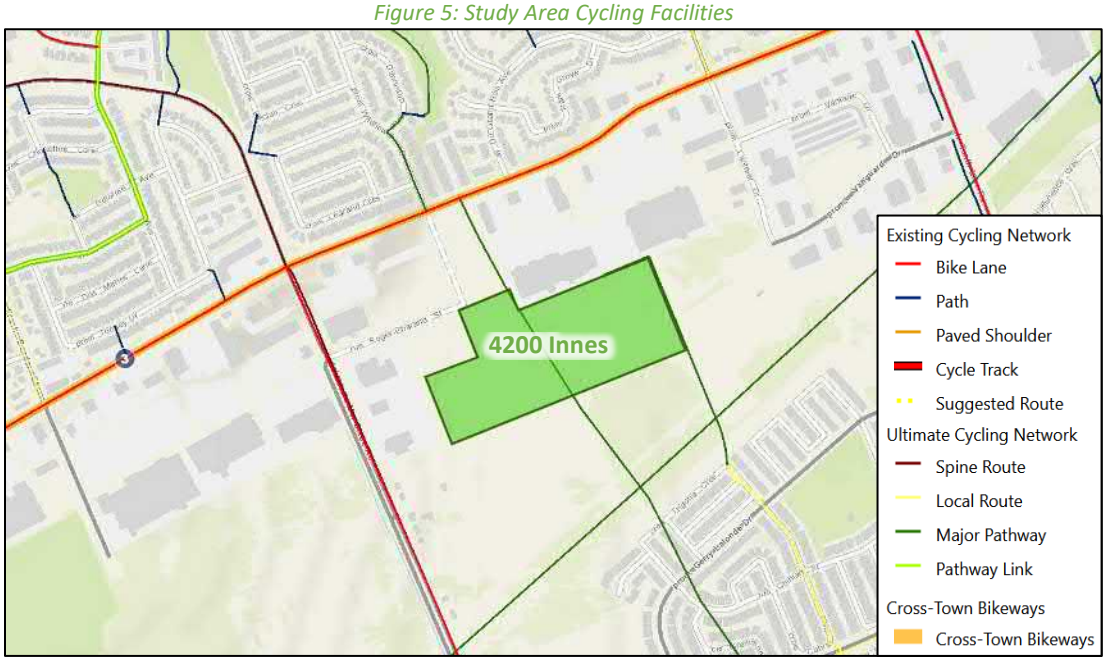
Innes Road, Mer Bleue Road, Jeanne D'Arc Boulevard, and Tenth Line Road are spine routes, and Prestwick Drive is a local route. Tenth Line Road north of Innes Road and Innes Road are cross-town bikeways. A major pathway is planned to be provided to connect Innes Road and Trans-Orleans pathway.

Figure 4: Study Area Pedestrian Facilities



Source: http://maps.ottawa.ca/geoOttawa/ Accessed: April 11, 2022

Figure 5: Study Area Cycling Facilities



Source: http://maps.ottawa.ca/geoOttawa/ Accessed: April 11, 2022

Pedestrian and cyclist volumes included in study area intersection counts, presented in Section 2.2.7, have been compiled and are illustrated in Figure 6 and Figure 7, respectively.

Figure 6: Existing Pedestrian Volumes

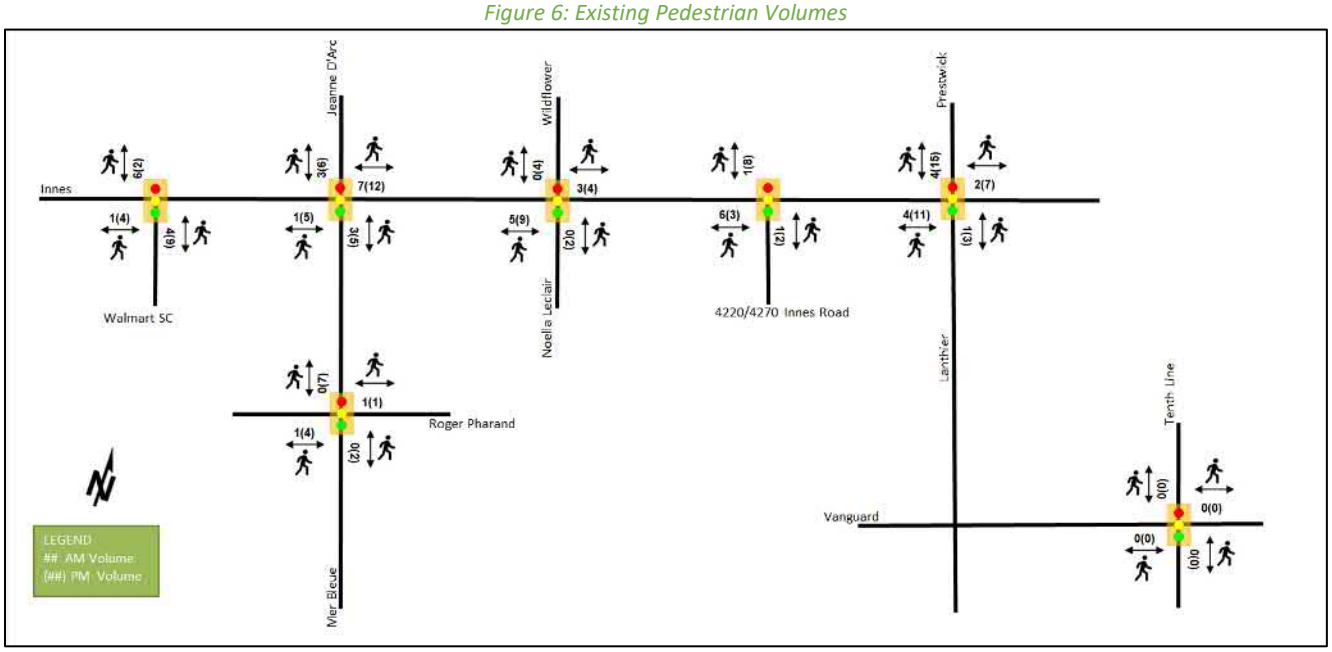
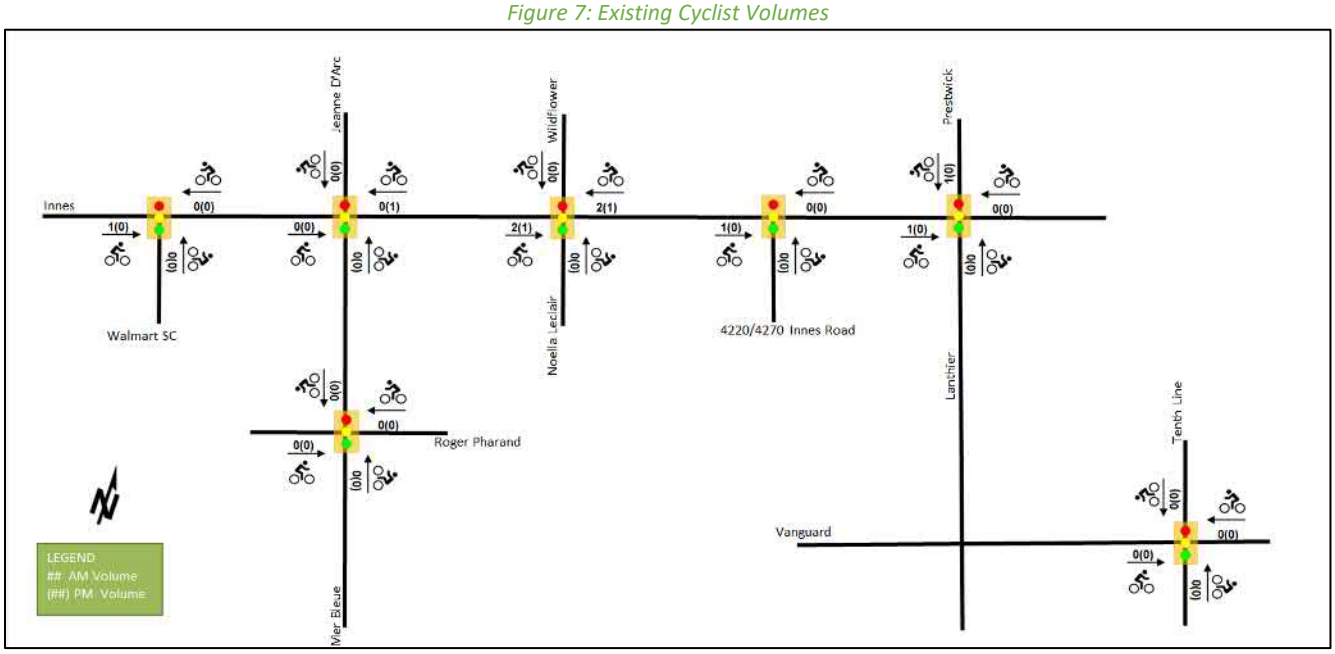


Figure 7: Existing Cyclist Volumes



2.2.5 Existing Transit

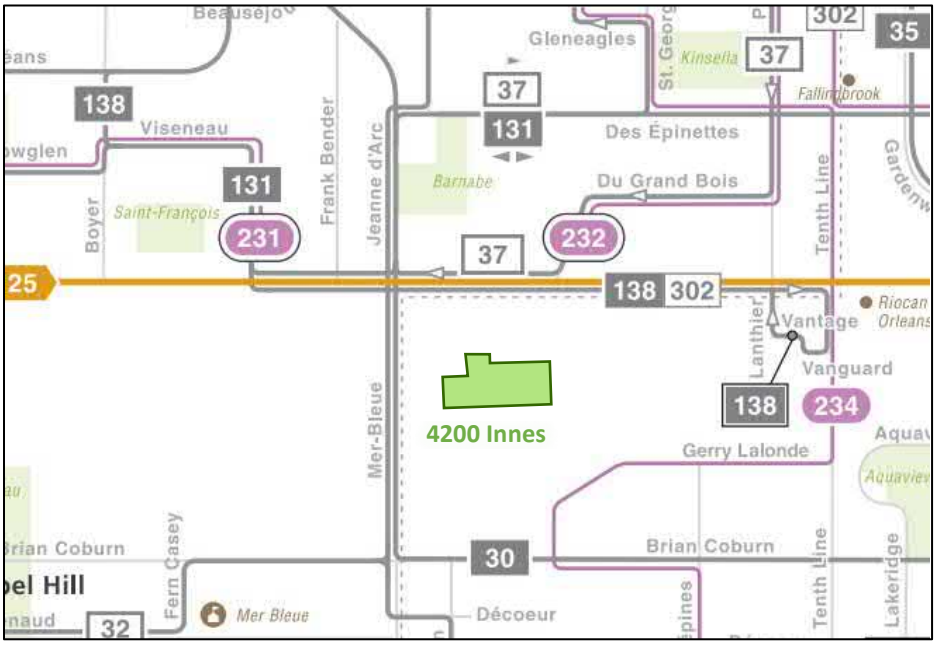
Within the study area, routes #25 and #138 travel along Innes Road, routes #30 and #32 travel along Jeanne D'Arc Boulevard South and Mer Bleue Road, and routes #37 and #131 travel along Jeanne D'Arc Boulevard South and Innes Road. The frequency of these routes within proximity of the proposed site currently are:

- Route # 25 – 10-15-minute service in the peak period/direction, 15-minute daytime service, 30-minute service after 8:00 PM

- Route # 37 – 30-minute service in the peak period/direction, one hour service after 6:00 PM
- Route # 138 – 30-minute service in the peak period/direction, one hour service outside of peaks
- Route # 30 – 30-minute service all-day
- Route # 32 – 30-minute service in the peak period/direction
- Route # 131 – 30-minute service all-day

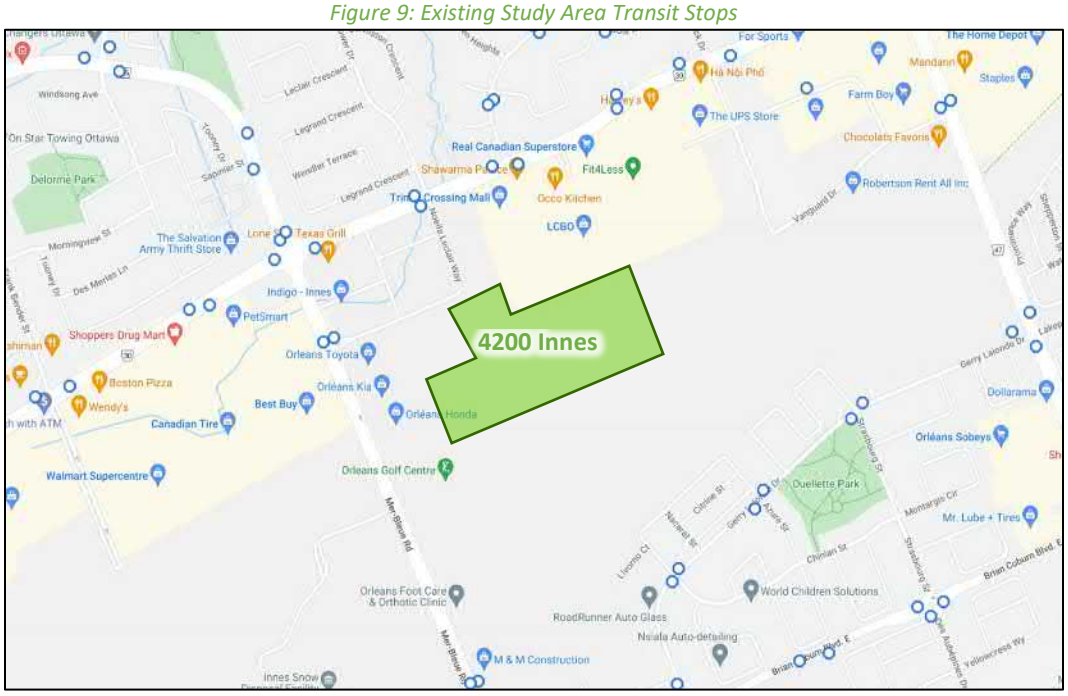
Figure 8 illustrates the transit system map in the study area and Figure 9 illustrates nearby transit stops.

Figure 8: Existing Study Area Transit Service



Source: http://www.octranspo.com/ Accessed: April 11, 2022

Figure 9: Existing Study Area Transit Stops



Source: http://www.octranspo.com/ Accessed: April 11, 2022

2.2.6 Existing Area Traffic Management Measures

On-street parking is permitted on both sides of Wildflower Drive and Roger Pharand Street. Speed limit pavement markings are provided on Wildflower Drive and stop ahead warning pavement markings are present on Prestwick Drive.

2.2.7 Existing Peak Hour Travel Demand

Existing turning movement counts were acquired from the City of Ottawa for the existing study area key intersections. Table 1 summarizes the intersection count dates.

Table 1: Intersection Count Date

Intersection	Count Date
Innes Road at Walmart SC	Thursday, February 20, 2020
Innes Road at Jeanne D'Arc Boulevard South /Mer Bleue Road	Thursday, January 09, 2020
Innes Road at Wildflower Drive/ Noella Leclair Street	Thursday, April 19, 2018
Innes Road at 4220/4270 Innes Road	Thursday, February 20, 2020
Innes Road at Prestwick Drive Lanthier Drive	Tuesday, January 15, 2019
Roger Pharand Street at Mer Bleue Road	Tuesday, January 15, 2019
Vanguard Drive at Tenth Line Road	Thursday, January 09, 2020

The Orleans Commercial Development has been included in the existing condition and the existing traffic counts were balanced along the roadway. Figure 10 illustrates the existing traffic counts and Table 2 summarizes the existing intersection operations. The level of service for signalized intersections is based on volume to capacity ratio (v/c) calculations for individual lane movements and HCM 2000 v/c calculations for the overall intersection. Detailed turning movement count data is included in Appendix B and the Synchro worksheets are provided in Appendix C.

Figure 10: Existing Traffic Counts

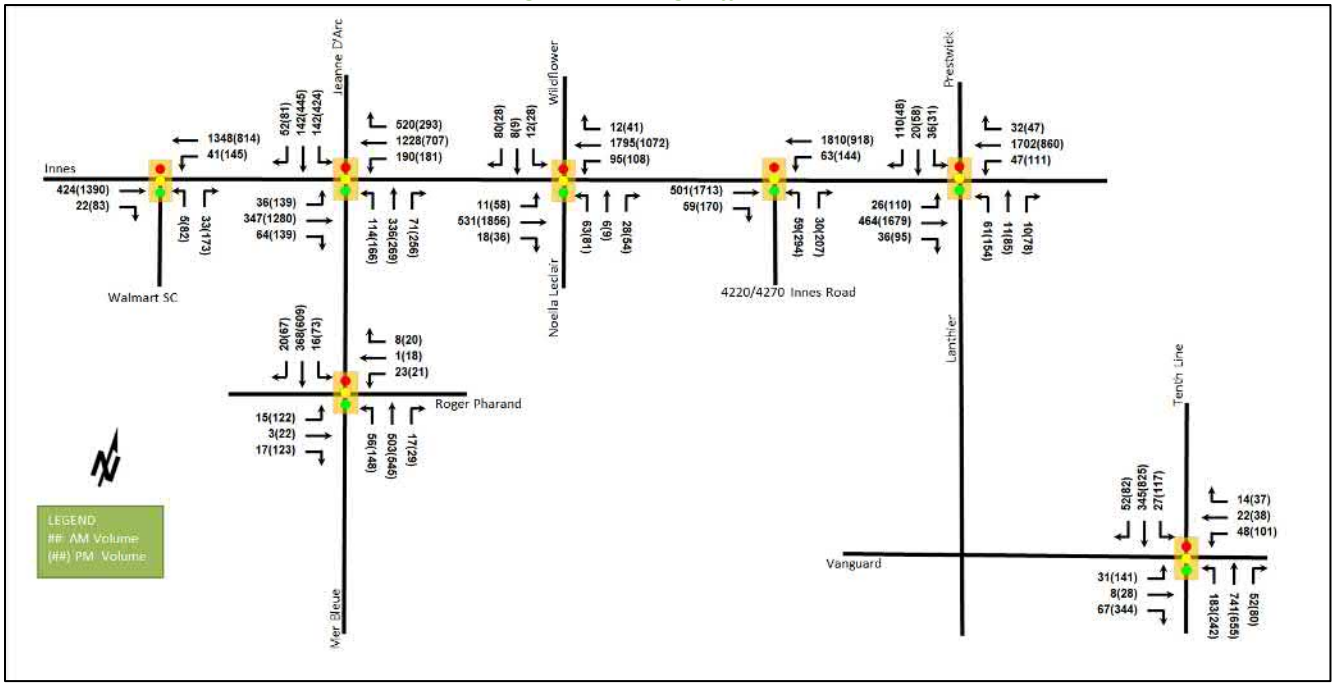


Table 2: Existing Intersection Operations

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay (s)	Q (95th)	LOS	V/C	Delay (s)	Q (95th)
Innes Road at Walmart SC *Signalized*	EB	A	0.19	3.1	26.4	C	0.77	20.0	222.3
	WBL	A	0.06	1.7	m2.5	B	0.63	41.1	m44.7
	WBT	A	0.53	4.5	212.0	A	0.35	1.6	m12.6
	NBL	A	0.03	44.6	4.8	A	0.50	62.7	36.6
	NBR	A	0.20	16.0	9.1	A	0.58	14.0	20.4
	Overall	**A**	**0.52**	**4.4**	-	**C**	**0.72**	**16.5**	-
Innes Road at Jeanne D'Arc Boulevard South /Mer Bleue Road *Signalized*	EBL	A	0.30	23.7	14.6	A	0.51	22.1	m32.2
	EBT	A	0.27	22.2	47.6	**F**	**1.06**	**70.7**	**#249.5**
	EBR	A	0.09	2.2	0.0	A	0.23	7.7	m16.5
	WBL	A	0.41	11.0	m18.6	**F**	**1.04**	**116.5**	**#93.0**
	WBT	D	0.82	26.2	196.6	A	0.58	31.1	88.0
	WBR	B	0.62	11.6	m115.0	A	0.42	5.8	15.7
	NBL	A	0.29	49.2	25.1	A	0.44	56.0	34.5
	NBT/R	C	0.79	55.8	68.1	D	0.88	54.0	**#81.0**
	SBL	B	0.64	66.0	**#33.5**	**F**	**1.02**	**101.4**	**#106.0**
	SBT/R	A	0.56	45.5	30.4	E	0.94	75.7	**#111.5**
	Overall	**C**	**0.79**	**29.4**	-	**F**	**1.04**	**59.3**	-
Innes Road at Wildflower Drive/Noella Leclair Street *Signalized*	EBL	A	0.10	11.9	m3.7	A	0.21	5.9	m4.6
	EBT/R	A	0.29	17.2	61.1	E	0.97	22.3	**m#171.2**
	WBL	A	0.20	5.8	m12.3	B	0.67	41.0	**#52.1**
	WBT/R	D	0.81	20.3	**#250.5**	A	0.54	12.8	141.5
	NBL	A	0.54	65.0	29.8	A	0.59	68.4	36.9
	NBT/R	A	0.24	22.9	11.5	A	0.30	17.8	14.9
	SBL	A	0.11	48.3	8.6	A	0.21	52.1	15.7
	SBT/R	A	0.41	18.9	18.3	A	0.19	22.5	11.9
	Overall	**C**	**0.80**	**20.3**	-	**D**	**0.89**	**20.7**	-
Innes Road at 4220/4270 Innes Road *Signalized*	EBT	A	0.22	5.8	59.5	**F**	**1.12**	**92.4**	**m#336.7**
	EBR	A	0.06	3.0	13.1	A	0.25	12.2	m25.4
	WBL	A	0.11	4.6	m7.7	B	0.63	43.2	**m#79.0**
	WBT	C	0.74	15.2	279.9	A	0.47	8.7	71.3
	NBL	A	0.23	50.1	12.7	A	0.59	55.4	**#81.9**
	NBR	A	0.17	15.7	8.4	A	0.55	30.9	49.3
	Overall	**C**	**0.75**	**13.6**	-	**E**	**0.96**	**57.2**	-
Innes Road at Prestwick Drive/Lanthier Drive *Signalized*	EBL	A	0.28	28.9	16.5	A	0.41	8.4	m6.4
	EBT	A	0.21	8.6	71.0	E	0.93	12.4	m50.1
	EBR	A	0.04	5.8	8.6	A	0.12	0.7	m0.4
	WBL	A	0.08	4.6	7.4	D	0.84	69.1	**#56.1**
	WBT/R	C	0.76	10.8	183.3	A	0.43	8.8	66.7
	NBL	B	0.61	72.0	28.9	C	0.79	74.6	**#73.4**
	NBT/R	A	0.12	30.4	9.7	A	0.54	45.0	57.5
	SBL	A	0.26	50.1	18.1	A	0.20	46.0	17.0
	SBT/R	B	0.65	46.2	40.1	A	0.36	36.9	37.2
	Overall	**C**	**0.76**	**14.4**	-	**E**	**0.92**	**18.4**	-

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay (s)	Q (95th)	LOS	V/C	Delay (s)	Q (95th)
Roger Pharand Street at Mer Bleue Road *Signalized*	EBL	A	0.08	28.1	6.0	A	0.54	38.4	29.8
	EBT/R	A	0.09	12.9	4.9	A	0.40	9.3	14.7
	WBL	A	0.12	29.3	7.9	A	0.10	26.0	7.4
	EBT/R	A	0.04	14.1	3.2	A	0.13	15.3	8.4
	NBL	A	0.09	7.7	13.3	A	0.37	13.1	38.6
	NBT	A	0.21	6.1	42.5	A	0.28	8.5	46.4
	NBR	A	0.02	0.9	1.1	A	0.03	2.6	3.2
	SBL	A	0.03	8.1	5.2	A	0.17	10.0	17.5
	SBT	A	0.16	5.9	30.8	A	0.31	8.7	52.6
	SBR	A	0.02	1.4	1.6	A	0.08	3.0	6.7
	Overall	**A**	**0.22**	**7.0**	**-**	**A**	**0.41**	**11.2**	**-**
Vanguard Drive at Tenth Line Road *Signalized*	EBL	A	0.27	55.1	17.3	A	0.50	47.9	57.0
	EBT/R	A	0.39	18.9	16.4	B	0.67	16.0	56.3
	WBL	A	0.45	62.3	24.4	**F**	**1.45**	**298.6**	**#77.2**
	WBT/R	A	0.23	36.5	15.4	A	0.19	23.7	22.7
	NBL	B	0.67	56.9	67.3	**F**	**1.13**	**145.8**	**#133.1**
	NBT	A	0.33	7.4	59.4	A	0.45	23.9	84.6
	NBR	A	0.05	0.7	1.9	A	0.12	5.0	10.1
	SBL	A	0.28	59.5	16.2	B	0.68	72.9	52.3
	SBT	A	0.20	13.5	36.1	B	0.61	29.0	112.7
	SBR	A	0.06	1.2	2.7	A	0.13	5.3	10.6
	Overall	**A**	**0.44**	**18.7**	**-**	**E**	**0.95**	**47.9**	**-**

Notes:
Saturation flow rate of 1800 veh/h/lane
Queue is measured in metres
Peak Hour Factor = 0.90
m = metered queue
# = volume for the 95th %ile cycle exceeds capacity
v/c = volume to capacity ratio

During the PM peak hour, capacity issues are noted at the intersection of Innes Road at Jeanne D'Arc Boulevard S South/Mer Bleue Road, Innes Road at 4220/4270 Innes Road, and Vanguard Drive at Tenth Line Road. In general, there may be extended queuing in westbound direction during the AM peak, and the eastbound and southbound directions during the PM peak.

The intersection of Innes Road at Jeanne D'Arc Boulevard South/Mer Bleue Road is over capacity with the eastbound through, westbound left-turn, and southbound left-turn movements are over theoretical capacity during the PM peak hour and may be subject to high delays and extended queues. Extended queues may be exhibited on the southbound left-turn movement during the AM peak hour and on the northbound and southbound shared through/right turn movements during the PM peak hour.

During the PM peak hour, the eastbound through movement at the intersection of the Innes Road at 4220/4270 Innes Road is over theoretical capacity and may be subject to high delays and extended queues. The westbound and northbound left-turn movements may exhibit extended queues.

At the intersection of Innes Road at Prestwick Drive/Lanthier Drive, the westbound and northbound left-turn movements may exhibit extended queues during the PM peak hour.

The westbound and northbound left-turn movements at the intersection of Vanguard Drive at Tenth Line Road is over theoretical capacity and may be subject to high delays and extended queues during the PM peak hour.

A network reduction of approximately 68 eastbound through, seven westbound left and six southbound left-turn vehicles could address the capacity constraints at Jeanne D'Arc Boulevard South/Mer Bleue Road and a reduction

of approximately 179 through vehicles in the eastbound direction could address the capacity constraints at Innes Road at 4220/4270 Innes Road.

Signal timing improvements at Vanguard Drive at Tenth Line Road may reduce the v/c to below 1.00 on the westbound and northbound left-turn movements. Alternatively, a network reduction of approximately 32 westbound left-turns and 26 northbound left-turn could address the capacity constraints.

2.2.8 Collision Analysis

Collision data have been acquired from the City of Ottawa open data website (data.ottawa.ca) for five years prior to the commencement of this TIA for the surrounding study are road network. Table 3 summarizes the collision types and conditions in the study area, Figure 11 illustrates the intersections and segments analyzed, and Table 4 summarizes the total collisions for each of these locations. Collision data are included in Appendix D.

Table 3: Study Area Collision Summary, 2016-2020

		Number	%
Total Collisions		**37**	**100%**
Classification	**Fatality**	0	0%
	Non-Fatal Injury	7	19%
	Property Damage Only	30	81%
Initial Impact Type	**Angle**	7	19%
	Rear end	22	59%
	Sideswipe	2	5%
	Turning Movement	6	16%
Road Surface Condition	**Dry**	22	59%
	Wet	14	38%
	Packed Snow	1	3%
Pedestrian Involved		0	0%
Cyclists Involved		0	0%

Figure 11: Study Area Collision Records – Representation of Study Area Collisions

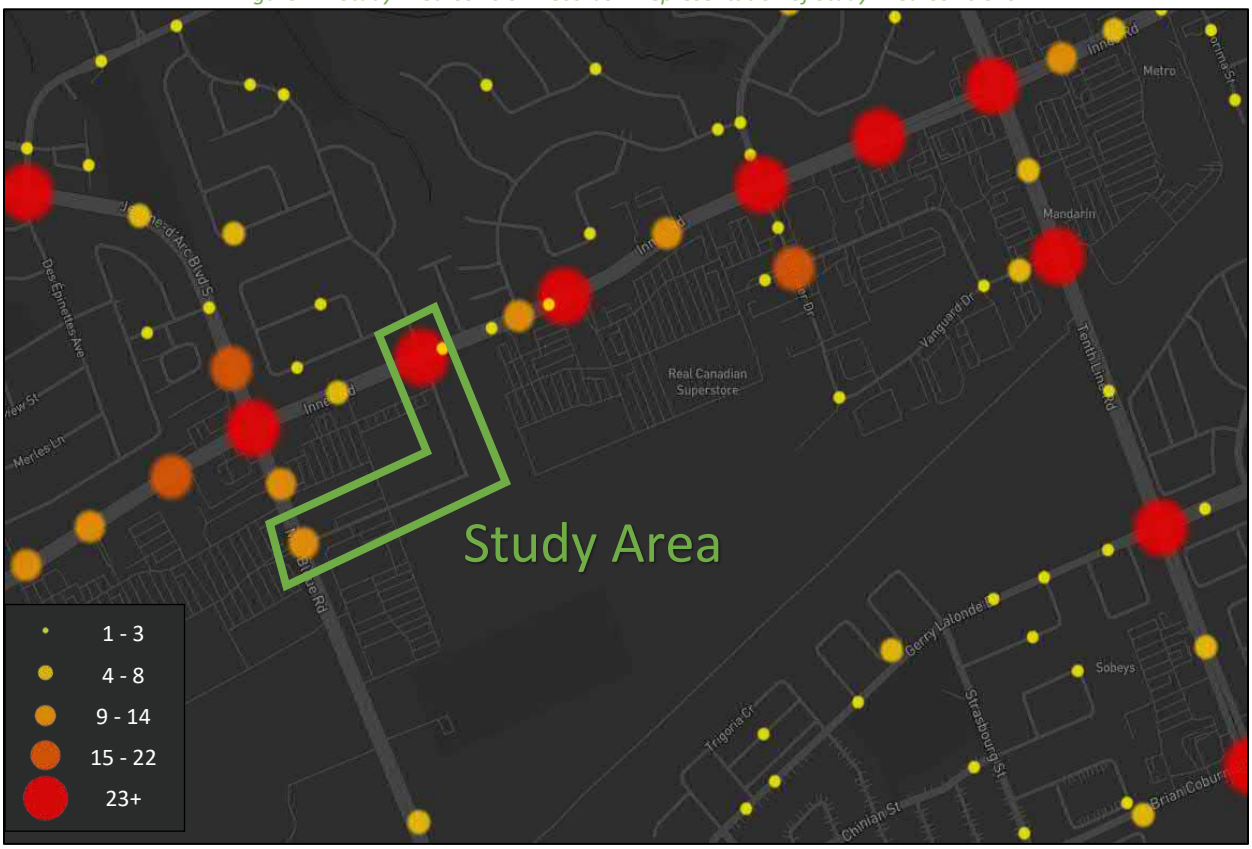


Table 4: Summary of Collision Locations, 2016-2020

	Number	%
Intersections / Segments	**37**	**100%**
Innes Road @ Wildflower Drive	28	76%
Mer Bleue Road @ 210 South of Innes Road	9	24%

Within the study area, the intersection of Innes Road at Wildflower Drive is noted to have experienced higher collisions than other locations. Table 5 summarizes the collision types and conditions for the location.

Table 5: Innes Road at Wildflower Drive Collision Summary

		Number	%
Total Collisions		**28**	**100%**
Classification	**Fatality**	0	0%
	Non-Fatal Injury	4	14%
	Property Damage Only	24	86%
Initial Impact Type	**Angle**	3	11%
	Rear end	21	75%
	Sideswipe	1	4%
	Turning Movement	3	11%
Road Surface Condition	**Dry**	20	71%
	Wet	7	25%
	Packed Snow	1	4%
Pedestrian Involved		0	0%
Cyclists Involved		0	0%

The Innes Road at Wildflower Drive intersection had a total of 28 collisions during the 2016-2020 time period, with 24 involving property damage only and the remaining four having non-fatal injuries. The collision types are most represented by rear end with 21 collisions, followed by turning movement and angle each with three collisions, and with the remaining collision types represented by sideswipe. Rear end collisions are typical of congested areas, similar to the remainder of Innes Road. Weather conditions do not affect collisions at this location.

2.3 Planned Conditions

2.3.1 Changes to the Area Transportation Network

The subject development is within the East Urban Community Design Plan area. As such, it is subject to the planning policies outlined in the CDP. The CDP proposes a future rapid transit corridor to be located south of the hydro corridor, and the pedestrian and cycling link is anticipated to be connected to the future BRT corridor.

Within the Transportation Master Plan (TMP), the Rapid Transit and Transit Priority (RTTP) Network's Network Concept diagram shows a continuous lane along Jeanne D'Arc Boulevard South and isolated transit priority measures along Innes Road and Mer Bleue between Innes Road and Brian Coburn Boulevard. However, only isolated transit priority measures along Jeanne D'Arc Boulevard South and Innes Road are currently within the Affordable Network.

The Vanguard Drive Extension (Lanthier Drive to Mer Bleue Road) Environmental Assessment Study Environmental Study Report (IBI, 2021) assumed the completion of the extension by 2031, dependent on developer driven growth requiring the additional collector road. The intersection of Mer Bleue Road and Vanguard Drive will be a City funded project. The functional design of Vanguard Drive outlines a 24-metre right of way, including sidewalks and cycle tracks on both sides, one travel lane in each direction and a parking lane that permits bus stop locations. The recommended plan for the Vanguard Drive Extension can be found in Appendix E.

2.3.2 Other Study Area Developments

3817-3843 Innes Road

The proposed development application includes a site plan application for three apartment buildings with a total of 97 residential units. The development is assumed to be built out in 2024 and is predicted to generate 23 new AM and 23 new PM two-way peak hour auto trips. (D. J. Halpenny & Associates Ltd, 2021).

3672 Innes Road, 3730 Innes Road, and 3828 Innes Road

The proposed development application includes a zoning by-law amendment to permit the construction of 340 single detached homes, 529 townhouses, 114 back-to-back townhomes, and 1,060 apartment units. Phase One, which is anticipated to be built by 2037, is forecasted to generate 312-341 new AM and 380-415 new PM two-way peak hour auto trips. Phase Two, which is anticipated to be built by 2042, is forecasted to generate 603-659 new AM and 725-793 new PM two-way peak hour auto trips. Phase Three, which is anticipated to be built by 2047, is forecasted to generate 968-1,056 new AM and 1,166-1,275 new PM two-way peak hour auto trips. (Castleglenn Consultants, 2021)

353 Gerry Lalonde Drive

The proposed development application includes a zoning by-law amendment to permit the construction of a total of 187 townhomes, and it is anticipated to be built by 2025. It is forecasted to generate 68 new AM and 63 new PM two-way peak hour auto trips. (Novatech, 2021)

3996 Innes Road

The proposed development application includes a site plan application for a five-story mixed-use building with a total of 20 residential apartment units, 175 m^2 of pharmacy, and 200 m^2 of the medical area. The development is anticipated to be built out in 2022, and it is predicted to generate 22 new AM and 28 new PM two-way peak hour auto trips. (Castleglenn Consultants, 2021)

3910 Innes Road

The proposed development application includes a site plan application for the expansion of the Canadian Tire Retail store. No TIA is available as part of this application.

2275 Mer Bleue Road

The proposed development application includes a zoning by-law amendment to permit the 112 townhouse units and a 0.75-hectare mid-rise mixed-use development block. The anticipated full build-out and occupancy horizon is 2024, and it is predicted to generate 131 new AM and 183 new PM two-way peak hour auto trips. (CGH Transportation, 2021)

2370 Tenth Line Road

The proposed development application includes a site plan application for 144 stacked townhomes and four low-rise mixed-use buildings comprising 96 dwelling units and approximately 3,170 m^2 of ground-floor commercial space. The anticipated full build-out and occupancy horizon is 2026, and it is predicted to generate 91 new AM and 147 new PM two-way peak hour auto trips. (CGH Transportation, 2021)

6429 Renaud Road

The proposed development application includes a site plan application for 90 back-to-back townhomes and 96 mid-rise terrace dwellings. The development is anticipated to be built out by 2024, and it is predicted to generate 90 new AM and 78 new PM two-way peak hour auto trips. (Castleglenn Consultants, 2020)

2167 Tenth Line Road

The proposed development application includes a site plan for a mixed-use development with 231 proposed apartment units and 500 square metres of retail. The development was completed in 2021, and it is predicted to generate 72 new AM and 69 new PM two-way peak hour auto trips.

3 Study Area and Time Periods

3.1 Study Area

The study area will include the intersections of:

- Innes Road at:
  - Walmart SC
  - Jeanne D'Arc Boulevard South /Mer Bleue Road
  - Wildflower Drive/Noella Leclair Street
  - 4220/4270 Innes Road
  - Prestwick Drive/Lanthier Drive
- Mer Bleue Road at
  - Roger Pharand Street
- Vanguard Drive at:
  - Lanthier Drive (Future Conditions)
  - Tenth Line Road

    - Noella Leclair Street Extension (Future Conditions)
    - New Local Road (Future Conditions)
- Noella Leclair Street at new local road (Future Conditions)

The boundary roads will be Roger Pharand Street, Noella Leclair Street, a new internal local road and the future Vanguard Drive Extension.

Screenline SL45 is present along Mer Bleue Road and SL47 is present along Innes Road.

3.2 Time Periods

As the proposed development is composed of residential and employment uses, the AM and PM peak hours will be examined.

3.3 Horizon Years

The anticipated build-out year is 2030. As a result, the full build-out plus five years horizon year is 2035.

4 Exemption Review

Table 6 summarizes the exemptions for this TIA.

Table 6: Exemption Review

Module	Element	Explanation	Exempt/Required
Design Review Component			
4.1 Development Design	4.1.2 Circulation and Access	Only required for site plans	Exempt
	4.1.3 New Street Networks	Only required for plans of subdivision	Required
4.2 Parking	4.2.1 Parking Supply	Only required for site plans	Exempt
	4.2.2 Spillover Parking	Only required for site plans where parking supply is 15% below unconstrained demand	Exempt
Network Impact Component			
4.5 Transportation Demand Management	All Elements	Not required for site plans expected to have fewer than 60 employees and/or students on location at any given time	Required
4.6 Neighbourhood Traffic Management	4.6.1 Adjacent Neighbourhoods	Only required when the development relies on local or collector streets for access and total volumes exceed ATM capacity thresholds	Required
4.8 Network Concept		Only required when proposed development generates more than 200 person-trips during the peak hour in excess of equivalent volume permitted by established zoning	Exempt

5 Development-Generated Travel Demand

5.1 Mode Shares

Examining the mode shares recommended in the TRANS Trip Generation Manual (2020) for the subject district, derived from the most recent National Capital Region Origin-Destination survey (OD Survey), the existing average district mode shares by land use for Orleans have been summarized in Table 7.

Table 7: TRANS Trip Generation Manual Recommended Mode Shares – Orleans

Travel Mode	Multi-Unit (High-Rise)		Employment Generator
	AM	PM	AM and PM
Auto Driver	54%	61%	71%
Auto Passenger	7%	13%	7%
Transit	29%	21%	13%
Cycling	0%	0%	1%
Walking	10%	6%	8%
Total	**100%**	**100%**	**100%**

5.2 Trip Generation

This TIA has been prepared using the vehicle and person trip rates for the residential dwellings using the TRANS Trip Generation Manual (2020) and the vehicle trip rates and derived person trip rates for commercial component from the ITE Trip Generation Manual 10th Edition (2017) using the City-prescribed conversion factor of 1.28. Table 8 summarizes the person trip rates for the proposed residential land uses for each peak period and the person trip rates for the non-residential land uses by peak hour.

Table 8: Trip Generation Person Trip Rates by Peak Period

Land Use	Land Use Code	Peak Period	Vehicle Trip Rate	Person Trip Rates
Multi-Unit (High-Rise)	221 & 222 (TRANS)	AM	-	0.80
		PM	-	0.90
Land Use	**Land Use Code**	**Peak Hour**	**Vehicle Trip Rate**	**Person Trip Rates**
General Office Building	710 (ITE)	AM	1.16	1.48
		PM	1.15	1.47
Assisted Living	254 (ITE)	AM	0.19	0.24
		PM	0.26	0.33

Using the above person trip rates, the total person trip generation has been estimated. Table 9 and Table 10 summarize the total person trip generation for the residential land uses and for the non-residential land uses.

Table 9: Total Residential Person Trip Generation by Peak Period- Phase One

Land Use	Units	AM Peak Period			PM Peak Period		
		In	Out	Total	In	Out	Total
Multi-Unit (High-Rise)	1,200	298	662	960	626	454	1080
Land Use	**Units**	**AM Peak Hour**			**PM Peak Hour**		
		In	**Out**	**Total**	**In**	**Out**	**Total**
Assisted Living	250 beds	35	23	58	30	48	78

Table 10: Total Residential Person Trip Generation by Peak Period- Phase Two

Land Use	Units	AM Peak Period			PM Peak Period		
		In	Out	Total	In	Out	Total
Multi-Unit (High-Rise)	1,140	283	629	912	595	431	1026
Land Use	**GFA**	**AM Peak Hour**			**PM Peak Hour**		
		In	**Out**	**Total**	**In**	**Out**	**Total**
General Office Building	23,865 sq ft	304	49	353	56	295	351

Internal capture rates from the ITE Trip Generation Handbook 3rd Edition have been assigned to the development's retail component for mixed-use developments. The rates summarized in Table 11 represent the percentage of trips to/from the retail use based on the residential component.

Table 11: Internal Capture Rates

Land Use	AM		PM	
	In	Out	In	Out
Residential to/from General Office	3%	1%	57%	2%

Trip generation by peak hour has been forecasted using the prescribed peak period conversion factors presented in the TRANS Trip Generation Manual (2020) for the residential component. Table 12 summarizes the residential and the non-residential trip generation by mode and peak hour for Phase One, and Table 13 summarizes the trip generation for Phase Two.

Table 12: Trip Generation by Mode – Phase One

Travel Mode		AM Peak Hour				PM Peak Hour			
		Mode Share	In	Out	Total	Mode Share	In	Out	Total
Multi-Unit (High-Rise)	Auto Driver	**54%**	77	171	249	**61%**	168	122	290
	Auto Passenger	**7%**	10	22	32	**13%**	36	26	62
	Transit	**29%**	47	106	153	**21%**	62	45	107
	Cycling	**0%**	0	0	0	**0%**	0	0	0
	Walking	**10%**	17	38	56	**6%**	20	14	34
	Total	**100%**	**149**	**331**	**480**	**100%**	**275**	**200**	**475**
Assisted Living	Auto Driver	**71%**	25	16	41	**71%**	21	34	55
	Auto Passenger	**7%**	2	2	4	**7%**	2	3	5
	Transit	**13%**	5	3	8	**13%**	4	6	10
	Cycling	**1%**	0	0	1	**1%**	0	0	1
	Walking	**8%**	3	2	5	**8%**	2	4	6
	Total	**100%**	**35**	**23**	**58**	**100%**	**30**	**48**	**78**
Total	Auto Driver	-	102	187	290	-	189	156	345
	Auto Passenger	-	12	24	36	-	38	29	67
	Transit	-	52	109	161	-	66	51	117
	Cycling	-	0	0	1	-	0	0	1
	Walking	-	20	40	61	-	22	18	40
	Total	-	**184**	**354**	**538**	-	**305**	**248**	**553**

As shown above, a total of 290 AM and 345 PM new peak hour two-way vehicle trips are projected as a result of Phase One proposed development.

Table 13: Trip Generation by Mode – Phase Two

Travel Mode		AM Peak Hour				PM Peak Hour			
		Mode Share	In	Out	Total	Mode Share	In	Out	Total
Multi-Unit (High-Rise)	Auto Driver	**54%**	73	163	236	**61%**	160	116	275
	Auto Passenger	**7%**	10	21	31	**13%**	34	25	59
	Transit	**29%**	45	100	145	**21%**	59	43	101
	Cycling	**0%**	0	0	0	**0%**	0	0	0
	Walking	**10%**	16	37	53	**6%**	19	14	32
	Total	**100%**	**142**	**315**	**456**	**100%**	**262**	**190**	**451**
General Office Building	Auto Driver	**71%**	209	35	244	**71%**	17	205	222
	Auto Passenger	**7%**	21	3	24	**7%**	2	20	22
	Transit	**13%**	38	6	45	**13%**	3	38	41
	Cycling	**1%**	3	0	3	**1%**	0	3	3
	Walking	**8%**	24	4	28	**8%**	2	23	25
	Internal Capture	*varies*	*-9*	*0*	*-9*	*varies*	*-32*	*-6*	*-38*
	Total	**100%**	**295**	**49**	**344**	**100%**	**24**	**289**	**313**
Total	Auto Driver	-	282	198	480	-	177	321	497
	Auto Passenger	-	31	24	55	-	36	45	81
	Transit	-	83	106	189	-	62	81	143
	Cycling	-	3	0	3	-	0	3	3
	Walking	-	40	41	81	-	21	37	57
	Total	-	**437**	**364**	**800**	-	**286**	**479**	**764**

As shown above, a total of 480 AM and 497 PM new peak hour two-way vehicle trips are projected as a result of Phase Two proposed development.

5.3 Trip Distribution

To understand the travel patterns of the subject development, the OD survey has been reviewed to determine the existing travel patterns that will be applied to the new vehicle trips. Table 14 below summarizes the distributions.

Table 14: OD Survey Distribution – Orleans

To/From	% of Trips
North	20%
South	5%
East	25%
West	50%
Total	**100%**

5.4 Trip Assignment

Using the distribution outlined above, turning movement splits, and access to major transportation infrastructure, the trips generated by the site have been assigned to the study area road network. Table 15 summarizes the proportional assignment to the study area roadways, and Figure 12 and Figure 13 illustrates the 2025 and 2030 new site generated volumes.

Table 15: Trip Assignment – Without the Vanguard Drive Extension

To/From	Via
North	15% Mer Bleue/ Jeanne D'Arc (N) 5% Wildflower (N)
South	5% Mer Bleue (S)
East	25% Innes (E)
West	40% Innes (W) 10% Mer Bleue (S)
Total	**100%**

Figure 12: 2025 New Site Generation Auto Volumes (Phase One)

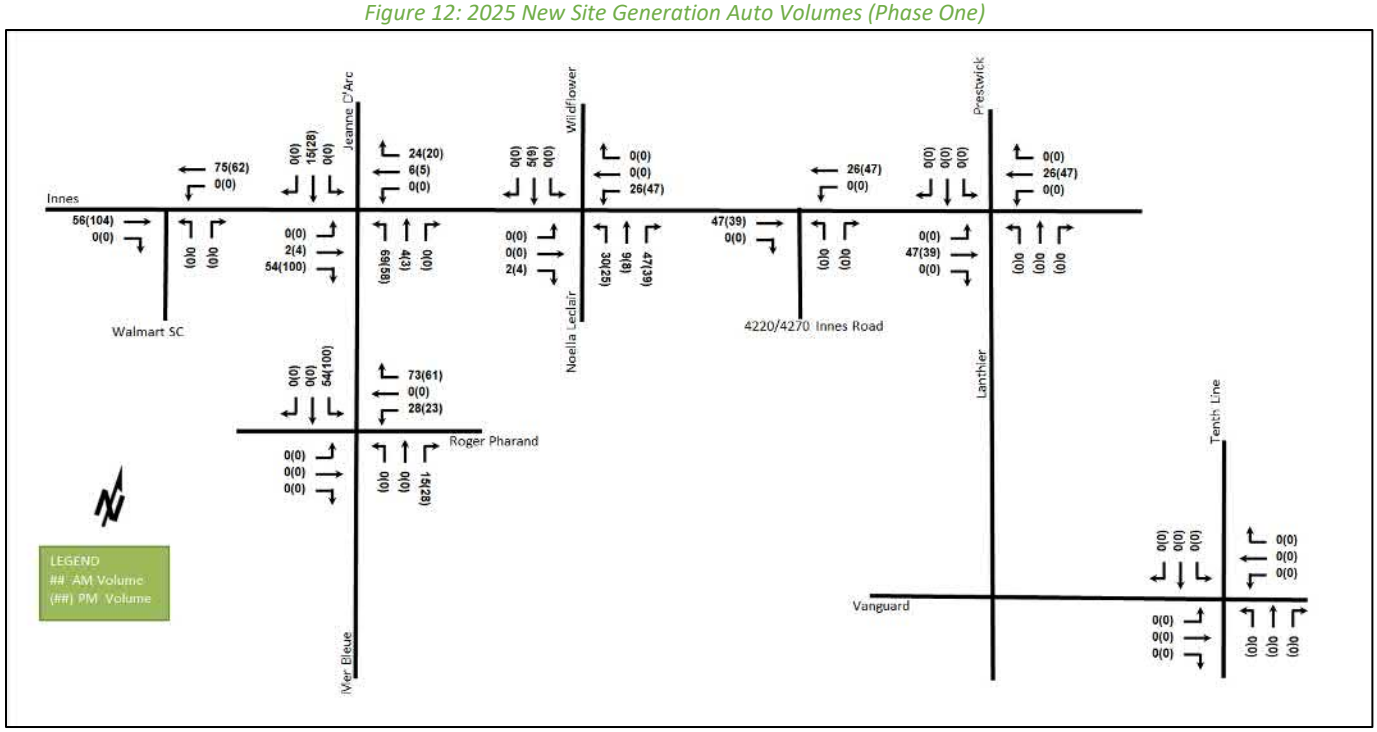
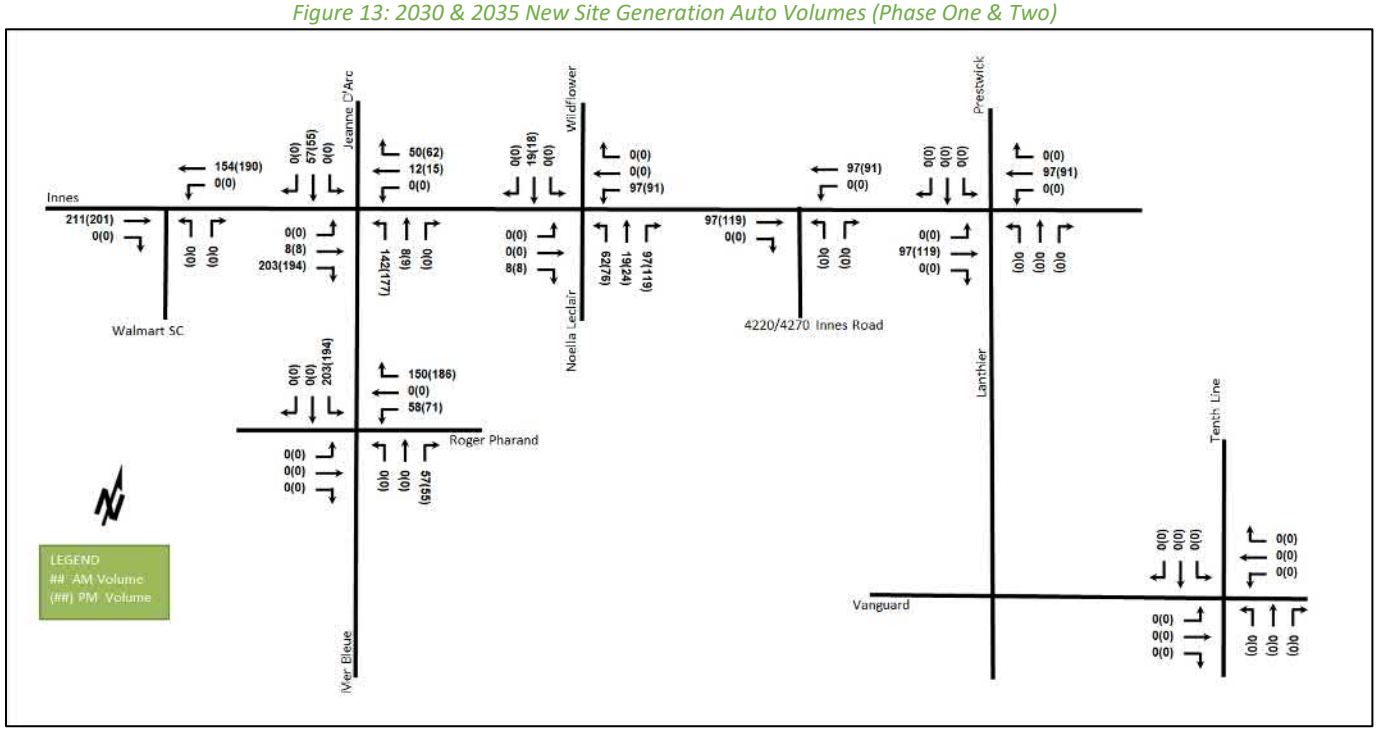


Figure 13: 2030 & 2035 New Site Generation Auto Volumes (Phase One & Two)

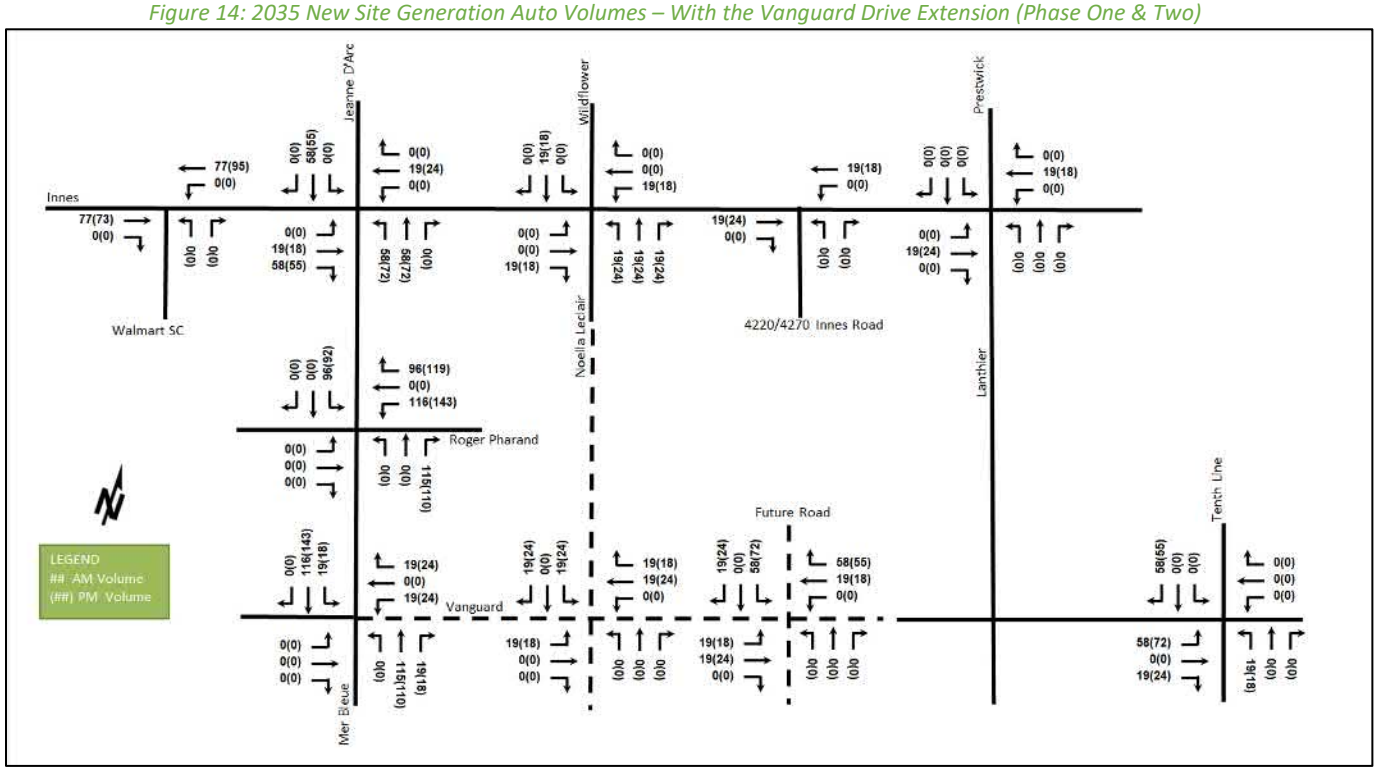


The Vanguard Drive Extension is expected to be built by 2031. Trips are re-assigned with the Vanguard Drive Extension for 2035 horizons. Table 16 summarizes the proportional assignment to the study area roadways with the Vanguard Drive Extension. Figure 14 illustrates the new site generated volumes with Vanguard Drive Extension.

Table 16: Trip Assignment – With the Vanguard Drive Extension

To/From	Via
North	15% Mer Bleue/ Jeanne D'Arc (N) 5% Wildflower (N)
South	5% Mer Bleue (S)
East	5% Innes (E) 20% Vanguard (E)
West	20% Innes (W) 30% Mer Bleue (S)
Total	**100%**

Figure 14: 2035 New Site Generation Auto Volumes – With the Vanguard Drive Extension (Phase One & Two)



6 Background Network Travel Demands

6.1 Transportation Network Plans

The transportation network plans were discussed in Section 2.3. The future rapid transit corridor that located south of the hydro corridor is assumed to be built beyond 2035. The Vanguard Drive Extension is the confirmed project and will be considered in the 2035 future horizon.

6.2 Background Growth

A review of the background projections from the City's TRANS Regional Model for the 2011 and 2031 horizons was completed to determine the background growth for each of the study area roadways, and these model horizons were compared to the existing volumes. The background TRANS model growth rates are summarized in Table 17 and the TRANS model plots are provided in Appendix F.

Table 17: TRANS Regional Model Projections – Study Area AM Growth Rates

Street	TRANS Rate		2011 to Existing		Existing to 2031	
	Eastbound	Westbound	Eastbound	Westbound	Eastbound	Westbound
Innes	0.76%	0.02%	2.27%	-1.41%	-1.05%	1.79%
	Northbound	**Southbound**	**Northbound**	**Southbound**	**Northbound**	**Southbound**
Tenth Line	4.32%	5.02%	3.44%	-0.07%	5.41%	11.61%
Jeanne D'Arc	1.37%	0.82%	0.86%	0.60%	1.99%	1.08%
Mer Bleue	11.43%	-10.58%	-9.50%	-27.97%	43.69%	16.46%

In general, the TRANS Model projections anticipate growth along the study area roadways. Of note, the volumes along Mer Bleue Road are significantly underestimated when compared to traffic counts and should not be considered for the area. To develop a valid growth rate, Tenth Line Road and Jeanne D'Arc Boulevard South will be reviewed and used for Mer Bleue Road.

A comparison of 2011 to Existing volumes and the Existing to 2031 volumes illustrates a situation that development has not progressed linearly and has been front loaded within the 2011 to 2031 timeframe. Although it is unlikely that the growth rates will decrease or become negative as the Existing to 2031 summary outlines, it is expected that they will be lower than the 2011 to Existing rates that have been experienced. Additionally, the explicit developments considered in the area for growth, as summarized in Sections 2.3.2 and 6.3, are included within the TRANS comparisons and would reduce the growth rates further.

Therefore, the recommended growth rates to be considered in Orleans are summarized in Table 18.

Table 18: Recommended Area Growth Rates

Street	AM Peak Hour		PM Peak Hour	
	Eastbound	Westbound	Eastbound	Westbound
Innes	0.50%	-	-	0.50%
	Northbound	**Southbound**	**Northbound**	**Southbound**
Tenth Line	2.00%	2.00%	2.00%	2.00%
Jeanne D'Arc	1.50%	1.00%	1.00%	1.50%
Mer Bleue	2.00%	2.00%	2.00%	2.00%

6.3 Other Developments

The background developments explicitly considered in the background conditions (Section 6.2) include:

- 3817-3843 Innes Road
- 2167 Tenth Line Road
- 6429 Renaud Road
- 2370 Tenth Line Road
- 2275 Mer Bleue Road
- 353 Gerry Lalonde Drive

A review of the TRANS Trip Generation Manual (2020) has illustrated that the prior methodologies for trip generation over estimated trips within the Ottawa context. As such, overall adjustment factors of 0.67 in AM peak hour and 0.52 in PM peak hour have been applied to the area background developments traffic.

Figure 15 illustrates the total 2025 background development volumes, and Figure 16 illustrates the total 2030 and 2035 background development volumes for the study area, adjusted for the changes in the transportation network and trip generation adjustment. The background development volumes within the study area have been provided in Appendix G.

Figure 15: 2025 Background Development Volumes

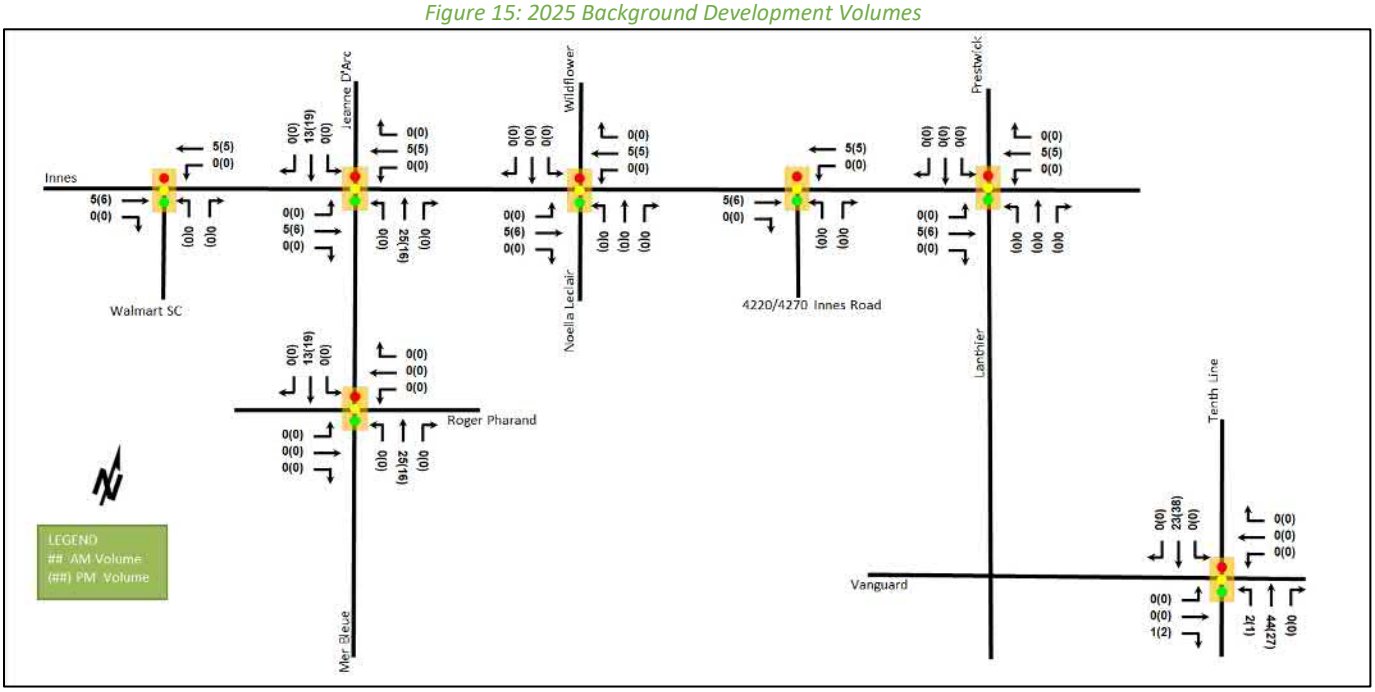
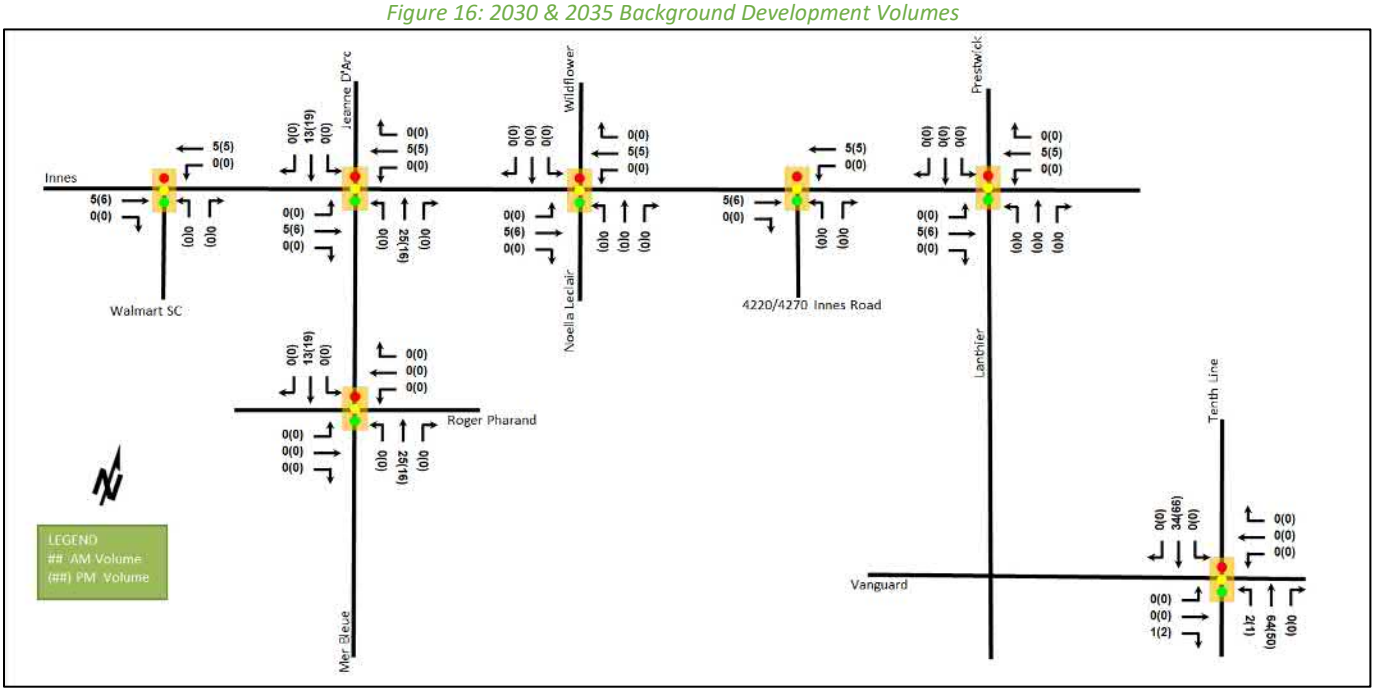


Figure 16: 2030 & 2035 Background Development Volumes



7 Demand Rationalization

7.1 2025 Future Background Operations

Figure 17 illustrates the 2025 background volumes and Table 19 summarizes the 2025 background intersection operations. The level of service for signalized intersections is based on v/c calculations for individual lane movements and HCM 2000 v/c calculations for the overall intersection. The synchro worksheets for the 2025 future background horizon are provided in Appendix H.

Figure 17: 2025 Future Background Volumes

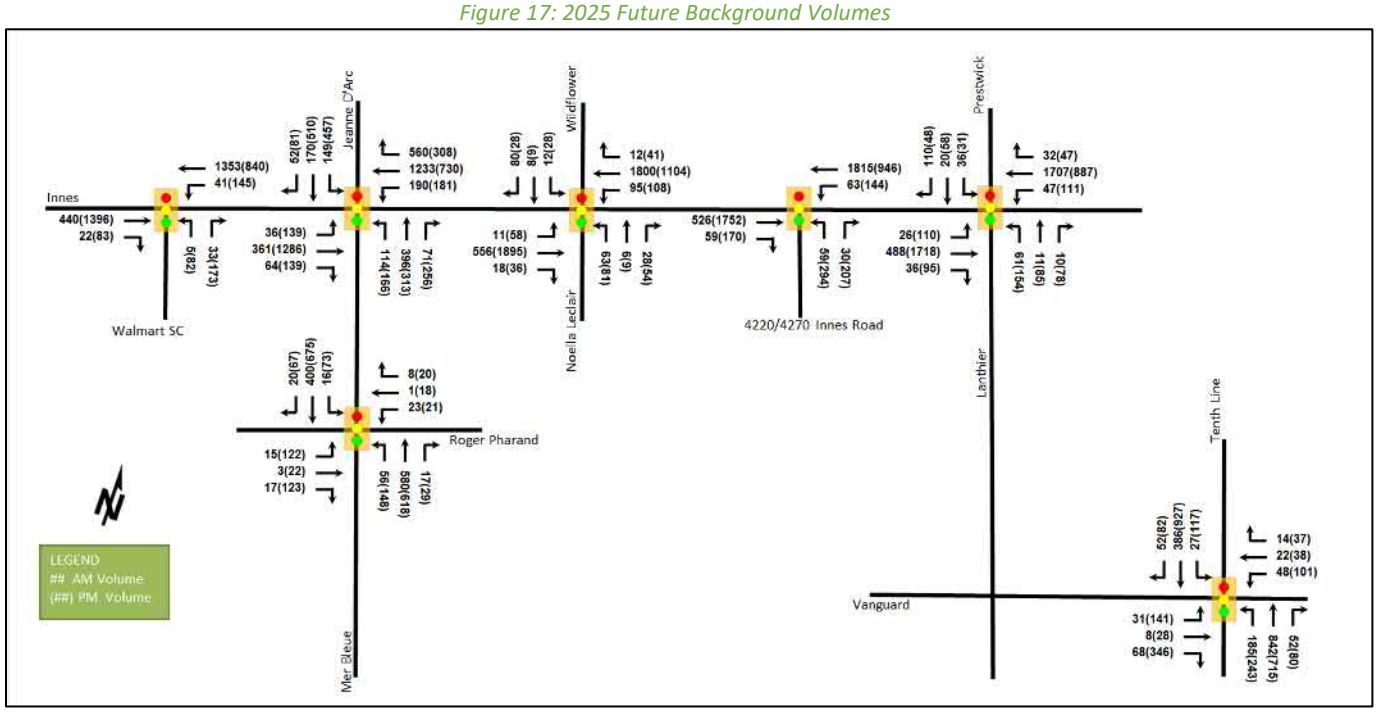


Table 19: 2025 Future Background Intersection Operations

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay (s)	Q (95th)	LOS	V/C	Delay (s)	Q (95th)
Innes Road at Walmart SC *Signalized*	EB	A	0.18	3.0	24.6	B	0.67	15.7	183.3
	WBL	A	0.06	1.7	m2.4	A	0.54	27.9	m29.0
	WBT	A	0.48	4.0	192.6	A	0.32	1.5	m11.6
	NBL	A	0.03	44.2	4.4	A	0.46	61.7	33.3
	NBR	A	0.18	16.5	8.6	A	0.56	14.2	19.2
	Overall	**A**	**0.47**	**4.0**	-	**B**	**0.63**	**13.2**	-
Innes Road at Jeanne D'Arc Boulevard South /Mer Bleue Road *Signalized*	EBL	A	0.22	19.7	12.6	A	0.43	19.9	m31.5
	EBT	A	0.25	21.8	43.5	E	0.96	45.4	**#210.2**
	EBR	A	0.09	1.4	0.0	A	0.21	6.1	m16.7
	WBL	A	0.36	12.6	m21.7	E	0.94	**91.1**	**#78.9**
	WBT	C	0.71	23.1	173.8	A	0.54	31.5	80.4
	WBR	A	0.59	11.0	108.1	A	0.40	5.9	14.6
	NBL	A	0.27	49.1	22.8	A	0.40	55.3	31.6
	NBT/R	D	0.81	56.6	71.0	D	0.88	54.6	**#78.8**
	SBL	B	0.63	66.2	**#30.7**	E	0.98	**92.9**	**#101.9**
	SBT/R	A	0.58	48.0	32.3	E	0.95	76.5	**#113.7**
	Overall	**C**	**0.74**	**28.9**	-	**E**	**0.98**	**50.6**	-

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay (s)	Q (95th)	LOS	V/C	Delay (s)	Q (95th)
Innes Road at Wildflower Drive/Noella Leclair Street *Signalized*	EBL	A	0.07	10.5	m3.5	A	0.17	5.7	m4.5
	EBT/R	A	0.26	16.1	57.8	D	0.87	17.5	**m#168.2**
	WBL	A	0.17	5.5	m12.3	B	0.64	37.7	**m#42.6**
	WBT/R	B	0.68	15.0	219.0	A	0.49	12.4	132.4
	NBL	A	0.50	63.7	27.8	A	0.55	66.6	33.7
	NBT/R	A	0.22	23.5	10.7	A	0.28	18.5	14.2
	SBL	A	0.10	48.9	8.3	A	0.19	52.2	14.8
	SBT/R	A	0.39	17.4	16.4	A	0.18	23.1	11.5
	Overall	**C**	**0.72**	**16.3**	-	**C**	**0.81**	**17.8**	-
Innes Road at 4220/4270 Innes Road *Signalized*	EBT	A	0.21	6.2	55.8	E	0.98	45.9	**#317.0**
	EBR	A	0.05	3.6	14.4	A	0.21	11.2	m25.4
	WBL	A	0.10	5.2	m8.7	A	0.59	41.1	**m#71.0**
	WBT	B	0.67	13.8	243.7	A	0.42	7.7	65.2
	NBL	A	0.21	49.7	11.7	B	0.61	58.1	**#71.5**
	NBR	A	0.16	16.0	7.8	A	0.53	28.6	42.1
	Overall	**B**	**0.68**	**12.7**	-	**D**	**0.87**	**33.7**	-
Innes Road at Prestwick Drive/Lanthier Drive *Signalized*	EBL	A	0.18	18.6	14.7	A	0.33	6.9	m6.4
	EBT	A	0.20	8.2	67.3	D	0.83	8.9	m51.3
	EBR	A	0.03	5.7	7.3	A	0.10	0.6	m0.4
	WBL	A	0.07	4.3	6.8	B	0.66	35.9	**#39.5**
	WBT/R	B	0.68	8.6	144.4	A	0.39	7.6	60.1
	NBL	A	0.54	65.7	26.0	C	0.77	75.5	60.3
	NBT/R	A	0.12	31.0	9.2	A	0.54	45.4	51.7
	SBL	A	0.24	50.4	16.8	A	0.19	46.8	15.7
	SBT/R	A	0.59	37.5	33.1	A	0.36	36.7	33.7
	Overall	**B**	**0.68**	**12.1**	-	**D**	**0.83**	**15.1**	-
Roger Pharand Street at Mer Bleue Road *Signalized*	EBL	A	0.07	27.7	5.5	A	0.50	37.5	27.0
	EBT/R	A	0.09	13.3	4.7	A	0.38	9.6	13.8
	WBL	A	0.11	28.8	7.4	A	0.10	26.2	6.9
	WBT/R	A	0.04	14.7	3.0	A	0.12	15.5	8.0
	NBL	A	0.08	7.6	12.2	A	0.33	12.1	34.2
	NBT	A	0.22	6.1	44.4	A	0.28	8.3	47.3
	NBR	A	0.01	0.5	0.7	A	0.03	2.2	2.8
	SBL	A	0.03	8.1	4.9	A	0.15	9.6	15.9
	SBT	A	0.16	5.8	30.1	A	0.31	8.5	52.4
	SBR	A	0.02	1.1	1.2	A	0.07	3.1	6.4
	Overall	**A**	**0.23**	**6.9**	-	**A**	**0.37**	**10.7**	-

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay (s)	Q (95th)	LOS	V/C	Delay (s)	Q (95th)
Vanguard Drive at Tenth Line Road *Signalized*	EBL	A	0.26	55.1	16.2	A	0.45	46.3	51.3
	EBT/R	A	0.37	19.3	15.8	B	0.61	12.1	42.0
	WBL	A	0.41	61.4	22.6	E	0.99	**135.1**	**#62.3**
	WBT/R	A	0.21	37.2	14.6	A	0.17	22.4	20.2
	NBL	B	0.69	59.9	62.5	E	1.00	**113.6**	**#117.2**
	NBT	A	0.33	7.2	59.4	A	0.44	23.1	82.7
	NBR	A	0.05	0.4	1.1	A	0.10	4.1	8.1
	SBL	A	0.26	59.1	15.4	B	0.65	71.6	47.6
	SBT	A	0.19	12.3	35.0	B	0.62	29.1	114.5
	SBR	A	0.06	0.8	1.6	A	0.11	4.3	8.6
	Overall	**A**	**0.44**	**17.9**	-	**C**	**0.79**	**37.3**	-

Notes: Saturation flow rate of 1800 veh/h/lane
Queue is measured in metres
Peak Hour Factor = 1.00
m = metered queue
# = volume for the 95th %ile cycle exceeds capacity
v/c = volume to capacity ratio

Intersections within the study area will operate similar to existing condition with improvement to the intersection operations due to the adjustment of the peak hour factor to 1.00 for forecasted conditions. All the over capacity movements will be reduced below a LOS F and near capacity movements showing additional capacity. The queuing constraints noted during the existing condition review are expected to remain.

7.2 2030 Future Background Operations

Figure 18 illustrates the 2030 background volumes and Table 20 summarizes the 2030 background intersection operations. The level of service for signalized intersections is based on v/c calculations for individual lane movements and HCM 2000 v/c calculations for the overall intersection. The synchro worksheets for the 2030 future background horizon are provided in Appendix I.

Figure 18: 2030 Future Background Volumes

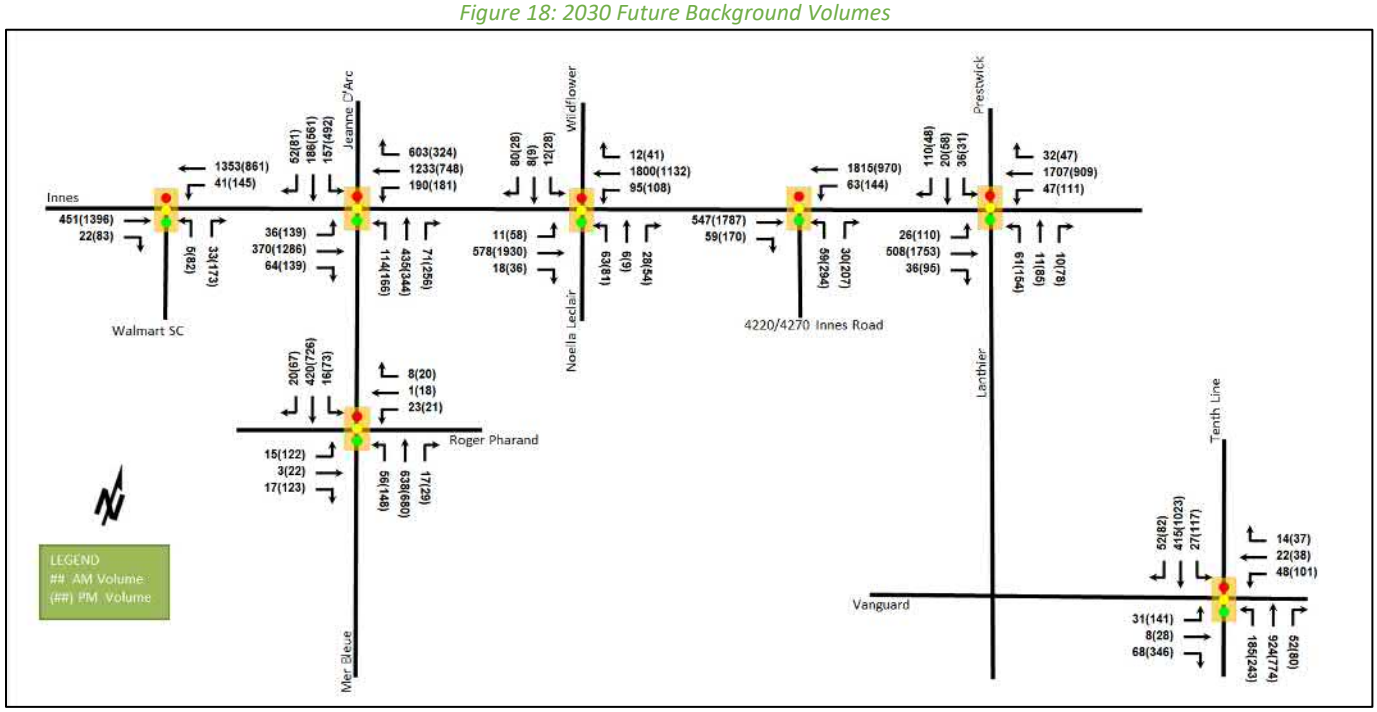


Table 20: 2030 Future Background Intersection Operations

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay (s)	Q (95th)	LOS	V/C	Delay (s)	Q (95th)
Innes Road at Walmart SC ***Signalized***	EB	A	0.18	3.1	25.1	B	0.67	15.7	183.3
	WBL	A	0.06	1.7	m2.4	A	0.54	27.7	m28.0
	WBT	A	0.48	4.0	192.5	A	0.33	1.4	m11.7
	NBL	A	0.03	44.2	4.4	A	0.46	61.7	33.3
	NBR	A	0.18	16.5	8.6	A	0.56	14.2	19.2
	Overall	**A**	**0.47**	**4.0**	-	**B**	**0.63**	**13.1**	-
Innes Road at Jeanne D'Arc Boulevard South /Mer Bleue Road ***Signalized***	EBL	A	0.23	19.9	12.7	A	0.44	20.0	m31.5
	EBT	A	0.26	22.0	45.1	E	0.96	45.4	**#210.2**
	EBR	A	0.09	1.5	0.0	A	0.21	6.1	m16.7
	WBL	A	0.37	12.9	m22.1	E	0.94	**91.2**	**#79.4**
	WBT	C	0.72	23.6	173.4	A	0.55	31.6	81.2
	WBR	B	0.64	12.8	132.7	A	0.41	5.9	14.9
	NBL	A	0.26	49.1	22.8	A	0.40	55.3	31.6
	NBT/R	D	0.84	58.7	77.5	E	0.91	59.5	**#93.4**
	SBL	B	0.68	69.2	**#33.2**	**F**	**1.11**	**126.7**	**#112.3**
	SBT/R	B	0.61	49.6	35.0	**F**	**1.03**	**94.3**	**#129.0**
	Overall	**C**	**0.76**	**30.2**	-	**F**	**1.01**	**57.6**	-
Innes Road at Wildflower Drive/Noella Leclair Street ***Signalized***	EBL	A	0.07	10.2	m3.5	A	0.18	5.6	m4.2
	EBT/R	A	0.27	16.1	59.4	D	0.89	17.4	m167.2
	WBL	A	0.17	5.6	m12.3	B	0.65	39.0	**m#43.3**
	WBT/R	B	0.68	15.0	219.0	A	0.50	12.6	136.2
	NBL	A	0.50	63.7	27.8	A	0.55	66.6	33.7
	NBT/R	A	0.22	23.5	10.7	A	0.28	18.5	14.2
	SBL	A	0.10	48.9	8.3	A	0.19	52.2	14.8
	SBT/R	A	0.39	17.4	16.4	A	0.18	23.1	11.5
	Overall	**C**	**0.72**	**16.3**	-	**C**	**0.83**	**17.7**	-
Innes Road at 4220/4270 Innes Road ***Signalized***	EBT	A	0.22	6.2	57.5	E	1.00	50.2	**#326.9**
	EBR	A	0.05	3.5	13.9	A	0.21	11.3	m24.9
	WBL	A	0.10	5.2	m8.7	A	0.59	41.0	**m#71.8**
	WBT	B	0.67	13.8	243.7	A	0.43	7.9	66.9
	NBL	A	0.21	49.7	11.7	B	0.61	58.1	**#71.5**
	NBR	A	0.16	16.0	7.8	A	0.53	28.9	42.3
	Overall	**B**	**0.68**	**12.6**	-	**D**	**0.89**	**35.9**	-
Innes Road at Prestwick Drive/Lanthier Drive ***Signalized***	EBL	A	0.18	18.4	14.7	A	0.34	7.1	m6.2
	EBT	A	0.20	8.1	70.3	D	0.85	9.6	m51.1
	EBR	A	0.03	5.6	7.4	A	0.10	0.6	m0.4
	WBL	A	0.07	4.3	6.8	B	0.69	41.3	**#43.0**
	WBT/R	B	0.68	8.6	144.4	A	0.40	7.7	62.1
	NBL	A	0.54	65.7	26.0	C	0.77	75.5	60.3
	NBT/R	A	0.12	31.0	9.2	A	0.54	45.4	51.7
	SBL	A	0.24	50.4	16.8	A	0.19	46.8	15.7
	SBT/R	A	0.59	37.5	33.1	A	0.36	36.7	33.7
	Overall	**B**	**0.68**	**12.0**	-	**D**	**0.84**	**15.5**	-

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay (s)	Q (95th)	LOS	V/C	Delay (s)	Q (95th)
Roger Pharand Street at Mer Bleue Road *Signalized*	EBL	A	0.07	27.7	5.5	A	0.50	37.5	27.0
	EBT/R	A	0.09	13.3	4.7	A	0.38	9.6	13.8
	WBL	A	0.11	28.8	7.4	A	0.10	26.2	6.9
	WBT/R	A	0.04	14.7	3.0	A	0.12	15.5	8.0
	NBL	A	0.08	7.7	12.2	A	0.35	12.8	35.5
	NBT	A	0.25	6.2	49.3	A	0.31	8.5	52.8
	NBR	A	0.01	0.5	0.7	A	0.03	2.2	2.8
	SBL	A	0.03	8.2	4.9	A	0.16	9.9	16.2
	SBT	A	0.16	5.9	31.6	A	0.33	8.6	57.0
	SBR	A	0.02	1.1	1.2	A	0.07	3.1	6.4
	Overall	**A**	**0.25**	**6.9**	**-**	**A**	**0.39**	**10.8**	**-**
Vanguard Drive at Tenth Line Road *Signalized*	EBL	A	0.26	55.1	16.2	A	0.45	46.3	51.3
	EBT/R	A	0.37	19.3	15.8	B	0.62	13.6	46.2
	WBL	A	0.41	61.4	22.6	E	0.99	**135.1**	**#62.3**
	WBT/R	A	0.21	37.2	14.6	A	0.17	22.4	20.2
	NBL	B	0.69	59.9	62.5	E	1.00	**113.6**	**#117.2**
	NBT	A	0.37	7.5	67.0	A	0.48	23.8	91.2
	NBR	A	0.05	0.4	1.1	A	0.10	4.1	8.1
	SBL	A	0.26	59.1	15.4	B	0.65	71.6	47.6
	SBT	A	0.20	12.4	37.6	B	0.68	30.9	130.5
	SBR	A	0.06	0.8	1.6	A	0.11	4.3	8.6
	Overall	**A**	**0.46**	**17.5**	**-**	**D**	**0.82**	**37.8**	**-**

Notes:
Saturation flow rate of 1800 veh/h/lane
Queue is measured in metres
Peak Hour Factor = 1.00
m = metered queue
# = volume for the 95th %ile cycle exceeds capacity
v/c = volume to capacity ratio

The 2030 future background conditions will operate similar to the 2025 future background conditions with the exception of the Innes Road at Jeanne D'Arc Boulevard South/Mer Bleue Road and Innes Road at 4220/4270 Innes Road intersections during the PM peak.

The Innes Road at Jeanne D'Arc Boulevard South/Mer Bleue Road intersection will become overcapacity due to the background developments, with the southbound left-turn and the shared through/right-turn lanes becoming over capacity with high delays and extended queuing.

The eastbound through lane at Innes Road at 4220/4270 Innes Road intersection may exhibit extended queues during the PM peak.

Similar to the existing conditions, a network reduction of approximately 47 left-turns and 16 through vehicles in the southbound direction could address the capacity constraints at Jeanne D'Arc Boulevard South/Mer Bleue Road. These improvements are similar to the existing conditions and confirm that the City will need to review the corridor operations.

7.3 2035 Future Background Operations

7.3.1 Without the Vanguard Drive Extension

Figure 19 illustrates the 2035 background volumes without the Vanguard Drive Extension and Table 21 summarizes the 2035 background intersection operations without the Vanguard Drive Extension. The level of service for signalized intersections is based on v/c calculations for individual lane movements and HCM 2000 v/c calculations for the overall intersection. The synchro worksheets for the 2035 future background horizon without the Vanguard Drive Extension are provided in Appendix J.

Figure 19: 2035 Future Background Volumes – without the Vanguard Drive Extension

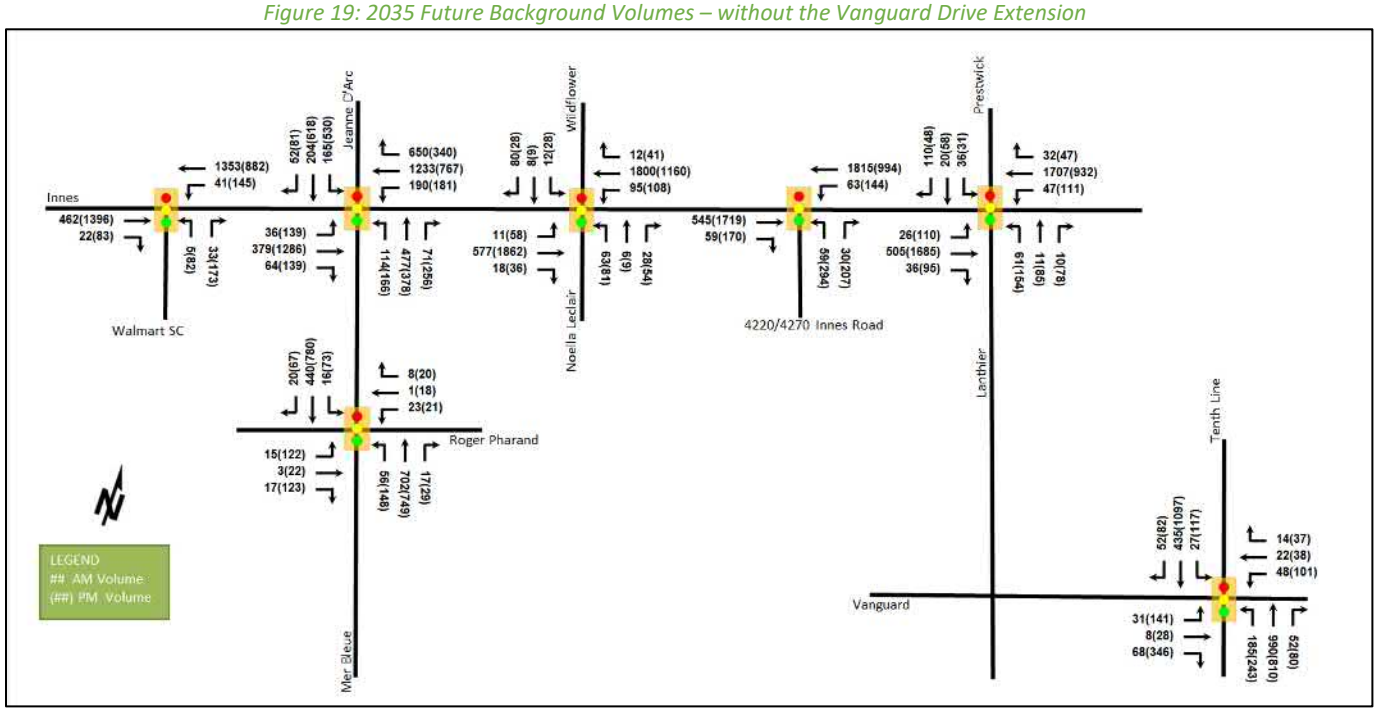


Table 21: 2035 Future Background Intersection Operations– without the Vanguard Drive Extension

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay (s)	Q (95th)	LOS	V/C	Delay (s)	Q (95th)
Innes Road at Walmart SC ***Signalized***	EB	A	0.19	3.1	25.8	B	0.67	15.7	183.3
	WBL	A	0.06	1.7	m2.4	A	0.54	27.6	m28.2
	WBT	A	0.48	3.9	192.5	A	0.34	1.4	m11.8
	NBL	A	0.03	44.2	4.4	A	0.46	61.7	33.3
	NBR	A	0.18	16.5	8.6	A	0.56	14.2	19.2
	Overall	**A**	**0.47**	**4.0**	-	**B**	**0.63**	**13.0**	-
Innes Road at Jeanne D'Arc Boulevard South /Mer Bleue Road ***Signalized***	EBL	A	0.23	20.3	12.7	A	0.45	20.3	m31.5
	EBT	A	0.27	22.4	46.5	E	0.96	45.4	**#210.2**
	EBR	A	0.09	1.6	0.0	A	0.21	6.1	m16.7
	WBL	A	0.38	13.3	m22.4	E	0.94	**91.2**	**#79.3**
	WBT	C	0.73	24.1	173.0	A	0.56	31.8	81.6
	WBR	B	0.70	15.2	158.0	A	0.43	5.8	14.9
	NBL	A	0.26	49.2	22.8	A	0.40	55.3	31.6
	NBT/R	D	0.88	61.6	**#90.2**	E	0.95	67.2	**#107.4**
	SBL	C	0.73	73.0	**#35.8**	**F**	**1.26**	**179.4**	**#123.2**
	SBT/R	B	0.63	51.0	38.1	**F**	**1.12**	**120.7**	**#146.1**
	Overall	**C**	**0.78**	**31.9**	-	**F**	**1.05**	**68.9**	-

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay (s)	Q (95th)	LOS	V/C	Delay (s)	Q (95th)
Innes Road at Wildflower Drive/Noella Leclair Street *Signalized*	EBL	A	0.07	10.1	m3.2	A	0.18	5.3	m4.0
	EBT/R	A	0.28	16.5	m61.0	E	0.91	16.7	m167.7
	WBL	A	0.17	5.6	m12.3	B	0.65	38.8	**m#43.6**
	WBT/R	B	0.68	15.0	219.0	A	0.52	12.8	140.3
	NBL	A	0.50	63.7	27.8	A	0.55	66.6	33.7
	NBT/R	A	0.22	23.5	10.7	A	0.28	18.5	14.2
	SBL	A	0.10	48.9	8.3	A	0.19	52.2	14.8
	SBT/R	A	0.39	17.4	16.4	A	0.18	23.1	11.5
	Overall	**C**	**0.72**	**16.4**	-	**C**	**0.84**	**17.4**	-
Innes Road at 4220/4270 Innes Road *Signalized*	EBT	A	0.23	6.2	59.4	**F**	**1.02**	**55.4**	**#338.3**
	EBR	A	0.05	3.3	13.2	A	0.21	11.2	m24.2
	WBL	A	0.10	5.3	m8.8	A	0.59	41.0	**m#71.8**
	WBT	B	0.67	13.8	243.7	A	0.44	8.0	68.5
	NBL	A	0.21	49.7	11.7	B	0.61	58.1	**#71.5**
	NBR	A	0.16	16.0	7.8	A	0.53	29.2	42.5
	Overall	**B**	**0.68**	**12.6**	-	**D**	**0.90**	**38.5**	-
Innes Road at Prestwick Drive/Lanthier Drive *Signalized*	EBL	A	0.18	18.2	14.6	A	0.35	7.4	m6.1
	EBT	A	0.21	8.0	73.2	D	0.87	10.4	m51.7
	EBR	A	0.03	5.5	7.5	A	0.10	0.6	m0.4
	WBL	A	0.08	4.3	6.8	C	0.71	46.7	**#46.2**
	WBT/R	B	0.68	8.6	144.4	A	0.41	7.8	64.0
	NBL	A	0.54	65.7	26.0	C	0.77	75.5	60.3
	NBT/R	A	0.12	31.0	9.2	A	0.54	45.4	51.7
	SBL	A	0.24	50.4	16.8	A	0.19	46.8	15.7
	SBT/R	A	0.59	37.5	33.1	A	0.36	36.7	33.7
	Overall	**B**	**0.68**	**12.0**	-	**D**	**0.86**	**16.0**	-
Roger Pharand Street at Mer Bleue Road *Signalized*	EBL	A	0.07	27.7	5.5	A	0.50	37.5	27.0
	EBT/R	A	0.09	13.3	4.7	A	0.38	10.1	14.3
	WBL	A	0.11	28.8	7.4	A	0.10	26.2	6.9
	WBT/R	A	0.04	14.7	3.0	A	0.12	15.5	8.0
	NBL	A	0.08	7.7	12.3	A	0.38	13.6	37.2
	NBT	A	0.27	6.4	55.0	A	0.34	8.7	59.3
	NBR	A	0.01	0.5	0.7	A	0.03	2.2	2.8
	SBL	A	0.03	8.2	4.9	A	0.18	10.3	16.7
	SBT	A	0.17	5.9	33.2	A	0.36	8.9	62.3
	SBR	A	0.02	1.1	1.2	A	0.07	3.1	6.4
	Overall	**A**	**0.27**	**6.9**	-	**A**	**0.40**	**10.9**	-

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay (s)	Q (95th)	LOS	V/C	Delay (s)	Q (95th)
Vanguard Drive at Tenth Line Road *Signalized*	EBL	A	0.26	55.1	16.2	A	0.45	46.3	51.3
	EBT/R	A	0.37	19.3	15.8	B	0.62	14.6	48.6
	WBL	A	0.41	61.4	22.6	E	0.99	**135.1**	**#62.3**
	WBT/R	A	0.21	37.2	14.6	A	0.17	22.4	20.2
	NBL	B	0.69	59.9	62.5	E	1.00	**113.6**	**#117.2**
	NBT	A	0.39	7.7	73.4	A	0.50	24.2	96.2
	NBR	A	0.05	0.4	1.1	A	0.10	4.1	8.1
	SBL	A	0.26	59.1	15.4	B	0.65	71.6	47.6
	SBT	A	0.21	12.5	39.5	C	0.73	32.5	144.2
	SBR	A	0.06	0.8	1.6	A	0.11	4.3	8.6
	Overall	**A**	**0.48**	**17.2**	**-**	**D**	**0.85**	**38.2**	**-**

Notes: Saturation flow rate of 1800 veh/h/lane; Queue is measured in metres; Peak Hour Factor = 1.00; m = metered queue; # = volume for the 95th %ile cycle exceeds capacity; v/c = volume to capacity ratio

The 2035 future background conditions operate similarly to the 2030 future background conditions with background growth and developments contributing to slight reductions in capacity, higher delays and queues.

The eastbound through lane at Innes Road at 4220/4270 Innes Road intersection will become over capacity with high delays and extending queuing during the PM peak.

As discussed previously, the PM peak hour network reductions required to address the capacity constraints at the area intersections would increase to approximately 107 vehicles for the southbound left-turn and 73 vehicles for the through vehicles at the intersection of Innes Road at Jeanne D'Arc Boulevard South/Mer Bleue Road, and 34 vehicles for the eastbound through vehicles at the Innes Road at 4220/4270 Innes Road. Alternatively, the City may explore signal timing adjustments along the Innes corridor to reduce the noted capacity constraints.

7.3.2 With the Vanguard Drive Extension

The Vanguard Drive Extension is assumed to be completed by 2031 and included in the 2035 background horizon. Volumes within the study area were re-distributed in the 2035 future horizons based on the existing volumes and other area development.

Figure 20 illustrates the 2035 background volumes with the Vanguard Drive Extension and Table 22 summarizes the 2035 background intersection operations with the Vanguard Drive Extension. The level of service for signalized intersections is based on v/c calculations for individual lane movements and HCM 2000 v/c calculations for the overall intersection. The synchro worksheets for the 2035 future background horizon with the Vanguard Drive Extension are provided in Appendix K.

Figure 20: 2035 Future Background Volumes – with the Vanguard Drive Extension

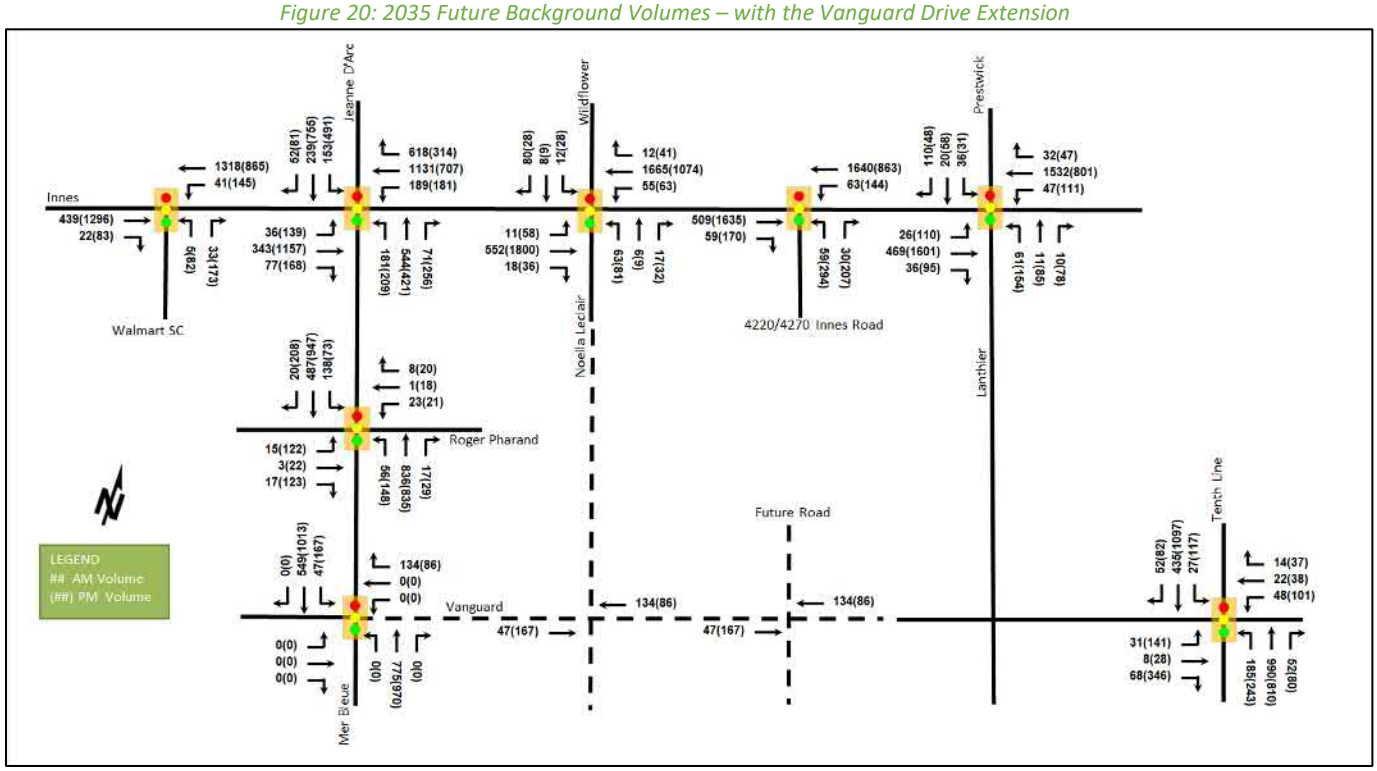


Table 22: 2035 Future Background Intersection Operations – with the Vanguard Drive Extension

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay (s)	Q (95th)	LOS	V/C	Delay (s)	Q (95th)
Innes Road at Walmart SC *Signalized*	EB	A	0.18	3.1	24.5	B	0.62	14.1	160.7
	WBL	A	0.06	2.5	m3.6	A	0.50	20.0	m23.3
	WBT	A	0.47	4.8	187.3	A	0.33	1.4	m11.7
	NBL	A	0.03	44.2	4.4	A	0.46	61.7	33.3
	NBR	A	0.18	16.5	8.6	A	0.56	14.2	19.2
	Overall	**A**	**0.46**	**4.6**	-	**A**	**0.59**	**11.8**	-
Innes Road at Jeanne D'Arc Boulevard South /Mer Bleue Road *Signalized*	EBL	A	0.20	18.7	12.1	A	0.42	19.5	30.9
	EBT	A	0.25	22.1	41.6	D	0.86	36.0	117.6
	EBR	A	0.10	2.4	0.0	A	0.24	5.4	17.9
	WBL	A	0.36	13.3	24.3	D	0.89	78.3	**#73.6**
	WBT	B	0.67	22.3	140.6	A	0.52	31.6	82.5
	WBR	B	0.67	13.8	139.3	A	0.40	6.0	16.8
	NBL	A	0.43	52.4	**#37.1**	A	0.51	57.6	38.7
	NBT/R	E	0.94	70.3	**#108.8**	**F**	**1.03**	**86.8**	**#125.4**
	SBL	B	0.70	71.8	**#32.0**	**F**	**1.19**	**154.8**	**#112.0**
	SBT/R	B	0.67	53.1	44.1	**F**	**1.34**	**202.9**	**#186.6**
	Overall	**C**	**0.76**	**34.1**	-	**F**	**1.05**	**82.0**	-

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay (s)	Q (95th)	LOS	V/C	Delay (s)	Q (95th)
Innes Road at Wildflower Drive/Noella Leclair Street *Signalized*	EBL	A	0.06	9.6	m3.2	A	0.16	4.9	m4.3
	EBT/R	A	0.25	14.9	m44.0	C	0.75	12.0	m159.5
	WBL	A	0.09	5.5	m8.4	A	0.36	14.1	m18.2
	WBT/R	B	0.63	13.3	199.7	A	0.46	11.8	125.3
	NBL	A	0.50	63.7	27.8	A	0.55	66.6	33.7
	NBT/R	A	0.16	26.7	8.9	A	0.20	22.1	11.7
	SBL	A	0.10	48.8	8.3	A	0.19	52.0	14.8
	SBT/R	A	0.39	17.4	16.4	A	0.18	23.1	11.5
	Overall	**B**	**0.67**	**15.2**	-	**B**	**0.74**	**13.8**	-
Innes Road at 4220/4270 Innes Road *Signalized*	EBT	A	0.20	6.4	53.2	E	0.92	37.7	**#283.7**
	EBR	A	0.05	4.0	12.7	A	0.21	11.5	m31.1
	WBL	A	0.09	5.7	m10.7	A	0.59	41.7	**m#71.0**
	WBT	A	0.60	12.5	216.1	A	0.39	7.4	59.4
	NBL	A	0.21	49.7	11.7	B	0.61	58.1	**#71.5**
	NBR	A	0.16	16.0	7.8	A	0.53	27.9	41.4
	Overall	**B**	**0.61**	**11.8**	-	**D**	**0.83**	**29.8**	-
Innes Road at Prestwick Drive/Lanthier Drive *Signalized*	EBL	A	0.14	15.3	14.1	A	0.30	5.9	m6.9
	EBT	A	0.19	7.9	65.8	C	0.77	6.6	m52.0
	EBR	A	0.03	5.7	7.1	A	0.10	0.6	m0.5
	WBL	A	0.07	4.3	6.8	A	0.60	23.7	**#27.0**
	WBT/R	B	0.61	7.4	116.3	A	0.35	7.3	52.7
	NBL	A	0.54	65.7	26.0	C	0.77	75.5	60.3
	NBT/R	A	0.12	31.0	9.2	A	0.54	45.4	51.7
	SBL	A	0.24	50.4	16.8	A	0.19	46.8	15.7
	SBT/R	A	0.55	30.9	29.5	A	0.36	36.7	33.7
	Overall	**B**	**0.62**	**11.1**	-	**C**	**0.78**	**13.8**	-
Roger Pharand Street at Mer Bleue Road *Signalized*	EBL	A	0.07	27.7	5.5	A	0.50	37.5	27.0
	EBT/R	A	0.09	13.3	4.7	A	0.42	18.2	20.3
	WBL	A	0.11	28.8	7.4	A	0.10	26.2	6.9
	WBT/R	A	0.04	14.7	3.0	A	0.12	15.5	8.0
	NBL	A	0.09	7.8	12.4	A	0.47	17.8	**#48.7**
	NBT	A	0.32	6.8	68.0	A	0.38	9.1	67.6
	NBR	A	0.01	0.5	0.7	A	0.03	2.2	2.8
	SBL	A	0.30	10.6	34.3	A	0.20	10.8	17.3
	SBT	A	0.19	6.0	36.9	A	0.43	9.6	79.6
	SBR	A	0.02	1.1	1.2	A	0.20	2.2	10.8
	Overall	**A**	**0.32**	**7.4**	-	**A**	**0.47**	**11.4**	-

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay (s)	Q (95th)	LOS	V/C	Delay (s)	Q (95th)
Vanguard Drive at Tenth Line Road *Signalized*	EBL	A	0.26	55.1	16.2	A	0.45	46.3	51.3
	EBT/R	A	0.37	19.3	15.8	B	0.62	14.6	48.6
	WBL	A	0.41	61.4	22.6	E	0.99	**135.1**	**#62.3**
	WBT/R	A	0.21	37.2	14.6	A	0.17	22.4	20.2
	NBL	B	0.69	59.9	62.5	E	1.00	**113.6**	**#117.2**
	NBT	A	0.39	7.7	73.4	A	0.50	24.2	96.2
	NBR	A	0.05	0.4	1.1	A	0.10	4.1	8.1
	SBL	A	0.26	59.1	15.4	B	0.65	71.6	47.6
	SBT	A	0.21	12.5	39.5	C	0.73	32.5	144.2
	SBR	A	0.06	0.8	1.6	A	0.11	4.3	8.6
	Overall	**A**	**0.48**	**17.2**	**-**	**D**	**0.85**	**38.2**	**-**
Vanguard Drive at Mer Bleue Road *Signalized*	EBL	-	-	-	-	-	-	-	-
	EBT/R	-	-	-	-	-	-	-	-
	WBL	-	-	-	-	-	-	-	-
	WBT/R	A	0.24	1.8	2.8	A	0.21	2.8	3.6
	NBL	-	-	-	-	-	-	-	-
	NBT/R	A	0.43	8.6	29.8	A	0.42	6.0	35.1
	SBL	A	0.14	8.5	6.2	A	0.49	12.8	25.1
	SBT	A	0.30	7.7	20.1	A	0.44	6.2	37.3
	SBR	-	-	-	-	-	-	-	-
	Overall	**A**	**0.37**	**7.7**	**-**	**A**	**0.45**	**6.5**	**-**

Notes:
Saturation flow rate of 1800 veh/h/lane
Queue is measured in metres
Peak Hour Factor = 1.00
m = metered queue
# = volume for the 95th %ile cycle exceeds capacity
v/c = volume to capacity ratio

The redistribution of the network volumes, with the Vanguard Drive Extension, will slightly improve the eastbound and westbound movements operations along Innes Road between Tenth Line Road and Mer Bleue Road during the peak hours and reduce operations the northbound approach at the intersection of Innes Road at Jeanne D'Arc Boulevard South/Mer Bleue Road.

During the PM peak hour, the northbound shared through/right-turn movement at the intersection of Innes Road at Jeanne D'Arc Boulevard South/Mer Bleue Road will become over theoretical capacity and may be subject to high delays and extended queues.

Similar to the 2030 future background conditions, the network reductions required to resolve the capacity issues will increase to approximately twelve through vehicles in the northbound direction, 76 left-turns and 210 through vehicles in the southbound direction could address the capacity constraints at Jeanne D'Arc Boulevard South/Mer Bleue Road. These improvements are similar to the existing conditions and confirm that the City will need to review the corridor operations.

7.4 2025 Future Total Operations

Figure 21 illustrates the 2025 future total volumes and Table 23 summarizes the 2025 future total intersection operations. The level of service for signalized intersections is based on v/c calculations for individual lane movements and HCM 2000 v/c calculations for the overall intersection, and average delay for unsignalized intersections. The synchro worksheets for the 2025 future total horizon are provided in Appendix L.

Figure 21: 2025 Future Total Volumes

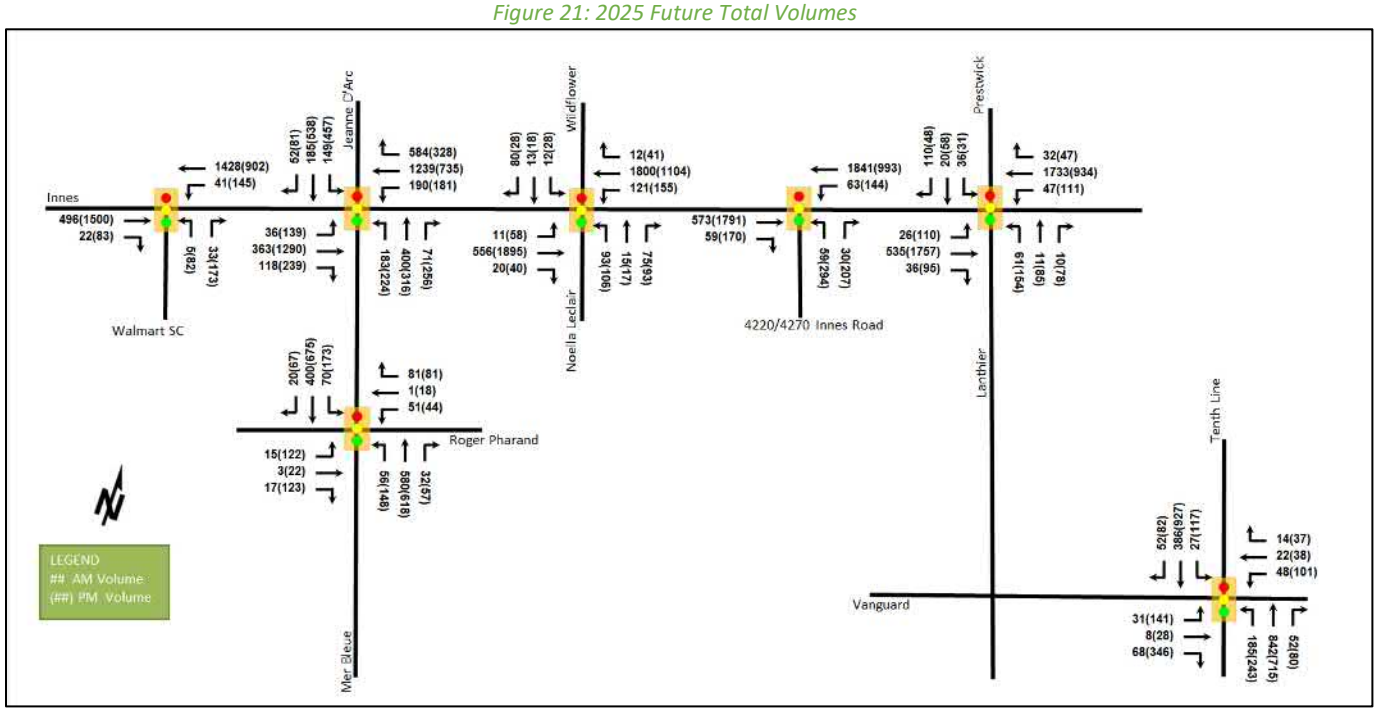


Table 23: 2025 Future Total Intersection Operations

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay (s)	Q (95th)	LOS	V/C	Delay (s)	Q (95th)
Innes Road at Walmart SC *Signalized*	EB	A	0.20	3.1	27.8	C	0.72	17.7	208.3
	WBL	A	0.06	2.2	m3.2	A	0.57	31.7	m30.5
	WBT	A	0.51	4.8	202.1	A	0.35	1.4	m11.6
	NBL	A	0.03	44.2	4.4	A	0.46	61.7	33.3
	NBR	A	0.18	16.5	8.6	A	0.56	14.2	19.2
	Overall	**A**	**0.49**	**4.5**	-	**A**	**0.68**	**14.4**	-
Innes Road at Jeanne D'Arc Boulevard South /Mer Bleue Road *Signalized*	EBL	A	0.22	19.8	12.7	A	0.44	20.3	m30.4
	EBT	A	0.26	22.3	45.8	E	0.96	45.4	**#212.3**
	EBR	A	0.16	4.8	12.6	A	0.33	6.0	m27.4
	WBL	A	0.36	11.9	m17.1	E	0.94	**93.5**	**#79.1**
	WBT	C	0.71	22.7	175.8	A	0.54	31.4	81.4
	WBR	B	0.61	11.3	116.2	A	0.42	5.5	14.1
	NBL	A	0.44	52.2	**#37.9**	A	0.54	58.5	41.3
	NBT/R	D	0.81	56.7	71.6	D	0.88	54.9	**#80.5**
	SBL	B	0.63	66.5	**#30.7**	E	0.99	**95.0**	**#101.9**
	SBT/R	A	0.60	49.5	34.9	E	0.99	**86.0**	**#122.3**
	Overall	**C**	**0.75**	**29.2**	-	**E**	**0.99**	**51.4**	-

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay (s)	Q (95th)	LOS	V/C	Delay (s)	Q (95th)
Innes Road at Wildflower Drive/Noella Leclair Street *Signalized*	EBL	A	0.07	12.5	m3.5	A	0.18	6.3	m4.4
	EBT/R	A	0.28	18.6	58.1	E	0.95	23.4	**m#167.4**
	WBL	A	0.22	7.2	m18.7	B	0.67	41.0	**#73.9**
	WBT/R	C	0.73	17.7	220.1	A	0.50	13.2	134.3
	NBL	B	0.62	66.6	36.7	B	0.65	71.5	42.8
	NBT/R	A	0.41	19.6	17.6	A	0.40	17.2	19.6
	SBL	A	0.09	45.4	8.0	A	0.19	50.9	14.9
	SBT/R	A	0.36	16.7	17.0	A	0.20	26.1	14.7
	Overall	**C**	**0.75**	**19.2**	-	**D**	**0.87**	**22.1**	-
Innes Road at 4220/4270 Innes Road *Signalized*	EBT	A	0.23	4.4	57.6	E	1.00	46.1	**m#314.5**
	EBR	A	0.05	1.9	8.4	A	0.21	9.3	m22.6
	WBL	A	0.10	5.2	m8.4	A	0.59	40.9	**m#70.6**
	WBT	B	0.68	14.1	247.1	A	0.44	8.0	68.4
	NBL	A	0.21	49.7	11.7	B	0.61	58.1	**#71.5**
	NBR	A	0.16	16.0	7.8	A	0.53	28.9	42.3
	Overall	**B**	**0.69**	**12.3**	-	**D**	**0.89**	**33.6**	-
Innes Road at Prestwick Drive/Lanthier Drive *Signalized*	EBL	A	0.19	18.3	14.5	A	0.35	7.2	m6.2
	EBT	A	0.22	8.0	70.4	D	0.85	9.7	m51.3
	EBR	A	0.03	5.3	7.0	A	0.10	0.6	m0.4
	WBL	A	0.08	4.3	6.8	B	0.69	41.3	**#43.0**
	WBT/R	B	0.69	8.8	149.0	A	0.41	7.8	64.2
	NBL	A	0.54	65.7	26.0	C	0.77	75.5	60.3
	NBT/R	A	0.12	31.0	9.2	A	0.54	45.4	51.7
	SBL	A	0.24	50.4	16.8	A	0.19	46.8	15.7
	SBT/R	A	0.59	38.5	33.6	A	0.36	36.7	33.7
	Overall	**B**	**0.69**	**12.1**	-	**D**	**0.85**	**15.5**	-
Roger Pharand Street at Mer Bleue Road *Signalized*	EBL	A	0.08	27.7	5.5	A	0.52	38.2	27.3
	EBT/R	A	0.09	13.2	4.7	A	0.37	9.4	13.8
	WBL	A	0.24	32.1	13.1	A	0.20	28.6	11.8
	WBT/R	A	0.29	8.6	8.6	A	0.28	9.9	11.5
	NBL	A	0.09	8.1	12.2	A	0.33	12.3	34.2
	NBT	A	0.24	6.8	44.4	A	0.28	8.4	47.3
	NBR	A	0.03	2.5	3.2	A	0.06	3.3	5.9
	SBL	A	0.13	8.5	15.1	A	0.36	12.5	39.6
	SBT	A	0.17	6.4	30.1	A	0.31	8.6	52.4
	SBR	A	0.02	1.1	1.2	A	0.07	3.1	6.4
	Overall	**A**	**0.25**	**8.1**	-	**A**	**0.40**	**11.0**	-

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay (s)	Q (95th)	LOS	V/C	Delay (s)	Q (95th)
Vanguard Drive at Tenth Line Road *Signalized*	EBL	A	0.26	55.1	16.2	A	0.45	46.3	51.3
	EBT/R	A	0.37	19.3	15.8	B	0.61	12.1	42.0
	WBL	A	0.41	61.4	22.6	E	0.99	**135.1**	**#62.3**
	WBT/R	A	0.21	37.2	14.6	A	0.17	22.4	20.2
	NBL	B	0.69	59.9	62.5	E	1.00	**113.6**	**#117.2**
	NBT	A	0.33	7.2	59.4	A	0.44	23.1	82.7
	NBR	A	0.05	0.4	1.1	A	0.10	4.1	8.1
	SBL	A	0.26	59.1	15.4	B	0.65	71.6	47.6
	SBT	A	0.19	12.3	35.0	B	0.62	29.1	114.5
	SBR	A	0.06	0.8	1.6	A	0.11	4.3	8.6
	Overall	**A**	**0.44**	**17.9**	**-**	**C**	**0.79**	**37.3**	**-**

Notes: Saturation flow rate of 1800 veh/h/lane
Queue is measured in metres
Peak Hour Factor = 1.00
m = metered queue
# = volume for the 95th %ile cycle exceeds capacity
v/c = volume to capacity ratio

The 2025 future total network operations are similar to the 2025 future background operations.

At the intersection of Innes Road at Jeanne D'Arc Boulevard South/Mer Bleue Road, northbound left-turn may be subject to extended queues during the AM peak hour, and southbound shared through/right-turn movement may be subject to high delays during the PM peak hour. A network reduction of approximately 21 northbound left-turn vehicles during the AM peak hour and 16 southbound through vehicles during PM peak hour could address the extended queues during the AM peak hour and high delays during the PM peak hour.

7.5 2030 Future Total Operations

Figure 22 illustrates the 2030 future total volumes and Table 24 summarizes the 2030 future total intersection operations. The level of service for signalized intersections is based on v/c calculations for individual lane movements and HCM 2000 v/c calculations for the overall intersection. The synchro worksheets for the 2030 future total horizon are provided in Appendix M.

Figure 22: 2030 Future Total Volumes

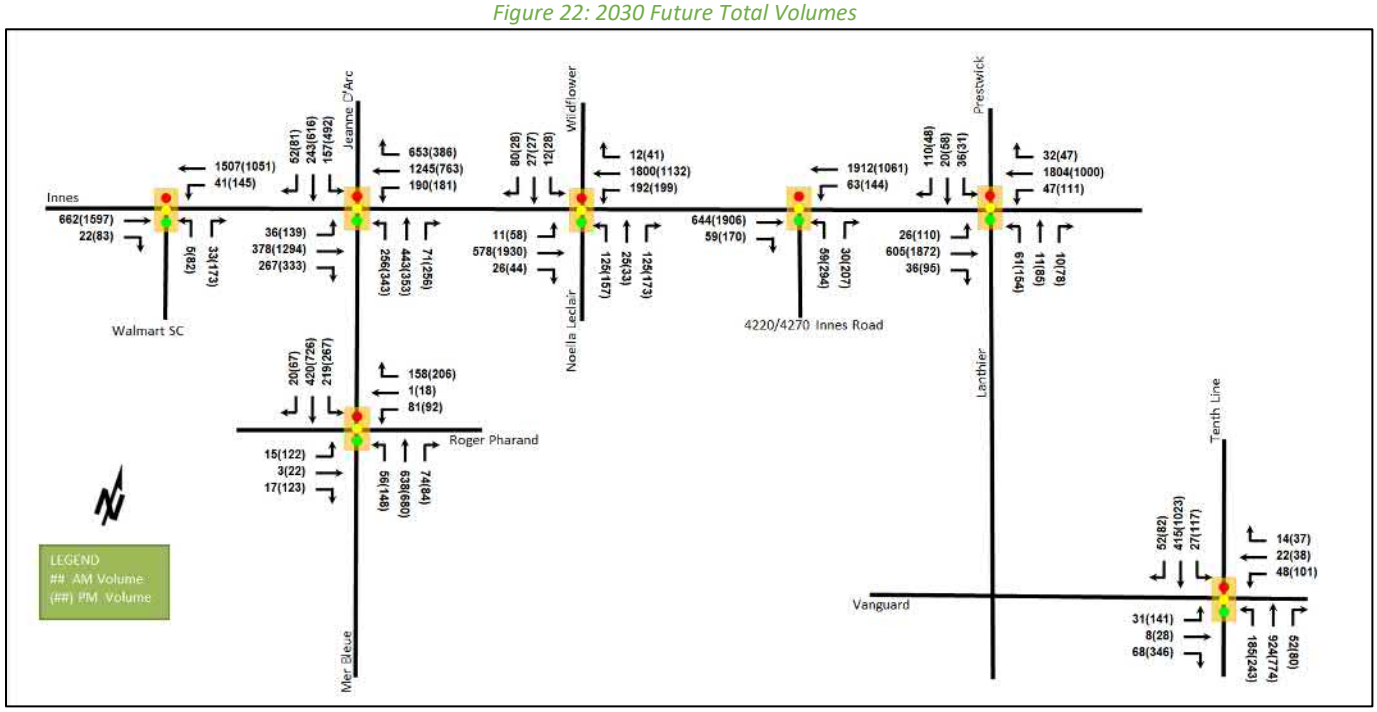


Table 24: 2030 Future Total Intersection Operations

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay (s)	Q (95th)	LOS	V/C	Delay (s)	Q (95th)
Innes Road at Walmart SC *Signalized*	EB	A	0.26	3.4	38.6	C	0.77	19.7	235.0
	WBL	A	0.07	3.3	m3.6	A	0.60	33.0	m25.9
	WBT	A	0.54	6.0	212.1	A	0.41	1.4	m11.7
	NBL	A	0.03	44.2	4.4	A	0.46	61.7	33.3
	NBR	A	0.18	16.5	8.6	A	0.56	14.2	19.2
	Overall	**A**	**0.52**	**5.4**	-	**C**	**0.72**	**15.0**	-
Innes Road at Jeanne D'Arc Boulevard South /Mer Bleue Road *Signalized*	EBL	A	0.24	20.3	13.1	A	0.45	21.0	m28.7
	EBT	A	0.27	23.9	51.7	E	0.96	45.5	**#213.3**
	EBR	A	0.33	6.8	34.3	A	0.42	6.3	m34.1
	WBL	A	0.38	11.9	m15.5	E	0.94	**94.4**	**#80.3**
	WBT	C	0.74	23.6	177.1	A	0.56	30.9	86.2
	WBR	B	0.70	13.9	158.5	A	0.47	4.8	13.8
	NBL	B	0.62	57.5	**#59.3**	D	0.83	72.9	**#67.6**
	NBT/R	D	0.85	59.2	79.0	E	0.92	60.6	**#97.2**
	SBL	B	0.63	65.4	**#33.2**	**F**	**1.13**	**134.3**	**#112.3**
	SBT/R	B	0.68	53.2	44.6	**F**	**1.12**	**119.6**	**#145.5**
	Overall	**C**	**0.79**	**30.9**	-	**F**	**1.03**	**60.7**	-

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay (s)	Q (95th)	LOS	V/C	Delay (s)	Q (95th)
Innes Road at Wildflower Drive/Noella Leclair Street *Signalized*	EBL	A	0.08	14.8	m3.8	A	0.19	6.8	m4.1
	EBT/R	A	0.31	22.4	60.6	E	0.99	27.1	m166.2
	WBL	A	0.38	12.5	m35.5	E	0.98	**89.3**	**#102.7**
	WBT/R	C	0.75	19.7	**#225.1**	A	0.53	15.1	139.6
	NBL	C	0.71	68.7	45.7	C	0.80	79.8	61.6
	NBT/R	A	0.52	17.9	23.3	B	0.64	33.9	49.0
	SBL	A	0.10	42.5	7.7	A	0.26	52.0	15.5
	SBT/R	A	0.36	17.7	20.1	A	0.20	27.3	17.3
	Overall	**C**	**0.79**	**21.7**	-	**E**	**0.96**	**29.0**	-
Innes Road at 4220/4270 Innes Road *Signalized*	EBT	A	0.26	3.3	61.9	**F**	**1.07**	**65.3**	**m#328.9**
	EBR	A	0.05	1.3	7.4	A	0.21	8.6	m20.9
	WBL	A	0.11	5.1	m7.9	A	0.59	40.6	**m#71.9**
	WBT	B	0.70	14.7	262.5	A	0.47	8.3	73.2
	NBL	A	0.21	49.7	11.7	B	0.61	58.1	**#71.5**
	NBR	A	0.16	16.0	7.8	A	0.53	29.4	42.7
	Overall	**C**	**0.71**	**12.3**	-	**E**	**0.93**	**43.3**	-
Innes Road at Prestwick Drive/Lanthier Drive *Signalized*	EBL	A	0.21	19.6	14.8	A	0.37	7.5	m5.8
	EBT	A	0.24	7.9	77.2	D	0.90	11.0	m52.8
	EBR	A	0.03	5.0	6.9	A	0.10	0.6	m0.3
	WBL	A	0.08	4.4	6.9	C	0.74	51.9	**#48.7**
	WBT/R	C	0.71	9.4	162.8	A	0.44	8.1	70.3
	NBL	A	0.54	65.7	26.0	C	0.77	75.5	60.3
	NBT/R	A	0.12	31.0	9.2	A	0.54	45.4	51.7
	SBL	A	0.24	50.4	16.8	A	0.19	46.8	15.7
	SBT/R	A	0.60	40.4	34.5	A	0.36	36.7	33.7
	Overall	**C**	**0.71**	**12.4**	-	**D**	**0.89**	**16.3**	-
Roger Pharand Street at Mer Bleue Road *Signalized*	EBL	A	0.08	27.0	5.5	B	0.68	49.9	29.7
	EBT/R	A	0.08	12.8	4.7	A	0.36	9.1	13.8
	WBL	A	0.36	34.6	19.0	A	0.39	33.0	21.5
	WBT/R	A	0.44	8.3	11.8	A	0.52	12.7	21.8
	NBL	A	0.10	8.4	12.2	A	0.36	13.5	35.7
	NBT	A	0.29	7.7	49.3	A	0.32	9.0	52.8
	NBR	A	0.07	2.9	6.7	A	0.09	2.9	7.1
	SBL	A	0.45	13.7	55.4	B	0.62	21.2	**#85.1**
	SBT	A	0.19	7.2	31.6	A	0.34	9.2	57.0
	SBR	A	0.02	1.1	1.2	A	0.07	3.2	6.4
	Overall	**A**	**0.43**	**9.7**	-	**B**	**0.63**	**13.4**	-

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay (s)	Q (95th)	LOS	V/C	Delay (s)	Q (95th)
Vanguard Drive at Tenth Line Road *Signalized*	EBL	A	0.26	55.1	16.2	A	0.45	46.3	51.3
	EBT/R	A	0.37	19.3	15.8	B	0.62	13.6	46.2
	WBL	A	0.41	61.4	22.6	E	0.99	**135.1**	**#62.3**
	WBT/R	A	0.21	37.2	14.6	A	0.17	22.4	20.2
	NBL	B	0.69	59.9	62.5	E	1.00	**113.6**	**#117.2**
	NBT	A	0.37	7.5	67.0	A	0.48	23.8	91.2
	NBR	A	0.05	0.4	1.1	A	0.10	4.1	8.1
	SBL	A	0.26	59.1	15.4	B	0.65	71.6	47.6
	SBT	A	0.20	12.4	37.6	B	0.68	30.9	130.5
	SBR	A	0.06	0.8	1.6	A	0.11	4.3	8.6
	Overall	**A**	**0.46**	**17.5**	**-**	**D**	**0.82**	**37.8**	**-**

Notes: Saturation flow rate of 1800 veh/h/lane
Queue is measured in metres
Peak Hour Factor = 1.00
m = metered queue
# = volume for the 95th %ile cycle exceeds capacity
v/c = volume to capacity ratio

The 2030 future total network operations are similar to the 2030 future background operations, with the site traffic increasing the PM eastbound volume through the Innes Road at 4220/4270 Innes Road intersection become over capacity similar to the existing conditions. This is similar to the existing conditions and can be addressed by signal timing adjustments along the Innes Road corridor or a network reduction as discussed in Section 2.2.7. It is noted that background growth and developments will require the City to mitigate these operations prior to 2030.

The 2030 future total conditions will continue to see similar capacity constraints at the Innes Road and Jeanne D'Arc Boulevard South/Mer Bleue Road. The northbound left-turn movement may exhibit extended queuing during both peak hours at the Innes Road and Jeanne D'Arc Boulevard South/Mer Bleue Road intersection. The westbound shared through/right-turn movement may exhibit extended queuing during PM peak at the Innes Road at Wildflower Drive/Noella Leclair Street intersection. The southbound left-turn movement may exhibit extended queuing during AM peak and westbound bound left-turn movement may exhibit high delays during PM peak at the Roger Pharand Street at Mer Bleue Road intersection.

Compared to the 2030 future background horizon, the network reductions required to resolve the capacity issues will increase to approximately 55 southbound left-turn and 71 southbound through vehicles at the Innes Road and Jeanne D'Arc Boulevard South/Mer Bleue Road intersection during the PM peak. The eastbound through network reductions at the intersection of Innes Road at 4220/4270 Innes Road would also increase during the PM peak to 115 vehicles to resolve the capacity issues.

7.6 2035 Future Total Operations

7.6.1 Without the Vanguard Drive Extension

Figure 23 illustrates the 2035 future total volumes without the Vanguard Drive Extension and Table 25 summarizes the 2035 future total intersection operations without the Vanguard Drive Extension. The level of service for signalized intersections is based on v/c calculations for individual lane movements and HCM 2000 v/c calculations for the overall intersection. The synchro worksheets for the 2035 future total horizon without the Vanguard Drive Extension are provided in Appendix N.

Figure 23: 2035 Future Total Volumes – Without the Vanguard Drive Extension

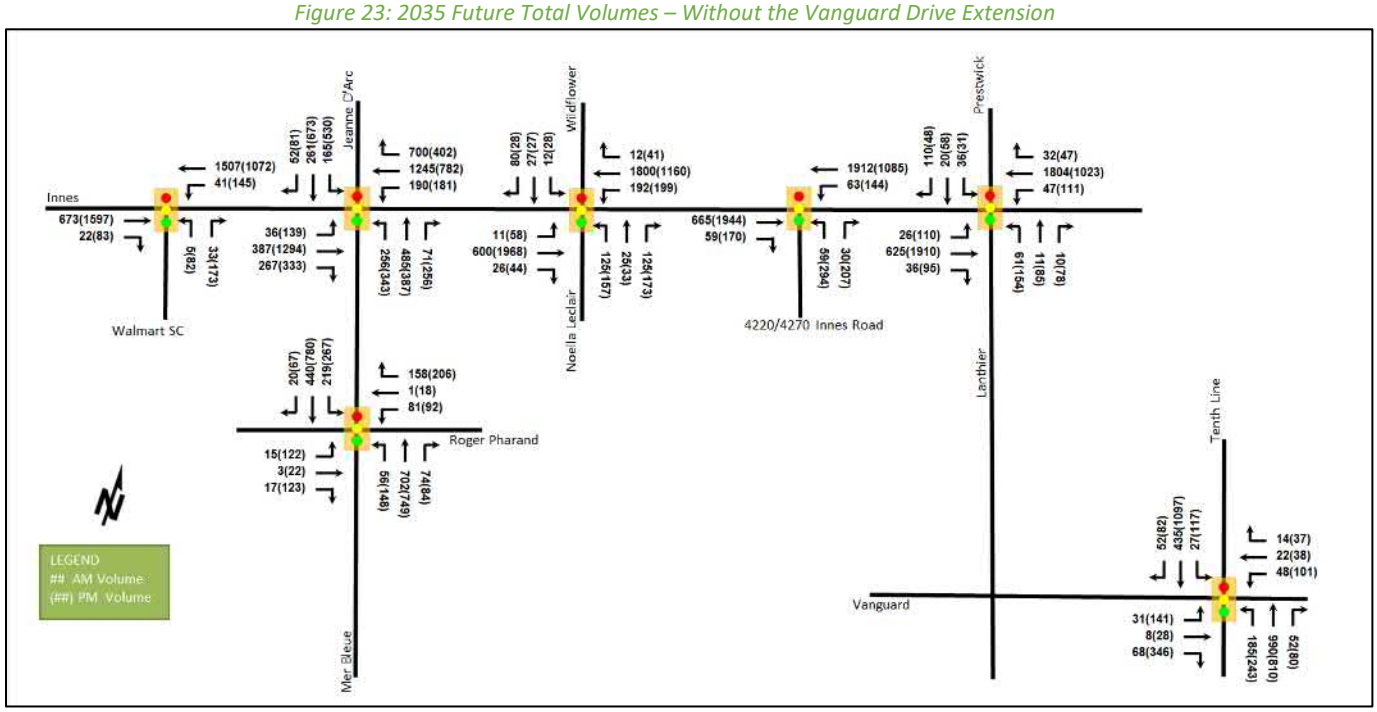


Table 25: 2035 Future Total Intersection Operations – Without the Vanguard Drive Extension

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay (s)	Q (95th)	LOS	V/C	Delay (s)	Q (95th)
Innes Road at Walmart SC ***Signalized***	EB	A	0.27	3.4	39.3	C	0.77	19.7	235.0
	WBL	A	0.07	3.4	m3.6	A	0.60	32.9	m25.9
	WBT	A	0.54	6.2	212.0	A	0.41	1.4	m11.8
	NBL	A	0.03	44.2	4.4	A	0.46	61.7	33.3
	NBR	A	0.18	16.5	8.6	A	0.56	14.2	19.2
	Overall	**A**	**0.52**	**5.5**	-	**C**	**0.72**	**14.9**	-
Innes Road at Jeanne D'Arc Boulevard South /Mer Bleue Road ***Signalized***	EBL	A	0.24	20.6	13.2	A	0.46	21.2	m28.7
	EBT	A	0.28	24.0	53.2	E	0.96	45.5	**#213.3**
	EBR	A	0.33	6.8	34.5	A	0.42	6.3	m34.1
	WBL	A	0.38	12.2	m16.1	E	0.94	**94.3**	**#79.0**
	WBT	C	0.74	24.0	176.7	A	0.57	30.9	87.3
	WBR	C	0.76	16.9	169.1	A	0.49	4.8	13.8
	NBL	B	0.63	58.1	**#59.3**	D	0.83	72.9	**#67.6**
	NBT/R	D	0.88	62.5	**#92.3**	E	0.96	69.3	**#111.3**
	SBL	B	0.69	69.4	**#35.8**	**F**	**1.28**	**187.1**	**#123.2**
	SBT/R	B	0.70	54.1	47.5	**F**	**1.21**	**152.2**	**#162.7**
	Overall	**C**	**0.80**	**32.5**	-	**F**	**1.07**	**72.3**	-

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay (s)	Q (95th)	LOS	V/C	Delay (s)	Q (95th)
Innes Road at Wildflower Drive/Noella Leclair Street *Signalized*	EBL	A	0.08	14.5	m3.6	A	0.20	6.5	m3.9
	EBT/R	A	0.32	22.3	m61.9	E	1.00	27.5	m166.3
	WBL	A	0.39	12.7	m35.5	E	0.98	**89.0**	**#102.3**
	WBT/R	C	0.75	19.7	**#225.1**	A	0.55	15.3	143.6
	NBL	C	0.71	68.7	45.7	C	0.80	79.8	61.6
	NBT/R	A	0.52	17.9	23.3	B	0.64	34.3	49.3
	SBL	A	0.10	42.5	7.7	A	0.26	52.0	15.5
	SBT/R	A	0.36	17.7	20.1	A	0.20	27.3	17.3
	Overall	**C**	**0.79**	**21.7**	-	**E**	**0.96**	**29.2**	-
Innes Road at 4220/4270 Innes Road *Signalized*	EBT	A	0.26	3.3	63.8	**F**	**1.09**	**73.6**	**m#330.3**
	EBR	A	0.05	1.3	7.2	A	0.21	8.6	m20.6
	WBL	A	0.11	5.1	m7.9	A	0.59	40.4	**m#72.4**
	WBT	B	0.70	14.7	262.5	A	0.48	8.4	74.8
	NBL	A	0.21	49.7	11.7	B	0.61	58.1	**#71.5**
	NBR	A	0.16	16.0	7.8	A	0.53	29.4	42.7
	Overall	**C**	**0.71**	**12.2**	-	**E**	**0.95**	**47.5**	-
Innes Road at Prestwick Drive/Lanthier Drive *Signalized*	EBL	A	0.21	19.5	14.9	A	0.38	7.6	m5.6
	EBT	A	0.25	7.9	80.1	E	0.92	11.8	m53.5
	EBR	A	0.03	5.0	7.0	A	0.10	0.6	m0.3
	WBL	A	0.08	4.4	6.9	C	0.74	51.9	**#48.7**
	WBT/R	C	0.71	9.4	162.8	A	0.45	8.2	72.5
	NBL	A	0.54	65.7	26.0	C	0.77	75.5	60.3
	NBT/R	A	0.12	31.0	9.2	A	0.54	45.4	51.7
	SBL	A	0.24	50.4	16.8	A	0.19	46.8	15.7
	SBT/R	A	0.60	40.4	34.5	A	0.36	36.7	33.7
	Overall	**C**	**0.71**	**12.4**	-	**D**	**0.90**	**16.6**	-
Roger Pharand Street at Mer Bleue Road *Signalized*	EBL	A	0.08	27.0	5.5	B	0.68	49.9	29.7
	EBT/R	A	0.08	12.8	4.7	A	0.36	9.6	14.3
	WBL	A	0.36	34.6	19.0	A	0.39	33.0	21.5
	WBT/R	A	0.45	8.7	12.2	A	0.55	16.8	26.3
	NBL	A	0.10	8.5	12.3	A	0.39	14.4	37.4
	NBT	A	0.31	7.9	55.0	A	0.35	9.3	59.3
	NBR	A	0.07	2.9	6.7	A	0.09	2.9	7.1
	SBL	A	0.49	15.4	**#65.1**	B	0.67	24.6	**#89.7**
	SBT	A	0.20	7.2	33.2	A	0.36	9.4	62.3
	SBR	A	0.02	1.1	1.2	A	0.07	3.2	6.4
	Overall	**A**	**0.46**	**9.9**	-	**B**	**0.67**	**14.1**	-

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay (s)	Q (95th)	LOS	V/C	Delay (s)	Q (95th)
Vanguard Drive at Tenth Line Road *Signalized*	EBL	A	0.26	55.1	16.2	A	0.45	46.3	51.3
	EBT/R	A	0.37	19.3	15.8	B	0.62	14.6	48.6
	WBL	A	0.41	61.4	22.6	E	0.99	**135.1**	**#62.3**
	WBT/R	A	0.21	37.2	14.6	A	0.17	22.4	20.2
	NBL	B	0.69	59.9	62.5	E	1.00	**113.6**	**#117.2**
	NBT	A	0.39	7.7	73.4	A	0.50	24.2	96.2
	NBR	A	0.05	0.4	1.1	A	0.10	4.1	8.1
	SBL	A	0.26	59.1	15.4	B	0.65	71.6	47.6
	SBT	A	0.21	12.5	39.5	C	0.73	32.5	144.2
	SBR	A	0.06	0.8	1.6	A	0.11	4.3	8.6
	Overall	**A**	**0.48**	**17.2**	**-**	**D**	**0.85**	**38.2**	**-**

Notes: Saturation flow rate of 1800 veh/h/lane
Queue is measured in metres
Peak Hour Factor = 1.00
m = metered queue
# = volume for the 95th %ile cycle exceeds capacity
v/c = volume to capacity ratio

During both peak hours, the study area intersection operates similar to the 2030 future total condition with exception of the southbound left-turn movement at Roger Pharand Street at Mer Bleue Road intersection may exhibit high delays during AM peak.

Compared to the 2035 future background horizon without the Vanguard Drive extension, the network reductions required to resolve the capacity issues will increase to approximately 113 left-turn and 128 through vehicles in the southbound direction at the Innes Road and Jeanne D'Arc Boulevard South/Mer Bleue Road intersection during the PM peak. The eastbound through network reductions at the intersection of Innes Road at 4220/4270 Innes Road would also increase during the PM peak to 153 vehicles to resolve the capacity issues. Alternatively, the City can include these volumes in the Innes corridor signal adjustments to address existing and background capacity constraints.

7.6.2 With the Vanguard Drive Extension

The Vanguard Drive Extension is assumed to be completed by 2031 and included in the 2035 future horizon. Figure 24 illustrates the 2035 background volumes with the Vanguard Drive Extension and Table 26 summarizes the 2035 background intersection operations with the Vanguard Drive Extension. The level of service for signalized intersections is based on v/c calculations for individual lane movements and HCM 2000 v/c calculations for the overall intersection, and average delay for unsignalized intersections. The synchro worksheets for the 2035 future total horizon with the Vanguard Drive Extension are provided in Appendix O.

Figure 24: 2035 Future Total Volumes – With the Vanguard Drive Extension

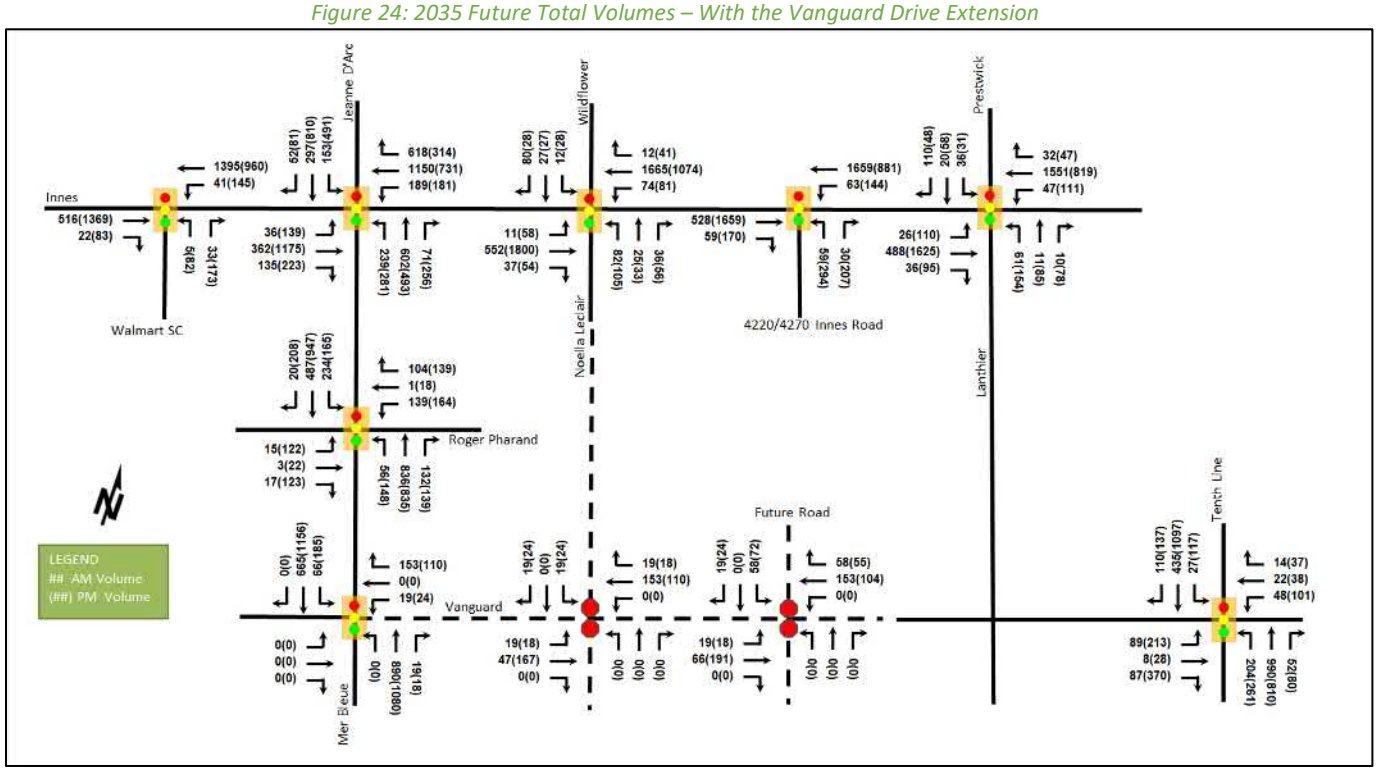


Table 26: 2035 Future Total Intersection Operations – With the Vanguard Drive Extension

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay (s)	Q (95th)	LOS	V/C	Delay (s)	Q (95th)
Innes Road at Walmart SC *Signalized*	EB	A	0.21	3.2	29.1	B	0.66	15.2	177.4
	WBL	A	0.06	3.6	m3.9	A	0.53	21.6	m22.0
	WBT	A	0.50	6.2	196.7	A	0.37	1.4	m11.7
	NBL	A	0.03	44.2	4.4	A	0.46	61.7	33.3
	NBR	A	0.18	16.5	8.6	A	0.56	14.2	19.2
	Overall	**A**	**0.48**	**5.6**	-	**B**	**0.62**	**12.1**	-
Innes Road at Jeanne D'Arc Boulevard South /Mer Bleue Road *Signalized*	EBL	A	0.21	19.1	12.3	A	0.43	19.9	m31.7
	EBT	A	0.26	22.9	46.3	D	0.88	36.7	133.7
	EBR	A	0.18	6.0	16.7	A	0.31	5.5	24.0
	WBL	A	0.37	12.2	m17.5	E	0.91	**86.4**	**#76.4**
	WBT	B	0.69	21.9	145.8	A	0.54	31.0	92.5
	WBR	C	0.72	14.1	157.7	A	0.45	5.2	17.0
	NBL	B	0.63	59.1	**#54.3**	B	0.68	63.3	50.7
	NBT/R	E	0.96	74.2	**#114.5**	**F**	**1.08**	**101.0**	**#134.7**
	SBL	B	0.70	71.8	**#32.0**	**F**	**1.19**	**154.8**	**#112.0**
	SBT/R	C	0.73	55.3	53.3	**F**	**1.43**	**238.9**	**#203.0**
	Overall	**C**	**0.79**	**35.3**	-	**F**	**1.09**	**89.8**	-

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay (s)	Q (95th)	LOS	V/C	Delay (s)	Q (95th)
Innes Road at Wildflower Drive/Noella Leclair Street *Signalized*	EBL	A	0.07	13.5	m3.4	A	0.18	6.0	m4.1
	EBT/R	A	0.28	19.9	m57.2	D	0.87	16.3	m159.6
	WBL	A	0.14	8.6	m15.2	A	0.55	31.4	m26.6
	WBT/R	B	0.70	17.4	201.0	A	0.51	14.4	126.3
	NBL	B	0.70	68.4	44.6	C	0.79	79.1	60.0
	NBT/R	A	0.27	24.2	16.4	A	0.31	22.7	21.9
	SBL	A	0.08	42.0	7.6	A	0.15	46.9	14.8
	SBT/R	A	0.37	17.9	20.2	A	0.20	27.4	17.3
	Overall	**C**	**0.73**	**20.3**	-	**D**	**0.83**	**19.2**	-
Innes Road at 4220/4270 Innes Road *Signalized*	EBT	A	0.21	3.6	54.7	E	0.93	36.6	**#290.5**
	EBR	A	0.05	1.8	8.9	A	0.21	10.0	m24.9
	WBL	A	0.10	5.7	m10.5	A	0.59	41.5	**m#71.1**
	WBT	B	0.61	12.6	220.5	A	0.39	7.5	60.6
	NBL	A	0.21	49.7	11.7	B	0.61	58.1	**#71.5**
	NBR	A	0.16	16.0	7.8	A	0.53	28.1	41.6
	Overall	**B**	**0.62**	**11.1**	-	**D**	**0.84**	**29.2**	-
Innes Road at Prestwick Drive/Lanthier Drive *Signalized*	EBL	A	0.15	15.1	13.8	A	0.31	6.0	m6.8
	EBT	A	0.20	7.8	66.5	C	0.78	6.9	m51.8
	EBR	A	0.03	5.6	7.1	A	0.10	0.6	m0.5
	WBL	A	0.07	4.3	6.8	B	0.62	26.0	**#19.3**
	WBT/R	B	0.62	7.5	118.9	A	0.36	7.4	54.4
	NBL	A	0.54	65.7	26.0	C	0.77	75.5	60.3
	NBT/R	A	0.12	31.0	9.2	A	0.54	45.4	51.7
	SBL	A	0.24	50.4	16.8	A	0.19	46.8	15.7
	SBT/R	A	0.56	31.8	29.9	A	0.36	36.7	33.7
	Overall	**B**	**0.62**	**11.2**	-	**C**	**0.79**	**14.0**	-
Roger Pharand Street at Mer Bleue Road *Signalized*	EBL	A	0.06	24.7	5.5	A	0.47	34.0	27.4
	EBT/R	A	0.07	11.9	4.7	A	0.38	16.2	20.3
	WBL	A	0.54	38.2	30.5	B	0.65	42.2	36.7
	WBT/R	A	0.21	7.8	7.9	A	0.27	8.7	11.9
	NBL	A	0.11	9.4	12.4	A	0.50	20.5	**#49.7**
	NBT	A	0.40	9.5	69.9	A	0.41	10.4	70.2
	NBR	A	0.13	2.4	8.8	A	0.14	2.5	9.1
	SBL	B	0.66	25.4	**#82.1**	A	0.49	19.1	**#52.1**
	SBT	A	0.23	8.2	36.9	A	0.45	10.9	79.6
	SBR	A	0.02	1.1	1.2	A	0.21	2.3	10.8
	Overall	**B**	**0.63**	**12.5**	-	**A**	**0.54**	**13.5**	-

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay (s)	Q (95th)	LOS	V/C	Delay (s)	Q (95th)
Vanguard Drive at Tenth Line Road *Signalized*	EBL	A	0.59	65.2	35.6	B	0.68	55.7	77.7
	EBT/R	A	0.37	15.5	16.4	B	0.66	17.1	57.8
	WBL	A	0.34	53.6	21.5	**F**	**1.15**	**185.2**	**#66.4**
	WBT/R	A	0.17	33.4	13.9	A	0.17	22.4	20.2
	NBL	B	0.67	56.8	67.7	**F**	**1.09**	**136.1**	**#128.3**
	NBT	A	0.43	9.9	83.2	A	0.50	24.3	96.2
	NBR	A	0.05	0.5	1.3	A	0.10	4.1	8.1
	SBL	A	0.26	59.1	15.4	B	0.65	71.6	47.6
	SBT	A	0.24	16.2	44.4	C	0.73	32.5	144.2
	SBR	A	0.13	3.6	9.7	A	0.19	9.4	19.6
	Overall	**A**	**0.52**	**19.9**	**-**	**E**	**0.91**	**42.5**	**-**
Vanguard Drive at Mer Bleue Road *Signalized*	EBL	-	-	-	-	-	-	-	-
	EBT/R	-	-	-	-	-	-	-	-
	WBL	A	0.06	12.9	4.7	A	0.12	36.4	12.1
	WBT/R	A	0.31	4.3	7.7	A	0.34	11.2	14.6
	NBL	-	-	-	-	-	-	-	-
	NBT/R	A	0.59	10.4	35.8	A	0.43	4.9	39.6
	SBL	A	0.29	11.5	9.1	A	0.57	14.1	32.4
	SBT	A	0.43	8.8	24.5	A	0.46	5.1	42.7
	SBR	-	-	-	-	-	-	-	-
	Overall	**A**	**0.42**	**9.3**	**-**	**A**	**0.55**	**6.2**	**-**
Vanguard Drive at Noella Leclair Street Un*signalized*	EB	A	0.01	7.6	0.0	A	0.01	7.5	0.0
	WB	A	-	0.0	0.0	A	-	0.0	0.0
	NB	A	-	0.0	0.0	A	-	0.0	0.0
	SB	A	0.05	9.9	1.5	B	0.06	10.1	1.5
	Overall	**A**	**-**	**1.9**	**-**	**A**	**-**	**1.7**	**-**
Vanguard Drive at new local road *Unsignalized*	EB	A	0.01	7.7	0.0	A	0.01	7.6	0.0
	WB	A	-	0.0	0.0	A	-	0.0	0.0
	NB	A	-	0.0	0.0	A	-	0.0	0.0
	SB	B	0.11	10.8	3.0	B	0.15	11.5	3.8
	Overall	**A**	**-**	**2.6**	**-**	**A**	**-**	**2.7**	**-**

Notes: Saturation flow rate of 1800 veh/h/lane
Queue is measured in metres
Peak Hour Factor = 1.00
m = metered queue
# = volume for the 95th %ile cycle exceeds capacity
v/c = volume to capacity ratio

Compared to the 2035 background horizons with the Vanguard Drive extension, the westbound left-turn movement during the PM peak at Innes Road and Jeanne D'Arc Boulevard South/Mer Bleue Road intersection may be subject to high delays, the southbound left-turn movements during both peak hours may exhibit extended queues at the intersection of Roger Pharand Street at Mer Bleue Road, and the westbound and northbound left-turn movements at the intersection of Vanguard Drive at Tenth Line Road will be over theoretical capacity and may be subject to high delays and extended queues during the PM peak hour.

Compared to the 2035 future background horizon with the Vanguard Drive extension, the network reduction required to resolve the capacity issues will increase to approximately 36 northbound through, 76 southbound left-turn and 265 through vehicles at the Innes Road and Jeanne D'Arc Boulevard South/Mer Bleue Road intersection during the PM peak.

It is noted that the westbound and northbound left-turn movements at the Vanguard Drive at Tenth Line Road intersection during the PM peak will return to being over capacity. This is similar to the existing conditions and

can be addressed by signal timing adjustments or a network reduction of approximately 48 westbound left-turn and 21 northbound left-turn vehicles.

Compared to the 2035 futural total condition without the Vanguard Drive extension, although the eastbound and westbound movements operations along Innes Road between Tenth Line Road and Mer Bleue Road during the peak hours will be slightly improved with the redistribution of the network volumes, there will be capacity constraints on the northbound shared through/right-turn movement during the PM peak hour at Innes Road and Jeanne D'Arc Boulevard South/Mer Bleue Road intersection and westbound and northbound left-turn movement during the PM peak hour at Vanguard Drive and Tenth Line Road intersection. Extended queues may also be exhibited on the northbound left-turn movement during the PM peak hour at Roger Pharand Street and Mer Bleue Road intersection.

7.7 Modal Share Sensitivity and Demand Rationalization Conclusions

The modal shares applied to the subject development are consistent to the City's existing modal split in Orleans, with 29% transit and 54% auto expected during the AM peak and 21% transit and 61% auto during the PM peak. The existing mode shares may begin to shift towards a large transit share once the Stage 2 LRT is open and the transit routes switch to focus towards LRT stations rather than the east-west travel currently required. Overall, it is expected that the auto share will reduce in the future and be dependent on the City's implementation of effective transit routes to serve the area. It is recommended that the existing mode shares be used for this study to outline the network reductions that may occur should transit adoption lag once LRT is opened.

Notwithstanding the above, each horizon has outlined a progression of network reductions that may be required to be alleviate potential PM peak hour capacity constraints, or alternatively where signal timing adjustments would be required, are outlined below in Table 27. The progression of the improvements noted are consistent with the existing conditions and the City will need to address the constraints as the other area developments are completed.

Table 27: Required Network Volume Reductions or Alternative Signal Timing Adjustments

Intersection	Movement	Ex.	2025		2030			2035 w/o Vanguard Ext			2035 w/ Vanguard Ext		
			FB	FT	FB	FT	Sig Adj?	FB	FT	Sig Adj?	FB	FT	Sig Adj?
Innes Road at Jeanne D'Arc Boulevard South /Mer Bleue Road	EBT	68	-	-	-	-	Y	-	-	N	-	-	Y
	WBL	7	-	-	-	-		-	-		-	-	
	SBL	6	-	-	47	55		107	113		76	76	
	SBT	-	-	-	16	71		73	128		210	265	
	NBT	-	-	-	-	-		-	-		12	36	
Innes Road at 4220 / 4270 Innes Road	EBT	179	-	-	-	115	-/N	34	153	N	-	-	-
Vanguard Drive at Tenth Line Road	WBL	32	-	-	-	-	-	-	-	-	-	48	Y
	NBL	26	-	-	-	-		-	-		-	21	

At the intersection of Innes Road at 4220/4270 Innes Road, where signal timing adjustments may be able to address capacity issues in the background conditions but not the total conditions at 2030, the future total intersection operations are nonetheless forecasted to an improvement from the existing conditions. This pattern is additionally noted for the 2035 background and total conditions at this intersection where signal timing adjustments are not anticipated to be able to resolve capacity issues in either set of conditions.

At the intersection of Innes Road at Jeanne D'Arc Boulevard South/Mer Bleue Road at the 2035 horizon, through the combination of signal timing adjustments and a reduction of 20 eastbound through movements in the future background conditions and 25 eastbound through vehicles in the future total conditions may reduce v/c of all movements to 1.00 or below.

While the language of "reductions" to vehicle volumes has been used throughout the foregoing, it is noted that the "reduction" applies to the forecasted future volumes arrived at via the selected growth rates and forecasted future area development traffic. More appropriately, these "reductions" may be thought of as future person trips shifted from auto modes to transit from the outset of development or from the regional network new trip capacity comes online due to the LRT connection.

This "reduction" may be further influenced by emerging trends. Office space trip generation, which is forecasted above as 244 AM and 222 PM peak hour two-way auto trips in Phase Two may be mitigated by flexible work arrangements where employees may work off-peak hours, only certain days per week, or in the office on an as-needed, periodic basis. This trend will be mirrored in the residential component's trip generation, forecasted above as 485 AM and 565 PM peak hour two-way auto trips across both phases, as commuter trips included as part of the current methodology are similarly averted. These trends would be applicable to all area traffic and therefore further potential exists beyond the shifts from transit for the approximately 9% reduction required in eastbound vehicles on Innes Road at the intersection of 4200/4270 Innes Road to resolve capacity issues in the future.

As the subject development will be phased, these operations will be continually evaluated through the Transportation Impact Assessments supporting the individual site plan applications. While the Vanguard Drive extension is not anticipated to be required within the study area horizons through these future modal and technological shifts, the City should continue to evaluate the implementation timeline beyond the 2030 horizon based upon the realized future area traffic to be documented in these forthcoming TIAs.

8 Development Design

8.1 Design for Sustainable Modes

The proposed development is a mixed-use subdivision. The vehicle surface parking lots will be provided at each building. Sidewalks will be provided along Noella Leclair Street Extension and the new local road, and it will be connected to the Vanguard Drive Extension. Hard surfaces will be provided to connect adjacent buildings.

The proposed development will include 1.51 acres of park, and walkways will be provided to connect buildings to the park and within the park. Walkways will also connect to Vanguard Drive Extension, which will have cycle tracks and sidewalks along both sides of the road.

Individual site plan applications will be required for the individual blocks, including a TIA or TIA addendums including the modules that support site plan design review.

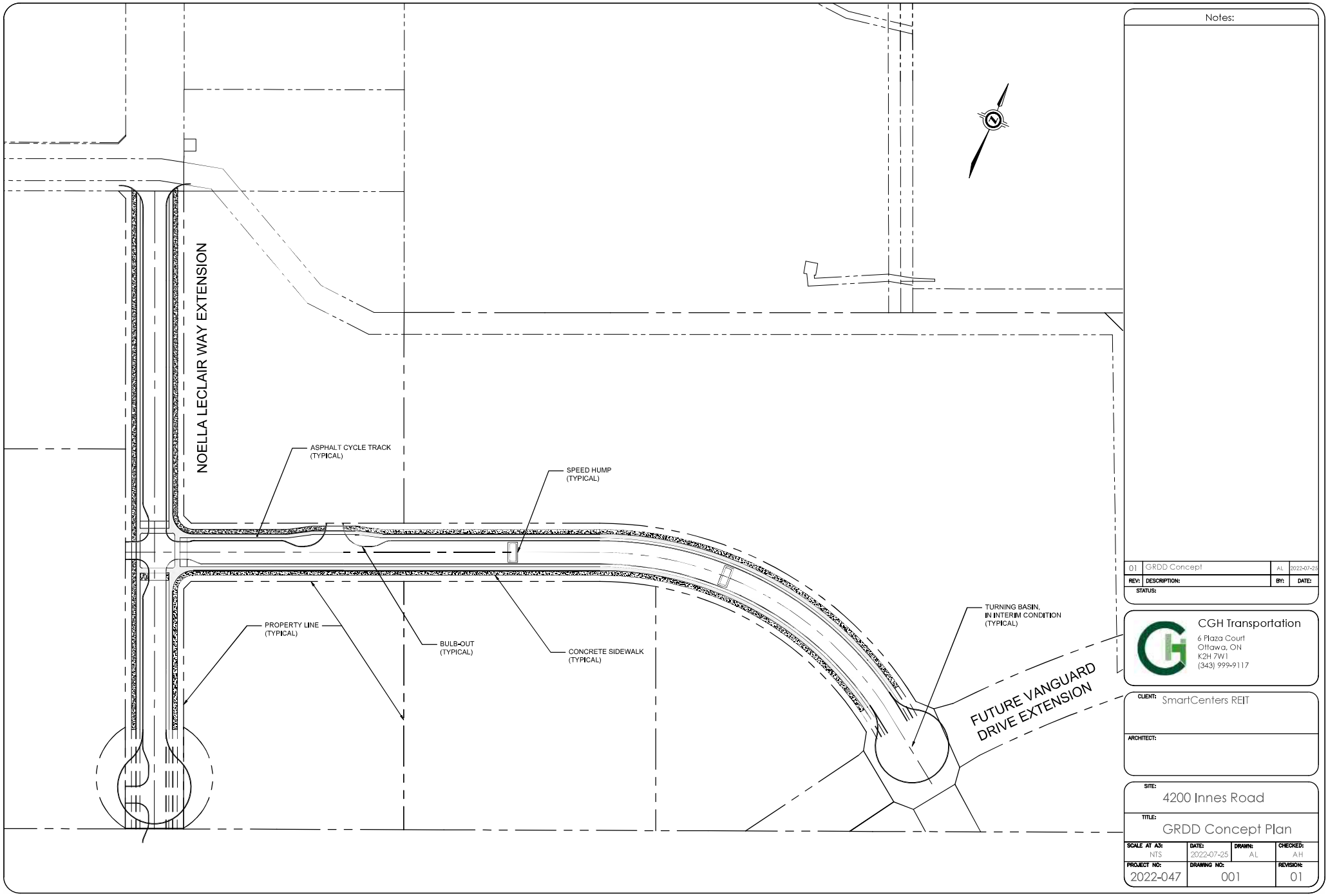
8.2 New Street Networks

The planned street network will include two 24.0-metre roadways. The local roads are proposed to be posted as 30 km/h. Cycle tracks will be provided along Noella Leclair Street and the new local road.

Figure 25 illustrates the concept traffic calming plan to support the pedestrian and cycling connectivity within the subdivision. Traffic calming elements are recommended at the internal intersections, including bulb-outs to narrow each approach to the intersection (e.g. reduced crossing distance) and speed humps. While the Vanguard Drive extension is not anticipated to be required within the study area horizons, turn arounds will be provided at the end of Noella Leclair Street and the new local road. No changes to the City led environmental assessment for Vanguard Drive are proposed as part of the subdivision.

As the subject development will be phased, the City should continue to evaluate the implementation timeline of the internal road network, area improvements and the future Vanguard Drive extension as individual site plans proceed and traffic counts are updated to reflect changes in area travel (e.g. transit to LRT, hybrid employment programs, etc.).

Figure 25: Concept Traffic Calming Plan



9 Boundary Street Design

Table 28 summarizes the MMLOS analysis for the boundary streets of Roger Pharand Street, Vanguard Drive, Noella Leclair Street, and the new local road. The boundary street analysis is based on the land-use designation of "General Urban Area". The MMLOS worksheets have been provided in Appendix P.

Table 28: Boundary Street MMLOS Analysis

Segment		Pedestrian LOS		Bicycle LOS		Transit LOS		Truck LOS	
		PLOS	Target	BLOS	Target	TLOS	Target	TrLOS	Target
Roger Pharand Street	Existing	**F**	C	D	D	-	-	-	-
	Future	A	C	D	D	-	-	-	-
Vanguard Drive	Future	B	C	A	D	-	-	-	-
Noella Leclair Street	Future	A	C	B	D	-	-	-	-
new local road	Future	A	C	B	D	-	-	-	-

Roger Pharand Street does not meet the pedestrian MMLOS target in existing condition but will be met in the future condition.

Both pedestrian and bicycle MMLOS targets will be met along the boundary streets in future condition.

10 Access Intersections Design

10.1 Location and Design of Access

Subdivision will connect to Innes Road (arterial road) via the extension of Noella Leclair Street and the new local road. Once Vanguard Drive is extended by the City, Noella Leclair Street and the new local road will connect to planned intersections on Vanguard Drive with connections east to Tenth Line Road and west to Mer Bleue Road. Within the subdivision, no turn lanes are proposed at the intersection of Noella Leclair Street Extension and the new local road and will be controlled by minor stop control.

10.2 Intersection Control

The internal road network will extend to the arterial road network at Innes Road and at Mer Bleue Road at signalized intersections.

10.3 Access Intersection Design

10.3.1 Future Access Intersection Operations

10.3.1.1 Without the Vanguard Drive extension

The intersection of Noella Leclair Street at Roger Pharand Street would provided access to the subdivision, and will connect to the intersections at Innes Road and at Mer Bleue Road. The operations are summarized in Section 7.4, 7.5 and 7.6.1 for the future conditions. No capacity issues were noted at the Innes Road and at the Mer Bleue Road intersections, no mitigation will be required.

10.3.1.2 With the Vanguard Drive extension

Once Vanguard Drive is extended to Mer Bleue Road, access to the subdivision will also be provided through the new intersections with Noella Leclair Street and the new local road. The operations are summarized in Section 7.4, 7.5 and 7.6.2 for the future conditions. No capacity issues were noted at the Innes Road, at the Mer Bleue Road and at the future Vanguard Drive intersections, no mitigation will be required.

10.3.2 Access Intersection MMLOS

Table 29 summarizes the MMLOS analysis for the subdivision access intersections of Innes Road at Wildflower Drive/Noella Leclair Street and Roger Pharand Street at Mer Bleue Road. Delays from the 2035 Future Total Horizon have been used for the MMLOS analysis. The existing and future conditions for both intersections will be the same and are considered in one row. The Innes Road at Wildflower Drive/Noella Leclair Street intersection analysis is based on the land-use designation of "Arterial Main Street", and the Roger Pharand Street at Mer Bleue Road intersection is based on "General Urban Area". The MMLOS worksheets have been provided in Appendix P.

Table 29: Access Intersection MMLOS Analysis

Intersection	Pedestrian LOS		Bicycle LOS		Transit LOS		Truck LOS		Auto LOS	
	PLOS	Target	BLOS	Target	TLOS	Target	TrLOS	Target	ALOS	Target
Innes Road at Wildflower Drive/ Noella Leclair Street	F	C	F	C	C	D	-	-	E/D	D
Roger Pharand Street at Mer Bleue Road	F	C	E	C	-	-	-	-	B	D

Note: Transit LOS and Auto LOS format "Without Vanguard"" / "With Vanguard"

The pedestrian LOS targets will not be met at intersections within the study area. As typical for arterial roads, the crossing distance does not permit the targets to be met. To meet pedestrian LOS targets, the maximum crossing distance would need to be reduced to three-lane widths on all pedestrian crossings.

The bicycle LOS targets will not be met at the intersections within the study area. To meet bicycle LOS targets, the left-turn configurations would need to be two-stage or turn boxes.

To meet auto LOS at Innes Road at Wildflower Drive/Noella Leclair Street intersection without the Vanguard Drive Extension, network reductions or signal timing adjustments would be required as noted in Section 7.7. The progression of the improvements noted are consistent with the existing conditions and the City will need to address the constraints as the other area developments are completed.

10.3.3 Recommended Design Elements

No changes are required for the existing Innes Road at Wildflower Drive/Noella Leclair Street and the Roger Pharand Street at Mer Bleue Road intersections.

No changes are proposed to the environmental assessment design for the access intersections along the Vanguard Drive extension.

11 Transportation Demand Management

11.1 Context for TDM

The mode shares used within the TIA represent the unmodified district mode shares. Overall, the modal shares are likely to be achieved and supporting TDM measures should be provided to encourage shifts towards sustainable modes.

The subject site is within a design priority area. Total bedrooms within the development is subject to the final unit count and layout selections by purchasers. No age restrictions are noted.

11.2 Need and Opportunity

The subject site has been assumed to rely predominantly on auto travel and those assumptions have been carried through the analysis. As the unmodified district mode shares have been applied, risks to other network users from failing to meet mode share targets are low.

11.3 TDM Program

The "suite of post occupancy TDM measures" has been summarized in the TDM checklists for the residential land uses. The checklist is provided in Appendix Q. The key TDM measures recommended to be considered in future site plan applications include:

- Inclusion of a 1-year Presto card for first time new townhome purchase, with a set time frame for this offer (e.g. 6-months) from the initial opening of the site
- Contract with provider to install on-site bikeshare station
- Provide a multimodal travel option information package to new residents

It is noted that the subdivision application will only define the road network and future development blocks. Future site plan TIAs will need to review the required TDM measures for each site plan.

12 Neighbourhood Traffic Management

The proposed development will connect to the arterial network via Noella Leclair Street (a local road), Roger Pharand Street (a local road), a new local road, and the future Vanguard Drive Extension (a collector road). The TIA guidelines have outlined thresholds for two-way traffic on local and collector roads and have been found to be too low for the purposes of this analysis. City Staff have noted that these thresholds are under review and will be updated in the future.

In general, the local roadways are anticipated to convey between 150 to 690 vehicles during the peak hours and the future Vanguard Drive corridor will range between 250 to 425 vehicles during the peak hours. Given the road network, additional local roads and connections to Innes Road or Mer Bleue Road are not feasible. The volumes along Vanguard Drive are suitable for a collector roadway. No changes to the roadway classifications or proposed road network are proposed for the subdivision.

13 Transit

13.1 Route Capacity

In Section 5.1 the trip generation by mode was estimated, including an estimate of the number of transit trips that will be generated by the proposed development. Table 30 summarizes the transit trip generation.

Table 30: Trip Generation by Transit Mode

Travel Mode	Mode Share	AM Peak Hour			PM Peak Hour		
		In	Out	Total	In	Out	Total
Transit	Various	135	215	350	128	132	260

The proposed development is anticipated to generate an additional 350 AM peak hour transit trips and 260 PM peak hour transit trips. Of these trips, 215 outbound AM trips and 128 inbound PM trips are anticipated. From the trip distribution found in Section 5.3, site-generated transit ridership impacts can be forecasted on the area network.

Ridership increases of approximately 43 outbound trips to the north during the AM peak hour and 26 inbound trips from the north during the PM peak hour are anticipated on routes #32, #37, #131, and #138, and approximately ten outbound trips to the south during the AM peak hour and six inbound trips from the south during the PM peak hour are anticipated on the routes #32.

Ridership increases of approximately 54 outbound trips to the east during the AM peak hour and 32 inbound trips from the east during the PM peak hour are anticipated on routes #25, #30, #32, and #131, and approximately 108 outbound trips to the west during the AM peak hour and 64 inbound trips from the west during the PM peak hour are anticipated on routes #25, #30 and #131.

Overall, the maximum service increase needed to accommodate these riders would be the substitution of one single higher capacity bus (i.e., an articulated bus in place of a standard bus) each peak hour for each route.

13.2 Transit Priority

13.2.1 Without the Vanguard Drive Extension

The transit movements impacted by the site traffic include the northbound shared through/right-turn and southbound through/right-turn movements at the Innes Road at Jeanne D'Arc Boulevard/Mer Bleue Road and the eastbound through movement at the Innes Road at 4220/4270 Innes Road intersections. The existing and background conditions result in a transit level of service of F for all but the eastbound through/right-turn during the AM peak for Innes Road at 4220/4270 Innes Road.

At the intersection of Innes Road at Jeanne D'Arc Boulevard/Mer Bleue Road, the increase in the delays for the northbound direction amount to less that a transit LOS (TLOS) change during the AM peak and one level decrease in the TLOS during the AM peak. For the southbound direction, the AM peak is less than one TLOS difference and the PM peak delays are high during the existing conditions and increase significantly as it is already over capacity. If this movement was under capacity, it is not expected that the site traffic (28 total vehicles) would cause the delays to increase by of 30 seconds.

The eastbound movement at the Innes Road at 4220/4270 Innes Road will remain at a TLOS B during the AM peak and is expected to be similar to the existing conditions during the PM peak.

Overall, the site traffic is not anticipated to cause undue impact on the transit network and the need for additional transit priority along Innes Road or Jeanne D'Arc Boulevard South/Mer Bleue Road would be required for the existing conditions. The City would be required to study the impact of any priority measures (e.g. queue jump lanes) as it will require a trade off on intersection space between transit, active modes and auto vehicles and their associated operations. No mitigation or further analysis is required as part of this study.

13.2.2 With the Vanguard Drive Extension

The extension of Vanguard Drive is anticipated to shift come volume from Innes Road between Tenth Line Road and Mer Bleue Road. This shift will decrease the expected delays for the eastbound direction at the Innes Road at 4220/4270 Innes Road intersection, and increase delays for the northbound and southbound movements at the Innes Road at Jeanne D'Arc Boulevard/Mer Bleue Road intersection. This is a function of the City providing additional roadways and redistributing traffic on that network. As noted in section 13.2.1, this would need to be considered by the City when evaluating intersection improvements around transit priority measures.

14 Network Intersection Design

14.1 Network Intersection Control

No change to the existing signalized control is recommended for the network intersections.

14.2 Network Intersection Design

14.2.1 2035 Future Total Network Intersection Operations

The operations are noted in Section 7.4. Capacity constraints will be at the intersection of Innes Road at Jeanne D'Arc Boulevard South/Mer Bleue Road and at Innes Road at 4220/4270 Innes Road during the PM peak hour without the Vanguard Drive Extension and will be at the intersection of Innes Road at Jeanne D'Arc Boulevard South/Mer Bleue Road and at Vanguard Drive at Tenth Line Road during the PM peak hour with the Vanguard Drive Extension.

It is expected that the existing mode shares may begin to shift towards a large transit share once the Stage 2 LRT is open and will be dependent on the City's implementation of effective transit routes to serve the area.

The required network reductions for study area intersections have been summarized in Section 7.7 and the intersection operations will be continually evaluated through the Transportation Impact Assessments supporting the individual site plan applications.

14.2.2 Network Intersection MMLOS

Table 31 summarizes the MMLOS analysis for the network intersections within the study area. Delays from the 2035 Future Total Horizon have been used for the MMLOS analysis. The existing and future conditions for both intersections will be the same and are considered in one row. The intersections along Innes Road are based on the land-use designation of "Arterial Main Street", and other intersections are based on "General Urban Area". The MMLOS worksheets has been provided in Appendix P.

Table 31: Study Area Intersection MMLOS Analysis

Intersection	Pedestrian LOS		Bicycle LOS		Transit LOS		Truck LOS		Auto LOS	
	PLOS	Target	BLOS	Target	TLOS	Target	TrLOS	Target	ALOS	Target
Innes Road at Walmart SC	F	C	F	C	C/C	D	-	-	C/B	D
Innes Road at Jeanne D'Arc Boulevard South /Mer Bleue Road	F	C	F	C	F/F	D	A	D	F/F	D
Innes Road at 4220/4270 Innes Road	F	C	F	C	F/E	D	-	-	E/D	D
Innes Road at Prestwick Drive/Lanthier Drive	F	C	F	C	F/F	D	-	-	D/C	D
Vanguard Drive at Tenth Line Road	F	C	F	C	-	-	-	-	D/E	D
Vanguard Drive at Mer Bleue Road (Future)	F	C	A	C	-	-	-	-	A	D

Note: Transit LOS and Auto LOS format "Without Vanguard"" / "With Vanguard"

The pedestrian LOS targets will not be met at intersections within the study area. As typical for arterial roads, the crossing distance does not permit the targets to be met. To meet pedestrian LOS targets, the maximum crossing distance would need to be reduced to three lane-widths on all pedestrian crossings.

The bicycle LOS targets will not be met at the intersections within the study area. To meet bicycle LOS targets, the left-turn configurations would need to be two-stage or turn boxes.

The transit LOS targets will not be met at the intersections of Innes Road at Jeanne D'Arc Boulevard South/Mer Bleue Road, Innes Road at 4220/4270 Innes Road, and Innes Road at Prestwick Drive/Lanthier Drive. To meet transit LOS, the delay at the intersections would need to be reduced to below 30 seconds.

Without the Vanguard Drive Extension, the auto LOS targets will not be met at the intersections of Innes Road at Jeanne D'Arc Boulevard South/Mer Bleue Road, and Innes Road at 4220/4270 Innes Road intersections. With the Vanguard Drive Extension, the auto LOS targets will not be met at the intersections of Innes Road at Jeanne D'Arc Boulevard South/Mer Bleue Road and Vanguard Drive at Tenth Line Road. To meet auto LOS, network reductions or signal timing adjustments would be required as noted in Section 7.7. The progression of the improvements noted are consistent with the existing conditions and the City will need to address the constraints as the other area developments are completed.

14.2.3 Recommended Design Elements

No study area intersection design elements are proposed as part of this study.

15 Summary of Improvements Indicated and Modifications Options

The following summarizes the analysis and results presented in this TIA report:

Proposed Site and Screening

- The proposed subdivision is expected to include a total of 2,340 high-rise residential units, 238,650 sq. ft. of employment space, a long-term care facility, and a 1.51-hectare park
- The subdivision will connect to Roger Pharand Street, Noella Leclair Street, and the future Vanguard Drive extension
- The initial phase is proposed to be completed by 2025, and the second phase is proposed to be completed by 2030
- The trip generation trigger was met for the TIA Screening

Existing Conditions

- Innes Road, Mer Bleue Road, Jeanne D'Arc Boulevard South, and Tenth Line Road are arterial roads, and Prestwick Drive and Vanguard Drive are collector roads in the study area
- Sidewalks are provided on Innes Road, Mer Bleue Road, Jeanne D'Arc Boulevard, Vanguard Drive, Lanthier Drive, Tenth Line Road, Prestwick Drive, Wildflower Drive, Noella Leclair Street, and Roger Pharand Street
- Bike lanes are provided along both sides of Innes Road, Mer Bleue Road, and Tenth Line Road south of Innes Road
- Innes Road, Mer Bleue Road, Jeanne D'Arc Boulevard, and Tenth Line Road are spine routes
- Tenth Line Road north of Innes Road and Innes Road are cross-town bikeways
- A major pathway is planned to be provided to connect Innes Road and Trans-Orleans pathway
- The Innes Road at Wildflower Drive intersection has a high number of collisions at the study area intersections (76% or 28 collisions), predominantly represented by the rear end collision type
- During the PM peak hour, capacity issues are noted at the intersection of Innes Road at Jeanne D'Arc Boulevard South/Mer Bleue Road, Innes Road at 4220/4270 Innes Road, and Vanguard Drive at Tenth Line Road

Development Generated Travel Demand

- The proposed Phase One development is forecasted to produce 538 AM and 553 PM two-way people trips during, and Phase Two is forecasted to produce a total of 800 AM and 764 PM two-way people trips
- Of the forecasted people trips, Phase One is forecasted to produce 290 AM and 345 two-way vehicle trips, and Phase Two is forecasted to produce 480 AM and 497 two-way vehicle trips
- Of the forecasted trips, 20% are anticipated to travel north, 5% to the south, 25 % to the east, and 50 % to the west
- The Vanguard Drive Extension is expected to be built by 2031, and trips will be re-assigned with the Vanguard Drive Extension for 2035 future horizons
- Both with and without the Vanguard Drive Extension will be included in the 2035 future horizons

Background Conditions

- The background developments were explicitly included in the background conditions, along with background growth along Innes Road, Tenth Line Road, Jeanne D'Arc Boulevard, and Mer Bleue Road on the mainline volumes and direction

Development Design

- The plan of subdivision includes the extension of Noella Leclair Street and a new local road, with future development blocks adjacent to these roadways
- Sidewalks will be provided along Noella Leclair Street Extension and the new local road, and it will be connected to the Vanguard Drive Extension
- Individual site plan applications will be required for the individual blocks, including a TIA or TIA addendums including the modules that support site plan design review
- Traffic calming elements are recommended in the future internal road intersections including bulb-outs and speed humps

Boundary Street Design

- Both pedestrian and bicycle MMLOS targets will be met along the Roger Pharand Street, future extension of Vanguard Drive, Noella Leclair Street extension, and the new local road and in future condition

Access Intersections Design

- Subdivision will connect to Innes Road, Mer Bleue Road, and Vanguard Drive Extension via Noella Leclair Street, Roger Pharand Street, and a new local road
- Accesses to the future Vanguard Drive Extension is consistent with the City recommended plans
- Within the subdivision, no turn lanes are proposed at the intersection of Noella Leclair Street and the new local road and will be controlled by minor stop control

TDM

- Supportive TDM measures recommended to be considered in future site plan applications include:
    - Inclusion of a 1-year Presto card for first time new townhome purchase, with a set time frame for this offer (e.g. 6-months) from the initial opening of the site
    - Contract with provider to install on-site bikeshare station
    - Provide a multimodal travel option information package to new residents

- Future site plan TIAs will need to review the required TDM measures for each site plan

NTM

- The TIA guidelines have outlined thresholds for two-way traffic on local and collector roads and have been found to be too low for the purposes of analysis
- City Staff have noted that these thresholds are under review and will be updated in the future
- No changes to the roadway classifications or proposed road network are proposed for the subdivision

Transit

- The proposed development is anticipated to generate an additional 350 AM peak hour transit trips and 260 PM peak hour transit trips
- The maximum service increase needed to accommodate these riders would be the substitution of a single higher capacity bus (i.e., an articulated bus in place of a standard bus) to/from the north and west per peak hour
- The site traffic is not considered to have a significant impact on the transit movements for Innes Road and Jeanne D'Arc Boulevard South/Mer Bleue Road, and long delays are subject to the existing and background conditions
- The City will need to address the existing and background conditions to improve the transit delays or study the impacts of transit priority measures on active mode and auto vehicle level of service once space is provided to transit vehicles at the Innes Road intersections

Network Intersection Design

- It is expected that the auto share will reduce in the future and be dependent on the City's implementation of effective transit routes to serve the area
- The progression of the improvements noted are consistent with the existing conditions and the City will need to address the constraints as the other area developments are completed
- The intersection operations will be continually evaluated through the Transportation Impact Assessments supporting the individual site plan applications
- The pedestrian LOS targets will not be met at intersections within the study area, and the maximum crossing distance would need to be reduced to three lane-widths on all pedestrian crossings
- The left-turn configurations would need to be two-stage or turn boxes to meet bicycle LOS targets at the intersections within the study area
- The transit LOS targets will not be met at the intersections of Innes Road at Jeanne D'Arc Boulevard South/Mer Bleue Road, at 4220/4270 Innes Road, and at Prestwick Drive/Lanthier Drive, and the delay at the would need to be reduced to below 30 seconds
- The progression of the improvements noted are consistent with the existing conditions and the City will need to address the constraints as the other area developments are completed

16 Conclusion

It is recommended that, from a transportation perspective, the proposed development applications proceed.

Prepared By:

Yu-Chu Chen, EIT
Transportation Engineering-Intern

Reviewed By:

Andrew Harte, P.Eng.
Senior Transportation Engineer