IBI GROUP
400–333 Preston Street
Ottawa ON K1S 5N4 Canada
tel 613 225 1311 fax 613 225 9868
ibigroup.com

September 15, 2020

Mr. Mike Giampa
Transportation Project Manager
City of Ottawa
Infrastructure Approvals
Development Review Central & South Branch
110 Laurier Avenue West
Ottawa, ON
K1P 1J1

Dear Mr. Giampa:

FINDLAY CREEK STAGE 5 - TRANSPORTATION IMPACT ASSESSMENT
FINAL REPORT

Enclosed is the Transportation Impact Assessment (TIA) Final Report prepared in support of the proposed Findlay Creek Stage 5 development at 3100 Leitrim Road by Tartan Land Corporation.

This document incorporates responses to City of Ottawa circulation comments received based on the Step 4 Report submission, dated January 2020. All responses to the most recent set of comments as well as all previous comments received throughout the TIA review process have been provided in **Appendix A**.

Please note that the overall conclusions of the TIA report remain unchanged from the previous submission.

Regards,

David Hook, P.Eng.

cc. Melissa Cote – Tartan Land Corporation

Transportation Impact Assessment – Final Report

Findlay Creek Stage 5

Prepared for Tartan Land Corporation
by IBI Group
September 15, 2020

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REVIEWER:	David Hook
AUTHORIZATION:	Justin Date
CIRCULATION LIST:	Mike Giampa - City of Ottawa Transportation Project Manager
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TIA Plan Reports - Certification

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

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

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

CERTIFICATION

1. I have reviewed and have a sound understanding of the objectives, needs and requirements of the City of Ottawa's Official Plan, Transportation Master Plan and the Transportation Impact Assessment (2017) Guidelines;

2. I have a sound knowledge of industry standard practice with respect to the preparation of transportation impact assessment reports, including multi modal level of service review;

3. I have substantial experience (more than 5 years) in undertaking and delivering transportation impact studies (analysis, reporting and geometric design) with strong background knowledge in transportation planning, engineering or traffic operations; and

4. I am either a licensed[1] or registered[1] professional in good standing, whose field of expertise [check √ appropriate field(s)] is either transportation engineering □ or transportation planning □.

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

Dated at Ottawa this 15th day of September, 2020.
(City)

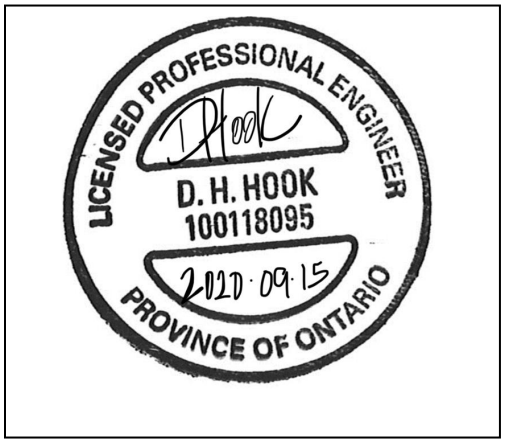
Name: David Hook, P.Eng.

Professional Title: Project Engineer

Signature of Individual certifier that she/he meets the above four criteria

Office Contact Information (Please Print)
Address: 400-333 Preston Street
City / Postal Code: K1S 5N4
Telephone / Extension: 613-225-1311 ext. 64029
E-Mail Address: dhook@ibigroup.com

Stamp



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Executive Summary

IBI Group (IBI) was retained by Tartan Land Corporation to undertake a Transportation Impact Assessment (TIA) in support of a Draft Plan of Subdivision application for a proposed residential development to be located at 3100 Leitrim Road, Ottawa. The site represents Phase 5 of Tartan's development lands, and is generally bound by Leitrim Road to the north, Kelly Farm Drive to the east, a stormwater management pond to the south and the Albion Road Industrial Park to the west. The Draft Plan consists of 170 single-family homes and 219 street townhomes. Full build-out and occupancy of the site is anticipated in a single phase by 2026.

The proposed development will provide two new access intersections on Kelly Farm Drive: Street 1 will be constructed opposite Barrett Farm Drive approximately 175m south of Leitrim Road, while Street 3 will be constructed as a new three-legged intersection approximately 295m south of Leitrim Road. Both access intersections will be configured as two-way stop control intersections with free-flow along Kelly Farm Drive.

The proposed development is expected to generate up to 433 and 494 two-way person-trips during the weekday morning and afternoon peak hours, respectively. Mode share targets utilized for the development of site-generated traffic volumes were established with consideration of both the Leitrim Master Transportation Study, as well as, the South Gloucester / Leitrim Traffic Assessment Zone (TAZ) in the 2011 Origin-Destination Survey. Site-generated person-trips were stratified based on a blend of the AM Peak 'From District' and PM Peak 'To District' mode shares from the TAZ and further refined based on the Leitrim MTS. A transit mode share of 16%, published in the Leitrim MTS, was brought forward to the 2026 build-out year in recognition of LRT service to the Leitrim Station by this time. It has been assumed that the increase in the transit mode share would result in a corresponding decrease in auto driver mode share and that all other mode shares would remain constant through to the 2031 study horizon. The resulting two-way trip generation is, therefore, 264 and 301 vehicles per hour during the weekday morning and afternoon peak hours, respectively. The site-generated vehicle trips represent a marginal increase in traffic volumes with respect to the overall traffic projections within the 2031 study horizon year.

To promote sustainable transportation for local trips, the internal road network within the development is organized in a modified grid pattern with relatively short segments. This grid-like pattern will provide convenient and direct access to the existing multi-use pathway located on the west side of Kelly Farm Drive, adjacent the development. Furthermore, sidewalks and mid-block pathway connections have been strategically located within the development to create a more porous, walkable community.

The results of the analysis indicate that the intersections of Kelly Farm & Barrett Farm/ Street 1 and Kelly Farm & Street 3 are expected to operate within acceptable levels of service (LOS 'B' or better) during the weekday morning and afternoon peak hours. Both were analysed as unsignalized, two-way stop-controlled intersections and do not warrant auxiliary lanes or future modifications to intersection control within the timeframe of this study.

The Leitrim & Kelly Farm intersection, which opened to the public in November 2019 as a signalized intersection, features 'protected intersection' elements such as fully-integrated cycling and pedestrian facilities including concrete sidewalks, cycle tracks and a bi-directional multi-use path. Based on the results of the intersection capacity analysis, this intersection is expected to operate at an acceptable level of service (i.e. LOS 'C') beyond the study horizon year. Furthermore, queue lengths were found to be sufficient to accommodate the projected increase in traffic associated with the proposed development.

Multi-modal level of service identified potential refinements at the intersection of Leitrim & Kelly Farm, as well as on boundary street segment that could further improve mobility and comfort for all road users. Potential remediation measures have been identified in which the City could consider to meet the prescribed targets. It should be noted that, although these measures would improve mobility and comfort

for all road users, they are not required to safely accommodate the transportation demands of the proposed development.

The analysis conducted as part of this study indicates that no off-site geometric improvements are necessary as a result of the proposed development, and as such an RMA will not be required.

As travel demands are expected to be well within the capacity constraints of the adjacent transportation network, a post-development monitoring plan is also not a requirement of this study.

Based on the findings of this study, it is the overall opinion of IBI Group that the proposed development will integrate well with and can be safely accommodated by the adjacent transportation network.

1 Introduction

IBI Group (IBI) was retained by Tartan Land Corporation to undertake a Transportation Impact Assessment (TIA) in support of a Draft Plan of Subdivision application for a proposed residential development to be located at 3100 Leitrim Road, Ottawa.

In accordance with the City of Ottawa's Transportation Impact Assessment Guidelines, published in June 2017, the following report is divided into four major components:

- **Screening** – Prior to the commencement of a TIA, an initial assessment of the proposed development is undertaken to establish the need for a comprehensive review of the site based on three triggers: Trip Generation, Location and Safety.
- **Scoping** – This component of the TIA report describes both the existing and planned conditions in the vicinity of the development and defines study parameters such as the study area, analysis periods and analysis years of the development. It also provides an opportunity to identify any scope exemptions that would eliminate elements of scope described in the TIA Guidelines that are not relevant to the development proposal, based on consultation with City staff.
- **Forecasting** – The Forecasting component of the TIA is intended to review both the development-generated travel demand and the background network travel demand, and provides an opportunity to rationalize this demand to ensure projections are within the capacity constraints of the transportation network.
- **Analysis** – This component documents the results of any analyses undertaken to ensure that the transportation related features of the proposed development are in conformance with prescribed technical standards and that its impacts on the transportation network are both sustainable and effectively managed. It also identifies a development strategy to ensure that what is being proposed is aligned with the City of Ottawa's policies and city-building objectives.

Throughout the development of a TIA report, each of the four study components above are submitted in draft form to the City of Ottawa and undergo a review by a designated Transportation Project Manager. Any comments received are addressed to the satisfaction of the City's Transportation Project Manager before proceeding with subsequent components of the study. All technical comments and responses throughout this process are included in **Appendix A**.

Dependent on the findings of this report, the complete submission of this Transportation Impact Assessment may also require Functional Design Drawings of recommended roadway improvements to support a Roadway Modification Application (RMA). The submission may also require a post-development Monitoring Plan to track performance of the planned TIA Strategy. The need for these two elements will be confirmed through the analysis undertaken for this report.

2 TIA Screening

An initial screening was completed to confirm the need for a Transportation Impact Assessment by reviewing the following three triggers:

- **Trip Generation**: Based on the proposed number of single-detached and townhome units, the minimum development size threshold has been exceeded and therefore the Trip Generation trigger is satisfied.
- **Location**: The proposed development will have two site access intersections on Kelly Farm Drive. Kelly Farm Drive does not form part of the transit priority, rapid transit or spine bicycle network, nor is it within a Design Priority Area (DPA) or Transit-Oriented Development (TOD) zone. As such, the Location trigger is not satisfied.
- **Safety**: Boundary street conditions were reviewed to determine if there is an elevated potential for safety concerns adjacent the site. Based on this review, there is no elevated potential for safety concerns adjacent to the site and therefore the Safety trigger is not satisfied.

As the proposed development meets the Trip Generation trigger, the need to undertake a Transportation Impact Assessment is confirmed.

A copy of the Screening Form is provided in **Appendix B**.

3 Project Scoping

3.1 Description of Proposed Development

3.1.1 Site Location

The proposed development is approximately 18 hectares in size and is located in the Leitrim Community. The site is bound by Leitrim Road to the north, Kelly Farm Drive to the east, a stormwater management pond to the south and the Albion Road Industrial Park to the west. The site configuration considers the right-of-way for the future Leitrim Road realignment.

The site location and its surrounding context is illustrated in **Exhibit 1**.

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Findlay Creek Stage 5
Transportation Impact Assessment

Exhibit 1:
Site Location

PROJECT No. 122283
DATE: September 2020
SCALE: 0m 250m 500m

3.1.2 Land Use Details

Table 1 summarizes the proposed land uses included in this development.

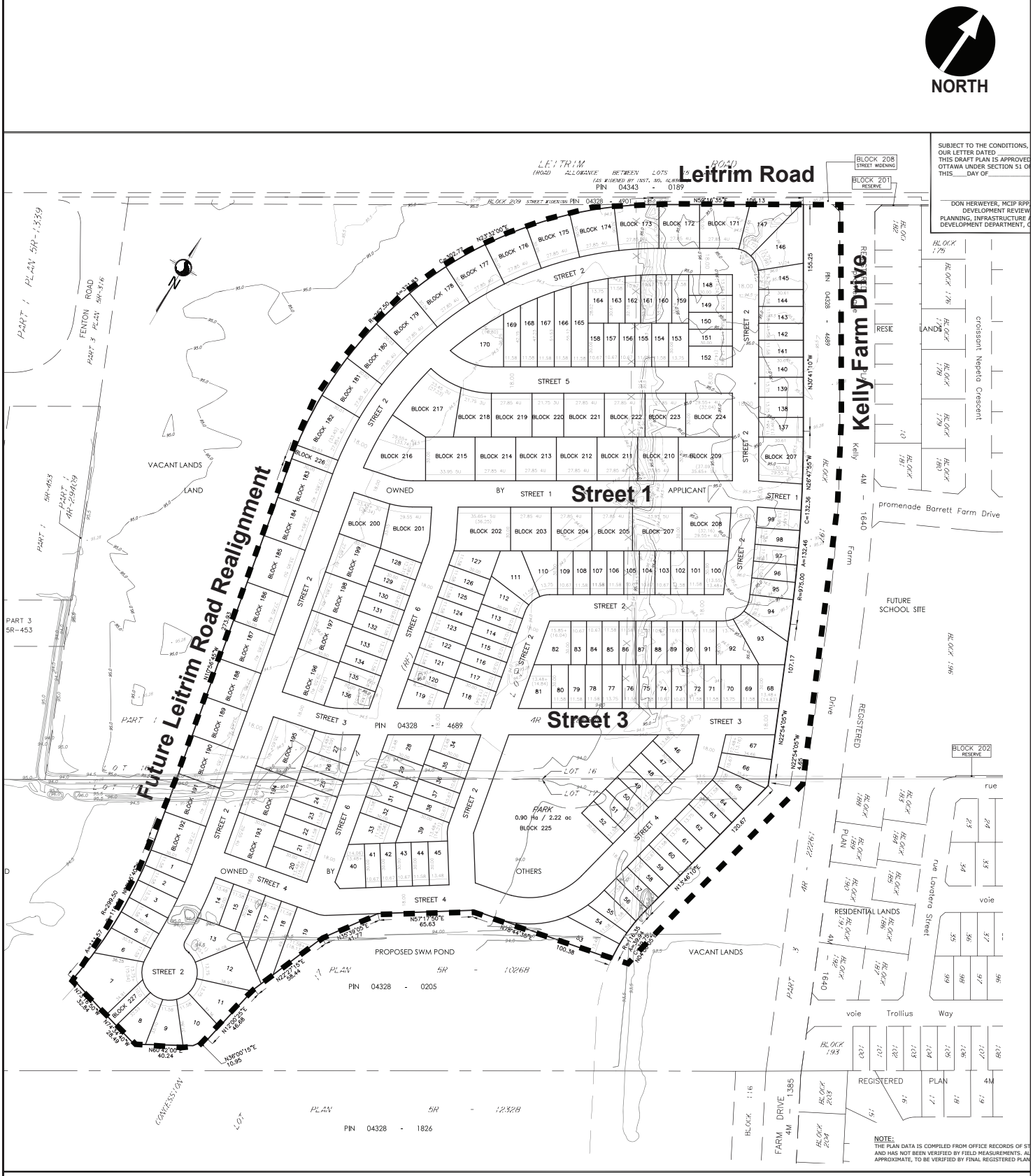
Table 1 - Land Use Statistics

LAND USE	SIZE
Single-Family Homes	170 units
Townhomes	219 units

The Draft Plan the proposed development is illustrated in **Exhibit 2**.

3.1.3 Development Phasing & Date of Occupancy

The proposed Findlay Creek Stage 5 development is expected to be fully built out and occupied in a single phase by 2026.



IBI

Findlay Creek Stage 5
Transportation Impact Assessment

Exhibit 2:
Proposed Development

PROJECT No. 122283
DATE: September 2020
SCALE: 0m 50m 100m

3.2 Existing Conditions

3.2.1 Existing Road Network

3.2.1.1 Roadways

The proposed development is bound by the following street(s):

- **Leitrim Road** is an arterial road that extends from River Road to Russell Road. Within the vicinity of the proposed development, Leitrim Road has a two-lane rural cross-section and a right-of-way protection of 35.5m with an additional 5.0m potentially required on the north side to accommodate a rural cross-section. The posted speed limit is 60 km/h near Bank Street and transitions to 80 km/h approximately 400m west of Bank Street.
- **Kelly Farm Drive** is an urban collector road that extends north-south through the Findlay Creek Community and has recently been extended north to Leitrim Road. Kelly Farm Drive has a 24m right-of-way and an unposted speed limit of 50 km/h.

Other streets within the vicinity of the proposed development are as follows:

- **Bank Street** is an arterial road that extends north-south through Ottawa from Wellington Street in the north to the southern urban boundary where it becomes County Road 31. Bank Street has a 4-lane rural cross-section that transitions to two lanes approximately 200m south of Leitrim Road with a posted speed limit of 70 km/h and a right-of-way protection of 44.5m.
- **Rotary Way** is an urban collector road that extends from Bank Street to Fernside Street. Rotary Way has a 26m right-of-way and an unposted speed limit of 50 km/h.
- **Albion Road** is an arterial road that extends from Bank Street to Mitch Owens Road. In the vicinity of the proposed development, Albion Road has a two-lane rural cross-section with a posted speed limit of 80 km/h and a right-of-way protection of 37.5m.

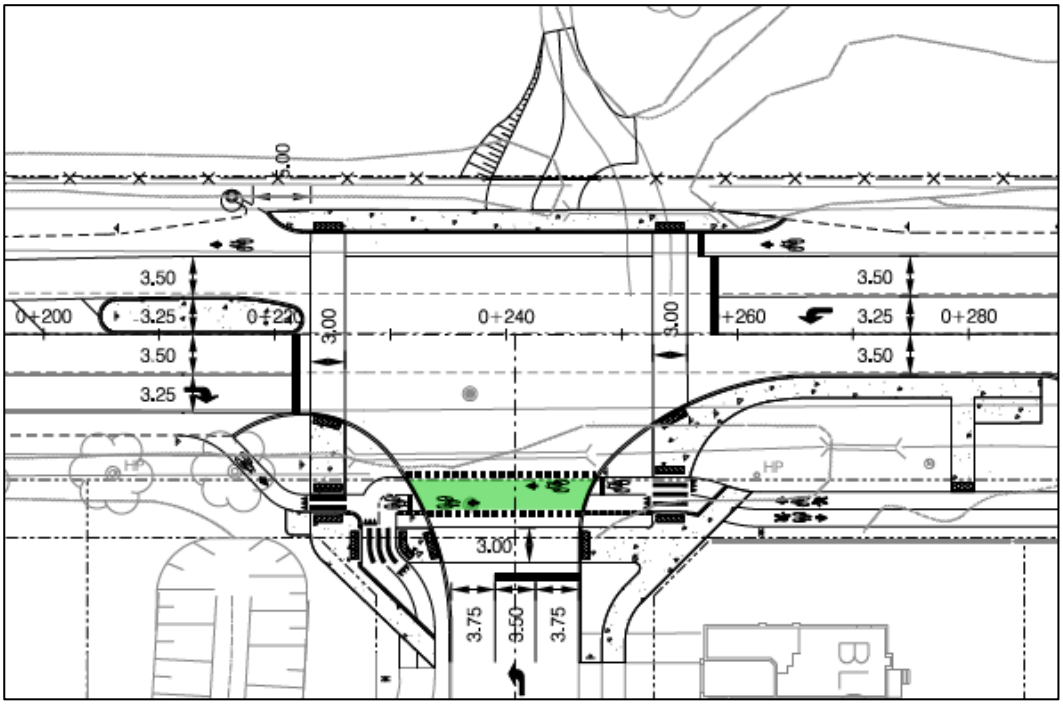
3.2.1.2 Intersections

There are two intersection of significance within the 1km radius of the context area of the proposed development:

- **Albion Road & Leitrim Road** – A four-legged intersection with shared through-right lanes and auxiliary left-turn lanes on each approach.
- **Leitrim Road & Kelly Farm Drive** – This recently constructed intersection is signalized and has auxiliary left-turn lanes on the westbound and northbound approaches and an auxiliary right-turn lane on the eastbound approach. **Figure 1** illustrates the intersection configuration of the intersection of Leitrim Road & Kelly Farm Drive.

Given that the Leitrim Road & Kelly Farm Drive intersection is located immediately adjacent to the site, it is expected that this intersection will be the most significantly impacted existing junction within the vicinity of the development.

Figure 1 - Leitrim Road & Kelly Farm Drive Intersection Configuration



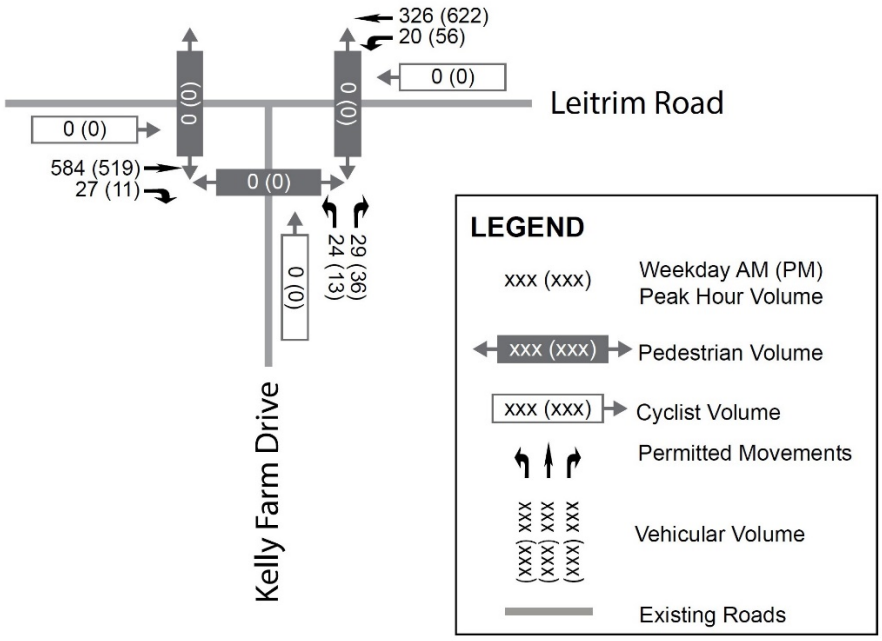
3.2.1.3 Traffic Management Measures

There are currently no existing traffic management or traffic calming measures on the boundary streets within the vicinity of the proposed development.

3.2.1.4 Existing Traffic Volumes

As the proposed development will consist of residential land uses, the weekday morning and afternoon peak hour traffic conditions will be most affected by the associated increase in traffic. Kelly Farm Drive was opened for public use on November 22, 2019. Weekday morning and afternoon peak hour turning movement counts were recorded by the City of Ottawa for the Leitrim Road & Kelly Farm Drive intersection on December 17, 2019. Peak hour traffic volumes representative of existing conditions are shown in **Figure 2**. Traffic count data is provided in **Appendix C**.

Figure 2 - Existing (2019) Traffic



3.2.2 Existing Bicycle and Pedestrian Facilities

Presently, only small pockets of pedestrian infrastructure exist within the vicinity of the proposed development. Pedestrian crosswalks and concrete refuges are provided at the Leitrim Road & Kelly Farm Drive intersection and a concrete sidewalk is provided on the east side of Kelly Farm Drive. Pedestrian crosswalks are provided with only 1m wide asphalt corner refuge areas at the Albion Road & Leitrim Road intersection.

The following cycling facilities currently exist within the vicinity of the proposed development:

- A bi-directional cross-ride is provided on the northbound approach of the Leitrim Road & Kelly Farm Drive intersection and a multi-use pathway is provided on the south side of Leitrim Road between Kelly Farm Drive and Muscari Street.
- A paved shoulder is provided on the north side of Leitrim Road between Kelly Farm Drive and Muscari Street.
- A multi-use path is provided on the west side of Kelly Farm Drive, south of Leitrim Road.

3.2.3 Existing Transit Facilities and Service

The following transit routes, operated by OC Transpo, exist within the vicinity of the site:

- **Route #93** provides regular, all-day service between Leitrim Station and Greenboro Station and operates on 15- to 30-minute headways during peak periods. On weekends service is reduced to 30-minute headways.
- **Route #99** provides regular, all-day service between Barrhaven Centre Station and Greenboro / Leitrim Station and operates on 15- to 30-minute headways during peak periods. On weekends service is reduced to 30-minute headways with no service to Leitrim Station.

- **Route #294** provides weekday peak period service between Hurdman Station and the Findlay Creek community and operates on 30-minute headways.
- **Route #299** provides weekday peak period service between LeBreton Station and Manotick and operates twice in the morning and twice in the afternoon with buses departing approximately one hour apart.

Transit service maps for the individual routes above are provided in **Appendix D**. Existing local transit services are illustrated in **Figure 3**. New bus stops have been constructed at the Leitrim Road & Kelly Farm Drive intersection but are not yet in service.

Figure 3 – Existing Local Transit Services

Source: OC Transpo

3.2.4 Collision History

A review of historical collision data has been reviewed for the road network surrounding the proposed development. The TIA Guidelines require a safety review if at least six collisions for any one movement or of a discernible pattern, over a five-year period have occurred. **Table 2** summarizes all reported collisions between January 1, 2014 and December 31, 2018.

Table 2 – Reported Collisions within Vicinity of Proposed Development

LOCATION	# OF REPORTED COLLISIONS
INTERSECTIONS	
Albion Road & Leitrim Road	34
➢ Approaching Collisions	1
➢ Angle Collisions	4
➢ Rear-End Collisions	17
➢ Sideswipe Collisions	1
➢ Turning Movement Collisions	8
➢ Single Motor Vehicle (SMV) Collisions	3
Leitrim Road & Kelly Farm Drive	0 [1]
SEGMENTS	
Leitrim Road – Albion Road to Fenton Road	3
➢ Rear-Ends Collisions	2
➢ Other	1
Leitrim Road – Fenton Road to Bank Street	21
➢ Approaching Collisions	2
➢ Angle Collisions	1
➢ Rear-End Collisions	9
➢ Sideswipe Collisions	2
➢ Turning Movement Collisions	2
➢ Single Motor Vehicle (SMV) Collisions	5

[1] *The Leitrim Road & Kelly Farm Drive intersection opened to the public in November 2019.*

Based on a preliminary review of the collision history at the locations noted above, rear-end and turning movement collisions at the intersection of Albion Road & Leitrim Road, as well as, rear-end collisions along the segment of Leitrim Road between Fenton Road and Bank Street may warrant further review.

Detailed collision records are provided in **Appendix E**.

3.3 Planned Conditions

3.3.1 Transportation Network

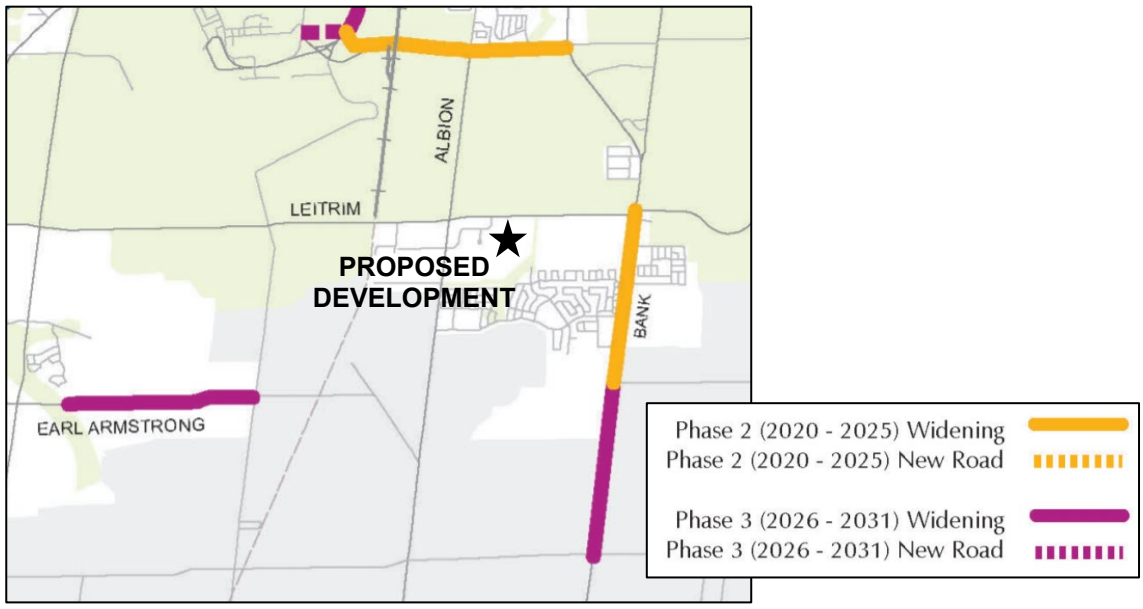
3.3.1.1 Future Road Network Projects

The 2013 Transportation Master Plan (TMP) outlines future road network modifications required in the 2031 'Affordable Network'. The following project was noted that may have an impact on area traffic within the vicinity of the site:

- **Bank Street** – Planned widening from two to four lanes between Leitrim Road and Blais Road by 2025 (Phase 2: 2020-2025) and from two to four lanes between Blais Road and Rideau Road by 2031 (Phase 3: 2026-2031).

Figure 4 illustrates the planned changes to the arterial road network projects in the broader area, as per the TMP Affordable Plan.

Figure 4 - Future Road Network Projects



Source: 2013 Transportation Master Plan – Map 11 '2031 Affordable Network'

The Bank Street Widening Class Environmental Assessment Study (Bank Street EA) triggered an update to the staging of recommended modifications in the TMP. These changes have been summarized in **Table 3**.

Table 3 - Staging of Recommended Modifications in the Bank Street EA

ROAD / PHASING	PROJECT DETAILS
Phase 2: 2020-2025	
Bank Street	Widen Bank Street from 2 to 4 lanes from Leitrim Road to Findlay Creek Drive including locally widening Leitrim Road to 4-lanes through the intersection with Bank Street.
Phase 3: 2026-2031	
Bank Street	Widen Bank Street from Findlay Creek Drive to south of Blais Road / the Urban Boundary from 2 to 4 lanes.
Beyond 2031	
Bank Street	Widen Bank Street from the Urban Boundary to Rideau Road from 2 to 4 lanes, including a two-way left turn lane within the rural area. Widen Bank Street to 6 lanes through the Leitrim Road intersection.

Various intersections along Bank Street within the greater context area have recently undergone modifications to accommodate the traffic demands of adjacent developments prior to the widening of the corridor.

The *2019 City-Wide* Development *Charges (DC) Background Study (March 15, 2019)* indicates that the timing for the Bank Street widening has since been revised. The DC study indicates that funding for widening between Leitrim Road and Findlay Creek Drive will be available by 2020-2024 and funding for widening between Findlay Creek Drive and Blais Road will be available by 2030-2031. Funding for widening south of Blais Road has not been allocated at this time.

The Bank Street widening project timeline and extents have been updated several times since the TMP was published. Based on recent discussions with City of Ottawa staff, the current staging plan for the Bank Street widening in the vicinity of the proposed development is as follows:

- Widening of Bank Street from two to four lanes from south of Leitrim Road to Dun Skipper Drive is scheduled to be completed by end of 2022.
- The reconstruction of the Bank Street & Leitrim Road intersection is scheduled to be completed by end of 2023.

It is understood that the Bank Street widening and the reconstruction of the Bank Street & Leitrim Road intersection will be completed in accordance with the complete streets philosophy.

In addition to the Bank Street widening, the TMP also indicates that Leitrim Road may be realigned between Limebank Road and Kelly Farm Drive, Albion Road may be widened north of the realigned Leitrim Road and Earl Armstrong Road may be extended east to Hawthorne Road. These road network modifications, however, are in the 2031 'Network Concept' and therefore are not expected to be implemented prior to 2031.

The City of Ottawa Official Plan Schedule E indicates that Kelly Farm Drive may eventually be extended further south to intersect with the future extension of Earl Armstrong Road. The timing for the extension of Kelly Farm Drive is unknown at this time.

Within the immediate vicinity of the proposed development, a minor east-west collector road (Barrett Farm Drive) is proposed that will extend from Kelly Farm Drive to Bank Street to form the fourth leg of the Bank Street & Rotary Way intersection as well as the fourth leg of the Kelly Farm Drive & Street 1 intersection.

3.3.1.2 Future Transit Facilities and Services

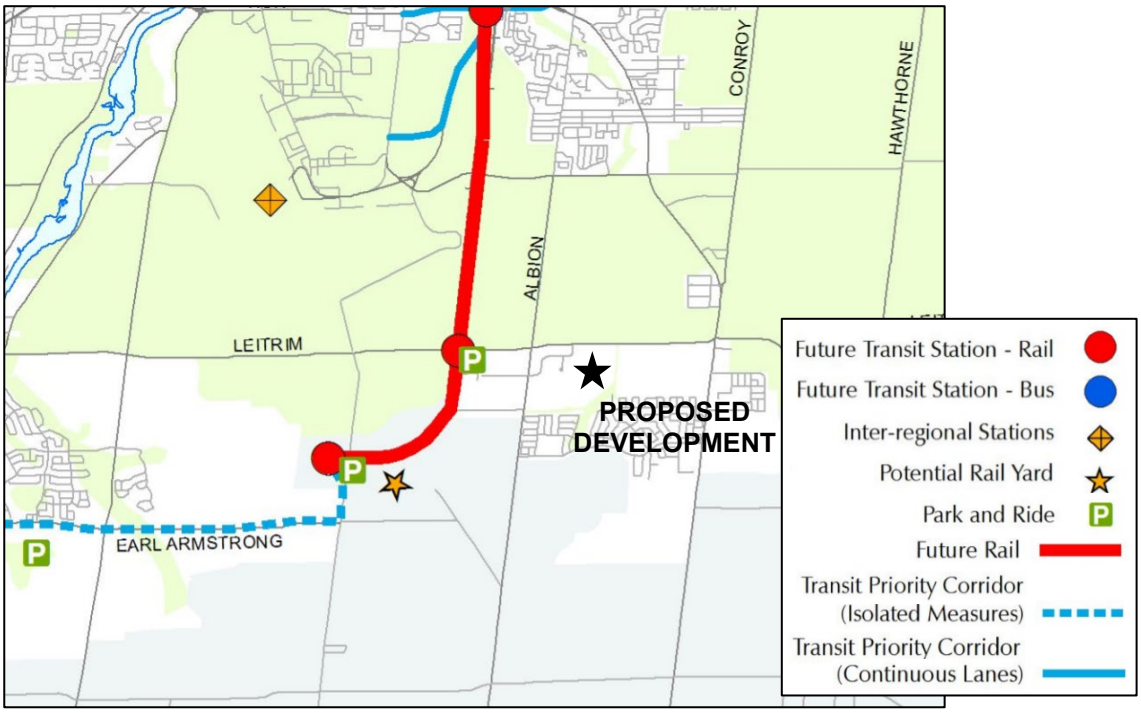
With consideration that Kelly Farm Drive has now been extended to Leitrim Road, the City of Ottawa intends to reconfigure Route #294 to Leitrim Road, providing direct transit service to the proposed development as well as the adjacent Barrett Lands subdivision. Transit Services expect that the changes to Route #294 will occur in 2021.

The 2013 TMP outlines the future rapid transit and transit priority (RTTP) network. The following projects were noted in the 'Affordable RTTP Network' that may have a future impact on study area traffic:

- **Trillium Line Extension** – Extension of the Trillium Line from its current terminus at Greenboro Station to Bowesville Station. The *Trillium Line Light Rail Transit Extension Addendum (September 2018)* and the *Trillium Line Extension Planning and Environmental Assessment (EA) Study (January 2016)* both expand upon the TMP. The Trillium Line will now extend to Limebank Road with a spur line to the Ottawa International Airport. Based on the official Stage 2 LRT website, the Trillium Line extension is expected to be completed by the end of 2022.

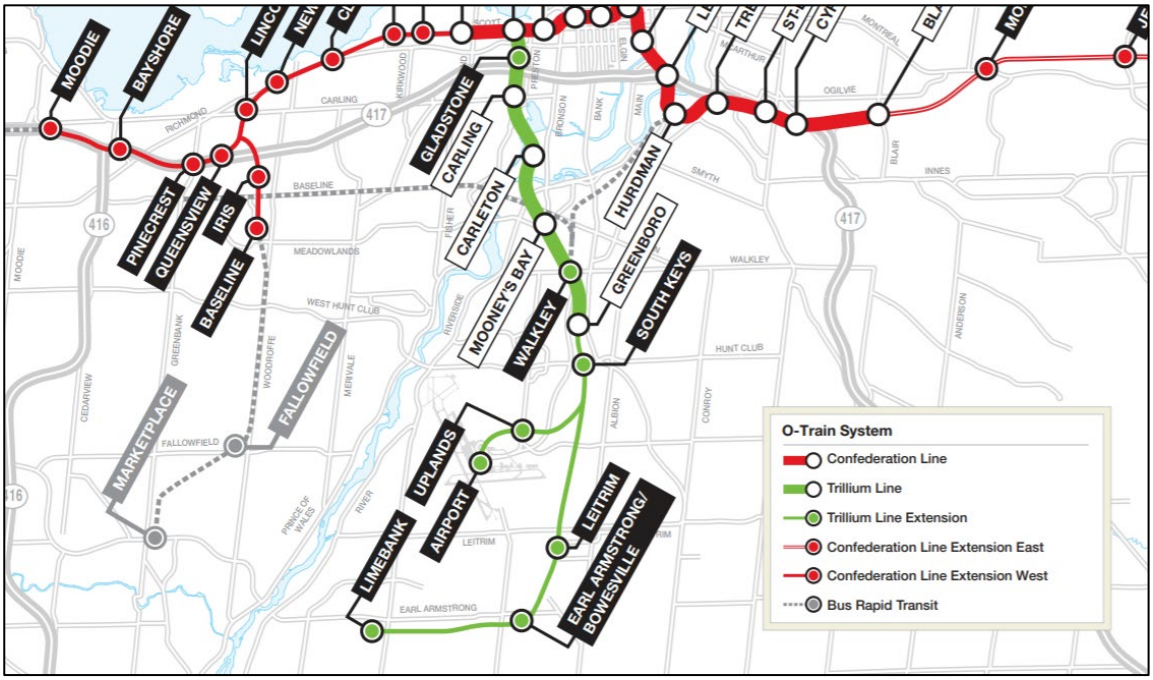
Figure 5 shows the transit infrastructure projects in the vicinity of the proposed development that are part of the TMP's 2031 Affordable Network. **Figure 6** below illustrates the proposed Trillium Line extension, including the recommendations from the EA study and the addendum.

Figure 5 - Future 'Affordable RTTP Network Projects'



Source: 2013 Transportation Master Plan – Map 5 '2031 Affordable Network'

Figure 6 - Stage 2 LRT - Trillium Line Extension



Source: Stage 2 LRT Website – Trillium Line South Highlight Summary

3.3.1.3 Future Cycling and Pedestrian Facilities

The 2013 Ottawa Cycling Plan (OCP) designates Bank Street, Leitrim Road and Albion Road as 'Spine Routes', which form part of a system linking the commercial, employment, institutional, residential and educational nodes throughout the City of Ottawa, and designates Kelly Farm Drive as a 'Local Route'.

The Leitrim Road EA indicates that Leitrim Road will be widened to four lanes with a multi-use pathway (MUP) on the south side. This future widening however is not expected within the City's 2031 planning horizon.

The Bank Street EA recommended the implementation of sidewalks and cycle tracks on both sides of Bank Street within the urban area, MUP within the Greenbelt and paved shoulders separated from the travel lane by a rumble strip within the rural area. A functional design for the four-lane widening of Bank Street was recently completed and included concrete sidewalks, cycle tracks and protected intersections.

A MUP has recently been constructed on the on the west side of Kelly Farm Drive and on the south side of Leitrim Road between Kelly Farm Drive and Muscari Street. There are presently no plans to extend the MUP on Leitrim Road from Muscari Street to Bank Street. A segment of MUP will be provided on the south side of Leitrim Road as part of the reconstruction of the Bank Street & Leitrim Road intersection.

Based on the Leitrim Master Transportation Plan, sidewalks will be provided on all collector roadways and some local roadways within the Leitrim Community. No dedicated cycling infrastructure is planned along Barrett Farm Drive.

3.3.2 Future Adjacent Developments

The City of Ottawa Transportation Impact Assessment (TIA) Guidelines specify that all significant developments proposed within the surrounding area which are likely to occur within the study's horizon year must be identified and taken into consideration in the development of future background traffic projections.

There are two known developments of significance in the vicinity of the proposed development, which have been previously accounted for in the Leitrim Master Transportation Study (MTS) prepared by IBI Group (March 2017).

All current developments applications adjacent to the site are summarized in **Table 4**. The approximate locations of these developments are shown in **Exhibit 3**.

Table 4 - Adjacent Developments

DEVELOPMENT	LAND USE	SIZE [1]
Barrett Lands	Residential	797 units
Barrett Lands Extension	Residential	150 units

Notes:
[1] Unit count based on the Leitrim Master Transportation Study prepared by IBI Group (March 2017)

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Findlay Creek Stage 5
Transportation Impact Assessment

Exhibit 3:
Adjacent Developments

PROJECT No. 122283
DATE: September 2020
SCALE: 0m 250m 500m

3.3.3 Network Concept Screenline

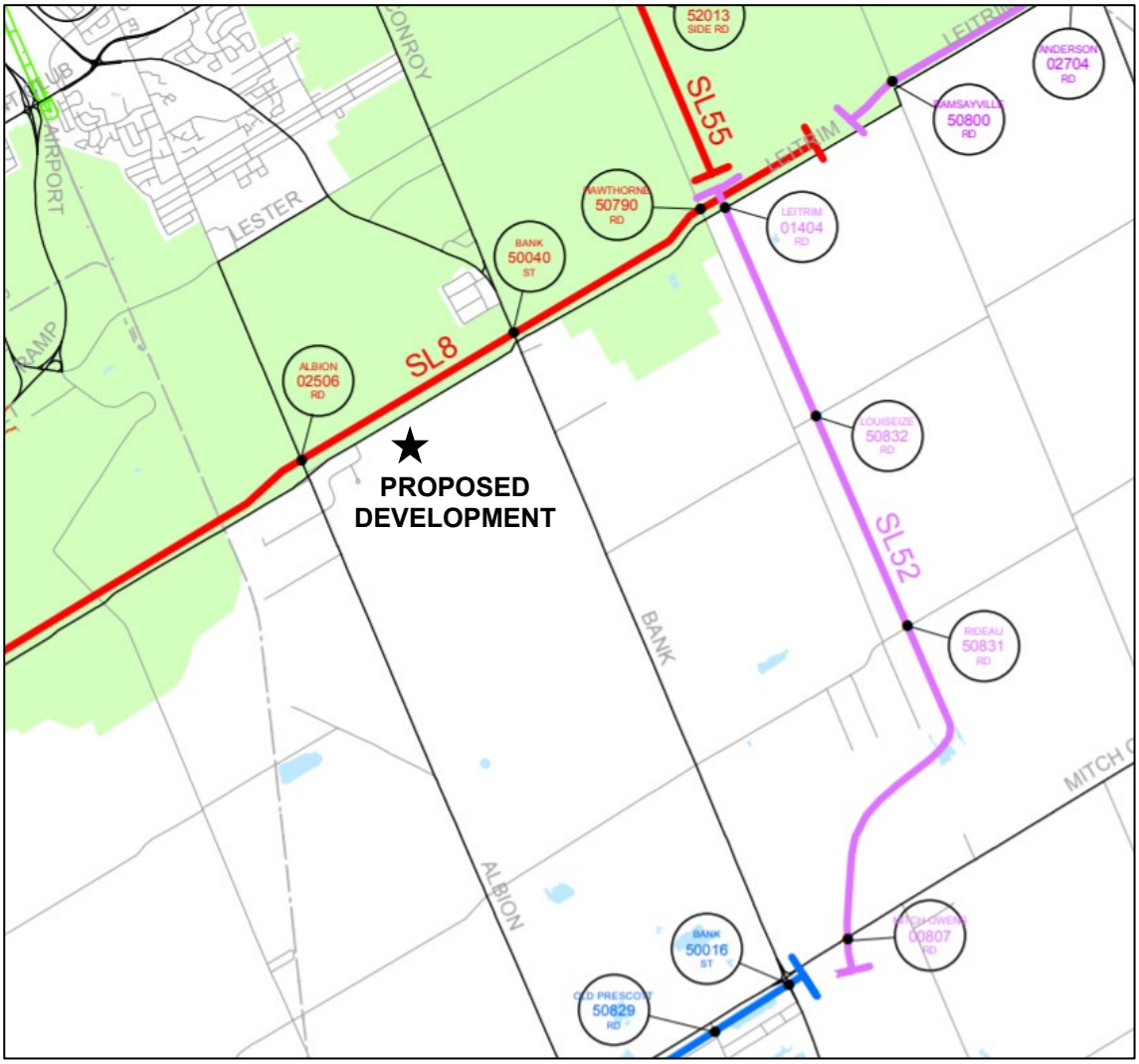
A screenline is a predetermined boundary between areas of major traffic generation that captures all significant points of entry from one area to another to compare crossing demand with the available roadway capacity. Screenlines are typically located along geographical barriers such as rivers, rail lines or within the greenbelt. To capture existing flow and model future demand, count stations are established at each crossing point along the screenline.

The nearest strategic planning screenlines adjacent to the development have been considered in the screenline analysis:

- **SL8 – Leitrim** – This is the nearest east/west screenline to the proposed development, and it follows the northern side of Leitrim Road from east of Hawthorne Road to Limebank Road where it turns north till it crosses River Road and terminates at the Rideau River. This screenline has four crossing points: River Road, Albion Road, Bank Street and Hawthorne Road.
- **SL52 – Hawthorne - South** – This is the nearest north/south screenline to the proposed development, and it follows Hawthorne Road from north of Leitrim Road to the end of Hawthorne Road where it turns slightly westward to cross Mitch Owens Road between Bank Street and Sale Barn Road. The screenline has four crossing points: Leitrim Road, Louiseize Road, Rideau Road and Mitch Owens Road.

SL8 and SL52 are shown in **Figure 7**, as determined from the City of Ottawa's Road Network Development Report (2013), a supporting document to the 2013 Transportation Master Plan (TMP).

Figure 7 - Screenlines



Source: TRANS Screenline System (2010)

3.4 Study Area

The Leitrim Master Transportation Study (MTS), prepared by IBI Group in March 2017, analysed the impact of all developments near Bank Street within the Leitrim Community at the City's 2031 planning horizon and provided recommended intersection configurations and phasing for each intersection along Bank Street between Leitrim Road and Blais Road. A functional design for the Bank Street Widening through the Leitrim Community was recently completed. As such, further analysis of the Bank Street & Leitrim Road and Bank Street & Rotary Way intersections is not required.

Detailed design is also currently underway for the Albion Road & Leitrim Road intersection and accounts for future projected growth in the area. Any modifications to this intersection would be expected to mitigate any historical collision patterns. As such, further analysis of this intersection is not required.

Given the above, a study area defined by the segment of Kelly Farm Drive between Leitrim Road and the southern boundary of the proposed development will provide a sufficient assessment of the development's impact on the adjacent transportation network.

The following intersections will therefore be assessed for vehicular capacity as part of this study:

- Leitrim Road & Kelly Farm Drive (signalized)
- Kelly Farm Drive & Barrett Farm Drive / Street 1
- Kelly Farm Drive & Street 3

Multi-modal Level of Service will be conducted for all signalized intersections within the study area described above as well as the sections of Leitrim Road and Kelly Farm Drive adjacent to the proposed development.

3.5 Time Periods

As the proposed development will consist solely of residential units, traffic generated during the weekday morning and afternoon peak hours is expected to result in the most significant impact to traffic operations on the adjacent network.

3.6 Study Horizon Year

The following future analysis years will be assessed in this study:

- Year 2026 – Full Build-out / Occupancy of Proposed Development
- Year 2031 – 5 years Beyond Full Build-out / Occupancy

3.7 Exemptions Review

The TIA Guidelines provide exemption considerations for elements of the Design Review and Network Impact components. **Table 5** summarizes the TIA modules that are not applicable to this study.

Table 5 - Exemptions Review

TIA MODULE	ELEMENT	EXEMPTION CONISDERATIONS	REQUIRED
DESIGN REVIEW COMPONENT			
4.1 Development Design	4.1.2 Circulation and Access	• Only required for site plans	✗
	4.1.3 New Street Networks	• Only required for plans of subdivision	✓
4.2 Parking	4.2.1 Parking Supply	• Only required for site plans	✗
	4.2.2 Spillover Parking	• Only required for site plans where parking supply is 15% below unconstrained demand	✗
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	✓
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	✓
4.8 Network Concept	n/a	• Only required when proposed development generates more than 200 person-trips during the peak hour in excess of the equivalent volume permitted by established zoning	✓

4 Forecasting

4.1 Development Generated Traffic

4.1.1 Trip Generation Methodology

Peak hour site-generated traffic volumes were developed using the 2009 TRANS Trip Generation Residential Trip Rates Study Report.

The TRANS trip generation rates are based on a blended rate derived from 17 trip generation studies undertaken in 2008, the ITE Trip Generation Manual and the 2005 TRANS OD Travel Survey. Separate trip generation rates exist for each of the four general geographic areas in Ottawa: Core, Urban (Inside the Greenbelt), Suburban (Outside the Greenbelt) and Rural. These trip generation rates reflect existing travel behavior by dwelling type and geographic area. Adjusted trip generation rates also exist to reflect increased transit usage for developments in close proximity to rapid transit stations. The TIA Guidelines recommend that the TRANS trip generation rates be converted to person-trips based on the vehicular mode share proportions detailed in the TRANS Trip Generation study.

The person-trips were then subdivided based on representative mode share percentages applicable to the study area to determine the number of vehicle, transit, pedestrian, cycling and other trip types.

Target mode shares were developed based on the local mode shares from the O-D Survey and the Leitrim Community Master Transportation Study (MTS).

4.1.2 Trip Generation Results

4.1.2.1 Vehicle Trip Generation

Peak hour vehicular traffic volumes associated with the Findlay Creek Stage 5 development were determined using the peak hour trip generation rates in the TRANS Trip Generation study.

The base vehicular trip generation results for the proposed development have been summarized in **Table 6**.

Table 6 - Base Vehicular Trip Generation

LAND USE	SIZE	PERIOD	GENERATED TRIPS (VPH)		
			IN	OUT	TOTAL
Single Family Homes	170 du	AM	34	84	118
		PM	94	59	153
Townhomes	219 du	AM	44	76	120
		PM	82	73	155

Notes: du = Dwelling Units, vph = Vehicles Per Hour

4.1.2.2 Person Trip Generation

The person-trip to vehicle-trip conversion factors for TRANS trip generation rates vary depending on the peak hour, geographic location and land use considered. The vehicular trip generation results for the residential land uses from the previous section were divided by the vehicle mode shares to determine the number of person-trips generated.

The results after applying the appropriate conversion factors have been summarized in **Table 7**.

Table 7 - Person-Trip Generation

LAND USE	VEH MODE SHARE	PERIOD	PERSON TRIPS (PPH)		
			IN	OUT	TOTAL
Single Family Homes	55%	AM	62	153	215
	64%	PM	147	93	240
Townhomes	55%	AM	80	138	218
	61%	PM	135	120	255
		AM Total	**142**	**291**	**433**
		PM Total	**282**	**213**	**495**

Notes: pph = persons per hour

4.1.2.3 Mode Share Proportions

The 2011 TRANS Origin-Destination (O-D) Survey provides approximations of the existing modal share within the South Gloucester / Leitrim Traffic Assessment Zone (TAZ). Relevant extracts from the 2011 O-D Survey are provided in **Appendix F**.

The AM Peak 'From District' and PM Peak 'To District' mode share distributions were averaged to estimate the weekday morning and afternoon commuter mode share distribution. Further refinements to the transit mode share were made based on the Leitrim MTS. A transit mode share of 16%, published in the Leitrim MTS, was brought forward to the 2026 build-out year in recognition of LRT service to the Leitrim Station by this time. It has been assumed that the increase in the transit mode share would result in a corresponding decrease in auto driver mode share and that all other mode shares would remain constant through to the 2031 study horizon. **Table 8** below summarizes the 2011 O-D Survey mode shares, as well as, the 2026 and 2031 mode share targets.

Table 8 - 2011 O-D Survey Mode Shares and Proposed Mode Share Targets

TRAVEL MODE	2011 O-D SURVEY MODE SHARES [1]	2026 & 2031 MODE SHARE TARGETS
Auto Driver	66%	61%
Auto Passenger	16%	16%
Transit	11%	16%
Cycling	1%	1%
Walking	0%	0%
Other	6%	6%

Notes:
[1] Average mode share from South Gloucester / Leitrim TAZ consisting of AM 'From District' & PM 'To District'

4.1.2.4 Trip Reduction Factors

Deduction of Existing Development Trips

Not Applicable: The proposed development lands are currently undeveloped, and do not generate any traffic volumes.

Pass-by Traffic

Not Applicable: The proposed development will not generate pass-by traffic.

Synergy/ Internalization

Not Applicable: The proposed development will include only residential land uses; therefore internalization reduction factors are not required for this study.

4.1.2.5 Trip Generation by Mode

The 2026 and 2031 mode share targets presented above were applied to the number of development-generated person-trips to determine the number of trips per travel mode. The results are summarized in **Table 9**.

Table 9 – Peak Hour Person Trips by Mode

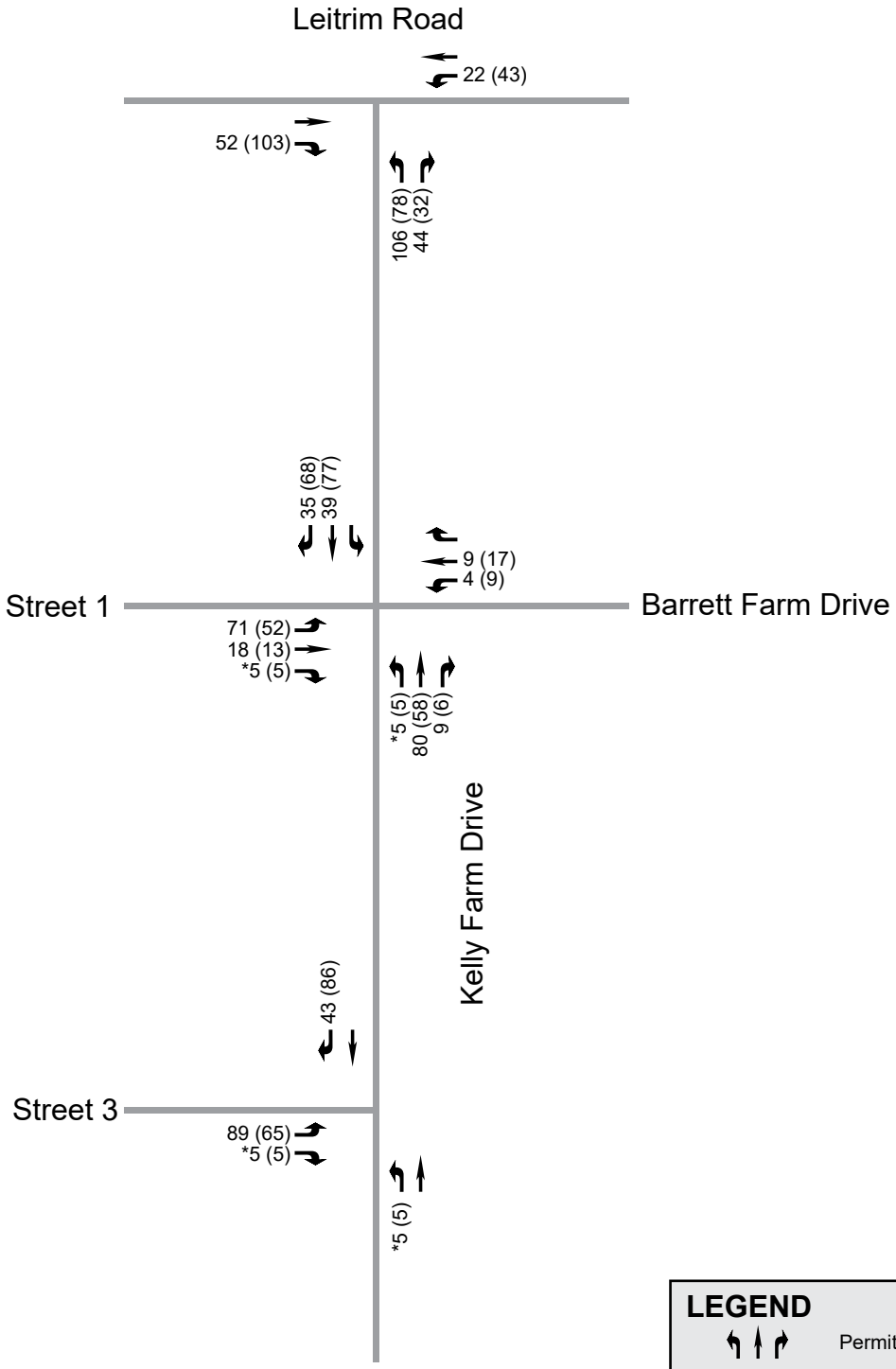
MODE	2026 & 2031			
	AM		PM	
	IN	OUT	IN	OUT
Auto Driver	87	177	171	130
Auto Passenger	23	46	45	34
Transit	23	46	45	34
Cycling	1	3	3	2
Walking	0	0	0	0
Other	9	18	17	13
Total	**433**		**494**	

4.1.3 Trip Distribution and Assignment

As the proposed development is directly adjacent to the Barrett Lands and Barrett Land Extension developments, trips generated by the proposed development were distributed to the adjacent road network using a similar distribution as was applied for these two developments in the Leitrim MTS:

- 60% to/from the west via Leitrim Road
- 25% to/from the north on Bank Street via Leitrim Road
- 10% to/from the north on Bank Street via Barrett Farm Drive
- 5% to/from the south on Bank Street via Barrett Farm Drive

Utilizing the estimated number of new auto trips and applying the above distribution, future site-generated traffic volumes for the 2026 and 2031 analysis years have been established for each of the study area intersections as illustrated in **Exhibit 4**.



Findlay Creek Stage 5
Transportation Impact Assessment

Exhibit 4:
2026 & 2031 Site Generated Traffic

PROJECT No. 122283
DATE: September 2020
SCALE: N.T.S.

4.2 Background Network Traffic

4.2.1 Changes to the Background Transportation Network

To properly assess future traffic conditions, planned modifications to the transportation network that may impact travel patterns or demand within the study area have been considered. The Scoping section of this TIA reviewed the anticipated changes to the study area transportation network based on the Transportation Master Plan (TMP), Capital Budget Forecasts and the *2019 City-Wide Development Charges Background Study* and determined that within the study area no road, pedestrian or cycling network modifications are planned within the study's 2031 horizon. The Trillium Line Extension is projected to be completed by the end of 2022 which may result in an increase in transit mode share within the study area, as reflected in the future mode share targets.

4.2.2 General Background Growth Rates

The background growth rate is intended to represent regional growth from outside the study area that utilize the adjacent road network. Consistent with the Leitrim Master Transportation Study (MTS), a 1% annual growth rate has been considered for the determination of future background traffic.

This background growth rate has only been applied to the through movements on Leitrim Road as traffic generation relating to all known future adjacent developments has been explicitly accounted for in the analysis.

4.2.3 Other Area Development

All current adjacent development applications within the study area were previously identified in **Table 4**. All of the developments identified have been accounted for in the future background volume projections. The developments represent specific areas of growth within the study area and are therefore considered in addition to the general background growth rate discussed previously.

4.3 Demand Rationalization

The purpose of this section is to rationalize future travel demands within the study area to account for potential capacity limitations in the transportation network and its ability to effectively accommodate the additional demand generated by a new development.

4.3.1 Description of Capacity Issues

Based on both the Barrett Lands Subdivision Community Transportation Study (IBI Group, September 2013) and the Barrett Extension Land Community Transportation Study (IBI Group, August 2016), the intersection of Leitrim Road & Kelly Farm Drive is not expected to experience any capacity issues as a signalized intersection.

4.3.2 Adjustment to Development Generated Demands

With no capacity issues expected at the intersection of Leitrim Road & Kelly Farm Drive, no adjustments have been made to development-generated traffic volumes.

4.3.3 Adjustment to Background Network Demands

Similarly to the above, no adjustments have been applied to background network demands.

4.4 Traffic Volume Summary

4.4.1 Future Background Traffic Volumes

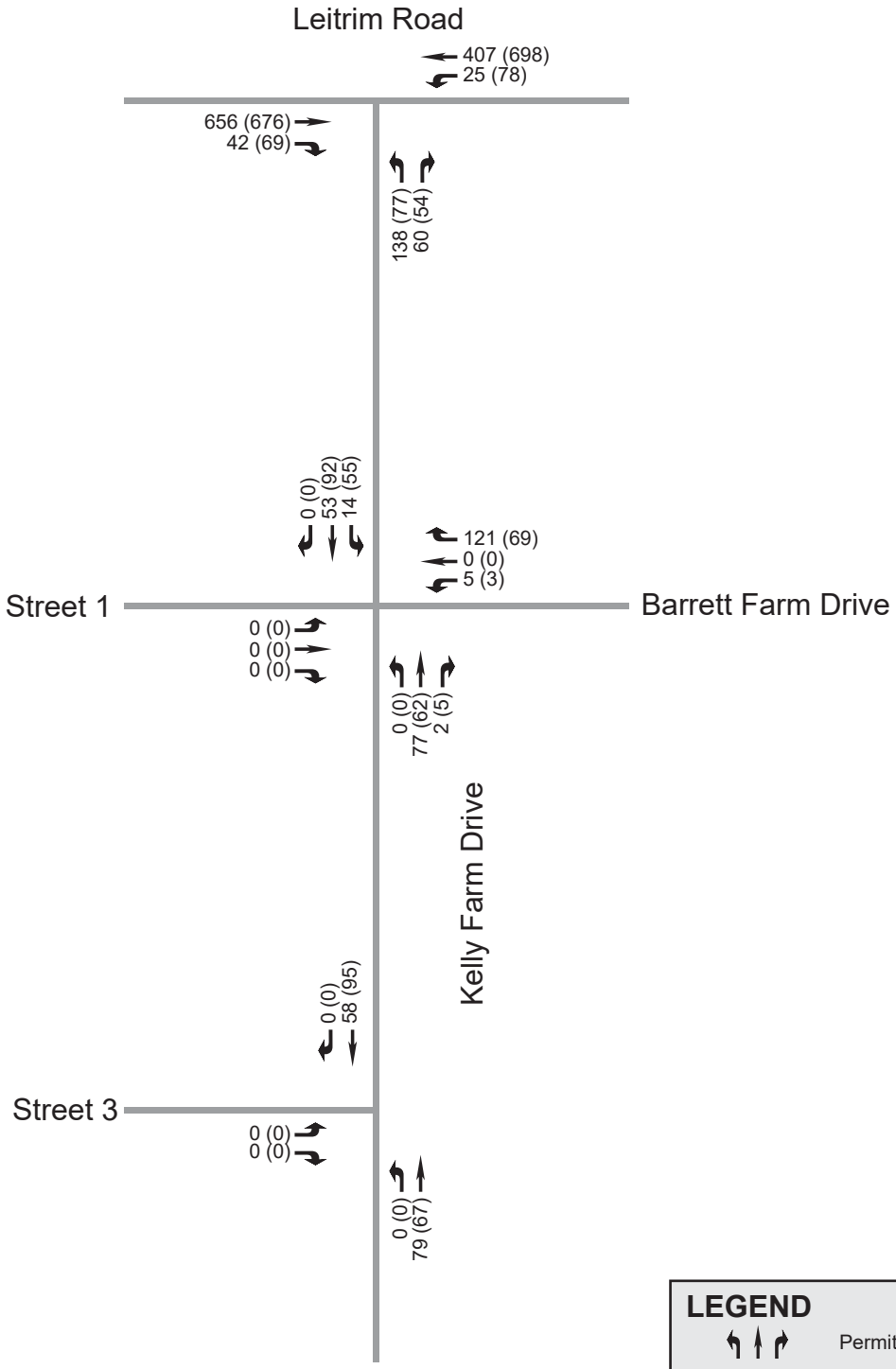
Future background traffic volume projections have been established by combining the adjacent development traffic and background traffic derived through the application of a growth rate as discussed previously.

Exhibit 5 and **Exhibit 6** present the future background traffic volumes anticipated for the 2026 build-out year, as well as the 2031 study horizon, respectively.

4.4.2 Future Total Traffic Volumes

Future total volumes have been derived by combining the site-generated traffic from **Exhibit 4** with the future background volumes from **Exhibit 5** and **Exhibit 6**.

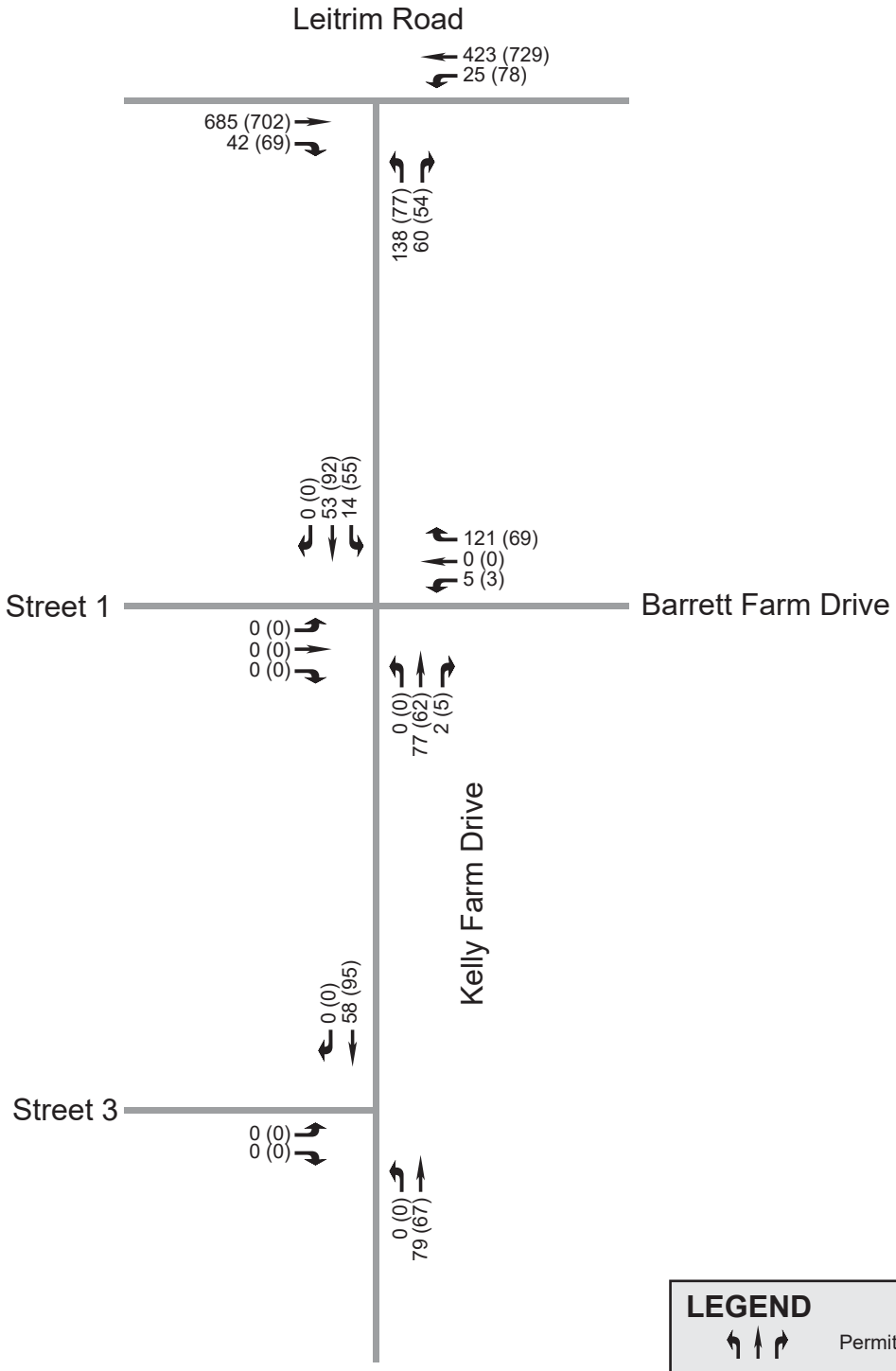
Exhibit 7 and **Exhibit 8** present the future total traffic volumes anticipated for 2026 and 2031 analysis years, respectively.



Findlay Creek Stage 5
Transportation Impact Assessment

Exhibit 5:
Future (2026)
Background Traffic

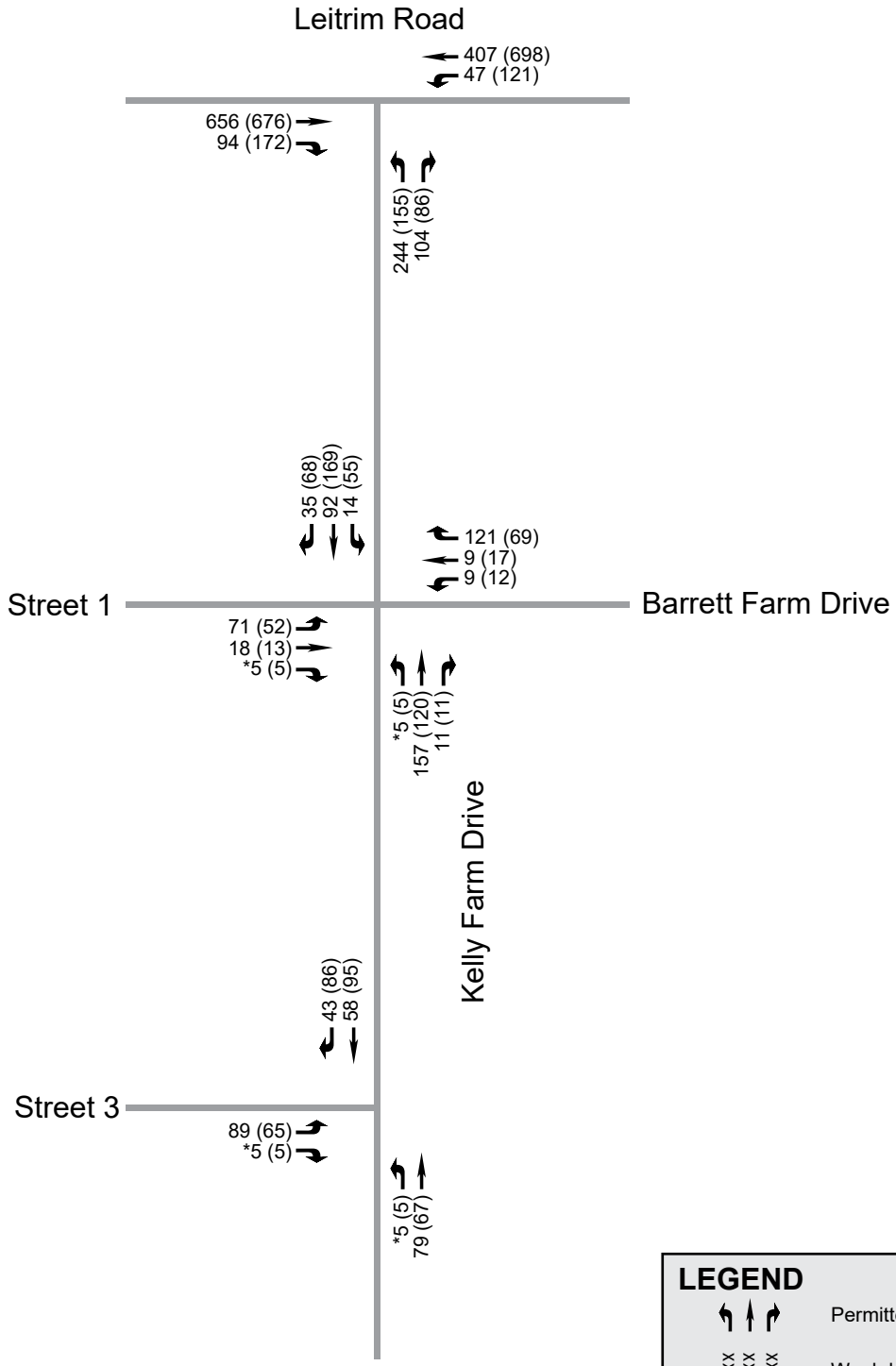
PROJECT No. 122283
DATE: September 2020
SCALE: N.T.S.



Findlay Creek Stage 5
Transportation Impact Assessment

Exhibit 6:
Future (2031)
Background Traffic

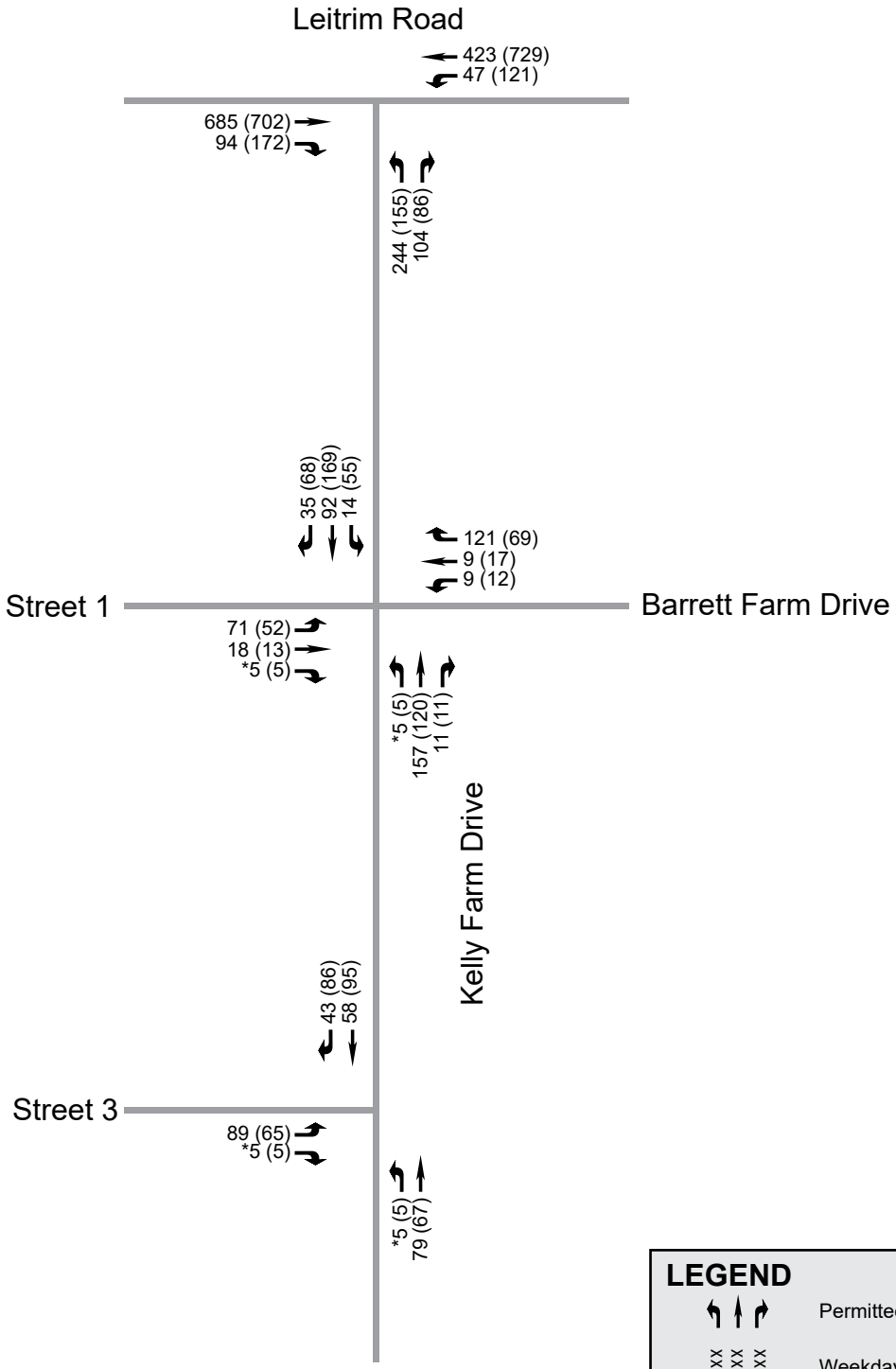
PROJECT No. 122283
DATE: September 2020
SCALE: N.T.S.



Findlay Creek Stage 5
Transportation Impact Assessment

Exhibit 7:
Future (2026) Total Traffic

PROJECT No. 122283
DATE: September 2020
SCALE: N.T.S.



IBI

Findlay Creek Stage 5
Transportation Impact Assessment

Exhibit 8:
Future (2031) Total Traffic

PROJECT No. 122283
DATE: September 2020
SCALE: N.T.S.

5 Analysis

5.1 Development Design

5.1.1 Design for Sustainable Modes

The potential sidewalk configuration within the subdivision, as well as, the planned bus stop locations on Kelly Farm Drive and Barrett Farm Drive are illustrated in **Exhibit 9**. Based on these bus stop locations, approximately 97% of the proposed residential units are within a 400m walking distance of transit service. This is slightly above OC Transpo's target of 95% of residential units, therefore the proposed bus stops at the intersection of Kelly Farm Drive & Barrett Farm Drive / Street 1 will provide adequate transit coverage for the proposed development.

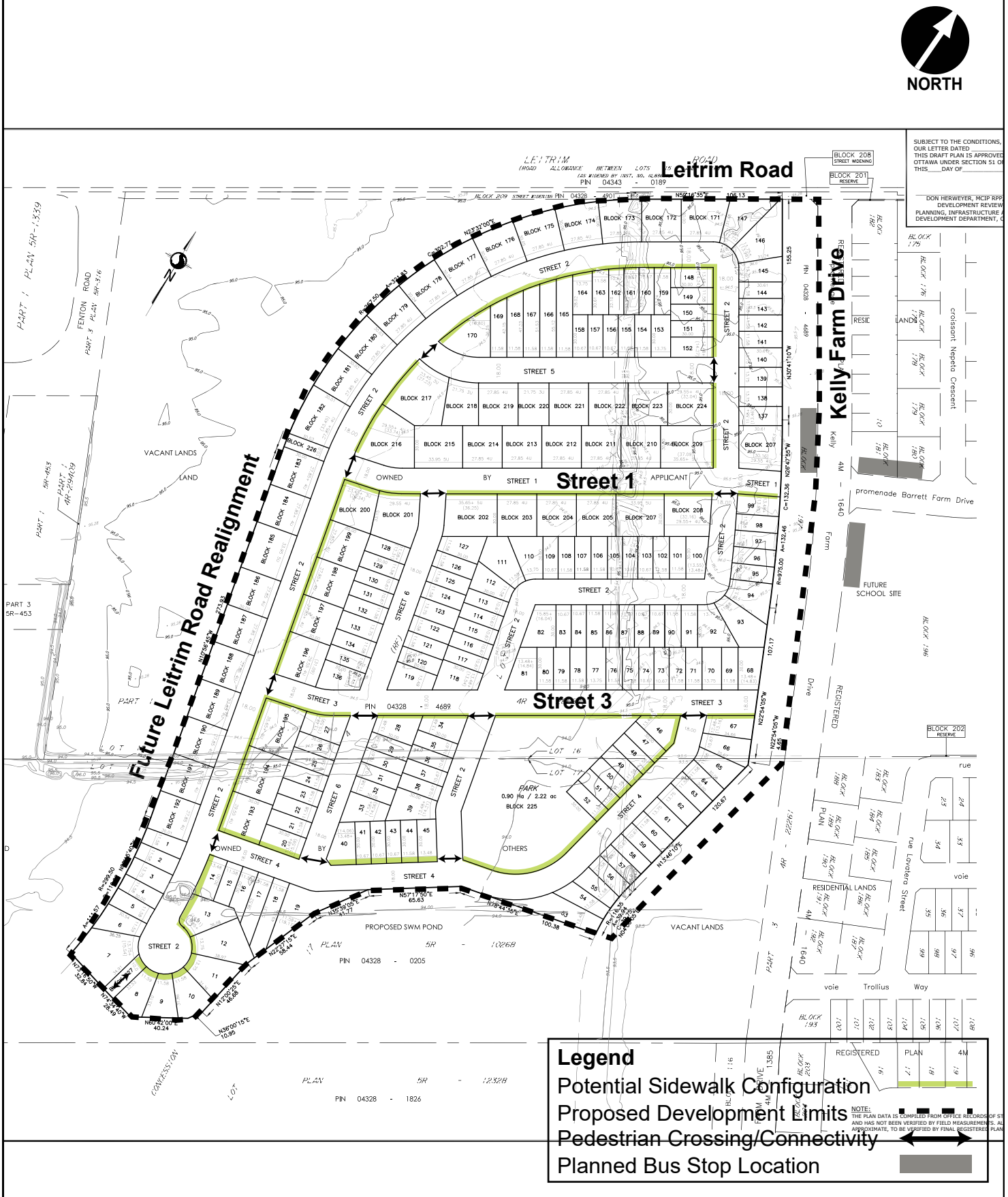
The TDM-Supportive Development Design and Infrastructure Checklist was completed and is provided in **Appendix G**. This checklist identifies anticipated measures that are being considered in association with the proposed development to offset the vehicular impact on the adjacent road network.

5.1.2 Circulation and Access

Not Applicable: The Circulation and Access element is exempt from this TIA, as defined in the study scope. This element is not required for a Draft Plan of Subdivision.

5.1.3 New Street Networks

The road network within the proposed development features two local roads, Street 1 and Street 3, that provide access to Kelly Farm Drive and several internal local roads for circulation within the subdivision. The local roads are organized in a modified grid pattern with relatively short segments and strategic mid-block pathway connections to create a more porous, walkable community.



IBI

Findlay Creek Stage 5
Transportation Impact Assessment

Exhibit 9:
Proposed Mobility Plan

PROJECT No. 122283
DATE: September 2020
SCALE: 0m 50m 100m

5.2 Parking

Not Applicable: The Parking Supply and Spillover Parking elements are exempt from this TIA, as defined in the study scope. These elements are not required for Draft Plans of Subdivision.

5.3 Boundary Streets

5.3.1 Mobility

Segment-based Multi-Modal Level of Service (MMLOS) was completed for the sections of Leitrim Road and Kelly Farm Drive adjacent to the proposed development and the results of the analysis are summarized in **Table 10** below. The MMLOS targets for each road vary based on a variety of factors such as the Official Plan designation / policy area, cycling network classification, transit network classification and whether the road is classified as a truck route. Details of the MMLOS analysis are provided in **Appendix H**.

Table 10 - Segment MMLOS

LOCATION	LEVEL OF SERVICE BY MODE			
	PEDESTRIAN (PLOS)	BICYCLE (BLOS)	TRANSIT (TLOS)	TRUCK (TkLOS)
SEGMENTS				
Leitrim Road – Western Development Boundary to Kelly Farm Drive	**F** (Target: C)	**F** (Target: C)	**D** (Target: D)	**D** (Target: D)
Kelly Farm Drive – Leitrim Road to Street 1 / Barrett Farm Drive	**A** (Target: C)	**A** (Target: D)	**E** (Target: D)	**B** (Target: N/A[1])
Kelly Farm Drive – Street 1 / Barrett Farm Drive to Street 3	**A** (Target: C)	**A** (Target: D)	**E** (Target: D)	**B** (Target: N/A[1])

Notes:

[1] Collector roads in the General Urban Area that are not on a truck route do not have a TkLOS target.

The segment of Leitrim Road adjacent to the proposed development is currently not meeting its PLOS and BLOS targets. The extension of the multi-use path along the south side of Leitrim Road would allow this road segment to achieve a PLOS of 'D' and a BLOS of 'A'. Given the high operating speed and high traffic volume on Leitrim Road, a PLOS of 'C' or better is not achievable without a reduction in the operating speed to below 60 km/h.

The results of the Segment MMLOS indicate that currently both segments of Kelly Farm Drive within the study area are not meeting their Transit Level of Service (TLOS) targets. Given the frequency of residential driveways along these segments of Kelly Farm Drive, it is not feasible to reduce the level of driveway friction in order to improve the TLOS.

It should be noted that these deficiencies are representative of existing conditions and will not be exacerbated by the proposed development.

5.3.2 Road Safety

Both the segment of Kelly Farm Drive adjacent to the proposed development and the Leitrim Road & Kelly Farm Drive intersection have only recently been constructed and therefore there is no history of collisions at either location to review. As such, the historical collision analysis will be limited to the segment of Leitrim Road adjacent to the proposed development.

The TIA Guidelines require a safety review if at least six collisions for any one movement or of a discernible pattern, over a five-year period have occurred. Based on the preliminary collision history analysis in Section 3.2.4, there have been 11 rear-end collisions along the segment of Leitrim Road between Fenton Road and Bank Street between January 1, 2014 and December 31, 2018. A review of the collision details indicates the following:

- There were four eastbound rear-end collisions and five westbound rear-end collisions
- Two of the collisions occurred during rainy conditions
- Two of the collisions occurred during dawn or dusk
- Six of the collisions occurred on weekdays between 3pm and 5pm and three occurred between 6am and 9am

Based on these collision details, no significant contributing factors were observed. The majority of these collisions were likely related to vehicles entering or exiting a driveway. Given the high operating speed on Leitrim Road, there is a higher likelihood for rear-end collisions to occur at these locations. Recent development in the area is expected to have improved traffic operations along this segment of Leitrim Road as it has consolidated access to Leitrim Road to a few intersections and reduced the number of private driveways along this segment.

5.4 Access Intersections

5.4.1 Location and Design of Access

The proposed development will provide two new access intersections on Kelly Farm Drive:

- **Kelly Farm Drive and Barrett Farm Drive / Street 1** will be a future four-legged, unsignalized intersection with two-way stop control approximately 175m south of Leitrim Road.
- **Kelly Farm Drive and Street 3** will be a future three-legged, unsignalized intersection approximately 295m south of Leitrim Road. This intersection will also be configured as a two-way stop control intersection with free-flow in the north-south direction.

There are no other new access intersections proposed within the study area as part of the subject development.

5.4.2 Intersection Control

5.4.2.1 Traffic Signal Warrants

Based on the projected traffic volumes, neither of the two site access intersections are expected to trigger the traffic signal warrants under Future (2031) Total Traffic conditions.

The results of the traffic signal warrants are provided in **Appendix I**.

5.4.2.2 Roundabout Analysis

As per the City's Roundabout Implementation Policy, intersections that satisfy any of the following criteria should be screened utilizing the Roundabout Initial Feasibility Screening Tool:

- At any new City intersection
- Where traffic signals are warranted
- At intersections where capacity or safety problems are being experienced

Both site access intersections were assessed against the above noted criteria and a Roundabout Feasibility Screening Tool was completed for these intersections, as they are considered 'new City intersections'. The results of the Roundabout Feasibility Screening Tool indicate that implementing a roundabout may be problematic at either location due to space constraints. Furthermore, based on the suitability factors a roundabout is also not technically feasible at either location. A mini-roundabout may be technically feasible at either location, however, is not recommended as Kelly Farm Drive has been recently constructed.

The results of the Roundabout Feasibility Screening Tool are provided in **Appendix I**.

5.4.3 Intersection Design (MMLOS)

There is currently no methodology for evaluating Multi-Modal Level of Service (MMLOS) at unsignalized intersections. Both site access intersections are anticipated to remain unsignalized beyond the 2031 study horizon and as such MMLOS analysis was not conducted for these intersections. Assumptions regarding intersection control at both intersections were confirmed by the intersection capacity analysis results presented in subsequent sections of this TIA report.

5.5 Transportation Demand Management (TDM)

The City of Ottawa is committed to implementing Transportation Demand Management (TDM) measures on a City-wide basis in an effort to reduce automobile dependence, particularly during the weekday peak travel periods. TDM initiatives are aimed at encouraging individuals to use non-auto modes of travel during the peak periods.

5.5.1 Context for TDM

As described in the Forecasting section of this report, mode shares used to estimate future development traffic were based on both the 2011 TRANS Origin-Destination (OD) Survey for the South Gloucester/Leitrim Traffic Assessment Zone (TAZ) and the Leitrim Master Transportation Study (MTS).

The proposed development aligns with the objectives of the Building Better and Smarter Suburbs (BBSS) policy document, which promotes sustainable and compact growth. The majority of units are street townhomes, providing an appropriate level of density for a development situated outside of Ottawa's Greenbelt and far removed from a Transit-Oriented Development (TOD) zone or Design Priority Area (DPA).

5.5.2 Need and Opportunity

The surrounding community is presently considered to be auto-oriented, however the recent completion of the multi-use pathways along the south side of Leitrim Road and the west side of Kelly Farm Drive present an opportunity to shift travel patterns within the surrounding community to more sustainable modes. The provision for transit service along Kelly Farm Drive and Barrett Farm Drive within close proximity to the site, as planned, will help promote the use of transit as a convenient and efficient mode of transportation, thereby reducing dependence on private automobile usage.

To promote sustainable transportation for local trips, the internal road network of the proposed development has been configured with short street segments and frequent intersections to provide direct connections to the adjacent collector and arterial road network which will be capable of supporting transit service. Sidewalks and strategically-placed mid-block pathway connections will be provided at appropriate locations within the subdivision to facilitate access to local amenities, recreational pathways and the adjacent road and transit network.

5.5.3 TDM Program

The proposed development conforms to the City's TDM principles by providing convenient and direct connections to adjacent pedestrian, cycling and transit facilities, as well as nearby amenities.

The City of Ottawa's TDM Measures Checklist was completed for the proposed development, and the results are provided in **Appendix G**.

5.6 Neighbourhood Traffic Management

5.6.1 Adjacent Neighbourhoods

The proposed development will depend on Kelly Farm Drive, an urban collector road, for access to the arterial road network. As a collector road, Kelly Farm Drive has a liveability threshold of 300 vehicles per hour, as prescribed by the Transportation Impact Assessment Guidelines. Based on projected Future (2031) Total Traffic volumes, this road will be required to accommodate up to 518 vehicles per hour between Leitrim Road and Barrett Farm Drive during the afternoon weekday peak hour. It should be noted, however, that traffic volumes of this magnitude are not uncommon on a collector road approaching an arterial (i.e. Leitrim Road). Further, the impacts to the neighbourhood will be minimal, as there is only single-loaded residential frontage planned along this portion of Kelly Farm Drive. South of Barrett Farm Drive, two-way traffic volumes are expected to be in the order of 300 vehicles per hour or less during the weekday morning and afternoon peak hours, therefore not exceeding the targeted volume threshold.

5.7 Transit

5.7.1 Route Capacity

The estimated future 2031 total transit passenger demand within the study area was provided in the Forecasting component of this study. The results have been summarized in **Table 11**.

Table 11 - 2031 Development Generated Transit Demand

PERIOD	PEAK PERIOD DEMAND	
	IN	OUT
AM	23	46
PM	45	34

OC Transpo is planning to provide transit service along Kelly Farm Drive and Barrett Farm Drive within the vicinity of the site. It is recommended that OC Transpo confirm that the proposed transit service can accommodate projected transit ridership demand associated with the proposed development, as indicated above.

5.7.1 Transit Priority Measures

Transit priority measures are not required at any of the signalized study area intersections to support the projected travel demands within the timeframe of this study.

5.8 Review of Network Concept

As discussed in Section 3.3.3, the following screenlines are applicable to this study: SL8 – Leitrim and SL52 – Hawthorne - South. A summary comparison of the City 2031 Network Concept demand and capacity has been provided in **Table 12**.

Table 12 – 2031 Network Concept

SCREENLINE	AM 2031 PREFERRED INBOUND		
	DEMAND	CAPACITY	V/C RATIO
SL8 – Leitrim	5,884	7,000	0.84
SL52 – Hawthorne - South	892	3,400	0.26

Note 1 - Table results from Road Network Development Report: Final Report (December 2013)

As shown above, some excess capacity is projected across both screenlines, therefore network capacity deficiencies are not expected due to the addition of site-generated traffic associated with the proposed development.

5.9 Intersection Design

The following sections summarize the methodology and results of the multi-modal intersection capacity analysis conducted within the study area.

5.9.1 Intersection Control

5.9.1.1 Traffic Signal Warrants

Traffic signal warrants for site access intersections were discussed previously in Section 5.4. The intersection of Leitrim Road & Kelly Farm Drive is currently signalized, therefore traffic signal warrant analysis was not completed for this intersection.

5.9.1.2 Roundabout Analysis

The feasibility of implementing roundabouts at applicable site access intersections was evaluated in Section 5.4. As the Leitrim Road & Kelly Farm Drive was recently constructed as a signalized intersection, the implementation of a roundabout at this location was not considered.

5.9.2 Intersection Analysis Criteria (Automobile)

The following section outlines the City of Ottawa's methodology for determining motor vehicle Level of Service (LOS) at signalized and unsignalized intersections.

5.9.2.1 Signalized Intersections

In qualitative terms, the Level of Service (LOS) defines operational conditions within a traffic stream and their perception by motorists. A LOS definition generally describes these conditions in terms of such factors as delay, speed and travel time, freedom to manoeuvre, traffic interruptions, safety, comfort and convenience. LOS can also be related to the ratio of the volume to capacity (v/c) which is simply the relationship of the traffic volume (either measured or forecast) to the capability of the intersection or road section to accommodate a given traffic volume. This capability varies depending on the factors described above. LOS are given letter designations from 'A' to 'F'. LOS 'A' represents the best operating conditions and LOS 'E' represents the level at which the

intersection or an approach to the intersection is carrying the maximum traffic volume that can, practicably, be accommodated. LOS 'F' indicates that the intersection is operating beyond its theoretical capacity.

The City of Ottawa has developed criteria as part of the Transportation Impact Assessment Guidelines, which directly relate the volume to capacity (v/c) ratio of a signalized intersection to a LOS designation. These criteria are as follows:

Table 13 - LOS Criteria for Signalized Intersections

LOS	VOLUME TO CAPACITY RATIO (v/c)
A	0 to 0.60
B	0.61 to 0.70
C	0.71 to 0.80
D	0.81 to 0.90
E	0.91 to 1.00
F	> 1.00

The intersection capacity analysis technique provides an indication of the LOS for each movement at the intersection under consideration and for the intersection as a whole. The overall v/c ratio for an intersection is defined as the sum of equivalent volumes for all critical movements at the intersection divided by the sum of capacities for all critical movements.

The Level of Service calculation is based on locally-specific parameters as described in the TIA Guidelines and incorporates existing signal timing plans obtained from the City of Ottawa. The analysis existing conditions utilized a Peak Hour Factor (PHF) of 0.90, while future conditions considers optimized signal timing plans and use of a Peak Hour Factor (PHF) of 1.0 to recognize peak spreading beyond a 15-minute period in congested conditions.

5.9.2.2 Unsignalized Intersections

The capacity of an unsignalized intersection can also be expressed in terms of the LOS it provides. For an unsignalized intersection, the Level of Service is defined in terms of the average movement delays at the intersection. This is defined as the total elapsed time from when a vehicle stops at the end of the queue until the vehicle departs from the stop line; and includes the time required for a vehicle to travel from the last-in-queue position to the first-in-queue position. The average delay for any particular minor movement at the un-signalized intersection is a function of the capacity of the approach and the degree of saturation.

The Highway Capacity Manual 2010 (HCM), prepared by the Transportation Research Board, includes the following Levels of Service criteria for unsignalized intersections, related to average movement delays at the intersection, as indicated in **Table 14**.

Table 14 - LOS Criteria for Unsignalized Intersections

LOS	DELAY (seconds)
A	<10
B	>10 and <15
C	>15 and <25
D	>25 and <35
E	>35 and <50
F	>50

The unsignalized intersection capacity analysis technique included in the HCM and used in this study provides an indication of the Level of Service for each movement of the intersection under consideration. By this technique, the performance of the unsignalized intersection can be compared under varying traffic scenarios, using the Level of Service concept in a qualitative sense. One unsignalized intersection can be compared with another unsignalized intersection using this concept. Level of Service 'E' represents the capacity of the movement under consideration and generally, in large urban areas, Level of Service 'D' is considered to represent an acceptable operating condition. Level of Service 'E' is considered an acceptable operating condition for planning purposes for intersections located within Ottawa's Urban Core including the downtown and its vicinity). Level of Service 'F' indicates that the movement is operating beyond its design capacity.

5.9.3 Intersection Capacity Analysis

Following the established intersection capacity analysis criteria described above, the existing and future conditions are analysed during the weekday peak hour traffic volumes derived in this study.

The following section presents the results of the intersection capacity analysis. All tables summarize study area intersection LOS results during the weekday morning and afternoon peak hour periods.

The Synchro output files have been provided in **Appendix J**.

5.9.3.1 Existing (2019) Traffic

An intersection capacity analysis has been undertaken using the Existing (2019) Traffic volumes presented in **Figure 2**, yielding the following results:

Table 15 - Intersection Capacity Analysis: Existing (2019) Traffic

INTERSECTION	TRAFFIC CONTROL	AM PEAK HOUR		PM PEAK HOUR	
		OVERALL LOS (V/C OR DELAY)	CRITICAL MOVEMENTS (V/C OR DELAY)	OVERALL LOS (V/C OR DELAY)	CRITICAL MOVEMENTS (V/C OR DELAY)
Leitrim Road & Kelly Farm Drive	Signalized	A (0.42)	EBT (0.49)	A (0.45)	EBT (0.48)

5.9.3.2 Future (2026) Background Traffic

An intersection capacity analysis has been undertaken using the Future (2026) Background Traffic volumes presented in **Exhibit 5**, yielding the following results:

Table 16 - Intersection Capacity Analysis: 2026 Background Traffic

INTERSECTION	TRAFFIC CONTROL	AM PEAK HOUR		PM PEAK HOUR	
		OVERALL LOS (V/C OR DELAY)	CRITICAL MOVEMENTS (V/C OR DELAY)	OVERALL LOS (V/C OR DELAY)	CRITICAL MOVEMENTS (V/C OR DELAY)
Leitrim Road & Kelly Farm Drive	Signalized	A (0.53)	EBT (0.58)	A (0.58)	EBT (0.60)
Kelly Farm Drive & Barrett Farm Drive / Street 1	Unsignalized [1] (TWSC)	A (9.2s)	WBTRL (9.2s)	A (8.9s)	WBTRL (8.9s)

Notes:
[1] TWSC – Two-way stop-controlled intersection

5.9.3.3 Future (2031) Background Traffic

An intersection capacity analysis has been undertaken using the Future (2031) Background Traffic volumes presented in **Exhibit 6**, yielding the following results:

Table 17 - Intersection Capacity Analysis: 2031 Background Traffic

INTERSECTION	TRAFFIC CONTROL	AM PEAK HOUR		PM PEAK HOUR	
		OVERALL LOS (V/C OR DELAY)	CRITICAL MOVEMENTS (V/C OR DELAY)	OVERALL LOS (V/C OR DELAY)	CRITICAL MOVEMENTS (V/C OR DELAY)
Leitrim Road & Kelly Farm Drive	Signalized	A (0.54)	EBT (0.60)	A (0.60)	EBT (0.62)
Kelly Farm Drive & Barrett Farm Drive / Street 1	Unsignalized [1] (TWSC)	A (9.2s)	WBTRL (9.2s)	A (8.9s)	WBTRL (8.9s)

Notes:
[1] TWSC – Two-way stop-controlled intersection

5.9.3.4 Future (2026) Total Traffic

An intersection capacity analysis has been undertaken using the Future (2026) Total Traffic volumes presented in **Exhibit 7**, yielding the following results:

Table 18 - Intersection Capacity Analysis: 2026 Total Traffic

INTERSECTION	TRAFFIC CONTROL	AM PEAK HOUR		PM PEAK HOUR	
		OVERALL LOS (V/C OR DELAY)	CRITICAL MOVEMENTS (V/C OR DELAY)	OVERALL LOS (V/C OR DELAY)	CRITICAL MOVEMENTS (V/C OR DELAY)
Leitrim Road & Kelly Farm Drive	Signalized	C (0.72)	EBT (0.82)	C (0.72)	WBL (0.85)
Kelly Farm Drive & Barrett Farm Drive / Street 1	Unsignalized (TWSC) [2]	B (13.3s)	EBTRL (13.3s)	B (14.5s)	EBTRL (14.5s)
Kelly Farm Drive & Street 3	Unsignalized (TWSC) [2]	A (9.8s)	EBRL (9.8s)	A (10.0s)	EBRL (10.0s)

Notes:
[1] TWSC – Two-way stop-controlled intersection

With the addition of site-generated traffic in 2026, each study area intersection is expected to operate at an acceptable level of service (i.e. LOS 'C' or better), as indicated in **Table 18** above.

5.9.3.5 Future (2031) Total Traffic

An intersection capacity analysis has been undertaken using the Future (2031) Total Traffic volumes presented in **Exhibit 8**, yielding the following results:

Table 19 - Intersection Capacity Analysis: 2031 Total Traffic

INTERSECTION	TRAFFIC CONTROL	AM PEAK HOUR		PM PEAK HOUR	
		OVERALL LOS (V/C OR DELAY)	CRITICAL MOVEMENTS (V/C OR DELAY)	OVERALL LOS (V/C OR DELAY)	CRITICAL MOVEMENTS (V/C OR DELAY)
Leitrim Road & Kelly Farm Drive	Signalized	C (0.74)	EBT (0.86)	C (0.74)	WBL (0.85)
Kelly Farm Drive & Barrett Farm Drive / Street 1	Unsignalized (TWSC) [1]	B (13.3s)	EBTRL (13.3s)	B (14.5s)	EBTRL (14.5s)
Kelly Farm Drive & Street 3	Unsignalized (TWSC) [1]	A (9.8s)	EBRL (9.8s)	A (10.0s)	EBRL (10.0s)

Notes:
[1] TWSC – Two-way stop-controlled intersection

As indicated in **Table 19** above, the study area intersections are expected to perform well below their theoretical capacity at the study horizon year under total traffic conditions.

5.9.4 Intersection Design (MMLOS)

Analysis of existing conditions for each mode has been conducted based on the methodology prescribed in the City of Ottawa Multi-Modal Level of Service (MMLOS) Guidelines. The Level of Service for each mode has been calculated for each intersection where signals exist or are anticipated. The intersection MMLOS results have been summarized in **Table 20**.

Detailed MMLOS analysis results are provided **Appendix H**.

Table 20 - Intersection MMLOS

LOCATION	LEVEL OF SERVICE BY MODE			
	PEDESTRIAN (PLOS)	BICYCLE (BLOS)	TRANSIT (TLOS)	TRUCK (TkLOS)
INTERSECTIONS				
Leitrim Road & Kelly Farm Drive	**E** (Target: C)	**E** (Target: C)	**D** (Target: D)	**E** (Target: D)

5.9.4.1 Summary of Potential Improvements

Based on the MMLOS results outlined in **Table 20**, the following measures have been identified that could improve conditions for each travel mode:

Pedestrians

The PLOS at intersections is based on several factors including the number of traffic lanes that pedestrians must cross, corner radii and whether the crossing allows for permissive or protective right or left turns, among others. The City of Ottawa minimum target for PLOS is 'C'.

The intersection is shown to exceed the PLOS target due to pedestrian delays experienced at each approach. Increasing the pedestrian walk time or reducing the cycle length may help reduce the pedestrian delay, however this may result in negative impacts to the vehicle Level of Service.

Cyclists

The BLOS at intersections is dependent on several factors: the number of lanes that the cyclist is required to cross to make a left-turn, the presence of a dedicated right-turn lane on the approach and the operating speed of each approach. The City target for BLOS is 'C'.

The results of the analysis indicate that the intersection is currently operating at a BLOS 'E' as a result of high operating speeds along Leitrim Road and the need to cross one lane of traffic to make a left turn. This intersection currently exists with elements of a 'protected' intersection, but was not designed to be 'fully-protected' due to land constraints along the north side of Leitrim Road. Ultimately, cycling infrastructure is planned to be accommodated entirely on the south side of Leitrim Road. In the interim, cyclists may dismount using the pedestrian crosswalk to/from the multi-use path on Kelly Farm Drive.

Transit

Intersection TLOS is based on the average signal delay experienced by transit vehicles on each approach. The City Target TLOS is 'D'.

The results of the analysis indicate that the average signal delay at the intersection complies with the TLOS target.

Truck

The Truck LOS (TKLOS) is based on the right-turn radii, as well as the number of receiving lanes for vehicles making a right-turn from the traffic lane being analysed. The City of Ottawa target for TKLOS is 'E'.

The TkLOS at the intersection is an 'E' due to the effective turning radius on the eastbound right-turn movement capable of accommodating transit vehicles. Given that Kelly Farm Drive is not a truck route, however, it is expected that this substandard TkLOS is acceptable in this context.

Based on the MMLOS analysis presented above, there are no recommended changes to the intersection of Leitrim Road and Kelly Farm Drive.

5.10 Geometric Review

The following section provides a review of all geometric requirements for the study area intersections.

5.10.1 Sight Distance and Corner Clearances

The proposed site access intersections are located along a straight segment of Kelly Farm Drive with no significant horizontal or vertical alignment constraints. Sight distance and corner clearances are therefore not expected to be a concern at either location.

5.10.2 Auxiliary Lane Analysis

Auxiliary turning lane requirements for all intersections within the study area are described as follows:

5.10.2.1 Unsignalized Auxiliary Left-Turn Lane Requirements

The intersection of Kelly Farm Drive & Barrett Farm Drive / Street 1 will be configured as two-way stop-controlled intersection. A southbound left-turn is planned at Street 1, however, as only nominal volumes are anticipated the need for a northbound left-turn lane is not required at this intersection, nor at the proposed Street 3 intersection.

Based on the projected volumes, an MTO left-turn signal warrant analysis was deemed unnecessary at this intersection.

Auxiliary lanes are not warranted on the Street 1 or Street 3 approaches with Kelly Farm Drive as these will be stop-controlled.

5.10.2.2 Signalized Auxiliary Left-Turn Requirements

A review of auxiliary left-turn lane storage requirements was completed at all signalized intersections within the study area under Future (2031) Total Traffic conditions. The review compared the projected 95th percentile queue lengths from Synchro operational results, and the standard queue length calculation based on the following equation:

$$Storage\ Length = \frac{NL}{C} \times 1.5$$

Where:
N = number of vehicles per hour
L = Length occupied by a vehicle in the queue = 7 m
C = number of traffic signal cycles per hour

The results of the auxiliary left-turn lane analysis are summarized below in **Table 21**.

Table 21 - Auxiliary Left-Turn Storage Analysis at Signalized Intersections

INTERSECTION	APPROACH	95TH %ILE QUEUE LENGTH (M)	CALCULATED QUEUE LENGTH (M)	EXISTING PARALLEL LANE LENGTH (M)	STORAGE DEFICIENCY (M)
Leitrim Road & Kelly Farm Drive	NB	45	50	60	Existing Storage Adequate
	WB	#60	30	80	Existing Storage Adequate

Notes:
Recommended storage lengths do not consider deceleration and taper lengths. Values rounded to nearest 5m.

As per the results of the queue length analyses presented above, the existing storage provided is adequate. No modifications to the above intersection(s) are recommended.

5.10.2.3 Unsignalized Auxiliary Right-Turn Lane Requirements

The Transportation Association of Canada (TAC) suggests that auxiliary right-turn lanes be considered "when the volume of decelerating or accelerating vehicles compared with through vehicles causes undue hazard." Consideration for auxiliary right-turn lanes is typically given when the right-turning traffic exceeds 10% of the through volume and is at least 60 vehicles per hour.

Although both site access intersections would meet the criteria for a southbound right-turn lane, based on turning movement volumes of 70-90 vehicles during the weekday PM peak hour, it is not expected that southbound right-turning traffic will present a hazard to through traffic on Kelly Farm Drive, given the relatively low volume of traffic expected on this roadway.

5.10.2.4 Signalized Auxiliary Right-Turn Lane Requirements

The 95th percentile queue length for the eastbound right-turn movement at the intersection of Leitrim Road & Kelly Farm Drive under Future (2031) Total Traffic conditions was compared to the existing storage provided to ensure that the eastbound right-turn lane has sufficient storage to accommodate the proposed development. Based on the results of the Synchro analysis, a maximum 95th percentile queue length of 8.8m is expected on this movement during the weekday afternoon peak hour. The existing right-turn lane has 60m of parallel lane, therefore sufficient storage exists to accommodate background traffic demand as well as the demand generated by the proposed development.

5.11 Summary of Recommendations

Based on the intersection capacity, Multi-Modal Level of Service and auxiliary lane analyses results presented above, no geometric modifications are required at any of the study area intersections to accommodate the proposed development within the study horizon year.

5.11.1 Leitrim Road & Kelly Farm Drive

The results of the analysis indicate that the Leitrim Road & Kelly Farm Drive intersection is expected to operate at an acceptable level of service (i.e. LOS 'C') under Future (2031) Total Traffic conditions during the weekday afternoon peak hour.

Based on queue length analyses completed for this intersection, no modifications to existing auxiliary lanes will be required within the timeframe horizon year of this study.

5.11.2 Kelly Farm Drive & Barrett Farm Drive / Street 1

The results of the analysis indicate that the Kelly Farm & Barrett Farm/ Street 1 intersection is expected to operate at an acceptable level of service (i.e. LOS 'B') as a two-way stop-controlled intersection with stop control on the east and west approaches.

A southbound left-turn was recommended for the Barrett Lands subdivision, however due to the nominal northbound left-turn volumes expected, no northbound auxiliary left-turn lane is warranted at this intersection.

5.11.3 Kelly Farm Drive & Street 3

The results of the analysis indicate that the Kelly Farm & Street 3 intersection is expected to operate below its theoretical capacity (LOS 'A') under Future (2031) Total Traffic conditions as a stop-controlled intersection (eastbound approach only) with single, shared lanes on all approaches.

As a result of the nominal northbound left-turn volumes expected at this intersection, no northbound auxiliary left-turn lane is warranted.

6 Conclusion

The proposed residential development at 3100 Leitrim Road is expected to generate up to 264 and 301 two-way vehicular trips during the weekday morning and afternoon peak hours, respectively. These traffic volumes were distributed amongst two all-movements access intersections, representing a marginal increase in traffic volumes with respect to the overall traffic projections within the 2031 study horizon year. Mode share targets were developed with consideration of the transit mode share in the Leitrim Master Transportation Study, as well as, the mode share distributions in the South Gloucester / Leitrim Traffic Assessment Zone (TAZ) from the 2011 Origin-Destination Survey.

The results of the analysis indicate that the intersections of Kelly Farm & Barrett Farm/ Street 1 and Kelly Farm & Street 3 are expected to operate within acceptable levels of service (LOS 'B' or better) during the weekday morning and afternoon peak hours. Both were analysed as unsignalized, two-way stop-controlled intersections and do not warrant auxiliary lanes or future modifications to intersection control within the timeframe of this study.

The Leitrim & Kelly Farm intersection, which opened to the public in November 2019 as a signalized intersection, features 'protected intersection' elements such as fully-integrated cycling and pedestrian facilities including concrete sidewalks, cycle tracks and a bi-directional multi-use path. Based on the results of the intersection capacity analysis, this intersection is expected to operate at an acceptable level of service (i.e. LOS 'C') beyond the study horizon year. Furthermore, queue lengths were found to be sufficient to accommodate the projected increase in traffic associated with the proposed development.

Multi-modal level of service identified potential refinements at the intersection of Leitrim & Kelly Farm, as well as on boundary street segment that could further improve mobility and comfort for all road users. Potential remediation measures have been identified in which the City could consider to meet the prescribed targets. It should be noted that, although these measures would improve mobility and comfort for all road users, they are not required to safely accommodate the transportation demands of the proposed development.

The analysis conducted as part of this study indicates that no off-site geometric improvements are necessary as a result of the proposed development, and as such an RMA will not be required.

As travel demands are expected to be well within the capacity constraints of the adjacent transportation network, a post-development monitoring plan is also not a requirement of this study.

Based on the findings of this study, it is the overall opinion of IBI Group that the proposed development will integrate well with and can be safely accommodated by the adjacent transportation network.

Appendix A – City Circulation Comments

Step 1 & 2 Submission (Screening & Scoping) – Circulation Comments & Response

Report Submitted: December 11, 2019
Comments Received: January 7, 2020
Transportation Project Manager: Mike Giampa

1) Identify any relevant collision patterns within the five-year collision history.

   - IBI Response: The collision analysis in Section 3.2.4 will be expanded to identify any relevant collision patterns within the five-year collision history.

2) MMLOS should be completed for the section of Leitrim that fronts the proposed development.

   - IBI Response: The study area for the MMLOS analysis will be expanded to include the section of Leitrim Road adjacent to the proposed development.

Step 3 Submission (Forecasting) – Circulation Comments & Response

Report Submitted: January 10, 2020
Comments Received: January 31, 2020
Transportation Project Manager: Mike Giampa

1) Use a blend of from/within district traffic in the AM peak and to/within district in the PM peak.

   - IBI Response: The use of a blended rate to include the 'Within' mode share results in an 8% pedestrian share which may not be achievable for this site, given the significant walking distance (~2km) to the nearest local employment and commercial nodes within the TAZ. It is therefore anticipated that the majority of commuter trips will continue to follow a general blend of the 'From District' and 'To District' mode shares during the weekday morning and afternoon peak hours, respectively.

2) Consider a higher westbound trip assignment percentage, as some of the increased transit usage will be from those driving to the park and ride at Leitrim station.

   - IBI Response: Acknowledged. The trip distribution to/from the west has been increased by 10% to account for trips associated with the Leitrim Park and Ride.

     The revised distribution is as follows:
     - 60% to/from the west via Leitrim Road
     - 25% to/from the north on Bank Street via Leitrim Road
     - 10% to/from the north on Bank Street via Barrett Farm Drive
     - 5% to/from the south on Bank Street via Barrett Farm Drive

3) Consider increasing the transit mode share to 15%. Provide details on the 6% other trips.

   - IBI Response: The transit mode share of 16%, published in the Leitrim MTS, has been brought forward to the 2026 build-out year in recognition of LRT service to the Leitrim Station by this time. The 'other' mode share is 6%, representing a blended rate from the O-D Survey and is assumed to remain constant within the timeframe of the study.

Step 4 Submission (Analysis) – Circulation Comments & Response

Report Submitted: January 31, 2020
Comments Received: August 6, 2020
Transportation Project Manager: Mike Giampa

Transportation
Transportation Engineering Services

1) Section 4.1.2.3 Mode Share Proportions:
   2011 O-D survey mode shares in Table 8 do not add up to 100%. It is assumed that auto passenger mode share should be 16% (consistent with the 2026 and 2031 mode share targets). Please confirm.

   - **IBI Response:** The passenger mode share should be 16% instead of 11%. Table 8 in the TIA report has been updated accordingly.

2) Section 5.1.3 New Street Networks:
   Ensure that all local streets are designed with a target operating speed of 30km/h per the recent Strategic Road Safety Action Plan Update. A 30 km/h Design Guideline with further guidance on how to achieve a 30km/h target for new roadways is being developed in 2020. The following general measures are recommended as preliminary steps towards designing and building all new or reconstructed local residential streets with a target operating speed of 30km/h per the new Strategic Road Safety Action Plan Update:

   a. Provide bulb-outs that narrow local roads to a 7m target throat width at local-local and local-collector road intersections. Review turning templates using AutoTurn. Ensure that an HSU can make the turns at local-locals, using the entire road space.
   b. Periodic pinch points if appropriate (can be combined with a mid-block vertical measure) – following Traffic Calming Design Guidelines
   c. Generally consistent spacing of vertical measures (speed humps, tables, crossings or intersections) – in line with the constraints identified in the Traffic Calming Design Guidelines. This includes:
      a. Raised intersections if feasible – some T-intersections may not be possible, so consider a raised x-walk on one of the legs if possible (using engineering judgment about spacing of intersections – i.e. if close, may not all have to be raised). Also, can be applied when block spacing is close and mid-block speed humps would remove too much on-street parking.
      b. For blocks that are 125-150m long – consider 1 speed hump
      c. For blocks that are 200m+ – consider 2 speed humps
      d. For bus routes – consultation with OC Transpo is required. Typically, horizontal deflection is preferred for traffic calming rather than vertical measures. If vertical measures are required, utilize speed tables not speed humps. Use raised intersections only when bus is moving slowly i.e. to turn or coming to a stop at a stop sign.

- **IBI Response:** Noted. A Pavement Marking, Signage and Road Geometry drawing will be produced and will include traffic calming measures per the above recommendations. It shall be noted that all roads within the proposed development will be classified as Local roads, and therefore will not support transit routes. Transit coverage can be adequately achieved via bus stops on Kelly Farm Drive, as discussed in the TIA report.

3) Consider providing a sidewalk surrounding the proposed park on block 224.

   - **IBI Response:** The proposed sidewalk on Street 4 has been relocated to the north side to surround the proposed park on block 224.

4) Consider providing a sidewalk on the north side of Street 1 (in addition to the proposed south side sidewalk). This sidewalk is particularly recommended from the eastern Street 1 / Street 2 intersection to the Kelly Farm Drive / Barrett Farm Drive / Street 1 intersection to connect the sidewalk on the west side of Street 2 (east) to Kelly Farm Drive.

   - **IBI Response:** Given the 18m right-of-way associated with a typical local road such as Street 1 within the proposed development, it is not feasible to provide sidewalks on both sides of the road right-of-way without compromising right-of-way allocated for other cross-section elements. The sidewalk has been proposed on the south side to accommodate pedestrians generated by residents between Street 1 and Street 3.

5) Section 5.4.2.2 Roundabout Analysis:
   Attach the roundabout screening tool referenced in this section, they are missing from Appendix

   - **IBI Response:** Appendix I has been updated to include the Roundabout Feasibility Screening Tool for the proposed intersections of Kelly Farm Drive with Street 1 and Street 3.

Street Lighting

No comments with initial TIS for this circulation. Street lighting reserves the right to make future comments based on subsequent submissions.

- **IBI Response:** Acknowledged.

Future considerations are as follows:
If there are any proposed changes to the existing roadway geometry, the City of Ottawa Street Light Asset Management Group is required to provide a full street light design. Upon completion of proposed roadway geometry design changes, please submit digital Micro Station drawings with proposed roadway geometry changes to the Street Lighting Department, so that we may proceed with the detailed street light design and coordination with the Street Light maintenance provider and all necessary parties. Be advised that the applicant will be 100% responsible for all costs associated with any Street Light design as a result of the roadway geometry change.

Alterations and /or repairs are required where the existing street light plant is directly, indirectly or adversely affected by the scope of work under this circulation, due to the proposed road reconstruction

process. All street light plant alterations and/or repairs must be performed by the City of Ottawa's Street Light maintenance provider.

Be advised that the applicant will be 100% responsible for all costs associated with any relocations/modifications to the existing street light plant.

- **IBI Response:** Acknowledged.

Transit Services

1) Regarding section 3.3.1.2 Future Transit, please note that the timeline for re-configuring Route 294 has been pushed back until at least 2021.

   - **IBI Response:** Acknowledged. The text in Section 3.3.1.2 has been updated accordingly.

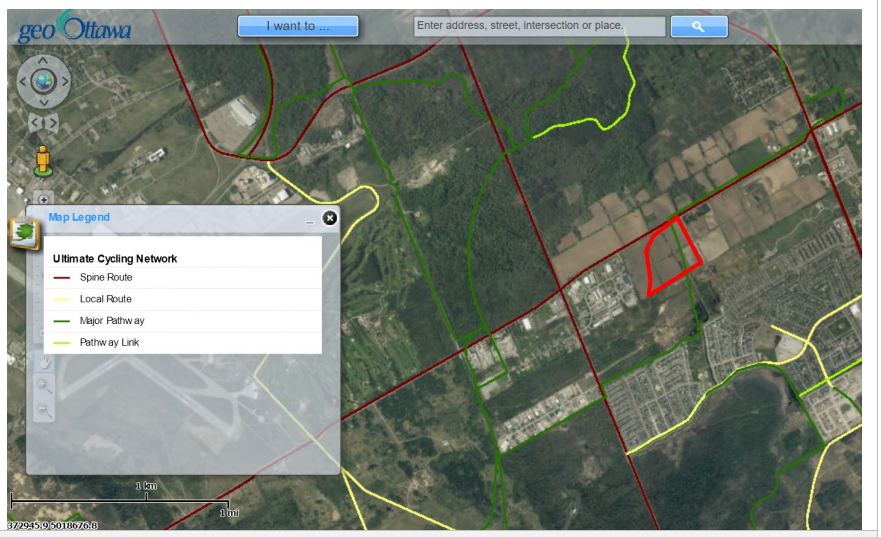
2) Consider extending Street 1 through Blocks 181-182 and pathway Block 225 to enable a future connection to realigned Leitrim Road. With this Street 1 would become a transit street, providing improved transit route options through the development and to/from the surrounding community. It would also provide a convenient through-connection between realigned Leitrim and Bank Street via Street 1 and Barrett Farm. This would also redistribute some of the development-generate vehicle traffic, reducing the load on Kelly Farm.

   - **IBI Response:** Given that Street 1 will be a local road with an 18m right-of-way, it is not expected that this street will be required to support transit service. Further, providing a connection between Street 1 and the future re-aligned Leitrim Road would encourage its use as a cut-through route to access Bank Street, which may impact liveability within the proposed development, as well as other adjacent subdivisions.

Appendix B – Screening Form

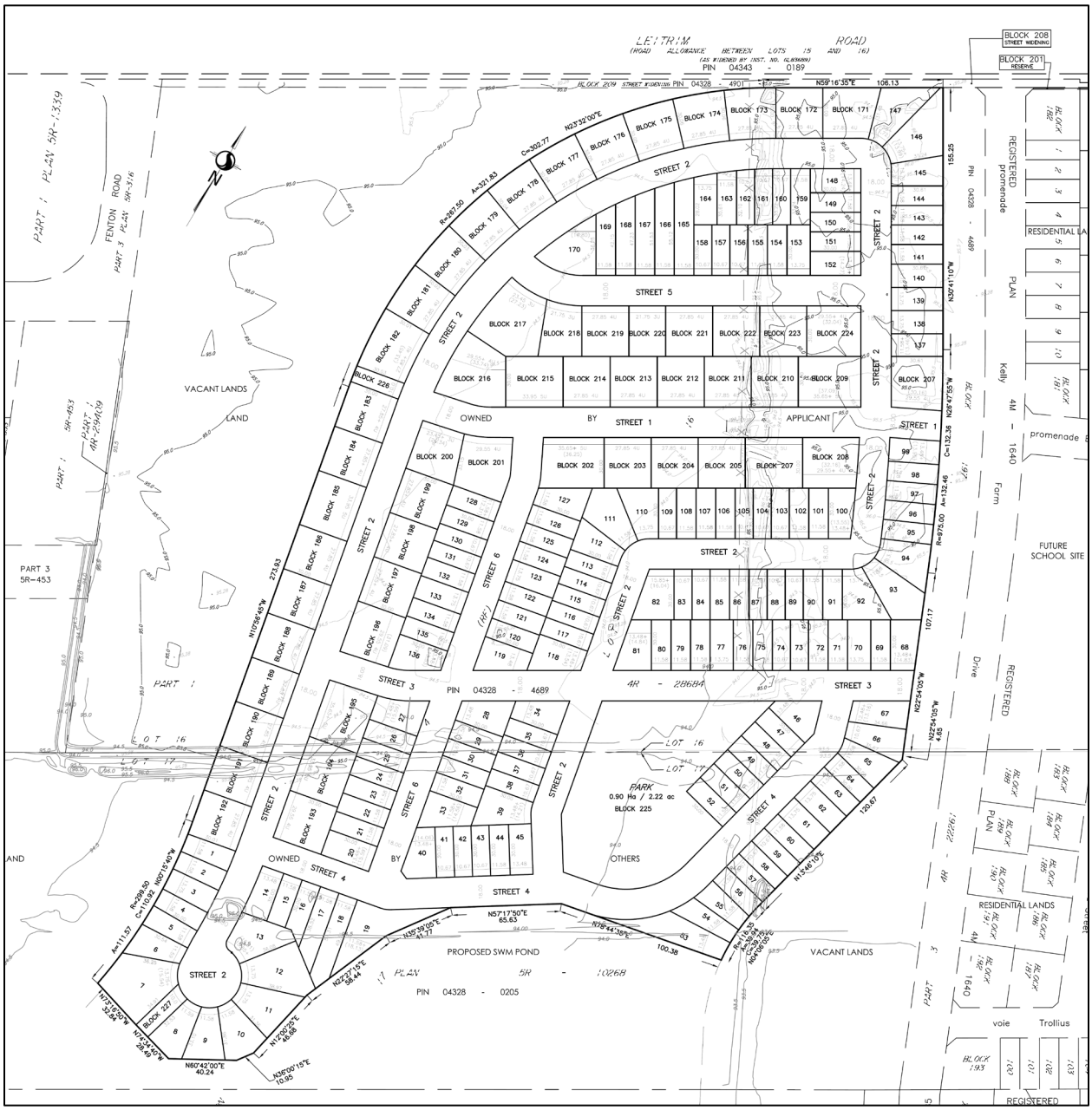
City of Ottawa 2017 TIA Guidelines Screening Form

1. Description of Proposed Development

Municipal Address	3100 Leitrim Road
Description of Location	Leitrim Community – South of Leitrim Road and west of Kelly Farm Drive 
Land Use Classification	Single-Detached Houses and Townhomes
Development Size (units)	170 Single-Detached Units 219 Townhome Units
Development Size (m^2)	
Number of Accesses and Locations	Two (2) access intersections on Kelly Farm Drive
Phase of Development	Findlay Creek Stage 5
Buildout Year	2026

If available, please attach a sketch of the development or site plan to this form.

Proposed Development:



2. Trip Generation Trigger

Considering the Development's Land Use type and Size (as filled out in the previous section), please refer to the Trip Generation Trigger checks below.

Land Use Type	Minimum Development Size
Single-family homes	40 units ✓
Townhomes or apartments	90 units ✓
Office	3,500 m^2
Industrial	5,000 m^2
Fast-food restaurant or coffee shop	100 m^2
Destination retail	1,000 m^2
Gas station or convenience market	75 m^2

** If the development has a land use type other than what is presented in the table above, estimates of person-trip generation may be made based on average trip generation characteristics represented in the current edition of the Institute of Transportation Engineers (ITE) Trip Generation Manual.*

Based on the results above, the Trip Generation Trigger is satisfied.

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?		✓
Is the development in a Design Priority Area (DPA) or Transit-oriented Development (TOD) zone?*		✓

**DPA and TOD are identified in the City of Ottawa Official Plan (DPA in Section 2.5.1 and Schedules A and B; TOD in Annex 6). See Chapter 4 for a list of City of Ottawa Planning and Engineering documents that support the completion of TIA).*

Based on the above, the Location Trigger is NOT satisfied.

4. Safety Triggers

	Yes	No
Are posted speed limits on a boundary street are 80 km/hr or greater?		✓
Are there any horizontal/vertical curvatures on a boundary street limits sight lines at a proposed driveway?		✓
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)?		✓
Is the proposed driveway within auxiliary lanes of an intersection?		✓
Does the proposed driveway make use of an existing median break that serves an existing site?		✓
Is there is a documented history of traffic operations or safety concerns on the boundary streets within 500 m of the development?		✓
Does the development include a drive-thru facility?		✓

Based on the results above, the Safety Trigger is NOT satisfied.

5. Summary

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

CONCLUSION: As one or more of the above triggers has been satisfied, a TIA will be required.

Appendix C – Traffic Data

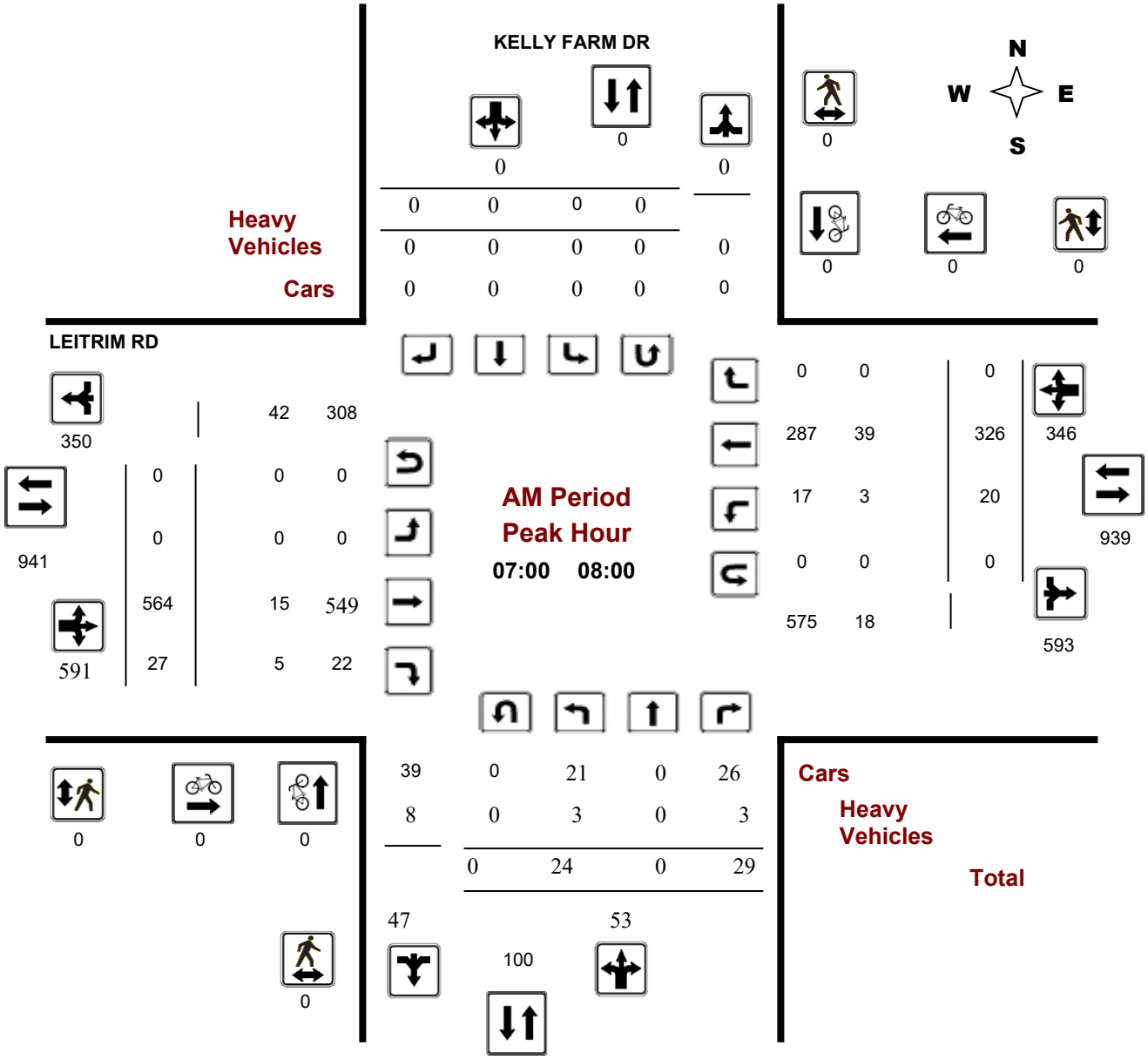
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

KELLY FARM DR @ LEITRIM RD

Survey Date: Tuesday, December 17, 2019 **WO No:** 39204

Start Time: 07:00 **Device:** Miovision



Comments

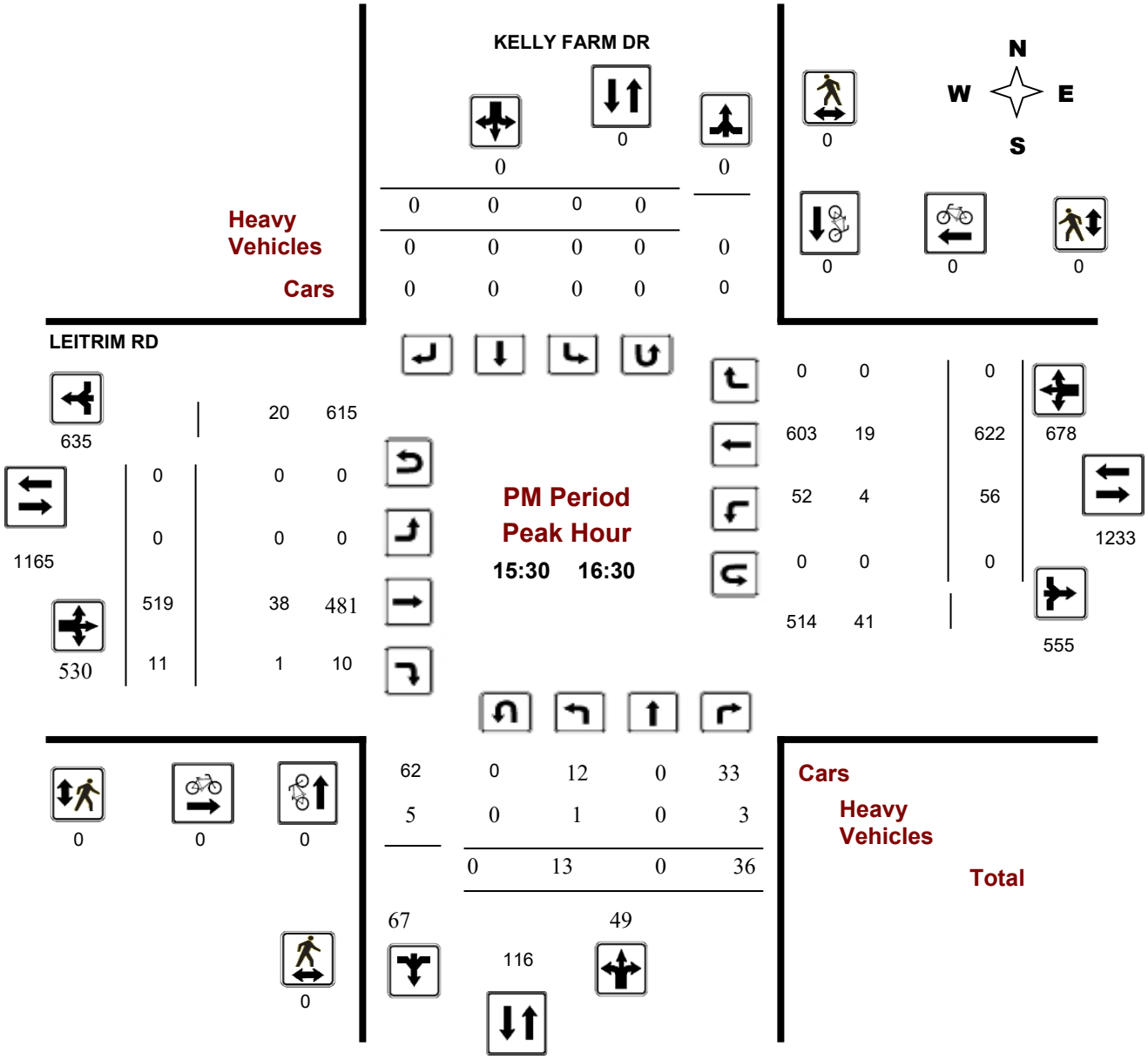
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

KELLY FARM DR @ LEITRIM RD

Survey Date: Tuesday, December 17, 2019 **WO No:** 39204

Start Time: 07:00 **Device:** Miovision



Comments

Appendix D – OC Transpo Routes

93

Local

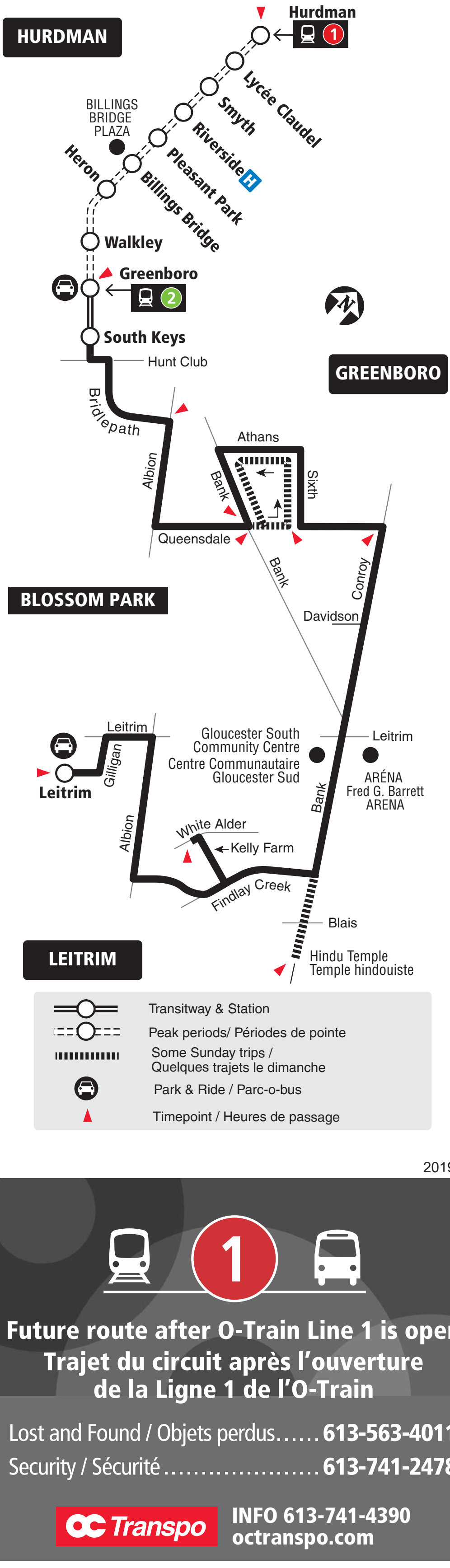
LEITRIM BLOSSOM PARK

GREENBORO HURDMAN

7 days a week / 7 jours par semaine

All day service

Service toute la journée



Transitway & Station

Peak periods/ Périodes de pointe

Some Sunday trips / Quelques trajets le dimanche

Park & Ride / Parc-o-bus

Timepoint / Heures de passage

2019.07

Future route after O-Train Line 1 is open
Trajet du circuit après l'ouverture de la Ligne 1 de l'O-Train

Lost and Found / Objets perdus..... **613-563-4011**

Security / Sécurité..... **613-741-2478**

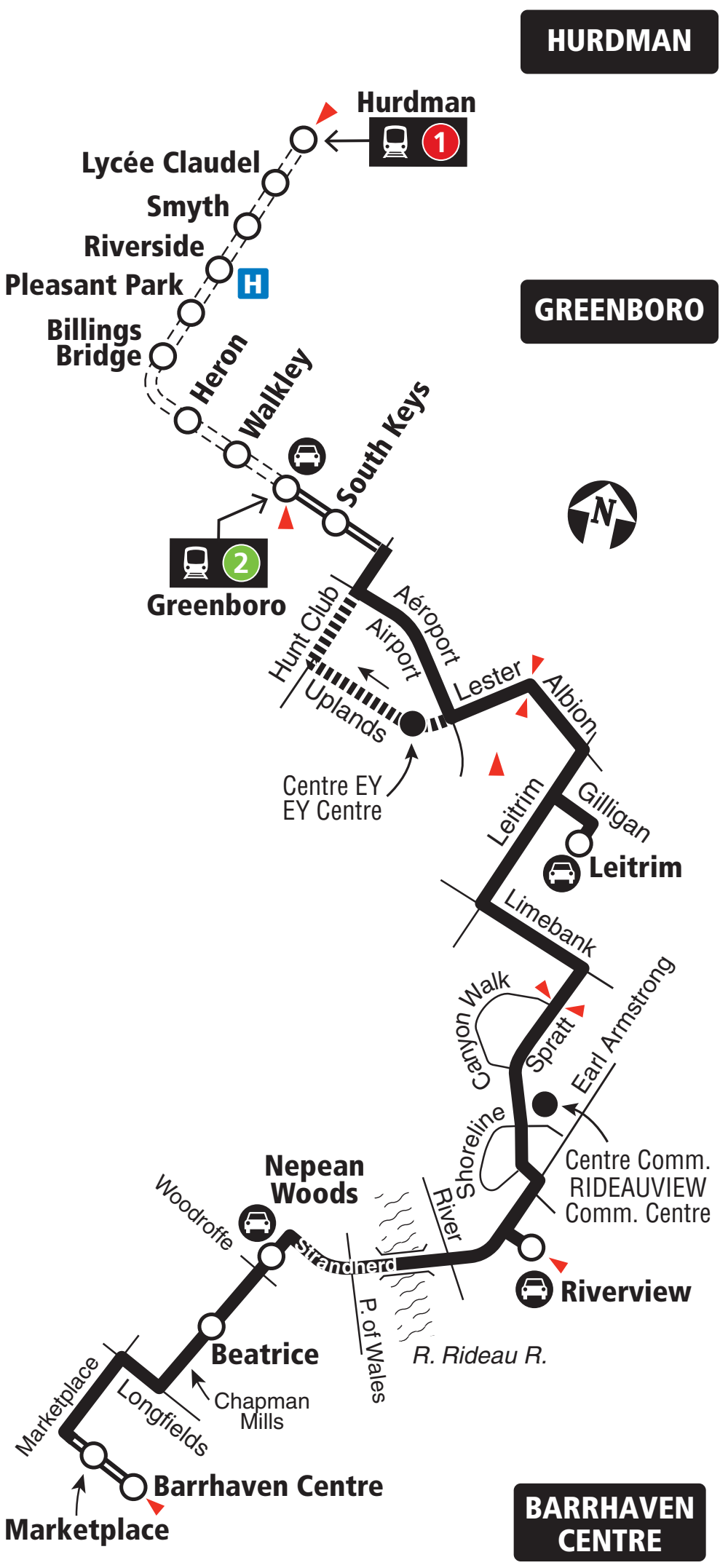
OC Transpo

INFO 613-741-4390
octranspo.com

99 Rapide

BARRHAVEN CENTRE
HURDMAN
GREENBORO

7 days a week / 7 jours par semaine



	Transitway & Station
	Transitway & Station Peak period / Période de pointe
	Saturday & Sunday only / Sam. et dim. seulement
	Park & Ride / Parc-o-bus
	Timepoint / Heures de passage

2019.07

1

Future route after O-Train Line 1 is open
Trajet du circuit après l'ouverture de la Ligne 1 de l'O-Train

Lost and Found / Objets perdus..... **613-563-4011**
Security / Sécurité **613-741-2478**

OC Transpo
INFO 613-741-4390
octranspo.com

NEW / NOUVEAU

294 Connexion

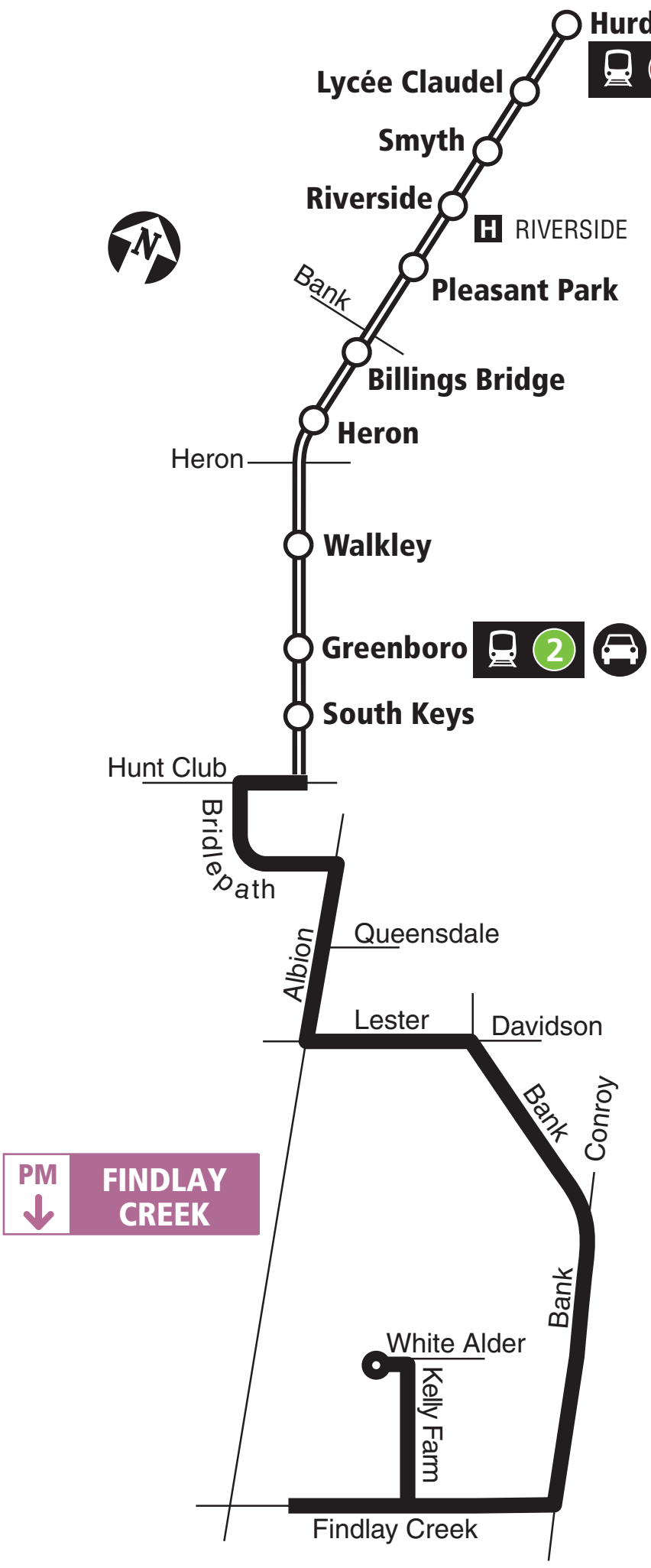
HURDMAN
FINDLAY CREEK

Monday to Friday / Lundi au vendredi

Peak periods only

Périodes de pointe seulement

AM ↑ HURDMAN



Transitway & Station

Park & Ride / Parc-o-bus

2017.12

Schedule / Horaire.....613-560-1000
Text / Texto 560560

plus your four digit bus stop number / *plus* votre numéro d'arrêt à quatre chiffres

Customer Relations
Service à la clientèle **613-842-3600**

Lost and Found / Objets perdus..... **613-563-4011**

Security / Sécurité **613-741-2478**

Effective December 24, 2017
En vigueur 24 décembre 2017

OC Transpo

INFO 613-741-4390
octranspo.com

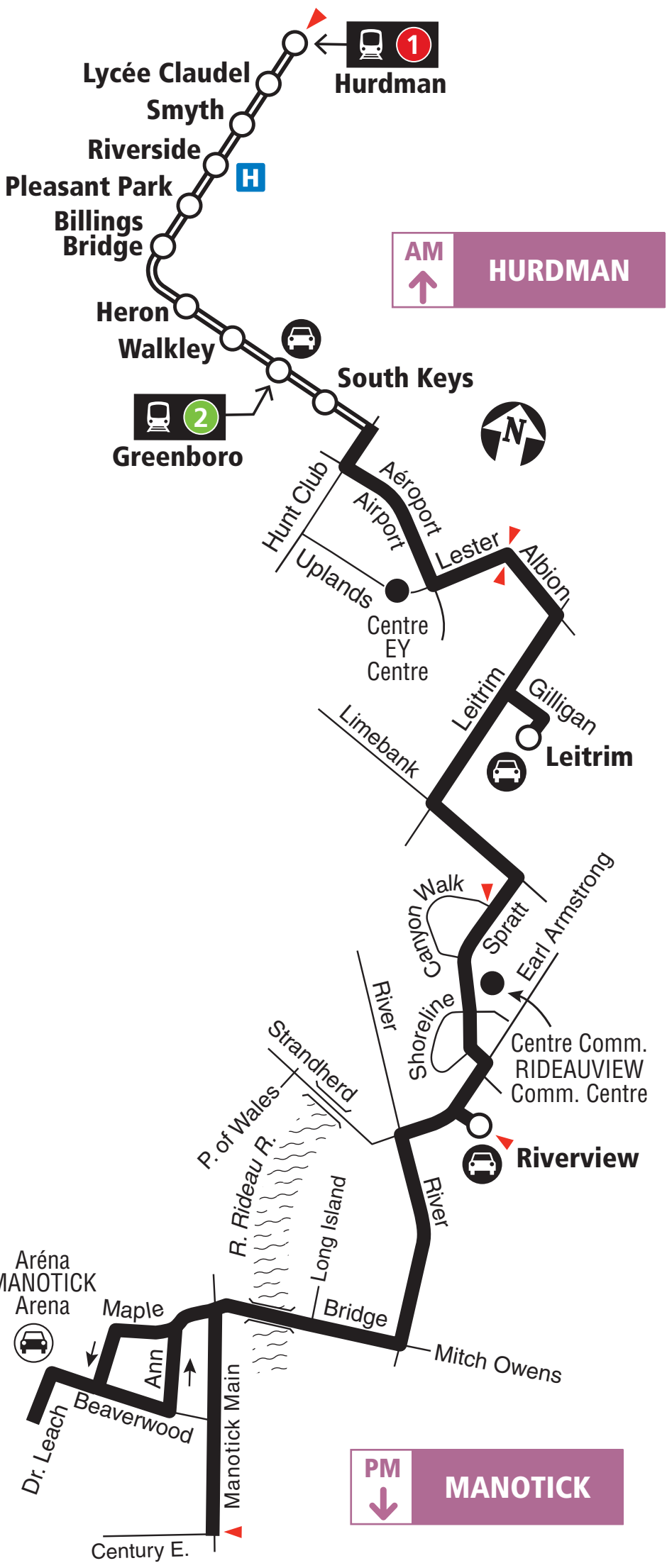
299 MANOTICK / HURDMAN

Connexion

Monday to Friday / Lundi au vendredi

Peak periods only

Périodes de pointe seulement



Transitway & Station

Park & Ride / Parc-o-bus

Timepoint / Heures de passage

2019.07

1

Future route after O-Train Line 1 is open
Trajet du circuit après l'ouverture de la Ligne 1 de l'O-Train

Lost and Found / Objets perdus..... **613-563-4011**

Security / Sécurité **613-741-2478**

OC Transpo

INFO 613-741-4390
octranspo.com

Appendix E – Collision Data

City Operations - Transportation Services

Collision Details Report - Public Version

From: January 1, 2014 **To:** December 31, 2018

Location: ARENA PL @ BANK ST

Traffic Control: Stop sign

Total Collisions: 6

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuver	Vehicle type	First Event	No. Ped
2014-Apr-23, Wed,08:50	Clear	Turning movement	P.D. only	Dry	South	Turning left	Automobile, station wagon	Other motor vehicle	
					North	Going ahead	Automobile, station wagon	Other motor vehicle	
2016-Mar-10, Thu,09:10	Clear	Angle	P.D. only	Wet	West	Turning left	Delivery van	Other motor vehicle	
					North	Going ahead	Automobile, station wagon	Other motor vehicle	
					North	Stopped	Pick-up truck	Other motor vehicle	
2015-Sep-07, Mon,13:34	Clear	Angle	Non-fatal injury	Dry	West	Turning left	Automobile, station wagon	Other motor vehicle	
					North	Going ahead	Passenger van	Other motor vehicle	
2017-Jan-19, Thu,07:39	Clear	Angle	P.D. only	Wet	West	Turning left	Police vehicle	Other motor vehicle	
					North	Overtaking	Automobile, station wagon	Other motor vehicle	
2017-Oct-11, Wed,07:00	Clear	Angle	Non-fatal injury	Dry	North	Going ahead	Automobile, station wagon	Other motor vehicle	
					West	Turning left	Automobile, station wagon	Other motor vehicle	

2016-Nov-19, Sat,16:02	Clear	SMV other	P.D. only	Dry	South	Unknown	Unknown	Other

Location: BANK ST @ LEITRIM RD

Traffic Control: Traffic signal **Total Collisions:** 58

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuver	Vehicle type	First Event	No. Ped
2014-Jan-03, Fri,09:12	Freezing Rain	SMV other	P.D. only	Ice	North	Slowing or stopping	Automobile, station wagon	Skidding/sliding	
2014-Aug-13, Wed,21:39	Rain	Rear end	P.D. only	Wet	South	Going ahead	Automobile, station wagon	Other motor vehicle	
					South	Slowing or stopping	Automobile, station wagon	Other motor vehicle	
2014-Aug-21, Thu,08:14	Rain	Rear end	P.D. only	Wet	North	Going ahead	Pick-up truck	Other motor vehicle	
					North	Stopped	Pick-up truck	Other motor vehicle	
2014-Aug-13, Wed,07:47	Rain	Turning movement	Non-fatal injury	Wet	South	Turning left	Automobile, station wagon	Other motor vehicle	
					North	Going ahead	Automobile, station wagon	Other motor vehicle	
2014-Aug-22, Fri,13:00	Clear	Sideswipe	P.D. only	Dry	West	Unknown	Automobile, station wagon	Other motor vehicle	
					West	Unknown	Automobile, station wagon	Other motor vehicle	
2014-Oct-21, Tue,21:31	Clear	Rear end	P.D. only	Dry	West	Turning left	Automobile, station wagon	Other motor vehicle	
					West	Turning left	Automobile, station wagon	Other motor vehicle	
2014-Dec-01, Mon,23:10	Clear	Angle	Non-fatal injury	Dry	South	Going ahead	Pick-up truck	Other motor vehicle	

					West	Going ahead	Automobile, station wagon	Other motor vehicle
2014-Nov-04, Tue,16:30	Clear	Turning movement	P.D. only	Dry	West	Turning left	Automobile, station wagon	Other motor vehicle
					East	Going ahead	Automobile, station wagon	Other motor vehicle
2014-Oct-20, Mon,16:15	Clear	Angle	P.D. only	Dry	East	Going ahead	Pick-up truck	Other motor vehicle
					North	Going ahead	Pick-up truck	Other motor vehicle
2014-Nov-20, Thu,15:52	Clear	Rear end	P.D. only	Dry	South	Slowing or stopping	Automobile, station wagon	Other motor vehicle
					South	Stopped	Automobile, station wagon	Other motor vehicle
2015-Apr-18, Sat,09:22	Clear	Rear end	Non-fatal injury	Dry	South	Slowing or stopping	Passenger van	Other motor vehicle
					South	Going ahead	Automobile, station wagon	Other motor vehicle
2015-Feb-18, Wed,08:37	Strong wind	Rear end	P.D. only	Wet	North	Going ahead	Automobile, station wagon	Other motor vehicle
					North	Slowing or stopping	Automobile, station wagon	Other motor vehicle
2015-Sep-29, Tue,16:20	Rain	Rear end	P.D. only	Wet	South	Going ahead	Automobile, station wagon	Skidding/sliding
					South	Stopped	Pick-up truck	Other motor vehicle
2015-Jan-06, Tue,18:00	Clear	Rear end	Non-fatal injury	Wet	South	Changing lanes	Automobile, station wagon	Other motor vehicle
					South	Slowing or stopping	Automobile, station wagon	Other motor vehicle

2015-Feb-12, Thu,06:50	Snow	SMV other	P.D. only	Loose snow	South	Going ahead	Pick-up truck	Curb
2015-Jan-09, Fri,10:51	Clear	Angle	Non-fatal injury	Wet	South	Going ahead	Automobile, station wagon	Other motor vehicle
					West	Going ahead	Pick-up truck	Other motor vehicle
					East	Turning left	Truck - closed	Other motor vehicle
2015-Jan-06, Tue,05:46	Other	Turning movement	Non-fatal injury	Wet	South	Turning left	Automobile, station wagon	Other motor vehicle
					North	Going ahead	Pick-up truck	Other motor vehicle
2015-Feb-21, Sat,14:19	Snow	Rear end	P.D. only	Loose snow	North	Unknown	Automobile, station wagon	Other motor vehicle
					North	Stopped	Automobile, station wagon	Other motor vehicle
2015-Aug-31, Mon,17:30	Clear	Turning movement	P.D. only	Dry	North	Turning right	Automobile, station wagon	Other motor vehicle
					North	Going ahead	Pick-up truck	Other motor vehicle
2015-Jun-09, Tue,18:29	Clear	Rear end	P.D. only	Dry	East	Going ahead	Automobile, station wagon	Other motor vehicle
					East	Stopped	Pick-up truck	Other motor vehicle
2015-Aug-26, Wed,17:15	Rain	Rear end	Non-fatal injury	Wet	West	Slowing or stopping	Automobile, station wagon	Other motor vehicle
					West	Stopped	Automobile, station wagon	Other motor vehicle
					West	Stopped	Automobile, station wagon	Other motor vehicle

2015-Jun-30, Tue,11:19	Clear	Rear end	P.D. only	Dry	South	Going ahead	Automobile, station wagon	Other motor vehicle
					South	Stopped	Pick-up truck	Other motor vehicle
2015-Jun-26, Fri,15:41	Clear	Rear end	P.D. only	Dry	East	Going ahead	Truck - dump	Other motor vehicle
					East	Stopped	Automobile, station wagon	Other motor vehicle
2015-Jan-13, Tue,16:20	Clear	Rear end	P.D. only	Ice	South	Slowing or stopping	Automobile, station wagon	Other motor vehicle
					South	Stopped	Passenger van	Other motor vehicle
2016-Mar-09, Wed,10:46	Clear	Turning movement	Non-fatal injury	Wet	North	Turning left	Delivery van	Other motor vehicle
					South	Going ahead	Automobile, station wagon	Other motor vehicle
2016-Sep-22, Thu,10:44	Clear	Angle	Non-fatal injury	Dry	North	Going ahead	Passenger van	Other motor vehicle
					West	Going ahead	Pick-up truck	Other motor vehicle
2016-Jun-15, Wed,08:22	Clear	Turning movement	Non-fatal injury	Dry	North	Going ahead	Automobile, station wagon	Other motor vehicle
					South	Turning left	Automobile, station wagon	Other motor vehicle
2015-Dec-14, Mon,07:08	Rain	Rear end	P.D. only	Wet	West	Turning left	Passenger van	Skidding/sliding
					West	Turning left	Automobile, station wagon	Other motor vehicle
2015-Nov-20, Fri,17:10	Clear	Rear end	P.D. only	Dry	South	Going ahead	Pick-up truck	Other motor vehicle

					South	Stopped	Automobile, station wagon	Other motor vehicle
					South	Stopped	Pick-up truck	Other motor vehicle
2016-Jan-20, Wed,16:15	Clear	Rear end	P.D. only	Dry	North	Turning left	Unknown	Other motor vehicle
					North	Turning left	Automobile, station wagon	Other motor vehicle
2016-Jan-07, Thu,14:17	Clear	Rear end	P.D. only	Ice	South	Slowing or stopping	Automobile, station wagon	Other motor vehicle
					South	Stopped	Automobile, station wagon	Other motor vehicle
2015-Dec-22, Tue,17:52	Rain	Turning movement	P.D. only	Wet	South	Turning left	Automobile, station wagon	Other motor vehicle
					North	Going ahead	Automobile, station wagon	Other motor vehicle
2016-Jun-28, Tue,21:31	Rain	Angle	Non-fatal injury	Wet	North	Going ahead	Automobile, station wagon	Other motor vehicle
					East	Going ahead	Pick-up truck	Other motor vehicle
2016-May-29, Sun,18:48	Clear	Turning movement	P.D. only	Dry	South	Going ahead	Pick-up truck	Other motor vehicle
					North	Turning left	Pick-up truck	Other motor vehicle
2017-Jan-09, Mon,07:15	Clear	Rear end	P.D. only	Wet	North	Slowing or stopping	Automobile, station wagon	Other motor vehicle
					North	Stopped	Pick-up truck	Other motor vehicle
2017-Jan-11, Wed,09:37	Clear	Angle	P.D. only	Wet	South	Going ahead	Automobile, station wagon	Other motor vehicle

					East	Going ahead	Automobile, station wagon	Other motor vehicle
2016-Dec-30, Fri,17:03	Clear	Rear end	P.D. only	Dry	South	Going ahead	Automobile, station wagon	Other motor vehicle
					South	Slowing or stopping	Automobile, station wagon	Other motor vehicle
					South	Slowing or stopping	Automobile, station wagon	Other motor vehicle
2017-Jan-06, Fri,07:55	Clear	Turning movement	Non-fatal injury	Wet	North	Going ahead	Automobile, station wagon	Other motor vehicle
					South	Turning left	Pick-up truck	Other motor vehicle
					West	Stopped	Passenger van	Other motor vehicle
					West	Stopped	Automobile, station wagon	Other motor vehicle
2016-Oct-31, Mon,21:19	Clear	Turning movement	P.D. only	Dry	West	Turning left	Automobile, station wagon	Other motor vehicle
					East	Going ahead	Pick-up truck	Other motor vehicle
2016-Nov-25, Fri,05:20	Clear	SMV other	P.D. only	Dry	East	Going ahead	Automobile, station wagon	Animal - wild
2016-Dec-05, Mon,07:54	Snow	Turning movement	P.D. only	Packed snow	East	Going ahead	Pick-up truck	Other motor vehicle
					East	Turning left	Truck - tractor	Other motor vehicle
2017-Mar-14, Tue,12:36	Snow	Sideswipe	P.D. only	Loose snow	North	Changing lanes	Automobile, station wagon	Other motor vehicle
					North	Going ahead	Automobile, station wagon	Other motor vehicle

2017-Jul-12, Wed,21:09	Rain	Sideswipe	P.D. only	Wet	South	Going ahead	Pick-up truck	Other motor vehicle
					South	Going ahead	Automobile, station wagon	Other motor vehicle
2017-May-05, Fri,15:54	Rain	Rear end	P.D. only	Wet	South	Going ahead	Automobile, station wagon	Other motor vehicle
					South	Stopped	Pick-up truck	Other motor vehicle
2017-May-18, Thu,20:30	Rain	Rear end	P.D. only	Wet	West	Slowing or stopping	Automobile, station wagon	Other motor vehicle
					West	Stopped	Automobile, station wagon	Other motor vehicle
2017-Oct-04, Wed,12:25	Rain	Rear end	P.D. only	Wet	North	Going ahead	Automobile, station wagon	Other motor vehicle
					North	Stopped	Automobile, station wagon	Other motor vehicle
2018-Apr-05, Thu,09:38	Clear	Sideswipe	P.D. only	Dry	South	Changing lanes	Automobile, station wagon	Other motor vehicle
					South	Going ahead	Automobile, station wagon	Other motor vehicle
2017-Sep-27, Wed,16:07	Clear	Turning movement	P.D. only	Wet	North	Turning left	Truck - tractor	Other motor vehicle
					South	Going ahead	Automobile, station wagon	Other motor vehicle
2018-Feb-07, Wed,15:21	Snow	Rear end	P.D. only	Slush	South	Going ahead	Passenger van	Other motor vehicle
					South	Stopped	School bus	Other motor vehicle
2018-May-07, Mon,08:25	Clear	Rear end	P.D. only	Dry	North	Going ahead	Automobile, station wagon	Other motor vehicle

					North	Stopped	Automobile, station wagon	Other motor vehicle
2018-May-04, Fri,16:12	Clear	Rear end	P.D. only	Wet	South	Going ahead	Pick-up truck	Other motor vehicle
					South	Slowing or stopping	Automobile, station wagon	Other motor vehicle
					South	Slowing or stopping	Automobile, station wagon	Other motor vehicle
2018-May-11, Fri,22:47	Clear	Turning movement	P.D. only	Dry	North	Turning left	Pick-up truck	Other motor vehicle
					South	Going ahead	Automobile, station wagon	Other motor vehicle
2018-Jun-01, Fri,16:26	Clear	Rear end	Non-fatal injury	Dry	North	Going ahead	Bicycle	Other motor vehicle
					North	Slowing or stopping	Automobile, station wagon	Other motor vehicle
2018-Jul-10, Tue,14:50	Clear	Rear end	P.D. only	Dry	North	Going ahead	Automobile, station wagon	Other motor vehicle
					North	Stopped	Passenger van	Other motor vehicle
2018-Oct-18, Thu,16:40	Clear	Other	P.D. only	Dry	North	Reversing	Pick-up truck	Other motor vehicle
					South	Stopped	Automobile, station wagon	Other motor vehicle
2018-Sep-15, Sat,18:27	Clear	Sideswipe	P.D. only	Dry	East	Going ahead	Automobile, station wagon	Other motor vehicle
					East	Going ahead	Automobile, station wagon	Other motor vehicle
2018-Oct-30, Tue,14:30	Clear	Rear end	P.D. only	Dry	South	Going ahead	Pick-up truck	Other motor vehicle

					South	Stopped	Automobile, station wagon	Other motor vehicle	
2018-Aug-16, Thu,21:00	Clear	Turning movement	P.D. only	Dry	East	Turning left	Automobile, station wagon	Other motor vehicle	
					West	Going ahead	Automobile, station wagon	Other motor vehicle	

Location: BANK ST @ ROTARY WAY

Traffic Control: Traffic signal **Total Collisions:** 9

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuver	Vehicle type	First Event	No. Ped
2015-Jan-22, Thu,04:13	Clear	SMV other	P.D. only	Ice	South	Going ahead	Automobile, station wagon	Pole (sign, parking meter)	
2015-Apr-09, Thu,09:16	Clear	Angle	P.D. only	Dry	West	Turning right	Automobile, station wagon	Other motor vehicle	
					North	Stopped	Municipal transit bus	Other motor vehicle	
2015-Jul-29, Wed,17:22	Clear	Rear end	Non-fatal injury	Dry	South	Going ahead	Automobile, station wagon	Other motor vehicle	
					South	Stopped	Pick-up truck	Other motor vehicle	
					South	Going ahead	Pick-up truck	Other motor vehicle	
2016-Sep-14, Wed,07:25	Clear	Turning movement	Non-fatal injury	Dry	South	Turning left	School bus	Other motor vehicle	
					North	Going ahead	Automobile, station wagon	Other motor vehicle	
2016-Dec-09, Fri,08:43	Snow	Rear end	P.D. only	Ice	West	Slowing or stopping	Automobile, station wagon	Other motor vehicle	
					West	Stopped	School bus	Other motor vehicle	

2017-Nov-17, Fri,07:45	Clear	Rear end	P.D. only	Dry	South	Going ahead	Passenger van	Other motor vehicle	
					South	Stopped	Automobile, station wagon	Other motor vehicle	
2017-Dec-11, Mon,16:40	Clear	Rear end	P.D. only	Wet	North	Slowing or stopping	Automobile, station wagon	Other motor vehicle	
					North	Stopped	Automobile, station wagon	Other motor vehicle	
					North	Going ahead	Unknown	Other motor vehicle	
2018-May-16, Wed,15:23	Clear	Rear end	P.D. only	Dry	South	Going ahead	Automobile, station wagon	Other motor vehicle	
					South	Stopped	Automobile, station wagon	Other motor vehicle	
					South	Stopped	Pick-up truck	Other motor vehicle	
					South	Stopped	Automobile, station wagon	Other motor vehicle	
2018-Jul-05, Thu,00:18	Clear	SMV other	P.D. only	Dry	North	Turning left	Passenger van	Curb	

Location: BANK ST btwn ARENA PL & WHITE ALDER AVE

Traffic Control: No control

Total Collisions: 28

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuver	Vehicle type	First Event	No. Ped
2014-Mar-29, Sat,03:12	Clear	SMV other	P.D. only	Dry	South	Going ahead	Pick-up truck	Ran off road	
2014-Aug-12, Tue,17:35	Rain	Rear end	P.D. only	Wet	South	Going ahead	Automobile, station wagon	Other motor vehicle	
					South	Stopped	Automobile, station wagon	Other motor vehicle	
2014-Sep-18, Thu,12:25	Clear	Approaching	Non-fatal injury	Dry	South	Going ahead	Automobile, station wagon	Other motor vehicle	

					North	Going ahead	Truck - dump	Other motor vehicle
2015-Feb-19, Thu,16:42	Clear	Turning movement	Non-fatal injury	Dry	South	Overtaking	Automobile, station wagon	Other motor vehicle
					North	Turning left	Automobile, station wagon	Other motor vehicle
2014-Nov-10, Mon,07:34	Clear	Rear end	P.D. only	Dry	North	Slowing or stopping	Delivery van	Other motor vehicle
					North	Slowing or stopping	Pick-up truck	Other motor vehicle
2014-Oct-03, Fri,11:33	Clear	Other	P.D. only	Dry	North	Going ahead	Pick-up truck	Other
					South	Going ahead	Automobile, station wagon	Debris falling off vehicle
2015-Apr-13, Mon,08:12	Clear	Turning movement	P.D. only	Dry	South	Making "U" turn	Automobile, station wagon	Other motor vehicle
					North	Going ahead	School bus	Other motor vehicle
2015-May-14, Thu,14:05	Clear	Rear end	Non-fatal injury	Dry	North	Going ahead	Pick-up truck	Other motor vehicle
					North	Slowing or stopping	Pick-up truck	Other motor vehicle
					North	Slowing or stopping	Automobile, station wagon	Other motor vehicle
2015-May-23, Sat,15:01	Clear	Angle	Non-fatal injury	Dry	East	Turning left	Automobile, station wagon	Other motor vehicle
					South	Going ahead	Pick-up truck	Other motor vehicle
2016-Oct-29, Sat,16:08	Clear	Rear end	P.D. only	Wet	South	Going ahead	Automobile, station wagon	Other motor vehicle

					South	Slowing or stopping	Automobile, station wagon	Other motor vehicle
2015-Oct-19, Mon,06:24	Clear	Angle	P.D. only	Dry	East	Turning left	Pick-up truck	Other motor vehicle
					South	Turning right	Pick-up truck	Other motor vehicle
2015-Oct-10, Sat,15:55	Clear	Rear end	P.D. only	Dry	South	Going ahead	Automobile, station wagon	Other motor vehicle
					South	Stopped	Pick-up truck	Other motor vehicle
2016-Jan-06, Wed,17:24	Clear	Rear end	P.D. only	Wet	South	Going ahead	Automobile, station wagon	Other motor vehicle
					South	Slowing or stopping	Automobile, station wagon	Other motor vehicle
2016-Nov-11, Fri,13:18	Clear	Sideswipe	P.D. only	Dry	South	Changing lanes	Truck-other	Other motor vehicle
					South	Going ahead	Automobile, station wagon	Other motor vehicle
2016-Sep-30, Fri,07:42	Clear	Rear end	Non-fatal injury	Dry	North	Slowing or stopping	Automobile, station wagon	Other motor vehicle
					North	Stopped	Automobile, station wagon	Other motor vehicle
2017-Feb-02, Thu,18:03	Clear	Angle	P.D. only	Dry	South	Overtaking	Automobile, station wagon	Other motor vehicle
					East	Turning left	Automobile, station wagon	Other motor vehicle
2017-Mar-08, Wed,16:03	Rain	Rear end	P.D. only	Wet	North	Slowing or stopping	Automobile, station wagon	Other motor vehicle
					North	Stopped	Automobile, station wagon	Other motor vehicle

2017-Apr-27, Thu,16:25	Clear	Angle	P.D. only	Dry	East	Turning left	Automobile, station wagon	Other motor vehicle
					South	Going ahead	Automobile, station wagon	Other motor vehicle
2017-Jun-07, Wed,15:44	Clear	Angle	P.D. only	Dry	East	Turning left	Pick-up truck	Other motor vehicle
					South	Going ahead	Automobile, station wagon	Other motor vehicle
2017-Sep-10, Sun,00:58	Clear	SMV other	P.D. only	Dry	North	Going ahead	Automobile, station wagon	Ran off road
2017-Sep-18, Mon,16:10	Clear	Rear end	P.D. only	Dry	South	Going ahead	Automobile, station wagon	Other motor vehicle
					South	Slowing or stopping	Automobile, station wagon	Other motor vehicle
2017-Dec-24, Sun,13:16	Clear	Rear end	P.D. only	Wet	South	Going ahead	Automobile, station wagon	Other motor vehicle
					South	Stopped	Automobile, station wagon	Other motor vehicle
					South	Stopped	Automobile, station wagon	Other motor vehicle
2017-Nov-25, Sat,00:46	Clear	SMV other	P.D. only	Dry	North	Going ahead	Automobile, station wagon	Animal - wild
2018-Jan-06, Sat,14:25	Clear	Angle	Non-fatal injury	Dry	East	Turning left	Pick-up truck	Other motor vehicle
					South	Going ahead	Automobile, station wagon	Other motor vehicle
2018-Feb-03, Sat,14:05	Clear	Angle	Non-fatal injury	Wet	West	Turning left	Automobile, station wagon	Other motor vehicle

					South	Going ahead	Automobile, station wagon	Other motor vehicle	
					North	Going ahead	Automobile, station wagon	Other motor vehicle	
2018-Jun-19, Tue,15:35	Clear	Rear end	P.D. only	Dry	South	Changing lanes	Automobile, station wagon	Other motor vehicle	
					South	Slowing or stopping	Automobile, station wagon	Other motor vehicle	
					South	Slowing or stopping	Automobile, station wagon	Other motor vehicle	
					South	Slowing or stopping	Automobile, station wagon	Other motor vehicle	
2018-Jun-15, Fri,16:08	Clear	Angle	P.D. only	Dry	East	Turning left	Automobile, station wagon	Other motor vehicle	
					South	Going ahead	Automobile, station wagon	Other motor vehicle	
2018-Jul-27, Fri,16:25	Rain	SMV other	P.D. only	Wet	South	Going ahead	Automobile, station wagon	Curb	

Location: BANK ST btwn LEITRIM RD & ARENA PL

Traffic Control: No control

Total Collisions: 7

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuver	Vehicle type	First Event	No. Ped
2014-Jan-08, Wed,16:09	Clear	Rear end	P.D. only	Wet	South	Going ahead	Automobile, station wagon	Skidding/sliding	
					South	Slowing or stopping	Automobile, station wagon	Other motor vehicle	
2014-May-16, Fri,16:37	Rain	Rear end	Non-fatal injury	Wet	South	Going ahead	Pick-up truck	Other motor vehicle	
					South	Stopped	Pick-up truck	Other motor vehicle	

2014-Aug-25, Mon,15:15	Clear	Rear end	P.D. only	Dry	South	Going ahead	Pick-up truck	Other motor vehicle	
					South	Stopped	Pick-up truck	Other motor vehicle	
2015-Apr-02, Thu,17:30	Clear	Rear end	P.D. only	Dry	South	Going ahead	Pick-up truck	Other motor vehicle	
					South	Stopped	Automobile, station wagon	Other motor vehicle	
2016-Oct-21, Fri,16:00	Rain	Sideswipe	P.D. only	Wet	South	Changing lanes	Pick-up truck	Other motor vehicle	
					South	Changing lanes	Automobile, station wagon	Other motor vehicle	
2017-Oct-25, Wed,16:12	Clear	Angle	P.D. only	Dry	West	Turning left	Automobile, station wagon	Other motor vehicle	
					North	Going ahead	Automobile, station wagon	Other motor vehicle	
2018-May-15, Tue,17:29	Clear	Sideswipe	P.D. only	Dry	South	Changing lanes	Pick-up truck	Other motor vehicle	
					South	Slowing or stopping	Automobile, station wagon	Other motor vehicle	

Location: FENTON RD @ LEITRIM RD

Traffic Control: Stop sign

Total Collisions: 1

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuver	Vehicle type	First Event	No. Ped
2016-Jun-22, Wed,07:53	Clear	Rear end	Non-fatal injury	Dry	West	Going ahead	Pick-up truck	Other motor vehicle	
					West	Stopped	Pick-up truck	Other motor vehicle	

Location: LEITRIM RD @ ALBION RD

Traffic Control: Traffic signal

Total Collisions: 34

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuver	Vehicle type	First Event	No. Ped
2014-Jan-08, Wed,10:34	Clear	SMV other	P.D. only	Ice	North	Slowing or stopping	Pick-up truck	Ran off road	
2014-Aug-12, Tue,07:15	Clear	Rear end	Non-fatal injury	Dry	South	Going ahead	Automobile, station wagon	Other motor vehicle	
					South	Stopped	Passenger van	Other motor vehicle	
2014-Sep-04, Thu,17:15	Clear	Approaching	P.D. only	Dry	East	Going ahead	Automobile, station wagon	Other motor vehicle	
					West	Turning left	Truck and trailer	Other motor vehicle	
2015-Mar-27, Fri,08:25	Snow	Rear end	Non-fatal injury	Loose snow	West	Going ahead	Automobile, station wagon	Other motor vehicle	
					West	Slowing or stopping	Pick-up truck	Other motor vehicle	
2014-Dec-10, Wed,23:41	Snow	Rear end	P.D. only	Slush	East	Turning left	Automobile, station wagon	Other motor vehicle	
					East	Turning left	Pick-up truck	Other motor vehicle	
2015-Aug-19, Wed,15:15	Clear	Rear end	P.D. only	Dry	South	Going ahead	Unknown	Other motor vehicle	
					South	Stopped	Pick-up truck	Other motor vehicle	
2015-Jul-04, Sat,23:33	Clear	Turning movement	Non-fatal injury	Dry	South	Turning left	Pick-up truck	Other motor vehicle	
					North	Going ahead	Pick-up truck	Other motor vehicle	

2015-Oct-24, Sat,13:31	Clear	Rear end	P.D. only	Dry	West	Going ahead	Automobile, station wagon	Other motor vehicle	
					West	Stopped	Pick-up truck	Other motor vehicle	
2015-Dec-01, Tue,16:39	Freezing Rain	SMV other	Non-fatal injury	Ice	West	Going ahead	Automobile, station wagon	Pedestrian	1
2016-Jan-07, Thu,07:16	Clear	Rear end	P.D. only	Wet	North	Slowing or stopping	Automobile, station wagon	Other motor vehicle	
					North	Stopped	Automobile, station wagon	Other motor vehicle	
2015-Sep-16, Wed,07:20	Clear	Sideswipe	P.D. only	Dry	South	Changing lanes	Automobile, station wagon	Other motor vehicle	
					South	Changing lanes	Automobile, station wagon	Other motor vehicle	
2016-May-19, Thu,16:40	Clear	Rear end	Non-fatal injury	Dry	South	Slowing or stopping	Pick-up truck	Other motor vehicle	
					South	Stopped	Automobile, station wagon	Other motor vehicle	
2016-Sep-06, Tue,18:08	Clear	Rear end	P.D. only	Dry	East	Going ahead	Automobile, station wagon	Other motor vehicle	
					East	Stopped	Automobile, station wagon	Other motor vehicle	
2017-Aug-17, Thu,14:29	Clear	Turning movement	Non-fatal injury	Dry	South	Making "U" turn	Bicycle	Other motor vehicle	
					North	Going ahead	Automobile, station wagon	Cyclist	
2017-Feb-11, Sat,14:17	Clear	Angle	P.D. only	Wet	North	Turning left	Automobile, station wagon	Other motor vehicle	
					East	Stopped	Pick-up truck	Other motor vehicle	

					East	Stopped	Automobile, station wagon	Other motor vehicle
2017-Feb-17, Fri,16:40	Clear	Turning movement	P.D. only	Dry	North	Turning left	Automobile, station wagon	Other motor vehicle
					South	Going ahead	Pick-up truck	Other motor vehicle
2017-Jan-18, Wed,08:42	Snow	Angle	P.D. only	Wet	East	Turning left	Automobile, station wagon	Other motor vehicle
					North	Merging	Pick-up truck	Other motor vehicle
2016-Dec-13, Tue,16:18	Clear	Rear end	P.D. only	Dry	South	Going ahead	Automobile, station wagon	Other motor vehicle
					South	Stopped	Automobile, station wagon	Other motor vehicle
2017-Mar-06, Mon,19:40	Freezing Rain	Rear end	P.D. only	Ice	West	Slowing or stopping	Pick-up truck	Other motor vehicle
					West	Stopped	Pick-up truck	Other motor vehicle
2017-Mar-24, Fri,20:15	Snow	Rear end	P.D. only	Loose snow	South	Slowing or stopping	Automobile, station wagon	Skidding/sliding
					South	Stopped	Automobile, station wagon	Other motor vehicle
2017-Sep-20, Wed,20:45	Clear	Turning movement	P.D. only	Dry	North	Turning left	Automobile, station wagon	Other motor vehicle
					South	Going ahead	Automobile, station wagon	Other motor vehicle
2017-Nov-23, Thu,12:13	Clear	Rear end	P.D. only	Dry	South	Slowing or stopping	Automobile, station wagon	Other motor vehicle
					South	Stopped	Automobile, station wagon	Other motor vehicle

2017-Oct-17, Tue,06:58	Clear	SMV other	Non-fatal injury	Dry	North	Turning right	Passenger van	Pedestrian	1
2018-Feb-01, Thu,14:48	Clear	Rear end	P.D. only	Dry	South	Going ahead	Automobile, station wagon	Other motor vehicle	
					South	Stopped	Automobile, station wagon	Other motor vehicle	
2018-Feb-06, Tue,09:53	Clear	Turning movement	P.D. only	Packed snow	North	Turning left	Automobile, station wagon	Other motor vehicle	
					North	Going ahead	Automobile, station wagon	Other motor vehicle	
2018-Apr-10, Tue,17:17	Clear	Rear end	P.D. only	Dry	South	Slowing or stopping	Automobile, station wagon	Other motor vehicle	
					South	Stopped	Automobile, station wagon	Other motor vehicle	
2018-Nov-04, Sun,20:50	Clear	Turning movement	P.D. only	Dry	South	Turning right	Pick-up truck	Other motor vehicle	
					South	Turning right	Automobile, station wagon	Other motor vehicle	
2018-Dec-07, Fri,17:21	Clear	Rear end	P.D. only	Dry	South	Going ahead	Pick-up truck	Other motor vehicle	
					South	Stopped	Automobile, station wagon	Other motor vehicle	
2018-Dec-14, Fri,17:07	Freezing Rain	Turning movement	P.D. only	Ice	North	Turning left	Automobile, station wagon	Other motor vehicle	
					South	Going ahead	Automobile, station wagon	Other motor vehicle	
2018-Sep-13, Thu,20:49	Clear	Rear end	P.D. only	Dry	East	Unknown	Unknown	Other motor vehicle	

					East	Stopped	Automobile, station wagon	Other motor vehicle
2018-Sep-21, Fri,20:45	Clear	Angle	P.D. only	Wet	North	Going ahead	Automobile, station wagon	Other motor vehicle
					West	Going ahead	Automobile, station wagon	Other motor vehicle
2018-Sep-20, Thu,17:45	Clear	Turning movement	P.D. only	Dry	West	Going ahead	Automobile, station wagon	Other motor vehicle
					East	Turning left	Pick-up truck	Other motor vehicle
2018-Aug-08, Wed,21:13	Rain	Angle	P.D. only	Wet	South	Turning right	Automobile, station wagon	Other motor vehicle
					West	Going ahead	Automobile, station wagon	Other motor vehicle
2018-Nov-16, Fri,15:17	Snow	Rear end	P.D. only	Slush	West	Slowing or stopping	Automobile, station wagon	Other motor vehicle
					West	Stopped	Automobile, station wagon	Other motor vehicle

Location: LEITRIM RD btwn FENTON RD & ALBION RD

Traffic Control: No control

Total Collisions: 3

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuver	Vehicle type	First Event	No. Ped
2015-Apr-23, Thu,17:08	Clear	Rear end	P.D. only	Dry	West	Slowing or stopping	Automobile, station wagon	Other motor vehicle	
					West	Stopped	Automobile, station wagon	Other motor vehicle	
2017-Dec-12, Tue,13:20	Snow	Other	P.D. only	Packed snow	East	Going ahead	Pick-up truck	Other	
					West	Going ahead	Automobile, station wagon	Debris falling off vehicle	

2018-May-30, Wed,17:33	Clear	Rear end	P.D. only	Dry	West	Going ahead	Automobile, station wagon	Other motor vehicle	
					West	Going ahead	Pick-up truck	Other motor vehicle	

Location: LEITRIM RD btwn FENTON RD & BANK ST

Traffic Control: No control **Total Collisions:** 21

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuver	Vehicle type	First Event	No. Ped
2014-Feb-04, Tue,08:11	Clear	Rear end	P.D. only	Wet	East	Slowing or stopping	Automobile, station wagon	Other motor vehicle	
					East	Stopped	Pick-up truck	Other motor vehicle	
2014-Apr-21, Mon,20:00	Rain	SMV other	P.D. only	Wet	East	Going ahead	Pick-up truck	Animal - wild	
2014-Jun-18, Wed,16:55	Clear	Turning movement	P.D. only	Dry	West	Making "U" turn	Passenger van	Other motor vehicle	
					West	Going ahead	Automobile, station wagon	Other motor vehicle	
2014-Oct-19, Sun,11:23	Clear	Approaching	P.D. only	Dry	West	Going ahead	Unknown	Other motor vehicle	
					East	Going ahead	Pick-up truck	Other motor vehicle	
2015-Mar-23, Mon,18:19	Clear	Turning movement	P.D. only	Dry	West	Turning left	Automobile, station wagon	Other motor vehicle	
					West	Overtaking	Police vehicle	Other motor vehicle	
2015-May-28, Thu,21:19	Clear	SMV other	P.D. only	Dry	West	Going ahead	Automobile, station wagon	Animal - wild	
2015-Feb-22, Sun,22:30	Drifting Snow	SMV other	P.D. only	Ice	East	Going ahead	Passenger van	Skidding/sliding	

2016-May-19, Thu,16:35	Rain	Sideswipe	Non-fatal injury	Wet	West	Going ahead	Automobile, station wagon	Other motor vehicle
					West	Going ahead	Pick-up truck	Other motor vehicle
2015-Oct-16, Fri,06:43	Clear	Rear end	P.D. only	Wet	West	Slowing or stopping	Automobile, station wagon	Other motor vehicle
					West	Slowing or stopping	Passenger van	Other motor vehicle
2016-Feb-15, Mon,12:15	Clear	SMV other	P.D. only	Dry	West	Going ahead	Passenger van	Animal - wild
2016-Nov-11, Fri,16:05	Clear	Rear end	Non-fatal injury	Dry	West	Going ahead	Automobile, station wagon	Other motor vehicle
					West	Slowing or stopping	Pick-up truck	Other motor vehicle
					West	Going ahead	Pick-up truck	Other motor vehicle
2016-Apr-25, Mon,15:37	Clear	Rear end	P.D. only	Dry	East	Overtaking	Pick-up truck	Other motor vehicle
					East	Slowing or stopping	Other farm vehicle	Other motor vehicle
2016-Jul-26, Tue,05:45	Clear	Sideswipe	Non-fatal injury	Dry	East	Going ahead	Pick-up truck	Cyclist
					East	Going ahead	Bicycle	Other motor vehicle
2016-Oct-05, Wed,16:25	Clear	Rear end	P.D. only	Dry	West	Going ahead	Automobile, station wagon	Other motor vehicle
					West	Slowing or stopping	Automobile, station wagon	Other motor vehicle
					West	Unknown	Unknown	Other motor vehicle

2016-Nov-21, Mon,17:42	Snow	Approaching	P.D. only	Loose snow	West	Going ahead	Pick-up truck	Other motor vehicle
					East	Going ahead	Pick-up truck	Other motor vehicle
					West	Going ahead	Pick-up truck	Debris falling off vehicle
2017-May-05, Fri,08:01	Rain	Rear end	Non-fatal injury	Wet	East	Going ahead	Automobile, station wagon	Other motor vehicle
					East	Stopped	Automobile, station wagon	Other motor vehicle
2017-Dec-06, Wed,06:54	Clear	Angle	P.D. only	Dry	South	Reversing	Delivery van	Other motor vehicle
					East	Stopped	Automobile, station wagon	Other motor vehicle
2017-Sep-21, Thu,15:52	Clear	Rear end	P.D. only	Dry	West	Going ahead	Passenger van	Other motor vehicle
					West	Going ahead	Passenger van	Other motor vehicle
2018-Mar-20, Tue,16:42	Clear	Rear end	P.D. only	Dry	West	Going ahead	Pick-up truck	Other motor vehicle
					West	Stopped	Automobile, station wagon	Other motor vehicle
					West	Stopped	Automobile, station wagon	Other motor vehicle
2018-Sep-10, Mon,16:38	Rain	Rear end	P.D. only	Wet	East	Slowing or stopping	Pick-up truck	Other motor vehicle
					East	Slowing or stopping	Automobile, station wagon	Other motor vehicle
					East	Slowing or stopping	Automobile, station wagon	Other motor vehicle
					East	Stopped	Pick-up truck	Other motor vehicle

2018-Aug-27, Mon,15:54	Clear	SMV other	P.D. only	Dry	West	Going ahead	Automobile, station wagon	Ran off road

Appendix F – Trip Generation Data

Table 3.12: Person Trip Generation Rates – (all households with residents not older than 55 years of age)

Person Trip Generation Rates
All Households with persons 55 years of age or less
AM and PM Peak Hours

Dwelling Unit Types \ Geographic Areas		Core Area Person Trip Rate	Core Area %▽	Urban Area (Inside the greenbelt) Person Trip Rate	Urban Area %▽	Suburban (Outside the greenbelt) Person Trip Rate	Suburban %▽	Rural Person Trip Rate	Rural %▽	All Areas Person Trip Rate
Single detached:	AM	0.85	- 7%	0.99	+ 9%	0.94	+ 3%	0.78	- 14%	0.91
	PM	0.74	- 3%	0.75	- 1%	0.79	+ 4%	0.71	- 7%	0.76
Semi-detached:	AM	0.79	- 10%	0.97	10%	0.89	+ 1%	0.64	- 27%	0.88
	PM	0.74	- 1%	0.68	- 9%	0.82	+ 9%	0.60	- 20%	0.75
Row Townhouse:	AM	0.71	- 3%	0.78	+ 7%	0.67	- 8%	0.74	+ 1%	0.73
	PM	0.62	- 3%	0.60	- 6%	0.69	+ 8%	0.56	- 13%	0.64
Apartment:	AM	0.48	- 4%	0.51	+ 2%	0.53	+ 6%	0.36	- 28%	0.50
	PM	0.45	0%	0.42	- 7%	0.52	+ 16%	0.52	+ 16%	0.45
All Types:	AM	0.62	- 23%	0.82	+ 2%	0.86	+ 8%	0.76	- 5%	0.80
	PM	0.57	- 16%	0.63	- 7%	0.75	+ 10%	0.69	+ 1%	0.68

Note: 5 % (+ or -) represents the percentage delta change in trip rate when compared against the average trip rate across all geographic areas

Table 3.13: Mode Shares - (all households with residents not older than 55 years of age)

Reported Mode Shares
All Households with persons 55 years of age or less
AM and PM Peak Hours

Dwelling Unit Types \ Geographic Areas		Core Area Vehicle Trips	Core Area Transit Share	Core Area Non-Motorised	Urban Area (Inside the greenbelt) Vehicle Trips	Urban Area Transit Share	Urban Area Non-Motorised	Suburban (Outside the greenbelt) Vehicle Trips	Suburban Transit Share	Suburban Non-Motorised	Rural * Vehicle Trips	Rural * Transit Share	Rural * Non-Motorised	All Areas Vehicle Trips	All Areas Transit Share	All Areas Non-Motorised
Single - Detached:	AM	35%	20%	33%	51%	26%	11%	55%	25%	9%	60%	27%	4%	54%	25%	10%
	PM	45%	11%	32%	58%	19%	13%	64%	19%	6%	73%	13%	2%	63%	17%	8%
Semi-Detached:	AM	38%	30%	26%	44%	35%	10%	52%	24%	12%	64%	27%	5%	49%	28%	12%
	PM	36%	20%	34%	51%	27%	13%	62%	17%	7%	77%	12%	1%	58%	20%	10%
Row / Townhouse:	AM	33%	22%	40%	45%	34%	10%	55%	27%	8%	73%	15%	3%	49%	30%	11%
	PM	39%	15%	42%	53%	28%	8%	61%	22%	6%	74%	15%	1%	57%	24%	9%
Apartment:	AM	27%	27%	43%	37%	41%	14%	44%	34%	13%	76%	8%	16%	36%	35%	23%
	PM	23%	29%	42%	40%	37%	14%	44%	33%	9%	48%	4%	17%	35%	33%	23%
All Types:	AM	32%	24%	38%	47%	31%	11%	54%	26%	9%	61%	26%	4%	51%	27%	11%
	PM	34%	21%	38%	53%	24%	12%	62%	20%	6%	73%	13%	2%	59%	20%	10%

Note: Percentages do not necessarily sum to 100% as the proportion of automobile passengers have not been tabulated. Vehicle trips reflect the percentage of vehicle drivers.
* - Rural area sample size is extremely low and mode shares are highly influenced by school types where public transportation levels are high during the AM versus the PM peaks.

Table 6.1: Vehicle Trip Generation Rates

Vehicle Trip Generation Rates AM and PM Peak Hours						
ITE Land Use Code	Dwelling Unit Type / Data Source		Vehicle Trip Generation Rate			
			2008 Count Data	ITE	OD Survey	Blended Rate
210	Single-detached dwellings	AM	0.66	0.75	0.56	0.66
		PM	0.89	1.01	0.53	0.81
224	Semi-detached dwellings, townhouses, rowhouses	AM	0.40	0.70	0.46	0.52
		PM	0.64	0.72	0.46	0.61
231	Low-rise condominiums (1 or 2 floors)	AM	0.53	0.67	0.21	0.47
		PM	0.41	0.78	0.18	0.46
232	High-rise condominiums (3+ floors)	AM	0.53	0.34	0.21	0.36
		PM	0.41	0.38	0.18	0.32
233	Luxury condominiums	AM	0.53	0.56	0.21	0.43
		PM	0.41	0.55	0.18	0.38
221	Low-rise apartments (2 floors)	AM	0.19	0.46	0.21	0.29
		PM	0.21	0.58	0.18	0.32
223	Mid-rise apartments (3-10 floors)	AM	0.19	0.30	0.21	0.23
		PM	0.21	0.39	0.18	0.26
222	High-rise apartments (10+ floors)	AM	0.19	0.30	0.21	0.23
		PM	0.21	0.35	0.18	0.25

Table 6.2: Recommended Vehicle Trip Directional Splits

Comparison of Directional Splits (Inbound/Outbound) AM and PM Peak Hours								
ITE Land Use Code	Area Dwelling Unit Type / Data Source		2008 Count Data		ITE		Blended Rate	
			Inbound	Outbound	Inbound	Outbound	Inbound	Outbound
210	Single-detached dwellings	AM	33%	67%	25%	75%	29%	71%
		PM	60%	40%	63%	37%	62%	39%
224	Semi-detached dwellings, townhouses, rowhouses	AM	40%	60%	33%	67%	37%	64%
		PM	55%	45%	51%	49%	53%	47%
231	Low-rise condominiums (1 or 2 floors)	AM	36%	64%	25%	75%	31%	70%
		PM	54%	46%	58%	42%	56%	44%
232	High-rise condominiums (3+ floors)	AM	36%	64%	19%	81%	28%	73%
		PM	54%	46%	62%	38%	58%	42%
233	Luxury condominiums	AM	36%	64%	23%	77%	30%	71%
		PM	54%	46%	63%	37%	59%	42%
221	Low-rise apartments (2 floors)	AM	22%	78%	21%	79%	22%	79%
		PM	62%	38%	65%	35%	64%	37%
223	Mid-rise apartments (3-10 floors)	AM	22%	78%	25%	75%	24%	77%
		PM	62%	38%	61%	39%	62%	39%
222	High-rise apartments (10+ floors)	AM	22%	78%	25%	75%	24%	77%
		PM	62%	38%	61%	39%	62%	39%

Table 6.3: Recommended Vehicle Trip Generation Rates for Residential Land Uses with Transit Bonus

Recommended Vehicle Trip Generation Rates with Transit Bonus AM and PM Peak Hours									
ITE Land Use Code	Dwelling Unit Type / Geographic Area		Vehicle Trip Rate						
			Core		Urban (Inside the Greenbelt)		Suburban (Outside the Greenbelt)		Rural
			Base Rate	< 600m to Rapid Transit	Base Rate	< 600m to Rapid Transit	Base Rate	< 600m to Rapid Transit	Base Rate
210	Single-detached dwellings	AM	0.40	0.31	0.67	0.50	0.70	0.49	0.62
		PM	0.60	0.33	0.76	0.57	0.90	0.63	0.92
224	Semi-detached dwellings, townhouses, rowhouses	AM	0.34	0.34	0.51	0.50	0.54	0.39	0.62
		PM	0.39	0.38	0.51	0.51	0.71	0.51	0.67
231	Low-rise condominiums (1 or 2 floors)	AM	0.34	0.34	0.50	0.50	0.60	0.60	0.71
		PM	0.29	0.29	0.49	0.49	0.66	0.66	0.72
232	High-rise condominiums (3+ floors)	AM	0.26	0.26	0.38	0.38	0.46	0.46	0.54
		PM	0.20	0.20	0.34	0.34	0.46	0.46	0.50
233	Luxury condominiums	AM	0.31	0.31	0.45	0.45	0.55	0.55	0.65
		PM	0.24	0.24	0.40	0.40	0.55	0.55	0.59
221	Low-rise apartments (2 floors)	AM	0.21	0.21	0.31	0.31	0.37	0.37	0.44
		PM	0.20	0.20	0.34	0.34	0.46	0.46	0.50
223	Mid-rise apartments (3-10 floors)	AM	0.17	0.17	0.24	0.24	0.29	0.29	0.35
		PM	0.16	0.16	0.28	0.28	0.37	0.37	0.41
222	High-rise apartments (10+ floors)	AM	0.17	0.17	0.24	0.24	0.29	0.29	0.35
		PM	0.16	0.16	0.27	0.27	0.36	0.36	0.39

Note: The transit bonus was only applied to geographic areas and dwelling unit types where the reported transit mode shares were less than the transit mode share reported for residential development located within the 600m proximity to a rapid transit station. It is noted that condominium and apartment housing categories reported similar levels of transit mode shares independent of location to rapid transit stations.

6.5 Future Data Collection

While the rates presented in were prepared by blending the vehicle trip rates from ITE, the OD Survey and the 2008 local trip generation studies, it is important to stress the importance and need for ongoing local trip generation surveys to monitor changes in travel behaviour. The 2008 trip generation studies undertaken to support this study provide insight into local travel patterns and a well organized ongoing annual data collection program aimed at trip generation surveys of key land uses or requirement for data collection by local developers will continue to provide recent and accurate local trip generation rates. For example the high-rise apartment category of dwelling units reported the lowest peak hour vehicle trip rates.

South Gloucester / Leitrim

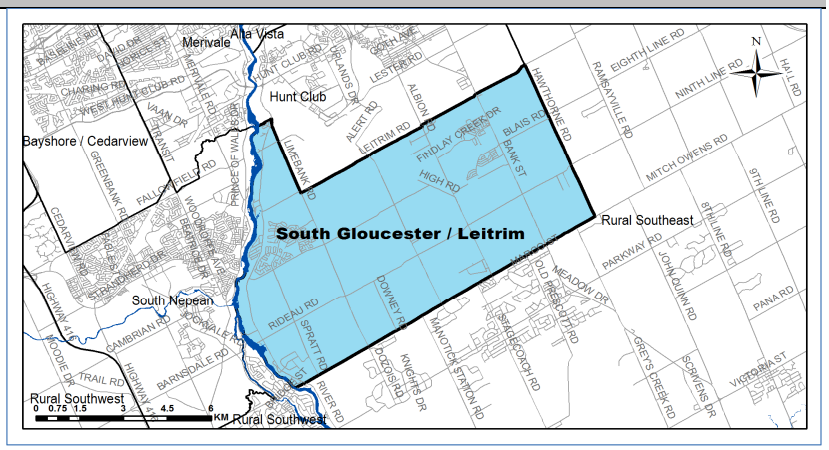
Demographic Characteristics

Population	17,600	Actively Travelled	14,190
Employed Population	8,910	Number of Vehicles	11,080
Households	6,240	Area (km^2)	78.9

Occupation Status (age 5+)	Male	Female	Total
Full Time Employed	4,550	3,630	8,180
Part Time Employed	130	590	730
Student	2,160	2,130	4,290
Retiree	720	770	1,490
Unemployed	90	220	320
Homemaker	20	540	560
Other	80	120	200
Total:	7,750	8,010	15,760

Traveller Characteristics	Male	Female	Total
Transit Pass Holders	790	1,070	1,850
Licensed Drivers	5,790	5,940	11,730
Telecommuters	60	10	70
Trips made by residents	20,810	24,430	45,240

Selected Indicators	
Daily Trips per Person (age 5+)	2.87
Vehicles per Person	0.63
Number of Persons per Household	2.82
Daily Trips per Household	7.25
Vehicles per Household	1.78
Workers per Household	1.43
Population Density (Pop/km2)	220

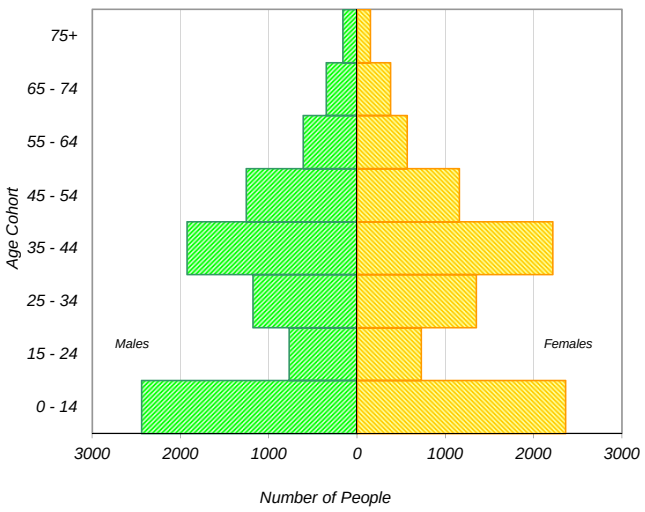


Household Size		
1 person	880	14%
2 persons	1,870	30%
3 persons	1,170	19%
4 persons	1,630	26%
5+ persons	690	11%
Total:	6,240	100%

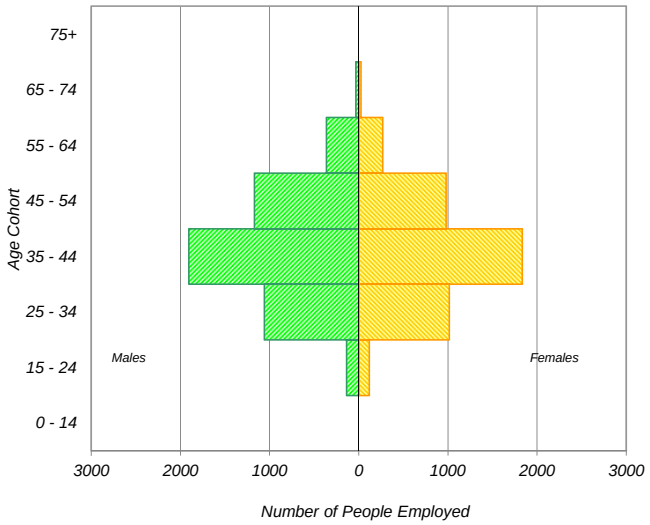
Households by Vehicle Availability		
0 vehicles	40	1%
1 vehicle	2,080	33%
2 vehicles	3,510	56%
3 vehicles	510	8%
4+ vehicles	100	2%
Total:	6,240	100%

Households by Dwelling Type		
Single-detached	3,300	53%
Semi-detached	770	12%
Townhouse	2,010	32%
Apartment/Condo	150	2%
Total:	6,240	100%

Population



Employed Population

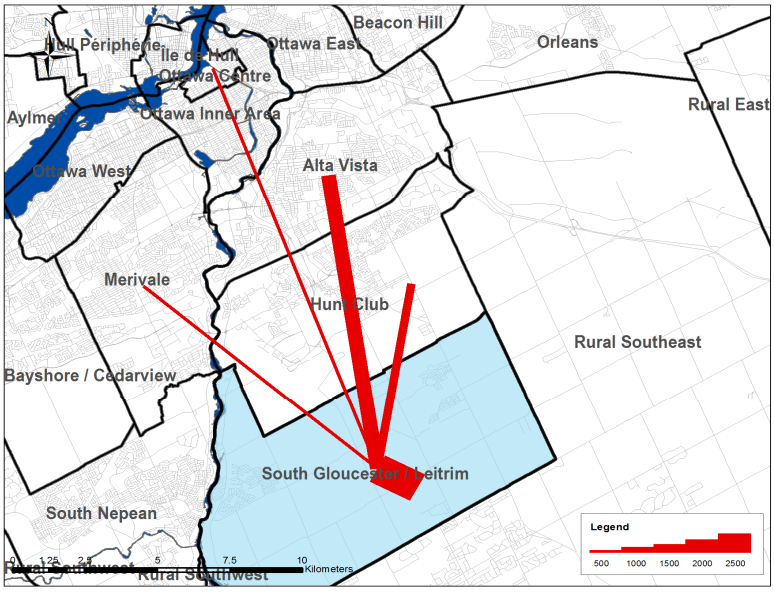


* In 2005 data was only collected for household members aged 11+ therefore these results cannot be compared to the 2011 data.

Travel Patterns

Top Five Destinations of Trips from South Gloucester / Leitrim

AM Peak Period



Summary of Trips to and from South Gloucester / Leitrim

AM Peak Period (6:30 - 8:59) Districts	Destinations of Trips From District	% Total	Origins of Trips To District	% Total
Ottawa Centre	930	9%	0	0%
Ottawa Inner Area	530	5%	250	4%
Ottawa East	240	2%	40	1%
Beacon Hill	240	2%	30	0%
Alta Vista	1,970	18%	160	2%
Hunt Club	1,100	10%	870	13%
Merivale	770	7%	340	5%
Ottawa West	290	3%	0	0%
Bayshore / Cedarview	170	2%	70	1%
Orléans	50	0%	170	3%
Rural East	0	0%	10	0%
Rural Southeast	210	2%	570	8%
South Gloucester / Leitrim	3,680	34%	3,680	55%
South Nepean	310	3%	100	1%
Rural Southwest	120	1%	220	3%
Kanata / Stittsvile	140	1%	60	1%
Rural West	40	0%	60	1%
Île de Hull	90	1%	0	0%
Hull Périphérie	10	0%	20	0%
Plateau	0	0%	20	0%
Aylmer	0	0%	0	0%
Rural Northwest	20	0%	10	0%
Pointe Gatineau	10	0%	30	0%
Gatineau Est	0	0%	0	0%
Rural Northeast	20	0%	0	0%
Buckingham / Masson-Angers	0	0%	20	0%
Ontario Sub-Total:	10,790	99%	6,630	99%
Québec Sub-Total:	150	1%	100	1%
Total:	10,940	100%	6,730	100%

Trips by Trip Purpose

24 Hours	From District		To District		Within District	
Work or related	6,300	29%	3,270	15%	700	6%
School	1,640	8%	840	4%	1,930	16%
Shopping	1,830	8%	720	3%	700	6%
Leisure	2,730	13%	1,990	9%	660	6%
Medical	440	2%	120	1%	120	1%
Pick-up / drive passenger	1,610	7%	970	4%	1,720	14%
Return Home	6,020	28%	13,110	60%	5,320	44%
Other	1,160	5%	680	3%	850	7%
Total:	21,730	100%	21,700	100%	12,000	100%

AM Peak (06:30 - 08:59)	From District		To District		Within District	
Work or related	4,650	64%	1,740	57%	420	11%
School	1,310	18%	810	27%	1,580	43%
Shopping	60	1%	40	1%	10	0%
Leisure	140	2%	50	2%	0	0%
Medical	80	1%	0	0%	0	0%
Pick-up / drive passenger	780	11%	180	6%	900	25%
Return Home	100	1%	120	4%	330	9%
Other	150	2%	110	4%	430	12%
Total:	7,270	100%	3,050	100%	3,670	100%

PM Peak (15:30 - 17:59)	From District		To District		Within District	
Work or related	140	3%	150	2%	40	1%
School	30	1%	0	0%	80	2%
Shopping	270	6%	170	2%	210	6%
Leisure	840	19%	420	6%	140	4%
Medical	50	1%	0	0%	30	1%
Pick-up / drive passenger	310	7%	360	5%	400	12%
Return Home	2,400	54%	5,990	82%	2,350	69%
Other	400	9%	200	3%	150	4%
Total:	4,440	100%	7,290	100%	3,400	100%

Peak Period (%)	Total:	% of 24 Hours	Within District (%)
24 Hours	55,430		22%
AM Peak Period	13,990	25%	26%
PM Peak Period	15,130	27%	22%

Trips by Primary Travel Mode

24 Hours	From District		To District		Within District	
Auto Driver	14,990	69%	14,970	69%	5,210	43%
Auto Passenger	3,870	18%	3,650	17%	3,120	26%
Transit	1,630	8%	1,740	8%	200	2%
Bicycle	90	0%	100	0%	20	0%
Walk	40	0%	40	0%	2,680	22%
Other	1,110	5%	1,200	6%	770	6%
Total:	21,730	100%	21,700	100%	12,000	100%

AM Peak (06:30 - 08:59)	From District		To District		Within District	
Auto Driver	4,640	64%	2,070	68%	1,540	42%
Auto Passenger	1,260	17%	210	7%	1,140	31%
Transit	860	12%	100	3%	60	2%
Bicycle	70	1%	20	1%	10	0%
Walk	20	0%	0	0%	620	17%
Other	420	6%	640	21%	300	8%
Total:	7,270	100%	3,040	100%	3,670	100%

PM Peak (15:30 - 17:59)	From District		To District		Within District	
Auto Driver	3,100	70%	4,920	67%	1,510	44%
Auto Passenger	1,020	23%	1,120	15%	860	25%
Transit	150	3%	790	11%	50	1%
Bicycle	20	0%	80	1%	0	0%
Walk	10	0%	0	0%	850	25%
Other	130	3%	390	5%	130	4%
Total:	4,430	100%	7,300	100%	3,400	100%

Avg Vehicle Occupancy	From District	To District	Within District
24 Hours	1.26	1.24	1.60
AM Peak Period	1.27	1.10	1.74
PM Peak Period	1.33	1.23	1.57

Transit Modal Split	From District	To District	Within District
24 Hours	8%	9%	2%
AM Peak Period	13%	4%	2%
PM Peak Period	4%	12%	2%

Appendix G – TDM Checklists

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)*	☑ Proposed sidewalk connections via Street 1 and Street 3 will provide direct access to bus stops on Kelly Farm Drive
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)*	☑ A network of sidewalks is proposed within the development

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)*	☑ All sidewalks will be constructed per City standards
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)*	☑ Proposed pedestrian facilities will conform to AODA standards
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)*	☑ Subdivision has been configured with short road segments to promote a permeable pedestrian environment
BASIC	1.2.6	Provide safe, direct and attractive walking routes from building entrances to nearby transit stops	☑ Proposed sidewalk connections via Street 1 and Street 3 will provide direct access to bus stops on Kelly Farm Drive
BASIC	1.2.7	Ensure that walking routes to transit stops are secure, visible, lighted, shaded and wind-protected wherever possible	☑ Sidewalks will be illuminated per City standards
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)*	☐ N/A
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)*	☐ N/A
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)*	☐ N/A
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)*	☐ N/A
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	☐
	5.	**CARSHARING & BIKESHARING**	
	5.1	**Carshare parking spaces**	
BETTER	5.1.1	Provide up to three carshare parking spaces in an R3, R4 or R5 Zone for specified residential uses *(see Zoning By-law Section 94)*	☐
	5.2	**Bikeshare station location**	
BETTER	5.2.1	Provide a designated bikeshare station area near a major building entrance, preferably lighted and sheltered with a direct walkway connection	☐
	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	☐ N/A
BASIC	6.1.2	Provide parking for long-term and short-term users that is consistent with mode share targets, considering the potential for visitors to use off-site public parking	☐
BASIC	6.1.3	Where a site features more than one use, provide shared parking and reduce the cumulative number of parking spaces accordingly *(see Zoning By-law Section 104)*	☐
BETTER	6.1.4	Reduce the minimum number of parking spaces required by zoning by one space for each 13 square metres of gross floor area provided as shower rooms, change rooms, locker rooms and other facilities for cyclists in conjunction with bicycle parking *(see Zoning By-law Section 111)*	☐
	6.2	**Separate long-term & short-term parking areas**	
BETTER	6.2.1	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)	☐

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	☐
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 H – MMLOS Analysis

Multi-Modal Level of Service
Findlay Creek Stage 5
Scenario: Existing Conditions

December 31, 2019

IBI

INTERSECTIONS		Leitrim Road & Kelly Farm Drive												Intersection 1			
		NORTH leg	SOUTH leg	EAST leg	WEST leg	NORTH leg	SOUTH leg	EAST leg	WEST leg	NORTH leg	SOUTH leg	EAST leg	WEST leg	NORTH leg	SOUTH leg	EAST leg	WEST leg
Pedestrian	Lanes (do NOT include lanes protected by bulb-outs)		3	3	3												
	Median		No Median	No Median	Median (>2.4m)												
	Island Refuge																
	Conflicting Left Turns (from street to right)		Permissive	No left turn/prohibited	Permissive												
	Conflicting Right Turns (from street to left)		Permissive or yield control	Permissive or yield control	No right turn												
	RTOR? (from street to left)		RTOR allowed	RTOR allowed	RTOR prohibited												
	Ped Leading Interval? (on cross street)		No	No	No												
	Corner Radius		> 15m to 25m	No right turn	> 10m to 15m												
	Right Turn Channel		No right turn channel	No right turn	No right turn channel												
	Crosswalk Type		Standard transverse markings	Standard transverse markings	Standard transverse markings												
	LOS (PETSI)		68 C	88 B	78 B	#N/A #N/A	#N/A #N/A	#N/A	#N/A	#N/A #N/A	#N/A #N/A	#N/A #N/A	#N/A #N/A	#N/A #N/A	#N/A #N/A	#N/A #N/A	#N/A #N/A
	Cycle Length (sec)		100	100	100												
	Pedestrian Walk Time (solid white symbol) (sec)		7	7	7												
	LOS (Delay,seconds)		44.3 E	44.3 E	44.3 E	#DIV/0! #DIV/0!	#DIV/0! #DIV/0!	#DIV/0! #DIV/0!	#DIV/0! #DIV/0!	#DIV/0! #DIV/0!	#DIV/0! #DIV/0!	#DIV/0! #DIV/0!	#DIV/0! #DIV/0!	#DIV/0! #DIV/0!	#DIV/0! #DIV/0!	#DIV/0! #DIV/0!	#DIV/0! #DIV/0!
	Overall Level of Service		**E**			**#N/A**				**#N/A**				**#N/A**			
Cyclist	Type of Bikeway		Bike Lanes/Cycle Track	Bike Lanes/Cycle Track	Bike Lanes/Cycle Track												
	Turning Speed (based on corner radius & angle)																
	Right Turn Storage Length																
	Dual Right Turn?																
	Shared Through-Right?																
	Bike Box?			No													
	Number of Lanes Crossed for Left Turns			1 Lane Crossed													
	Operating Speed on Approach			≥ 60km/h													
	Dual Left Turn Lanes?			No													
	Level of Service		A **E**	E **E**	A **E**	**#VALUE!**				**#VALUE!**				**#VALUE!**			
Transit	Average Signal Delay		≤20 sec	≤30 sec	≤30 sec												
	Level of Service		C **D**	D **D**	D **D**	A **A**	A	A	A	A **A**	A	A	A	A **A**	A	A	A
Truck	Turning Radius (Right Turn)		> 15m		10 to 15m												
	Number of Receiving Lanes		1		1												
			C **E**		E **E**												

SEGMENTS		Kelly Farm Drive - Leitrim Road to Street 1			Kelly Farm Drive - Street 1 to Street 3			Leitrim Road - West of Kelly Farm Drive			Intersection 1	Section		
		1	2	3	1	2	3	1	2	3		1	2	3
Pedestrian	Sidewalk Width	2.0 or more			2.0 or more			No Sidewalk						
	Boulevard Width	> 2			> 2			N/A						
	AADT	< 3000			< 3000			N/A						
	On-Street Parking	N/A			N/A			N/A						
	Operating Speed	51 to 60 km/h			51 to 60 km/h			61 km/h or more						
	Level of Service	A **A**			A **A**			F **F**					**#VALUE!**	
Cyclist	Type of Bikeway	Physically Separated Bikeway			Physically Separated Bikeway			Mixed Traffic						
	Number of Travel Lanes (per direction)							1 Travel Lane Per Direction						
	Raised Median?													
	Bike Lane Width													
	Operating Speed							≥ 70 km/h						
	Bike Lane Blockages (Commercial Areas)													
	Median Refuge													
	Number of Travel Lanes on Sidestreet													
	Sidestreet Operating Speed													
	Level of Service	**A**			**A**			**F**						
Transit	Facility Type	Mixed Traffic			Mixed Traffic			Mixed Traffic						
	Friction	Moderate parking/driveway friction			Moderate parking/driveway friction			Limited parking/driveway friction						
	Level of Service	**E**			**E**			**D**				**#N/A**		
Truck	Curb Lane Width	>3.7			>3.7			≤3.3						
	Number of Travel Lanes	2			2			2						
		B **B**			B **B**			D **D**					**#VALUE!**	

Appendix I – Intersection Control Warrants

OTM BOOK 12* - JUSTIFICATION 7

Project: Findlay Creek Stage 5 **Date:** September 15, 2020

Project #: 122283

Location: Kelly Farm Drive (Major Roadway) at Street 1 (Minor Roadway)

Orientation: North/South East/West

Municipality: City of Ottawa **Scenario:** Future (2031) Total Traffic

WARRANT	DESCRIPTION	MINIMUM REQUIREMENT FOR 2 LANE HIGHWAYS				COMPLIANCE		
		FREE FLOW	RESTRICTED FLOW	ADJUSTED FREE FLOW	ADJUSTED RESTRICTED FLOW	SECTIONAL Number	SECTIONAL %	ENTIRE %
1. MINIMUM VEHICULAR VOLUME	A. Vehicle volumes, all approaches (Average Hour)	480	720	576	864	280	32%	32%
	B. Vehicle volume along minor roads (Average Hour)	120	170	144	204	97	48%	
2. DELAY TO CROSS TRAFFIC	A. Vehicle volumes, along artery (Average Hour)	480	720	576	864	183	21%	21%
	B. Combined vehicle and pedestrian volume crossing artery from minor roads (Average Hour)	50	75	60	90	44	49%	

Projected Traffic Volumes:

Average Hourly Volume (AHV) Equation: AHV = (amPHV + pmPHV)/4

AM Peak Hour Volumes

			↖	121	
35	92	14	←	9	
↙	↓	↘	↙	9	
	71	↗	↖	↑	↗
	18	→	0	157	11
	0	↘			

PM Peak Hour Volumes

			↖	69	
68	169	55	←	17	
↙	↓	↘	↙	12	
	52	↗	↖	↑	↗
	13	→	0	120	11
	0	↘			

Average Hourly Volumes (AHV)

			↖	48	
26	65	17	←	6	
↙	↓	↘	↙	5	
	31	↗	↖	↑	↗
	8	→	0	69	6
	0	↘			

Notes:

1. Vehicle volume warrant (1A) and (2A) for intersections of roadways having two or more moving lanes in one direction should be 25% higher than the values given above. — 1 Lane per Direction

2. Warrant values for free flow apply when the 85th percentile speed of artery traffic equals or exceeds 70 km/h or when the intersection lies within the built-up area of an isolated community having a population of less than 10,000. Warrant values for restricted flow apply to large urban communities when the 85th percentile speed of artery traffic does not exceed 70 km/h. — Restricted Flow

3. The lowest sectional percentage governs the entire warrant.

4. For "T" intersections the warrant values for the minor road should be increased by 50% (Warrant 1B only). — 4-legged Intersection

5. All flow values for Warrant 1 and Warrant 2 are to be increased by 20% for existing intersections and by 50% in the case of new intersections. — Existing Intersection

6. The crossing volumes are defined as the sum of:

(a) Left-turns from both minor road approaches. — 5 / 31

(b) The heaviest through volume from the minor road. — 8

(c) 50% of the heavier left turn movement from major road when both of the following are met: — 17

(i) the left-turn volume >120 vph — No

(ii) the left-turn volume plus the opposing volume >720 vph — No

(d) Pedestrians crossing the main road. — 0

CONCLUSION: **The intersection does NOT meet the minimum warrants for traffic control signals.**

* "Ontario Traffic Manual, Book 12 (March 2012)", Ontario Ministry of Transportation.

City of Ottawa
Roundabout Initial Feasability Screening Tool

The intent of this screening tool is to provide a relatively quick assessment of the feasibility of a roundabout at a particular intersection in comparison to other appropriate forms of traffic control or road modifications including all-way stop control, traffic signals, auxiliary lanes, etc. The intended outcome of this tool is to provide enough information to assist staff in deciding whether or not to proceed with an Intersection Control Study to investigate the feasibility of a roundabout in more

1	Project Name:	Findlay Creek Stage 5
2	Intersection:	Kelly Farm Drive & Barrett Farm Drive / Street 1
3	Location and Description of Intersection: Lane Configuration, total or approach AADT, distance to nearby intersection(s), etc. Attach or sketch a diagram and include existing and/or horizon-year turning movements. If an existing intersection then indicate type of control	New intersection on Kelly Farm Drive, approximately 175m south of Leitrim Road.
4	What traditional modifications are proposed? All-way stop control, traffic signals, auxiliary lanes, etc. Attach or sketch a diagram if necessary.	All-way stop control
5	What size of roundabout is being considered? Describe, and attach a Roundabout Traffic Flow Worksheet	Single-lane roundabout.
6	Why is a roundabout being considered?	This is a new city intersection.

7 Are there contra-indications for

If "Yes" is indicated for one or more of the contra-indications then a roundabout may be problematic at the subject intersection. That is not to say that a roundabout is not possible, just that there may be difficulties or high

No.	Contra-Indication	Outcome
1	Is there insufficient property at the intersection (i.e. less than 44 metres diameter if considering a single-lane roundabout, and less than 60 metres if considering a two-lane roundabout) or property constraints that would require demolition of adjacent	Yes [X] No [ ]
2	Are there any instances where stopping sight distance (SSD) of a roundabout yield line may not be attainable (i.e. the intersection is on a crest vertical curve)?	Yes [ ] No [X]
3	Is there an existing uncontrolled approach with a grade in excess of 4 percent?	Yes [ ] No [X]
4	Is the intersection located within a coordinated signal system?	Yes [ ] No [X]
5	Is there a closely-spaced traffic signal or railway crossing that could not be controlled with a nearby roundabout?	Yes [ ] No [X]
6	Are significant differences in directional flows or any situations of sudden high demand expected?	Yes [ ] No [x]
7	Are there known visually-impaired pedestrians that cross this intersection?	Yes [ ] No [X]

8 Are there suitability factors for a roundabout?

If "Yes" is indicated for two or more of the suitability factors then a roundabout should be technically feasible at the subject intersection..

No.	Suitability Factor	Outcome
1	Does the intersection currently experience an average collision frequency of more than 1.5 injury crashes per year, or a collision rate in excess of 1 injury crash per 1 million vehicles entering (MVE)?	Yes [ ] No [X]
2	Has there been a fatal crash at the intersection in the last 10 years?	Yes [ ] No [X]
3	Are capacity problems currently being experienced, or expected in the future?	Yes [ ] No [X]
4	Are traffic signals warranted, or expected to be warranted in the future?	Yes [ ] No [X]
5	Does the intersection have more than 4 legs, or unusual geometry?	Yes [ ] No [X]
6	Will Planned modifications to the intersection require that nearby structures be widened (i.e. to accommodate left-turn lanes)?	Yes [ ] No [X]
7	Is the intersection located at a transition between rural and urban environments (i.e. an urban boundary) such that a roundabout could act as a means of speed transition?	Yes [ ] No [X]

9	Conclusions/recommendation whether to proceed with an Intersection Control Study:	A roundabout is not recommended at this location. There are space constraints due to nearby properties and the ditch to the west of Kelly Farm Drive. Further, none of the suitability factors have been met.

City of Ottawa
Mini-Roundabout Screening Criteria

Mini roundabouts are best suited and most effective when they meet the following conditions;

No.	Criteria	Outcome
1	Located at minor collector road intersecting a minor collector road or a local residential road	Yes [X] No [ ]
2	ADT lesser than 15,000 (estimated ADT in case of new development area)	Yes [X] No [ ]
3	At least 10% of the total traffic has generated from minor road (estimated in case of new development area)	Yes [X] No [ ]
4	Operating speed <55km/hr or posted speed ≤ 50km/hr in a new development area	Yes [X] No [ ]
5	A right of way wide enough to accommodate a 13 m to 27 m Inscribed Circle Diameter roundabout and adjacent sidewalks	Yes [X] No [ ]
6	Situated on a non truck route or roads without heavy truck movements	Yes [X] No [ ]
7	Intersections with no more than four legs	Yes [X] No [ ]

Conclusion

A mini roundabout may be technically feasible at this location, however is not recommended as the intersection has recently been constructed as a two-way, stop-controlled intersection.

OTM BOOK 12* - JUSTIFICATION 7

Project: Findlay Creek Stage 5 **Date:** September 15, 2020

Project #: 122283

Location: Kelly Farm Drive (Major Roadway) at Street 3 (Minor Roadway)

Orientation: North/South East/West

Municipality: City of Ottawa **Scenario:** Future (2031) Total Traffic

WARRANT	DESCRIPTION	MINIMUM REQUIREMENT FOR 2 LANE HIGHWAYS				COMPLIANCE		
		FREE FLOW	RESTRICTED FLOW	ADJUSTED FREE FLOW	ADJUSTED RESTRICTED FLOW	SECTIONAL Number	SECTIONAL %	ENTIRE %
1. MINIMUM VEHICULAR VOLUME	A. Vehicle volumes, all approaches (Average Hour)	480	720	720	1080	145	13%	10%
	B. Vehicle volume along minor roads (Average Hour)	120	170	270	383	38	10%	
2. DELAY TO CROSS TRAFFIC	A. Vehicle volumes, along artery (Average Hour)	480	720	720	1080	107	10%	10%
	B. Combined vehicle and pedestrian volume crossing artery from minor roads (Average Hour)	50	75	75	113	38	34%	

Projected Traffic Volumes:

Average Hourly Volume (AHV) Equation: AHV = (amPHV + pmPHV)/4

AM Peak Hour Volumes

			↖	0				
43	58	0	←	0				
↙	↓	↘	↙	0				
	89	↗	↖	↑	↗			
	0	→	0	79	0			
	0	↘						

PM Peak Hour Volumes

			↖	0				
86	95	0	←	0				
↙	↓	↘	↙	0				
	65	↗	↖	↑	↗			
	0	→	0	67	0			
	0	↘						

Average Hourly Volumes (AHV)

			↖	0				
32	38	0	←	0				
↙	↓	↘	↙	0				
	38	↗	↖	↑	↗			
	0	→	0	37	0			
	0	↘						

Notes:

1. Vehicle volume warrant (1A) and (2A) for intersections of roadways having two or more moving lanes in one direction should be 25% higher than the values given above. — 1 Lane per Direction

2. Warrant values for free flow apply when the 85th percentile speed of artery traffic equals or exceeds 70 km/h or when the intersection lies within the built-up area of an isolated community having a population of less than 10,000. Warrant values for restricted flow apply to large urban communities when the 85th percentile speed of artery traffic does not exceed 70 km/h. — Restricted Flow

3. The lowest sectional percentage governs the entire warrant.

4. For "T" intersections the warrant values for the minor road should be increased by 50% (Warrant 1B only). — 3-legged Intersection

5. All flow values for Warrant 1 and Warrant 2 are to be increased by 20% for existing intersections and by 50% in the case of new intersections. — New Intersection

6. The crossing volumes are defined as the sum of:

(a) Left-turns from both minor road approaches. — 0 / 38

(b) The heaviest through volume from the minor road. — 0

(c) 50% of the heavier left turn movement from major road when both of the following are met: — 0

(i) the left-turn volume >120 vph — No

(ii) the left-turn volume plus the opposing volume >720 vph — No

(d) Pedestrians crossing the main road. — 0

CONCLUSION: **The intersection does NOT meet the minimum warrants for traffic control signals.**

* "Ontario Traffic Manual, Book 12 (March 2012)", Ontario Ministry of Transportation.

City of Ottawa
Roundabout Initial Feasability Screening Tool

The intent of this screening tool is to provide a relatively quick assessment of the feasibility of a roundabout at a particular intersection in comparison to other appropriate forms of traffic control or road modifications including all-way stop control, traffic signals, auxiliary lanes, etc. The intended outcome of this tool is to provide enough information to assist staff in deciding whether or not to proceed with an Intersection Control Study to investigate the feasibility of a roundabout in more

1	Project Name:	Findlay Creek Stage 5
2	Intersection:	Kelly Farm Drive & Street 3
3	Location and Description of Intersection: Lane Configuration, total or approach AADT, distance to nearby intersection(s), etc. Attach or sketch a diagram and include existing and/or horizon-year turning movements. If an existing intersection then indicate type of control	New intersection on Kelly Farm Drive, approximately 295m south of Leitrim Road.
4	What traditional modifications are proposed? All-way stop control, traffic signals, auxiliary lanes, etc. Attach or sketch a diagram if necessary.	Two-way stop control
5	What size of roundabout is being considered? Describe, and attach a Roundabout Traffic Flow Worksheet	Single-lane roundabout.
6	Why is a roundabout being considered?	This is a new City intersection.

7 Are there contra-indications for

If "Yes" is indicated for one or more of the contra-indications then a roundabout may be problematic at the subject intersection. That is not to say that a roundabout is not possible, just that there may be difficulties or high

No.	Contra-Indication	Outcome
1	Is there insufficient property at the intersection (i.e. less than 44 metres diameter if considering a single-lane roundabout, and less than 60 metres if considering a two-lane roundabout) or property constraints that would require demolition of adjacent	Yes [X] No [ ]
2	Are there any instances where stopping sight distance (SSD) of a roundabout yield line may not be attainable (i.e. the intersection is on a crest vertical curve)?	Yes [ ] No [X]
3	Is there an existing uncontrolled approach with a grade in excess of 4 percent?	Yes [ ] No [X]
4	Is the intersection located within a coordinated signal system?	Yes [ ] No [X]
5	Is there a closely-spaced traffic signal or railway crossing that could not be controlled with a nearby roundabout?	Yes [ ] No [X]
6	Are significant differences in directional flows or any situations of sudden high demand expected?	Yes [ ] No [x]
7	Are there known visually-impaired pedestrians that cross this intersection?	Yes [ ] No [X]

8 Are there suitability factors for a roundabout?

If "Yes" is indicated for two or more of the suitability factors then a roundabout should be technically feasible at the subject intersection..

No.	Suitability Factor	Outcome
1	Does the intersection currently experience an average collision frequency of more than 1.5 injury crashes per year, or a collision rate in excess of 1 injury crash per 1 million vehicles entering (MVE)?	Yes [ ] No [X]
2	Has there been a fatal crash at the intersection in the last 10 years?	Yes [ ] No [X]
3	Are capacity problems currently being experienced, or expected in the future?	Yes [ ] No [X]
4	Are traffic signals warranted, or expected to be warranted in the future?	Yes [ ] No [X]
5	Does the intersection have more than 4 legs, or unusual geometry?	Yes [ ] No [X]
6	Will Planned modifications to the intersection require that nearby structures be widened (i.e. to accommodate left-turn lanes)?	Yes [ ] No [X]
7	Is the intersection located at a transition between rural and urban environments (i.e. an urban boundary) such that a roundabout could act as a means of speed transition?	Yes [ ] No [X]

9	Conclusions/recommendation whether to proceed with an Intersection Control Study:	A roundabout is not recommended at this location. There are space constraints due to nearby properties and the ditch to the west of Kelly Farm Drive. Further, none of the suitability factors have been met.

City of Ottawa
Mini-Roundabout Screening Criteria

Mini roundabouts are best suited and most effective when they meet the following conditions;

No.	Criteria	Outcome
1	Located at minor collector road intersecting a minor collector road or a local residential road	Yes [X] No [ ]
2	ADT lesser than 15,000 (estimated ADT in case of new development area)	Yes [X] No [ ]
3	At least 10% of the total traffic has generated from minor road (estimated in case of new development area)	Yes [X] No [ ]
4	Operating speed <55km/hr or posted speed ≤ 50km/hr in a new development area	Yes [X] No [ ]
5	A right of way wide enough to accommodate a 13 m to 27 m Inscribed Circle Diameter roundabout and adjacent sidewalks	Yes [X] No [ ]
6	Situated on a non truck route or roads without heavy truck movements	Yes [X] No [ ]
7	Intersections with no more than four legs	Yes [X] No [ ]

Conclusion

A mini roundabout may be technically feasible at this location, however is not recommended as the roadway has recently been constructed.

Appendix J – Intersection Capacity Analyses

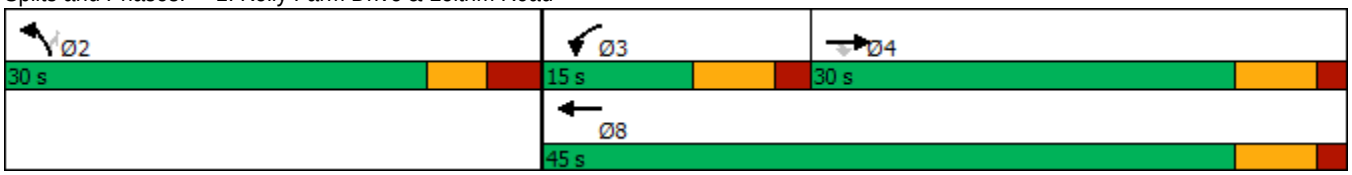
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	584	27	20	326	24	29
Future Volume (vph)	584	27	20	326	24	29
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)		70.0	80.0		60.0	0.0
Storage Lanes		1	1		1	1
Taper Length (m)			2.5		2.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850				0.850
Flt Protected			0.950		0.950	
Satd. Flow (prot)	1767	1300	1503	1625	1544	1406
Flt Permitted			0.950		0.950	
Satd. Flow (perm)	1767	1300	1503	1625	1544	1406
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		30				32
Link Speed (k/h)	80			80	50	
Link Distance (m)	287.5			317.6	172.1	
Travel Time (s)	12.9			14.3	12.4	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	3%	19%	15%	12%	12%	10%
Adj. Flow (vph)	649	30	22	362	27	32
Shared Lane Traffic (%)						
Lane Group Flow (vph)	649	30	22	362	27	32
Turn Type	NA	Perm	Prot	NA	Prot	Perm
Protected Phases	4		3	8	2	
Permitted Phases		4				2
Detector Phase	4	4	3	8	2	2
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	19.4	19.4	11.6	11.4	23.4	23.4
Total Split (s)	30.0	30.0	15.0	45.0	30.0	30.0
Total Split (%)	40.0%	40.0%	20.0%	60.0%	40.0%	40.0%
Maximum Green (s)	23.6	23.6	8.4	38.6	23.6	23.6
Yellow Time (s)	4.6	4.6	4.6	4.6	3.3	3.3
All-Red Time (s)	1.8	1.8	2.0	1.8	3.1	3.1
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.4	6.4	6.6	6.4	6.4	6.4
Lead/Lag	Lag	Lag	Lead			
Lead-Lag Optimize?	Yes	Yes	Yes			
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	Max	Max	None	Max	None	None
Walk Time (s)	7.0	7.0			7.0	7.0
Flash Dont Walk (s)	6.0	6.0			10.0	10.0
Pedestrian Calls (#/hr)	0	0			0	0
Act Effct Green (s)	44.2	44.2	6.4	47.1	6.6	6.6
Actuated g/C Ratio	0.75	0.75	0.11	0.80	0.11	0.11
v/c Ratio	0.49	0.03	0.14	0.28	0.16	0.17
Control Delay	11.0	3.9	25.2	4.2	25.3	11.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Total Delay	11.0	3.9	25.2	4.2	25.3	11.9
LOS	B	A	C	A	C	B
Approach Delay	10.7			5.4	18.1	
Approach LOS	B			A	B	
Queue Length 50th (m)	28.7	0.0	2.2	13.0	2.6	0.0
Queue Length 95th (m)	#121.7	3.9	7.5	25.8	8.5	6.2
Internal Link Dist (m)	263.5			293.6	148.1	
Turn Bay Length (m)		70.0	80.0		60.0	
Base Capacity (vph)	1319	978	213	1292	616	580
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.49	0.03	0.10	0.28	0.04	0.06

Intersection Summary			
Area Type:	Other		
Cycle Length: 75			
Actuated Cycle Length: 59.2			
Natural Cycle: 70			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.49			
Intersection Signal Delay: 9.3		Intersection LOS: A	
Intersection Capacity Utilization 47.3%		ICU Level of Service A	
Analysis Period (min) 15			

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: Kelly Farm Drive & Leitrim Road

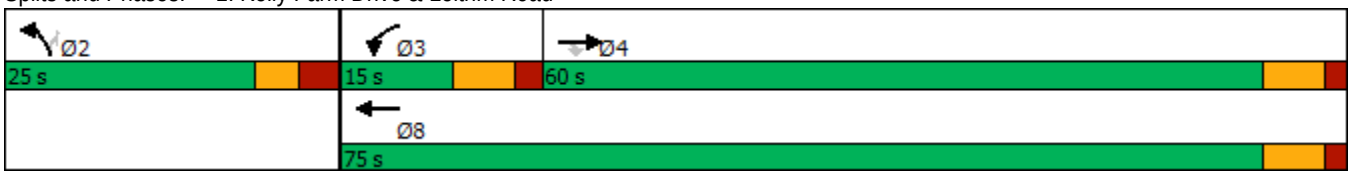


Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	519	11	56	622	13	36
Future Volume (vph)	519	11	56	622	13	36
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)		70.0	80.0		60.0	0.0
Storage Lanes		1	1		1	1
Taper Length (m)			2.5		2.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850				0.850
Flt Protected			0.950		0.950	
Satd. Flow (prot)	1701	1419	1616	1767	1601	1432
Flt Permitted			0.950		0.950	
Satd. Flow (perm)	1701	1419	1616	1767	1601	1432
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		12				40
Link Speed (k/h)	80			80	50	
Link Distance (m)	287.5			317.6	172.1	
Travel Time (s)	12.9			14.3	12.4	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	7%	9%	7%	3%	8%	8%
Adj. Flow (vph)	577	12	62	691	14	40
Shared Lane Traffic (%)						
Lane Group Flow (vph)	577	12	62	691	14	40
Turn Type	NA	Perm	Prot	NA	Prot	Perm
Protected Phases	4		3	8	2	
Permitted Phases		4				2
Detector Phase	4	4	3	8	2	2
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	19.4	19.4	11.6	11.4	23.4	23.4
Total Split (s)	60.0	60.0	15.0	75.0	25.0	25.0
Total Split (%)	60.0%	60.0%	15.0%	75.0%	25.0%	25.0%
Maximum Green (s)	53.6	53.6	8.4	68.6	18.6	18.6
Yellow Time (s)	4.6	4.6	4.6	4.6	3.3	3.3
All-Red Time (s)	1.8	1.8	2.0	1.8	3.1	3.1
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.4	6.4	6.6	6.4	6.4	6.4
Lead/Lag	Lag	Lag	Lead			
Lead-Lag Optimize?	Yes	Yes	Yes			
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	Max	Max	None	Max	None	None
Walk Time (s)	7.0	7.0			7.0	7.0
Flash Dont Walk (s)	6.0	6.0			10.0	10.0
Pedestrian Calls (#/hr)	0	0			0	0
Act Effct Green (s)	61.1	61.1	7.6	74.5	6.5	6.5
Actuated g/C Ratio	0.71	0.71	0.09	0.87	0.08	0.08
v/c Ratio	0.48	0.01	0.44	0.45	0.12	0.28
Control Delay	10.1	3.8	47.6	3.9	40.0	17.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Total Delay	10.1	3.8	47.6	3.9	40.0	17.8
LOS	B	A	D	A	D	B
Approach Delay	10.0			7.5	23.6	
Approach LOS	A			A	C	
Queue Length 50th (m)	51.6	0.0	10.0	31.3	2.3	0.0
Queue Length 95th (m)	84.8	2.0	22.6	55.3	7.9	9.1
Internal Link Dist (m)	263.5			293.6	148.1	
Turn Bay Length (m)		70.0	80.0		60.0	
Base Capacity (vph)	1207	1010	157	1528	347	342
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.48	0.01	0.39	0.45	0.04	0.12

Intersection Summary			
Area Type:	Other		
Cycle Length: 100			
Actuated Cycle Length: 86.1			
Natural Cycle: 70			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.48			
Intersection Signal Delay: 9.2		Intersection LOS: A	
Intersection Capacity Utilization 53.3%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 1: Kelly Farm Drive & Leitrim Road

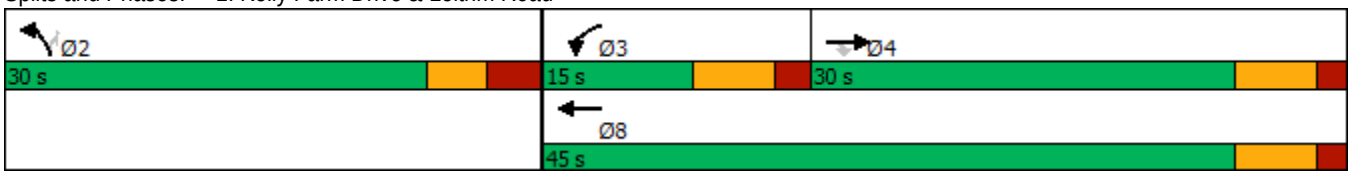


Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	656	42	25	407	138	60
Future Volume (vph)	656	42	25	407	138	60
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)		70.0	80.0		60.0	0.0
Storage Lanes		1	1		1	1
Taper Length (m)			2.5		2.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850				0.850
Flt Protected			0.950		0.950	
Satd. Flow (prot)	1767	1300	1503	1625	1544	1406
Flt Permitted			0.950		0.950	
Satd. Flow (perm)	1767	1300	1503	1625	1544	1406
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		42				60
Link Speed (k/h)	80			80	50	
Link Distance (m)	287.5			317.6	172.1	
Travel Time (s)	12.9			14.3	12.4	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	3%	19%	15%	12%	12%	10%
Adj. Flow (vph)	656	42	25	407	138	60
Shared Lane Traffic (%)						
Lane Group Flow (vph)	656	42	25	407	138	60
Turn Type	NA	Perm	Prot	NA	Prot	Perm
Protected Phases	4		3	8	2	
Permitted Phases		4				2
Detector Phase	4	4	3	8	2	2
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	19.4	19.4	11.6	11.4	23.4	23.4
Total Split (s)	30.0	30.0	15.0	45.0	30.0	30.0
Total Split (%)	40.0%	40.0%	20.0%	60.0%	40.0%	40.0%
Maximum Green (s)	23.6	23.6	8.4	38.6	23.6	23.6
Yellow Time (s)	4.6	4.6	4.6	4.6	3.3	3.3
All-Red Time (s)	1.8	1.8	2.0	1.8	3.1	3.1
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.4	6.4	6.6	6.4	6.4	6.4
Lead/Lag	Lag	Lag	Lead			
Lead-Lag Optimize?	Yes	Yes	Yes			
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	Max	Max	None	Max	None	None
Walk Time (s)	7.0	7.0			7.0	7.0
Flash Dont Walk (s)	6.0	6.0			10.0	10.0
Pedestrian Calls (#/hr)	0	0			0	0
Act Effct Green (s)	40.3	40.3	6.6	43.1	10.8	10.8
Actuated g/C Ratio	0.64	0.64	0.11	0.69	0.17	0.17
v/c Ratio	0.58	0.05	0.16	0.36	0.52	0.21
Control Delay	15.7	4.6	28.4	7.4	30.5	8.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Total Delay	15.7	4.6	28.4	7.4	30.5	8.5
LOS	B	A	C	A	C	A
Approach Delay	15.1			8.6	23.8	
Approach LOS	B			A	C	
Queue Length 50th (m)	38.6	0.0	2.7	20.1	14.5	0.0
Queue Length 95th (m)	#148.1	5.5	9.0	43.1	28.9	7.9
Internal Link Dist (m)	263.5			293.6	148.1	
Turn Bay Length (m)		70.0	80.0		60.0	
Base Capacity (vph)	1136	851	201	1118	582	567
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.58	0.05	0.12	0.36	0.24	0.11

Intersection Summary			
Area Type:	Other		
Cycle Length: 75			
Actuated Cycle Length: 62.7			
Natural Cycle: 70			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.58			
Intersection Signal Delay: 14.3		Intersection LOS: B	
Intersection Capacity Utilization 55.2%		ICU Level of Service B	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 1: Kelly Farm Drive & Leitrim Road



Intersection	
Int Delay, s/veh	4.6

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	5	121	77	2	14	53
Future Vol, veh/h	5	121	77	2	14	53
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	0	0	11	0	0	17
Mvmt Flow	5	121	77	2	14	53

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	159	78	0	0	79	0
Stage 1	78	-	-	-	-	-
Stage 2	81	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	837	988	-	-	1532	-
Stage 1	950	-	-	-	-	-
Stage 2	947	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	829	988	-	-	1532	-
Mov Cap-2 Maneuver	829	-	-	-	-	-
Stage 1	950	-	-	-	-	-
Stage 2	938	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9.2	0	1.5
HCM LOS	A		

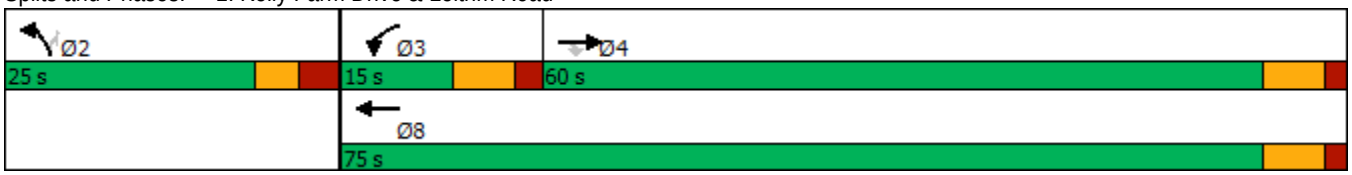
Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	981	1532	-
HCM Lane V/C Ratio	-	-	0.128	0.009	-
HCM Control Delay (s)	-	-	9.2	7.4	0
HCM Lane LOS	-	-	A	A	A
HCM 95th %tile Q(veh)	-	-	0.4	0	-

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	676	69	78	698	77	54
Future Volume (vph)	676	69	78	698	77	54
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)		70.0	80.0		60.0	0.0
Storage Lanes		1	1		1	1
Taper Length (m)			2.5		2.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850				0.850
Flt Protected			0.950		0.950	
Satd. Flow (prot)	1701	1419	1616	1767	1601	1432
Flt Permitted			0.950		0.950	
Satd. Flow (perm)	1701	1419	1616	1767	1601	1432
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		69				54
Link Speed (k/h)	80			80	50	
Link Distance (m)	287.5			317.6	172.1	
Travel Time (s)	12.9			14.3	12.4	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	7%	9%	7%	3%	8%	8%
Adj. Flow (vph)	676	69	78	698	77	54
Shared Lane Traffic (%)						
Lane Group Flow (vph)	676	69	78	698	77	54
Turn Type	NA	Perm	Prot	NA	Prot	Perm
Protected Phases	4		3	8	2	
Permitted Phases		4				2
Detector Phase	4	4	3	8	2	2
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	19.4	19.4	11.6	11.4	23.4	23.4
Total Split (s)	60.0	60.0	15.0	75.0	25.0	25.0
Total Split (%)	60.0%	60.0%	15.0%	75.0%	25.0%	25.0%
Maximum Green (s)	53.6	53.6	8.4	68.6	18.6	18.6
Yellow Time (s)	4.6	4.6	4.6	4.6	3.3	3.3
All-Red Time (s)	1.8	1.8	2.0	1.8	3.1	3.1
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.4	6.4	6.6	6.4	6.4	6.4
Lead/Lag	Lag	Lag	Lead			
Lead-Lag Optimize?	Yes	Yes	Yes			
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	Max	Max	None	Max	None	None
Walk Time (s)	7.0	7.0			7.0	7.0
Flash Dont Walk (s)	6.0	6.0			10.0	10.0
Pedestrian Calls (#/hr)	0	0			0	0
Act Effct Green (s)	61.1	61.1	7.9	73.0	9.7	9.7
Actuated g/C Ratio	0.67	0.67	0.09	0.80	0.11	0.11
v/c Ratio	0.60	0.07	0.56	0.50	0.46	0.27
Control Delay	15.1	2.6	56.6	6.1	46.9	14.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Total Delay	15.1	2.6	56.6	6.1	46.9	14.2
LOS	B	A	E	A	D	B
Approach Delay	13.9			11.1	33.4	
Approach LOS	B			B	C	
Queue Length 50th (m)	74.7	0.0	13.3	40.2	12.9	0.0
Queue Length 95th (m)	125.9	5.5	#30.3	74.0	26.2	10.2
Internal Link Dist (m)	263.5			293.6	148.1	
Turn Bay Length (m)		70.0	80.0		60.0	
Base Capacity (vph)	1132	968	148	1406	324	333
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.60	0.07	0.53	0.50	0.24	0.16

Intersection Summary			
Area Type:	Other		
Cycle Length: 100			
Actuated Cycle Length: 91.7			
Natural Cycle: 80			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.60			
Intersection Signal Delay: 14.2		Intersection LOS: B	
Intersection Capacity Utilization 62.8%		ICU Level of Service B	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 1: Kelly Farm Drive & Leitrim Road



Intersection	
Int Delay, s/veh	3.7

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	3	69	62	5	55	92
Future Vol, veh/h	3	69	62	5	55	92
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	0	0	8	0	0	7
Mvmt Flow	3	69	62	5	55	92

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	267	65	0	0	67	0
Stage 1	65	-	-	-	-	-
Stage 2	202	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	727	1005	-	-	1547	-
Stage 1	963	-	-	-	-	-
Stage 2	837	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	700	1005	-	-	1547	-
Mov Cap-2 Maneuver	700	-	-	-	-	-
Stage 1	963	-	-	-	-	-
Stage 2	806	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	8.9	0	2.8
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	987	1547	-
HCM Lane V/C Ratio	-	-	0.073	0.036	-
HCM Control Delay (s)	-	-	8.9	7.4	0
HCM Lane LOS	-	-	A	A	A
HCM 95th %tile Q(veh)	-	-	0.2	0.1	-

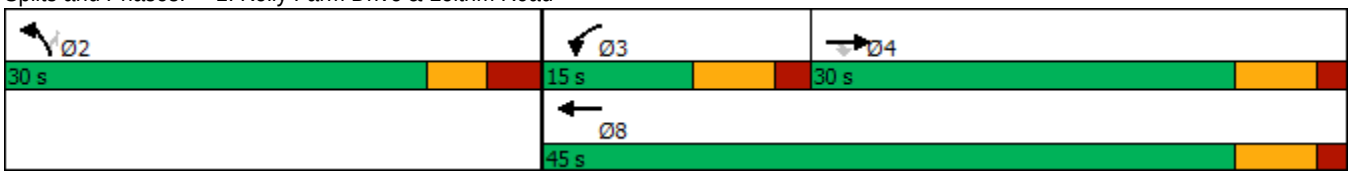
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	685	42	25	423	138	60
Future Volume (vph)	685	42	25	423	138	60
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)		70.0	80.0		60.0	0.0
Storage Lanes		1	1		1	1
Taper Length (m)			2.5		2.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850				0.850
Flt Protected			0.950		0.950	
Satd. Flow (prot)	1767	1300	1503	1625	1544	1406
Flt Permitted			0.950		0.950	
Satd. Flow (perm)	1767	1300	1503	1625	1544	1406
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		42				60
Link Speed (k/h)	80			80	50	
Link Distance (m)	287.5			317.6	172.1	
Travel Time (s)	12.9			14.3	12.4	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	3%	19%	15%	12%	12%	10%
Adj. Flow (vph)	685	42	25	423	138	60
Shared Lane Traffic (%)						
Lane Group Flow (vph)	685	42	25	423	138	60
Turn Type	NA	Perm	Prot	NA	Prot	Perm
Protected Phases	4		3	8	2	
Permitted Phases		4				2
Detector Phase	4	4	3	8	2	2
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	19.4	19.4	11.6	11.4	23.4	23.4
Total Split (s)	30.0	30.0	15.0	45.0	30.0	30.0
Total Split (%)	40.0%	40.0%	20.0%	60.0%	40.0%	40.0%
Maximum Green (s)	23.6	23.6	8.4	38.6	23.6	23.6
Yellow Time (s)	4.6	4.6	4.6	4.6	3.3	3.3
All-Red Time (s)	1.8	1.8	2.0	1.8	3.1	3.1
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.4	6.4	6.6	6.4	6.4	6.4
Lead/Lag	Lag	Lag	Lead			
Lead-Lag Optimize?	Yes	Yes	Yes			
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	Max	Max	None	Max	None	None
Walk Time (s)	7.0	7.0			7.0	7.0
Flash Dont Walk (s)	6.0	6.0			10.0	10.0
Pedestrian Calls (#/hr)	0	0			0	0
Act Effct Green (s)	40.3	40.3	6.6	43.1	10.8	10.8
Actuated g/C Ratio	0.64	0.64	0.11	0.69	0.17	0.17
v/c Ratio	0.60	0.05	0.16	0.38	0.52	0.21
Control Delay	16.3	4.6	28.4	7.6	30.5	8.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Total Delay	16.3	4.6	28.4	7.6	30.5	8.5
LOS	B	A	C	A	C	A
Approach Delay	15.6			8.7	23.8	
Approach LOS	B			A	C	
Queue Length 50th (m)	41.3	0.0	2.7	21.1	14.5	0.0
Queue Length 95th (m)	#156.6	5.5	9.0	45.3	28.9	7.9
Internal Link Dist (m)	263.5			293.6	148.1	
Turn Bay Length (m)		70.0	80.0		60.0	
Base Capacity (vph)	1136	851	201	1118	582	567
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.60	0.05	0.12	0.38	0.24	0.11

Intersection Summary			
Area Type:	Other		
Cycle Length: 75			
Actuated Cycle Length: 62.7			
Natural Cycle: 75			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.60			
Intersection Signal Delay: 14.6		Intersection LOS: B	
Intersection Capacity Utilization 56.8%		ICU Level of Service B	
Analysis Period (min) 15			

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: Kelly Farm Drive & Leitrim Road



Intersection	
Int Delay, s/veh	4.6

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	5	121	77	2	14	53
Future Vol, veh/h	5	121	77	2	14	53
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	0	0	11	0	0	17
Mvmt Flow	5	121	77	2	14	53

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	159	78	0	0	79	0
Stage 1	78	-	-	-	-	-
Stage 2	81	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	837	988	-	-	1532	-
Stage 1	950	-	-	-	-	-
Stage 2	947	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	829	988	-	-	1532	-
Mov Cap-2 Maneuver	829	-	-	-	-	-
Stage 1	950	-	-	-	-	-
Stage 2	938	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9.2	0	1.5
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	981	1532	-
HCM Lane V/C Ratio	-	-	0.128	0.009	-
HCM Control Delay (s)	-	-	9.2	7.4	0
HCM Lane LOS	-	-	A	A	A
HCM 95th %tile Q(veh)	-	-	0.4	0	-

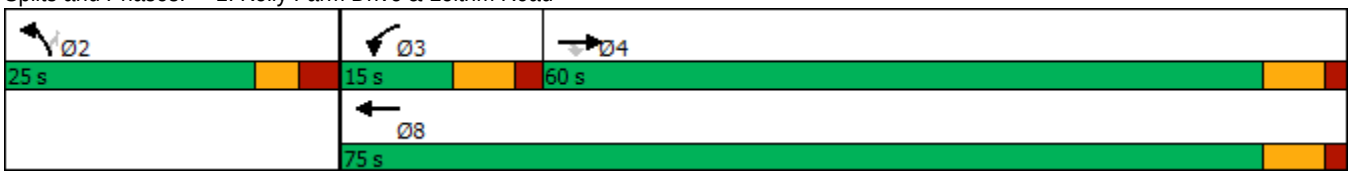
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	702	69	78	729	77	54
Future Volume (vph)	702	69	78	729	77	54
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)		70.0	80.0		60.0	0.0
Storage Lanes		1	1		1	1
Taper Length (m)			2.5		2.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850				0.850
Flt Protected			0.950		0.950	
Satd. Flow (prot)	1701	1419	1616	1767	1601	1432
Flt Permitted			0.950		0.950	
Satd. Flow (perm)	1701	1419	1616	1767	1601	1432
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		69				54
Link Speed (k/h)	80			80	50	
Link Distance (m)	287.5			317.6	172.1	
Travel Time (s)	12.9			14.3	12.4	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	7%	9%	7%	3%	8%	8%
Adj. Flow (vph)	702	69	78	729	77	54
Shared Lane Traffic (%)						
Lane Group Flow (vph)	702	69	78	729	77	54
Turn Type	NA	Perm	Prot	NA	Prot	Perm
Protected Phases	4		3	8	2	
Permitted Phases		4				2
Detector Phase	4	4	3	8	2	2
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	19.4	19.4	11.6	11.4	23.4	23.4
Total Split (s)	60.0	60.0	15.0	75.0	25.0	25.0
Total Split (%)	60.0%	60.0%	15.0%	75.0%	25.0%	25.0%
Maximum Green (s)	53.6	53.6	8.4	68.6	18.6	18.6
Yellow Time (s)	4.6	4.6	4.6	4.6	3.3	3.3
All-Red Time (s)	1.8	1.8	2.0	1.8	3.1	3.1
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.4	6.4	6.6	6.4	6.4	6.4
Lead/Lag	Lag	Lag	Lead			
Lead-Lag Optimize?	Yes	Yes	Yes			
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	Max	Max	None	Max	None	None
Walk Time (s)	7.0	7.0			7.0	7.0
Flash Dont Walk (s)	6.0	6.0			10.0	10.0
Pedestrian Calls (#/hr)	0	0			0	0
Act Effct Green (s)	61.1	61.1	7.9	73.0	9.7	9.7
Actuated g/C Ratio	0.67	0.67	0.09	0.80	0.11	0.11
v/c Ratio	0.62	0.07	0.56	0.52	0.46	0.27
Control Delay	15.7	2.6	56.6	6.3	46.9	14.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Total Delay	15.7	2.6	56.6	6.3	46.9	14.2
LOS	B	A	E	A	D	B
Approach Delay	14.5			11.2	33.4	
Approach LOS	B			B	C	
Queue Length 50th (m)	79.5	0.0	13.3	43.3	12.9	0.0
Queue Length 95th (m)	134.5	5.5	#30.3	79.9	26.2	10.2
Internal Link Dist (m)	263.5			293.6	148.1	
Turn Bay Length (m)		70.0	80.0		60.0	
Base Capacity (vph)	1132	968	148	1406	324	333
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.62	0.07	0.53	0.52	0.24	0.16

Intersection Summary			
Area Type:	Other		
Cycle Length: 100			
Actuated Cycle Length: 91.7			
Natural Cycle: 80			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.62			
Intersection Signal Delay: 14.4		Intersection LOS: B	
Intersection Capacity Utilization 64.2%		ICU Level of Service C	
Analysis Period (min) 15			

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: Kelly Farm Drive & Leitrim Road



Intersection	
Int Delay, s/veh	3.7

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	3	69	62	5	55	92
Future Vol, veh/h	3	69	62	5	55	92
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	0	0	8	0	0	7
Mvmt Flow	3	69	62	5	55	92

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	267	65	0	0	67	0
Stage 1	65	-	-	-	-	-
Stage 2	202	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	727	1005	-	-	1547	-
Stage 1	963	-	-	-	-	-
Stage 2	837	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	700	1005	-	-	1547	-
Mov Cap-2 Maneuver	700	-	-	-	-	-
Stage 1	963	-	-	-	-	-
Stage 2	806	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	8.9	0	2.8
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	987	1547	-
HCM Lane V/C Ratio	-	-	0.073	0.036	-
HCM Control Delay (s)	-	-	8.9	7.4	0
HCM Lane LOS	-	-	A	A	A
HCM 95th %tile Q(veh)	-	-	0.2	0.1	-

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	656	94	47	407	244	104
Future Volume (vph)	656	94	47	407	244	104
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)		70.0	80.0		60.0	0.0
Storage Lanes		1	1		1	1
Taper Length (m)			2.5		2.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850				0.850
Flt Protected			0.950		0.950	
Satd. Flow (prot)	1767	1300	1503	1625	1544	1406
Flt Permitted			0.950		0.950	
Satd. Flow (perm)	1767	1300	1503	1625	1544	1406
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		94				104
Link Speed (k/h)	80			80	50	
Link Distance (m)	287.5			317.6	172.1	
Travel Time (s)	12.9			14.3	12.4	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	3%	19%	15%	12%	12%	10%
Adj. Flow (vph)	656	94	47	407	244	104
Shared Lane Traffic (%)						
Lane Group Flow (vph)	656	94	47	407	244	104
Turn Type	NA	Perm	Prot	NA	Prot	Perm
Protected Phases	4		3	8	2	
Permitted Phases		4				2
Detector Phase	4	4	3	8	2	2
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	19.4	19.4	11.6	11.4	23.4	23.4
Total Split (s)	30.0	30.0	15.0	45.0	30.0	30.0
Total Split (%)	40.0%	40.0%	20.0%	60.0%	40.0%	40.0%
Maximum Green (s)	23.6	23.6	8.4	38.6	23.6	23.6
Yellow Time (s)	4.6	4.6	4.6	4.6	3.3	3.3
All-Red Time (s)	1.8	1.8	2.0	1.8	3.1	3.1
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.4	6.4	6.6	6.4	6.4	6.4
Lead/Lag	Lag	Lag	Lead			
Lead-Lag Optimize?	Yes	Yes	Yes			
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	Max	Max	None	Max	None	None
Walk Time (s)	7.0	7.0			7.0	7.0
Flash Dont Walk (s)	6.0	6.0			10.0	10.0
Pedestrian Calls (#/hr)	0	0			0	0
Act Effct Green (s)	30.4	30.4	7.2	38.8	15.7	15.7
Actuated g/C Ratio	0.45	0.45	0.11	0.58	0.23	0.23
v/c Ratio	0.82	0.15	0.30	0.43	0.68	0.26
Control Delay	33.2	5.3	34.1	11.0	33.4	6.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0

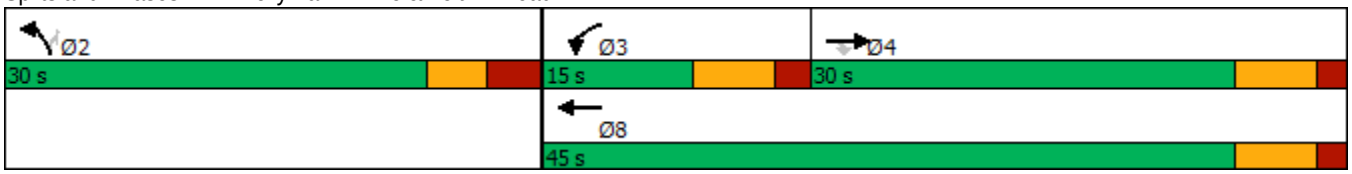
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Total Delay	33.2	5.3	34.1	11.0	33.4	6.4
LOS	C	A	C	B	C	A
Approach Delay	29.7			13.4	25.3	
Approach LOS	C			B	C	
Queue Length 50th (m)	~81.7	0.0	5.5	25.7	27.8	0.0
Queue Length 95th (m)	#171.4	9.3	15.5	56.2	48.5	9.8
Internal Link Dist (m)	263.5			293.6	148.1	
Turn Bay Length (m)		70.0	80.0		60.0	
Base Capacity (vph)	797	638	188	936	543	562
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.82	0.15	0.25	0.43	0.45	0.19

Intersection Summary			
Area Type:	Other		
Cycle Length: 75			
Actuated Cycle Length: 67.3			
Natural Cycle: 70			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.82			
Intersection Signal Delay: 24.0		Intersection LOS: C	
Intersection Capacity Utilization 66.2%		ICU Level of Service C	
Analysis Period (min) 15			

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: Kelly Farm Drive & Leitrim Road



Intersection	
Int Delay, s/veh	5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		⇕			⇕			⇕			⇕	
Traffic Vol, veh/h	71	18	0	9	9	121	0	157	11	14	92	35
Future Vol, veh/h	71	18	0	9	9	121	0	157	11	14	92	35
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	0	0	0	0	0	0	0	11	0	0	17	0
Mvmt Flow	71	18	0	9	9	121	0	157	11	14	92	35

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	366	306	110	310	318	163	127	0	0	168	0	0
Stage 1	138	138	-	163	163	-	-	-	-	-	-	-
Stage 2	228	168	-	147	155	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	594	611	949	646	602	887	1472	-	-	1422	-	-
Stage 1	870	786	-	844	767	-	-	-	-	-	-	-
Stage 2	779	763	-	860	773	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	503	604	949	626	595	887	1472	-	-	1422	-	-
Mov Cap-2 Maneuver	503	604	-	626	595	-	-	-	-	-	-	-
Stage 1	870	777	-	844	767	-	-	-	-	-	-	-
Stage 2	665	763	-	831	764	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	13.3	10.1	0	0.8
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1472	-	-	521	838	1422	-	-
HCM Lane V/C Ratio	-	-	-	0.171	0.166	0.01	-	-
HCM Control Delay (s)	0	-	-	13.3	10.1	7.6	0	-
HCM Lane LOS	A	-	-	B	B	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.6	0.6	0	-	-

Intersection	
Int Delay, s/veh	3.2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	89	0	0	79	58	43
Future Vol, veh/h	89	0	0	79	58	43
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	0	0	0	11	17	0
Mvmt Flow	89	0	0	79	58	43

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	159	80	101	0	-	0
Stage 1	80	-	-	-	-	-
Stage 2	79	-	-	-	-	-
Critical Hdwy	6.4	6.2	4.1	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-	-
Pot Cap-1 Maneuver	837	986	1504	-	-	-
Stage 1	948	-	-	-	-	-
Stage 2	949	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	837	986	1504	-	-	-
Mov Cap-2 Maneuver	837	-	-	-	-	-
Stage 1	948	-	-	-	-	-
Stage 2	949	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	9.8	0	0
HCM LOS	A		

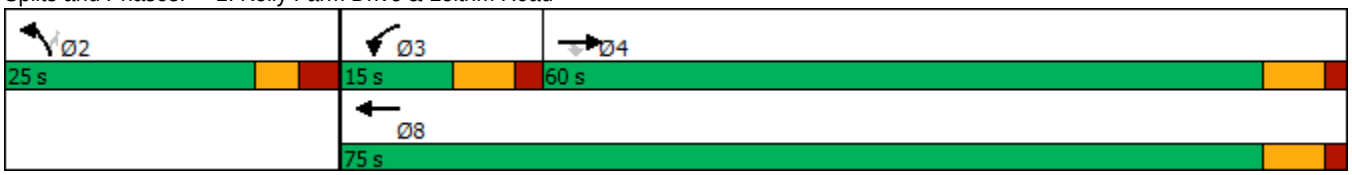
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1504	-	837	-	-
HCM Lane V/C Ratio	-	-	0.106	-	-
HCM Control Delay (s)	0	-	9.8	-	-
HCM Lane LOS	A	-	A	-	-
HCM 95th %tile Q(veh)	0	-	0.4	-	-

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	676	172	121	698	155	86
Future Volume (vph)	676	172	121	698	155	86
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)		70.0	80.0		60.0	0.0
Storage Lanes		1	1		1	1
Taper Length (m)			2.5		2.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850				0.850
Flt Protected			0.950		0.950	
Satd. Flow (prot)	1701	1419	1616	1767	1601	1432
Flt Permitted			0.950		0.950	
Satd. Flow (perm)	1701	1419	1616	1767	1601	1432
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		172				86
Link Speed (k/h)	80			80	50	
Link Distance (m)	287.5			317.6	172.1	
Travel Time (s)	12.9			14.3	12.4	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	7%	9%	7%	3%	8%	8%
Adj. Flow (vph)	676	172	121	698	155	86
Shared Lane Traffic (%)						
Lane Group Flow (vph)	676	172	121	698	155	86
Turn Type	NA	Perm	Prot	NA	Prot	Perm
Protected Phases	4		3	8	2	
Permitted Phases		4				2
Detector Phase	4	4	3	8	2	2
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	19.4	19.4	11.6	11.4	23.4	23.4
Total Split (s)	60.0	60.0	15.0	75.0	25.0	25.0
Total Split (%)	60.0%	60.0%	15.0%	75.0%	25.0%	25.0%
Maximum Green (s)	53.6	53.6	8.4	68.6	18.6	18.6
Yellow Time (s)	4.6	4.6	4.6	4.6	3.3	3.3
All-Red Time (s)	1.8	1.8	2.0	1.8	3.1	3.1
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.4	6.4	6.6	6.4	6.4	6.4
Lead/Lag	Lag	Lag	Lead			
Lead-Lag Optimize?	Yes	Yes	Yes			
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	Max	Max	None	Max	None	None
Walk Time (s)	7.0	7.0			7.0	7.0
Flash Dont Walk (s)	6.0	6.0			10.0	10.0
Pedestrian Calls (#/hr)	0	0			0	0
Act Effct Green (s)	53.7	53.7	8.4	68.7	14.0	14.0
Actuated g/C Ratio	0.56	0.56	0.09	0.72	0.15	0.15
v/c Ratio	0.71	0.20	0.85	0.55	0.66	0.30
Control Delay	21.1	2.4	90.5	8.8	52.3	10.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Total Delay	21.1	2.4	90.5	8.8	52.3	10.9
LOS	C	A	F	A	D	B
Approach Delay	17.3			20.9	37.6	
Approach LOS	B			C	D	
Queue Length 50th (m)	85.9	0.0	22.5	51.7	27.3	0.0
Queue Length 95th (m)	141.6	9.1	#56.4	90.5	47.2	12.4
Internal Link Dist (m)	263.5			293.6	148.1	
Turn Bay Length (m)		70.0	80.0		60.0	
Base Capacity (vph)	955	872	142	1270	311	348
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.71	0.20	0.85	0.55	0.50	0.25

Intersection Summary			
Area Type:	Other		
Cycle Length: 100			
Actuated Cycle Length: 95.5			
Natural Cycle: 80			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.85			
Intersection Signal Delay: 21.4		Intersection LOS: C	
Intersection Capacity Utilization 69.9%		ICU Level of Service C	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 1: Kelly Farm Drive & Leitrim Road



Intersection	
Int Delay, s/veh	4.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	52	13	0	12	17	69	0	120	11	55	169	68
Future Vol, veh/h	52	13	0	12	17	69	0	120	11	55	169	68
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	0	0	0	0	0	0	0	8	0	0	7	0
Mvmt Flow	52	13	0	12	17	69	0	120	11	55	169	68

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	482	444	203	446	473	126	237	0	0	131	0	0
Stage 1	313	313	-	126	126	-	-	-	-	-	-	-
Stage 2	169	131	-	320	347	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	498	511	843	526	493	930	1342	-	-	1467	-	-
Stage 1	702	661	-	883	796	-	-	-	-	-	-	-
Stage 2	838	792	-	696	638	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	433	489	843	498	471	930	1342	-	-	1467	-	-
Mov Cap-2 Maneuver	433	489	-	498	471	-	-	-	-	-	-	-
Stage 1	702	632	-	883	796	-	-	-	-	-	-	-
Stage 2	759	792	-	652	610	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	14.5	10.7	0	1.4
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1342	-	-	443	729	1467	-	-
HCM Lane V/C Ratio	-	-	-	0.147	0.134	0.037	-	-
HCM Control Delay (s)	0	-	-	14.5	10.7	7.5	0	-
HCM Lane LOS	A	-	-	B	B	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.5	0.5	0.1	-	-

Intersection	
Int Delay, s/veh	2.1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	65	0	0	67	95	86
Future Vol, veh/h	65	0	0	67	95	86
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	0	0	0	8	7	0
Mvmt Flow	65	0	0	67	95	86

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	205	138	181	0	-	0
Stage 1	138	-	-	-	-	-
Stage 2	67	-	-	-	-	-
Critical Hdwy	6.4	6.2	4.1	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-	-
Pot Cap-1 Maneuver	788	916	1407	-	-	-
Stage 1	894	-	-	-	-	-
Stage 2	961	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	788	916	1407	-	-	-
Mov Cap-2 Maneuver	788	-	-	-	-	-
Stage 1	894	-	-	-	-	-
Stage 2	961	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	10	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1407	-	788	-	-
HCM Lane V/C Ratio	-	-	0.082	-	-
HCM Control Delay (s)	0	-	10	-	-
HCM Lane LOS	A	-	B	-	-
HCM 95th %tile Q(veh)	0	-	0.3	-	-

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	685	94	47	423	244	104
Future Volume (vph)	685	94	47	423	244	104
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)		70.0	80.0		60.0	0.0
Storage Lanes		1	1		1	1
Taper Length (m)			2.5		2.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850				0.850
Flt Protected			0.950		0.950	
Satd. Flow (prot)	1767	1300	1503	1625	1544	1406
Flt Permitted			0.950		0.950	
Satd. Flow (perm)	1767	1300	1503	1625	1544	1406
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		94				104
Link Speed (k/h)	80			80	50	
Link Distance (m)	287.5			317.6	172.1	
Travel Time (s)	12.9			14.3	12.4	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	3%	19%	15%	12%	12%	10%
Adj. Flow (vph)	685	94	47	423	244	104
Shared Lane Traffic (%)						
Lane Group Flow (vph)	685	94	47	423	244	104
Turn Type	NA	Perm	Prot	NA	Prot	Perm
Protected Phases	4		3	8	2	
Permitted Phases		4				2
Detector Phase	4	4	3	8	2	2
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	19.4	19.4	11.6	11.4	23.4	23.4
Total Split (s)	30.0	30.0	15.0	45.0	30.0	30.0
Total Split (%)	40.0%	40.0%	20.0%	60.0%	40.0%	40.0%
Maximum Green (s)	23.6	23.6	8.4	38.6	23.6	23.6
Yellow Time (s)	4.6	4.6	4.6	4.6	3.3	3.3
All-Red Time (s)	1.8	1.8	2.0	1.8	3.1	3.1
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.4	6.4	6.6	6.4	6.4	6.4
Lead/Lag	Lag	Lag	Lead			
Lead-Lag Optimize?	Yes	Yes	Yes			
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	Max	Max	None	Max	None	None
Walk Time (s)	7.0	7.0			7.0	7.0
Flash Dont Walk (s)	6.0	6.0			10.0	10.0
Pedestrian Calls (#/hr)	0	0			0	0
Act Effct Green (s)	30.4	30.4	7.2	38.8	15.7	15.7
Actuated g/C Ratio	0.45	0.45	0.11	0.58	0.23	0.23
v/c Ratio	0.86	0.15	0.30	0.45	0.68	0.26
Control Delay	36.3	5.3	34.1	11.2	33.4	6.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0

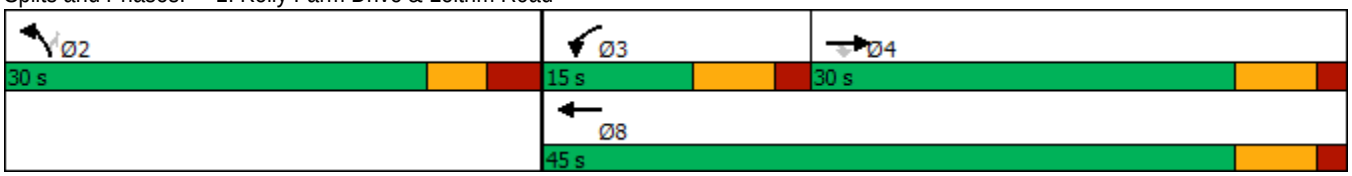
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Total Delay	36.3	5.3	34.1	11.2	33.4	6.4
LOS	D	A	C	B	C	A
Approach Delay	32.6			13.5	25.3	
Approach LOS	C			B	C	
Queue Length 50th (m)	~96.0	0.0	5.5	27.0	27.8	0.0
Queue Length 95th (m)	#180.9	9.3	15.5	59.1	48.5	9.8
Internal Link Dist (m)	263.5			293.6	148.1	
Turn Bay Length (m)		70.0	80.0		60.0	
Base Capacity (vph)	797	638	188	936	543	562
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.86	0.15	0.25	0.45	0.45	0.19

Intersection Summary			
Area Type:	Other		
Cycle Length: 75			
Actuated Cycle Length: 67.3			
Natural Cycle: 75			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.86			
Intersection Signal Delay: 25.4		Intersection LOS: C	
Intersection Capacity Utilization 66.2%		ICU Level of Service C	
Analysis Period (min) 15			

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: Kelly Farm Drive & Leitrim Road



Intersection	
Int Delay, s/veh	5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		⇕			⇕			⇕			⇕	
Traffic Vol, veh/h	71	18	0	9	9	121	0	157	11	14	92	35
Future Vol, veh/h	71	18	0	9	9	121	0	157	11	14	92	35
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	0	0	0	0	0	0	0	11	0	0	17	0
Mvmt Flow	71	18	0	9	9	121	0	157	11	14	92	35

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	366	306	110	310	318	163	127	0	0	168	0	0
Stage 1	138	138	-	163	163	-	-	-	-	-	-	-
Stage 2	228	168	-	147	155	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	594	611	949	646	602	887	1472	-	-	1422	-	-
Stage 1	870	786	-	844	767	-	-	-	-	-	-	-
Stage 2	779	763	-	860	773	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	503	604	949	626	595	887	1472	-	-	1422	-	-
Mov Cap-2 Maneuver	503	604	-	626	595	-	-	-	-	-	-	-
Stage 1	870	777	-	844	767	-	-	-	-	-	-	-
Stage 2	665	763	-	831	764	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	13.3	10.1	0	0.8
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1472	-	-	521	838	1422	-	-
HCM Lane V/C Ratio	-	-	-	0.171	0.166	0.01	-	-
HCM Control Delay (s)	0	-	-	13.3	10.1	7.6	0	-
HCM Lane LOS	A	-	-	B	B	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.6	0.6	0	-	-

Intersection	
Int Delay, s/veh	3.2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	89	0	0	79	58	43
Future Vol, veh/h	89	0	0	79	58	43
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	0	0	0	11	17	0
Mvmt Flow	89	0	0	79	58	43

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	159	80	101	0	-	0
Stage 1	80	-	-	-	-	-
Stage 2	79	-	-	-	-	-
Critical Hdwy	6.4	6.2	4.1	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-	-
Pot Cap-1 Maneuver	837	986	1504	-	-	-
Stage 1	948	-	-	-	-	-
Stage 2	949	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	837	986	1504	-	-	-
Mov Cap-2 Maneuver	837	-	-	-	-	-
Stage 1	948	-	-	-	-	-
Stage 2	949	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	9.8	0	0
HCM LOS	A		

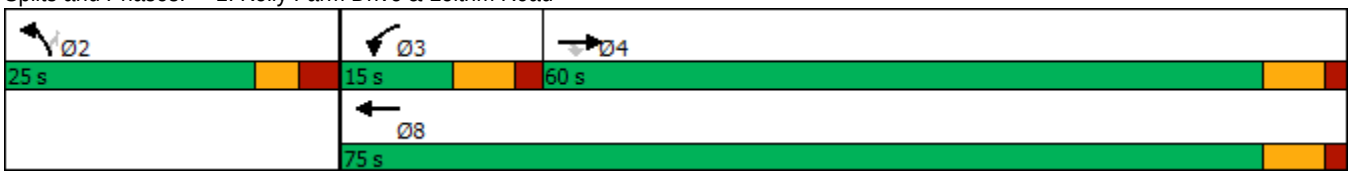
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1504	-	837	-	-
HCM Lane V/C Ratio	-	-	0.106	-	-
HCM Control Delay (s)	0	-	9.8	-	-
HCM Lane LOS	A	-	A	-	-
HCM 95th %tile Q(veh)	0	-	0.4	-	-

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	702	172	121	729	155	86
Future Volume (vph)	702	172	121	729	155	86
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)		70.0	80.0		60.0	0.0
Storage Lanes		1	1		1	1
Taper Length (m)			2.5		2.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850				0.850
Flt Protected			0.950		0.950	
Satd. Flow (prot)	1701	1419	1616	1767	1601	1432
Flt Permitted			0.950		0.950	
Satd. Flow (perm)	1701	1419	1616	1767	1601	1432
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		172				86
Link Speed (k/h)	80			80	50	
Link Distance (m)	287.5			317.6	172.1	
Travel Time (s)	12.9			14.3	12.4	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	7%	9%	7%	3%	8%	8%
Adj. Flow (vph)	702	172	121	729	155	86
Shared Lane Traffic (%)						
Lane Group Flow (vph)	702	172	121	729	155	86
Turn Type	NA	Perm	Prot	NA	Prot	Perm
Protected Phases	4		3	8	2	
Permitted Phases		4				2
Detector Phase	4	4	3	8	2	2
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	19.4	19.4	11.6	11.4	23.4	23.4
Total Split (s)	60.0	60.0	15.0	75.0	25.0	25.0
Total Split (%)	60.0%	60.0%	15.0%	75.0%	25.0%	25.0%
Maximum Green (s)	53.6	53.6	8.4	68.6	18.6	18.6
Yellow Time (s)	4.6	4.6	4.6	4.6	3.3	3.3
All-Red Time (s)	1.8	1.8	2.0	1.8	3.1	3.1
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.4	6.4	6.6	6.4	6.4	6.4
Lead/Lag	Lag	Lag	Lead			
Lead-Lag Optimize?	Yes	Yes	Yes			
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	Max	Max	None	Max	None	None
Walk Time (s)	7.0	7.0			7.0	7.0
Flash Dont Walk (s)	6.0	6.0			10.0	10.0
Pedestrian Calls (#/hr)	0	0			0	0
Act Effct Green (s)	53.7	53.7	8.4	68.7	14.0	14.0
Actuated g/C Ratio	0.56	0.56	0.09	0.72	0.15	0.15
v/c Ratio	0.74	0.20	0.85	0.57	0.66	0.30
Control Delay	22.2	2.4	90.5	9.2	52.3	10.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Total Delay	22.2	2.4	90.5	9.2	52.3	10.9
LOS	C	A	F	A	D	B
Approach Delay	18.3			20.8	37.6	
Approach LOS	B			C	D	
Queue Length 50th (m)	91.4	0.0	22.5	55.7	27.3	0.0
Queue Length 95th (m)	151.3	9.1	#56.4	97.7	47.2	12.4
Internal Link Dist (m)	263.5			293.6	148.1	
Turn Bay Length (m)		70.0	80.0		60.0	
Base Capacity (vph)	955	872	142	1270	311	348
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.74	0.20	0.85	0.57	0.50	0.25

Intersection Summary			
Area Type:	Other		
Cycle Length: 100			
Actuated Cycle Length: 95.5			
Natural Cycle: 80			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.85			
Intersection Signal Delay: 21.7		Intersection LOS: C	
Intersection Capacity Utilization 71.3%		ICU Level of Service C	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 1: Kelly Farm Drive & Leitrim Road



Intersection	
Int Delay, s/veh	4.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		⇕			⇕			⇕			⇕	
Traffic Vol, veh/h	52	13	0	12	17	69	0	120	11	55	169	68
Future Vol, veh/h	52	13	0	12	17	69	0	120	11	55	169	68
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	0	0	0	0	0	0	0	8	0	0	7	0
Mvmt Flow	52	13	0	12	17	69	0	120	11	55	169	68

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	482	444	203	446	473	126	237	0	0	131	0	0
Stage 1	313	313	-	126	126	-	-	-	-	-	-	-
Stage 2	169	131	-	320	347	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	498	511	843	526	493	930	1342	-	-	1467	-	-
Stage 1	702	661	-	883	796	-	-	-	-	-	-	-
Stage 2	838	792	-	696	638	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	433	489	843	498	471	930	1342	-	-	1467	-	-
Mov Cap-2 Maneuver	433	489	-	498	471	-	-	-	-	-	-	-
Stage 1	702	632	-	883	796	-	-	-	-	-	-	-
Stage 2	759	792	-	652	610	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	14.5	10.7	0	1.4
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1342	-	-	443	729	1467	-	-
HCM Lane V/C Ratio	-	-	-	0.147	0.134	0.037	-	-
HCM Control Delay (s)	0	-	-	14.5	10.7	7.5	0	-
HCM Lane LOS	A	-	-	B	B	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.5	0.5	0.1	-	-

Intersection	
Int Delay, s/veh	2.1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	65	0	0	67	95	86
Future Vol, veh/h	65	0	0	67	95	86
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	0	0	0	8	7	0
Mvmt Flow	65	0	0	67	95	86

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	205	138	181	0	-	0
Stage 1	138	-	-	-	-	-
Stage 2	67	-	-	-	-	-
Critical Hdwy	6.4	6.2	4.1	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-	-
Pot Cap-1 Maneuver	788	916	1407	-	-	-
Stage 1	894	-	-	-	-	-
Stage 2	961	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	788	916	1407	-	-	-
Mov Cap-2 Maneuver	788	-	-	-	-	-
Stage 1	894	-	-	-	-	-
Stage 2	961	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	10	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1407	-	788	-	-
HCM Lane V/C Ratio	-	-	0.082	-	-
HCM Control Delay (s)	0	-	10	-	-
HCM Lane LOS	A	-	B	-	-
HCM 95th %tile Q(veh)	0	-	0.3	-	-