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1015 March Road

Traffic Impact Assessment

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Proposed Development
1015 March Road

Transportation Impact Assessment

Prepared By:

NOVATECH
Suite 200, 240 Michael Cowpland Drive
Ottawa, Ontario
K2M 1P6

February 2022
Revised: August 2022

Novatech File: 121247
Ref: R-2021-133

NOVATECH
Engineers, Planners & Landscape Architects

August 5, 2022

City of Ottawa
Planning and Growth Management Department
110 Laurier Ave. W., 4th Floor,
Ottawa, Ontario K1P 1J1

Attention: **Mr. Mike Giampa**
Senior Transportation Engineer, Infrastructure Applications

Dear Mr. Giampa:

Reference: **1015 March Road**
Revised Transportation Impact Assessment
Novatech File No. 121247

We are pleased to submit the following revised Transportation Impact Assessment (TIA) in support of Plan of Subdivision and Zoning By-Law Amendment applications for the property located at 1015 March Road, for your review and signoff. The structure and format of this report is in accordance with the City of Ottawa Transportation Impact Assessment Guidelines (June 2017). This revised TIA has been prepared to address City comments dated April 19, 2022.

If you have any questions or comments regarding this report, please feel free to contact me.

Yours truly,

NOVATECH

Patrick Hatton, P. Eng.
Project Manager | Transportation/Traffic

CC: Lisa Stern, Planner II

Suite 200, 240 Michael Cowpland Drive, Ottawa ON K2M 1P6 Tel: 613.254.9643 Fax: 613.254.5867 www.novatech-eng.com

TIA Plan Reports

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

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

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

CERTIFICATION

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

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

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Dated at Ottawa (City) this 5th day of August, 2022.

Name: Patrick Hatton, P.Eng.
(Please Print)

Professional Title: Project Manager, Transportation / Traffic

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

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EXECUTIVE SUMMARY

Novatech has been retained by 13533441 Canada Inc. to prepare this revised Transportation Impact Assessment (TIA) in support of the application for a Draft Plan of Subdivision and Zoning By-Law Amendment (ZBLA) to allow for the development of 1015 March Road in Kanata North. For the purposes of this TIA, March Road is considered to be oriented in a north-south direction.

The site is on the west side of March Road and is occupied by a single detached dwelling and accessory structure (both structures to be removed prior to redevelopment) with the remainder of the site being agricultural land.

The following describes the existing and planned land uses surrounding the Subject Lands:

North: A planned subdivision (CUD Developments) at 1053, 1075, and 1145 March Road that will include 590 dwelling units and a portion of land dedicated for the school block proposed on the site for this current TIA, as well as neighbourhood park, an OC Transpo park and ride, and open space for the realignment of the Shirley's Brook (Tributary 2). A future emergency service (fire hall) is also planned further north.

East: A planned subdivision (Cavanagh Developments) at 1020-1070 March Road that will consist of 790 dwelling units. The future residential development will also include a school, neighbourhood park, as well as neighbourhood mixed use for the lands fronting March Road. Open space blocks for realignment of the Shirley's Brook (Tributary 2) also forms part of these applications. South of the Cavanaugh subdivision (and southeast of the subject lands) is another planned subdivision (Minto Communities) at 936 March Road that will consist of 854 dwelling units. The future development will include a school, neighbourhood park, and community mixed use for the lands fronting March Road.

South: A planned subdivision (Brigil) at 927 March Road that will consist of 1,861 dwelling units. The future development will also include a school, neighbourhood park, and open space for the Shirley's Brook (Tributary 3), and community mixed use for the lands fronting March Road.

West: Future land to be developed as part of the CUD subdivision abut the Subject Site to the west. A combination of country lot estate subdivisions and rural lands are situated further west.

The Kanata North Urban Expansion Area (KNUEA) is an approximately 181-hectare area located north of several established urban communities in Kanata. A Transportation Master Plan (TMP) provided a review of a number of alternative transportation solutions and alternative design concepts to support the development of the KNUEA area. The review included an analysis of alternative park and ride facility locations, alternative intersection controls along March Road, access alternatives to Old Carp Road, alternative access locations along March Road, and internal intersection control alternatives. As discussed at the pre-consultation meeting, this TIA will follow the City's 2017 TIA guidelines. However, the TMP will serve as the parent document for this TIA, as many elements of the analysis were already completed as part of the TMP. As such, the TIA will reference the previous analysis presented in the TMP and will provide a supplementary review of aspects of the subdivision to fulfil the requirements of the TIA.

The site will be subdivided to consist of one future commercial block on the eastern portion abutting March Road, a French public high school on the western portion of the site and extend Street 10 to March Road. A road widening block will be dedicated to the City. These uses are consistent with

those identified in the KNUEA TMP. The future institutional block and commercial block will be subject to future Site Plan Control applications when proposals are advanced for the development.

The subject application satisfies all three triggers for completing a TIA report per the City's TIA Screening Form.

The study area for this report will include March Road as well as the following intersections:

- March Road/Halton Terrace/Maxwell Bridge Road; and,
- March Road/Street 10 (access intersection).

The selected time periods for the analysis are the weekday AM and PM peak hours, as they represent the 'worst case' combination of site generated traffic and adjacent street traffic. The proposed development is anticipated to be constructed with full occupancy in 2026.

The conclusions and recommendations of this TIA can be summarized as follows:

- Street 10 is a proposed collector road running along the north edge of the development and is consistent with the KNUEA CDP TMP. The collector roadway design will include a sidewalk on the north side and a multi-use path (MUP) on the south (site) side and encourage the use of active transportation modes for utilitarian trips, particularly between the proposed site uses (commercial, school) and the planned nearby residential developments.

- March Road is the only boundary street for the subject site. Complete streets principles were incorporated into the interim and ultimate cross-sections for March Road. The proposed signalized access location is consistent with the KNUEA CDP TMP and is not anticipated to impact the complete street design for March Road.

- The Subject Lands will be served by one signalized all-movement access along March Road at Street 10. It is anticipated that the commercial development will be served by an all-movement driveway to Street 10 and a right-in, right-out access to March Road. The school is expected to have driveways to Street 10 as well as Street 12 (CUD subdivision).

- As development progresses within the KNUEA, and subject to the City and Development Charges Funding, March Road will be widened to accommodate the increase in vehicular traffic and ultimately extend the future Kanata North Transitway. Subject to the urban portion of the March Road widening project being brought into the affordable plan, and subject to reasonable terms being established including payback period, the Kanata North Land Owners Group (KNLOG) is prepared to enter into a front ending agreement with the City to construct the four lane widening of March Road to the limit of the urban area.

- The location of the proposed signalized all-movement access is consistent with the KNUEA CDP TMP. A northbound left turn lane was found to be warranted along March Road for traffic turning into Street 10 based on 2026 traffic volumes with the addition of site trips. Signalization warrants indicate that the intersection of March Road at Street 10 is not expected to warrant signalization in 2031 with development of the KNUEA. Intersection analysis with STOP control at the intersection indicates high delay (138 seconds in 2026, 150 seconds in 2031) for the eastbound left movement during the AM peak hour. The high delay may cause exiting vehicles to choose an unacceptable gap in traffic along March Road,

resulting in a safety issue. With signalization, the intersection was found to operate with LOS D during the AM and PM peak hours in 2026 and 2031.

- A functional design of the March Road at Street 10 intersection has been prepared with a two-lane cross section along March Road.

- The proposed March Road/Street 10 signalized intersection will meet the target BLOS and Auto LOS, however it will not meet the target PLOS and TkLOS. With a planned high school within the subdivision, an articulated bus was used as the design vehicle at the intersection.
    - The pedestrian walk times for the March Road crossings are equivalent to PLOS E and the PETSI scores for each of the approaches are B or C, missing the PLOS target A. An increase in the pedestrian walk time for the March Road crossings and reduction in the pedestrian crossing distance on each of the three legs are required to achieve the PLOS target. Considering the high through traffic volume and the single through lane in each direction along March Road, long green times and the proposed lane configuration are required.
    - The TkLOS for the north and west approaches are F, missing the target. To achieve the target a corner radius of more than 15m, or a second receiving lane is required on each approach. The wider radius would decrease the PETSI score for the PLOS evaluation and is not recommended. It is understood that March Road will be widened to include a second southbound through lane in the future.

- While the projected volume along Street 10 exceeds the NTM threshold for a collector roadway during the 2031 AM peak hour, its 224 eastbound vehicles and 168 westbound vehicles correspond to volume to capacity ratios of 0.37 and 0.28, respectively (both LOS A). The projected volume along Street 10 during the 2031 PM peak hour (257 vph) does not exceed the NTM threshold. Street 10 is not anticipated to operate above-capacity. Therefore, no neighbourhood traffic management measures are recommended.

- The proposed commercial development is anticipated to generate approximately 3 transit trips (2 in, 1 out) during the AM peak hour and 12 transit trips (5 in, 7 out) during the PM peak hour. These transit trips associated with the commercial development are not anticipated to impact the capacity of the transit routes.

- Based on the estimated person trip generation for the school, the school is expected to generate 308 transit trips (all entering) during the AM peak hour. Additional transit routes are expected to be required to service the school and school transit trips will be reviewed further at site plan. School transit trips are in addition to some school busing (assumed 4 school buses with 152 peak hour student trips).

- The March Road/Halton Terrace/Maxwell Bridge Road intersection meets the target TLOS and Auto LOS, however it does not meet the target PLOS, BLOS and TkLOS for the General Urban Area.
    - A reduction in the east-west crossing distance for pedestrians would provide the greatest improvement to the PLOS at this intersection. However, based on the projected future traffic volumes, the existing cross section along March Road is appropriate. To achieve the target BLOS on the north and south approaches, the City could give consideration to providing a two-stage left-turn bike box to facilitate left-

turn movements. A BLOS B can be achieved on the east approach with a reduced operating speed of 40km/hr.

- The north approach to March Road/Halton Terrace/Maxwell Bridge Road intersection does not meet the target TkLOS for the General Urban Area. As Halton Terrace is not designated as a truck route, the TkLOS E on the north approach is considered appropriate. Increasing the right turn radii on this approach would decrease the PETSI score for the PLOS evaluation and is not recommended.

- As the proposed development is to be constructed within the build-out time frame identified in the KNUEA CDP TMP, intersection capacity analysis presented in the KNUEA CDP TMP is representative of the conditions following build-out of the proposed development.

- The intersection capacity analysis presented in the KNUEA CDP TMP suggests the study area intersections will operate with a LOS D or better during the weekday AM and PM peak hours through the 2031 horizon year.

1.0 SCREENING

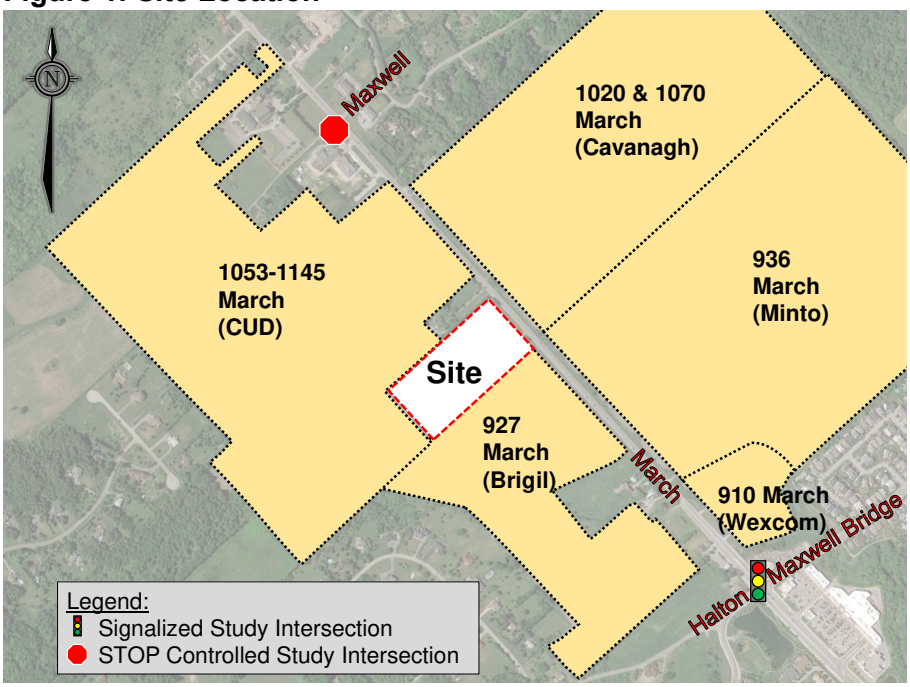
1.1 Introduction

Novatech has been retained by 13533441 Canada Inc. to prepare this revised Transportation Impact Assessment (TIA) in support of Plan of Subdivision and Zoning By-Law Amendment applications for the property located at 1015 March Road. For the purposes of this TIA, March Road is considered to be oriented in a north-south direction. The site will be subdivided to consist of one future commercial block, one future institutional block, and extend Street 10 to March Road. A road widening block will be dedicated to the City. The extension of Street 10 to March Road will connect with the street segment also known as Street 10, shown on the Draft Plan of Subdivision for CU Developments (CUD) *(City File No.: D07-16-18-0023 and D02-02-18-0076)* which is located north and west of the subject site. The future institutional block and commercial block will be subject to future Site Plan Control applications when proposals are advanced for the development.

The Kanata North Urban Expansion Area (KNUEA) is an approximately 181-hectare area located north of several established urban communities in Kanata. In June 2016, the KNUEA Community Design Plan (CDP) was approved and provides direction between the Official Plan policy and development approval to enable development to occur incrementally over time in an optimum and coordinated manner and to provide a guide to the preparation and review of future applications for development. A Transportation Master Plan (TMP) was prepared as part of the CDP to review and assess the traffic impacts for the preferred development option. The subject development is located within the KNUEA and the proposed land uses are in accordance with the approved *2016 Kanata North Community Design Plan*.

The site is on the west side of March Road in the community of Kanata North and is occupied by a single detached dwelling and accessory structure (both structures to be removed prior to redevelopment) with the remainder of the site being agricultural land. The following describes the planned land uses adjacent to the subject site (site location shown in **Figure 1**).

Figure 1: Site Location



North:
CU Developments (CUD) is planning to subdivide the land at 1053, 1075, and 1145 March Road to develop 590 dwelling units, including detached and townhouse *(City File Nos.: D07-16-18-0023 and D02-02-18-0076)*. The future residential development will also include a portion of land dedicated for the school block proposed on the subject site, neighbourhood park, an OC Transpo park and ride, and open space for the realignment of the Shirley's

Brook (Tributary 2). A future emergency service (fire hall) is also planned further north.

East: Cavanagh Developments is proposing to subdivide the land at 1020-1070 March Road that will consist of 790 dwelling units, including detached, semi-detached and townhouse east of March Road and the Subject Site *(City File Nos.: D02-02-19-0090 and D07-16-19-0020)*. The future residential development will also include a school, neighbourhood park, as well as neighbourhood mixed use for the lands fronting March Road. Open space blocks for realignment of the Shirley's Brook (Tributary 2) also forms part of these applications. Minto Communities *(City File Nos.: D02-02-18-0109 and D07-16-18-0032)* is proposing to subdivide the lands at 936 March Road that will consist of 854 dwelling units, including detached, semi-detached, and townhouse. The future residential development will include a school, neighbourhood park, and community mixed use for the lands fronting March Road.

South: Brigil is proposing to subdivide the land at 927 March Road that will consist of 1,861 dwelling units, including detached, townhouse, and apartment dwellings *(City File Nos.: D01-01-20-0027, D02-02-20-0138, D07-16-20-0034)*. The future development will also include a school, neighbourhood park, and open space for the Shirley's Brook (Tributary 3), and community mixed use for the lands fronting March Road.

West: Future land to be developed as part of the CUD subdivision abut the Subject Site to the west. A combination of country lot estate subdivisions and rural lands are situated further west.

1.2 Proposed Development

The Subject Site was designated under the previous *Official Plan* as a *General Urban Area* as per *Schedule B – Urban Policy Plan*. Under the new *Official Plan*, the Subject Site is now designated as a *Corridor – Mainstreet* up to 220m from the centreline of March Road with the balance designated "Neighbourhood" and is located within the *Suburban (West) Transect* of *Schedule B5*. The *Suburban Transect* comprises neighbourhoods within the urban boundary located outside the *Greenbelt*.

The subject site is currently dual zoned RC[338r] – Rural Commercial Zone, Rural Exception 338 and RU – Rural Countryside Zone. To facilitate the future proposed development as shown on the Draft Plan of Subdivision (**Appendix A**), a Zoning By-law Amendment will be required to change the zoning to urban uses that would permit an institutional use and to increase the range of permitted uses on the commercial block to match the approved land uses in the 2016 CDP.

The proposed future development will include commercial / retail space on the eastern portion abutting March Road as well as a French public high school on the western portion of the site. These uses are consistent with those from the CDP. The commercial areas will be refined with a future site plan and the school is subject to the 6.0-acre school site being acquired by the school board. Along the north edge of the subject property runs a planned collector road that was shown as 'Street 10' on the recent Draft Plan of Subdivision for the CUD site just to the north (1053-1145 March Road). Pedestrian sidewalks will be provided on both sides of Street 10 and will connect the future pedestrian sidewalks in the CUD subdivision to March Road. The future intersection of March Road at Street 10 is planned as a full movement signalized intersection and is eligible for development charge funding. It is expected that the commercial development will be accessed by an all-movement driveway along the planned Street 10 as well as a right-in, right-out access to March Road. The school is expected to have driveways to Street 10 as well as Street 12 (CUD subdivision). The proposed development is expected to be fully occupied in 2026.

1.3 Screening Form

The City's 2017 TIA Guidelines identify three triggers for completing a TIA report, including trip generation, location, and safety. The criteria for each trigger are outlined in the City's TIA Screening Form (See **Appendix B**). The trigger results are as follows:

- Trip Generation Trigger – The development is anticipated to generate over 60 peak hour person trips; further assessment **is required** based on this trigger.

- Location Triggers – March Road is shown as a Spine route within the City's Cycling Plan through its online GeoOttawa tool; further assessment **is required** based on this trigger.

- Safety Triggers – The posted speed limit along March Road is 80km/h and the proposed driveways to March Road and to Street 10 are near the planned signals at March Road / Street 10; further assessment **is required** based on this trigger.

2.0 SCOPING

2.1 Existing Conditions

2.1.1 Roadways

All roadways within the study area fall under the jurisdiction of the City of Ottawa.

March Road is an arterial roadway that for the purposes of this study is considered to run on a north-south alignment within the study area, running between Dunrobin Road and Highway 417. West of Dunrobin Road, the roadway runs on an east-west alignment until Appleton Sideroad in Almonte, where it continues as Ottawa Street. South of Highway 417, the roadway continues on a north-south alignment as Eagleson Road. In front of the site it has a two-lane undivided rural cross-section and a posted speed limit of 80km/h. School zone signage with a flashing amber beacon is provided near St. Isidore Catholic School, reducing the posted speed to 60km/h during school hours. March Road is classified as a truck route, allowing full loads. The Official Plan reserves a 44.5m right-of-way (ROW) and the ROW of March Road at the frontage is about 31m. A widening is required and is shown as Block 1 on the Draft Plan in **Appendix A**.

Halton Terrace is a collector roadway that generally runs on an east-west alignment within the study area, running between Flamborough Way (south of Morgan's Grant Way) and March Road. East of March Road, the roadway continues on an east-west alignment as Maxwell Bridge Road before terminating at Celtic Ridge Crescent. Within the study area, Halton Terrace has a two-lane urban cross-section, sidewalks on both sides of the roadway, and a posted speed limit of 40 km/h. Halton Terrace is not classified as a truck route. Street parking is permitted.

Maxwell Bridge Road is a collector roadway that runs on an east-west alignment between March Road and Marconi Avenue and is a local roadway between Marconi Avenue and Celtic Ridge Crescent. Within the study area, Maxwell Bridge Road has a two-lane urban cross-section, sidewalks on both sides of the roadway, and an unposted regulatory speed limit of 50 km/h under the Highway Traffic Act. Maxwell Bridge Road is not classified as a truck route. Street parking is permitted.

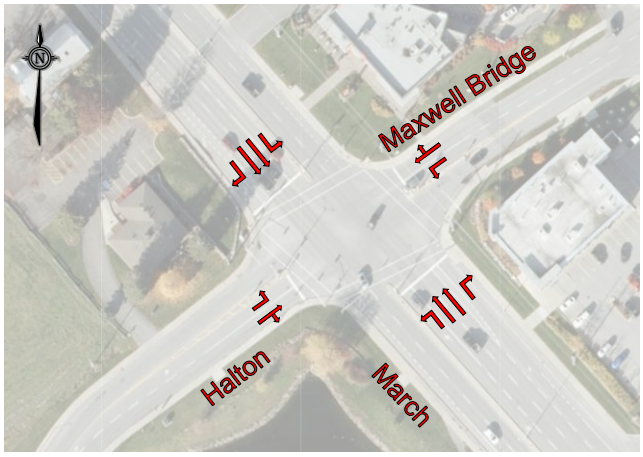
Maxwell Road is a local roadway that runs about 120m from March Road to Hedge Drive with a two-lane rural cross-section with roadside ditches on both sides and an unposted regulatory speed limit of 50 km/h under the Highway Traffic Act. Maxwell Road is not classified as a truck route. Street parking is permitted.

Old Carp Road is a collector roadway that runs from Halton Terrace to March Road at Donald B. Munro Drive in the west. It has a two-lane rural cross-section with roadside ditches on both sides and a posted speed limit of 40 km/h. Old Carp Road is not classified as a truck route. Street parking is permitted.

2.1.2 Intersections

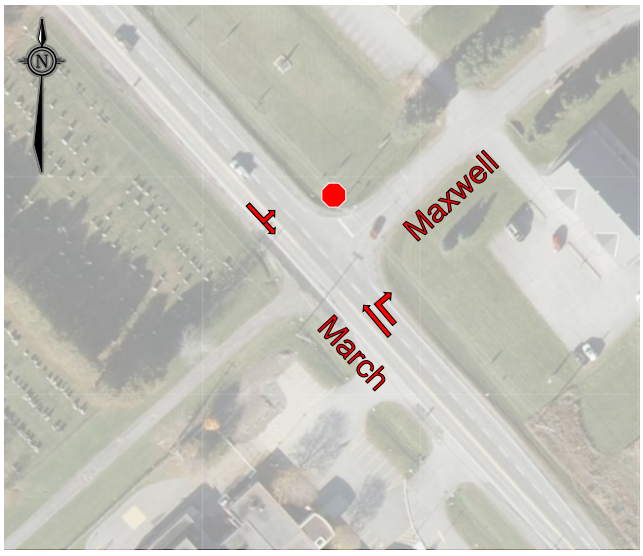
March Road/Halton Terrace/Maxwell Bridge Road

- Signalized four-legged intersection
- North/South Approaches (March Road): one left turn lane, two through lanes, and one right turn lane; pocket bike lanes on both approaches
- East Approach (Maxwell Bridge Road): one left turn lane and one shared through/right turn lane
- West Approach (Halton Terrace): one left turn lane and one shared through/right turn lane



March Road/ Maxwell Road

- Unsignalized three-legged intersection
- North Approach (March Road): one shared left turn / through lane
- South Approach (March Road): one through lane, one right turn lane
- East Approach (Maxwell Road): one shared left turn/right turn lane



2.1.3 Driveways

There are farm accesses on both sides of March Road and three low volume residential driveways along the west side of March Road within 200m of the site. These residential driveways serve 1015 March Road (site), 1035 March Road, and 1053 March Road.

2.1.4 Pedestrian and Cycling Facilities

Fronting the site, March Road has gravel shoulders and a rural cross-section with roadside ditches on both sides. March Road has concrete sidewalks and bike lanes on both sides starting approximately 150m north of Maxwell Bridge Road / Halton Terrace and running south. Maxwell Bridge Road and Halton Terrace have concrete sidewalks on both sides. There are no dedicated cycling facilities on Halton Terrace and Maxwell Bridge Road. There are no dedicated cycling facilities or sidewalks on Maxwell Road.

In the City of Ottawa's Cycling Plan through its online GeoOttawa tool, March Road is classified as a Spine Route and Halton Terrace is classified as a Local Route south of Klondike Road as well as between March Road and Old Carp Road (with the Local Route continuing along Old Carp Road).

2.1.5 Area Traffic Management

The Halton Terrace – Jack Donohue Public School Traffic Calming Study has been completed to reduce the negative impacts of motorized traffic and promote safety of students in the area. The study considered Halton Terrace between Dunollie Crescent (west intersection) and Whernside Terrace and recommends four sets of speed cushions, two Type 'B' pedestrian crossovers, and a painted edgeline along Halton Terrace in front of the school. There are no other Area Traffic Management (ATM) studies within the study area that have been completed or are currently in progress. Centreline flex posts are provided along Halton Terrace. SLOW text pavement markings and centreline flex posts are provided along Maxwell Bridge Road.

2.1.6 Transit

The nearest bus stops to the subject site are as follows and are each about 1km from the site:

<u>Maxwell Bridge / Windance</u>

- Stop #9057 – for route 63
  (located at the south side of Maxwell Bridge west of Sundance Crescent)

<u>Halton Terrace / Flamborough Way</u>

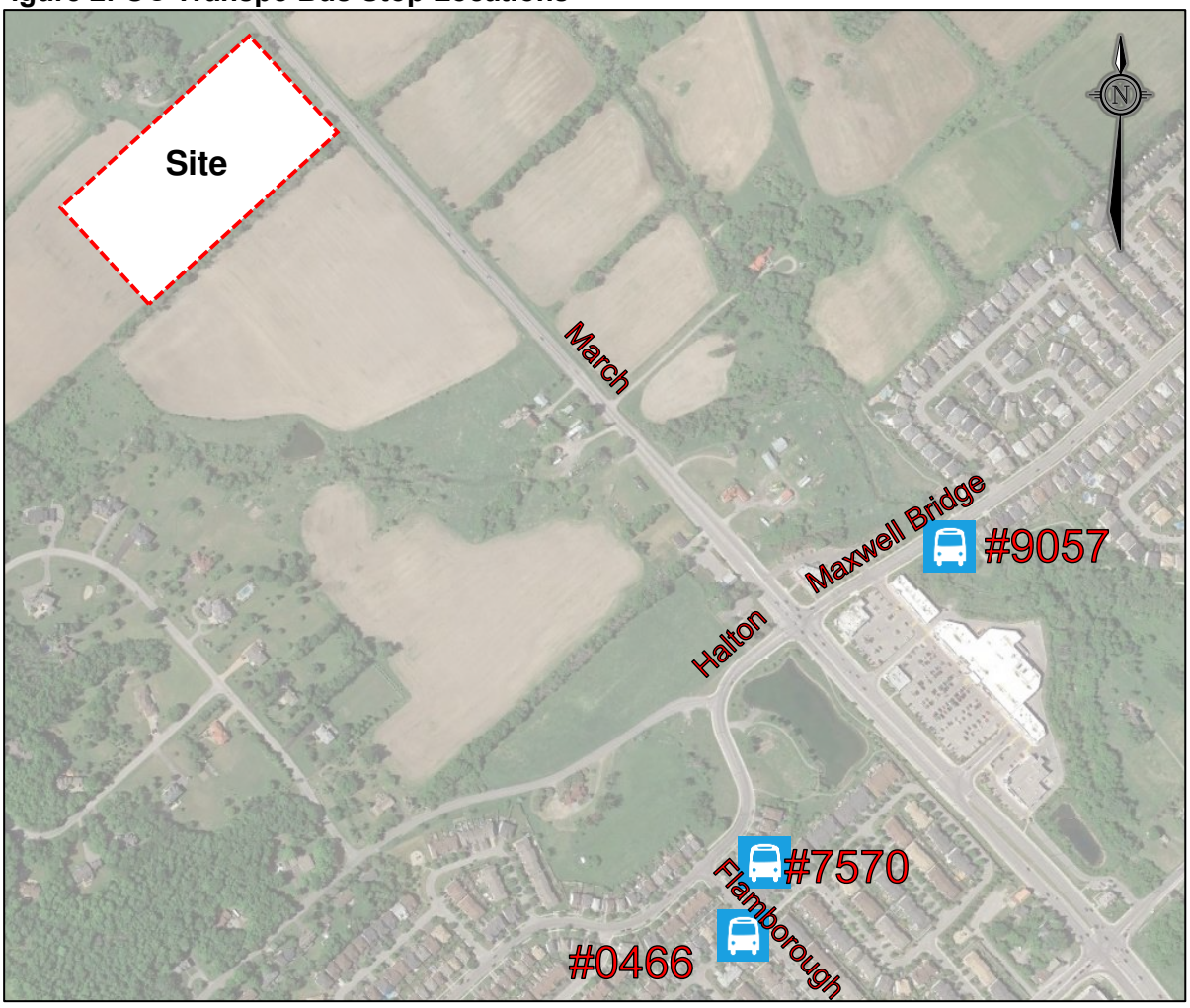
- Stop #7570 – for route 63
  (located at the southeast corner)

<u>Flamborough / Woliston</u>

- Stop #0466 – for route 64
  (located at the northwest corner)

The locations of these bus stops are shown in **Figure 2**.

Figure 2: OC Transpo Bus Stop Locations



OC Transpo Route 63 is a rapid transit route that travels between the Briarbrook community and Tunney's Pasture Station, or Sacré-Coeur (Gatineau) during peak periods. Route 63 generally operates on 15 to 30 minute headways on weekdays and 30 to 60 minute headways on weekends.

OC Transpo Route 64 is a local transit route that travels between the Briarbrook community and Tunney's Pasture Station. Route 64 generally operates on 15 to 30 minute headways on weekdays.

OC Transpo maps for the routes outlined above is included in **Appendix C**.

2.1.7 Existing Traffic Volumes

Existing traffic volumes at the study area intersections are summarized in Figure 3 of the KNUEA Existing Conditions Report attached in Appendix A of Volume 2 of the KNUEA CDP TMP and included in **Appendix D** of this TIA.

Subsequent weekday traffic counts completed by the City of Ottawa on March 4, 2020 at the March Road intersection with Maxwell Bridge / Halton (See **Appendix D**) have been compared to the existing traffic volumes from the KNUEA CDP TMP. The 2020 volumes are generally in line with the

existing volumes from the TMP and the TMP existing volumes have been carried forward for analysis.

2.1.8 Collision Records

Historical collision data for the study area from the last five years were obtained from the City's Public Works and Service Department. The collision summary reports are included in **Appendix E**.

The collision data have been evaluated to determine if there are any identifiable collision patterns. The number of collisions at each intersection from January 1, 2015 to December 31, 2019 is summarized in **Table 1**. During the period, there were no fatal collisions reported.

Table 1: Reported Collisions

Intersection/ Roadway Segment	Impact Type					Total
	Rear End	Turning	Sideswipe	Angle	SMV(1)/ Other	
March Road at Halton Terrace/ Maxwell Bridge Road	2	5	4	1	2	**14**
March Road – Maxwell Bridge Road to Maxwell Road	6	2	3	-	10	**21**
March Road at Maxwell Road	1	-	-	-	-	**1**

1. SMV: Single Motor Vehicle

March Road at Halton Terrace/Maxwell Bridge Road
Of the fourteen collisions, four of the collisions caused injuries. Six of the collisions occurred in clear conditions, five occurred in snow conditions, two occurred in rain conditions, and one occurred in freezing rain. One of the collisions (SMV) involved a pedestrian, none of the collisions involved a cyclist.

March Road – Maxwell Bridge Road to Maxwell Road
Of the twenty-one collisions, four caused injuries. Fifteen of the collisions occurred in clear conditions, three occurred in snow conditions, two occurred in rain conditions, and one in freezing rain. None of the collisions involved a pedestrian or a cyclist.

Of the six rear end collisions:
- One caused injury.
- Three occurred in clear conditions, 2 in rain conditions, and one in snow conditions.
- Three were between northbound vehicles and three were between southbound vehicles.

Of the ten SMV / other collisions:
- Two caused injury.
- Seven occurred in clear conditions, two occurred in snow conditions, and one in freezing rain.

March Road at Maxwell Road
The collision at this intersection occurred in snow conditions and did not cause injuries. It did not involve a pedestrian or a cyclist.

2.2 Planned Conditions

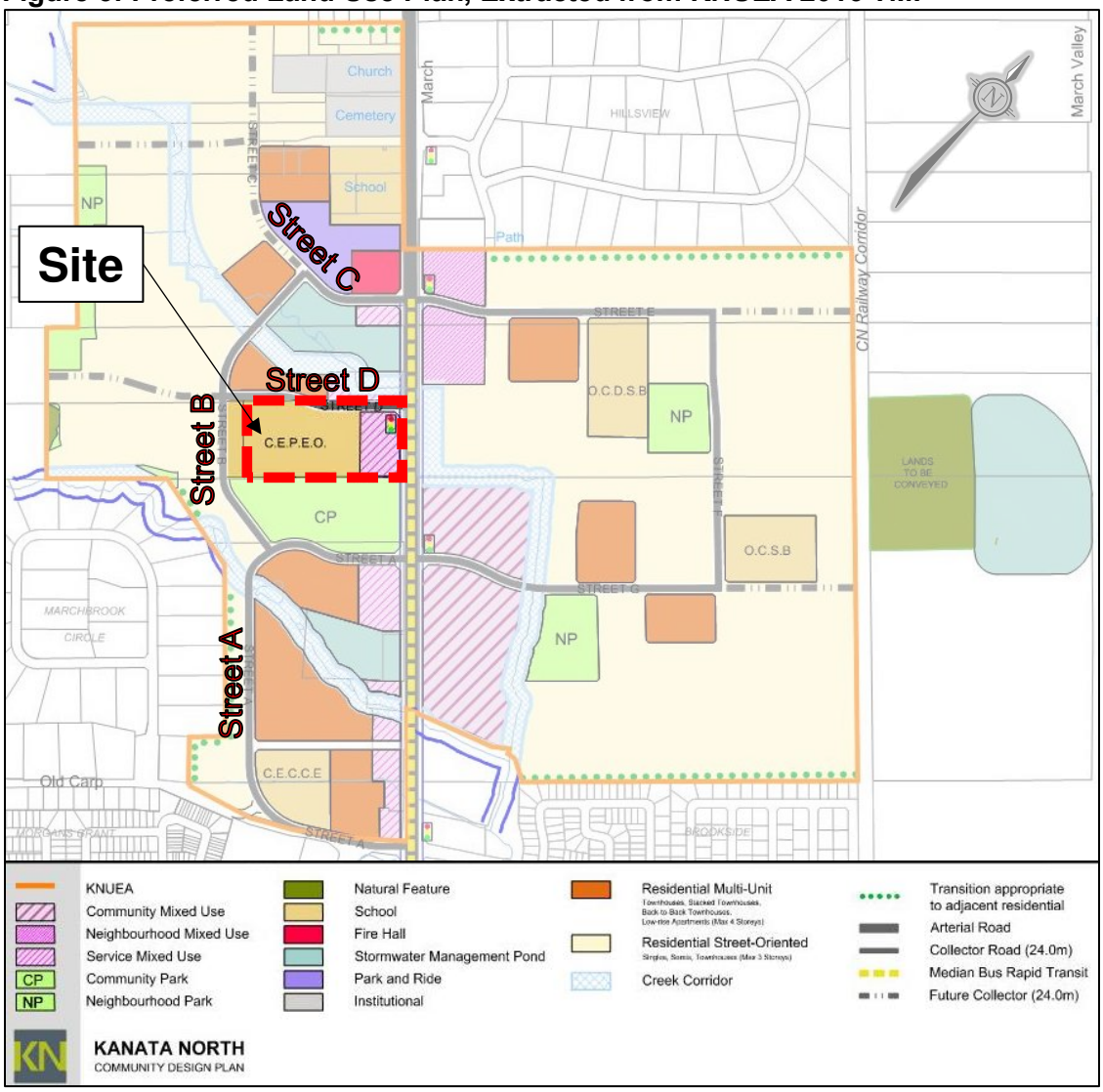
2.2.1 Planned Transportation Projects

The City of Ottawa's 2013 Transportation Master Plan (TMP) does not identify any upcoming roadway projects within the study area in its 2031 Affordable Road Network. A widening of March Road from two lanes to four between Halton Terrace/Maxwell Bridge Road and Dunrobin Road is identified in the 2031 Network Concept, to provide additional vehicular capacity for developments such as the KNUEA.

The Rapid Transit and Transit Priority (RTTP) Network identifies transit improvements in its 2031 Affordable Network and 2031 Network Concepts. In the Network Concept, at-grade bus rapid transit (BRT) will be provided on March Road between Highway 417 and Halton Terrace/Maxwell Bridge Road. In the Affordable Network, at-grade BRT will be provided on March Road between Highway 417 and Solandt Road, and transit priority measures such as transit priority signals and queue jump lanes will be provided on March Road between Carling Avenue and Halton Terrace/Maxwell Bridge Road.

As part of the implementation of the KNUEA through the subdivision applications in surrounding developments, new collector roadways will be developed in the area west of March Road (See **Figure 3**) including the planned Street 10 (Street D in **Figure 3**), Street B, Street C, and the realignment of Halton Terrace and Old Carp Road to connect to Street A at T-intersections. Street A will then connect to March Road as the fourth leg of the Maxwell Bridge signalized intersection.

Figure 3: Preferred Land Use Plan, Extracted from KNUEA 2016 TMP



2.2.2 Other Area Developments

In proximity of the proposed development, there are multiple other residential and mixed-use developments under construction, approved, or in the approval process.

The KNUEA CDP was approved by the City of Ottawa in June 2016. The KNUEA is approximately 181 hectares and is located north of Maxwell Bridge Road. The KNUEA TMP estimated that the development of the KNUEA lands has the potential to consist of 960 single-detached homes, 950 street townhomes, 1,040 multi-unit residential dwellings, 37,160 m^2 GFA of commercial space, three elementary schools, one high school, and a 500-space park and ride.

Subsequent TIA reports (see below) have been prepared in support of developments within the KNUEA. It is noted that the unit counts for each subdivision are subject to change as their development plans progress and the development applications continue to evolve, which results in

more or fewer total units. The following developments are planned within the KNUEA TMP Area and their locations are shown in **Figure 1**.

927 March Road (Brigil, City File Nos.: D01-01-20-0027, D02-02-20-0138, D07-16-20-0034)
A TIA was prepared by Stantec in November 2020, in support of a subdivision that includes 35 single-detached homes, 78 townhomes, 1,838 apartment dwellings, and 6,100 m^2 GFA of commercial space. The TIA identified that the subdivision will be built in seven phases, with an ultimate buildout year of 2034.

936 March Road (Minto, City File Nos.: D02-02-18-0109 and D07-16-18-0032)
A TIA was prepared by CGH Transportation in April 2020, in support of a subdivision that includes 353 single-detached homes and 575 townhomes. The development includes a four-legged signalized intersection (Street 1) about 270m south of the planned Street 10 intersection with March Road. The TIA did not identify phasing but estimated an ultimate buildout year of 2023.

1053, 1075, and 1145 March Road (CUD, City File Nos.: D07-16-18-0023 and D02-02-18-0076)
A TIA was prepared by Novatech in October 2018, in support of a subdivision that includes 295 single-detached homes, 314 townhomes, and 216 apartment dwellings. The development shows the same Street 10 that is along the northern limits of the site for this current study and includes a four-legged signalized intersection (Street 1) about 193m to the north of the planned Street 10 intersection with March Road. The TIA did not identify phasing but estimated an ultimate buildout year of 2026.

1020 and 1070 March Road (Cavanagh City File Nos.: D02-02-19-0090 and D07-16-19-0020)
A TIA was prepared by Stantec in May 2020, in support of a subdivision that includes 297 single-detached homes, 315 townhomes, 116 apartment dwellings, 7,432 m^2 GFA of commercial space, and an elementary school of approximately 580 students. The development includes Street 1 east of March Road, forming the fourth leg of the intersection with the CUD Street 1. No connection is planned opposite Street 10 for the current study site. The TIA did not identify phasing but estimated an ultimate buildout year of 2031.

Additional developments are planned to the south of the KNUEA TMP Area and include:

*910 March Road (Wexcom, City File No.: D07-12-20-0089, Also shown on **Figure 1**).*
A TIA was prepared by CGH in January 2021, in support of a development that includes a 1,835 m^2 GFA hardware store, a 234 m^2 GFA restaurant with drive through, a 416 m^2 GFA retail store and a 249 m^2 GFA gas bar with attached Tim Hortons with drive-through. The TIA identified a buildout year of 2022.

788 March Road (City File No.: D07-12-18-0128)
A TIA (August 2018) and three subsequent addenda (October 2018, December 2018, and March 2020) were prepared by Parsons in support of a development including 92 apartment dwellings. The TIA identified a buildout year of 2023.

706-714 March Road (City File Nos.: D02-02-20-0135 and D07-12-21-0190)
A TIA was prepared by CGH in December 2020, in support of a development including a 4,165 m^2 GFA supermarket, 350 m^2 GFA fast-food restaurant with drive-through, and 1,500 m^2 GFA of multi-unit commercial space. The TIA identified a buildout year of 2023.

2.3 Study Area and Time Periods

The study area for this report will include the following intersections:

- March Road at Halton Terrace / Maxwell Bridge Road; and,
- March Road at Street 10 (access intersection).

The selected time periods for the analysis are the weekday AM and PM peak hours, as they represent the 'worst case' combination of site generated traffic and adjacent street traffic. The proposed development is expected to be fully occupied in 2026. Analysis will be completed for the 2026 buildout year and the 2031 horizon year.

2.4 Exemptions Review

This module reviews possible exemptions from the final TIA, as outlined in the TIA guidelines. The applicable exemptions for this site are identified in **Table 2**.

Table 2: TIA Exemptions

Module	Element	Exemption Criteria	Exemption Status
Design Review Component			
4.1 Development Design	*4.1.2* Circulation and Access	• Only required for site plans	Exempt
	4.1.3 New Street Networks	• Only required for plans of subdivision	Not Exempt
4.2 Parking	*4.2.1* Parking Supply	• Only required for site plans	Exempt
	4.2.2 Spillover Parking	• Only required for site plans where parking supply is 15% below unconstrained demand	Exempt
Network Impact Component			
4.5 Transportation Demand Management	*All elements*	• Not required for non-residential site plans expected to have fewer than 60 employees and/or students on location at any given time	Not Exempt
4.6 Neighbourhood Traffic Management	*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	Not Exempt
4.8 Network Concept	*All elements*	• Only required when proposed development generates more than 200 person-trips during the peak hour in excess of the equivalent volume permitted by the established zoning	Exempt

Note: Review of Modules 4.1.2 and 4.2.1 will be required with site plan submission. This TIA will consider what TDM Measures could be applied but TDM will be further reviewed at site plan submission.

3.0 FORECASTING

3.1 Development Generated Traffic

3.1.1 Trip Generation

The proposed development is consistent with the uses shown in the KNUEA CDP and its TMP. The commercial area for this site is about 15% of the service mixed use / neighbourhood mixed use identified in the TMP (See **Figure 3**). The trip generation for the proposed site (See **Table 3**) is expected to be consistent with the estimates from the KNUEA TMP for this development block, which includes the high school and 15% (15,000 ft^2 GFA) of the Specialty retail trips from the KNUEA TMP.

Table 3: ITE Trip Generation – Proposed Site Development

Land Use	ITE Land Use Code	Units[2]	ITE Trips Generated					
			AM Peak Hour			PM Peak Hour		
			In	Out	Total	In	Out	Total
KNUEA TMP Development[1]								
Specialty Retail	826	15	6	4	10	17	22	39
High School (veh trips)	530	800	189	155	344	49	55	104

Notes:
1. To maintain consistency with the KNUEA TMP, ITE Trip Generation is estimated based on rates used in the TMP, the ITE *Trip Generation 9th Edition* (Institute of Transportation Engineers, Washington, 2012). The site's commercial area equates to approximately 15% of the specialty retail presented in the KNUEA TMP.
2. Units are '1000 sq. ft. of gross floor area' for retail and 'students' for the school.

The KNUEA CDP TMP assumed all ITE estimated trips generated by the school were vehicle trips. For the purpose of this report, person trips generated by the school have been estimated from first principles.

The TRANS Trip Generation Manual suggests the modal shares for a school should be developed on a site-specific basis based on discussions with the school board. This application is for draft plan of subdivision only and further refinement of the school person trips will be completed at site plan stage once more information on the school is available.

School generated person trips by mode have been estimated based on typical travel patterns and the following assumptions:

- There will be 800 students and 45 staff.
- Modal shares for students will align with the high school modal share identified in the City's 2020 TRANS Trip Generation Manual.
- Modal shares for staff will align with the employment generator shares for the Kanata-Stittsville area.
- 90% of auto trips by students will be parent drop off with the remaining 10% being student drivers.
- There will be 4 school buses for the school. All school buses will arrive and depart during the AM peak hour and will arrive and depart before the start of the PM peak hour.
- All students and staff will arrive during the AM peak hour.

- 33% of non-school bus and transit students and 33% of staff will depart during the PM peak hour.

School Person Trips - Students

The City's 2020 TRANS Trip Generation Manual provides baseline modal shares for secondary schools in the City of Ottawa. The person trips for the 800 students are summarized in **Table 4**.

Table 4: Student Person Trips by Mode

Modal Share		AM Peak Hour			PM Peak Hour		
		IN	OUT	TOT	IN	OUT	TOT
Auto	22%	176	0	176	0	59	59
School Bus	19%	152	0	152	0	0	0
Transit	38%	304	0	304	0	0	0
Walk	18%	144	0	144	0	48	48
Bike	3%	24	0	24	0	8	8
Total	**100%**	**800**	**0**	**800**	**0**	**115**	**115**

School Person Trips – Staff

The proposed school is assumed to employ 45 staff. The modal shares for staff trips generated by the site have been estimated based on the employment generator shares for the Kanata-Stittsville area district in the 2020 TRANS Trip Generation Manual. A summary of the staff trips by modal share during the AM and PM periods are provided in **Table 5**.

Table 5: Staff Person Trips by Mode

Modal Share		AM Peak Hour			PM Peak Hour		
		IN	OUT	TOT	IN	OUT	TOT
Auto Driver	84%	38	0	38	0	13	13
Auto Passenger	4%	2	0	2	0	1	1
Transit	8%	4	0	4	0	0	0
Walk	3%	1	0	1	0	0	0
Bike	1%	0	0	0	0	0	0
Total	**100%**	**45**	**0**	**45**	**0**	**14**	**14**

School Person Trips - Total

The total person trips by mode for the high school are summarized in **Table 6**.

Table 6: Total School Person Trips by Mode

Modal Share	AM Peak Hour			PM Peak Hour		
	IN	OUT	TOT	IN	OUT	TOT
Auto Driver	56	0	56	0	19	19
Auto Passenger	160	0	160	0	54	54
School Bus	152	0	152	0	0	0
Transit	308	0	308	0	0	0
Walk	145	0	145	0	48	48
Bike	24	0	24	0	8	8
Total	**845**	**0**	**845**	**0**	**129**	**129**

Estimated Peak Hour Vehicle Trips

As some families may have multiple siblings who attend the school and some students may carpool, it has been assumed that the auto passengers will have an occupancy rate of 1.2 students per

vehicle. Based on the above assumptions, the total vehicle trips to/from the high school are summarized in **Table 7**.

Table 7: Total Vehicle Trips for the High School

	AM Peak Hour			PM Peak Hour		
	IN	OUT	TOT	IN	OUT	TOT
Student Auto Trips	150	135	285	44	50	94
Staff Auto Trips	38	0	38	0	13	13
Transit and School Buses	13	13	26	0	0	0
Total Vehicle Trips	**201**	**148**	**349**	**44**	**63**	**107**

The estimated total vehicle trips are similar to the estimated vehicle trips for the school from the KNUEA CDP TMP using the ITE published rates (See **Table 3**). The TMP trip estimates (from ITE) have been carried forward for analysis. Further analysis of trip generation for the school will be completed at site plan submission.

The KNUEA CDP TMP used a person trip adjustment factor of 1.42 to convert ITE trips to person trips. Retail trips estimated using the ITE rates have been converted to person trips (See **Table 8**) using a 1.42 adjustment factor.

Table 8: Person Trip Generation – Proposed Retail Development

Land Use	Person Trips Generated					
	AM Peak Hour			PM Peak Hour		
	In	Out	Total	In	Out	Total
Commercial / Retail[1]	9	6	15	24	31	55

Notes: 1. Proposed development retail trips have been increased by 42% per the KNUEA TMP.

The number of vehicle trips that the retail portion of the proposed site will generate has been estimated by categorizing the person trips by modal share. For consistency with the KNUEA TMP, the modal shares identified in the *2011 TRANS O-D Survey Report* for the Kanata/Stittsville Region were adjusted to reflect the increased transit modal share of 21%, with the auto driver share reduced accordingly. The 21% transit modal share will be achieved through the implementation of the planned transit projects outlined in the City's 2013 TMP affordable plan for the Kanata North area. The trips by modal share to the retail portion of the site are summarized in **Table 9**.

Table 9: Person Trips by Modal Share for Proposed Development – Retail

Travel Mode	Modal Share	AM Peak			PM Peak		
		IN	OUT	TOT	IN	OUT	TOT
	Person Trips	*9*	*6*	*15*	*24*	*31*	*55*
Auto Driver	59%	**6**	**3**	**9**	**14**	**18**	**32**
Auto Passenger	15%	1	1	2	4	4	8
Transit	21%	2	1	3	5	7	12
Non-Motorized	5%	0	1	1	1	2	3

The commercial / retail uses are expected to generate two types of external peak hour trips: primary and pass-by trips. Primary trips are made for the specific purpose of visiting the site and pass-by

trips are made as intermediate stops on the way to another destination (such as shopping on the way home from work). Peak hour pass-by trips have been estimated based on a pass-by rate of 34% (typical for shopping centre trips during the peak hour, and consistent with the KNUEA TMP). Of the primary retail trips, 20% are expected to be intra-community trips (those that stay within the KNUEA area). Of the trips generated by the proposed school, 50% are expected to be intra-community trips. These pass-by and intra-community trip assumptions are consistent with the KNUEA TMP. A summary of the estimated vehicle trips generated by the proposed development is included in **Table 10**.

Table 10: Vehicle Trips Generated by the Proposed Site

Trip Type		AM Peak			PM Peak		
		IN	OUT	TOT	IN	OUT	TOT
Total Vehicle Trips		**195**	**158**	**353**	**63**	**73**	**136**
Commercial / Retail Vehicle Trips	**Total**	**6**	**3**	**9**	**14**	**18**	**32**
	Primary External Trips	3	0	3	4	8	12
	Intra Community Trips	1	1	2	4	4	8
	Pass-by Trips	2	2	4	6	6	12
High School Vehicle Trips	**Total**	**189**	**155**	**344**	**49**	**55**	**104**
	Primary External Trips	103	69	172	23	29	52
	Intra Community Trips	86	86	172	26	26	52

3.1.2 Trip Distribution

The distribution of traffic generated by the proposed development is anticipated be consistent with the distribution presented in the KNUEA CDP TMP, and is summarized as follows:

Primary Trips

- 85% to/from the south; and,
- 15% to/from the north.

Intra-Community Trips

- 50% to/from CUD and Brigil;
- 25% to/from the north (Cavanagh); and,
- 25% to/from the south (Minto).

As the trips generated by the proposed development are anticipated to be in line with the assumed development in the KNUEA CDP TMP, the site traffic projections in the TMP are considered an appropriate representation of the anticipated traffic following build-out of the development and have not been updated.

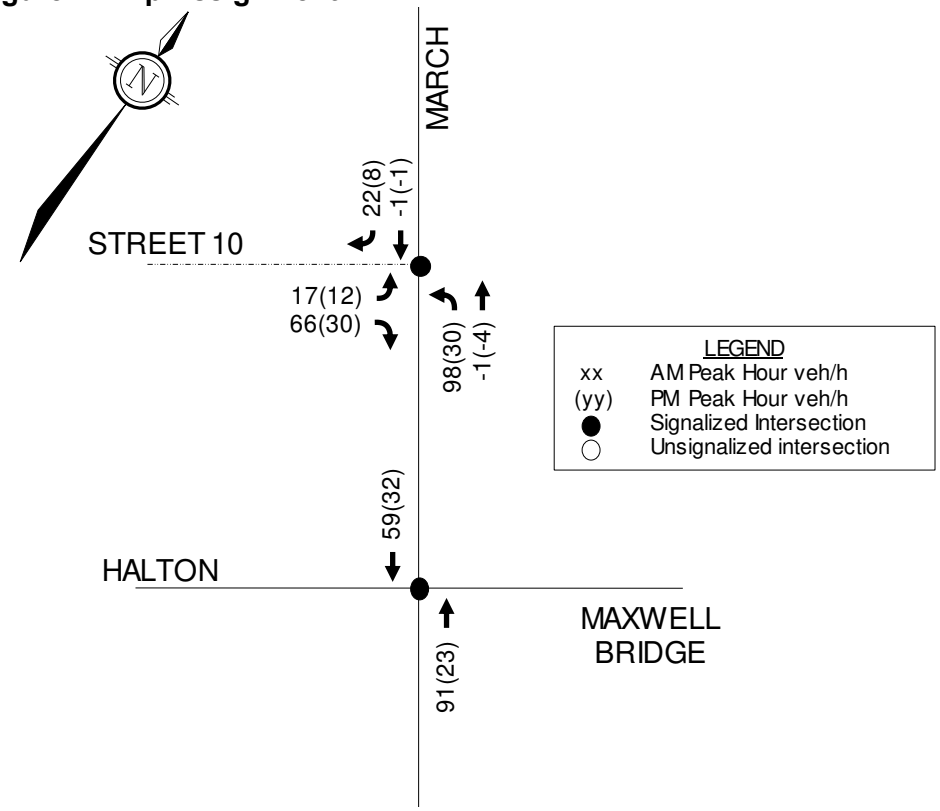
3.1.3 Trip Assignment

The assignment of vehicle trips for this site based on the ITE trip generation from the KNUEA CDP TMP (**Table 3**) is illustrated in **Figure 4** and assumes:

- 70% of intra community school trips to / from Cavanagh and Minto will use the adjacent intersections to the north and south to cross March Road; 30% will use March / Street 10.

- All intra community trips to / from CUD and Brigil will use the internal collector roadways without travelling via March Road.
- 10% of primary retail trips from the north will use the right-in, right-out driveway.
- 70% of primary retail trips to the south will use the right-in, right-out driveway.

Figure 4: Trip Assignment



3.2 Background Traffic

Background growth along the study area roadways is anticipated to be consistent with the projections in Section 6.5 of the KNUEA CDP TMP. Background traffic volumes for the 2026 build-out and 2031 horizon years were estimated in the KNUEA CDP TMP by increasing the existing transit modal shares to 21% and applying a 0.5% growth rate per annum to the traffic volumes. This transit modal share considers the 2031 affordable network concept including at-grade BRT between Corkstown Road and Solandt Road, a park and ride within the KNUEA area, and transit priority measures between Solandt Road and the KNUEA park and ride.

A review of the traffic impact assessments prepared in support of the other area developments (See **Section 4.2.2** and **Appendix F**) suggests a small portion of non KNUEA traffic is anticipated to use the study intersections. For the purposes of this assessment, it is assumed that the background growth assumptions utilized in the KNUEA CDP TMP account for the additional traffic generated by the other area developments outside the KNUEA.

Background and total traffic volumes for the 2026 build-out and 2031 horizon years are anticipated to be consistent with the projections in the KNUEA CDP TMP, and are provided in **Appendix D**.

3.3 Demand Rationalization

Intersection capacity analysis has been completed in Section 10.4 of the KNUEA CDP TMP. The projected intersection operations within the study area, as identified in the KNUEA CDP TMP, are summarized in **Table 11**.

Table 11: Intersection Capacity Analysis – 2026 and 2031 Future Background

Intersection	AM Peak			PM Peak		
	Max V/C Ratio	LOS	Mvmt	Max V/C Ratio	LOS	Mvmt
2026 Future Background						
March Road/ Maxwell Bridge Road/ Halton Terrace	0.45	A	EBT	0.57	A	WBT
2031 Future Background						
March Road/ Maxwell Bridge Road/ Halton Terrace	0.46	A	EBT	0.58	A	WBT

4.0 ANALYSIS

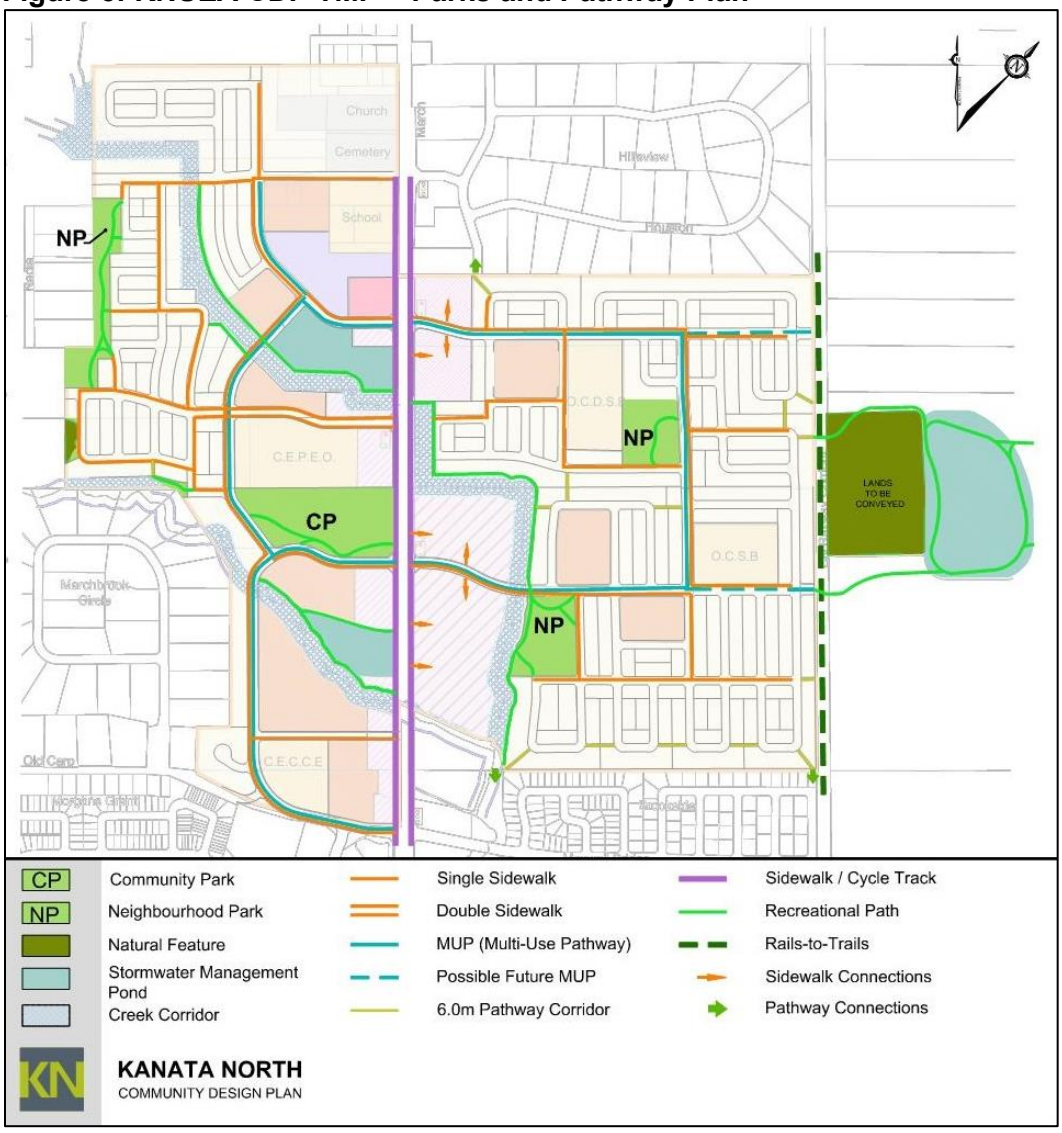
4.1 Development Design

4.1.1 Design for Sustainable Modes

Street 10 is a collector roadway running along the north edge of the development. The proposed road and sidewalk network is generally consistent with the Parks and Pathway Plan presented in the KNUEA CDP TMP, as shown in **Figure 5**, however, following discussion with City staff, an asphalt multi-use path (MUP) is now proposed along the south (site) side of Street 10 in lieu of concrete sidewalk. The sidewalk (north side) and MUP (south side) will encourage the use of active transportation modes for utilitarian trips, particularly between the proposed site uses (commercial, school) and the planned nearby residential developments.

A further review of the on-site design and the City's Transportation Demand Management (TDM) - Supportive Development Design and Infrastructure Checklist will be completed for each development block as they proceed with a Site Plan Control application.

Figure 5: KNUEA CDP TMP – Parks and Pathway Plan



4.1.2 Circulation and Access

This module is not required for Draft Plan of Subdivision applications. A review of the on-site circulation and access will be completed for each development block as they proceed with a Site Plan Control application.

4.1.3 New Street Networks

Street 10 is classified as a collector roadway within the subject subdivision and will have a right-of-way width of 24m. It will include a 9.5m road platform with a 2m sidewalk on the north side and a 3m MUP on the south side. The proposed Street 10 cross-section is shown in **Appendix G**.

4.2 Parking

This module is not required for Draft Plan of Subdivision applications. A review of the on-site parking requirements will be completed for each development block as they proceed with a Site Plan Control application.

4.3 Boundary Streets

March Road is the only boundary street for the subject site. As identified in **Section 2.2.1** widening of March Road is planned and while a complete street concept has already been prepared, MMLOS has been completed for the existing conditions.

Schedule 'B' of the City of Ottawa's Official Plan indicates the site is in a General Urban Area. Targets for pedestrian level of service (PLOS), bicycle level of service (BLOS), Transit Level of Service (TLOS), and truck level of service (TkLOS) for March Road reflect those outlined for an arterial road located within a General Urban Area Centre in Exhibit 22 of the MMLOS guidelines. The Segment PLOS, BLOS, TLOS, and TkLOS and associated targets are summarized in **Table 12**. Details on the Segment MMLOS are included in **Appendix J**.

Table 12: Segment MMLOS Summary

Intersection	PLOS	BLOS	TLOS	TkLOS
March Road	F	F	D	B
Target	**C**	**C**	**No Target**	**D**

The PLOS along March Road fronting the site is F, missing the target C. With its posted 80 km/h speed limit and more than 3,000 vehicles per day AADT, the highest attainable PLOS score is D (2m sidewalk and >2m boulevard) due to the roadway speed and volume. As part of the proposed roadway modifications described in the subsequent section, paved shoulders will be provided along March Road during the interim. As part of the future four-lane widening of March Road, a separated sidewalk will provide a PLOS D.

The BLOS along March Road currently operates with BLOS F and misses the target C. Due to the high operating speed, a physically separated bikeway is required to meet the target BLOS. As part of the proposed roadway modifications described in the subsequent section, paved shoulders achieving a BLOS E will be provided along March Road during the interim. As part of the future four-lane widening of March Road, a separated cycle track will provide a BLOS A.

A TLOS D is achieved along March Road adjacent to the site. No target TLOS is provided by the MMLOS Guidelines.

The TkLOS along March Road fronting the site surpasses the target D, achieving B.

The timing of the March Road widening from two to four lanes will be determined by the City of Ottawa through future TMP updates when the urban portion of the project is brought into the affordable plan. At that time, and subject to reasonable terms being established including payback period, the Kanata North Land Owners Group (KNLOG) is prepared to enter into a front ending agreement with the City to construct the four lane widening of March Road to the limit of the urban area.

The interim and ultimate cross-sections for March Road are depicted in Figures 24 and 25 of the KNUEA CDP TMP and are included in **Appendix G**. Both interim and ultimate cross-sections will provide complete streets elements such as sidewalks and cycle tracks on both sides of the roadway. The proposed signalized access location is consistent with the KNUEA CDP TMP and is not anticipated to impact the complete street design for March Road.

4.4 Access Intersections Design

The Subject Lands will be served by one signalized all-movement access along March Road at Street 10. It is anticipated that the commercial development will be served by an all-movement driveway along the planned Street 10 and a right-in, right-out access on March Road. The school is expected to have driveways to Street 10 as well as Street 12 (CUD subdivision).

The location of the proposed signalized all-movement access is consistent with the KNUEA CDP TMP. A northbound left turn lane was found to be warranted (See **Appendix H**) along March Road for traffic turning into Street 10 based on 2026 traffic volumes with the addition of site trips. Signalization warrants have been prepared (See **Appendix H**) and indicate that the intersection of March Road at Street 10 is not expected to warrant signalization in 2031 with development of the KNUEA. Intersection analysis has been prepared (See **Table 13** and **Appendix K**) for the March Road at Street 10 intersection with STOP control.

Table 13: Intersection Capacity Analysis – March Rd at Street 10 with STOP Control

Intersection	AM Peak			PM Peak		
	Max V/C Ratio or delay	LOS	Mvmt	Max V/C Ratio or delay (sec)	LOS	Mvmt
2026 Total Traffic						
March Road/ Street 10 (STOP Controlled)	138 sec	F	EBL	97 sec	F	EBL
2031 Total Traffic						
March Road/ Street 10 (STOP Controlled)	150 sec	F	EBL	103 sec	F	EBL

With STOP control, the March Road at Street 10 intersection is expected to operate with LOS F during the 2026 and 2031 AM and PM peak hours with development of the KNUEA area. With STOP control, average delays for the eastbound left turn movement during the AM peak hour were found to be 138 seconds (2026) and 150 seconds (2031). The high delay may cause exiting vehicles to choose an unacceptable gap in traffic along March Road, resulting in a safety issue. While traffic signals are not expected to be warranted (See **Appendix H**), signalization of the intersection is recommended concurrent with development due to the anticipated high approach delay for the eastbound left movement. This is consistent with the recommendations of Section 13.6.2 of the Council approved KNUEA CDP TMP, which recommends interim signalized access connections to March Road be constructed concurrent with the initiation of development. Since this is a Collector/Arterial intersection all works are DC recoverable and this intersection was previously approved as such.

Additional intersection analysis has been prepared (See **Table 14** and **Appendix K**) for the March Road at Street 10 intersection with signalization.

Table 14: Intersection Capacity Analysis – March Rd at Street 10 with Signalization

Intersection	AM Peak			PM Peak		
	Max V/C Ratio or delay	LOS	Mvmt	Max V/C Ratio or delay (sec)	LOS	Mvmt
2026 Total Traffic						
March Road/ Street 10 (Signalized)	0.84	D	SBTR	0.87	D	NBT
2031 Total Traffic						
March Road/ Street 10 (Signalized)	0.86	D	SBTR	0.89	D	NBT

With signalization of the intersection and two through lanes along March Road, all movements are expected to operate with LOS D or better during the AM and PM peak hours of 2026 and 2031.

During the AM peak hour in 2026, the southbound queue (260m) extends beyond the planned access intersection with CUD / Cavanagh (193m). During the PM peak hour in 2026, the northbound queue (338m) extends beyond the planned access intersection with Minto / Brigil (270m).

During the AM peak hour in 2031, the southbound queue (315m) extends beyond the planned access intersection with CUD / Cavanagh (193m). During the PM peak hour in 2031, the northbound queue (351m) extends beyond the planned access intersection with Minto / Brigil (270m).

The required storage length for the auxiliary lanes along March Road is taken as the worst case of either the TAC Geometric Road Design criteria or the 95th percentile queue length projected by the Synchro analysis. The TAC guidelines use the following equation to determine the required storage length:

Left Turn Storage = [1.5 x N x L] / [3600 / CL]
Where N is the number of turning vehicles in the peak hour, L is the vehicle length, and CL is the cycle length.

A summary of the projected Synchro 95th percentile queue lengths and TAC storage equation calculations for the auxiliary lanes along March Road is provided in **Table 15**.

Table 15: Turn Lane Storage Requirements – 2031 Total Volumes

Movement	95th Percentile Queue		TAC Storage Equation		Required Storage
	AM Peak	PM Peak	AM Peak	PM Peak	
Northbound Left	49m	9m	44m	40m	50m

Fifty metres of storage is recommended for the northbound left turn lane. Based on the design speed of 90km/h, TAC recommends a deceleration length of 160m and a minimum taper length of 95m.

TAC guidelines identify that in constrained conditions, it is often not feasible to provide both the deceleration distance and storage length requirements. In these cases, the taper/storage length can be used for the deceleration distance. The spacing between the subject intersection and the 936 March Road intersection to the south is approximately 270m. Based on the RMA submitted for the

936 March Road intersection, minimum storage (15m) is required for the southbound left turn lane. Assuming deceleration to occur over the entire length of the taper, an additional 65m parallel is required for deceleration. As such it is recommended that the 936 March Road southbound left turn lane be reduced to 80m parallel (15m storage and 65m deceleration) and 95m taper.

Based on the turn lane requirements for the 936 March Road intersection, approximately 95m of parallel length is available for the northbound left turn lane at the subject intersection. As this parallel length is insufficient to accommodate the 65m deceleration and 50m storage requirement, approximately 20m of deceleration is assumed to occur within the storage length.

A functional design of the March Road at Street 10 T-intersection (with a two-lane cross-section along March Road) is provided in **Appendix I**. Road Modification Approval (RMA) exhibits and a cost estimate are provided under a separate letter.

The curb radii at the intersection have been designed to accommodate an articulated bus design vehicle (See **Appendix A**). Given the High School block within the subdivision, the bus is also considered representative of a school bus.

The City's MMLOS guidelines were used to evaluate the LOS for each mode of transportation at the proposed March Road at Street 10 intersection using geometry from the functional design (See **Appendix I**). Schedule B of the City of Ottawa's Official Plan shows the intersection is within the general urban area, however a high school is proposed as part of this development. The associated MMLOS targets for an intersection within 300m of a school are identified in Exhibit 22 of the City's MMLOS guidelines. **Table 16** summarizes the MMLOS targets and results for pedestrians (PLOS), bicyclists (BLOS), transit (TLOS), trucks (TkLOS) and vehicles (Auto LOS) for the proposed intersection. Detailed MMLOS results are included in **Appendix J**.

Table 16: Access Intersection MMLOS Summary – Two Lane March Road

Intersection	PLOS	BLOS	TLOS	TkLOS	Auto LOS
March Road/Street 10	E	C	-	F	D
Target	**A**	**C**	**-**	**D**	**E**

The proposed March Road/Street 10 intersection will meet the target BLOS and Auto LOS, however it will not meet the target PLOS and TkLOS.

The pedestrian walk times for the March Road crossings are equivalent to PLOS E and the PETSI scores for each of the approaches are B or C, missing the PLOS target A. An increase in the pedestrian walk time for the crossings of March Road and reduction in the pedestrian crossing distance on each of the three legs are required to achieve the PLOS target. Considering the high traffic volumes and the single through lanes along March Road, long green times and the proposed lane configuration are required. Removal of lanes and reduced green time for March Road is not recommended. Since this is a T-intersection with planned signalized intersections to the north and south, there is expected to be minimal demand for pedestrian crossings of March Road at this intersection.

The TkLOS for the north and west approaches are F, missing the target. To achieve the target a corner radius of more than 15m, or a second receiving lane is required on each approach. A wider radius would decrease the PETSI score for the PLOS evaluation and is not recommended. As

identified above, this intersection is designed to accommodate an articulated bus. No further modifications are recommended. It is understood that March Road will be widened to include a second southbound through lane in the future.

With widening of March Road (See cross sections in **Appendix G**), it is expected that the additional lanes will result in increased pedestrian crossing distances (leading to worsened PLOS at the intersection), however the additional lanes will result in improved TkLOS. During the ultimate intersection design, it is recommended that the City implement two-stage pedestrian crossings along March Road to improve the PLOS.

4.5 Transportation Demand Management

As the tenants for the commercial site are not known and the school site has not been purchased by the school board, a review of the City's TDM Measures Checklist has not been completed as part of this application. The TDM Measures Checklist will be completed for each development block as they proceed with a Site Plan Control application.

4.6 Neighbourhood Traffic Management

The 2017 TIA Guidelines identify two-way peak hour traffic volume thresholds for considering when a Neighbourhood Traffic Management (NTM) plan should be developed, when the site relies on local or collector roadways for access. The NTM two-way volume thresholds are as follows:

- 120 vehicles per hour (vph) for local roadways;
- 300 vph for collector roadways;
- 600 vph for major collector roadways.

The proposed development will rely on Street 10 (collector roadway) for access. The two-way volumes along Street 10 are projected to be 392 vph during the 2031 AM peak hour and 257 vph during the 2031 PM peak hour.

The typical lane capacities shown in the City's TRANS Long-Range Transportation Model have been used to estimate the directional capacity, based on roadway classification and general characteristics (i.e. suburban with limited access, urban with on-street parking, etc.). To compare the directional capacity with the NTM thresholds, the two-way NTM thresholds have been halved to represent a one-way volume threshold. The assumed directional capacities (in vehicles per hour per lane, or vphpl) and NTM one-way volume thresholds (in vph) for each roadway are summarized as follows:

- Street 10: 600 vphpl capacity each direction; 150 vph threshold (25% of capacity)

Any roadway operating at 60% capacity or less (i.e. a v/c ratio of 0.60 or better) is considered to be operating at the best possible Auto LOS A. Therefore, the NTM thresholds are considered to be very low.

While the projected volume along Street 10 exceeds the NTM threshold of 300 vehicles per hour for a collector roadway during the 2031 AM peak hour, its 224 eastbound vehicles and 168 westbound vehicles correspond to volume to capacity ratios of 0.37 and 0.28, respectively (both LOS A). The projected volume along Street 10 during the 2031 PM peak hour (257 vph) does not exceed the NTM threshold.

Street 10 is not anticipated to operate above-capacity. Therefore, no neighbourhood traffic management measures are recommended.

4.7 Transit

The KNUEA CDP TMP suggests the overall residential development within the KNUEA lands will generate 414 transit trips (89 in, 325 out) during the AM peak hour and 497 transit trips (322 in, 175 out) during the PM peak hour. Based on the trip generation presented in **Section 3.1** above, the proposed commercial development is anticipated to generate approximately 3 transit trips (2 in, 1 out) during the AM peak hour and 12 transit trips (5 in, 7 out) during the PM peak hour. These transit trips associated with the commercial development are not anticipated to impact the capacity of the transit routes.

Based on the estimated person trip generation for the school (See **Table 6**), the school is expected to generate 308 transit trips (all entering) during the AM peak hour. Additional transit routes are expected to be required to service the school and school transit trips will be reviewed further at site plan. School transit trips are in addition to some school busing (assumed 4 school buses with 152 peak hour student trips).

4.8 Review of Network Concept

Per Table 2, this Module is exempt from the analysis.

4.9 Intersection Design

4.9.1 Existing Intersection MMLOS Analysis

The City's MMLOS guidelines were used to evaluate the LOS for each mode of transportation at the existing March Road at Maxwell Bridge intersection. The intersection layout is depicted in **Section 2.1.2**. Schedule B of the City of Ottawa's Official Plan shows the intersection is within the general urban area and the associated MMLOS targets are identified in Exhibit 22 of the City's MMLOS guidelines. **Table 17** summarizes the MMLOS targets and results and detailed MMLOS results are included in **Appendix J**.

Table 17: Study Intersection MMLOS Summary

Intersection	PLOS	BLOS	TLOS	TkLOS	Auto LOS
March Road/Halton Terrace/ Maxwell Bridge Road	F	F	C	E	B
Target	**C**	**B**	**D**	**D**	**D**

This intersection meets the target TLOS and Auto LOS, however it does not meet the target PLOS, BLOS and TkLOS for the General Urban Area.

A reduction in the east-west crossing distance for pedestrians would provide the greatest improvement to the PLOS at this intersection. However, based on the projected future traffic volumes, the existing cross section along March Road is appropriate. Based on the City's criteria (vehicle/pedestrian conflicts that exceed 400,000 over an eight-hour period), textured or ladder crosswalks are not warranted on any legs of this intersection.

To achieve the target BLOS on the north and south approaches, the City could consider providing two-stage left-turn bike boxes to facilitate left-turn movements. A BLOS B can be achieved on the east approach with a reduced operating speed of 40km/hr.
The north approach to this intersection does not meet the target TkLOS for the General Urban Area. As Halton Terrace is not designated as a truck route, the TkLOS E on the north approach is considered appropriate. Increasing the right turn radii on this approach would decrease the PETSI score for the PLOS evaluation and is not recommended.

4.9.2 Future Intersection Auto Analysis

As the proposed development is to be constructed within the build-out time frame identified in the KNUEA CDP TMP, the intersection analysis presented in the KNUEA CDP TMP is representative of the conditions following build-out of the proposed development. The projected intersection operations within the study area, as identified in the KNUEA CDP TMP, are summarized in **Table 18**.

Table 18: Intersection Capacity Analysis – Four through lanes on March Road

Intersection	AM Peak			PM Peak		
	Max V/C Ratio	LOS	Mvmt	Max V/C Ratio	LOS	Mvmt
2026 Total Traffic						
March Road/ Maxwell Bridge Road/ Halton Terrace	0.77	C	SBT	0.81	D	EBL
2031 Total Traffic						
March Road/ Maxwell Bridge Road/ Halton Terrace	0.78	C	SBT	0.83	D	EBL

Based on the analysis presented in the KNUEA CDP TMP, the study area intersections are anticipated to operate with a LOS D or better during the weekday AM and PM peak hours through the 2031 horizon year with widening along March Road.

5.0 CONCLUSIONS AND RECOMMENDATIONS

- Street 10 is a proposed collector road running along the north edge of the development and is consistent with the KNUEA CDP TMP. The collector roadway design will include a sidewalk on the north side and a multi-use path (MUP) on the south (site) side and encourage the use of active transportation modes for utilitarian trips, particularly between the proposed site uses (commercial, school) and the planned nearby residential developments.

- March Road is the only boundary street for the subject site. Complete streets principles were incorporated into the interim and ultimate cross-sections for March Road. The proposed signalized access location is consistent with the KNUEA CDP TMP and is not anticipated to impact the complete street design for March Road.

- The Subject Lands will be served by one signalized all-movement access along March Road at Street 10. It is anticipated that the commercial development will be served by an all-movement driveway to Street 10 and a right-in, right-out access to March Road. The school is expected to have driveways to Street 10 as well as Street 12 (CUD subdivision).

- As development progresses within the KNUEA, and subject to the City and Development Charges Funding, March Road will be widened to accommodate the increase in vehicular traffic and ultimately extend the future Kanata North Transitway. Subject to the urban portion of the March Road widening project being brought into the affordable plan, and subject to reasonable terms being established including payback period, the Kanata North Land Owners Group (KNLOG) is prepared to enter into a front ending agreement with the City to construct the four lane widening of March Road to the limit of the urban area.

- The location of the proposed signalized all-movement access is consistent with the KNUEA CDP TMP. A northbound left turn lane was found to be warranted along March Road for traffic turning into Street 10 based on 2026 traffic volumes with the addition of site trips. Signalization warrants indicate that the intersection of March Road at Street 10 is not expected to warrant signalization in 2031 with development of the KNUEA. Intersection analysis with STOP control at the intersection indicates high delay (138 seconds in 2026, 150 seconds in 2031) for the eastbound left movement during the AM peak hour. The high delay may cause exiting vehicles to choose an unacceptable gap in traffic along March Road, resulting in a safety issue. With signalization, the intersection was found to operate with LOS D during the AM and PM peak hours in 2026 and 2031.

- A functional design of the March Road at Street 10 intersection has been prepared with a two-lane cross section along March Road.

- The proposed March Road/Street 10 signalized intersection will meet the target BLOS and Auto LOS, however it will not meet the target PLOS and TkLOS. With a planned high school within the subdivision, an articulated bus was used as the design vehicle at the intersection.
    - The pedestrian walk times for the March Road crossings are equivalent to PLOS E and the PETSI scores for each of the approaches are B or C, missing the PLOS target A. An increase in the pedestrian walk time for the March Road crossings and reduction in the pedestrian crossing distance on each of the three legs are required to achieve the PLOS target. Considering the high through traffic volume and the single through lane in each direction along March Road, long green times and the proposed lane configuration are required.
    - The TkLOS for the north and west approaches are F, missing the target. To achieve the target a corner radius of more than 15m, or a second receiving lane is required on each approach. The wider radius would decrease the PETSI score for the PLOS evaluation and is not recommended. It is understood that March Road will be widened to include a second southbound through lane in the future.

- While the projected volume along Street 10 exceeds the NTM threshold for a collector roadway during the 2031 AM peak hour, its 224 eastbound vehicles and 168 westbound vehicles correspond to volume to capacity ratios of 0.37 and 0.28, respectively (both LOS A). The projected volume along Street 10 during the 2031 PM peak hour (257 vph) does not exceed the NTM threshold. Street 10 is not anticipated to operate above-capacity. Therefore, no neighbourhood traffic management measures are recommended.

- The proposed commercial development is anticipated to generate approximately 3 transit trips (2 in, 1 out) during the AM peak hour and 12 transit trips (5 in, 7 out) during the PM peak

hour. These transit trips associated with the commercial development are not anticipated to impact the capacity of the transit routes.

- Based on the estimated person trip generation for the school, the school is expected to generate 308 transit trips (all entering) during the AM peak hour. Additional transit routes are expected to be required to service the school and school transit trips will be reviewed further at site plan. School transit trips are in addition to some school busing (assumed 4 school buses with 152 peak hour student trips).

- The March Road/Halton Terrace/Maxwell Bridge Road intersection meets the target TLOS and Auto LOS, however it does not meet the target PLOS, BLOS and TkLOS for the General Urban Area.
    - A reduction in the east-west crossing distance for pedestrians would provide the greatest improvement to the PLOS at this intersection. However, based on the projected future traffic volumes, the existing cross section along March Road is appropriate. To achieve the target BLOS on the north and south approaches, the City could give consideration to providing a two-stage left-turn bike box to facilitate left-turn movements. A BLOS B can be achieved on the east approach with a reduced operating speed of 40km/hr.
    - The north approach to March Road/Halton Terrace/Maxwell Bridge Road intersection does not meet the target TkLOS for the General Urban Area. As Halton Terrace is not designated as a truck route, the TkLOS E on the north approach is considered appropriate. Increasing the right turn radii on this approach would decrease the PETSI score for the PLOS evaluation and is not recommended.

- As the proposed development is to be constructed within the build-out time frame identified in the KNUEA CDP TMP, intersection capacity analysis presented in the KNUEA CDP TMP is representative of the conditions following build-out of the proposed development.

- The intersection capacity analysis presented in the KNUEA CDP TMP suggests the study area intersections will operate with a LOS D or better during the weekday AM and PM peak hours through the 2031 horizon year.

NOVATECH

Prepared by:

Patrick Hatton, P.Eng.
Project Manager | Transportation

Reviewed by:

Brad Byvelds, P.Eng.
Project Manager | Transportation

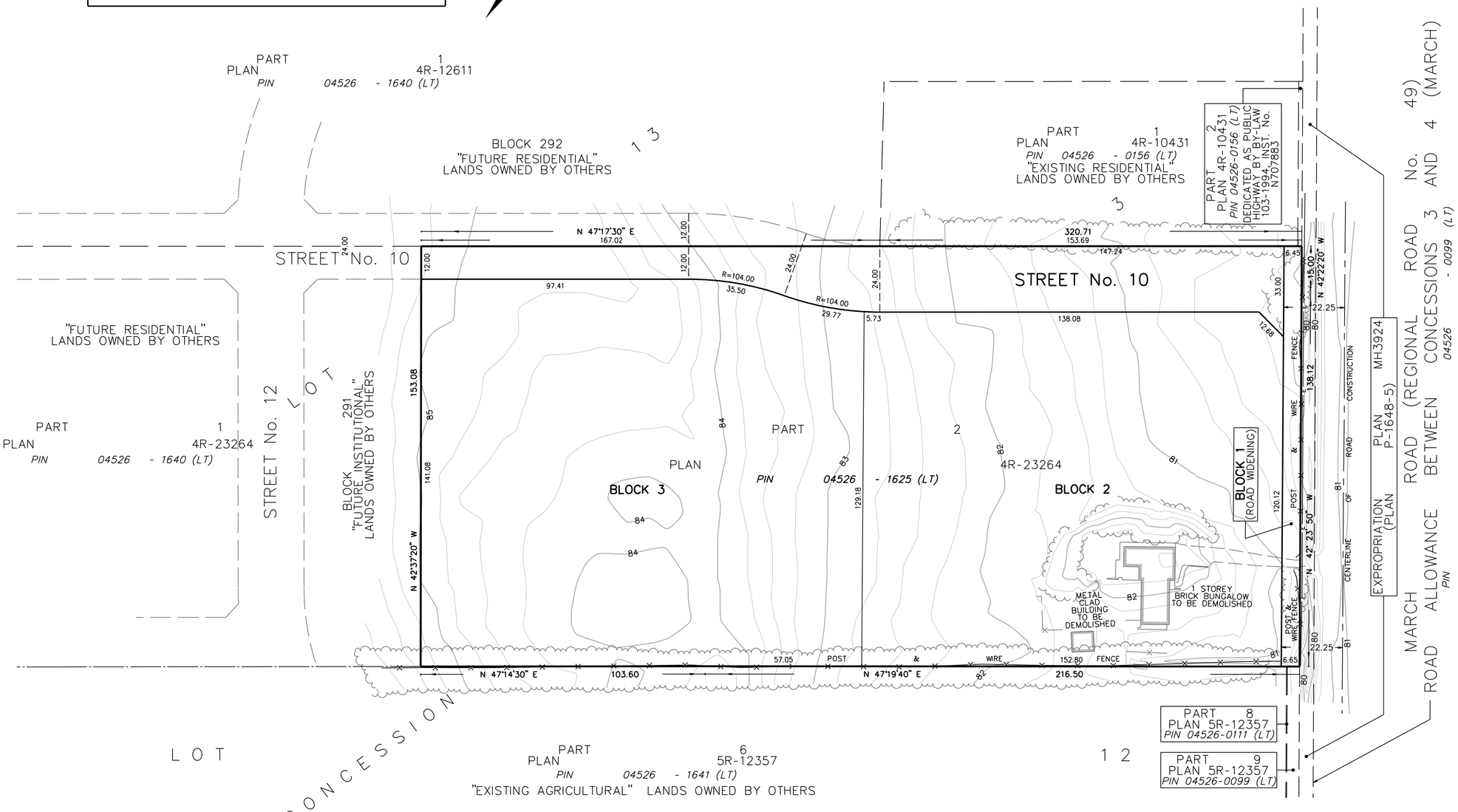
APPENDIX A

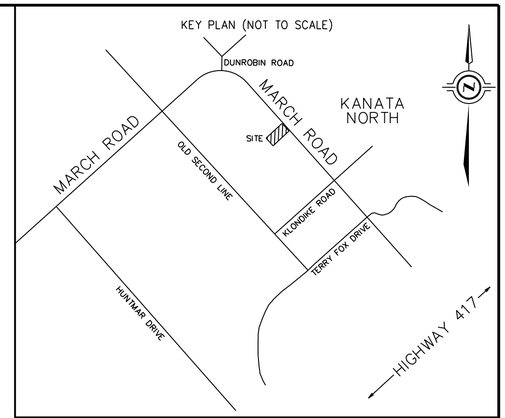
Preliminary Draft Plan of Subdivision

SCHEDULE OF LAND USE		
LAND USE	BLOCK	AREA (sq. m)
COMMERCIAL	2	19,681.8
INSTITUTIONAL	3	22,357.5
ROAD WIDENING	1	1,002.5
STREET	'10'	5,994.4
TOTAL:		49,036.2

SUBJECT TO THE CONDITIONS, IF ANY, SET FORTH IN OUR LETTER DATED.....,THIS DRAFT PLAN IS APPROVED BY THE CITY OF OTTAWA UNDER SECTION 51 OF THE PLANNING ACT THIS ..... DAY OF ....., 2021.

ERIN O'CONNELL, MCIP, RPP, MANAGER
DEVELOPMENT REVIEW WEST
PLANNING, INFRASTRUCTURE AND ECONOMIC DEVELOPMENT DEPARTMENT,
CITY OF OTTAWA





DRAFT PLAN OF SUBDIVISION OF

PART OF LOT 13 CONCESSION 3

(GEOGRAPHIC TOWNSHIP OF MARCH)
NOW IN THE

CITY OF OTTAWA

SCALE 1 : 1000

20 0 20 40 60 metres

METRIC DISTANCES AND/OR COORDINATES SHOWN ON THIS PLAN ARE IN METRES AND CAN BE CONVERTED TO FEET BY DIVIDING BY 0.3048.

J.D. BARNES LIMITED

ADDITIONAL INFORMATION REQUIRED UNDER SECTION 51(17) OF THE PLANNING ACT.

(a)(b)(e)(f)(g)(j) and (l) - As shown on this Plan.

(c) - As shown on this Draft and Key Plan

(d) - Land to be used in accordance with the Schedule of Land Use.

(h)(k) - Full Municipal Services to be available

(i) - See Soils Report

Ottawa Formation, limestone

NOTES

DISTANCES ARE GROUND

ALL DISTANCES ON CURVES ARE ARC DISTANCES UNLESS OTHERWISE SPECIFIED

ELEVATION NOTE

ELEVATIONS SHOWN ON THIS PLAN ARE RELATED TO GEODETIC DATUM AND ARE DERIVED FROM MINISTRY OF TRANSPORTATION CONTROL MONUMENT 0011968U001 HAVING A PUBLISHED ELEVATION OF 78.945 METRES.

LEGEND

-E- DENOTES OVERHEAD UTILITY CABLE (HYDRO)

CONTOUR INTERVALS ARE SHOWN AS 1.00m FOR MAJOR AND 0.25m FOR MINOR

DENOTES MAJOR CONTOUR

DENOTES MINOR CONTOUR

SURVEYOR'S CERTIFICATE

I HEREBY CERTIFY THAT THE BOUNDARIES OF THE LAND TO BE SUBDIVIDED ARE CORRECTLY SHOWN.

SEPTEMBER 8th, 2021
DATE

FOR REVIEW
SHAWN LEROUX
ONTARIO LAND SURVEYOR

OWNER'S CERTIFICATE

THUY THI THANH PHAM, BEING A REGISTERED OWNER OF THE SUBJECT LANDS HEREBY AUTHORIZES J. D. BARNES LIMITED TO PREPARE AND SUBMIT THIS DRAFT PLAN OF SUBDIVISION FOR APPROVAL.

DATE THUY THI THANH PHAM

OWNER'S CERTIFICATE

HING TRONG WONG, BEING A REGISTERED OWNER OF THE SUBJECT LANDS HEREBY AUTHORIZES J. D. BARNES LIMITED TO PREPARE AND SUBMIT THIS DRAFT PLAN OF SUBDIVISION FOR APPROVAL.

DATE HING TRONG WONG

OWNER'S CERTIFICATE

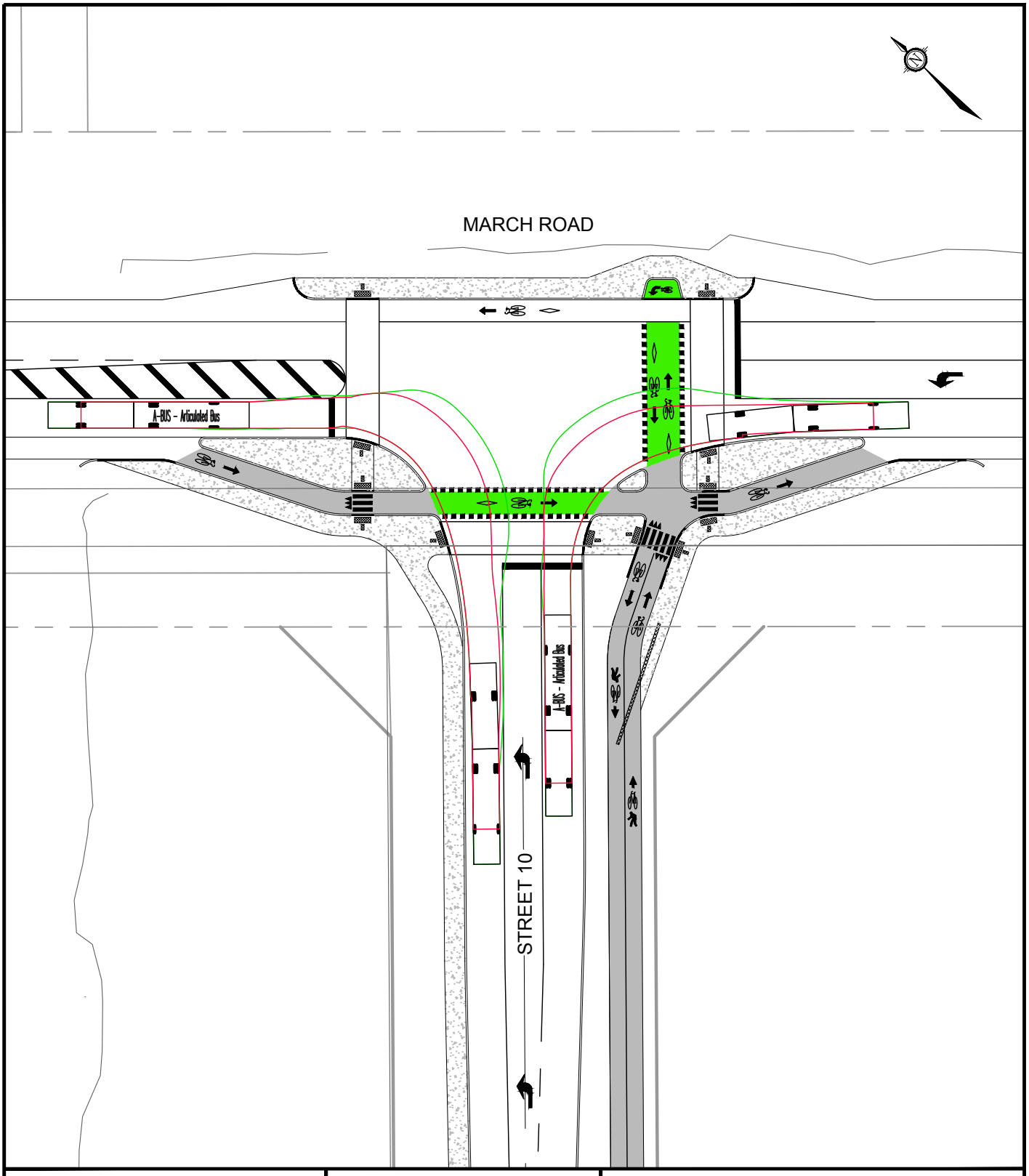
CHING KIM MACDONELL, BEING A REGISTERED OWNER OF THE SUBJECT LANDS HEREBY AUTHORIZES J. D. BARNES LIMITED TO PREPARE AND SUBMIT THIS DRAFT PLAN OF SUBDIVISION FOR APPROVAL.

DATE CHING KIM MACDONELL

J.D.BARNES LIMITED
SURVEYING MAPPING GIS
LAND INFORMATION SPECIALISTS
62 STEACIE DRIVE, SUITE 103, KANATA, ON K2K 2A9
T: (613) 731-7244 F: (613) 254-8659 www.jdbarnes.com

DRAWN BY:	CHECKED BY:	REFERENCE NO.:
NS	SL	21-10-109
PLOTTED: 10/29/2021		DATED: 09/01/2021

FILE: G:\21-10-109\00\Drawing\Draft Plan\21-10-109-00 Draft Plan.dgn



NOVATECH
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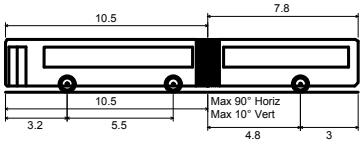
Suite 200, 240 Michael Cowpland Drive
Ottawa, Ontario, Canada K2M 1P6

Telephone (613) 254-9643
Facsimile (613) 254-5867
Website www.novatech-eng.com



A-BUS - Articulated Bus

Overall Length	18.300m
Overall Width	2.400m
Overall Body Height	2.733m
Min Body Ground Clearance	0.320m
Track Width	2.400m
Lock-to-lock time	4.00s
Curb to Curb Turning Radius	13.100m

MARCH ROAD/ STREET 10
CITY OF OTTAWA

TURNING MOVEMENTS

1 : 500 (0 5 10 15 20)

AUG 2022 121247 FIGURE A2

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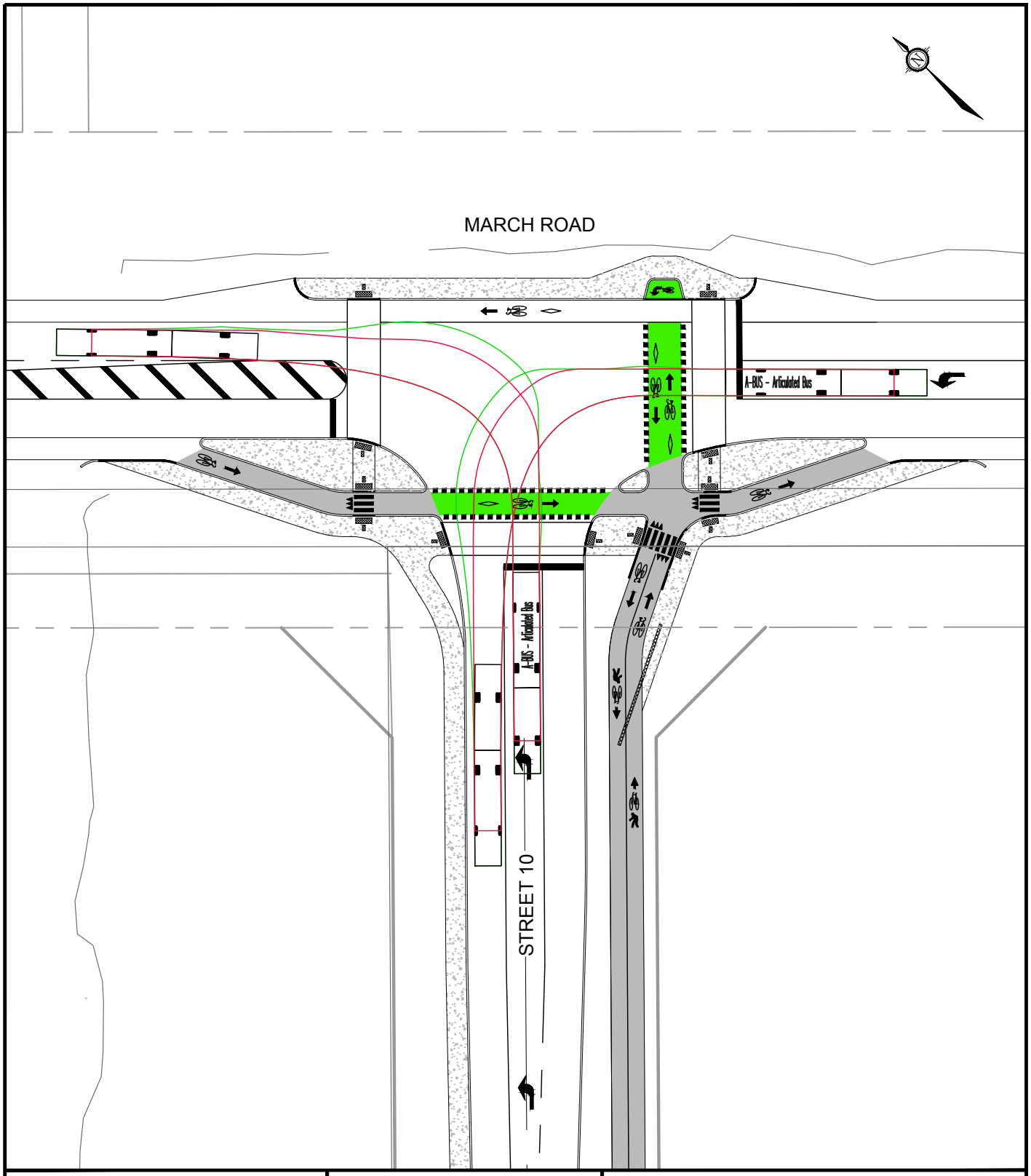

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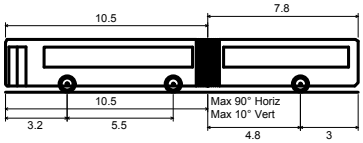

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Min Body Ground Clearance	0.320m
Track Width	2.400m
Lock-to-lock time	4.00s
Curb to Curb Turning Radius	13.100m

MARCH ROAD/ STREET 10
CITY OF OTTAWA

TURNING MOVEMENTS

1 : 500 (0 5 10 15 20)

AUG 2022 121247 FIGURE A3

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SHT8X11.DWG - 216mmX278mm

APPENDIX B

TIA Screening Form

City of Ottawa 2017 TIA Guidelines Screening Form

1. Description of Proposed Development

Municipal Address	**1015 March Road**
Description of Location	**West side of March Road, between Halton Terrace and Maxwell Road**
Land Use Classification	**Commercial, Institutional**
Development Size (units)	
Development Size (m^2)	**1,394m^2 (Commercial), One French Public High School**
Number of Accesses and Locations	**1 connection to March Road and 1 connection to planned Street 10**
Phase of Development	
Buildout Year	**2026**

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

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.*

If the proposed development size is greater than the sizes identified 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).*

If any of the above questions were answered with 'Yes,' the Location Trigger is 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?		✓

If any of the above questions were answered with 'Yes,' the Safety Trigger is satisfied.

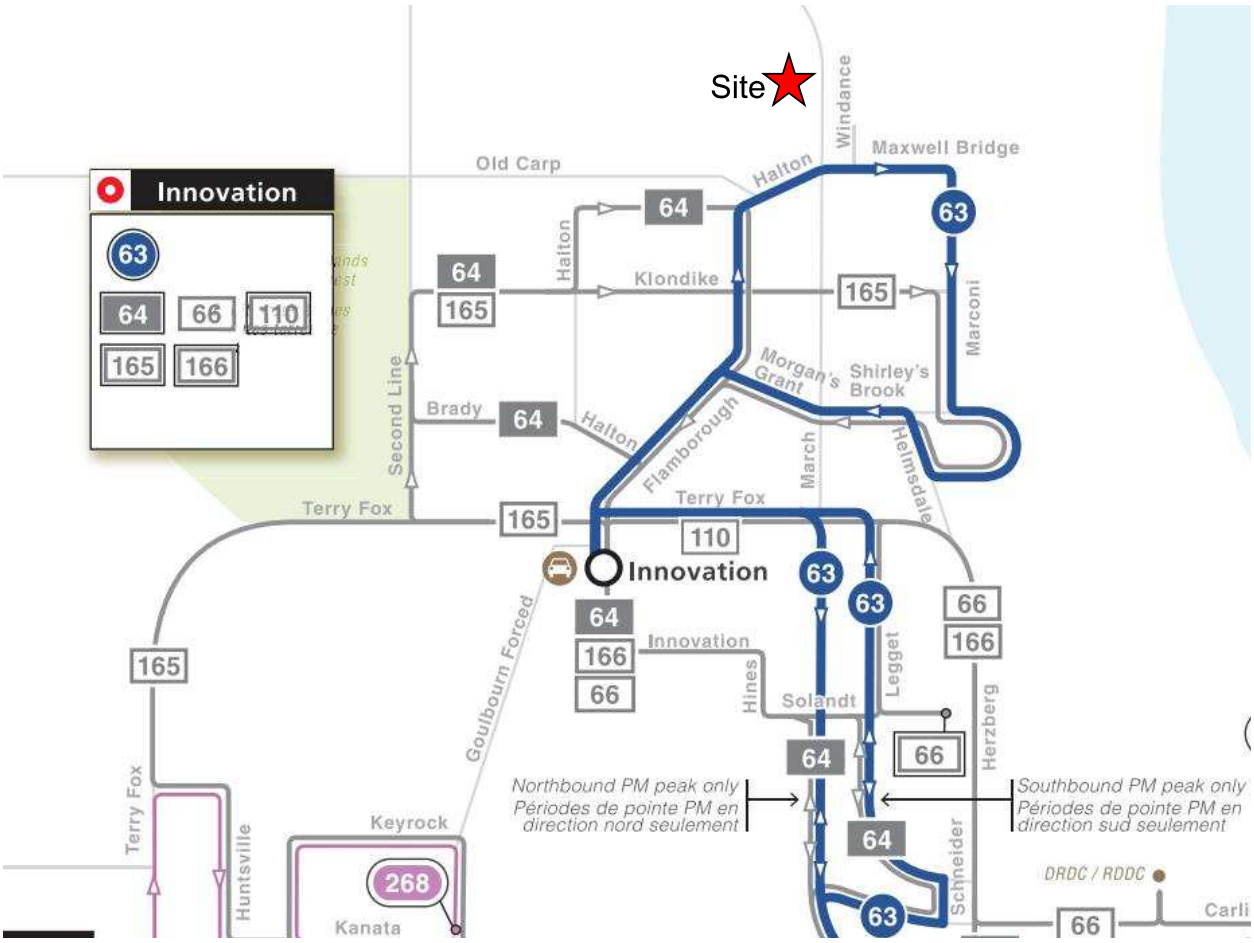
5. Summary

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

If none of the triggers are satisfied, the TIA Study is complete. If one or more of the triggers is satisfied, the TIA Study must continue into the next stage (Screening and Scoping).

APPENDIX C

OC Transpo Route Maps

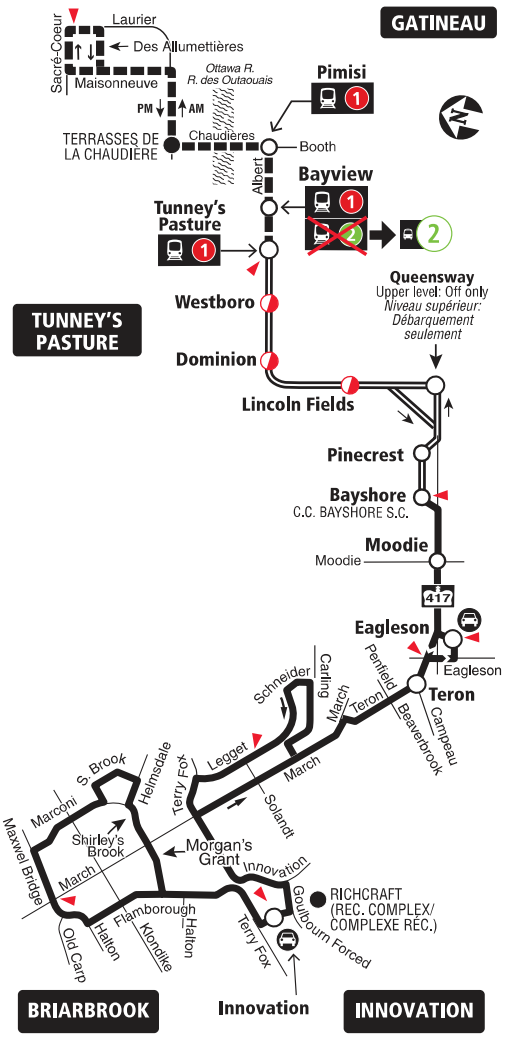

Site
Windance
Maxwell Bridge
Old Carp
Halton
Innovation
63
64
66
110
165
166
64
165
Halton
Klondike
165
Marconi
Second Line
Brady
64
Halton
Morgan's Grant
Shirley's Brook
Flamborough
March
Helmsdale
Terry Fox
165
Terry Fox
110
Innovation
63
63
66
166
64
166
66
Innovation
Goulbourn Forced
Hines
Solandt
Legget
165
Terry Fox
Huntsville
Keyrock
268
Kanata
64
66
Herzberg
Northbound PM peak only
Périodes de pointe PM en direction nord seulement
Southbound PM peak only
Périodes de pointe PM en direction sud seulement
64
Schneider
DRDC / RDDC
63
66
Carli

63 Rapide

INNOVATION
BRIARBROOK
TUNNEY'S PASTURE
GATINEAU

7 days a week / 7 jours par semaine

All day service
Service toute la journée



Transitway & Station
Peak Periods Only / Périodes de pointe seulement
Eastbound: AM Off only - Westbound: Full Service
Vers l'est AM: Débarquement seulement
Vers l'ouest: Service complet
Park & Ride / Parc-o-bus
Timepoint / Heures de passage

2021.09

Schedule / Horaire 613-560-1000
Text / Texto* 560560
plus your four digit bus stop number / *plus* votre numéro d'arrêt à quatre chiffres
*Standard message rates may apply / Les tarifs réguliers de messagerie texte peuvent s'appliquer

Customer Service
Service à la clientèle 613-560-5000

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

Security / Sécurité 613-741-2478

Effective September 5, 2021
En vigueur 5 septembre 2021

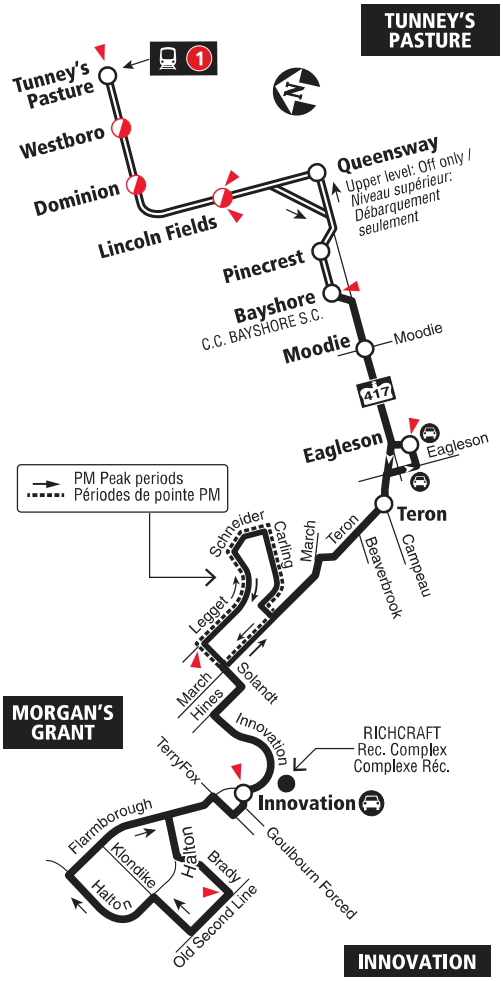
OC Transpo
INFO 613-560-5000
octranspo.com

64 Local

MORGAN'S GRANT
INNOVATION
TUNNEY'S PASTURE

Monday to Friday / Lundi au vendredi

All day service
Service toute la journée



Transitway & Station

Eastbound: AM Off only - Westbound: Full Service
Vers l'est AM: Débarquement seulement
Vers l'ouest: Service complet

Park & Ride / Parc-o-bus

Timepoint / Heures de passage

2021.09

Schedule / Horaire 613-560-1000
Text / Texto* 560560
plus your four digit bus stop number / *plus* votre numéro d'arrêt à quatre chiffres
*Standard message rates may apply / Les tarifs réguliers de messagerie texte peuvent s'appliquer

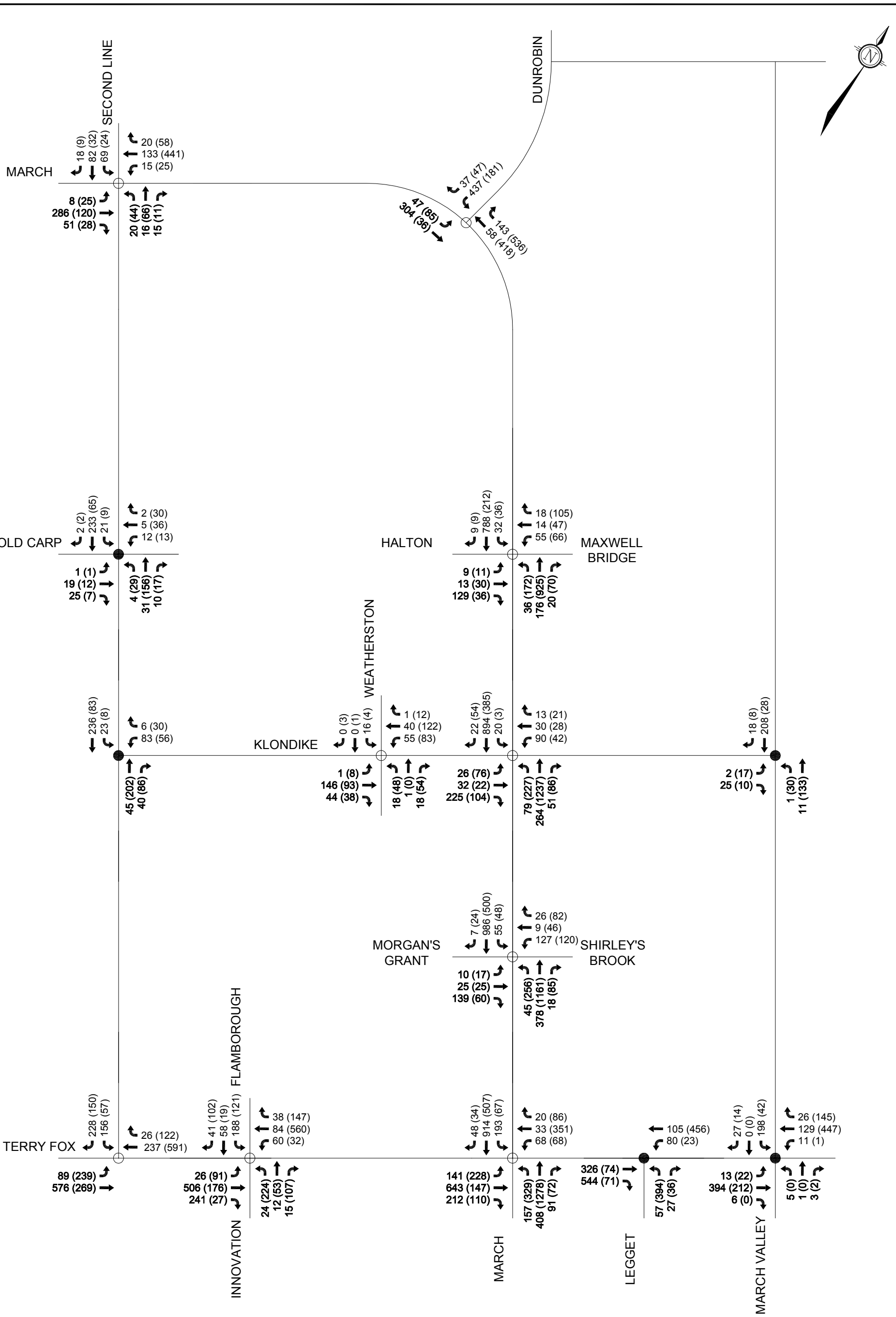
Customer Service
Service à la clientèle **613-560-5000**
Lost and Found / Objets perdus..... **613-563-4011**
Security / Sécurité **613-741-2478**

Effective September 5, 2021
En vigueur 5 septembre 2021

OC Transpo
INFO 613-560-5000
octranspo.com

APPENDIX D

Traffic Count Data



NOVATECH ENGINEERING CONSULTANTS LTD.
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Email: novainfo@novatech-eng.com

LEGEND

- Unsignalized Intersection
- Signalized Intersection
- xx VPH AM Peak Hour
- (xx) VPH PM Peak Hour

KANATA NORTH URBAN EXPANSION STUDY AREA

EXISTING TRAFFIC VOLUMES

MAR 2013 112117 FIGURE # 3

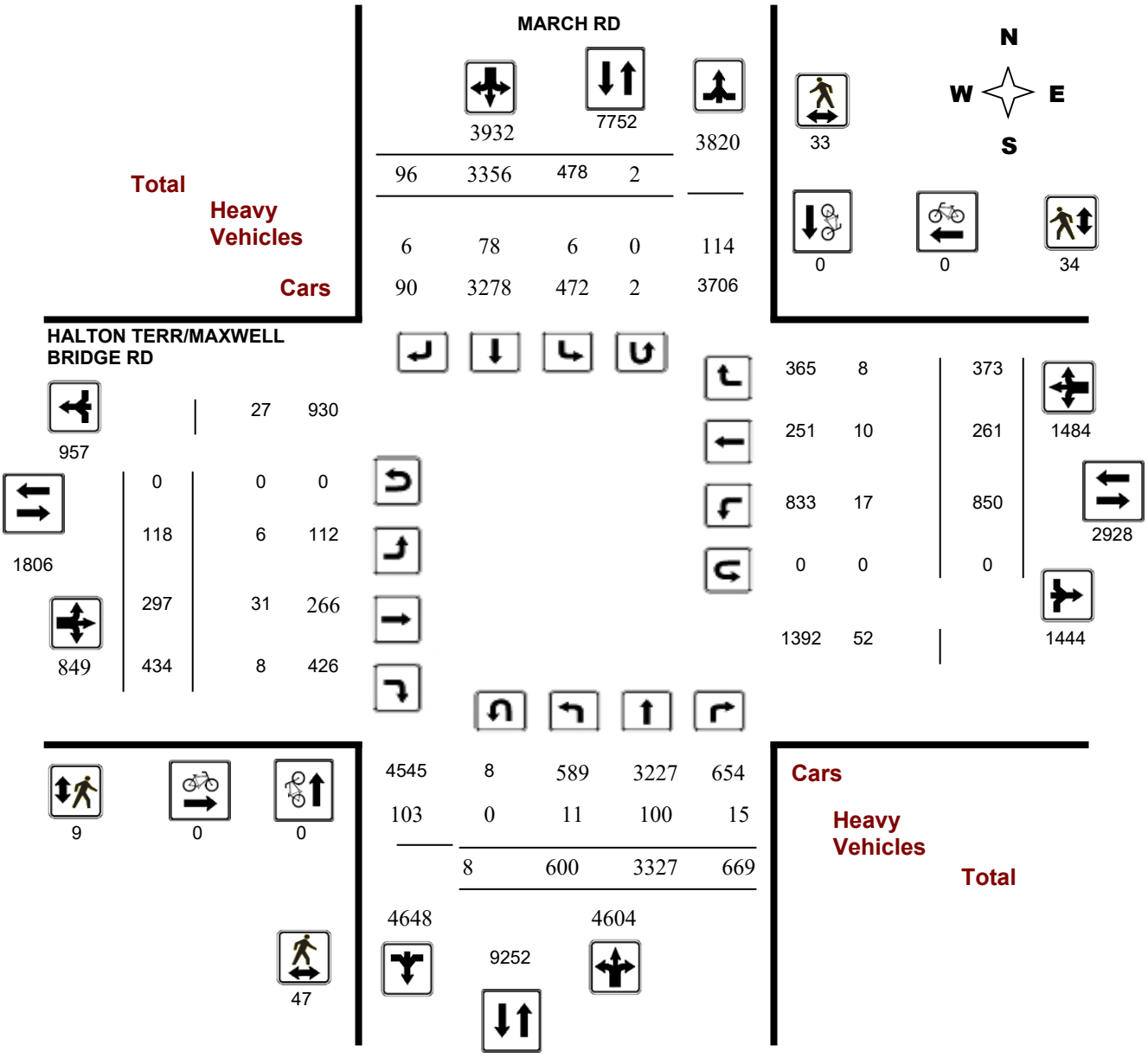
Transportation Services - Traffic Services

Turning Movement Count - Study Results

HALTON TERR/MAXWELL BRIDGE RD @ MARCH RD

Survey Date: Wednesday, March 04, 2020
Start Time: 07:00
WO No: 39372
Device: Miovision

Full Study Diagram



5472187 - WED JAN 22, 2020 - 8HRS - LORETTA

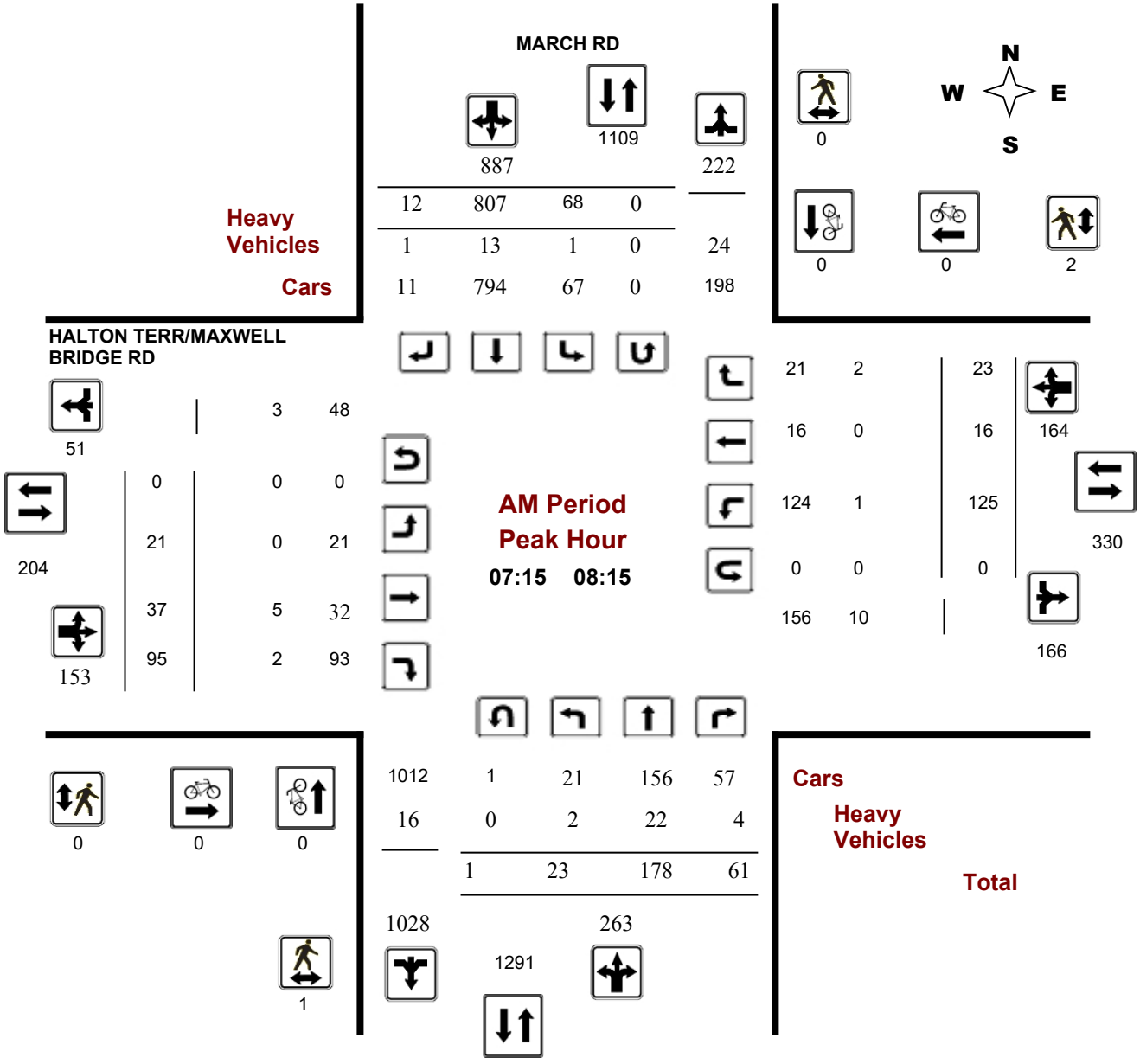
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

HALTON TERR/MAXWELL BRIDGE RD @ MARCH RD

Survey Date: Wednesday, March 04, 2020 **WO No:** 39372

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



Comments 5472187 - WED JAN 22, 2020 - 8HRS - LORETTA

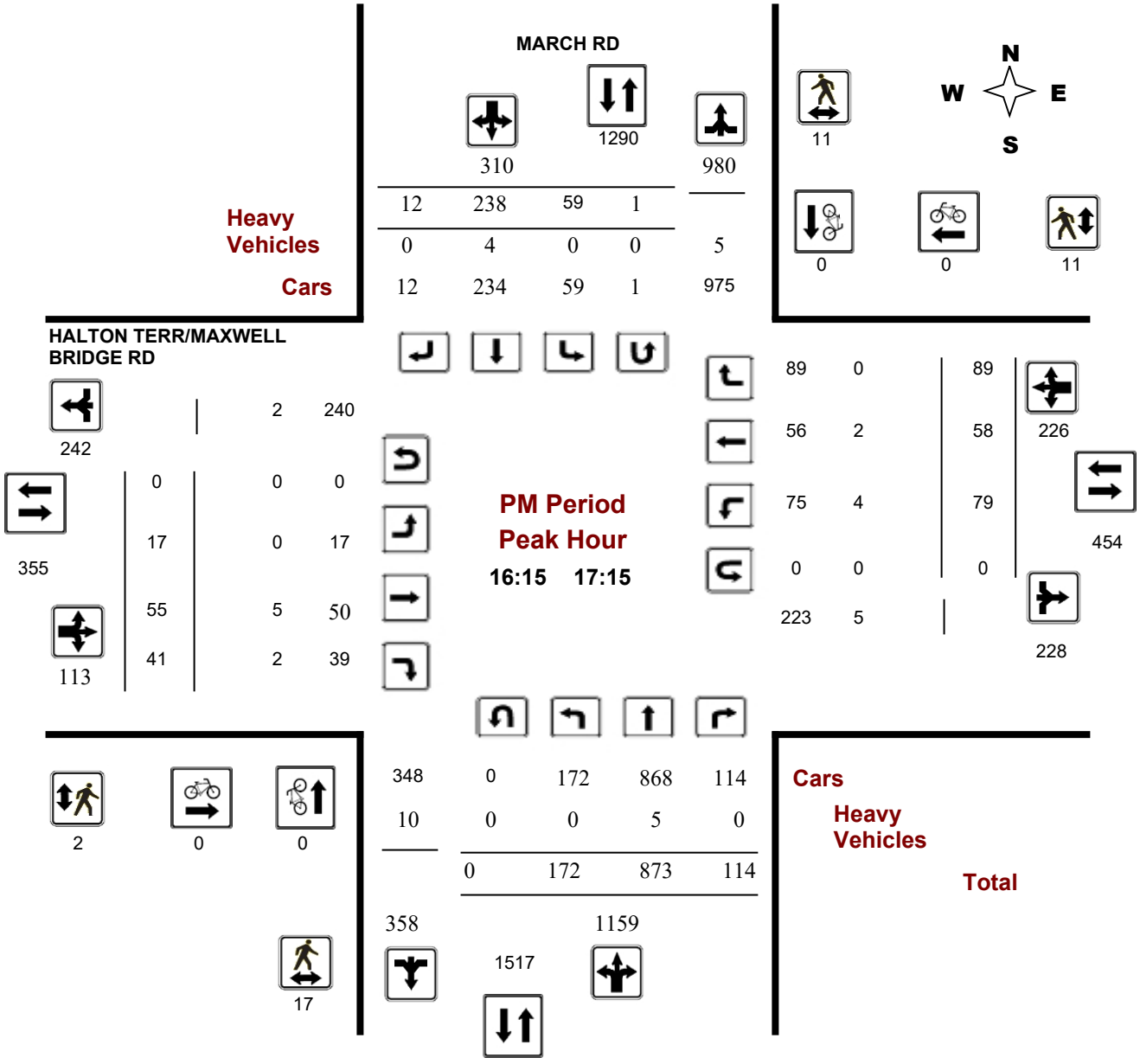
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

HALTON TERR/MAXWELL BRIDGE RD @ MARCH RD

Survey Date: Wednesday, March 04, 2020 **WO No:** 39372

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



Comments 5472187 - WED JAN 22, 2020 - 8HRS - LORETTA

Transportation Services - Traffic Services

Turning Movement Count - Study Results

HALTON TERR/MAXWELL BRIDGE RD @ MARCH RD

Survey Date: Wednesday, March 04, 2020 **WO No:** 39372

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

Full Study Summary (8 HR Standard)

Survey Date: Wednesday, March 04, 2020

Total Observed U-Turns

Northbound: 8 Southbound: 2

Eastbound: 0 Westbound: 0

AADT Factor

1.00

	MARCH RD								HALTON TERR/MAXWELL BRIDGE RD									
	Northbound				Southbound				Eastbound				Westbound					
Period	LT	ST	RT	**NB TOT**	LT	ST	RT	**SB TOT**	**STR TOT**	LT	ST	RT	**EB TOT**	LT	ST	RT	**WB TOT**	**STR TOT**	**Grand Total**
07:00 08:00	21	180	50	**251**	56	785	10	**851**	**1102**	18	36	90	**144**	122	16	23	**161**	**305**	**1407**
08:00 09:00	35	152	76	**263**	78	758	10	**846**	**1109**	21	32	83	**136**	141	24	19	**184**	**320**	**1429**
09:00 10:00	28	208	62	**298**	69	517	13	**599**	**897**	21	42	87	**150**	120	28	29	**177**	**327**	**1224**
11:30 12:30	58	268	85	**411**	52	283	9	**344**	**755**	3	24	28	**55**	115	18	27	**160**	**215**	**970**
12:30 13:30	47	287	86	**420**	43	266	7	**316**	**736**	8	21	34	**63**	109	15	28	**152**	**215**	**951**
15:00 16:00	96	608	104	**808**	58	265	19	**342**	**1150**	18	41	36	**95**	59	50	73	**182**	**277**	**1427**
16:00 17:00	156	867	101	**1124**	63	246	11	**320**	**1444**	18	51	39	**108**	70	52	88	**210**	**318**	**1762**
17:00 18:00	159	757	105	**1021**	59	236	17	**312**	**1333**	11	50	37	**98**	114	58	86	**258**	**356**	**1689**
Sub Total	600	3327	669	**4596**	478	3356	96	**3930**	**8526**	118	297	434	**849**	850	261	373	**1484**	**2333**	**10859**
U Turns				**8**				**2**	**10**				**0**				**0**	**0**	**10**
Total	600	3327	669	**4604**	478	3356	96	**3932**	**8536**	118	297	434	**849**	850	261	373	**1484**	**2333**	**10869**
EQ 12Hr	834	4625	930	**6400**	664	4665	133	**5465**	**11865**	164	413	603	**1180**	1182	363	518	**2063**	**3243**	**15108**
Note: These values are calculated by multiplying the totals by the appropriate expansion factor.														**1.39**					
AVG 12Hr	786	4358	876	**6031**	626	4396	126	**5151**	**11865**	155	389	569	**1112**	1114	342	489	**1944**	**3243**	**15108**
Note: These volumes are calculated by multiplying the Equivalent 12 hr. totals by the AADT factor.														**1**					
AVG 24Hr	1030	5709	1148	**7901**	820	5759	165	**6748**	**14649**	202	510	745	**1457**	1459	448	640	**2547**	**4004**	**18653**
Note: These volumes are calculated by multiplying the Average Daily 12 hr. totals by 12 to 24 expansion factor.														**1.31**					

Note: U-Turns provided for approach totals. Refer to 'U-Turn' Report for specific breakdown.

Transportation Services - Traffic Services

Turning Movement Count - Study Results

HALTON TERR/MAXWELL BRIDGE RD @ MARCH RD

Survey Date: Wednesday, March 04, 2020 **WO No:** 39372

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

Full Study 15 Minute Increments

		MARCH RD									HALTON TERR/MAXWELL BRIDGE RD									
		Northbound				Southbound					Eastbound				Westbound					
Time Period		LT	ST	RT	N TOT	LT	ST	RT	S TOT	STR TOT	LT	ST	RT	E TOT	LT	ST	RT	W TOT	STR TOT	Grand Total
07:00	07:15	6	45	14	65	9	179	0	188	15	2	8	19	29	36	4	6	46	15	328
07:15	07:30	8	54	12	74	14	224	1	239	17	5	6	27	38	29	4	3	36	17	387
07:30	07:45	4	54	16	75	12	183	5	200	7	8	10	25	43	25	3	4	32	7	350
07:45	08:00	3	27	8	38	21	199	4	224	7	3	12	19	34	32	5	10	47	7	343
08:00	08:15	8	43	25	76	21	201	2	224	12	5	9	24	38	39	4	6	49	12	387
08:15	08:30	6	32	18	56	20	182	1	203	5	5	8	18	31	37	3	5	45	5	335
08:30	08:45	11	42	22	76	15	189	3	207	9	7	7	27	41	26	6	5	37	9	361
08:45	09:00	10	35	11	56	22	186	4	212	6	4	8	14	26	39	11	3	53	6	347
09:00	09:15	7	52	23	82	23	166	8	197	16	8	18	37	63	40	10	9	59	16	401
09:15	09:30	8	54	17	79	17	126	1	144	10	7	9	33	49	30	10	10	50	10	322
09:30	09:45	7	55	11	74	17	125	2	144	5	4	6	13	23	27	3	4	34	5	275
09:45	10:00	6	47	11	65	12	100	2	114	4	2	9	4	15	23	5	6	34	4	228
11:30	11:45	17	55	19	92	14	77	4	95	5	1	6	10	17	35	5	8	48	5	252
11:45	12:00	15	57	20	94	10	70	1	81	10	2	6	10	18	25	6	3	34	10	227
12:00	12:15	16	84	26	126	12	70	3	85	3	0	4	3	7	30	2	8	40	3	258
12:15	12:30	10	72	20	103	16	66	1	83	3	0	8	5	13	25	5	8	38	3	237
12:30	12:45	15	79	28	122	8	56	2	66	7	3	6	8	17	37	5	9	51	7	256
12:45	13:00	11	74	27	112	12	71	3	86	10	3	7	9	19	33	3	7	43	10	260
13:00	13:15	11	83	10	104	8	71	1	80	4	1	6	13	20	18	2	6	26	4	230
13:15	13:30	10	51	21	82	15	68	1	85	6	1	2	4	7	21	5	6	32	6	206
15:00	15:15	13	130	25	168	10	63	4	77	1	2	5	7	14	15	9	19	43	1	302
15:15	15:30	29	129	33	191	13	56	6	75	9	2	11	8	21	16	15	15	46	9	333
15:30	15:45	24	163	16	203	13	65	4	82	10	7	9	5	21	13	16	23	52	10	358
15:45	16:00	30	186	30	246	22	81	5	108	9	7	16	16	39	15	10	16	41	9	434
16:00	16:15	27	202	22	251	17	62	3	82	7	4	12	11	27	17	9	25	51	7	411
16:15	16:30	40	251	17	308	16	64	1	81	3	6	13	11	30	14	11	18	43	3	462
16:30	16:45	43	214	32	289	10	50	4	65	1	2	11	8	21	20	14	27	61	1	436
16:45	17:00	46	200	30	276	20	70	3	93	3	6	15	9	30	19	18	18	55	3	454
17:00	17:15	43	208	35	286	13	54	4	71	2	3	16	13	32	26	15	26	67	2	456
17:15	17:30	32	217	18	267	17	65	1	83	1	3	10	5	18	30	14	21	65	1	433
17:30	17:45	37	173	26	236	21	50	3	74	9	5	15	7	27	37	11	27	75	9	412
17:45	18:00	47	159	26	232	8	67	9	84	0	0	9	12	21	21	18	12	51	0	388
Total:		600	3327	669	4604	478	3356	96	3932	216	118	297	434	849	850	261	373	1484	216	10,869

Note: U-Turns are included in Totals.

Transportation Services - Traffic Services

Turning Movement Count - Study Results

HALTON TERR/MAXWELL BRIDGE RD @ MARCH RD

Survey Date: Wednesday, March 04, 2020 **WO No:** 39372

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

Full Study Cyclist Volume

Time Period		MARCH RD			HALTON TERR/MAXWELL BRIDGE RD			
		Northbound	Southbound	Street Total	Eastbound	Westbound	Street Total	Grand Total
07:00	07:15	0	0	0	0	0	0	0
07:15	07:30	0	0	0	0	0	0	0
07:30	07:45	0	0	0	0	0	0	0
07:45	08:00	0	0	0	0	0	0	0
08:00	08:15	0	0	0	0	0	0	0
08:15	08:30	0	0	0	0	0	0	0
08:30	08:45	0	0	0	0	0	0	0
08:45	09:00	0	0	0	0	0	0	0
09:00	09:15	0	0	0	0	0	0	0
09:15	09:30	0	0	0	0	0	0	0
09:30	09:45	0	0	0	0	0	0	0
09:45	10:00	0	0	0	0	0	0	0
11:30	11:45	0	0	0	0	0	0	0
11:45	12:00	0	0	0	0	0	0	0
12:00	12:15	0	0	0	0	0	0	0
12:15	12:30	0	0	0	0	0	0	0
12:30	12:45	0	0	0	0	0	0	0
12:45	13:00	0	0	0	0	0	0	0
13:00	13:15	0	0	0	0	0	0	0
13:15	13:30	0	0	0	0	0	0	0
15:00	15:15	0	0	0	0	0	0	0
15:15	15:30	0	0	0	0	0	0	0
15:30	15:45	0	0	0	0	0	0	0
15:45	16:00	0	0	0	0	0	0	0
16:00	16:15	0	0	0	0	0	0	0
16:15	16:30	0	0	0	0	0	0	0
16:30	16:45	0	0	0	0	0	0	0
16:45	17:00	0	0	0	0	0	0	0
17:00	17:15	0	0	0	0	0	0	0
17:15	17:30	0	0	0	0	0	0	0
17:30	17:45	0	0	0	0	0	0	0
17:45	18:00	0	0	0	0	0	0	0
Total		0	0	**0**	0	0	0	0

Transportation Services - Traffic Services

Turning Movement Count - Study Results

HALTON TERR/MAXWELL BRIDGE RD @ MARCH RD

Survey Date: Wednesday, March 04, 2020 **WO No:** 39372

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

Full Study Pedestrian Volume

	MARCH RD			HALTON TERR/MAXWELL BRIDGE RD			
Time Period	NB Approach (E or W Crossing)	SB Approach (E or W Crossing)	Total	EB Approach (N or S Crossing)	WB Approach (N or S Crossing)	Total	Grand Total
07:00 07:15	0	1	**1**	0	0	**0**	**1**
07:15 07:30	0	0	**0**	0	1	**1**	**1**
07:30 07:45	0	0	**0**	0	0	**0**	**0**
07:45 08:00	1	0	**1**	0	1	**1**	**2**
08:00 08:15	0	0	**0**	0	0	**0**	**0**
08:15 08:30	0	0	**0**	0	0	**0**	**0**
08:30 08:45	0	0	**0**	0	1	**1**	**1**
08:45 09:00	1	2	**3**	0	1	**1**	**4**
09:00 09:15	1	0	**1**	0	0	**0**	**1**
09:15 09:30	0	1	**1**	1	1	**2**	**3**
09:30 09:45	0	0	**0**	0	0	**0**	**0**
09:45 10:00	0	0	**0**	1	0	**1**	**1**
11:30 11:45	2	0	**2**	0	1	**1**	**3**
11:45 12:00	2	0	**2**	0	0	**0**	**2**
12:00 12:15	0	0	**0**	0	2	**2**	**2**
12:15 12:30	1	0	**1**	0	0	**0**	**1**
12:30 12:45	1	0	**1**	0	0	**0**	**1**
12:45 13:00	0	0	**0**	0	0	**0**	**0**
13:00 13:15	2	0	**2**	0	0	**0**	**2**
13:15 13:30	2	0	**2**	0	0	**0**	**2**
15:00 15:15	0	5	**5**	0	4	**4**	**9**
15:15 15:30	4	2	**6**	0	6	**6**	**12**
15:30 15:45	1	0	**1**	0	0	**0**	**1**
15:45 16:00	0	1	**1**	1	0	**1**	**2**
16:00 16:15	3	5	**8**	1	1	**2**	**10**
16:15 16:30	6	0	**6**	1	6	**7**	**13**
16:30 16:45	4	8	**12**	0	1	**1**	**13**
16:45 17:00	6	2	**8**	1	2	**3**	**11**
17:00 17:15	1	1	**2**	0	2	**2**	**4**
17:15 17:30	3	1	**4**	0	1	**1**	**5**
17:30 17:45	3	4	**7**	0	3	**3**	**10**
17:45 18:00	3	0	**3**	3	0	**3**	**6**
Total	47	33	**80**	9	34	**43**	**123**

5472187 - WED JAN 22, 2020 - 8HRS - LORETTA

Transportation Services - Traffic Services

Turning Movement Count - Study Results

HALTON TERR/MAXWELL BRIDGE RD @ MARCH RD

Survey Date: Wednesday, March 04, 2020 **WO No:** 39372

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

Full Study Heavy Vehicles

		MARCH RD									HALTON TERR/MAXWELL BRIDGE RD									
		Northbound				Southbound					Eastbound				Westbound					
Time Period		LT	ST	RT	N TOT	LT	ST	RT	S TOT	STR TOT	LT	ST	RT	E TOT	LT	ST	RT	W TOT	STR TOT	Grand Total
07:00	07:15	1	5	3	**9**	0	6	0	**6**	**15**	0	2	0	**2**	0	0	0	**0**	**2**	**17**
07:15	07:30	2	9	2	**13**	1	3	0	**4**	**17**	0	1	2	**3**	0	0	2	**2**	**5**	**22**
07:30	07:45	0	3	1	**4**	0	3	0	**3**	**7**	0	1	0	**1**	0	0	0	**0**	**1**	**8**
07:45	08:00	0	2	0	**2**	0	4	1	**5**	**7**	0	1	0	**1**	1	0	0	**1**	**2**	**9**
08:00	08:15	0	8	1	**9**	0	3	0	**3**	**12**	0	2	0	**2**	0	0	0	**0**	**2**	**14**
08:15	08:30	0	2	0	**2**	1	2	0	**3**	**5**	0	1	0	**1**	0	0	0	**0**	**1**	**6**
08:30	08:45	0	5	1	**6**	0	3	0	**3**	**9**	0	0	0	**0**	0	1	0	**1**	**1**	**10**
08:45	09:00	0	2	0	**2**	1	3	0	**4**	**6**	0	1	0	**1**	1	1	0	**2**	**3**	**9**
09:00	09:15	2	6	0	**8**	0	7	1	**8**	**16**	1	2	2	**5**	0	1	1	**2**	**7**	**23**
09:15	09:30	1	6	1	**8**	0	2	0	**2**	**10**	1	2	2	**5**	0	0	1	**1**	**6**	**16**
09:30	09:45	0	2	0	**2**	0	3	0	**3**	**5**	0	0	0	**0**	0	0	0	**0**	**0**	**5**
09:45	10:00	0	2	0	**2**	0	2	0	**2**	**4**	0	2	0	**2**	0	0	0	**0**	**2**	**6**
11:30	11:45	0	2	0	**2**	2	1	0	**3**	**5**	0	1	0	**1**	0	1	1	**2**	**3**	**8**
11:45	12:00	0	7	1	**8**	0	2	0	**2**	**10**	0	0	0	**0**	1	0	0	**1**	**1**	**11**
12:00	12:15	0	0	0	**0**	0	3	0	**3**	**3**	0	0	0	**0**	0	0	0	**0**	**0**	**3**
12:15	12:30	0	2	0	**2**	0	1	0	**1**	**3**	0	1	0	**1**	1	0	0	**1**	**2**	**5**
12:30	12:45	0	4	1	**5**	0	2	0	**2**	**7**	0	1	0	**1**	0	1	1	**2**	**3**	**10**
12:45	13:00	0	7	0	**7**	0	2	1	**3**	**10**	1	0	0	**1**	0	0	0	**0**	**1**	**11**
13:00	13:15	1	1	0	**2**	0	2	0	**2**	**4**	1	1	0	**2**	0	0	0	**0**	**2**	**6**
13:15	13:30	1	2	0	**3**	0	2	1	**3**	**6**	0	1	0	**1**	0	0	0	**0**	**1**	**7**
15:00	15:15	0	0	0	**0**	0	1	0	**1**	**1**	0	0	0	**0**	2	0	0	**2**	**2**	**3**
15:15	15:30	0	3	1	**4**	0	5	0	**5**	**9**	0	1	0	**1**	0	1	0	**1**	**2**	**11**
15:30	15:45	1	5	1	**7**	0	3	0	**3**	**10**	1	1	0	**2**	1	1	0	**2**	**4**	**14**
15:45	16:00	1	2	1	**4**	1	2	2	**5**	**9**	0	1	0	**1**	0	0	0	**0**	**1**	**10**
16:00	16:15	1	3	0	**4**	0	3	0	**3**	**7**	1	1	0	**2**	1	1	2	**4**	**6**	**13**
16:15	16:30	0	3	0	**3**	0	0	0	**0**	**3**	0	1	0	**1**	2	2	0	**4**	**5**	**8**
16:30	16:45	0	0	0	**0**	0	1	0	**1**	**1**	0	2	1	**3**	0	0	0	**0**	**3**	**4**
16:45	17:00	0	0	0	**0**	0	3	0	**3**	**3**	0	1	0	**1**	1	0	0	**1**	**2**	**5**
17:00	17:15	0	2	0	**2**	0	0	0	**0**	**2**	0	1	1	**2**	1	0	0	**1**	**3**	**5**
17:15	17:30	0	1	0	**1**	0	0	0	**0**	**1**	0	1	0	**1**	1	0	0	**1**	**2**	**3**
17:30	17:45	0	4	1	**5**	0	4	0	**4**	**9**	0	0	0	**0**	3	0	0	**3**	**3**	**12**
17:45	18:00	0	0	0	**0**	0	0	0	**0**	**0**	0	1	0	**1**	1	0	0	**1**	**2**	**2**
Total:	None	11	100	15	**126**	6	78	6	**90**	**216**	6	31	8	**45**	17	10	8	**35**	**80**	**296**

Transportation Services - Traffic Services

Turning Movement Count - Study Results

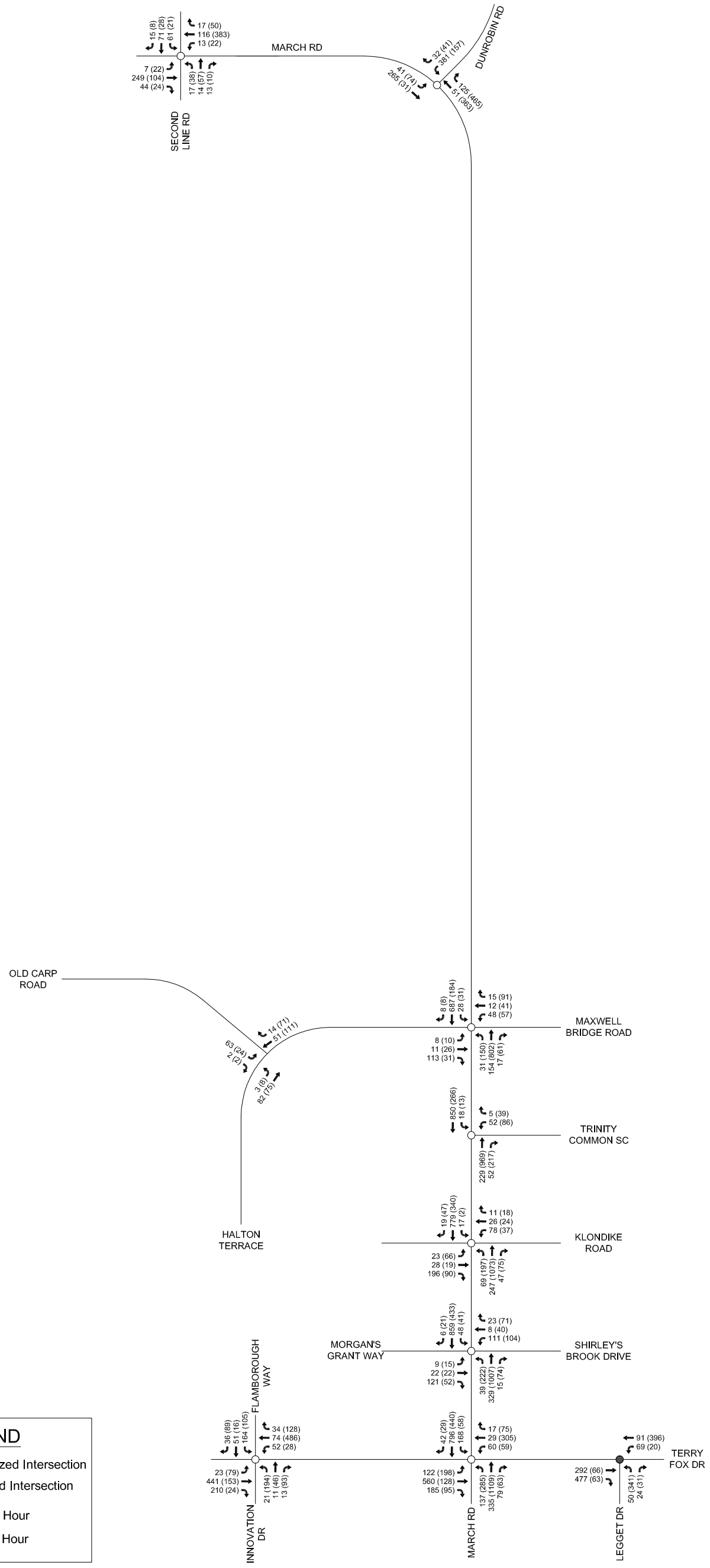
HALTON TERR/MAXWELL BRIDGE RD @ MARCH RD

Survey Date: Wednesday, March 04, 2020 **WO No:** 39372

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

Full Study 15 Minute U-Turn Total

Time Period		MARCH RD		HALTON TERR/MAXWELL BRIDGE RD		Total
		Northbound U-Turn Total	Southbound U-Turn Total	Eastbound U-Turn Total	Westbound U-Turn Total	
07:00	07:15	0	0	0	0	0
07:15	07:30	0	0	0	0	0
07:30	07:45	1	0	0	0	1
07:45	08:00	0	0	0	0	0
08:00	08:15	0	0	0	0	0
08:15	08:30	0	0	0	0	0
08:30	08:45	1	0	0	0	1
08:45	09:00	0	0	0	0	0
09:00	09:15	0	0	0	0	0
09:15	09:30	0	0	0	0	0
09:30	09:45	1	0	0	0	1
09:45	10:00	1	0	0	0	1
11:30	11:45	1	0	0	0	1
11:45	12:00	2	0	0	0	2
12:00	12:15	0	0	0	0	0
12:15	12:30	1	0	0	0	1
12:30	12:45	0	0	0	0	0
12:45	13:00	0	0	0	0	0
13:00	13:15	0	0	0	0	0
13:15	13:30	0	1	0	0	1
15:00	15:15	0	0	0	0	0
15:15	15:30	0	0	0	0	0
15:30	15:45	0	0	0	0	0
15:45	16:00	0	0	0	0	0
16:00	16:15	0	0	0	0	0
16:15	16:30	0	0	0	0	0
16:30	16:45	0	1	0	0	1
16:45	17:00	0	0	0	0	0
17:00	17:15	0	0	0	0	0
17:15	17:30	0	0	0	0	0
17:30	17:45	0	0	0	0	0
17:45	18:00	0	0	0	0	0
Total		8	2	0	0	10



LEGEND

- Unsignalized Intersection
- Signalized Intersection

xx VPH AM Peak Hour

(xx) VPH PM Peak Hour

KANATA NORTH

COMMUNITY DESIGN PLAN

FIGURE NO. 11

2026 BACKGROUND TRAFFIC VOLUMES

DATE JUN 2016

JOB 112117

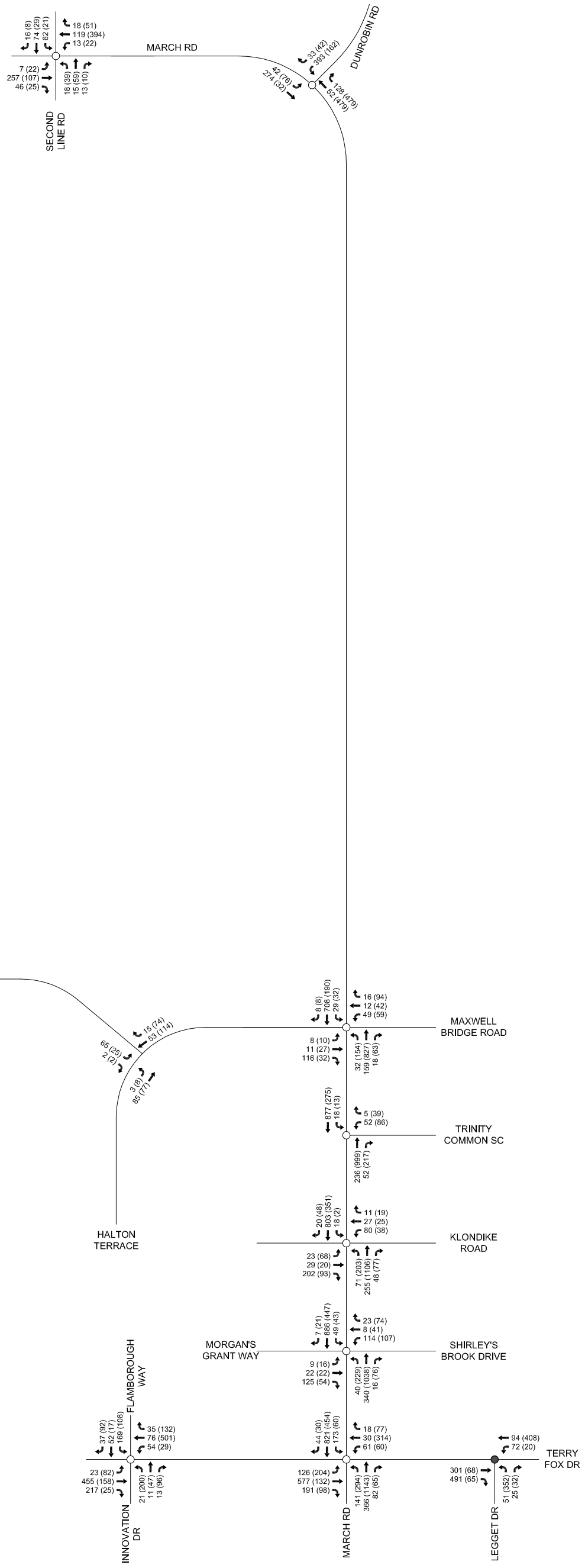
SCALE N.T.S.

NOVATECH

Engineers, Planners & Landscape Architects

M:\2012\112117\CAD\Design\Figures\Traffic\TMP\FINAL\Traffic Figures.dwg, 2026 BACKGROUND, Mar 28, 2016 - 3:07pm, bbyvelds

SHT11x17.DWG - 279mmx432mm



LEGEND

- Unsignalized Intersection
- Signalized Intersection
- xx VPH AM Peak Hour
- (xx) VPH PM Peak Hour

KANATA NORTH

COMMUNITY DESIGN PLAN

FIGURE NO. 12

2031 BACKGROUND TRAFFIC VOLUMES

DATE JUN 2016

JOB 112117

SCALE N.T.S.

NOVATECH
Engineers, Planners & Landscape Architects

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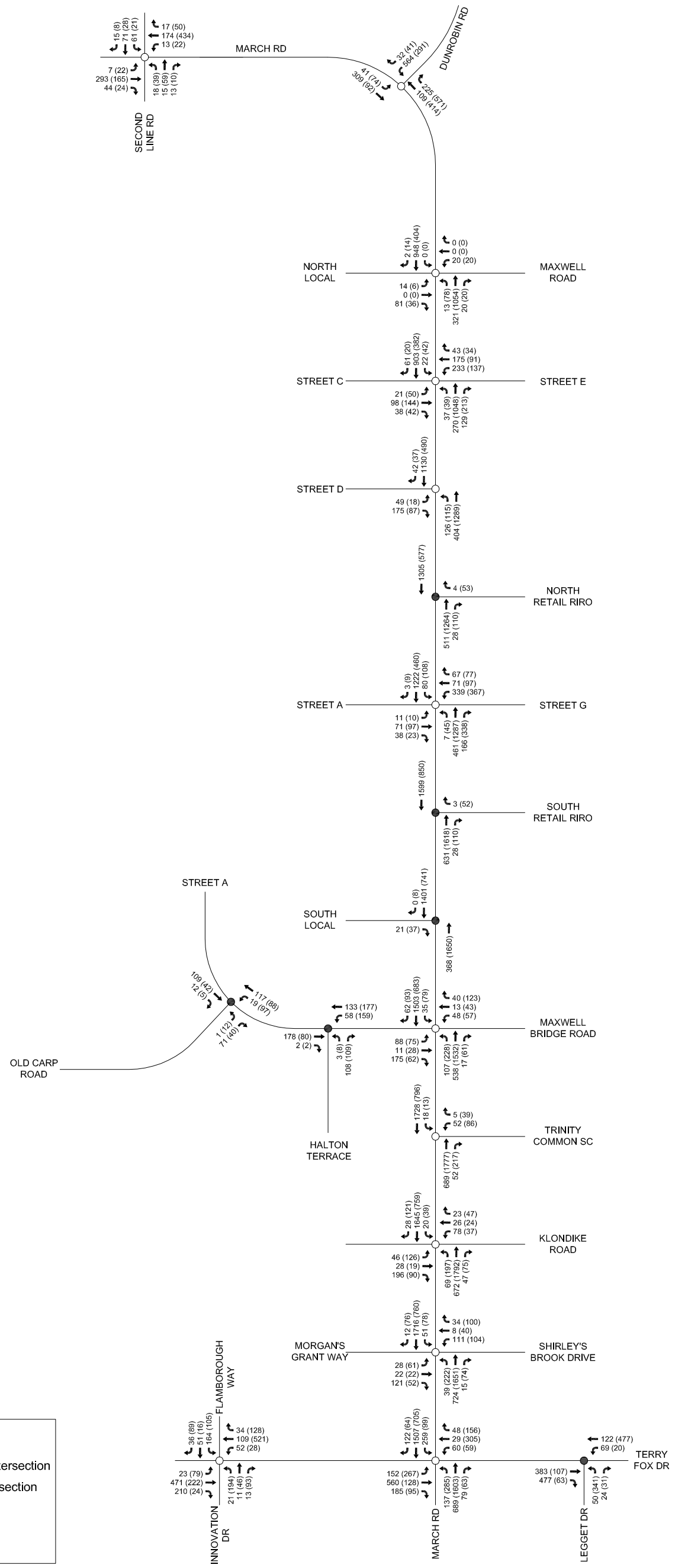


LEGEND

- Unsignalized Intersection
- Signalized Intersection
- xx VPH AM Peak Hour
- (xx) VPH PM Peak Hour

KANATA NORTH

COMMUNITY DESIGN PLAN

FIGURE NO. 36

2026 TOTAL TRAFFIC VOLUMES

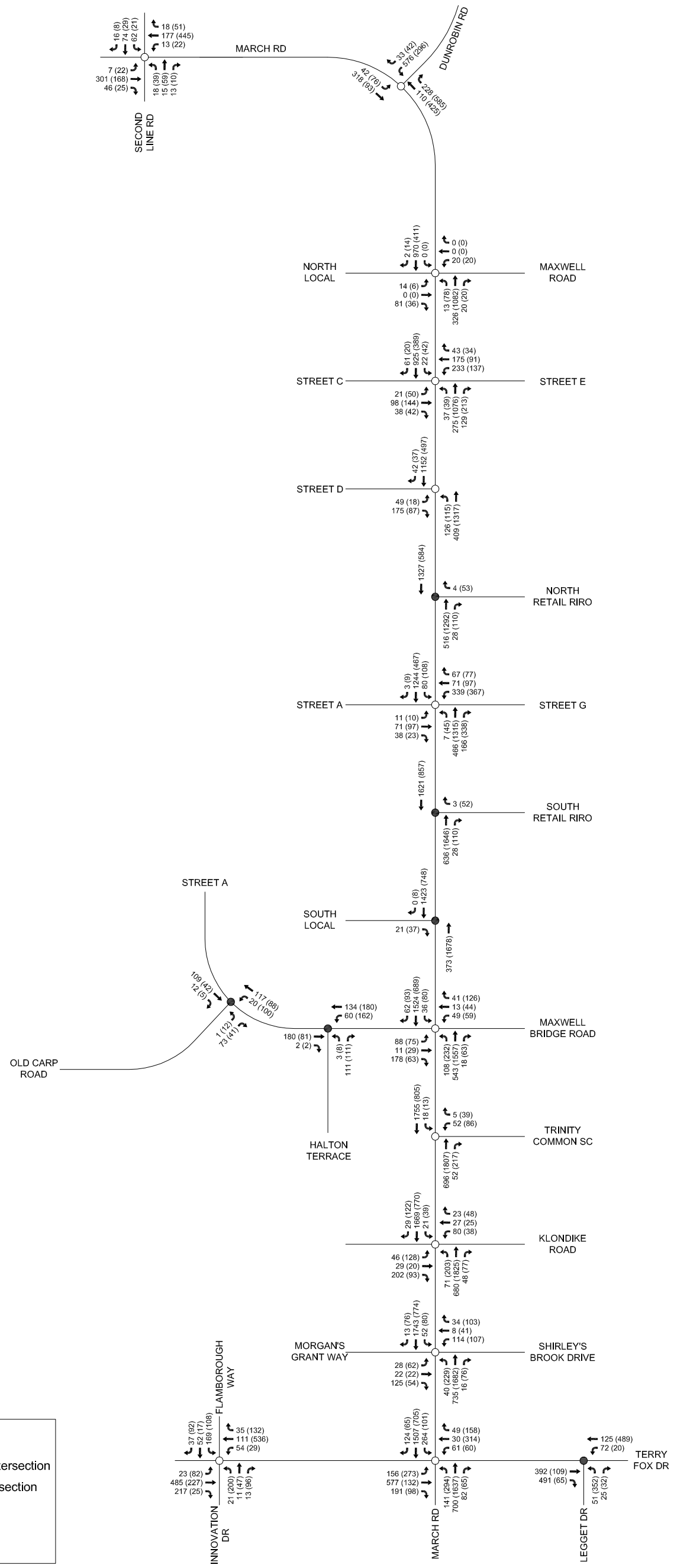
DATE JUN 2016 JOB 112117

SCALE N.T.S.

NOVATECH
Engineers, Planners & Landscape Architects

M:\2012\112117\CAD\Design\Figures\Traffic\TMP\FINAL\Traffic Figures.dwg, 2026 TOTAL, Mar 28, 2016 - 3:07pm, bbyvelds

SHT11x17.DWG - 279mmx432mm



KANATA NORTH
COMMUNITY DESIGN PLAN

FIGURE NO.37
2031 TOTAL TRAFFIC VOLUMES

DATE JUN 2016
JOB 112117
SCALE N.T.S.

NOVATECH
Engineers, Planners & Landscape Architects

APPENDIX E

Collision Records

Transportation Services - Traffic Services

Collision Details Report - Public Version

From: January 1, 2015 **To:** December 31, 2019

Location: HALTON TERR/MAXWELL BRIDGE RD @ MARCH RD

Traffic Control: Traffic signal **Total Collisions:** 14

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuver	Vehicle type	First Event	No. Ped
2015-Dec-13, Sun,17:23	Clear	Sideswipe	P.D. only	Dry	North	Changing lanes	Passenger van	Other motor vehicle	0
					North	Going ahead	Passenger van	Other motor vehicle	
2016-Feb-28, Sun,19:57	Freezing Rain	Turning movement	P.D. only	Ice	West	Turning left	Pick-up truck	Other motor vehicle	0
					East	Going ahead	Automobile, station wagon	Other motor vehicle	
2016-Sep-30, Fri,19:32	Clear	Turning movement	Non-fatal injury	Dry	South	Turning left	Automobile, station wagon	Other motor vehicle	0
					North	Going ahead	Pick-up truck	Other motor vehicle	
2016-Nov-24, Thu,06:47	Snow	Turning movement	Non-fatal injury	Ice	South	Turning left	Pick-up truck	Other motor vehicle	0
					North	Going ahead	Automobile, station wagon	Other motor vehicle	
2016-Dec-05, Mon,08:23	Snow	Sideswipe	P.D. only	Loose snow	West	Changing lanes	Pick-up truck	Other motor vehicle	0
					West	Going ahead	Automobile, station wagon	Other motor vehicle	
2016-Dec-23, Fri,10:59	Clear	Turning movement	P.D. only	Wet	South	Turning left	Automobile, station wagon	Other motor vehicle	0
					North	Going ahead	Pick-up truck	Other motor vehicle	
2017-Apr-19, Wed,14:14	Rain	Angle	Non-fatal injury	Wet	North	Going ahead	Automobile, station wagon	Other motor vehicle	0
					West	Stopped	Pick-up truck	Other motor vehicle	
2017-Jun-22, Thu,10:59	Clear	Other	P.D. only	Dry	West	Reversing	Automobile, station wagon	Other motor vehicle	0
					East	Stopped	Automobile, station wagon	Other motor vehicle	
2017-Nov-28, Tue,22:03	Rain	SMV other	Non-fatal injury	Wet	South	Turning left	Automobile, station wagon	Pedestrian	1
2018-Nov-15, Thu,17:20	Clear	Sideswipe	P.D. only	Dry	North	Changing lanes	Automobile, station wagon	Other motor vehicle	0
					North	Going ahead	Automobile, station wagon	Other motor vehicle	
2018-Dec-05, Wed,18:26	Snow	Turning movement	P.D. only	Loose snow	West	Turning left	Automobile, station wagon	Other motor vehicle	0
					East	Going ahead	Automobile, station wagon	Other motor vehicle	
2019-Feb-02, Sat,16:10	Snow	Rear end	P.D. only	Loose snow	West	Turning left	Automobile, station wagon	Other motor vehicle	0
					West	Turning left	Automobile, station wagon	Other motor vehicle	

Transportation Services - Traffic Services

Collision Details Report - Public Version

From: January 1, 2015 **To:** December 31, 2019

Location: HALTON TERR/MAXWELL BRIDGE RD @ MARCH RD

Traffic Control: Traffic signal **Total Collisions:** 14

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuver	Vehicle type	First Event	No. Ped
2019-Feb-12, Tue,15:00	Snow	Sideswipe	P.D. only	Wet	North	Changing lanes	Automobile, station wagon	Other motor vehicle	0
					North	Going ahead	Automobile, station wagon	Other motor vehicle	
2019-Mar-29, Fri,17:24	Clear	Rear end	P.D. only	Dry	South	Going ahead	Automobile, station wagon	Other motor vehicle	0
					South	Stopped	Automobile, station wagon	Other motor vehicle	

Location: MARCH RD @ MAXWELL 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
2017-Feb-14, Tue,16:55	Snow	Rear end	P.D. only	Loose snow	South	Going ahead	Automobile, station wagon	Other motor vehicle	0
					South	Stopped	Pick-up truck	Other motor vehicle	

Location: MARCH RD btwn HALTON TERR/MAXWELL BRIDGE RD & MAXWELL RD

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
2015-Jan-20, Tue,09:37	Clear	Rear end	Non-fatal injury	Dry	North	Going ahead	Automobile, station wagon	Other motor vehicle	0
					North	Turning left	Automobile, station wagon	Other motor vehicle	
2015-Jun-17, Wed,13:38	Clear	Sideswipe	P.D. only	Dry	North	Changing lanes	Automobile, station wagon	Other motor vehicle	0
					North	Going ahead	Automobile, station wagon	Other motor vehicle	
2015-Jun-20, Sat,03:14	Clear	SMV other	Non-fatal injury	Dry	South	Overtaking	Automobile, station wagon	Ran off road	0
2015-Sep-02, Wed,09:15	Clear	Rear end	P.D. only	Dry	South	Slowing or stopping	Automobile, station wagon	Other motor vehicle	0
					South	Slowing or stopping	Pick-up truck	Other motor vehicle	
2015-Sep-04, Fri,21:33	Clear	SMV other	P.D. only	Dry	South	Going ahead	Pick-up truck	Animal - wild	0
2016-Apr-22, Fri,13:53	Clear	SMV other	P.D. only	Wet	North	Unknown	Unknown	Animal - domestic	0
2016-Apr-24, Sun,11:02	Clear	Turning movement	P.D. only	Dry	North	Making "U" turn	Automobile, station wagon	Other motor vehicle	0
					North	Going ahead	Pick-up truck	Other motor vehicle	

Transportation Services - Traffic Services

Collision Details Report - Public Version

From: January 1, 2015 **To:** December 31, 2019

Location: MARCH RD btwn HALTON TERR/MAXWELL BRIDGE RD & MAXWELL RD

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
2016-May-06, Fri,06:56	Clear	SMV other	P.D. only	Dry	South	Going ahead	Automobile, station wagon	Animal - wild	0
2016-Oct-19, Wed,09:08	Clear	Rear end	P.D. only	Dry	North	Going ahead	Automobile, station wagon	Other motor vehicle	0
					North	Turning left	Automobile, station wagon	Other motor vehicle	
2016-Dec-11, Sun,21:53	Snow	SMV other	P.D. only	Loose snow	South	Going ahead	Passenger van	Pole (utility, power)	0
2017-Feb-08, Wed,04:35	Freezing Rain	SMV other	P.D. only	Slush	West	Reversing	Construction equipment	Pole (sign, parking meter)	0
2017-Feb-21, Tue,11:58	Clear	Sideswipe	Non-fatal injury	Dry	North	Merging	Pick-up truck	Other motor vehicle	0
					North	Going ahead	Automobile, station wagon	Other motor vehicle	
2017-Apr-06, Thu,21:59	Rain	Rear end	P.D. only	Wet	North	Changing lanes	Automobile, station wagon	Other motor vehicle	0
					North	Going ahead	Passenger van	Other motor vehicle	
2017-Jun-06, Tue,14:15	Clear	Sideswipe	P.D. only	Wet	North	Changing lanes	Unknown	Other motor vehicle	0
					North	Going ahead	Automobile, station wagon	Other motor vehicle	
2017-Nov-27, Mon,17:36	Clear	SMV other	Non-fatal injury	Wet	South	Going ahead	Automobile, station wagon	Ran off road	0
2018-Feb-01, Thu,17:05	Snow	Rear end	P.D. only	Loose snow	South	Slowing or stopping	Automobile, station wagon	Other motor vehicle	0
					South	Slowing or stopping	Automobile, station wagon	Other motor vehicle	
					North	Making "U" turn	Snow plow	Other	
2018-Dec-05, Wed,16:50	Snow	SMV other	P.D. only	Loose snow	West	Going ahead	Automobile, station wagon	Animal - wild	0
2019-May-26, Sun,18:54	Clear	Turning movement	P.D. only	Dry	North	Making "U" turn	Automobile, station wagon	Other motor vehicle	0
					North	Going ahead	Automobile, station wagon	Other motor vehicle	
2019-Sep-26, Thu,16:40	Rain	Rear end	P.D. only	Wet	South	Going ahead	Automobile, station wagon	Other motor vehicle	0
					South	Slowing or stopping	Automobile, station wagon	Other motor vehicle	
2019-Nov-15, Fri,22:25	Clear	SMV other	P.D. only	Dry	North	Going ahead	Automobile, station wagon	Animal - wild	0
2019-Dec-18, Wed,05:40	Clear	SMV other	P.D. only	Wet	West	Going ahead	Automobile, station wagon	Animal - wild	0

APPENDIX F

Relevant Excerpts from Previous Studies

3.0 FORECASTING

3.1 DEVELOPMENT GENERATED TRAVEL DEMAND

3.1.1 Trip Generation and Mode Shares

Consistent with the previously approved *Kanata North Community Design Plan Transportation Master Plan* (Novatech, June 2016), the *Institute of Transportation (ITE) Trip Generation Manual* (9th Edition) was used to forecast auto trip generation for the proposed development. Land use codes 210 – Single-Family Detached, 230 – Townhomes, 223 – Mid-Rise Apartments, 826 – Specialty Retail, were thought to be the most representative of the proposed land uses. It is noted that the ITE 9th edition would result in a higher trip generation when compared to the ITE 10th edition, thus yielding more conservative results.

Table 7 outlines the assumed land uses and the trip generation rates for each land use.

Table 7 - Land Uses and Trip Generation Rates

LUC	Land Use	Size	Weekday AM Peak Hour			Weekday PM Peak Hour		
			In	Out	Total	In	Out	Total
210	Single Detached Houses	35 units	25%	75%	0.98	63%	37%	1.17
230	Townhomes	78 units	17%	83%	0.54	67%	33%	0.63
220	Apartments	1,838 units	31%	69%	0.30	58%	42%	0.39
826	Specialty Retail[1]	65,600 ft^2 GFA	0	0	0	44%	56%	2.73

Notes: 1. The ITE Trip Generation Manual does not have any information for this land use during the AM peak, therefore, it is assumed that it generates a negligible amount during the AM roadway peak.

To remain consistent with the KNUEA TMP, the auto trip generation rates of the proposed land uses were converted to person trips using a conversion factor of 1.42.

Table 8 outlines development-generated person trips for each land use.

Table 8 - Person Trips Generated by Land Use

LUC	Land Use	Trip Conversion	Weekday AM Peak Hour			Weekday PM Peak Hour		
			In	Out	Total	In	Out	Total
210	Single Detached Houses	Auto Trips	9	26	35	26	15	41
		Person Trip Factor	1.42	1.42	1.42	1.42	1.42	1.42
		Person Trips	13	37	50	37	21	58
230	Townhomes	Auto Trips	7	35	42	33	16	49
		Person Trip Factor	1.42	1.42	1.42	1.42	1.42	1.42
		Person Trips	10	50	60	47	23	70
223	Mid-Rise Apartments	Auto Trips	171	380	551	416	301	717
		Person Trip Factor	1.42	1.42	1.42	1.42	1.42	1.42
		Person Trips	243	540	783	591	427	1018
826	Specialty Retail	Auto Trips	0	0	0	79	100	179
		Person Trip Factor	1.42	1.42	1.42	1.42	1.42	1.42
		Person Trips	0	0	0	112	142	254
Total Development		**Auto Trips**	**187**	**441**	**628**	**554**	**432**	**986**
		Person Trip Factor	**1.42**	**1.42**	**1.42**	**1.42**	**1.42**	**1.42**
		Person Trips	**266**	**627**	**893**	**787**	**613**	**1400**

The modal shares outlined in the approved *Kanata North Community Design Plan Transportation Master Plan* (Novatech, June 2016) were used for the subject development and the modal shares for each land use (residential and commercial) are outlined in **Table 9** below. The KNUEA TMP assumed a 20% transit mode share due to the implementation of transit facilities outlined in the Affordable Network of the City of Ottawa TMP. It is anticipated that the transit modal share of 20% will be met by the 2034 buildout year due to the assumed implementation of the transit signal priority lanes and the construction of the park-and-ride lot in the northwest quadrant of the KNUEA lands to cater to the growing population and provide adequate transit connectivity to the area. Realistically, the transit modal share in the area is not assumed to exceed 20% prior to the construction of the median BRT system along March Road.

Table 9 – Trip Generation by Mode

LUC	Land Use	Trip Conversion		Weekday AM Peak Hour			Weekday PM Peak Hour		
				In	Out	Total	In	Out	Total
210	Single Detached Houses	Auto	60%	8	22	30	22	13	35
		Passenger	15%	2	6	8	6	3	9
		Walk / Bike	5%	1	2	3	2	1	3
		Transit	20%	3	7	10	7	4	11
230	Townhomes	Auto	60%	6	30	36	28	14	42
		Passenger	15%	2	8	10	7	3	10
		Walk / Bike	5%	1	3	4	2	1	3
		Transit	20%	2	10	12	9	5	14
223	Mid-Rise Apartments	Auto	60%	146	324	470	355	256	611
		Passenger	15%	36	81	117	89	64	153
		Walk / Bike	5%	12	27	39	30	21	51
		Transit	20%	49	108	157	118	85	203
826	Specialty Retail	Auto	60%	0	0	0	67	85	152
		Passenger	15%	0	0	0	17	21	38
		Walk / Bike	5%	0	0	0	6	7	13
		Transit	20%	0	0	0	22	28	50
Total Development		**Auto Trips**		**160**	**376**	**536**	**472**	**368**	**840**
		Passenger		**40**	**95**	**135**	**119**	**91**	**210**
		Walk / Bike		**14**	**32**	**46**	**40**	**30**	**70**

		Transit	**54**	**125**	**179**	**156**	**122**	**278**

3.1.2 Internal Capture and Pass-By

When predicting trips that are associated with different land use types, the interaction between those land use types must be accounted for by applying the principals of internal capture adjustments. Internal capture trips are trips which are shared between two or more uses on the same site. A portion of the generated trips for each individual land use is therefore drawn from the adjacent land uses. Internal capture adjustments were made to account for vehicles that visit more than one land use within the subject development. Since these trips are contained within the subject site, accounting for each trip separately on the roadway network would result in "double-counting". For this reason, land uses that may have associated internal capture trips between one another ultimately had their net new trips adjusted consistent with typical industry standards. In the subject development, the land uses that are subject to internal capture reductions are the commercial land uses. It is safe to assume that there will be a percentage of trips destined to the subject commercial parcels that will originate from the subject residential land uses.

In addition, a portion of the auto trips generated by the proposed commercial land uses will be 'pass-by' in nature. Pass-by trips are considered intermediate stops between an origin and a destination. They are site trips that are drawn from existing traffic volumes on the road network that are "passing-by" the site. While the total number of trips generated by a given development remains the same, the turning movements at study area intersections and site accesses require adjustments to reflect pass-by traffic. The rate of pass-by traffic is based on the specific land use which was obtained from the *ITE Trip Generation Manual*. A pass-by rate of 34% was used for the commercial land use. As the commercial land use generates negligible trips during the AM peak hour, the pass-by rate was applied to the PM peak hour only.

Table 10 outlines the pass-by, internal capture, and net new trips anticipated for the proposed development.

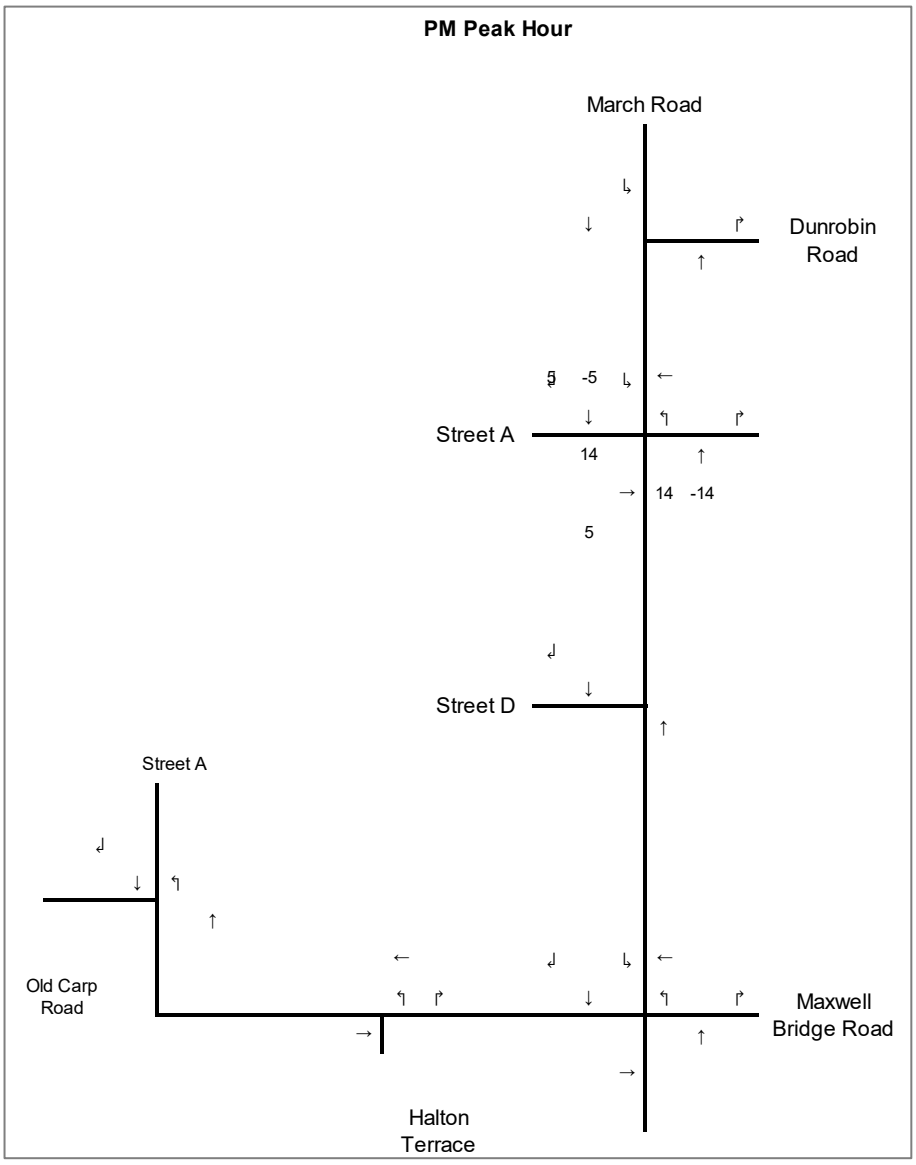
Figure 10 illustrates the pass-by trips the proposed development is anticipated to generate in the PM peak hour.

Table 10 - Pass-By and Internal Capture Trips

LUC	Land Use	Trip Conversion		Weekday AM Peak Hour			Weekday PM Peak Hour		
				In	Out	Total	In	Out	Total
210	Single Detached Houses	Auto Trips		8	22	30	22	13	35
		Internal Capture	0%	0	0	0	0	0	0
		Net Auto Trips		8	22	30	22	13	35
		Pass-By	0%	0	0	0	0	0	0
		Net New Auto Trips		8	22	30	22	13	35
230	Townhomes	Auto Trips		6	30	36	28	14	42
		Internal Capture	0%	0	0	0	0	0	0
		Net Auto Trips		6	30	36	28	14	42
		Pass-By	0%	0	0	0	0	0	0
		Net New Auto Trips		6	30	36	28	14	42
223	Mid-Rise Apartments	Auto Trips		146	324	470	355	256	611
		Internal Capture	0%	0	0	0	0	0	0
		Net Auto Trips		146	324	470	355	256	611
		Pass-By	0%	0	0	0	0	0	0
		Net New Auto Trips		146	324	470	355	256	611
826	Specialty Retail	Auto Trips		0	0	0	67	85	152
		Internal Capture	20%	0	0	0	13	17	30
		Net Auto Trips		0	0	0	54	68	122
		Pass-By	34%	0	0	0	21	21	42

		Net New Auto Trips	0	0	0	33	47	80
Total Development		**Auto Trips**	**160**	**376**	**536**	**472**	**368**	**840**
		Internal Capture	**0**	**0**	**0**	**13**	**17**	**30**
		Net Auto Trips	**160**	**376**	**536**	**459**	**351**	**810**
		Pass-By	**0**	**0**	**0**	**21**	**21**	**42**
		Net New Auto Trips	**160**	**376**	**536**	**438**	**330**	**768**

Figure 10 - Pass-By Volumes (PM Peak Hour)



3.1.3 Trip Distribution

The distribution of traffic to/from the proposed development follows the distribution outlined in the approved *Kanata North Community Design Plan Transportation Master Plan* (Novatech, June 2016). It is noteworthy that for residential land uses within the subject development, a total of 5% trips to/from the north during peak periods was assumed given the surrounding employment environment and the trip summary for the Kanata / Stittsville TAZ in the 2011 Trans O-D Survey. It is likely that 5% of the subject development's residents or less would be destined to Dunrobin during the AM and PM peak periods to/from their respective employers. However, for the commercial / specialty retail component of the development, it was assumed that 15% of the trips would be destined to/from the north (Dunrobin communities) on the basis that a specialty retail store in the subject development would likely attract some customers from Dunrobin during the peak periods. Given the number of generated trips associated with each land use, the weighted site trips to/from the north was found to be **6%**.

Table 11 summarizes the assumed trip distribution for the proposed development.

Table 11 - Trip Distribution

Direction		Via (to / from)	
		March Road (North)	**March Road (South)**
North	6%	6%	-
East	39%	-	39%
South	5%	-	5%
West	0%	-	-
Internal [1]	50%		50%
Total	**100%**	**6%**	**94%**

Notes:
1. Refers to trip origins/destinations within the same O-D Ward.

3.1.4 Trip Assignment

Site generated trips were assigned to the study area road network based on the trip distribution assumptions outlined above in **Table 11.**

Figure 11 illustrates the site traffic assignment.

Figure 12 illustrates new site generated trips during the AM and PM peak hours.

Figure 11 - Site Traffic Assignment

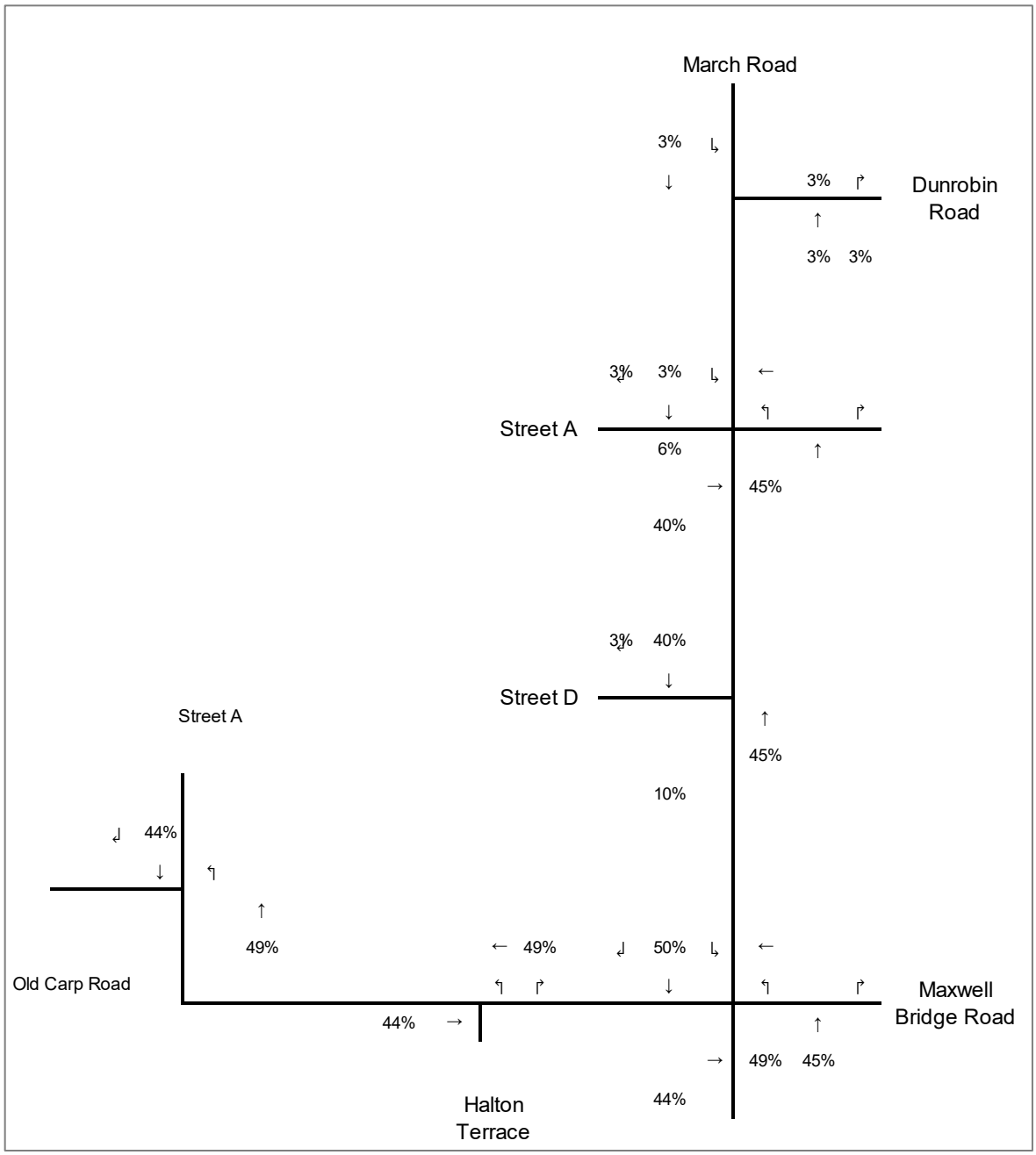


Figure 12 - Site Traffic Volumes

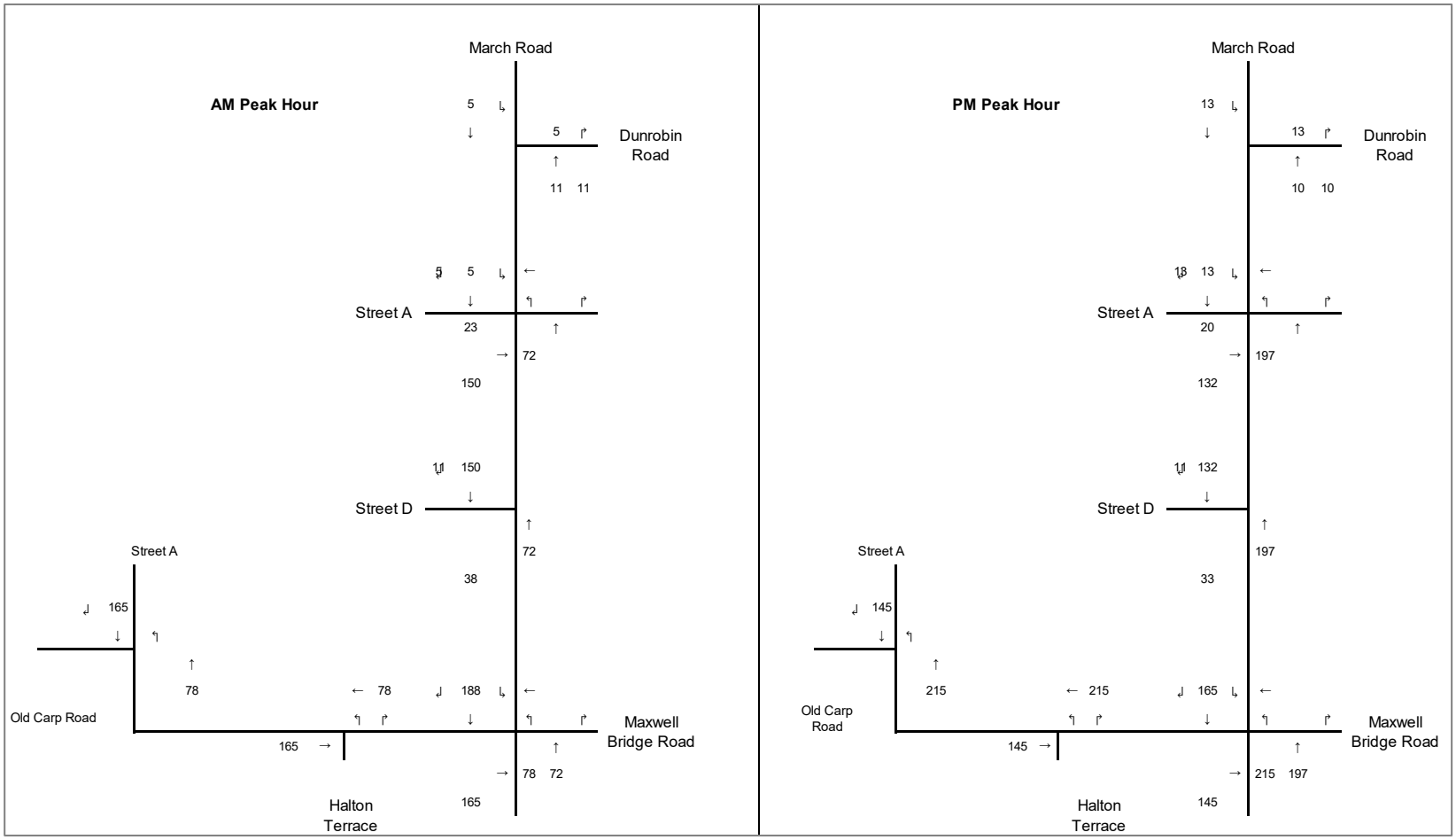


Table 4: ITE Trip Generation Person Trip Rates

Dwelling Type	ITE LUC	Peak Hour	Vehicle Trip Rate	Person Trip Rates
Single Detached	210	AM	0.72	0.92
		PM	0.96	1.23
Townhouse	220	AM	0.44	0.56
		PM	0.51	0.65

LUC – Land Use Code
Vehicle Trip Rates have been calculated using the fitted curve equations

Using the above Person Trip rates, the total person trip generation has been estimates. Table 5 below illustrates the total person trip generation by dwelling type.

Table 5: Total Person Trip Generation

Land Use	Units	AM Peak Hour			PM Peak Hour		
		In	Out	Total	In	Out	Total
Single Detached	455	105	314	419	353	207	560
Townhouse	401	52	173	225	164	97	261
Total Person Trips		**157**	**487**	**644**	**517**	**304**	**821**

Using the most recent National Capital Region Origin-Destination survey (OD Survey), the existing mode shares for Kanata/Stittsville have been determined (Table 6).

Table 6: OD Survey Existing Mode Share – Kanata Stittsville

Travel Mode	Existing Mode Share
Auto Driver	65%
Auto Passenger	15%
Transit	10%
Non-Auto	10%
Total	100%

The CDP considers a bus rapid transit facility along the centreline of March Road, and the City of Ottawa TMP 2031 Network Concept contemplates a conceptual future transit corridor along the section of March Road adjacent to the proposed development. However, the 2031 Affordable Network does not include any higher order transit facilities along the subject section of March Road. Therefore, as a conservative estimate of the traffic the existing mode share for the Kanata/Stittsville traffic zone was used.

Using the above mode shares and person trip rates the person trips by mode have been projected. Table 7 summarizes the trip generation by mode.

Table 7: Trip Generation by Mode

Travel Mode	Mode Share	In	Out	Total	In	Out	Total
Auto Driver	65%	102	316	418	336	198	534
Auto Passenger	15%	24	73	97	78	46	123
Transit	10%	16	48	65	51	31	82
Non-Auto Modes	10%	16	48	65	51	31	82
Total	100%	157	487	644	517	304	821

As shown above, 390 AM and 781 PM peak hour two-way trips are projected as a result of the proposed development.

No trip reductions factors (i.e. synergy, pass-by, etc.) have been applied as the subject development is composed entirely of residential units.

3.1.2 TIA Trip Generation Update and Comparison

As discussion in the pre-amble to this report, the unit count has changed based on updates to the plan of subdivision. The unit count changes are summarized in Table 8.

Table 8: Unit Change Comparison

Unit Type	Original Unit Count	Updated Unit Count	Change	Percent Change
Single-Detached Dwellings	455	353	-102	-22%
Townhouse Units	401	575	+174	+43%

The unit count has increased overall by 70 units, however, as the mix of unit types has changed, and therefore the trip generation has not necessarily increased. A comparison of the trip generation, using the same factors as Section 3.1.1, has been prepared and is summarized in Table 9

Table 9: Updated Total Person Trip Generation

Land Use	Units	AM Peak Hour			PM Peak Hour		
		In	Out	Total	In	Out	Total
Single Detached	353	81	244	325	276	162	438
Townhouse	575	74	248	322	228	134	362
Total Person Trips		**155**	**492**	**647**	**504**	**296**	**800**

The total updated person trip generation, presented in Table 9, have been compared to the total original person trip generation, presented in Table 10. This comparison is summarized in Table 10.

Table 10: Trip Generation Comparison

Land Use	AM Peak Hour			PM Peak Hour		
	In	Out	Total	In	Out	Total
Original Trip Gen	157	487	644	517	304	821
Updated Trip Gen	155	492	647	504	296	800
Change	**-2**	**5**	**3**	**-13**	**-8**	**-21**
Percent Change	**-1.3%**	**1.0%**	**0.5%**	**-2.5%**	**-2.6%**	**-2.6%**

As shown above, while the overall unit count has changed, due to the change in unit types, the trip generation is very similar to what was analyzed previously. Given the small change in trip generation, less than 3% and generally a reduction in trips, the change in units counts will not impact the results of the analysis presented in this report and therefore the analysis has been carried forward using the original unit count.

3.1.3 Trip Distribution

To understand the travel patterns of the subject development the OD Survey has been reviewed to determine the existing travel patterns. Table 11 below summarizes the distribution.

Table 11: OD Survey Existing Mode Share – Kanata/Stittsville

To/From	Percent of Trips
North	5%
South	60%
East	30%
West	5%
Total	100%

3.1.4 Trip Assignment

Using the distribution outlined above, turning movement splits, and access to major transportation infrastructure, the trips generated by the site have been assigned to the Study Area road network.

Figure 7: Traffic Assignment (%)

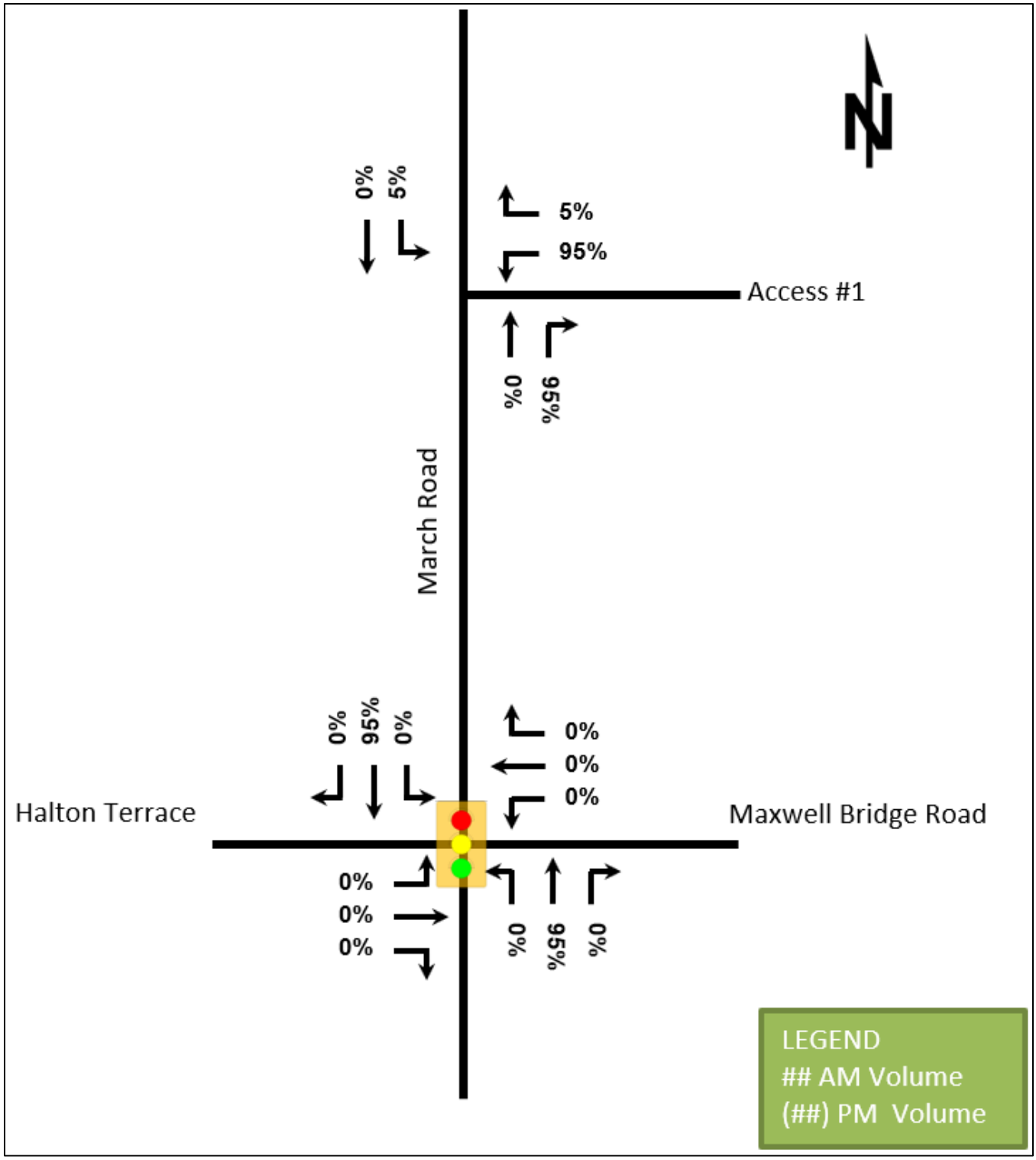
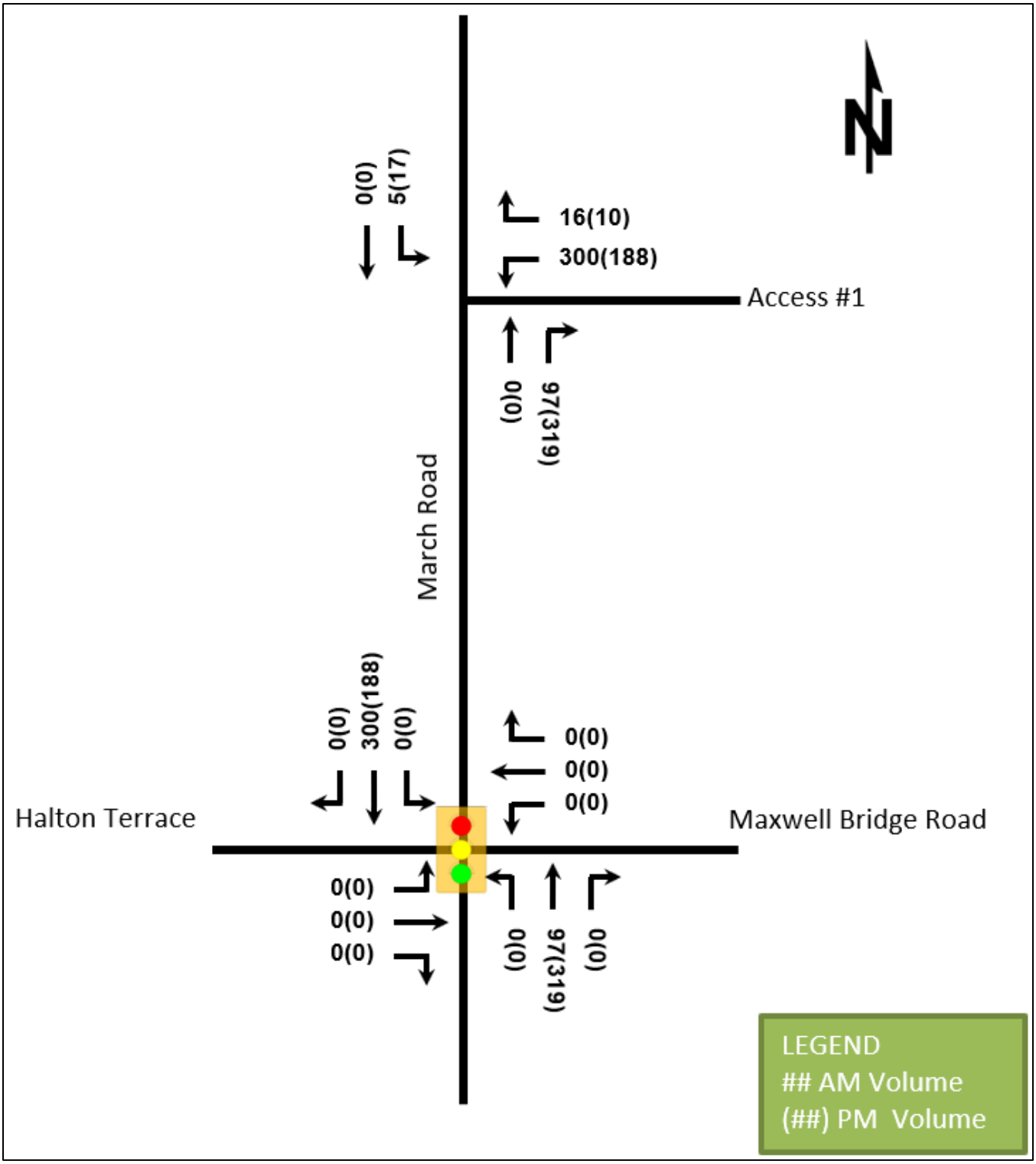


Figure 8: Assignment (Volumes)



Module	Element	Exemption Criteria	Exemption Applies
Neighbourhood Traffic Management		total volumes exceed ATM capacity thresholds	
4.8 Network Concept	*All elements*	• Only required when proposed development generates more than 200 person-trips during the peak hour in excess of the equivalent volume permitted by the established zoning	No

3.0 FORECASTING

3.1 Development-Generated Traffic

3.1.1 Trip Generation

The proposed development is located in the northwest quadrant of the KNUEA lands. The analysis presented in the KNUEA CDP TMP assumed approximately 30% of the overall residential development was located in the northwest quadrant, equating to approximately 330 single detached dwelling units and 655 residential condominium/townhouse units. The proposed development includes 295 single detached dwelling units and 530 residential condominium/townhouse units, which from a traffic perspective is less than the assumed development in the KNUEA CDP TMP.

The KNUEA CDP TMP used Land Use 210 – Single Detached Dwelling Units and Land Use 230 – Residential Condominium/Townhouse codes in the Institute of Transportation Engineers (ITE) Trip Generation Manual, 9th Edition. Land Use 230 – Residential Condominium/Townhouse reflects survey data for ownership units that have at least one other owned unit within the same building structure. The KNUEA CDP TMP applied a person trip adjustment factor of 1.42 to the ITE rates to determine the number of person trips generated the development.

In September 2017 ITE published the 10th Edition of the Trip Generation Manual. Previous editions of the ITE Trip Generation Manual contained separate land use codes for rental and ownership residential uses. The 10th edition reviewed previous data and found no clear difference between the rental and ownership sites within the ITE database. As such they combined the rental and ownership data, and separated the multifamily housing into three land use codes (low-rise, mid-rise, and high-rise). Land Use 220 – Multifamily Housing (Low-rise) in the 10th edition of the Trip Generation Manual reflects data from apartments, townhouses, and condominiums located within the same building with at least three other dwelling units and that have one or two levels (floors). This land use has 42 data points for the AM peak hour rates and 50 data points for the PM peak hour rates, which based on the ITE Trip Generation Manual is considered a sufficient data set.

Based on the foregoing, the rates for multifamily housing presented in the 10th edition of the ITE trip generation manual are more reflective of the multifamily residential units within the proposed development and have been used in the following analysis. The following table provides a comparison between the trips generated by the assumed development in the KNUEA CDP TMP (330 singles and 655 condominium/townhouses) using the KNUEA CDP TMP methodology and the trips generated by the proposed development (295 singles and 530 condominiums/townhouses) using the ITE Trip Generation Manual 10th Edition methodology.

Table 2: ITE Trip Generation

Land Use	ITE Code	Units	AM Peak			PM Peak		
			IN	OUT	TOT	IN	OUT	TOT
KNUEA CDP TMP								
Single Detached Dwellings	210	330	60	181	241	194	114	308
Residential Condominium/ Townhouse	230	655	39	193	232	188	93	281
		Total	**99**	**374**	**473**	**382**	**207**	**589**
Proposed Development								
Single Detached Dwellings	210	295	54	160	214	181	106	287
Multifamily (Low-Rise)	220	530	54	179	233	164	97	261
		Total	**108**	**339**	**447**	**345**	**203**	**548**
		Difference	**9**	**-35**	**-26**	**-37**	**-4**	**-41**

The KNUEA CDP TMP used a person trip adjustment factor of 1.42 to convert ITE trips to person trips. The City's 2017 TIA Guideline update provides a standardized person trip adjustment factor of 1.28 to convert ITE trips to person trips. The approved person trip adjustment factor of 1.28 was carried forward for the proposed development. A comparison of the person trips generated by the proposed development, compared to the assumed development in the KNUEA CDP TMP (using the 1.42 person trip adjustment factor assumed in the KNUEA CDP TMP) is provided in the following table.

Table 3: Projected Site-Generated Person Trips

Land Use	AM Peak			PM Peak		
	IN	OUT	TOTAL	IN	OUT	TOTAL
KNUEA CDP TMP						
Single Detached Dwellings	85	257	342	275	162	437
Residential Condominium/ Townhouse	55	274	329	267	132	399
Total	**140**	**531**	**671**	**542**	**294**	**836**
Proposed Development						
Single Detached Dwellings	**69**	**205**	**274**	**232**	**135**	**367**
Multifamily (Low-Rise)	**69**	**229**	**298**	**210**	**124**	**334**
Total	**138**	**434**	**572**	**442**	**259**	**701**
Difference	**-2**	**-97**	**-99**	**-100**	**-35**	**-135**

Based on the foregoing, the proposed development is anticipated to generate approximately 100 to 135 person trips less than the assumed development in the KNUEA CDP TMP.

The modal shares associated with the proposed development are anticipated to be consistent with the KNUEA CDP TMP. The transit modal share in the KNUEA CDP TMP was developed based on the 2031 target in the City's 2013 TMP for the Kanata/Stittsville area. The modal shares identified in the 2011 TRANS O-D Survey Report for the Kanata/Stittsville area were adjusted to reflect the increased transit modal share of 21%, with the auto driver share reduced accordingly. A comparison of the person trips by modal share between the proposed development and the assumed development in the KNUEA CDP TMP is provided in the following table.

Table 4: Site-Generated Trips by Modal Share

Travel Mode	Modal Share	AM Peak			PM Peak		
		IN	OUT	TOTAL	IN	OUT	TOTAL
KNUEA CDP TMP							
Total Person Trips		**140**	**531**	**671**	**542**	**294**	**836**
Auto Driver	59%	82	314	396	320	173	493
Auto Passenger	15%	21	79	100	81	44	125
Transit	21%	30	111	141	114	62	176
Non-Auto	5%	7	27	34	27	15	42
Proposed Development							
Total Person Trips		**138**	**434**	**572**	**442**	**259**	**701**
Auto Driver	59%	82	256	338	261	153	414
Auto Passenger	15%	21	65	86	66	39	105
Transit	21%	29	92	121	93	54	147
Non-Auto	5%	6	21	27	22	13	35
Auto Driver (Difference)		**0**	**-58**	**-58**	**-59**	**-20**	**-79**
Auto Passenger (Difference)		**0**	**-14**	**-14**	**-15**	**-5**	**-20**
Transit (Difference)		**-1**	**-19**	**-20**	**-21**	**-8**	**-29**
Non-Auto (Difference)		**-1**	**-6**	**-7**	**-5**	**-2**	**-7**

Based on the foregoing, the proposed development is anticipated to generate approximately 60 to 80 less vehicle trips compared to the assumed development in the KNUEA CDP TMP.

3.1.2 Trip Distribution

The distribution of traffic generated by the proposed development is anticipated be consistent with the distribution presented in the KNUEA CDP TMP, and is summarized as follows:

- 85% to/from the south
- 15% to/from the north

As the trips generated by the proposed development are anticipated to be less than the assumed development in the KNUEA CDP TMP, the site traffic projections in the TMP are considered a

conservative representation of the anticipated traffic following build-out of the development, and have not been updated.

3.2 Background Traffic

Background growth along the study area roadways is anticipated to be consistent with the projections in Section 6.5 of the KNUEA CDP TMP. Background traffic volumes for the 2026 build-out and 2031 horizon years were estimated in the KNUEA CDP TMP by increasing the existing transit modal shares to 21% and applying a 0.5% growth rate per annum to the traffic volumes

During the pre-consultation, City staff suggested the traffic analysis account for the following subdivisions:

- 457 & 467 Terry Fox Drive (Richardson Ridge)
- Area 2 of the Kanata Highlands

A review of the traffic impact assessments prepared in support of the above subdivisions suggests a small portion of traffic generated by the sites are anticipated to arrive/depart via March Road north of Terry Fox Drive. For the purposes of this assessment it is assumed that the background growth assumptions utilized in the KNUEA CDP TMP account for the additional traffic from the above subdivisions.

Background and total traffic volumes for the 2026 build-out and 2031 horizon years are anticipated to be consistent with the projections in the KNUEA CDP TMP, and are provided in **Appendix C**.

4.0 ANALYSIS

4.1 Development Design

This section provides a review of the development design in terms of road network and intersections, roadway cross sections, as well as intersection narrowing and pedestrian crossing locations. A review of the City's Transportation Demand Management (TDM) – Supportive Development Design and Infrastructure Checklist is exempt from Draft Plan of Subdivision applications. A review of this TDM checklist will be conducted for the multi-unit blocks within the subdivision during the Site Plan Control process, if required.

4.1.1 Road Network and Intersections

The proposed collector road network and access intersections are consistent with the KNUEA CDP TMP. The collector roadway design will encourage the use of active transportation modes for utilitarian trips such as shopping, attending schools, and visiting neighbours. All collector roadways within the proposed development are classified as potential transit streets. The local roadway and sidewalk/pathway network is generally consistent with the Parks and Pathway Plan in the KNUEA CDP TMP, as shown in **Figure 3**.

A recreational pathway is proposed along the open space corridor between March Road and Street 4. The section of the recreational pathway adjacent to the stormwater management facility will also function as a service road for the pond. The recreational pathway will terminate at the March Road right-of-way (ROW) limit and can be extended to March Road when widened.

3.0 FORECASTING

3.1 DEVELOPMENT GENERATED TRAVEL DEMAND

3.1.1 Trip Generation and Mode Shares

Consistent with the previously approved *Kanata North Community Design Plan Transportation Master Plan* (Novatech, June 2016), the *Institute of Transportation (ITE) Trip Generation Manual* was used to forecast auto trip generation for the proposed development. Land use codes 210 – Single-Family Detached, 230 – Townhomes, 220 – Apartment, 826 – Specialty Retail, and 520 – Elementary School were thought to be the most representative of the proposed land uses.

The Kanata North TMP included two designations for the commercial land uses: community commercial and neighbourhood commercial. A community commercial land use implies that it will service the entire KNUEA lands whereas a neighbourhood commercial land use implies that it will service the residential lands in the immediate vicinity (i.e. within the same neighbourhood). The Kanata North TMP designated the commercial lands within the subject Valecraft community as neighbourhood commercial, which as its name implies, will service the surrounding neighbourhood. This distinction between the types of commercial land uses is important when determining the trip generation potential of the development.

Table 6 outlines the assumed land uses and the trip generation rates for each land use.

Table 6 - Land Uses and Trip Generation Rates

LUC	Land Use	Size	Weekday AM Peak Hour			Weekday PM Peak Hour		
			In	Out	Total	In	Out	Total
210	Single Detached Houses	297 Units	25%	72%	0.73	63%	37%	0.94
230	Townhomes	315 units	17%	83%	0.41	67%	33%	0.49
220	Apartments	116 units	20%	80%	0.52	65%	35%	0.70
826	Specialty Retail[1]	80,000 GFA	0	0	0	44%	56%	2.67
520	Elementary School	580 students	55%	45%	0.45	49%	51%	0.15

Notes: 1. The ITE Trip Generation Manual does not have any information for this land use during the AM peak, therefore, it is assumed that it generates a negligible amount during the AM roadway peak.

As per the City of Ottawa's *2017 TIA Guidelines,* the auto trip generation rates of the proposed land uses were converted to person trips using a conversion factor of 1.28.

Table 7 outlines development-generated person trips for each land use.

Table 7 - Person Trips Generated by Land Use

LUC	Land Use	Trip Conversion	Weekday AM Peak Hour			Weekday PM Peak Hour		
			In	Out	Total	In	Out	Total
210	Single Detached Houses	Auto Trips	55	157	218	176	104	280
		Person Trip Factor	1.28	1.28	1.28	1.28	1.28	1.28
		Person Trips	70	201	279	225	133	358
230	Townhomes	Auto Trips	22	107	129	103	51	154
		Person Trip Factor	1.28	1.28	1.28	1.28	1.28	1.28
		Person Trips	28	137	165	132	65	197
220	Apartments	Auto Trips	12	49	61	53	28	81
		Person Trip Factor	1.28	1.28	1.28	1.28	1.28	1.28
		Person Trips	15	63	78	68	36	104
826	Specialty Retail	Auto Trips	0	0	0	94	119	213
		Person Trip Factor	1.28	1.28	1.28	1.28	1.28	1.28
		Person Trips	0	0	0	120	152	273
520	Elementary School	Auto Trips	144	117	261	43	44	87
		Person Trip Factor	1.28	1.28	1.28	1.28	1.28	1.28
		Person Trips	184	150	334	55	56	111
Total Development		**Auto Trips**	**233**	**430**	**669**	**469**	**346**	**815**
		Person Trip Factor	**1.28**	**1.28**	**1.28**	**1.28**	**1.28**	**1.28**
		Person Trips	**297**	**551**	**856**	**600**	**442**	**1043**

The previously approved *Kanata North Community Design Plan Transportation Master Plan* (Novatech, June 2016) assumed that all trips generated by the proposed schools are anticipated to be vehicle trips and therefore the TMP did not convert the school auto trips to person trips and then across the various modes of transportation. However, based on the traffic patterns to / from local schools within suburban communities in Ottawa, it is safe to assume that a large percentage of students will take a school bus, and as such, the vehicle trips were converted to person trips for the subject TIA.

As outlined in the *TRANS Committee's 2011 NCR Household Origin-Destination* Survey (2013), the subject development is located within the Rural West district. However, as it is part of the Kanata North Urban Expansion Area, it will behave more like the Kanata / Stittsville district which is a suburban community rather than a rural one. The modal shares outlined in the approved *Kanata North Community Design Plan Transportation Master Plan* (Novatech, June 2016) were used as a baseline and the modal shares for each of the three land uses (residential, commercial, and institutional) were developed and are outlined in **Table 8** below.

Table 8 - Modal Share Assumptions

Land Use	Travel Mode	TMP	Subject TIA	Rationale
Residential	Transit	20%	20%	No change.
	Auto Passenger	15%	15%	No change.
	Walk / Bike	5%	5%	No change.
	Auto Driver	60%	60%	No change.
Commercial	Transit	20%	0%	As outlined in the TMP, the commercial within the subject development is considered 'neighbourhood commercial' and therefore, it will only be serving the immediate neighbourhood, thus eliminating the need to take public transit to get to this land use.
	Auto Passenger	15%	15%	No change.
	Walk / Bike	5%	15%	As outlined in the TMP, the commercial parcels within the subject development is considered 'neighbourhood commercial' and therefore, an increase in the walk / bike modal share is reasonable to assume.
	Auto Driver	60%	70%	Increased as compared to the TMP to account for the reduction in transit to this land use.
Institutional	Transit	0%	70%	Increased to account for the number of school buses that will serve the proposed elementary school. This transit modal share has already been vetted by the City through the submission of the Step 3 Forecasting Report.
	Auto Passenger	0%	0%	No change.
	Walk / Bike	0%	0%	No change.
	Auto Driver	100%[1]	30%	Decreased as compared to the TMP to account for the increase in transit modal share.

Notes: 1. The TMP did not convert the school trips to person trips and therefore did not assign the school trips across the four modal shares.

Table 9 outlines the anticipated trip generation potential of the proposed development.

Table 9 – Trip Generation by Mode

LUC	Land Use	Trip Conversion		Weekday AM Peak Hour			Weekday PM Peak Hour		
				In	Out	Total	In	Out	Total
210	Single Detached Houses	Auto	60%	42	121	167	135	80	215
		Passenger	15%	11	30	42	34	20	54
		Walk / Bike	5%	4	10	14	11	7	18
		Transit	20%	14	40	56	45	27	72
230	Townhomes	Auto	60%	17	82	99	79	39	118
		Passenger	15%	4	21	25	20	10	30
		Walk / Bike	5%	1	7	8	7	3	10
		Transit	20%	6	27	33	26	13	39
220	Apartments	Auto	60%	9	38	47	41	22	62
		Passenger	15%	2	9	12	10	5	16
		Walk / Bike	5%	1	3	4	3	2	5
		Transit	20%	3	13	16	14	7	21
826	Specialty Retail	Auto	70%	0	0	0	84	106	191
		Passenger	15%	0	0	0	18	23	41
		Walk / Bike	15%	0	0	0	18	23	41
		Transit	0%	0	0	0	0	0	0
520	Elementary School	Auto	30%	55	45	100	17	17	33
		Passenger	0%	0	0	0	0	0	0
		Walk / Bike	0%	0	0	0	0	0	0
		Transit	70%	163	301	234	39	39	78
Total Development		**Auto Trips**		**123**	**286**	**409**	**356**	**264**	**619**
		Passenger		**17**	**60**	**79**	**82**	**58**	**141**
		Walk / Bike		**6**	**20**	**26**	**39**	**35**	**74**
		Transit		**152**	**185**	**339**	**124**	**86**	**210**

3.1.2 Internal Capture and Pass-By

When predicting trips that are associated with different land use types the interaction between those land use types must be accounted for by applying the principals of internal capture adjustments. Internal capture trips are trips which are shared between two or more uses on the same site. A portion of the generated trips for each individual land use is therefore drawn from the adjacent land uses. Internal capture adjustments were made to account for vehicles that visit more than one land use within the subject development. Since these trips are contained within the subject site, accounting for each trip separately on the roadway network would result in “double-counting”. For this reason, land uses that may have associated internal capture trips between one another ultimately had their net new trips adjusted consistent with typical industry standards. In the subject development, the land uses that are subject to internal capture reductions are the commercial land uses. Based on the TMP’s designation of neighbourhood commercial for the subject commercial land uses, it is safe to assume that there will be a large percentage of trips destined to the commercial parcels that will originate from the subject residential land uses.

In addition, a portion of the auto trips generated by the proposed commercial land uses will be ‘pass-by’ in nature. Pass-by trips are considered intermediate stops between an origin and a destination. They are site trips that are drawn from existing traffic volumes on the road network that are “passing-by” the site. While the total number of trips generated by a given development remains the same, the turning movements at study area intersections and site accesses require adjustments to reflect pass-by traffic. The rate of pass-by traffic is based on the specific land use which was obtained

from the *ITE Trip Generation Manual*. A pass-by rate of 34% was used for the commercial land use. As the commercial land use generates negligible trips during the AM peak hour, the pass-by rate was applied to the PM peak hour only.

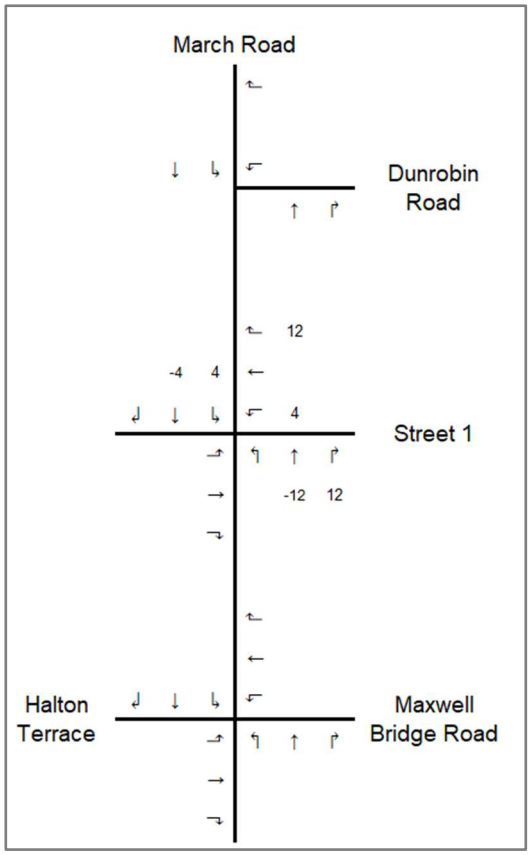
Table 10 outlines the pass-by, internal capture, and net new trips anticipated for the proposed development.

Figure 7 illustrates the pass-by trips the proposed development is anticipated to generate in the PM peak hour.

Table 10 - Pass-By and Internal Capture Trips

LUC	Land Use	Trip Conversion		Weekday AM Peak Hour			Weekday PM Peak Hour		
				In	Out	Total	In	Out	Total
210	Single Detached Houses	Auto Trips		42	121	167	135	80	215
		Internal Capture	0%	0	0	0	0	0	0
		Net Auto Trips		42	121	167	135	80	215
		Pass-By	0%	0	0	0	0	0	0
		Net New Auto Trips		42	121	167	135	80	215
230	Townhomes	Auto Trips		17	82	99	79	39	118
		Internal Capture	0%	0	0	0	0	0	0
		Net Auto Trips		17	82	99	79	39	118
		Pass-By	0%	0	0	0	0	0	0
		Net New Auto Trips		17	82	99	79	39	118
220	Apartments	Auto Trips		9	38	47	41	22	62
		Internal Capture	0%	0	0	0	0	0	0
		Net Auto Trips		9	38	47	41	22	62
		Pass-By	0%	0	0	0	0	0	0
		Net New Auto Trips		9	38	47	41	22	62
826	Specialty Retail	Auto Trips		0	0	0	84	106	191
		Internal Capture	50%	0	0	0	42	53	95
		Net Auto Trips		0	0	0	42	53	96
		Pass-By	34%	0	0	0	16	16	32
		Net New Auto Trips		0	0	0	26	37	64
520	Elementary School	Auto Trips		55	45	100	17	17	33
		Internal Capture	0%	0	0	0	0	0	0
		Net Auto Trips		55	45	100	17	17	33
		Pass-By	0%	0	0	0	0	0	0
		Net New Auto Trips		55	45	100	17	17	33
Total Development		**Auto Trips**		**123**	**286**	**409**	**356**	**264**	**619**
		Internal Capture		**0**	**0**	**0**	**42**	**53**	**95**
		Net Auto Trips		**123**	**286**	**409**	**314**	**211**	**524**
		Pass-By		**0**	**0**	**0**	**16**	**16**	**32**
		Net New Auto Trips		**123**	**286**	**409**	**298**	**195**	**492**

Figure 7 - Pass-By Volumes (PM Peak Hour)



3.1.3 Trip Distribution

The distribution of traffic to / from the proposed development follows the distribution outlined in the approved *Kanata North Community Design Plan Transportation Master Plan* (Novatech, June 2016).

Table 11 summarizes the assumed trip distribution for the proposed development.

Table 11 - Trip Distribution

Direction		Via (to / from)		
		March Road (North)	**March Road (South)**	**Street 1 (West)**
North	15%	15%	-	-
East	30%	-	30%	-
South	5%	-	5%	-
West	0%	-	-	-
Internal [1]	50%	-	30%	20% [2]
Total	**100%**	**15%**	**65%**	**20%**

Notes: 1. Refers to trip origins/destinations within the same O-D Ward.
2. These trips are assumed to be destined to / from the KNUEA Park and Ride

3.1.4 Trip Assignment

Site generated trips were assigned to the study area road network based on the trip distribution assumptions outlined above in **Table 11.**

Figure 8 illustrates the site traffic assignment.

Figure 9 illustrates new site generated trips during the AM and PM peak hours.

Figure 8 - Site Traffic Assignment

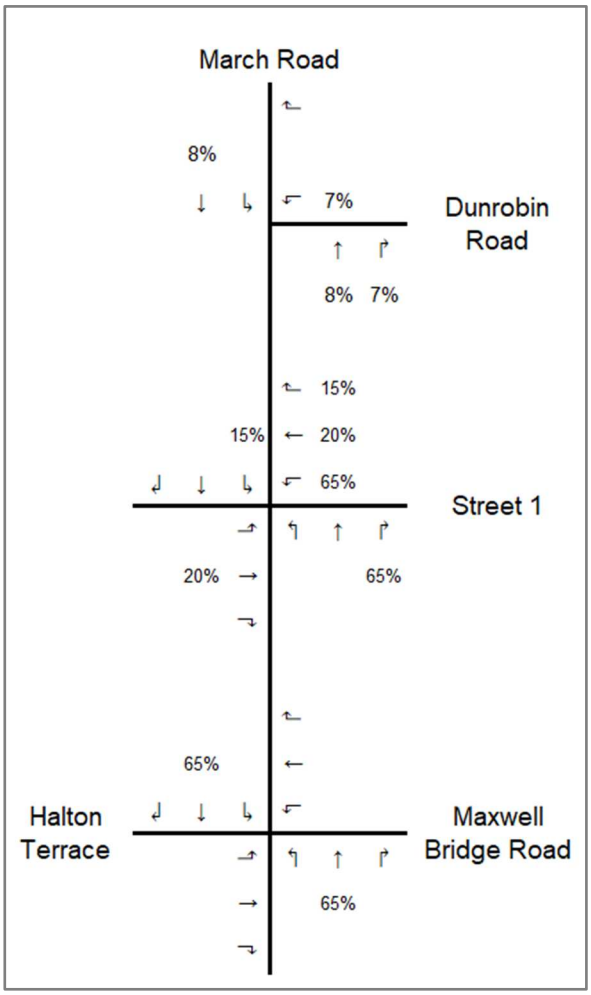
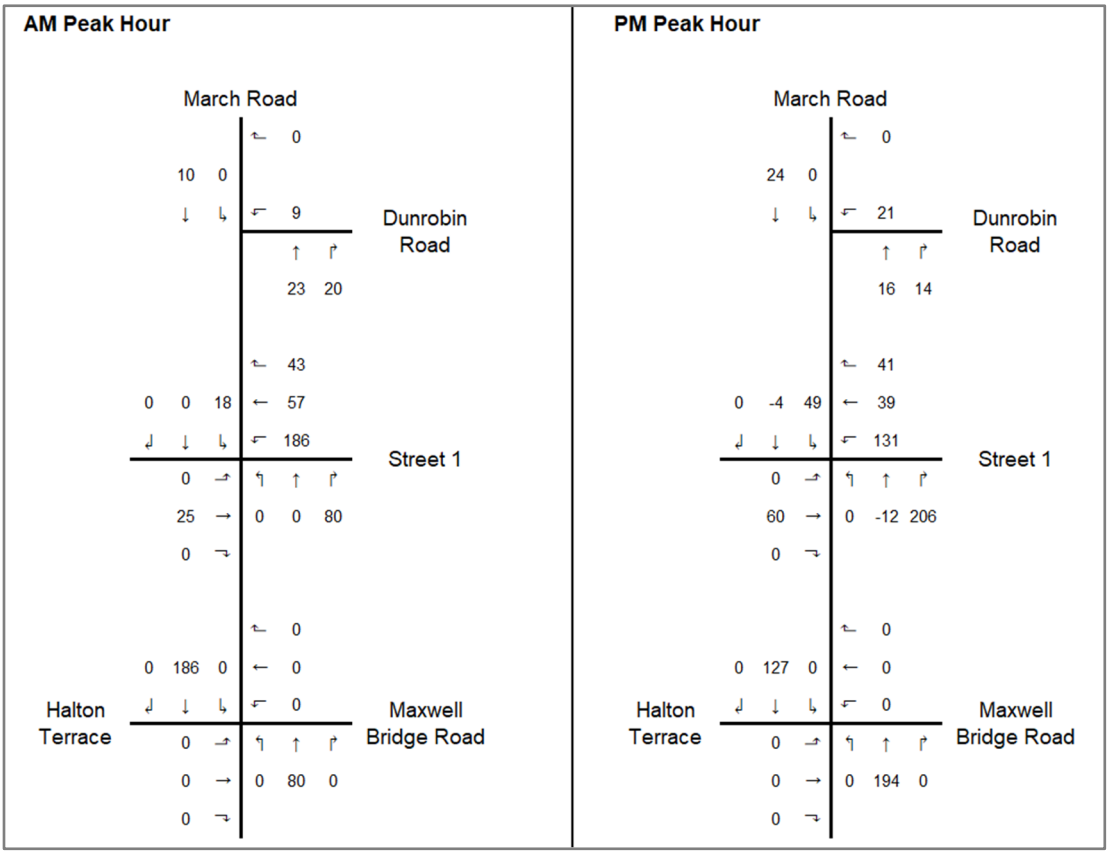


Figure 9 - Site Traffic Volumes



3.2 BACKGROUND NETWORK TRAVEL DEMAND

3.2.1 Transportation Network Plans

As outlined in **Table 3** in **Section 2.1.3.1**, the March Road widening and March Road Transit projects are anticipated to occur within the study area. In the absence of any definitive timelines in the TMP, these transportation improvements are not assumed to be in place for the study horizons of the subject TIA.

3.2.2 Background Growth

Existing traffic volumes were grown at a rate of 0.5% annually, non-compounding, to represent 2031 background traffic volumes. This rate of growth is consistent with the approved *Kanata North Community Design Plan Transportation Master Plan* (Novatech, June 2016).

Table 5: Trip Generation Person Trip Rates

Dwelling Type	Land Use Code	Peak Hour	Vehicle Trip Rate	Person Trip Rates
Hardware / Paint Store	816	AM	1.08	1.38
		PM	2.68	3.43
		Sat	2.25	2.88
Fast Casual Restaurant	930	AM	2.07	2.65
		PM	14.13	18.09
		Sat	34.02	43.55
Fast-Food Restaurant w Drive-Through	934	AM	40.19	51.44
		PM	32.67	41.82
		Sat	54.86	70.22
Coffee/Donut Shop w Drive-Through	937	AM	88.99	113.91
		PM	43.38	55.53
		Sat	87.70	112.26
Gasoline/Service Station w Convenience Market	945	AM	12.47	N/A
		PM	13.99	N/A
		Sat	19.35	N/A

Using the above Person Trip rates, the total person trip generation has been estimated. As the gasoline / service station with a convenience market is likely to generate only vehicle trips, the ITE vehicle trip rate will be used and all resulting trips will be allocated to the auto driver mode share in order to produce a conservative analysis. Table 6 below illustrates the total person trip generation by land use.

Table 6: Total Person Trip Generation

Land Use	Units / GFA	AM Peak Hour			PM Peak Hour			Sat Peak Hour		
		In	Out	Total	In	Out	Total	In	Out	Total
Hardware / Paint Store	20,256 sq.ft	15	13	28	32	37	69	32	26	58
Fast Casual Restaurant	3,601 sq.ft	7	3	10	36	29	65	86	71	157
Fast-Food Restaurant w Drive-Through	2,359 sq.ft	62	59	121	51	48	99	85	81	166
Coffee/Donut Shop w Drive-Through	2,058 sq.ft	119	115	234	57	57	114	115	116	231
Gasoline/Service Station w Convenience Market	10 pumping stations	64	61	125	71	69	140	96	97	193
Total Person Trips		**267**	**251**	**518**	**247**	**240**	**487**	**414**	**391**	**805**

Using the most recent National Capital Region Origin-Destination (OD Survey), the existing mode shares for the Kanata / Stittsville and Rural West TRANS districts have been summarized in Table 7. The proposed development is just within the Kanata / Stittsville district however, as requested by the City of Ottawa as part of the Forecasting Report review process, shown in Appendix H, the Rural West mode shares have been used instead to generate the site trips for the proposed development.

Table 7: Mode Share

Travel Mode	Kanata / Stittsville	Rural West
Auto Driver	65%	75%
Auto Passenger	15%	15%
Transit	10%	5%
Cycling	1%	1%
Walking	9%	4%
Total	100%	100%

Using the above mode shares and person trip rates, the person trips by mode have been forecasted during the peak hours. Where applicable, pass-by trips have been accounted for. These rates have been selected using ITE Trip Generation Manual 10th Edition Volume 1 Table E.32 for both the Fast-food Restaurant with a Drive-through and the Coffee / Donut Shop with a Drive-through land uses and Table E. 37 for the Gasoline / Service Station with Convenience Market land use. The average pass-by trip percentages for both the AM peak and PM peak periods were taken from these tables. For other land uses a pass-by rate has not been applied as they are unlikely to attract pass-by trips during the peak hours. The rates used for each land-use have been summarized in Table 8, as per the ITE Trip Generation Manual.

Table 8: Land Use Pass-by Rates

Land Use	Pass-by Rate	
	AM	PM
Fast-Food Restaurant w Drive-Through	49%	50%
Coffee/Donut Shop w Drive-Through	49%	50%
Gasoline/Service Station w Convenience Market	62%	56%

As no pass-by rates were available for the Coffee/Donut Shop with a Drive-through land use (LUC 937), the pass-by rates of a similar land use (Fast-food Restaurant with Drive-through (LUC 934)) have been used. This is considered conservative as it is suspected that the pass-by rates of a Coffee/Donut Shop with a Drive-through would be higher. Additionally, as no Saturday peak pass-by rates are available, the PM peak pass-by rates have been used. The pass-by reduction by land use can be seen in Appendix I and the total pass-by reduction can be seen in Table 9 below.

Given the relatively small size of the proposed development as well as the mix of different land uses, no notable degree of internal capture is expected, and as such, no internal capture rates have been considered. This will produce a conservative estimate of new peak hour vehicle trips.

Using the above mode shares and person trip rates, the person trips by mode have been projected. Table 9 summarizes the trip generation by mode.

Table 9: Trip Generation Mode

Travel Mode	Mode Share	AM Peak Hour			PM Peak Hour			Sat Peak Hour		
		In	Out	Total	In	Out	Total	In	Out	Total
Auto Driver	75%	217	203	420	202	199	401	335	317	652
Fast-Food Restaurant w Drive-Through Pass-by	-	*-24*	*-22*	*-45*	*-19*	*-18*	*-37*	*-32*	*-31*	*-63*
Coffee/Donut Shop w Drive-Through Pass-by	-	*-44*	*-43*	*-87*	*-22*	*-22*	*-44*	*-43*	*-44*	*-87*
Gasoline/Service Station w Convenience Market Pass-by	-	*-40*	*-38*	*-78*	*-40*	*-39*	*-79*	*-54*	*-55*	*-109*
Total Pass-by	-	*-108*	*-103*	*-211*	*-81*	*-79*	*-160*	*-129*	*-130*	*-259*
Net New	-	*109*	*100*	*209*	*121*	*120*	*241*	*206*	*187*	*393*
Auto Passenger	15%	30	28	58	27	26	53	48	44	92
Transit	5%	10	10	20	10	8	18	16	15	31
Cycling	1%	2	2	4	2	1	3	3	3	6
Walking	4%	8	8	16	6	6	12	12	12	24
Total	100%	**267**	**251**	**518**	**247**	**240**	**487**	**414**	**391**	**805**

As shown above, 209 AM, 241 PM and 393 Saturday net new peak hour two-way vehicle trips are projected as a result of the proposed development.

5.2 Trip Distribution

To understand the travel patterns of the subject development, the OD survey has been reviewed to determine the existing travel patterns in both the Kanata / Stittsville and Rural West TRANS districts. As requested by the City of Ottawa as part of the Forecasting Report review process, shown in Appendix H, the Rural West trip distribution pattern will be applied to the new vehicle trips. Table 10 below summarizes the various distributions of the two TRANS districts.

Table 10: OD Survey Existing Distribution

To/From	% of Trips	
	Kanata / Stittsville	**Rural West**
North	15%	15%
South	30%	20%
East	50%	50%
West	5%	15%
Total	100%	100%

5.3 Trip Assignment

Using the distribution outlined above, turning movement splits, and access to major transportation infrastructure, the pass-by trips and trips generated by the site have been assigned to the Study Area road network.

To assign the pass-by trips to the accesses, a ratio of southbound trips as a portion of all traffic on March Road, and northbound trips as a portion of all traffic on March Road was developed. It was determined that 80% of the total traffic is southbound and 20% is northbound in the 2022 AM peak period and 24% of the total traffic is southbound and 76% is northbound in both the 2022 PM and 2022 Saturday peak periods. It was also determined that 72% of the total traffic is southbound and 28% is northbound in the 2027 AM peak period and 35% of the total traffic is southbound and 65% is northbound in both the 2027 PM and 2027 Saturday peak periods. Using these percents the traffic volumes have been logically distributed to the access points.

Figure 18 and Figure 19 illustrate the forecasted site pass-by trip volumes for 2022 and 2027, respectively. Figure 20 illustrates the 2022 new site traffic assignment by percentage, Figure 21 illustrates the 2027 new site traffic assignment by percentage, Figure 22 illustrates the 2022 new site generated volumes, Figure 23 illustrates the 2027 new site generated volumes, and Figure 24 and Figure 25 illustrate the 2022 and 2027 net new site generated volumes, respectively.

Figure 18: Forecasted Site Pass-by Trip Volumes-2022

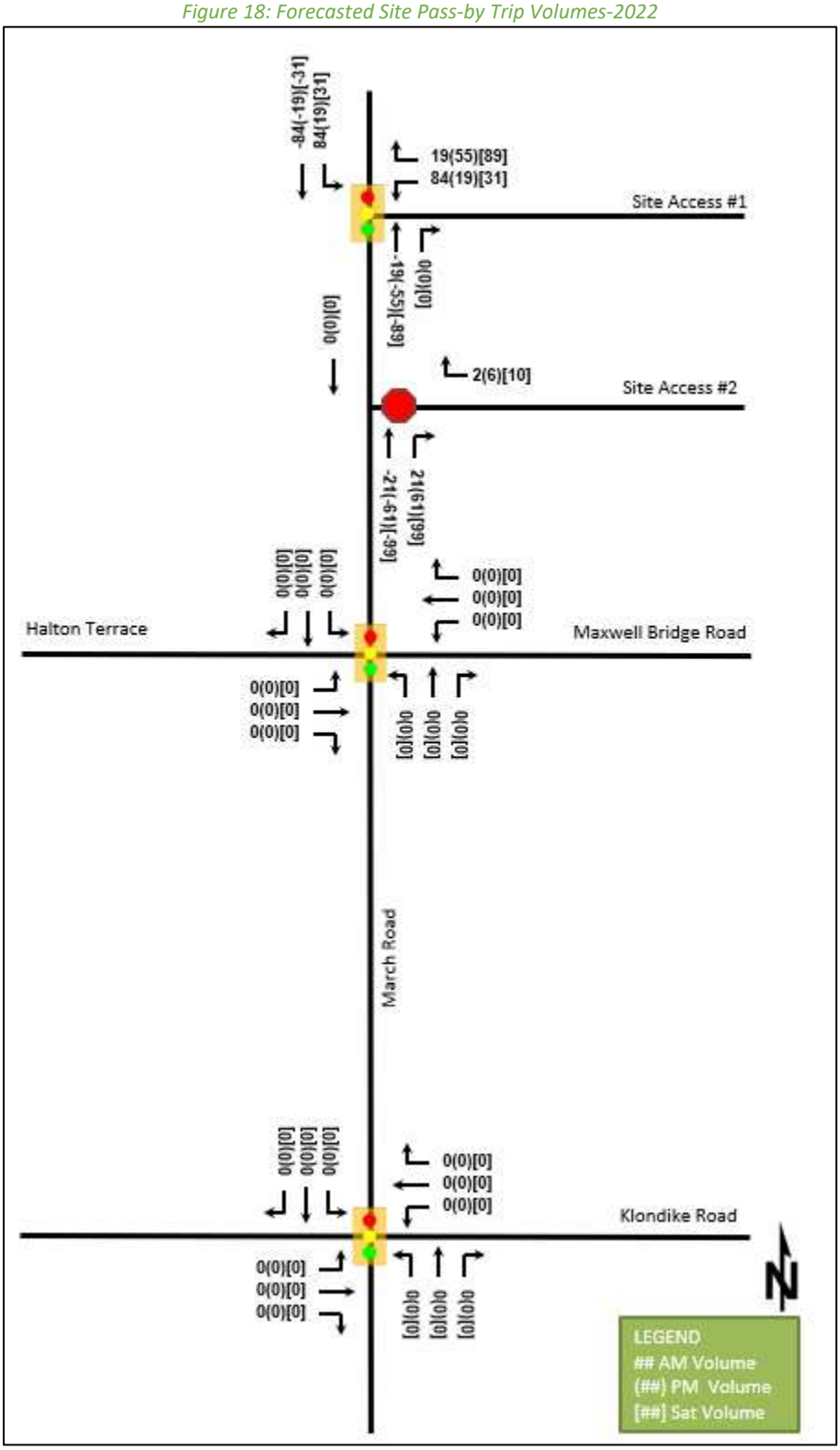


Figure 19: Forecasted Site Pass-by Trip Volumes-2027

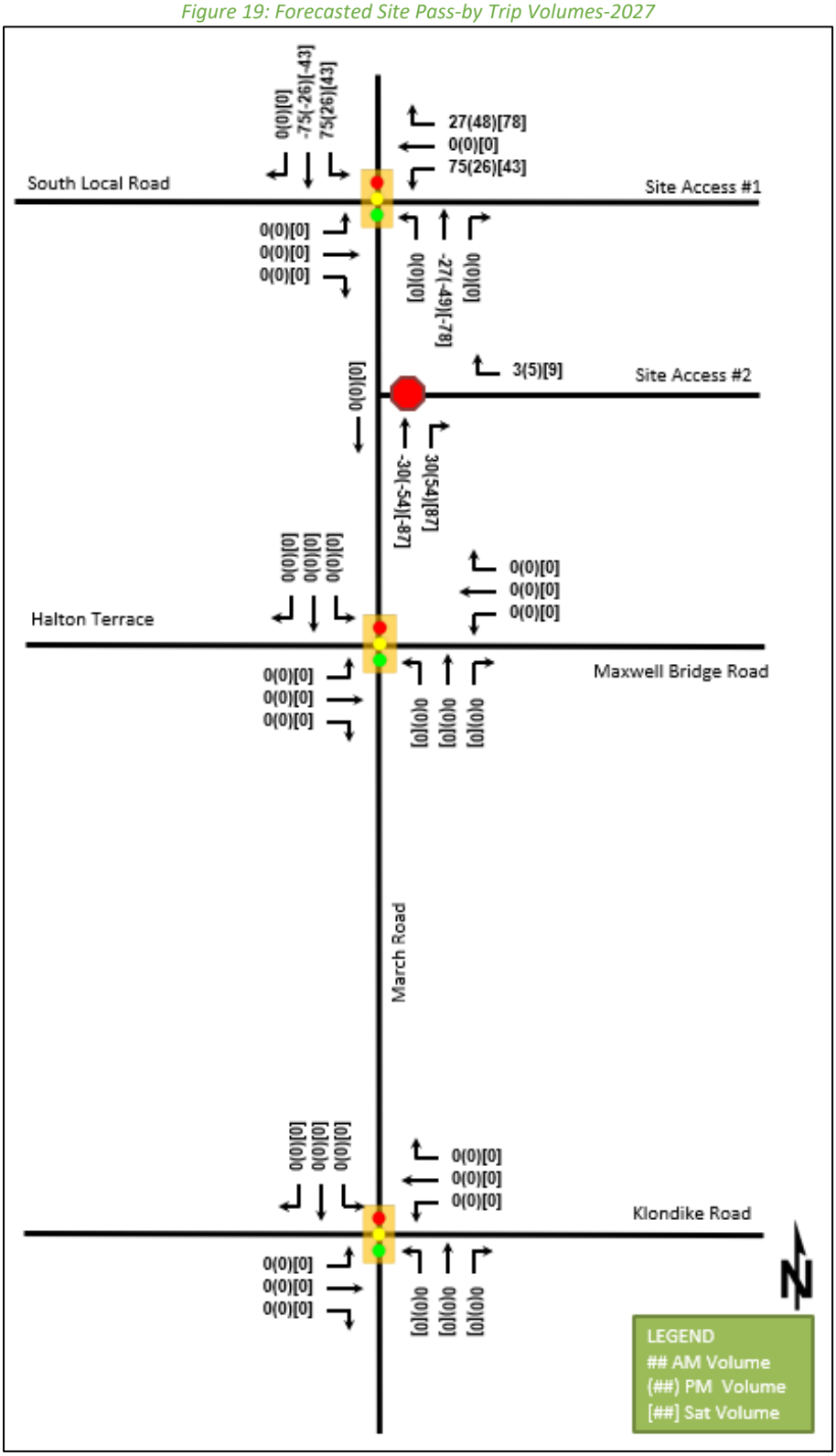


Figure 20: New Site Generation Assignment 2022 (%)

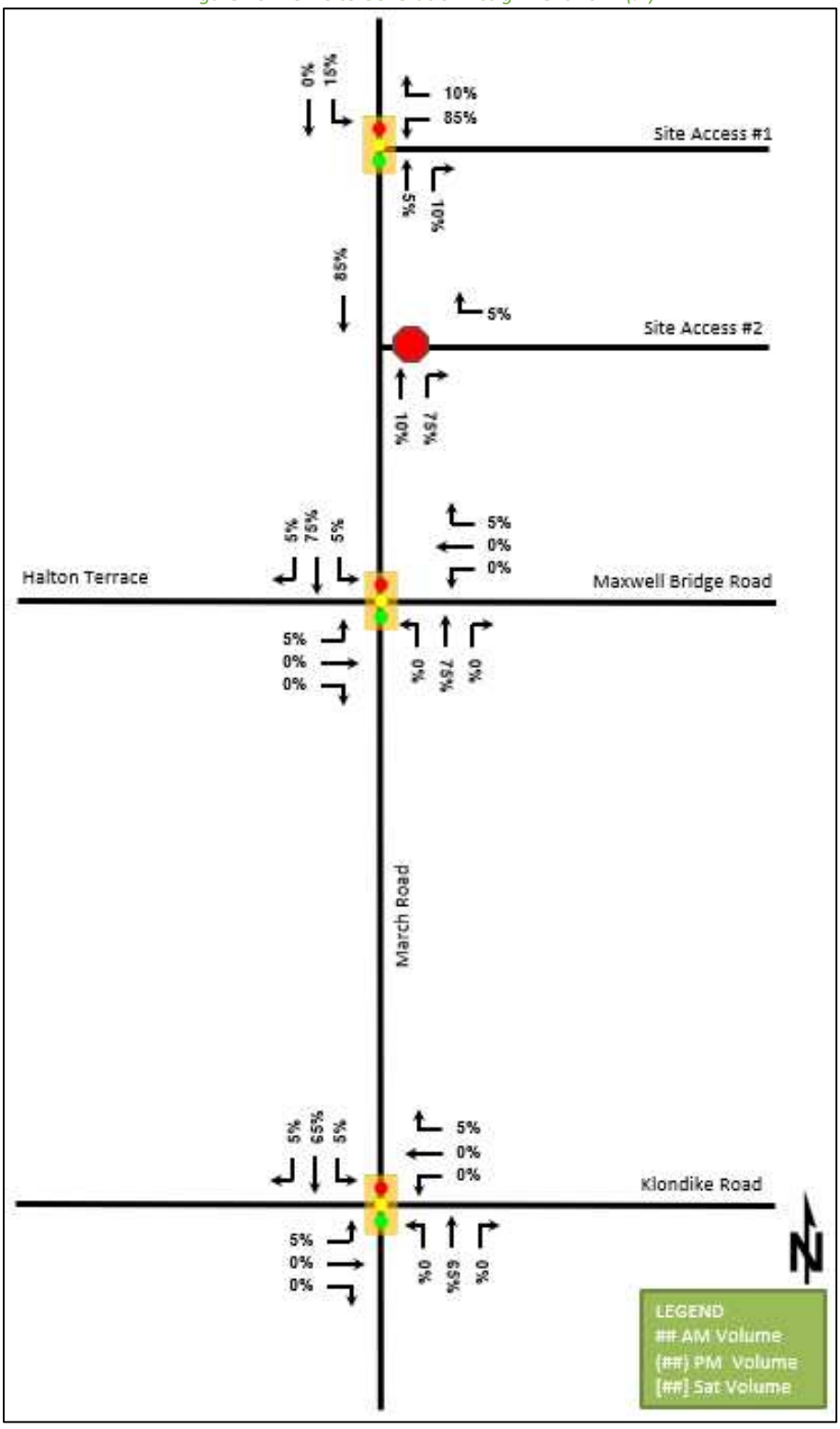


Figure 21: New Site Generation Assignment 2027 (%)

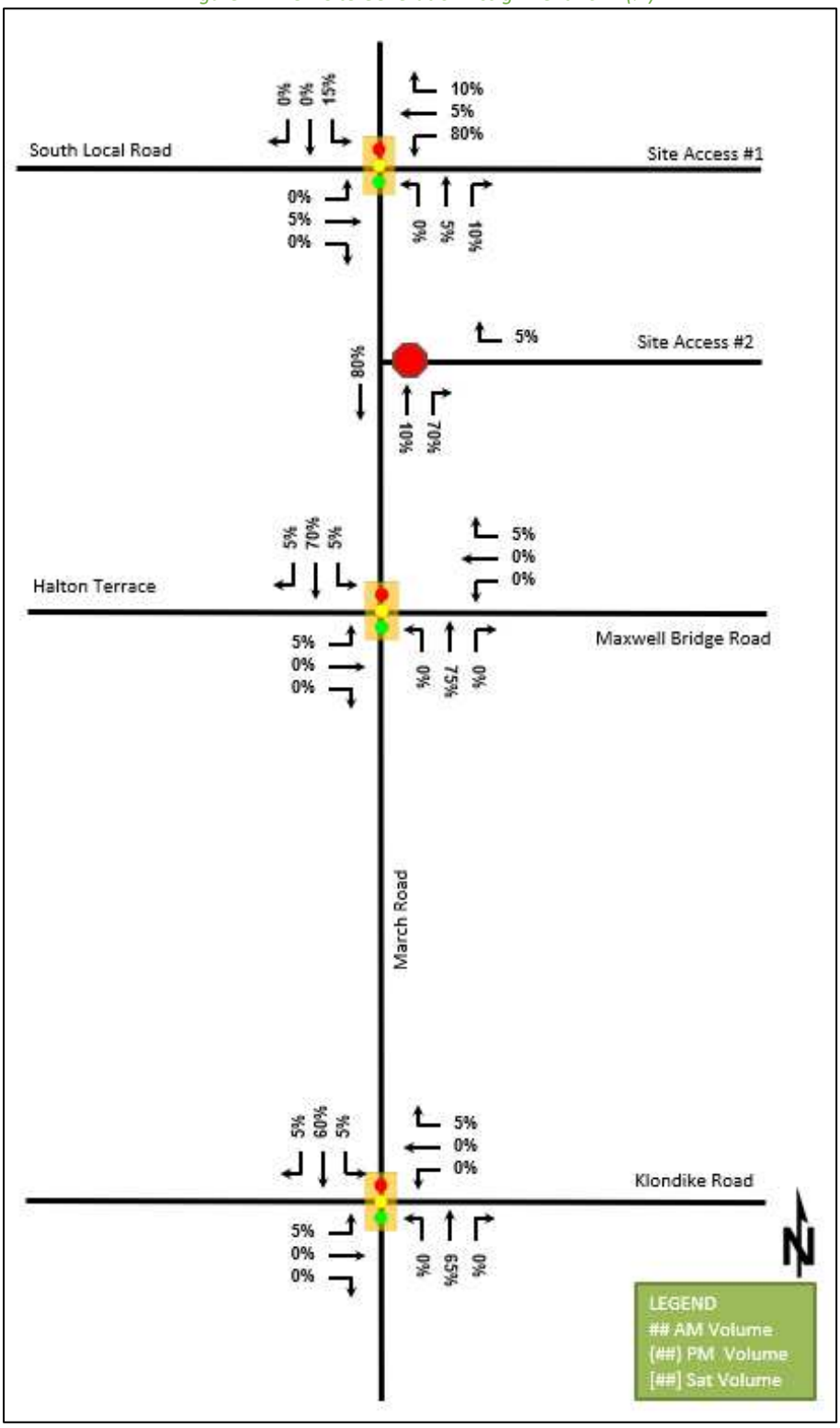


Figure 22: New Site Generation 2022 Auto Volumes

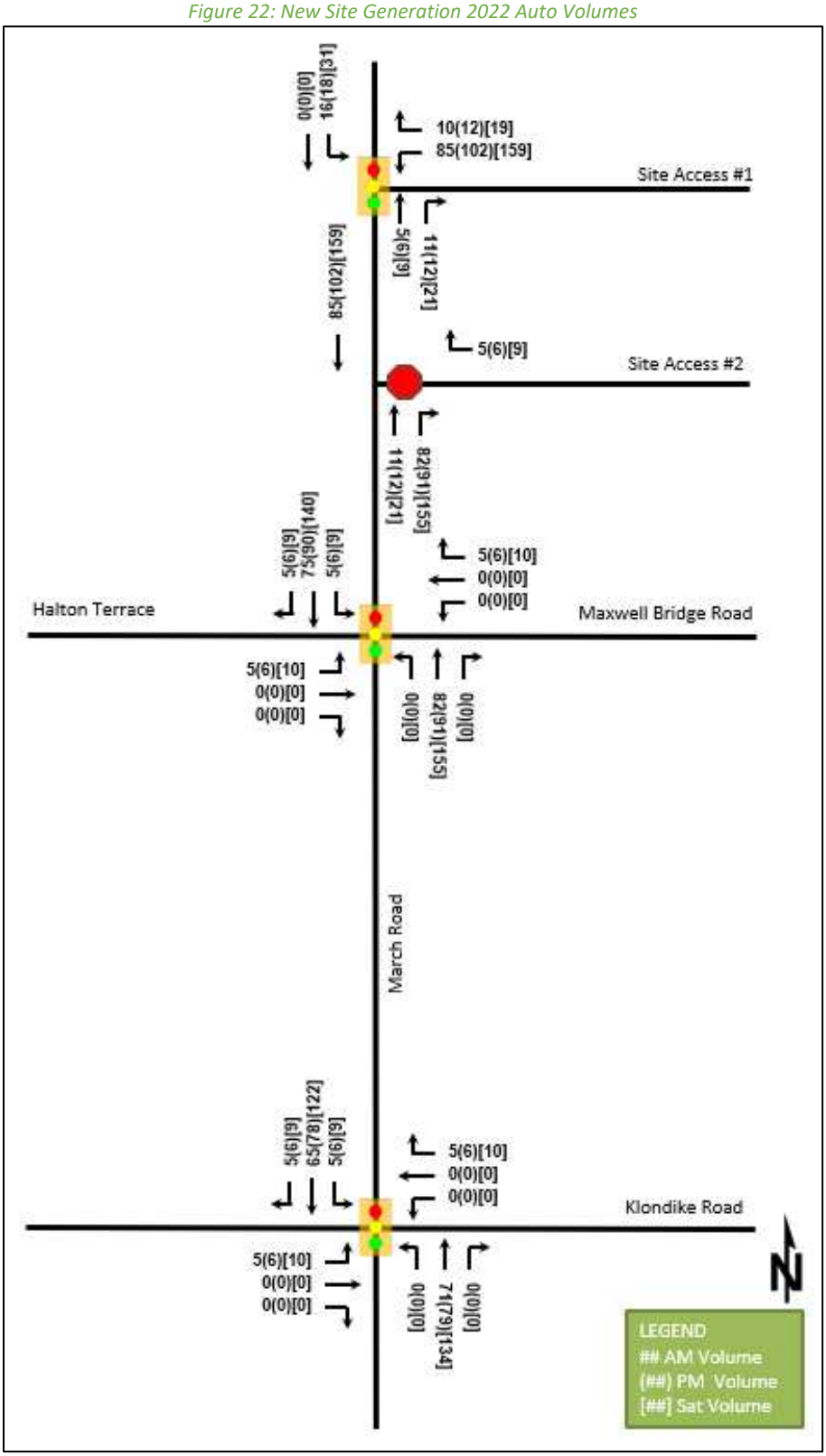


Figure 23: New Site Generation 2027 Auto Volumes

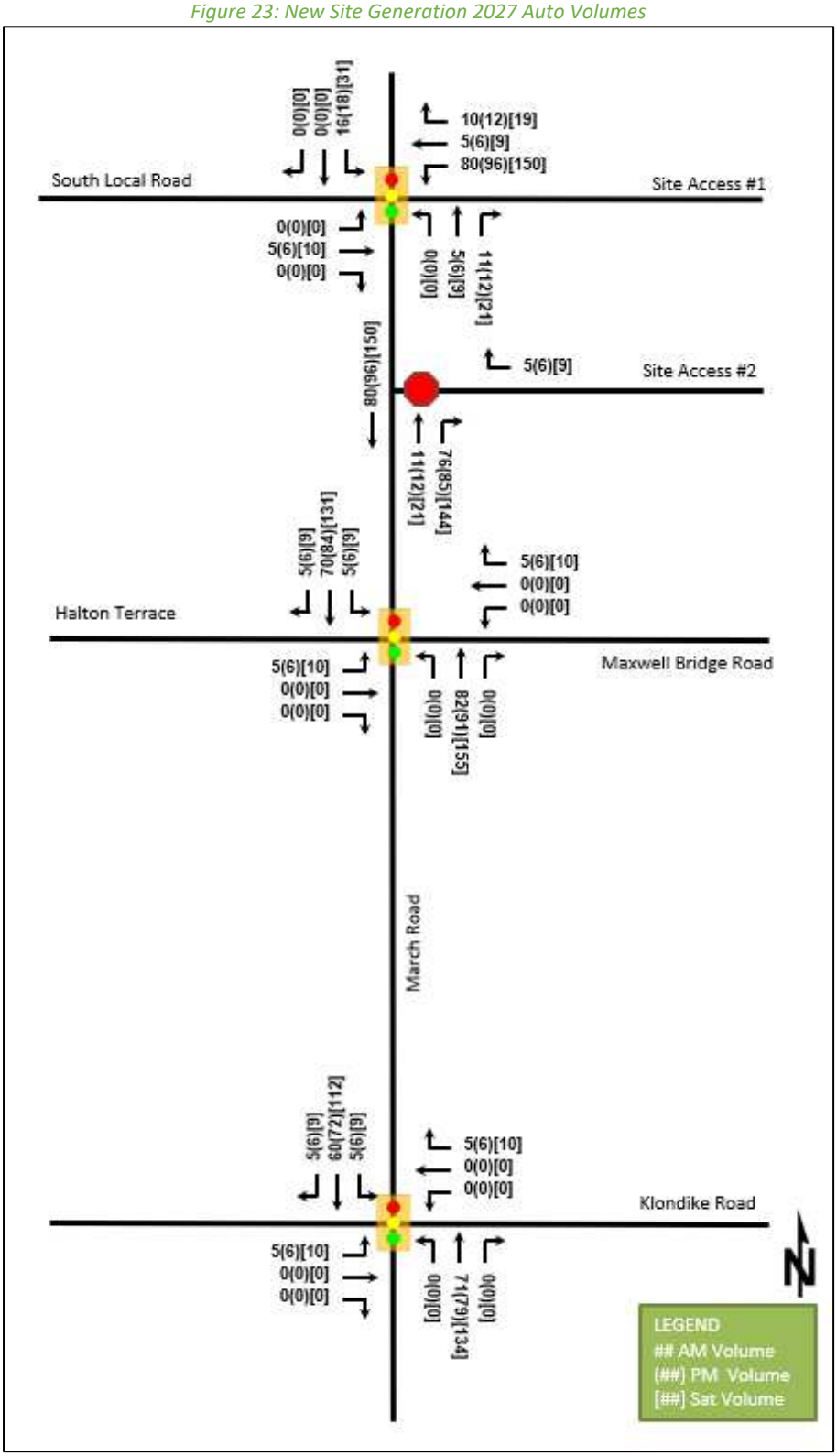


Figure 24: Net New Site Generation Auto Volumes 2022

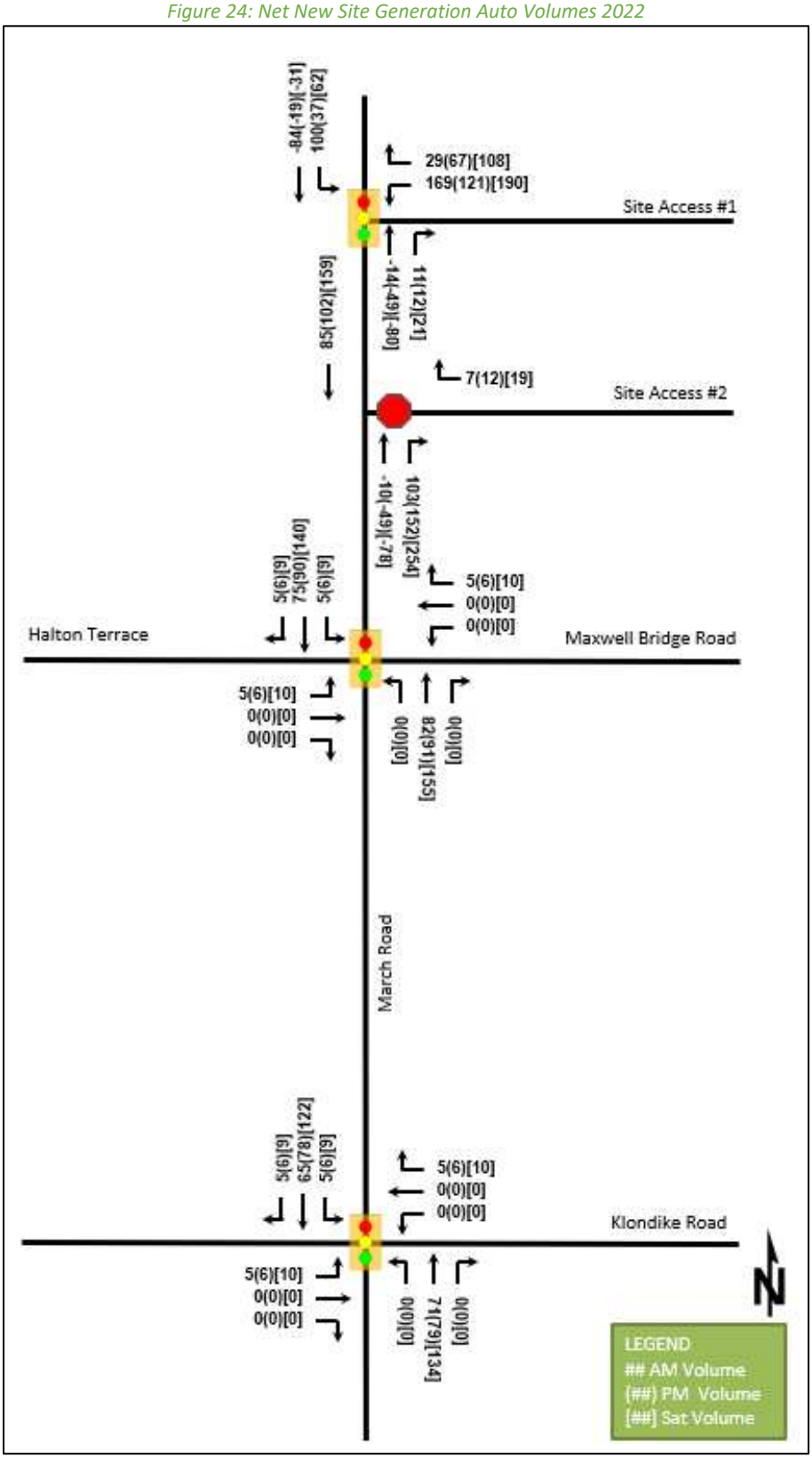
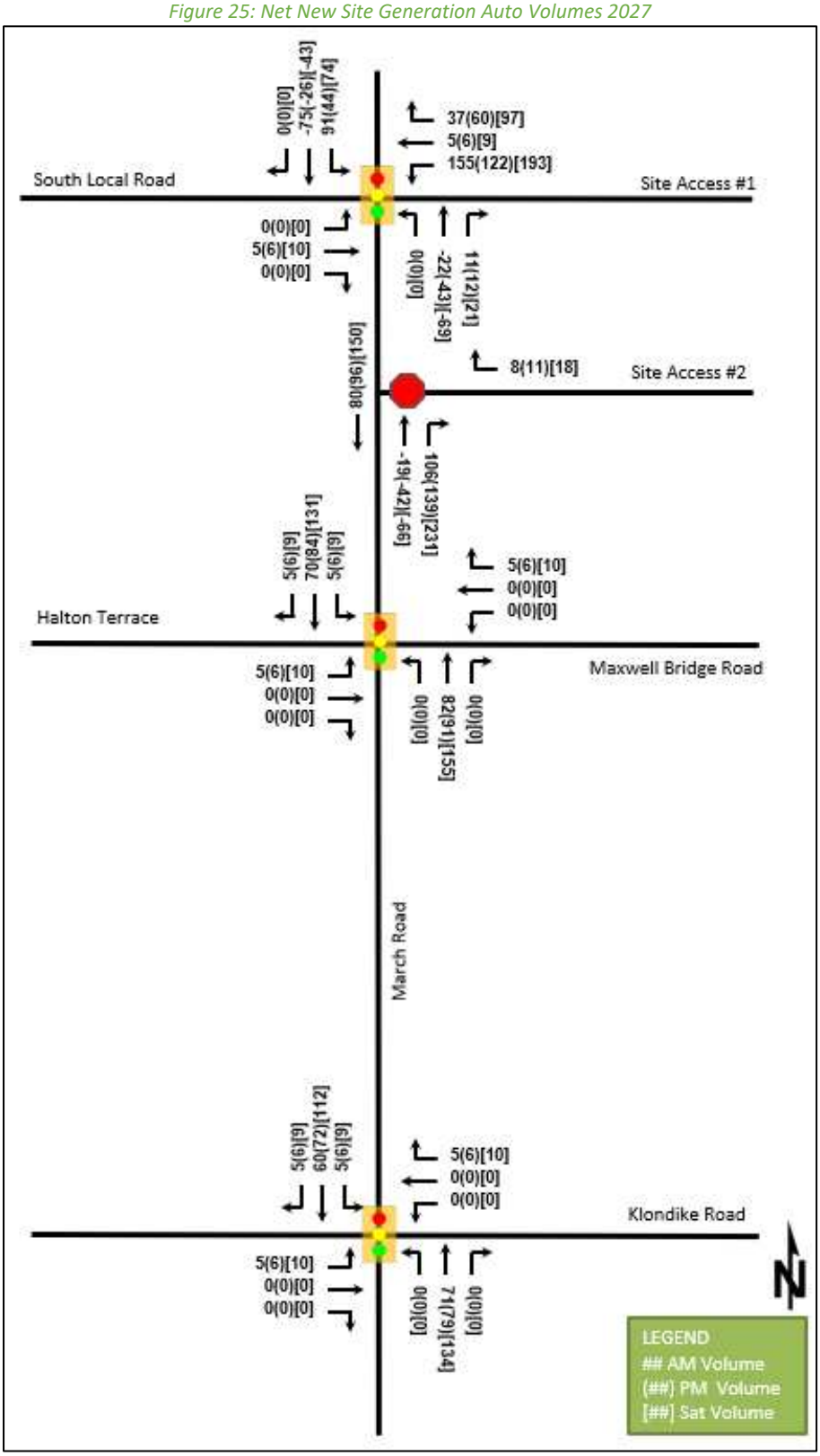


Figure 25: Net New Site Generation Auto Volumes 2027



March 19, 2020 **476760-01000**

Ralph Esposito Jr.
10731854 Canada Inc.
555 Legget Drive, Suite 304, Tower A, Kanata, ON, K2K 2X3

Subject: 788 March Road
Transportation Impact Assessment Study (October 2018) - Addendum 3

1. Introduction

1.1. Context

Recent changes have been made to the original Site Plan (dated July 07, 2018) for this residential project that impact the proposed development's peak hour traffic generation, and result in a different site configuration with respect to access location. This Addendum 3 represents an update to the original TIA and subsequent Addendum 1 to 2 with regard to these two items. The site is now anticipated to be developed in a single phase, and the updated Site Plan can be found in Appendix A.

2. Changes to Trip Generation

Site generated traffic is directly related to the number of proposed residential units. There is a proposed decrease in the number of units relative to the original study, and therefore the anticipated trips generated by the site is also expected to decrease. The following sections summarize the expected changes to the trip generation.

2.1. Trip Generation – Previous Study (2018)

The values shown in Table 1 below, were taken from the previous Site Plan for the Phase 2 (2023) horizon full buildout horizon where 196 residential units were proposed.

Table 1: Site Person Trip Generation Using OD-Survey Mode Share – Previous Study

Travel Mode	AM Mode Share	AM Peak (persons/h)			PM Peak (persons/h)		
		In	Out	Total	In	Out	Total
Auto Driver	50%	20	49	69	41	28	69
Auto Passenger	10%	3	11	14	8	6	14
Transit	25%	7	20	27	16	12	28
Non-motorized	15%	8	20	28	15	12	27
Total People Trips	100%	38	100	138	80	58	138
Total 'New' High-Rise Condominium (2023) Auto Trips		20	49	69	41	28	69

The total two-way anticipated site generated person trips are 138 for the AM and PM peak hours, and the total two-way vehicle generated trips are 69 trips for the AM and PM peak hours.

2.2. Trip Generation – 2020 Updated Site Plan

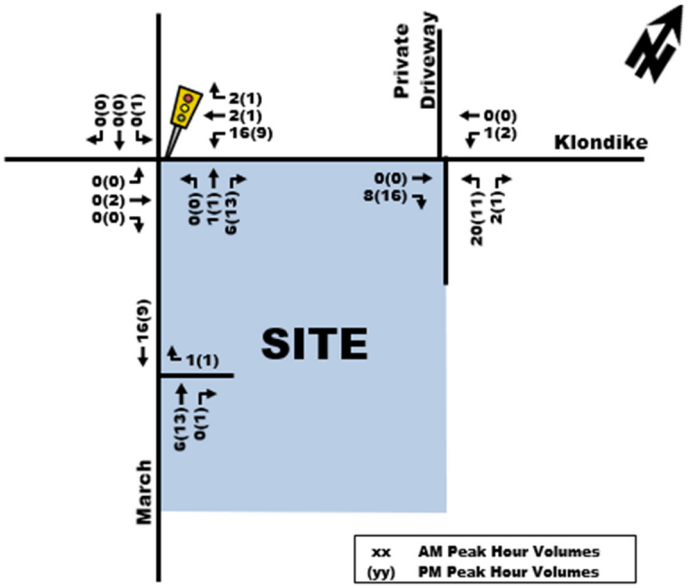
Using the updated Site Plan with the total of 92 proposed residential units and applying the same modal shares and directional splits, the new anticipated person trips are shown in Table 2 below.

Table 2: Site Person Trip Generation Using OD-Survey Mode Share – Updated

Travel Mode	AM Mode Share	AM Peak (persons/h)			PM Peak (persons/h)		
		In	Out	Total	In	Out	Total
Auto Driver	50%	9	23	32	19	13	32
Auto Passenger	10%	1	5	6	4	3	7
Transit	25%	4	13	17	9	7	16
Non-motorized	15%	3	7	10	5	5	10
Total People Trips	100%	17	48	65	37	28	65
Total 'New' High-Rise Condominium (2023) Auto Trips		9	23	32	19	13	32

The total two-way anticipated site generated person trips are 65 for the AM and PM peak hours, and the total two-way vehicle generated trips are 32 trips for the AM and PM peak hours. Figure 1, below shows the updated vehicle volumes assigned to the local roadways within the study area.

Figure 1: Updated Total Site Generated Vehicle Trips



2.3. Difference in Forecasted Trips

To understand the difference between the previous Site Plan and the updated Site Plan with regard to trip generation, the forecasted volumes from the original TIA were compared to those associated with the updated Site Plan. Table 3 summarizes the difference (Table 2 - Table 1 values).

Module	Element	Explanation	Exempt/Required
4.6 Neighbourhood Traffic Management	4.6.1 Adjacent Neighbourhoods	Only required when the development relies on local or collector streets for access and total volumes exceed ATM capacity thresholds	Required
4.8 Network Concept		Only required when proposed development generates more than 200 person-trips during the peak hour in excess of equivalent volume permitted by established zoning	Exempt

5 Development-Generated Travel Demand

5.1 Trip Generation and Mode Shares

This TIA has been prepared using the vehicle trip rates from the ITE Trip Generation Manual (10th Edition). Where possible, fitted curve rates were used to estimate the trip generation. This included the PM and Saturday peak hour Supermarket trip generation. The ITE Trip Generation Manual did not provide a fitted curve equation for the AM peak hour Supermarket trip generation and AM, PM and Saturday peak hour Fast-Food Restaurant with Drive-Through trip generation, therefore an average trip rate was used for these land uses and time periods. An average trip generation was also used for the Retail component of the development, as the fitted curve equations produced overly conservative estimates for a Retail building of a given size. To estimate person trip generation, a factor of 1.28 has been applied to the ITE rates. Table 5 summarizes the person trip rates for the proposed land uses.

Table 5: Trip Generation Person Trip Rates

Land Use	Land Use Code	Peak Hour	Vehicle Trip Rate	Person Trip Rates	Estimation Method
Supermarket	850	AM	3.82	4.89	Average
		PM	9.58	12.26	Fitted Curve
		SAT	11.37	14.55	Fitted Curve
Retail	820	AM	0.94	1.2	Average
		PM	3.81	4.88	Average
		SAT	4.5	5.76	Average
Fast-Food Restaurant w Drive-Through	934	AM	40.19	51.44	Average
		PM	32.67	41.82	Average
		SAT	54.86	70.22	Average

Using the above Person Trip rates, the total person trip generation has been estimated. Table 6 below illustrates the total person trip generation for the proposed development.

Table 6: Total Person Trip Generation

Land Use	Units / GFA	AM Peak Hour			PM Peak Hour			Sat Peak Hour		
		In	Out	Total	In	Out	Total	In	Out	Total
Supermarket	44,830 sq. ft.	131	88	219	280	271	551	333	319	652
Retail Store	16,145 sq. ft.	12	7	19	38	41	79	48	44	92
Fast-Food Restaurant w Drive-Through	3,770 sq. ft.	98	96	194	83	76	159	134	131	265
Total Person Trips		241	191	432	401	388	789	515	494	1009

To account for trips that are made to the site for more than one purpose (i.e. a patron getting groceries and then visiting the retail store before leaving the site), an internal capture rate has been applied to the total person trip generation to the Retail Store and the Fast-Food Restaurant with a Drive-Through. The ITE Trip Generation Handbook (3d Edition) provides the internal trip capture rates for trip origins and destinations within a mixed-use development and can be found in Appendix F.

The Supermarket portion of this development is the largest of three uses. Therefore, this land use is treated as the anchor for this development and is not reduced based on the multi-use capture rate. The smaller portions of this development, the retail and the fast-food portion, have been reduced to reflect supermarket users utilizing the on-site retail and fast-food. No Saturday peak hour, and retail (supermarket) to retail internal capture rates are provided in the ITE Trip Generation Handbook. The PM peak hour rates were used for Saturday peak hour period. A 10% retail (supermarket) to retail capture rates was assumed for the Retail Store portion of the development. This is considered a conservative estimate, as the values in the Trip Generation Handbook range from 0 to 75%. The internal capture rates are summarized in Table 7. The total net person trip generation can be seen in Table 8.

Table 7: Internal Capture Rates

Land Use	AM		PM		SAT	
	In	Out	In	Out	In	Out
Retail to/from Restaurant	8%	50%	14%	41%	14%	41%
Retail to/from Retail	10%	10%	10%	10%	10%	10%

Table 8: Total Net Person Trip Generation

Land Use	Units / GFA	AM Peak Hour			PM Peak Hour			Sat Peak Hour		
		In	Out	Total	In	Out	Total	In	Out	Total
Supermarket	44,830 sq. ft.	131	88	219	280	270	550	333	319	131
Retail Stores	16,145 sq. ft.	11	6	17	33	37	70	43	40	11
Fast-Food Restaurant w Drive-Through	3,770 sq. ft.	91	47	138	71	45	116	116	77	91
Total Person Trips		233	141	374	384	352	736	492	436	233

Using the most recent National Capital Region Origin-Destination (OD Survey), the existing mode shares for Kanata/Stittsville have been summarized in Table 9. The mode shares in the Study Area are expected to align with the OD Survey values, as the subject site is located in a typical suburban area with sidewalks connecting to adjacent residential developments. This will allow the closest residents to make frequent non-auto trips to the grocery and retail stores, whereas residents living slightly further away will still choose to use auto trips to get their groceries.

Table 9: Mode Shares

Travel Mode	Kanata/Stittsville Mode Share
Auto Driver	65%
Auto Passenger	20%
Transit	10%
Cycling	0%
Walking	5%
Total	100%

Using the above mode shares and person trip rates, the person trips by mode have been forecasted during the peak hours. Where applicable, pass-by trips have been accounted for, and the rates used for each land-use have been summarized in Table 10, as per the ITE Trip Generation Manual (3d Edition).

Table 10: Land Use Pass-by Rates

Land Use	Pass-by Rate		
	AM	PM	SAT
Supermarket	-	36%	28%
Retail Stores	-	34%	26%
Fast-Food Restaurant w Drive-Through	49%	50%	39%

As no Saturday peak pass-by rates were available for the Supermarket and Fast-Food Restaurant with Drive-Through, the ratio of PM to Saturday pass-by rates of a similar land use (Retail Store) were used to estimate the Supermarket and Fast-Food Restaurant with Drive-Through Saturday pass-by rates. This is considered conservative as it is likely that the pass-by rates of a Supermarket and a Fast-Food Restaurant with a Drive-Through during the Saturday peak hour are higher. Once the total pass-by trips were estimated using the rates outlined above, the In and Out trips were determined by dividing the total peak hour pass-by volumes by two. This is based on the assumption that trips coming into the proposed development will leave the site within the same hour. The pass-by reduction rates by land use can be seen in Appendix G and the total pass-by reduction can be seen in Table 11 below.

Using the above mode shares and person trip rates, the person trips by mode have been projected. Table 11 summarizes the trip generation by mode.

Table 11: Trip Generation Mode

Travel Mode	Mode Share	AM Peak Hour			PM Peak Hour			SAT Peak Hour		
		In	Out	Total	In	Out	Total	In	Out	Total
Auto Driver	65%	151	92	243	250	229	479	320	283	603
Supermarket Pass-by		*0*	*0*	*0*	*-64*	*-65*	*-129*	*-59*	*-60*	*-119*
Retail Store Pass-by		*0*	*0*	*0*	*-8*	*-8*	*-16*	*-7*	*-7*	*-14*
Fast-Food Restaurant w Drive-Through Pass-by		*-22*	*-22*	*-44*	*-19*	*-19*	*-38*	*-24*	*-25*	*-49*
Total Pass-by		*-22*	*-22*	*-44*	*-91*	*-92*	*-183*	*-90*	*-92*	*-182*
Net New Auto Driver	65%	129	70	199	159	137	296	230	191	421
Auto Passenger	20%	47	28	75	77	70	147	99	87	186
Transit	10%	23	15	38	38	36	74	48	44	92
Cycling	0%	0	0	0	0	0	0	0	0	0
Walking	5%	13	6	19	20	18	38	25	22	47
Total	**100%**	234	141	375	385	353	738	492	436	928

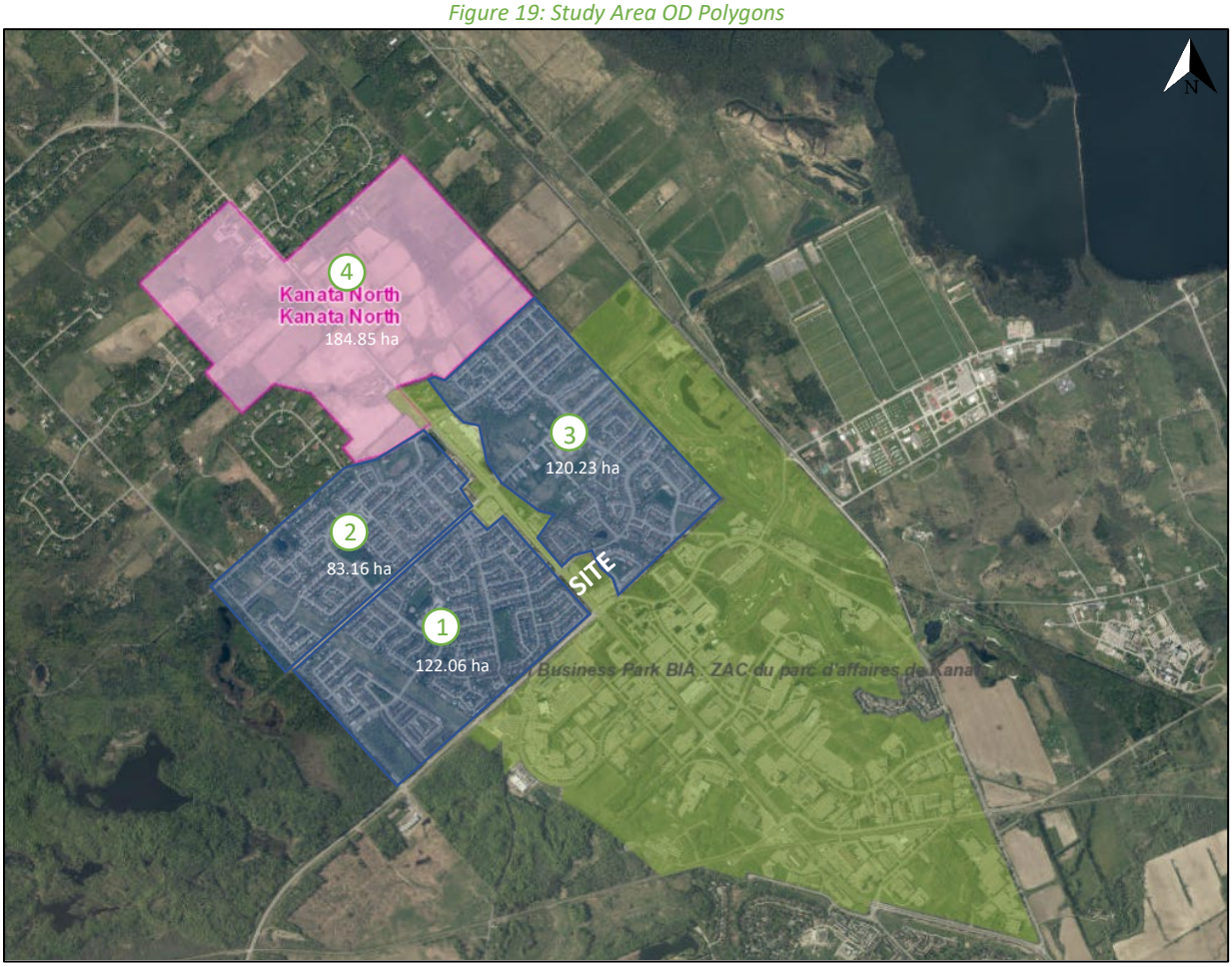
As shown above, 375 AM, 738 PM and 928 Saturday peak hour two-way person trips are projected as a result of the proposed development, out of which 199 AM, 296 PM and 421 Saturday peak hour trips are net new vehicle trips.

5.2 Trip Distribution

To understand the future travel patterns to the subject development, the location of Kanata North CDP boundary and residential communities in the Study Area have been reviewed to determine the anticipated travel patterns. A majority of the trips to the subject development are expected to be generated in an area bound by Terry Fox Drive to the south and the Urban Boundary to the east, west, and north. To determine the flow of traffic to and

from the subject development, this area was broken down into four polygons and the trips were distributed according to the polygon size. The polygon areas were measured using the advanced tools in geoOttawa website and the OD map along with the area calculation can be seen in Figure 19 and Table 12, respectively.

Figure 19: Study Area OD Polygons



Source: http://maps.ottawa.ca/geoOttawa/ Accessed: Aug 18, 2020

Table 12: OD Polygon Area % Calculation

Polygon	Area (ha)	Area (%)
1	122.06	24%
2	83.16	16%
3	120.23	24%
4	184.85	36%
Total	510.30	100%

5.3 Trip Assignment

Using the percentages shown in Table 12, the primary, or net new, auto trips were distributed to the Study Area road network. The new site generated volumes are illustrated in Figure 20.

In addition to the primary auto trips, it is expected that pass-by trips will also make up a significant portion of the site trip generation.

To assign the pass-by trips to the accesses, a ratio of southbound trips as a portion of all traffic on March Road, and northbound trips as a portion of all traffic on March Road was developed. It was determined that 75% of the total traffic is southbound and 25% is northbound in the 2023 AM peak period and 30% of the total traffic is southbound and 70% is northbound in both the 2023 PM and 2023 Saturday peak periods. It was also determined that 75% of the total traffic is southbound and 25% is northbound in the 2028 AM peak period and 30% of the total traffic is southbound and 70% is northbound in both the 2028 PM and 2028 Saturday peak periods. Using these percentages, the traffic volumes have been logically distributed to the access points. Figure 21 illustrates the site pass-by trip volumes.

Figure 22 illustrates the combined impact of the net new site trip generation and pass-by trips.

Figure 20: New Site Generation Auto Volumes

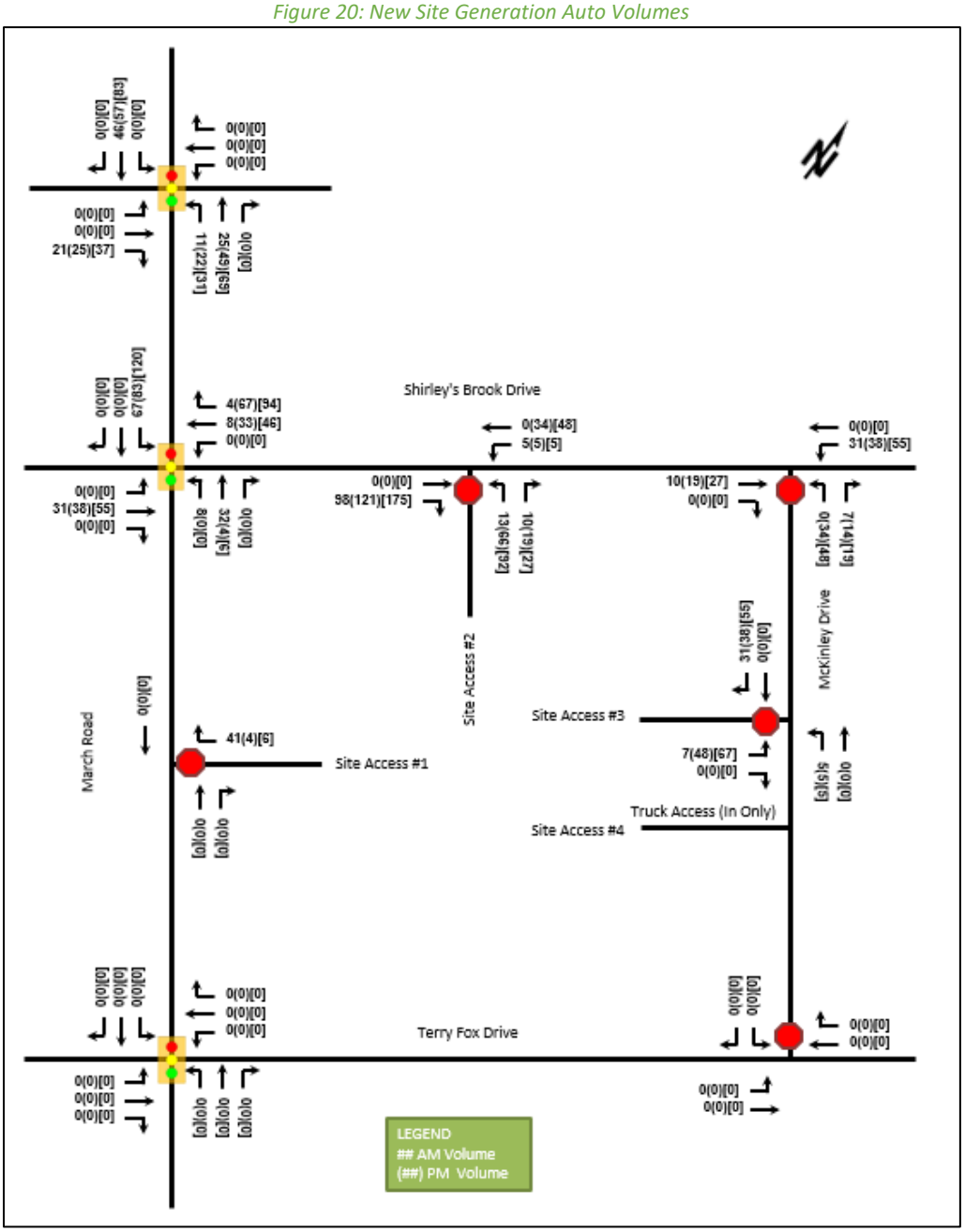


Figure 21: Forecasted Site Pass-by Trip Volumes

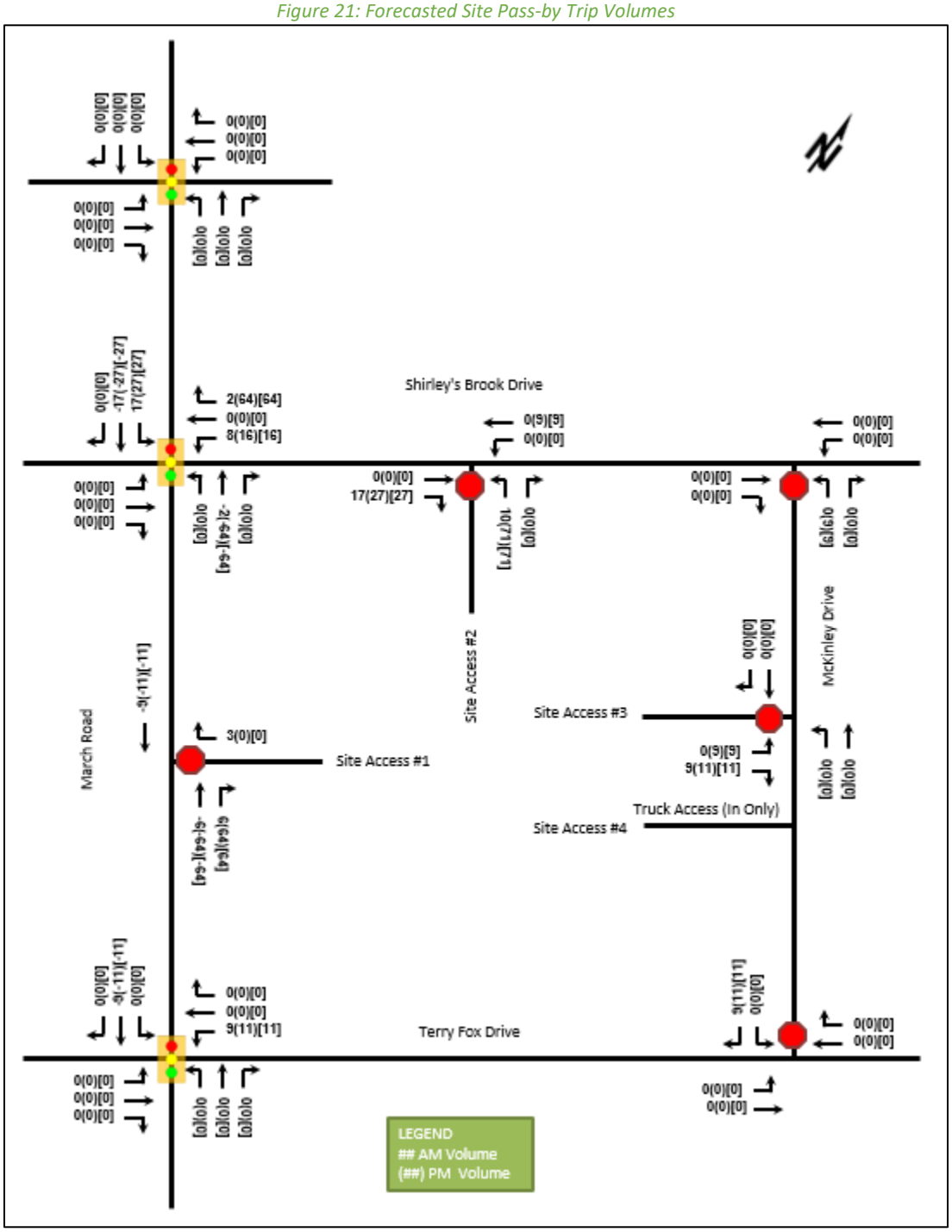
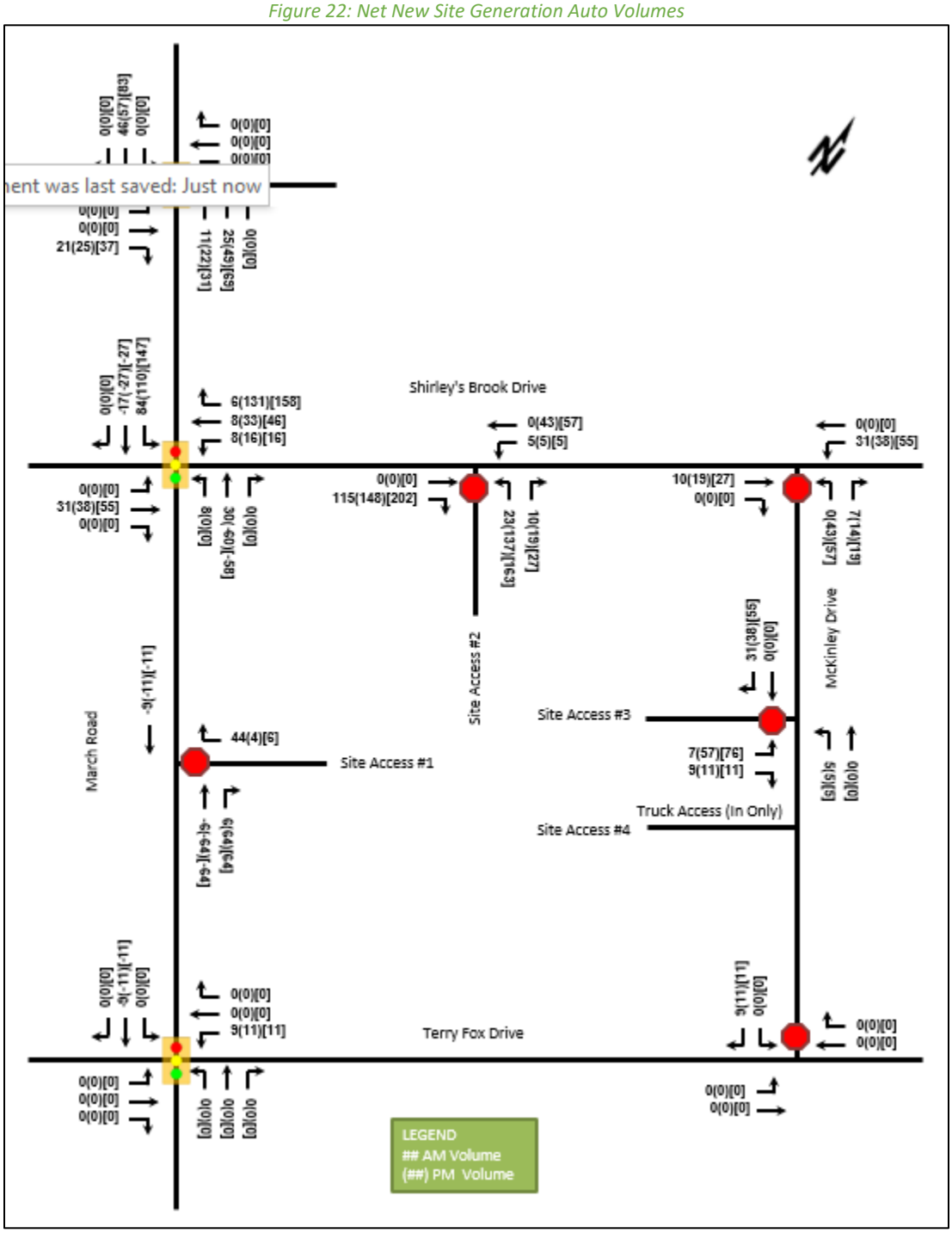
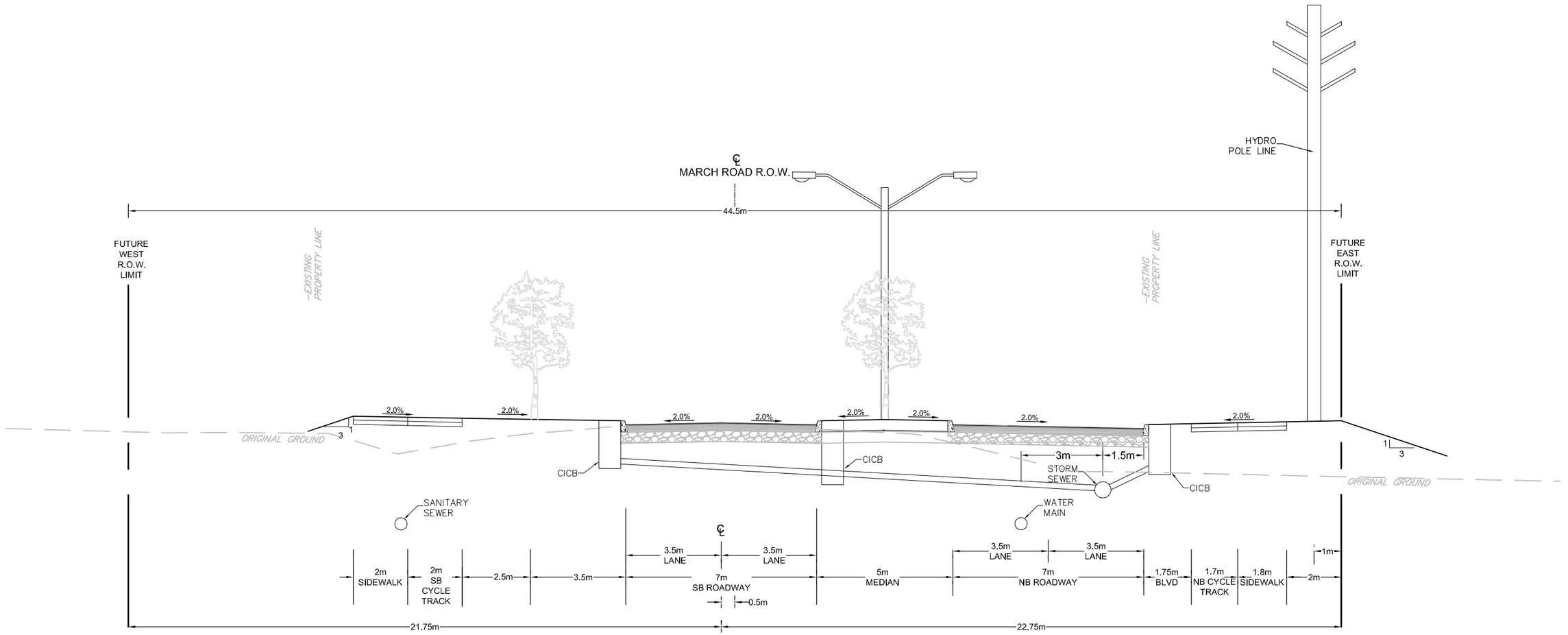


Figure 22: Net New Site Generation Auto Volumes



APPENDIX G

Street Cross-Sections



KANATA NORTH
COMMUNITY DESIGN PLAN

FIGURE NO. 24

MARCH ROAD - INTERIM
CROSS SECTION

DATE
JUN 2016

JOB
112117

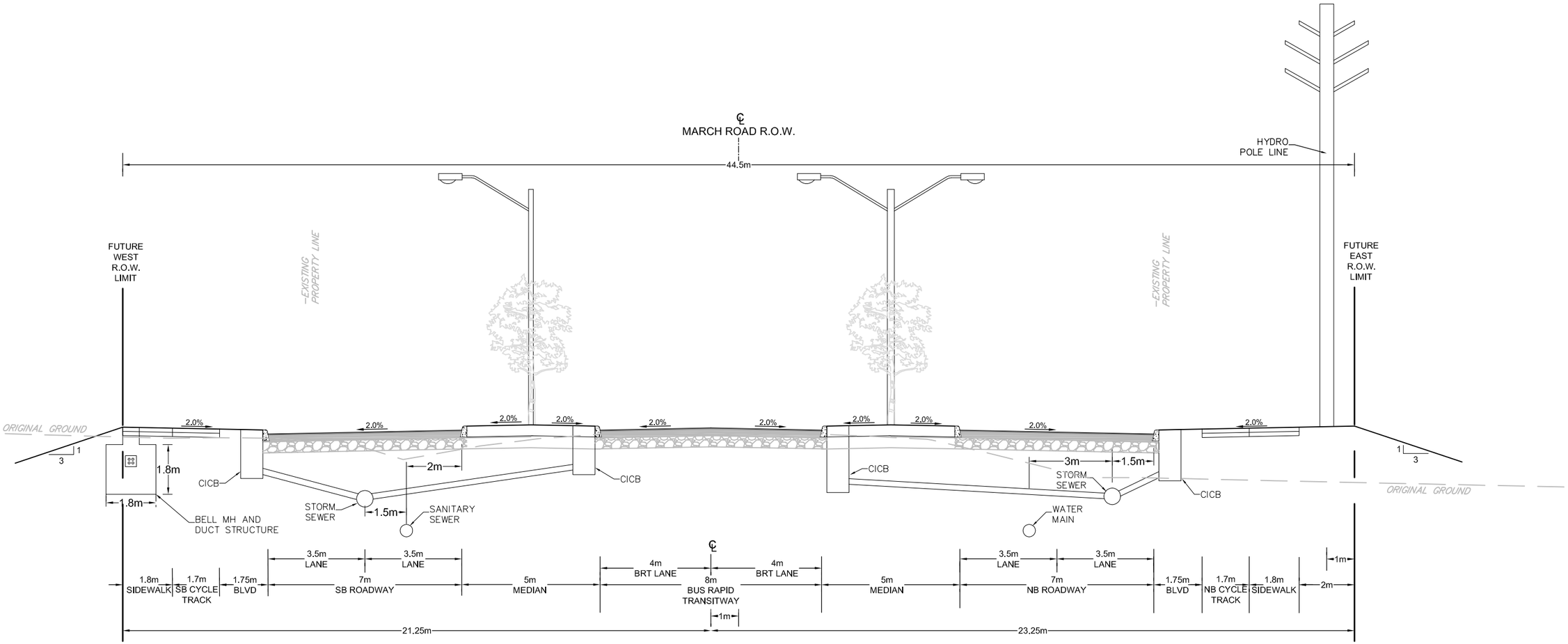
SCALE
1:150

0 1m 2m 4m

NOVATECH
Engineers, Planners & Landscape Architects

SHT11x17.DWG - 279mmx432mm

M:\2012\112117\CADDesign\Figures\Traffic\TMP\FINAL\112117 - March sections - 20160212.dwg, INTERIM (TMP), Apr 05, 2016 - 9:09am, tbrooks



KANATA NORTH
COMMUNITY DESIGN PLAN

FIGURE NO. 25

MARCH ROAD - ULTIMATE
CROSS SECTION

DATE
JUN 2016

JOB
112117

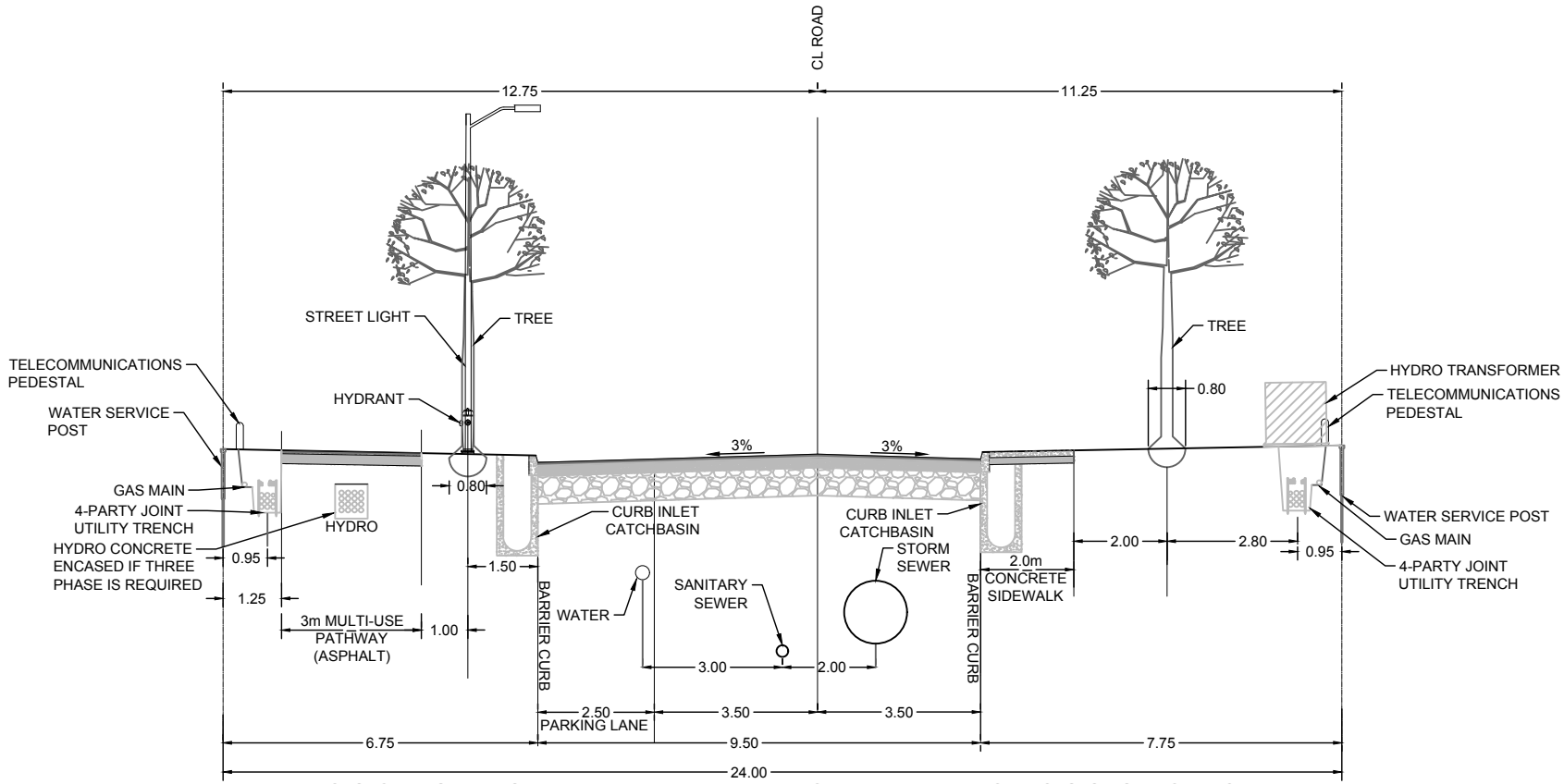
SCALE
1:150

0 1m 2m 4m

NOVATECH
Engineers, Planners & Landscape Architects

M:\2012\112117\CADDesign\Figures\Traffic\TMP\FINAL\112117 - March sections - 20160212.dwg, ULTIMATE (TMP), Apr 05, 2016 - 9:09am, tbrooks

SHT11x17.DWG - 279mmx432mm



BOSCH ST. (STREET 10) - TYPICAL 24.0m CROSS SECTION
FROM SALINGER ST. (STREET 12) TO MARCH ROAD
ADJACENT BLOCK 309 CU LANDS

NOVATECH
Engineers, Planners & Landscape Architects
Suite 200, 240 Michael Cowpland Drive
Ottawa, Ontario, Canada K2M 1P6

Telephone (613) 254-9643
Facsimile (613) 254-5867
Website www.novatech-eng.com

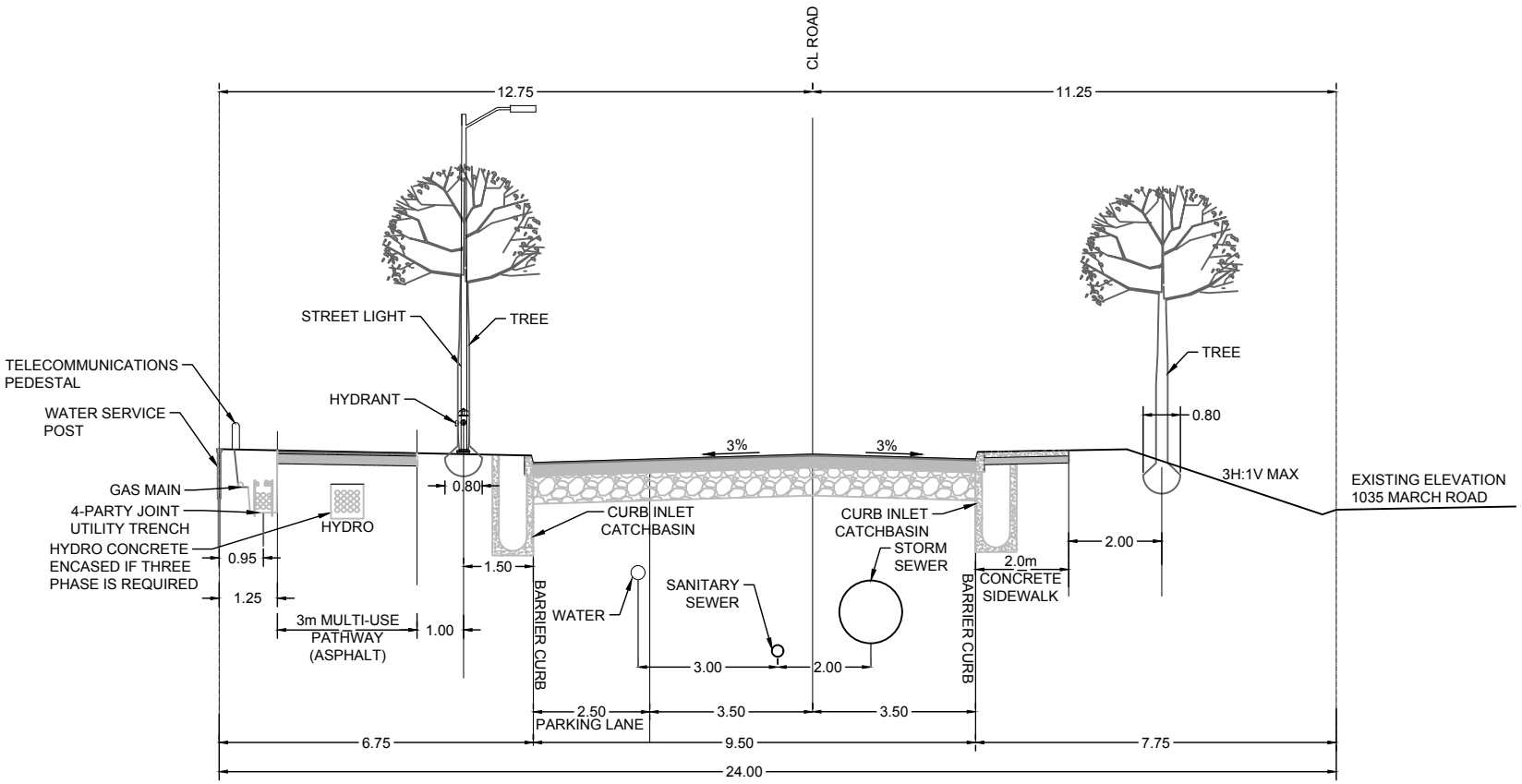
1015 MARCH ROAD

STREET 10 - TYPICAL
24.0m CROSS SECTION

SCALE 1 : 150 (0 2 4 6)

DATE	JOB	FIGURE
JULY 2022	121247	FIG-1

SHT8X11.DWG - 216mmx279mm



BOSCH ST. (STREET 10) - TYPICAL 24.0m CROSS SECTION FROM SALINGER ST. (STREET 12) TO MARCH ROAD ADJACENT 1035 MARCH ROAD

NOVATECH
Engineers, Planners & Landscape Architects
Suite 200, 240 Michael Cowpland Drive
Ottawa, Ontario, Canada K2M 1P6

Telephone (613) 254-9643
Facsimile (613) 254-5867
Website www.novatech-eng.com

1015 MARCH ROAD

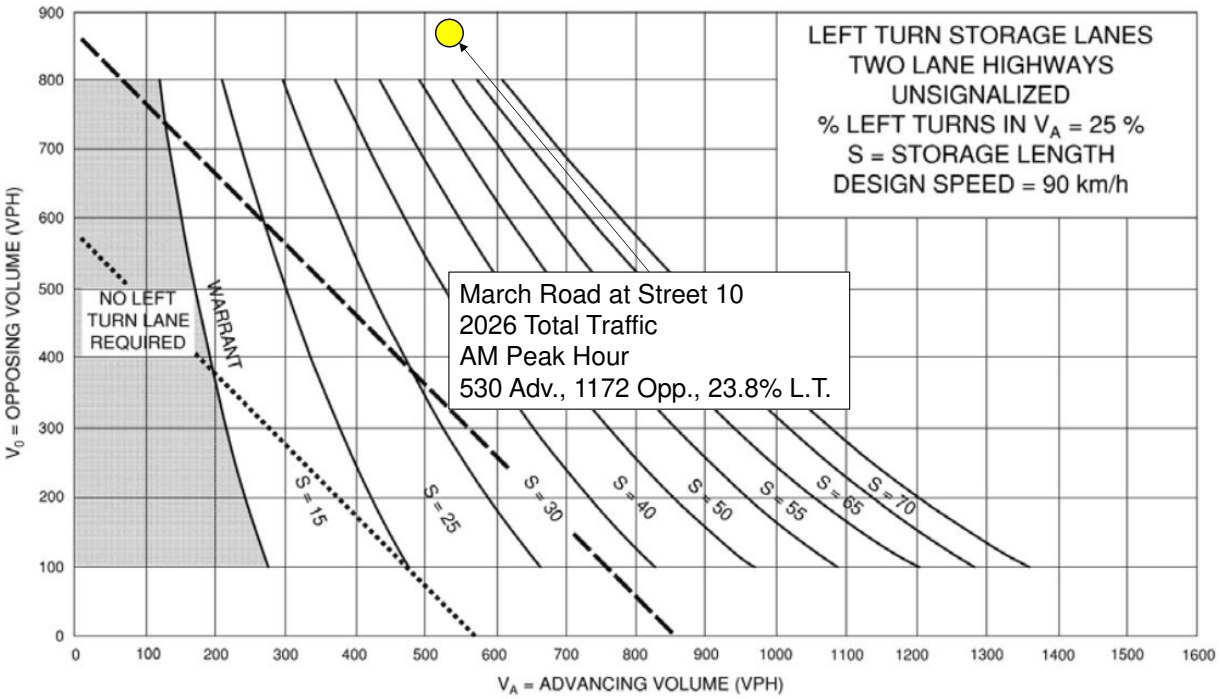
STREET 10 - TYPICAL 24.0m CROSS SECTION

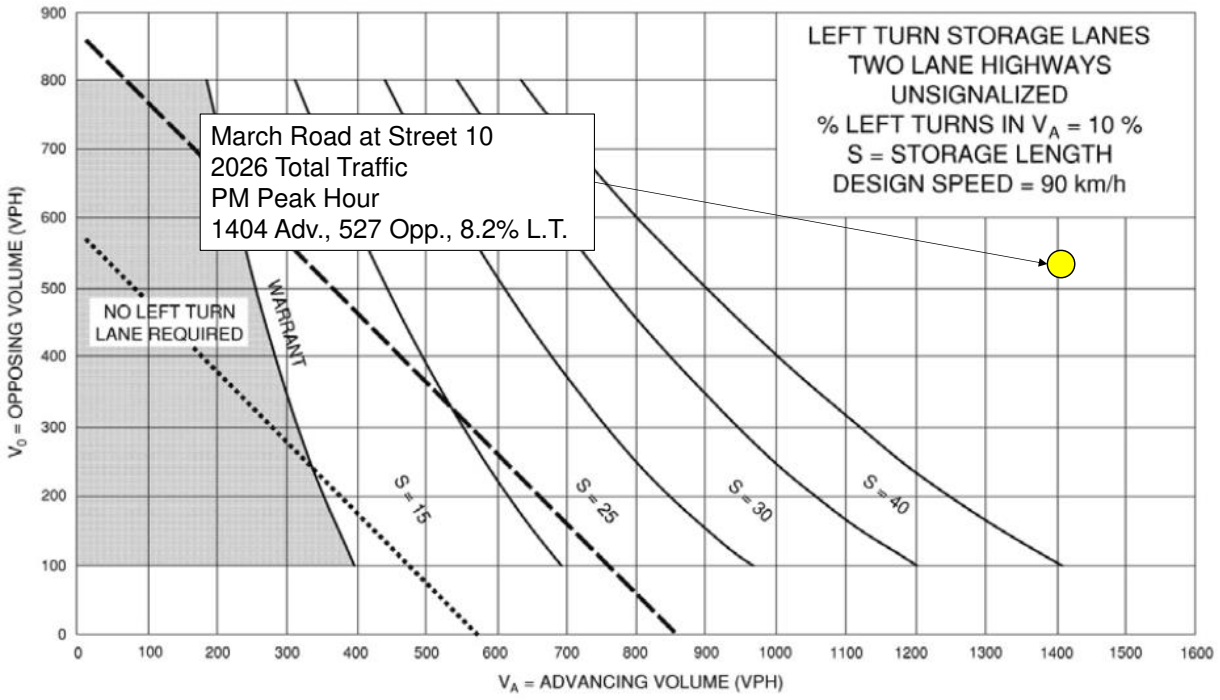
SCALE 1 : 150 (0, 2, 4, 6)

DATE JULY 2022 | JOB 121247 | FIGURE FIG-2

APPENDIX H

Warrants


LEFT TURN STORAGE LANES
TWO LANE HIGHWAYS
UNSIGNALIZED
% LEFT TURNS IN V_A = 25 %
S = STORAGE LENGTH
DESIGN SPEED = 90 km/h
March Road at Street 10
2026 Total Traffic
AM Peak Hour
530 Adv., 1172 Opp., 23.8% L.T.
NO LEFT TURN LANE REQUIRED
WARRANT
S = 15
S = 25
S = 30
S = 40
S = 50
S = 55
S = 65
S = 70
V_O = OPPOSING VOLUME (VPH)
V_A = ADVANCING VOLUME (VPH)
0
100
200
300
400
500
600
700
800
900
1000
1100
1200
1300
1400
1500
1600


LEFT TURN STORAGE LANES
TWO LANE HIGHWAYS
UNSIGNALIZED
% LEFT TURNS IN V_A = 10 %
S = STORAGE LENGTH
DESIGN SPEED = 90 km/h
March Road at Street 10
2026 Total Traffic
PM Peak Hour
1404 Adv., 527 Opp., 8.2% L.T.
NO LEFT TURN LANE REQUIRED
WARRANT
S = 15
S = 25
S = 30
S = 40
V_O = OPPOSING VOLUME (VPH)
V_A = ADVANCING VOLUME (VPH)
0
100
200
300
400
500
600
700
800
900
1000
1100
1200
1300
1400
1500
1600

NOVATECH ENGINEERING CONSULTANTS LTD.

TRAFFIC SIGNAL JUSTIFICATION
USING PROJECTED VOLUMES

LOCATION: March Road at Street 10

ANALYSIS SCENARIO: 2031 Total Traffic

JUSTIFICATION 7 – Projected Volumes

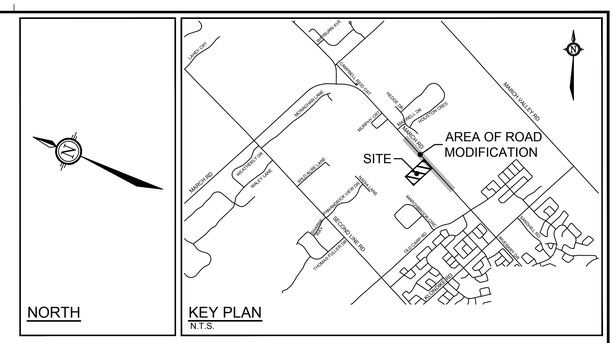
Justification	Description	Minimum Requirement 1 Lane Highways		Minimum Requirement 2 or more lanes		Compliance		
						Sectional		Entire %[2]
		Free Flow	Restr. Flow	Free Flow	Restr. Flow	Numerical [3]	%	
1 MINIMUM VEHICULAR VOLUME	A. Vehicle Volume, all approaches (average hour)	720	1080	600	900	1006	140%	46%
	B. Vehicle volume along minor street (average hour)	180 (270 T-Intersection)	255 (383 T-intersection)	120 (180 T-Intersection)	170 (255 T-intersection)	82	46%	
2 DELAY TO CROSS TRAFFIC	A. Vehicle Volume, major street (average hour)	720	1080	900	1350	924	128%	44%
	B. [1] Combined vehicle and pedestrian volume crossing artery from minor streets (average hour)	75	113	75	113	33	44%	

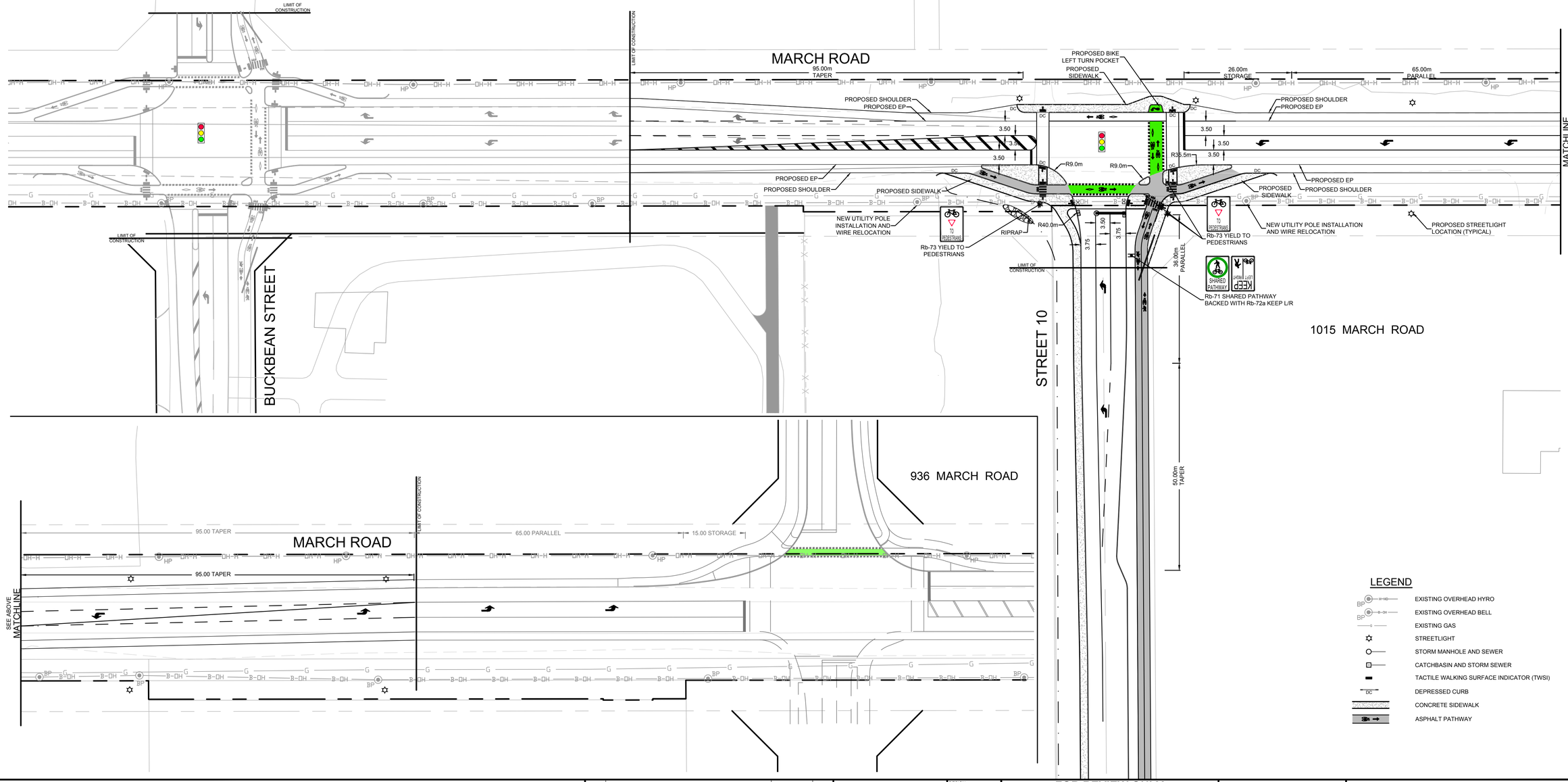
NOTES

1) For definition of crossing volume, refer to the Ontario Traffic Manual Book 12, Section 4.5 (March 2012).
2) The lowest sectional percentage governs the entire Justification.
3) Average hourly volumes estimated from peak hour volumes, AHV = PM / 2 or AHV = (AM+PM)/4.

APPENDIX I

Functional Design of March Road at Street 10





LEGEND

- EXISTING OVERHEAD HYRO
- EXISTING OVERHEAD BELL
- EXISTING GAS
- STREETLIGHT
- STORM MANHOLE AND SEWER
- CATCHBASIN AND STORM SEWER
- TACTILE WALKING SURFACE INDICATOR (TWSI)
- DEPRESSED CURB
- CONCRETE SIDEWALK
- ASPHALT PATHWAY

NOTE:
THE POSITION OF ALL POLE LINES, CONDUITS, WATERMAINS, SEWERS AND OTHER UNDERGROUND AND OVERGROUND UTILITIES AND STRUCTURES IS NOT NECESSARILY SHOWN ON THE CONTRACT DRAWINGS, AND WHERE SHOWN, THE ACCURACY OF THE POSITION OF SUCH UTILITIES AND STRUCTURES IS NOT GUARANTEED. BEFORE STARTING WORK, DETERMINE THE EXACT LOCATION OF ALL SUCH UTILITIES AND STRUCTURES AND ASSUME ALL LIABILITY FOR DAMAGE TO THEM.

No.	REVISION	DATE	BY
2.	ISSUED FOR CITY REVIEW	AUG 5/22	BJB
1.	ISSUED FOR CITY REVIEW	FEB 11/22	LKC

SCALE: 1:500

1:500
0 5 10 15 20

DESIGN	LKC/RCH
CHECKED	PH
DRAWN	LKC/RCH
CHECKED	BJB
APPROVED	JLL

FOR REVIEW ONLY

NOVATECH
Engineers, Planners & Landscape Architects
Suite 200, 240 Michael Cowpland Drive
Ottawa, Ontario, Canada K2M 1P6
Telephone (613) 254-9643
Facsimile (613) 254-5867
Website www.novatech-eng.com

LOCATION
CITY of OTTAWA
KANATA UNITED - KANATA NORTH

DRAWING NAME
MARCH ROAD/STREET 10
FUNCTIONAL DESIGN

PROJECT No. 121247-00
REV REV # 2
DRAWING No. 121247-FD

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PLEAR1.DWG - 841mm x 594mm

APPENDIX J

Multi-modal Level of Service (MMLOS)

Segment Level of Service

Pedestrian Level of Service (PLOS)

Side	Sidewalk Width	Boulevard Width	Motor Vehicle Traffic Volume (AADT)	Presence of On-Street Parking	Operating Speed	Segment PLOS
March Road						
East	-	-	> 3,000 vpd	No	90 km/h	F
West	-	-	> 3,000 vpd	No	90 km/h	F

Bicycle Level of Service (BLOS)

Bike Route	Type of Bikeway	Travel Lanes	Centreline Markings	Operating Speed	Segment BLOS
March Road					
Spine	Mixed Traffic	2	Centreline	90 km/h	F

Transit Level of Service (TLOS)

Facility Type	Congestion, Friction, and Potential Incidents	Segment TLOS
March Road		
Mixed Traffic Limited parking/driveway friction	Congestion, Low Friction, Medium Incident Type	D

Truck Level of Service (TkLOS)

Curb Lane Width	Travel Lanes	Segment TkLOS
March Road		
>3.7m	2 travel lanes	B

March Road/Street 10

Pedestrian Level of Service (PLOS)

Criteria	North Approach		South Approach		West Approach	
March Road/Street 10						
PETSI SCORE						
CROSSING DISTANCE CONDITIONS						
Median > 2.4m in Width	No	105	No	88	No	105
Lanes Crossed (3.5m Lane Width)	3		4		3	
SIGNAL PHASING AND TIMING						
Left Turn Conflict	Permissive	-8	No Left Turn/Prohibited	0	Permissive	-8
Right Turn Conflict	No Right Turn/Prohibited	0	Permissive or Yield	-5	Permissive or Yield	-5
Right Turn on Red	RTOR Allowed	-3	N/A	0	RTOR Allowed	-3
Leading Pedestrian Interval	No	-2	No	-2	No	-2
CORNER RADIUS						
Parallel Radius	No Right Turn	0	> 5m to 10m	-5	> 5m to 10m	-5
Parallel Right Turn Channel	No Right Turn	0	No Right Turn Channel	-4	No Right Turn Channel	-4
Perpendicular Radius	> 5m to 10m	-5	No Right Turn	0	> 5m to 10m	-5
Perpendicular Right Turn Channel	No Right Turn Channel	-4	N/A	0	No Right Turn Channel	-4
CROSSING TREATMENT						
Treatment	Standard	-7	Standard	-7	Standard	-7
PETSI SCORE		**76**		**65**		**62**
LOS		**B**		**C**		**C**
DELAY SCORE						
Cycle Length		120		120		120
Pedestrian Walk Time		7		7		78.4
DELAY SCORE		**53.2**		**53.2**		**7.2**
LOS		**E**		**E**		**A**
OVERALL		**E**		**E**		**C**

Bicycle Level of Service (BLOS)

Approach	Bikeway Facility Type	Criteria	Travel Lanes and/or Speed[1]	BLOS
March Road/Street 10				
North Approach	Paved Shoulder	Right Turn Lane Characteristics	N/A	-
		Left Turn Accommodation	No Left Turn	-
South Approach	Paved Shoulder	Right Turn Lane Characteristics	No Right Turn	-
		Left Turn Accommodation	No lane crossed; ≥60km/h	C
West Approach	Bike lane on approach	Right Turn Lane Characteristics	Shared Through/Right Turn Lane	A
		Left Turn Accommodation	No lane crossed; ≤50km/h	B

1. Operating Speed based on Posted Speed Limit + 10km/h

Transit Level of Service (TLOS)

March Road, north of Halton Terrace/Maxwell Bridge Road is not currently identified as a Transit Priority Corridor and does not have a target TLOS.

Truck Level of Service (TkLOS)

Approach	Effective Corner Radius (m)	Number of Receiving Lanes on Departure from Intersection	TkLOS
March Road/Street 10			
North Approach	<10m	1	F
South Approach	N/A	N/A	-
West Approach	<10m	1	F

Auto LOS

Traffic analysis of the signalized intersection with two through lanes along March Road (**Section 6.9.2** of the TIA) indicates the intersection is expected to operate with LOS D during the AM and PM peak hours in 2031 with site development. Synchro results are included in **Appendix K**.

March Road/Halton Terrace/Maxwell Bridge Road

Pedestrian Level of Service (PLOS)

CRITERIA	North Approach		South Approach		East Approach		West Approach	
PETSI SCORE								
CROSSING DISTANCE CONDITIONS								
Median > 2.4m in Width	No	23	No	23	No	88	No	88
Lanes Crossed (3.5m Lane Width)	8		8		4		4	
SIGNAL PHASING AND TIMING								
Left Turn Conflict	Permissive	-8	Permissive	-8	Perm + Prot	-8	Perm + Prot	-8
Right Turn Conflict	Permissive or Yield	-5	Permissive or Yield	-5	Permissive or Yield	-5	Permissive or Yield	-5
Right Turn on Red	RTOR Allowed	-3	RTOR Allowed	-3	RTOR Allowed	-3	RTOR Allowed	-3
Leading Pedestrian Interval	No	-2	No	-2	No	-2	No	-2
CORNER RADIUS								
Parallel Radius	> 10m to 15m	-6	> 10m to 15m	-6	> 15m to 25m	-8	> 10m to 15m	-6
Parallel Right Turn Channel	No Right Turn Channel	-4	No Right Turn Channel	-4	No Right Turn Channel	-4	No Right Turn Channel	-4
Perpendicular Radius	N/A	0	N/A	0	N/A	0	N/A	0
Perpendicular Right Turn Channel	N/A	0	N/A	0	N/A	0	N/A	0
CROSSING TREATMENT								
Treatment	Standard	-7	Standard	-7	Standard	-7	Standard	-7
PETSI SCORE		**-12**		**-12**		**51**		**53**
LOS		**F**		**F**		**D**		**D**
DELAY SCORE								
Cycle Length		120		120		120		120
Pedestrian Walk Time		13.4		13.4		27.4		27.4
DELAY SCORE		**47.3**		**47.3**		**35.7**		**35.7**
LOS		**E**		**E**		**D**		**D**
OVERALL		**F**		**F**		**D**		**D**

Bicycle Level of Service (BLOS)

Approach	Bikeway Facility Type	Criteria	Travel Lanes and/or Speed[1]	BLOS
March Road/Halton Terrace/Maxwell Bridge Road				
North Approach	Pocket Bike Lanes	Right Turn Lane Characteristics	Right turn lane to the right of pocket bike lane ≤ 50m	B
		Left Turn Accommodation	Two lanes crossed; ≥ 50km/hr	F
South Approach	Pocket Bike Lanes	Right Turn Lane Characteristics	Right turn lane to the right of pocket bike lane ≤ 50m	B
		Left Turn Accommodation	Two lanes crossed; ≥ 50km/hr	F
East Approach	Mixed Traffic	Right Turn Lane Characteristics	Shared Through/Right Turn Lane	A
		Left Turn Accommodation	One lane crossed; 50km/hr	D
West Approach	Mixed Traffic	Right Turn Lane Characteristics	Shared Through/Right Turn Lane	A
		Left Turn Accommodation	One lane crossed; 40km/hr	B

1. Operating Speed based on Posted Speed Limit + 10km/h

Transit Level of Service (TLOS)

Based on the existing traffic analysis presented in the KNUEA CDP TMP, the delay on the northbound and southbound approaches is described as follows:

- Northbound: 9 seconds (AM Peak) and 10 seconds (PM Peak)
- Southbound: 11 seconds (AM Peak) and 11 seconds (PM Peak)

Exhibit 16 in the MMLOS guidelines suggests this intersection is operating with a TLOS C.

Truck Level of Service (TkLOS)

Approach	Effective Corner Radius (m)	Number of Receiving Lanes on Departure from Intersection	LOS
March Road/Halton Terrace/Maxwell Bridge Road			
North Approach	10m to 15m	1	E
South Approach	> 15m	1	C
East Approach	10m to 15m	2	B
West Approach	10m to 15m	2	B
March Road/Dunrobin Road			
North Approach	> 15m	1	C
East Approach	> 15m	1	C
West Approach	N/A	N/A	N/A

Auto LOS

Intersection capacity analysis for the existing traffic condition was completed in the KNUEA CDP TMP. The existing operations at the study area intersections are depicted in Table 1 (Pages 4-5) of the existing conditions report, attached in Appendix A of Volume 2 of the KNUEA CDP TMP. The existing operations at the study area intersection are summarized in the following table.

Auto LOS Analysis – Existing

Intersection	AM Peak			PM Peak		
	Max V/C	LOS	Mvmt	Max V/C	LOS	Mvmt
March Road/Halton Terrace/ Maxwell Bridge Road	0.63	B	WBL	0.55	A	WBT/R

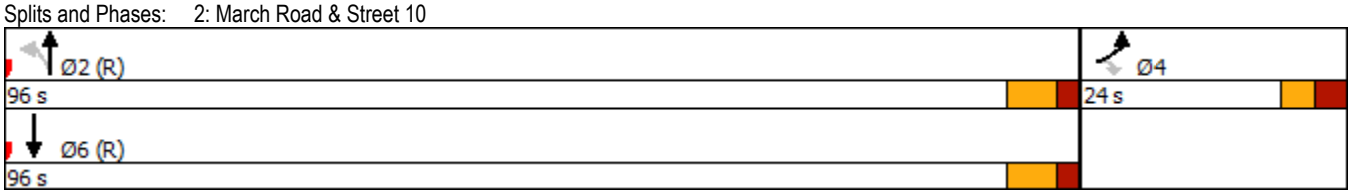
APPENDIX K

Synchro Reports

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	49	175	126	404	1130	42
Future Volume (vph)	49	175	126	404	1130	42
Satd. Flow (prot)	1658	1483	1658	1745	1736	0
Flt Permitted	0.950		0.154			
Satd. Flow (perm)	1658	1483	269	1745	1736	0
Satd. Flow (RTOR)		148			4	
Lane Group Flow (vph)	49	175	126	404	1172	0
Turn Type	Prot	Perm	Perm	NA	NA	
Protected Phases	4			2	6	
Permitted Phases		4	2			
Total Split (s)	24.0	24.0	96.0	96.0	96.0	
Total Lost Time (s)	6.0	6.0	6.6	6.6	6.6	
Act Effct Green (s)	11.4	11.4	96.0	96.0	96.0	
Actuated g/C Ratio	0.10	0.10	0.80	0.80	0.80	
v/c Ratio	0.31	0.64	0.59	0.29	0.84	
Control Delay	55.2	23.0	18.8	3.9	15.5	
Queue Delay	0.0	0.0	0.0	0.0	0.0	
Total Delay	55.2	23.0	18.8	3.9	15.5	
LOS	E	C	B	A	B	
Approach Delay	30.0			7.5	15.5	
Approach LOS	C			A	B	
Queue Length 50th (m)	10.2	5.6	7.7	17.0	116.4	
Queue Length 95th (m)	20.5	25.0	37.2	33.2	#260.2	
Internal Link Dist (m)	621.5			739.1	874.5	
Turn Bay Length (m)	38.0		100.0			
Base Capacity (vph)	248	348	215	1395	1388	
Starvation Cap Reductn	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	
Reduced v/c Ratio	0.20	0.50	0.59	0.29	0.84	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBT, Start of Green	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.84	
Intersection Signal Delay: 15.0	Intersection LOS: B
Intersection Capacity Utilization 98.1%	ICU Level of Service F
Analysis Period (min) 15	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	

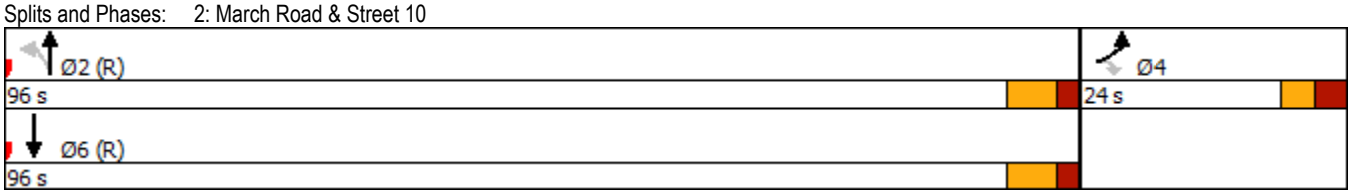
Splits and Phases: 2: March Road & Street 10



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	18	87	115	1289	490	37
Future Volume (vph)	18	87	115	1289	490	37
Satd. Flow (prot)	1658	1483	1658	1745	1729	0
Flt Permitted	0.950		0.459			
Satd. Flow (perm)	1658	1483	801	1745	1729	0
Satd. Flow (RTOR)		87			9	
Lane Group Flow (vph)	18	87	115	1289	527	0
Turn Type	Prot	Perm	Perm	NA	NA	
Protected Phases	4			2	6	
Permitted Phases		4	2			
Total Split (s)	24.0	24.0	96.0	96.0	96.0	
Total Lost Time (s)	6.0	6.0	6.6	6.6	6.6	
Act Effct Green (s)	10.2	10.2	101.7	101.7	101.7	
Actuated g/C Ratio	0.08	0.08	0.85	0.85	0.85	
v/c Ratio	0.13	0.42	0.17	0.87	0.36	
Control Delay	52.9	17.3	3.0	16.3	3.5	
Queue Delay	0.0	0.0	0.0	0.0	0.0	
Total Delay	52.9	17.3	3.0	16.3	3.5	
LOS	D	B	A	B	A	
Approach Delay	23.4			15.2	3.5	
Approach LOS	C			B	A	
Queue Length 50th (m)	3.7	0.0	4.3	159.8	23.9	
Queue Length 95th (m)	10.3	14.1	8.6	#338.2	35.8	
Internal Link Dist (m)	621.5			737.0	874.5	
Turn Bay Length (m)	38.0		100.0			
Base Capacity (vph)	248	296	679	1479	1467	
Starvation Cap Reductn	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	
Reduced v/c Ratio	0.07	0.29	0.17	0.87	0.36	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBT, Start of Green	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.87	
Intersection Signal Delay: 12.6	Intersection LOS: B
Intersection Capacity Utilization 90.4%	ICU Level of Service E
Analysis Period (min) 15	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	

Splits and Phases: 2: March Road & Street 10

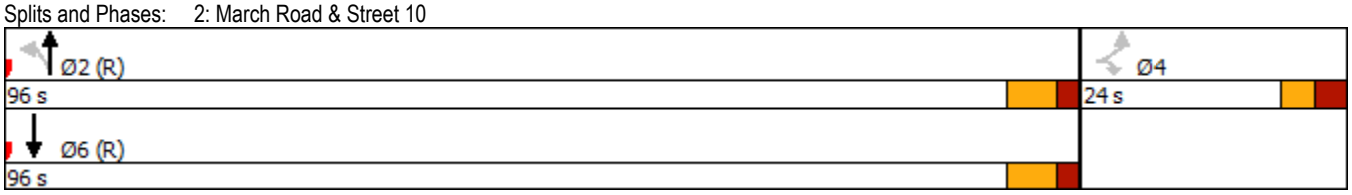


Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	49	175	126	409	1152	42
Future Volume (vph)	49	175	126	409	1152	42
Satd. Flow (prot)	1658	1483	1658	1745	1736	0
Flt Permitted	0.950		0.143			
Satd. Flow (perm)	1658	1483	250	1745	1736	0
Satd. Flow (RTOR)		142			4	
Lane Group Flow (vph)	49	175	126	409	1194	0
Turn Type	Perm	Perm	Perm	NA	NA	
Protected Phases				2	6	
Permitted Phases	4	4	2			
Total Split (s)	24.0	24.0	96.0	96.0	96.0	
Total Lost Time (s)	6.0	6.0	6.6	6.6	6.6	
Act Effct Green (s)	11.6	11.6	95.8	95.8	95.8	
Actuated g/C Ratio	0.10	0.10	0.80	0.80	0.80	
v/c Ratio	0.31	0.65	0.63	0.29	0.86	
Control Delay	54.7	24.5	23.5	4.0	16.9	
Queue Delay	0.0	0.0	0.0	0.0	0.0	
Total Delay	54.7	24.5	23.5	4.0	16.9	
LOS	D	C	C	A	B	
Approach Delay	31.1			8.6	16.9	
Approach LOS	C			A	B	
Queue Length 50th (m)	10.2	6.8	8.2	17.3	123.5	
Queue Length 95th (m)	20.4	26.4	#49.3	34.4	#314.6	
Internal Link Dist (m)	621.5			739.1	874.5	
Turn Bay Length (m)	38.0		100.0			
Base Capacity (vph)	248	343	199	1392	1385	
Starvation Cap Reductn	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	
Reduced v/c Ratio	0.20	0.51	0.63	0.29	0.86	

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBT, Start of Green
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.86
Intersection Signal Delay: 16.3 — Intersection LOS: B
Intersection Capacity Utilization 99.4% — ICU Level of Service F
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 2: March Road & Street 10



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	18	87	115	1317	497	37
Future Volume (vph)	18	87	115	1317	497	37
Satd. Flow (prot)	1658	1483	1658	1745	1729	0
Flt Permitted	0.950		0.455			
Satd. Flow (perm)	1658	1483	794	1745	1729	0
Satd. Flow (RTOR)		87			9	
Lane Group Flow (vph)	18	87	115	1317	534	0
Turn Type	Prot	Perm	Perm	NA	NA	
Protected Phases	4			2	6	
Permitted Phases		4	2			
Total Split (s)	24.0	24.0	96.0	96.0	96.0	
Total Lost Time (s)	6.0	6.0	6.6	6.6	6.6	
Act Effct Green (s)	10.2	10.2	101.7	101.7	101.7	
Actuated g/C Ratio	0.08	0.08	0.85	0.85	0.85	
v/c Ratio	0.13	0.42	0.17	0.89	0.36	
Control Delay	52.9	17.3	3.1	18.0	3.5	
Queue Delay	0.0	0.0	0.0	0.0	0.0	
Total Delay	52.9	17.3	3.1	18.0	3.5	
LOS	D	B	A	B	A	
Approach Delay	23.4			16.8	3.5	
Approach LOS	C			B	A	
Queue Length 50th (m)	3.7	0.0	4.4	174.0	24.4	
Queue Length 95th (m)	10.3	14.1	8.6	#351.3	36.4	
Internal Link Dist (m)	621.5			737.0	874.5	
Turn Bay Length (m)	38.0		100.0			
Base Capacity (vph)	248	296	673	1479	1467	
Starvation Cap Reductn	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	
Reduced v/c Ratio	0.07	0.29	0.17	0.89	0.36	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBT, Start of Green	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.89	
Intersection Signal Delay: 13.7	Intersection LOS: B
Intersection Capacity Utilization 92.0%	ICU Level of Service F
Analysis Period (min) 15	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	

Splits and Phases: 2: March Road & Street 10