Transportation Impact Study and Haul Route Assessment

Caledon Pit/Quarry

First Submission: December 2022

Second Submission: July 2023

March 2025 Revision | Project # 10042

CBM Aggregates, a division of St. Marys Cement Inc. (Canada)

VOTORANTIM cimentos cbm | TYLin

EXECUTIVE SUMMARY

T.Y. Lin International Canada Inc. (TYLin) was retained by CBM Aggregates (CBM), a division of St. Marys Cement Inc. (Canada) to complete a Transportation Impact Study (TIS) and Haul Route Assessment for the proposed CBM Caledon Pit / Quarry. This assessment concluded the following:

- Updated traffic volume counts surveyed June 2023 are deemed acceptable, ware adopted as baseline traffic conditions for traffic capacity and queueing analyses. These new traffic counts required revisions to the December 2022 TIS included herein such as; baseline and future traffic volumes, calibrated signal timing, updated traffic analysis, and access design.
- During the a.m. peak hour, a total of 30 new passenger car trips were estimated consisting of 15 inbound and outbound trips. During the p.m. peak hour, a total of 60 new car trips would be generated consisting of 25 inbound and 35 outbound trips. As employees and contractors are assumed to be entering and exiting the site outside of the adjacent road peak hours on Saturdays, no passenger car trips would be generated during the Saturday peak hour since staff is not expected to arrive or depart during the peak hours.
- During the a.m. peak hour, a total of 75 new truck trips would be generated consisting of 30 inbound and 45 outbound trips. During each of the p.m. and Saturday peak hours, a total of 60 new truck trips would be generated consisting of 30 inbound and 30 outbound trips.
- The proposed truck distribution includes 95% of truck traffic heading east on Charleston Sideroad towards Hurontario Street (with 90% travelling south and 5% travelling north on Hurontario Street) and the remaining 5% truck traffic heading west on Charleston Sideroad.
- A haul route assessment was undertaken to determine the location of the new future site access for the Caledon Pit / Quarry and includes several site access considerations including existing haul route restrictions, impact to existing residents, access spacing requirements in accordance with Region of Peel Road Characterization Study (RCS) and TAC guidelines, physical constraints, and safety considerations.
- It was determined that the preferred location of the proposed site access is along Charleston Sideroad (Regional Road 24) between Mississauga Road and Main Street (Regional Road 136) / Cataract Road. TYLin recommends the site access be located approximately 530 metres east of Mississauga Road and 880 metres west of Regional Road 136 measured curb extension-to-curb extension.
- Horizontal and vertical sightline assessments were conducted in the field. Based on a 100 km/h design speed, the proposed Charleston Sideroad access location satisfies

Transportation Association of Canada combination truck stopping sight distance and intersection sight distance requirements.

- The requirement for a traffic signal was not explicitly warranted at the proposed Charleston Sideroad site access under future total conditions based on a traffic volume. However, signalization of the access is recommended to improve the operation of the intersection by providing suitable gaps for trucks to enter and exit the site and accelerate safely without posing risk to other vehicles using Charleston Sideroad. It is noted that if the Region desires a signalized site access, the installation of the signal can be implemented at the cost of the client. Additionally, Charleston Sideroad is classified as rural/suburban road and satisfies the Transportation Association of Canada Geometric Design Guide for Canadian Roads minimum 400-metre full movement intersection spacing design criteria, preserving the arterial function of Charleston Sideroad, measured from curb extension to curb extension.
- A dedicated eastbound left-turn and westbound right-turn lane is proposed at the site access using requirements from the Region's RCS as well as the Transportation Association of Canada Geometric Design Guide for Canadian Road (TAC Manual).
- Under baseline conditions, all study intersections operate with reserve capacity and low delays with the exception of long delays for the eastbound through and westbound through movements in the PM and Saturday peak hours, though overall operations are still considered acceptable.
- This traffic impact assessment analyzed one future horizon year for the future conditions of the pit / quarry. As a result, the analyses adopted future background and total traffic conditions at a 2037 planning horizon year.
- During future background conditions, with the addition of background corridor growth, all intersections are expected to operate well and within capacity. However, southbound and northbound movements at Hurontario Street and Charleston Sideroad are expected to be at critical capacity but still with acceptable delay and with reserve capacity available. Long delays are again noted for the eastbound and westbound movements. As a result, TYLin recommends that the Region considers future monitoring in order to determine if adjustments to the signal timing plan and intersection operation parameters (e.g. cycle length adjustments, split optimizations) are required to accommodate an increase in background traffic, as needed.
- Under future total conditions, overall all intersections operate well with reserve capacity and acceptable delays with the addition of projected site traffic. The northbound, and southbound movements at the Hurontario Street and Charleston Sideroad intersection continue to operate with critical capacity but with acceptable delay and with reserve

capacity available . It was observed the addition of site traffic does not materially impact the operation of the intersection. The remaining study intersections, including the proposed site access, are expected to operate with reserve capacity and relatively low delays.

- Queueing analysis for all intersections projected that the average queues can be accommodated across all horizons within the effective storage. With the exception of Hurontario Street and Charleston Sideroad, the queueing analysis shows that the 95th percentile queues can be accommodated by the available storage. However, at Hurontario Street and Charleston Sideroad, it is observed under baseline and future background conditions that 95th percentile queues exceed the available storage length for multiple movements and is expected to continue under future total conditions. As a result, traffic analysis shows that the addition of site traffic would not contribute materially to the conditions at this intersection.
- It is concluded that the adjacent Charleston Sideroad study intersections at Main Street and Mississauga Road can accommodate the proposed Caledon Pit / Quarry development with significant reserve capacity. Under baseline and future traffic conditions the Hurontario Street and Charleston Sideroad intersection experiences acceptable though near capacity operations for several movements.

Overall based on this assessment it is concluded that:

- The proposed haul route is an existing and identified haul route in the Town of Caledon Official Plan;
- With the implementation of the recommendations, the proposed truck traffic from the CBM Pit / Quarry will not have unacceptable impacts on the safe and efficient use of the road network; and
- From an overall transportation perspective, the proximity of the site to market will result in minimizing the length and number of vehicle trips required to transport an essential raw material needed for the construction and maintenance of communities.

The results of the assessment provide the basis for the following technical recommendation to be included on the Aggregate Resources Act Site Plan for the proposed Caledon Pit / Quarry:

- Prior to shipping the licensee shall enter into an agreement with the Region of Peel for the construction of the: a) entrance / exit, b) Charleston Sideroad improvements,
- Prior to below water operations commencing in the Main Area and prior to operations commencing in the South Area, the licensee shall enter into an agreement with the Region of Peel for a crossing underneath Main Street and Charleston Sideroad, respectively.

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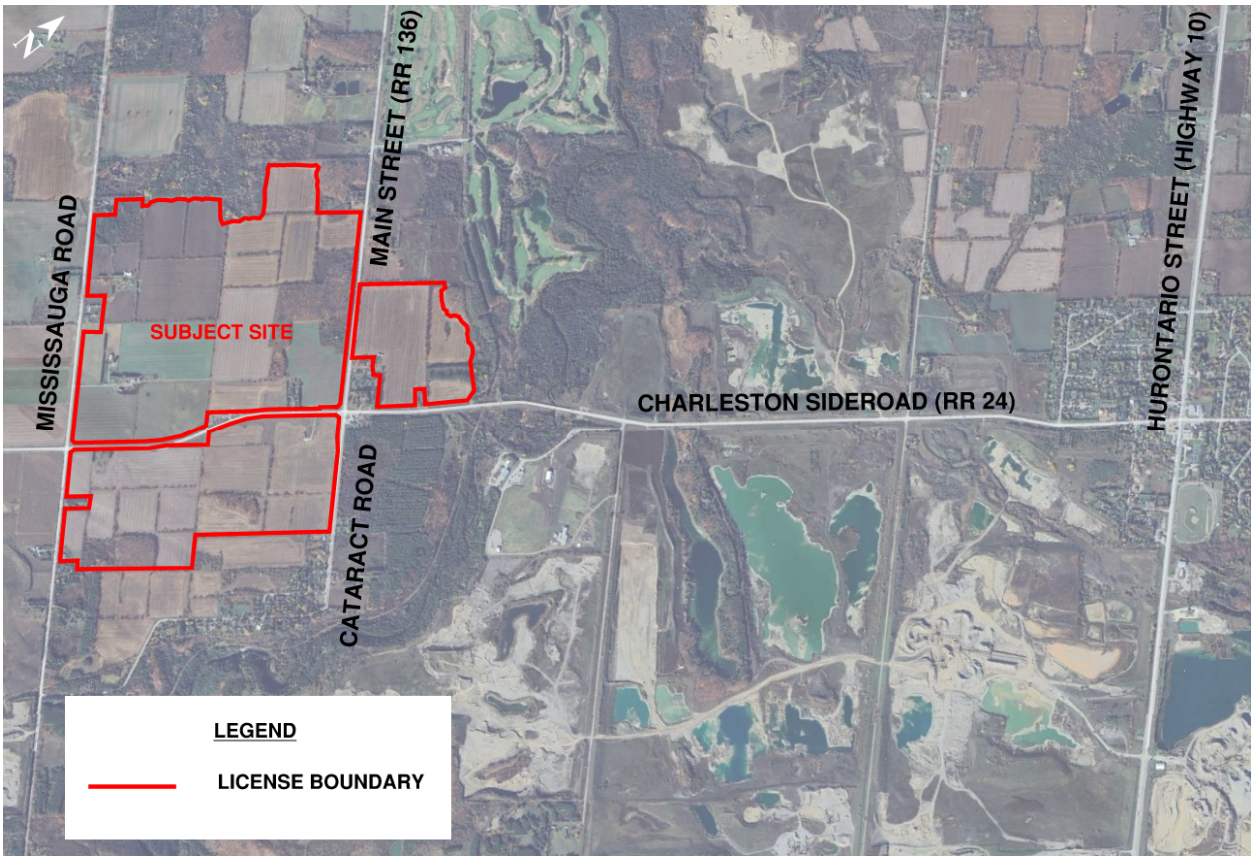
1 INTRODUCTION

CBM Aggregates (CBM), a division of St. Marys Cement Inc. (Canada) is applying to the Ministry of Natural Resources and Forestry (MNRF) for a Class A License (Pit and Above Water / Quarry Below Water) and to the Town of Caledon for an Official Plan Amendment and Zoning By-law Amendment to permit a mineral aggregate operation. T.Y. Lin International Canada Inc. (TYLin) has been retained by CBM to complete a Transportation Impact Study and Haul Route Assessment for the proposed CBM Caledon Pit / Quarry in accordance with the Terms of Reference found in **Appendix A**, Caledon Official Plan Sections 5.11.2.4.14 and 5.11.2.5, and the MNRF, Aggregate Resources Act Ontario Regulation 244/97.

CBM owns / controls approximately 323 hectares of land located at the northwest, northeast and southwest intersection of Regional Road 24 (Charleston Sideroad) and Regional Road 136 (Main Street). Of these lands, 261 hectares are proposed to be licensed under the Aggregate Resources Act and designated / zoned under the Planning Act to permit the proposed CBM Caledon Pit / Quarry. These lands are mapped as a Caledon High Potential Mineral Aggregate Resource Area (CHPMARA) in the Town of Caledon Official Plan and High Potential Mineral Aggregate Resource Area (HPMARA) in the Region of Peel Official Plan and are protected for their aggregate potential. The subject lands are generally bounded by Mississauga Road to the west, Main Street to the east, and Cataract to the east and south. The proposed pit / quarry location is shown in **Figure 1-1**.

Figure 1-1 Proposed Caledon Pit / Quarry Location



The remaining approximately 62 hectares of land owned / controlled by CBM are not subject to the application. These lands are referred to as "CBM Additional Lands" and these lands include approximately 36 hectares of land that is located adjacent to the minor urban centre of Cataract. As part of the application, CBM is proposing to create an upland forest and meadow grassland on these lands and is exploring the potential of conveying them permanently to a public authority for long term protection.

The lands proposed to be licensed under the Aggregate Resources Act are referred to as the "Subject Site" and are legally described as Part of Lots 15-18, Concession 4 WSCR and Part of Lot 16, Concession 3 WSCR (former Geographic Township of Caledon). The Subject Site is approximately 261 hectares and extraction is proposed on approximately 200 hectares. These lands are referred to as the "Extraction Area". The remaining approximate 61 hectares within the Subject Site and outside of the Extraction Area are referred to as the "Setback / Buffer Lands". The Setback / Buffer Lands are used to provide setbacks to surrounding land uses and natural heritage features and the majority of these lands include a 5-metre visual / acoustic berm and visual plantings.

The proposed Extraction Area includes approximately 78 million tonnes of a high-quality bedrock resource and approximately four million tonnes of a high-quality sand and gravel resource; the largest known available source of dolostone in the Greater Toronto and Hamilton Area (GTHA) Testing has confirmed that the mineral aggregate resource found on-site is suitable for the production of a wide range of construction products, including the use for high performance concrete. The bedrock resource provides some of the strongest and most durable aggregate material in Southern Ontario. The primary market area for the proposed CBM Caledon Pit / Quarry is the Greater Toronto Area, including the Town of Caledon and the Region of Peel. This site represents a close to market source of a high-quality mineral aggregate resource.

The proposed tonnage limit for the proposed CBM Caledon Pit / Quarry is 2.5 million tonnes per year and on average CBM anticipates shipping approximately 2.0 million tonnes per year. The proposed CBM Caledon Pit / Quarry is proposed to be operated in 7 phases. Phases 1, 2A, 3, 4, 5 are located to the northwest of the intersection of Regional Road 24 and 136. This area is referred to as the "Main Area". Phase 2B is located to the northeast of the intersection of Regional Road 24 and 136. This area is referred to as the "North Area". Phases 6 and 7 are located to the southwest of the intersection of Regional Road 24 and 136. This area is referred to as the "South Area".

Operations would commence in the Main Area and Phase 1 would include the permanent processing area (crushing, screening, and wash plant), aggregate recycling area and the entrance / exit for the quarry. Until such time as sufficient space is opened up to establish the permanent processing area, a temporary mobile crushing and processing plant is proposed to be used in Phase 1.

The entrance / exit for the CBM Caledon Pit / Quarry is proposed to be located onto Regional Road 24, approximately 160 west of the existing snow storage facility, 530 metres east of Mississauga Road, measured from curb extension-to-curb extension. The entrance / exit is proposed to be controlled by a new traffic light and the installation of auxiliary turn lanes and tapers on Regional Road 24 at CBM's expense. The primary haul route for the proposed CBM Caledon Pit / Quarry is trucks will travel eastward on Regional Road 24 and then southward on Highway 10. The proposed haul route is an existing aggregate haul route and is designated as an aggregate haul route in the Town of Caledon Official Plan.

Access to the North Area for aggregate extraction is anticipated approximately 10 years after the start of the operations in the Main Area. There will be no processing in the North Area and aggregate extracted from the North Area is proposed to be transported to the Main Area through a proposed tunnel underneath Regional Road 136 that would accommodate either a conveyor system or a truck crossing. Access to South Area is anticipated approximately 30 years after the

start of the operations in the Main Area. There will only be initial processing in the South Area and aggregate extracted from the South Area is proposed to be transported to the Main Area through a proposed tunnel underneath Regional Road 24 that would accommodate either a conveyor system or a truck crossing. Aside from the establishment of a 1-hectare stormwater settling pond on the easternmost portion of the North Area in the initial year of operation, the North and South areas will be maintained in their current state and agricultural uses until they are required for preparation for aggregate extraction.

The CBM Caledon Pit / Quarry is proposed to operate (extraction, processing, and drilling) 7:00 am to 7:00 pm Monday to Saturday, excluding statutory holidays and shipping is proposed from 6:00 am to 7:00 pm Monday to Saturday consistent with other mineral aggregate operations in Caledon. CBM is also proposing to permit limited shipping in the evening (7:00 pm to 6:00 am) to support public authority contracts that require the delivery of aggregates during these hours to complete public infrastructure projects. These activities will be limited to only highway trucks and shipping loaders and no other operations will be permitted during evening hours. Site preparation and rehabilitation is proposed to be permitted 7:00 am to 7:00 pm Monday to Friday.

The proposed CBM Caledon Pit / Quarry involves stripping topsoil and overburden from the subject site to create perimeter berms and any excess soil will be temporarily stored in the northern portion of the Main Area or used for progressive rehabilitation of the site. The proposed Extraction Area includes extracting both sand and gravel below the water table and the site will be dewatered to allow operations in a dry state. The proposed Extraction Area includes extracting sand and gravel resources (e.g., pit) at surface where it is located on site, and bedrock resources below the sand and gravel and/or overburden (e.g., quarry). The proposed quarry is proposed below the water table and the quarry will be dewatered to operate the quarry in a dry state. The site will be extracted in sequence of the proposed phases (Phase 1 to 7) and following extraction of Phase 7 the permanent processing plant in Phase 1 will be removed and this will be the final area to be extracted and rehabilitated. The phasing of the proposed mineral aggregate operation has been designed to reach final extraction limits and depths within each phase so progressive rehabilitation of the side slopes can be completed.

The proposed Aggregate Resources Act Site Plans includes all of the technical recommendations from this report to ensure that the site operates in accordance with applicable provincial standards and the applicable policy requirements of the Provincial Policy Statement, Places To Grow Plan, Greenbelt Plan, Region of Peel Official Plan and Town of Caledon Official Plan.

The objective of this study is to determine the traffic volumes anticipated to be generated by truck activity associated with the proposed quarry activity during the typical weekday a.m., p.m., and Saturday peak periods; to assess the impact of traffic on the adjacent road network; and as necessary, to recommend possible improvements to accommodate the projected site-related

traffic (as separate and distinct from traffic generated by background scenarios).

2 SITE CHARACTERISTICS

2.1 Study Environs

CBM owns / controls approximately 323 hectares of land located at the northwest, northeast and southwest intersection of Regional Road 24 (Charleston Sideroad) and Regional Road 136 (Main Street). Of these lands, 261 hectares are proposed to be licensed under the Aggregate Resources Act and designated / zoned under the Planning Act to permit the proposed CBM Caledon Pit / Quarry. These lands are mapped as a Caledon High Potential Mineral Aggregate Resource Area (CHPMARA) in the Town of Caledon Official Plan and High Potential Mineral Aggregate Resource Area (HPMARA) in the Region of Peel Official Plan and are protected for their aggregate potential. The subject lands are generally bounded by Mississauga Road to the west, Main Street to the east, and Cataract to the east and south.

2.2 Study Area

The haul route analyses include the following intersections, as requested during pre-consultation with the review agencies:

- Hurontario Street (Highway 10) and Charleston Sideroad (Peel Regional Road 24)
- Charleston Sideroad (Peel Regional Road 24) and Main Street (Peel Regional Road 136)
- Charleston Sideroad (Peel Regional Road 24) and Mississauga Road
- Charleston Sideroad (Peel Regional Road 24) and Future Site Access

Further details regarding the proposed location of the future site access are found in **Section 4**.

2.3 Pit / Quarry Statistics

The proposed tonnage limit for the proposed CBM Caledon Pit / Quarry is 2.5 million tonnes per year and on average CBM anticipates shipping approximately 2.0 million tonnes per year with an average of truck aggregate capacity of approximately 30 tonnes. The CBM Caledon Pit / Quarry is proposed to operate (extraction, processing, and drilling) 7:00 am to 7:00 pm Monday to Saturday, excluding statutory holidays and shipping is proposed from 6:00 am to 7:00 pm Monday to Saturday consistent with other mineral aggregate operations in Caledon. CBM is also proposing to permit limited shipping in the evening (7:00 pm to 6:00 am) to support public authority contracts that require the delivery of aggregates during these hours to complete public infrastructure projects. These activities will be limited to only highway trucks and shipping loaders and no other operations will be permitted during evening hours.

CBM is expected to employ approximately 30 staff members during the day shift (5:00 a.m. to 5:00 p.m.) and 20 members during the night shift (5:00 p.m. to 5:00 a.m.), should a public authority project require a night shift. Additionally, approximately 20 contractors will be on site for non-haulage operations during the day shift should one be needed for public authority contracts, when the site is at full operations.

2.4 Proposed Routing Plan and Haul Route Roadways

In accordance with Caledon Official Plan Section 5.11.2.4.14, the following primary haul routes for trucks destined to/from Caledon Pit / Quarry are proposed: 95% of truck traffic is anticipated to head east on Charleston Sideroad towards Hurontario Street (with 90% travelling south and 5% travelling north on Hurontario Street) and the remaining 5% is proposed to head west on Charleston Sideroad.

3 BASELINE TRAFFIC CONDITIONS

3.1 Road Network

Hurontario Street (Highway 10) is an existing north-south provincial highway with a rural four-lane cross-section under the jurisdiction of the MTO. Within the study area, Hurontario Street has a posted speed limit of 50 km/h north of Charleston Sideroad until Mistywood Drive / Chester Drive where it transitions to 60 km/h. The posted speed limit south of Charleston Sideroad is 50 km/h and increases to 80 km/h approximately one kilometre south of Charleston Sideroad.

Charleston Sideroad (Regional Road 24) is an existing east-west rural road with a two-lane cross-section under the jurisdiction of the Region of Peel. Within the study area, Charleston Sideroad has a posted speed limit of 80 km/h west of Willoughby Road and decreases to 50-60 km/h through Caledon Village.

Main Street (Regional Road 136) is an existing north-south rural road with a two-lane cross-section under the jurisdiction of the Region of Peel. Within the study area, Main Street has a posted speed limit of 80 km/h.

Mississauga Road is an existing north-south road with a rural two-lane cross-section under the jurisdiction of the Town of Caledon. Within the study area, Mississauga Road has a posted speed limit of 80 km/h north of Charleston Sideroad and 60 km/h south of Charleston Sideroad.

Cataract Road is an existing local road with a rural two-lane cross-section under the jurisdiction of the Town of Caledon. Cataract Road runs north-south from Charleston Sideroad (Peel Regional Road 24) and bends approximately 930 metres south of Charleston Sideroad and intersects as an east-west roadway with Mississauga Road. Within the study area, Cataract Road has a posted speed limit of 40 km/h.

3.2 Baseline 2023 Traffic Volumes

Turning movement counts (TMC) were obtained during 2020, 2021, 2022, and during 2023 with additional TMC data received for the intersection of Charleston Sideroad and Hurontario Street from MTO for the year of 2018. The table below summarizes the data collection dates and times. Existing traffic data is provided in **Appendix B**.

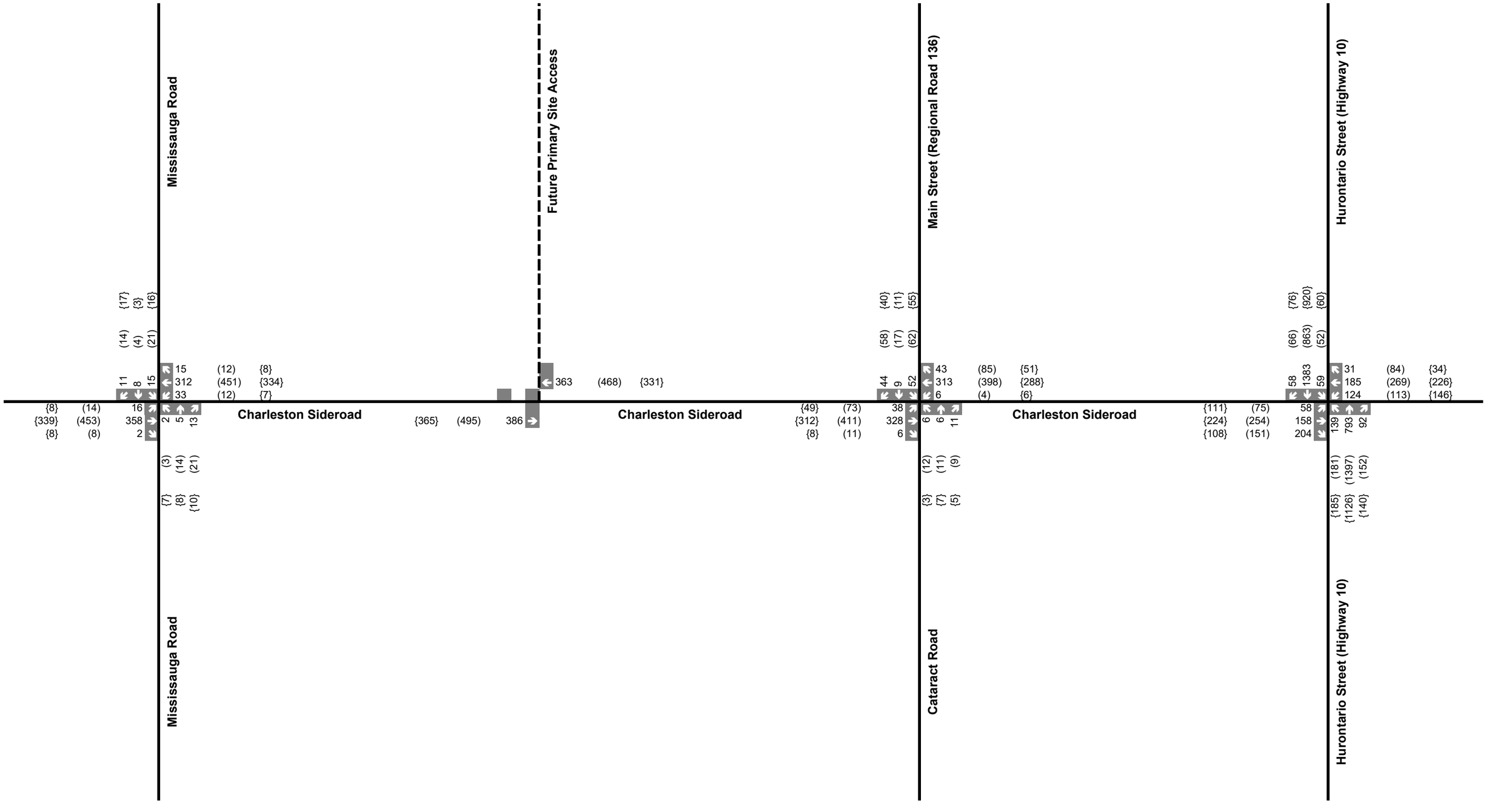
Table 3-1 Turning Movement Count Data Summary

Intersection	Date of Data Received		
	AM	PM	Saturday
Hurontario Street and Charleston Sideroad	May 16, 2018 November 5, 2020 July 8, 2021 April 21, 2022 June 22, 2023 June 23, 2023	May 16, 2018 November 5, 2020 July 8, 2021 April 21, 2022 June 22, 2023 June 23, 2023	November 7, 2020 July 10, 2021 April 23, 2022 June 24, 2023
Charleston Sideroad and Main Street / Cataract Road	November 5, 2020 July 8, 2021 April 21, 2022 June 22, 2023 June 23, 2023	November 5, 2020 July 8, 2021 April 21, 2022 June 22, 2023 June 23, 2023	November 7, 2020 July 10, 2021 April 23, 2022 June 24, 2023
Charleston Sideroad and Mississauga Road	November 5, 2020 July 8, 2021 April 21, 2022 June 22, 2023 June 23, 2023	November 5, 2020 July 8, 2021 April 21, 2022 June 22, 2023 June 23, 2023	November 7, 2020 July 10, 2021 April 23, 2022 June 24, 2023

Under previous versions of this report, the TMC data was observed for all the collection years to determine the most conservative observed traffic volumes in the study network. At Charleston Sideroad & Hurontario Street, 2018 pre-COVID MTO traffic counts were adopted as baseline traffic volumes as they were the most conservative.

However, upon revision, it is generally understood that municipalities across southern Ontario are currently accepting new traffic counts without adjustment for COVID-related factors . Therefore, 2023 data were adopted for the revision and used without adjustment factors applied for COVID-related reductions.

A comparison of total intersection volumes showed that Thursday June 22, 2023 had a greater total volume of vehicles in both the AM and PM peak hours when compared to peak hour volumes on Friday June 23, 2023. Therefore, Thursday June 23 data was selected for the AM and PM peak hour traffic analysis in order to achieve a more conservative analysis. Additionally, the revised TIS adopted the 2023 Saturday mid-day peak TMC. **Figure 3-1** shows the baseline 2023 traffic volumes.



Legend

xx A.M. Peak Hour Traffic
(xx) P.M. Peak Hour Traffic
{xx} Saturday Peak Hour Traffic

TYLin

Figure 3-1

Existing 2023 Traffic Volumes

4 SITE ACCESS CONSIDERATIONS

In order to satisfy Section 5.11.2.4.4 of the Caledon Official Plan, an evaluation of alternative haul routes has been identified and evaluated. As part of the haul route assessment, the potential locations that were considered for the future site access include:

- The segment on Charleston Sideroad between Mississauga Road and Main Street / Cataract Road;
- The segment on Main Street approximately 600 metres north of Charleston Sideroad and adjacent to the subject lands bounded by Main Street; and
- The segment of Mississauga Road north of Charleston Sideroad and south of existing residential dwellings (approximately 300 metres north of Charleston Sideroad).

A qualitative review was done based on several criteria in order to determine the preferred location for the site access as described below.

4.1 Haul Route Restrictions

One of the criteria for determining the ideal site access location includes a review of heavy vehicle restrictions along the study area roadways where a site access could be proposed. The following summarizes the findings:

- **Charleston Sideroad:** There are no heavy vehicle restrictions along Charleston Sideroad within the vicinity of the subject site and thus, this road is a viable option for a site access location.
- **Mississauga Road:** There are heavy vehicle restrictions on Mississauga Road from King Street to Bush Street, south of the subject site. Furthermore, municipal heavy restrictions (seasonal or all-year) are placed along Mississauga Road directly north and south of the subject lands. In order to propose a site access along Mississauga Road, road improvements may be required to accommodate heavy vehicle activity.
- **Main Street:** There are no heavy vehicle restrictions along Main Street within the study area.
- **Cataract Road:** There are heavy vehicle restrictions along Cataract Road within the vicinity of the site and thus, does not establish a feasible location for a site access.

Additionally, as per the Town of Caledon Official Plan (OP) (April 2018), haul routes for new aggregate operations are to be on High-capacity Arterial roads only. Both Charleston Sideroad and Main Street are identified as high-capacity arterial roads as per the Caledon OP Section 5.11.2.5.1 and Schedule J.

As Cataract Road and Mississauga Road have heavy vehicle restrictions, Charleston Sideroad and Main Street are considered to be preferred alternatives for the future site access location based on heavy vehicle restrictions criteria.

Figure 4-1 shows the locations along study area road network where a site location is not recommended as per TAC and RCS site access guidelines.

Figure 4-1 Site Access Restrictions

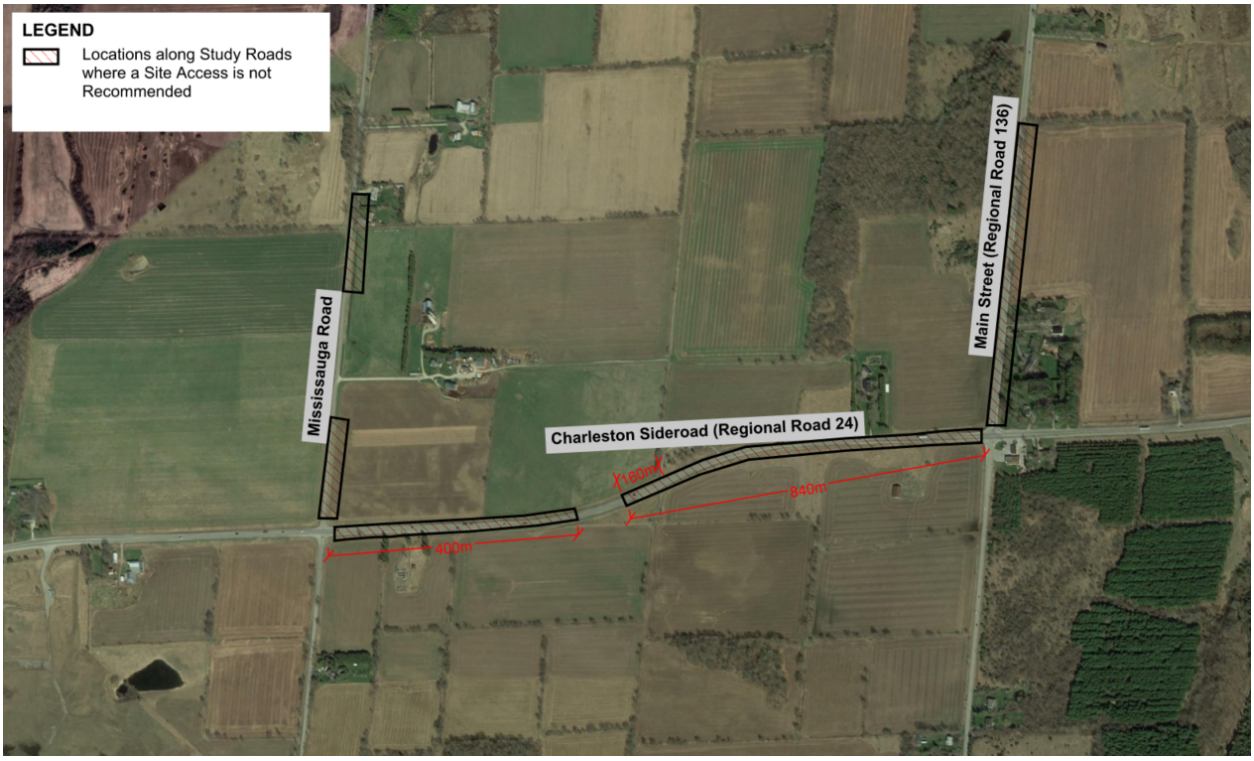
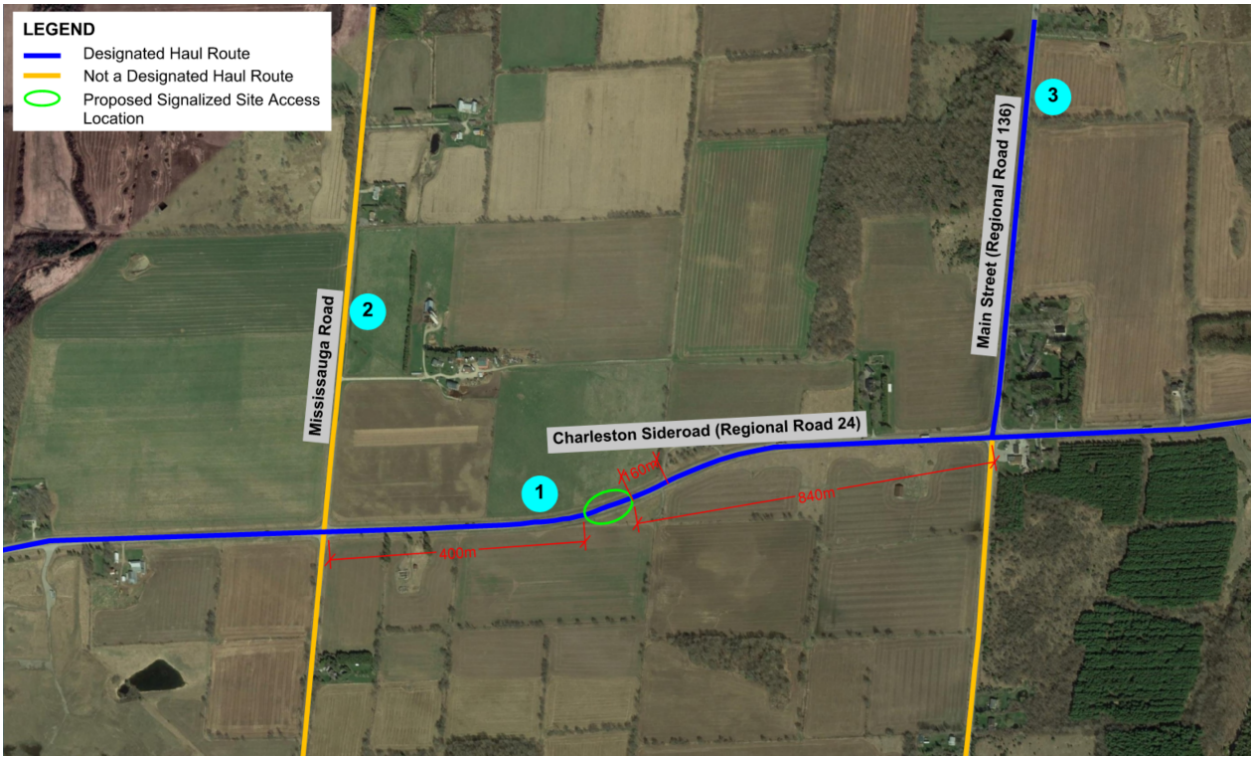


Figure 4-2 illustrates the existing trucks restrictions and preferred location for the future site access. The revised access location satisfies TAC minimum intersection spacing and will ensure that storage and taper lengths of the proposed auxiliary turn lanes do not impact the existing accesses, specifically the Charleston Sideroad snow storage facility access.

Figure 4-2 Existing Truck Restrictions



4.2 Access Spacing Requirements

Access spacing requirements were determined using Transportation Association of Canada (TAC) Geometric Design Guide for Canadian Roads (GDG) Chapter 9 – Intersections Guidelines and Peel Region Road Characterization Study (RCS). Excerpts from TAC GDG Chapter 9 and Peel Region RCS are found in **Appendix C**.

In accordance with Peel Region RCS guidelines, full-moves intersections along rural roads such as Charleston Sideroad and Main Street are required to be spaced a minimum of 600 metres measured from curb extension to curb extension. Along the segment of Charleston Sideroad between Mississauga Road and Main Street / Cataract Road, there are two-600-metre segments where a site access cannot be located which provides a smaller potential range where a site access can be placed. Main Street has only one-600-metre restricted segment within the vicinity of the study area, and Mississauga Road is a local road which follows TAC GDG suggested intersection

spacing of 400 metres, thus permitting a larger range of acceptable access spacing along Mississauga Road where the quarry access can be located.

Given the criteria mentioned, a midblock section along Charleston Sideroad is the ideal location for the proposed midblock entrance to the quarry. This segment is situated on a horizontal curve along Charleston Sideroad, where there is an existing snow storage facility. This facility operates with a one-way counter-clockwise circulation and has distinct inbound and outbound driveways.

Using the intersection spacing from the Road Characterization Study to determine the allowable location for the proposed entrance has placed it near the snow storage facility. This proximity means the proposed driveway design could affect the snow storage facility, especially if auxiliary lanes and tapers overlap the existing driveways. Additionally, simultaneous use of the snow storage facility and the proposed site driveway could lead to conflicting traffic movements and interactions between vehicles, which must be considered when identifying the preferred quarry entrance location.

While the Road Characterization Study outlines ideal intersection spacing, the proposed quarry entrance assessment considered other factors, such as sightlines (Section 4.4) and entrance design (Section 9), considering the road's horizontal deflection and the presence of a snow storage facility and truck turnaround.

These factors indicate that a location outside the midblock segment is more suitable based on a comparison of the trade-offs between adhering to intersection spacing guidelines and avoiding design and operational conflicts with nearby driveways.

TAC GDG Chapter 9 – Intersections, recommends a minimum 400 metre intersection spacing along arterial rural/suburban roadways. This allows sufficient space required for left-turn lane facilities and potential acceleration/deceleration distances required at adjacent intersections. Furthermore, satisfying the minimum intersection spacing will ensure that storage and taper lengths of the potential left-turn lanes do not impact the existing accesses, specifically the Charleston Sideroad Peel Region snow storage access.

Based on the above criteria, it is recommended the proposed site access be located approximately 530 metres east of Mississauga Road, 160 metres west of the snow storage facility access.

4.3 Traffic Signal Infrastructure and Existing Intersection Improvements

Left-turn infrastructure is present at the intersection of Charleston Sideroad and Main Street, allowing for easier left turns to and from the north. Should auxiliary lanes be recommended as a mitigation measure to service the quarry, external road improvements would be required on

Charleston Sideroad at Mississauga Road or the quarry access. Furthermore, currently there are traffic signals located only at the Charleston Sideroad and Main Street intersection. If signalization is required at the potential access along Charleston Sideroad, or Mississauga Road intersection, road improvements would be necessary to accommodate signal infrastructure, at CBM's expense.

4.4 Horizontal and Vertical Sightlines

A site visit was conducted on November 16, 2021, by TYLin Staff to assess vertical and horizontal sightlines along the study area road network based on intersection sight distance (ISD) and stopping sight distance (SSD) in accordance with TAC guidelines to confirm practicality for site access locations. **Table 4-1** summarizes the ISD and SSD from Equation 9.9.1, Table 9.9.4 and 9.9.6 from the TAC guidelines that were referred to during the site investigation.

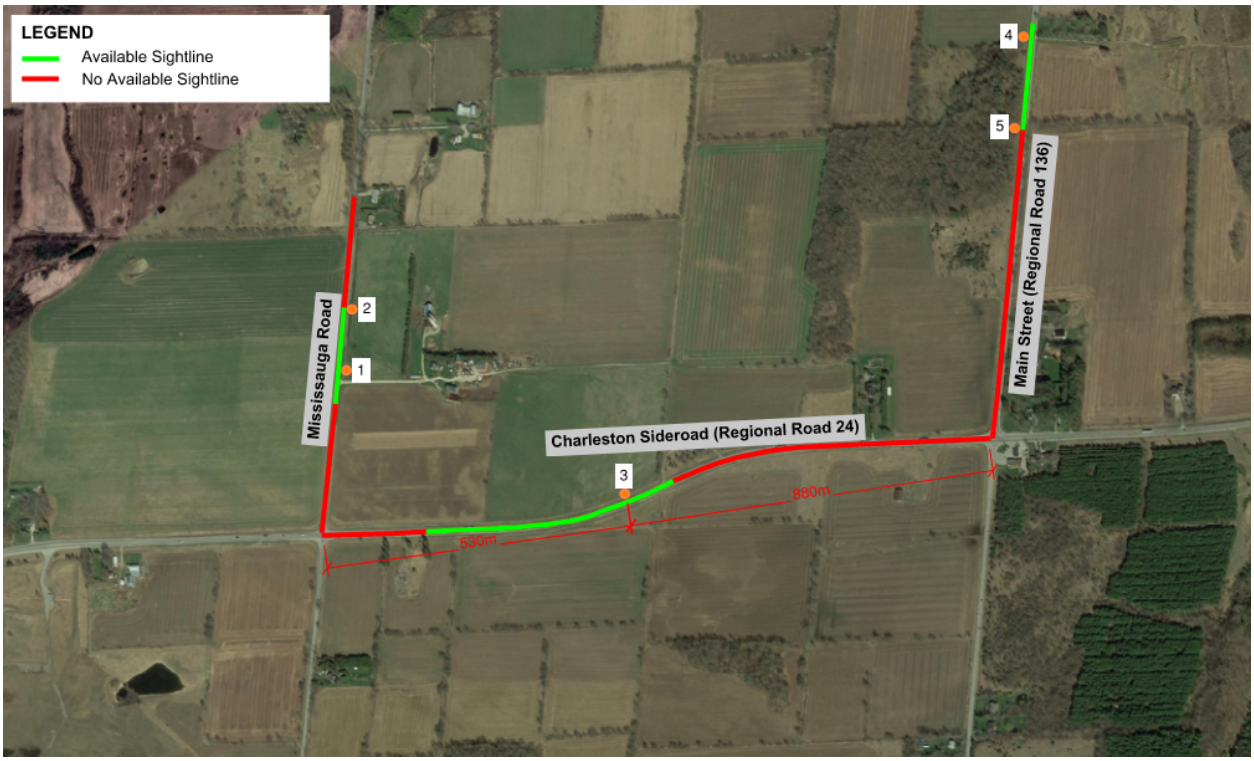
Table 4-1 ISD and SSD for Different Design Vehicles

Parameter	Design Speed	
	90 km/hour	100 km/hour
Left-Turn ISD (m)		
Passenger Car	190	210
Single-Unit Truck	240	265
Combination Truck	290	320
Right-Turn ISD (m)		
Passenger Car	165	185
Single-Unit Truck	215	240
Combination Truck	265	295
SSD Approaching Intersection (m)		
Passenger Car[1]	160	185

[1] - TAC guidelines only provide SSD for passenger vehicles however Section 2.5.3.1 of TAC states that SSD requirements for trucks are generally longer due to additional distance required to stop as well as due to cabin position. The sight distance above assumes a minimal vertical deflection.

For a more conservative sightline analysis, the 100 km/h design speed was selected. **Figure 4-3** shows the approximate locations where measurements were taken for the sightline review. **Appendix D** shows the sightline analysis drawings conducted at the site access.

Figure 4-3 Approximate Location of SSD and ISD Measurements



Along Mississauga Road, right-turn ISD requirements were not met for trucks at the potential site access near Location 1. In addition, a site visit on December 10, 2024 assessed the left-turn ISD and observed an ISD of approximately 200m. Near Location 2, only right-turn ISD was assessed due to limited sightlines at Location 1. All right-turn ISD requirements were met at Location 2.

Along Charleston Sideroad, all sightline distances met the required criteria near Location 3. It was observed that some road signs cause slight visual obstructions due to the horizontal curve. It is recommended to clear all landscape or other obstructions near the edge of the property as driver's sightline may go through the property line in the future.

Along Main Street at Location 4, the right-turn ISD requirements were only met for a single-unit truck due to a crest in the road. All sightline distances met the required standards at Location 5.

Further details and images of the site visit can be found in **Appendix E**.

4.5 Safety and Route Considerations

The Belfountain Village and Conservation Area is located south of the subject site along Mississauga Road; although temporarily closed, this Conservation Area would generate non-site related traffic when reopened and create potential conflicts with trucks turning outbound along Mississauga Road. Aside from the heavy truck restrictions, this is another reason that Mississauga

Road is not a preferred roadway for a site access location.

CBM confirmed the proposed truck distribution estimates 95% of truck traffic heading east on Charleston Sideroad towards Hurontario Street (with 90% travelling south and 5% travelling north on Hurontario Street) and the remaining 5% truck traffic heading west on Charleston Sideroad to serve other markets west of the study area. Placing a site access along the proposed haulage route creates a more efficient haulage process. As the haulage route is proposed to primarily travel along Charleston Sideroad, it is a preferred road for a site access location.

4.6 Preferred Future Site Access Location

A site access consideration review was conducted to determine the preferred location for the future site access. Several factors and conditions were analyzed quantitatively and qualitatively including haul route restrictions, existing capacity analysis results, a high-level sightline review, study area road classifications, safety / route considerations, and physical constraints.

Due to heavy vehicle restrictions, Cataract Road and Mississauga Road are not considered preferred locations for the site access unless future road improvements are completed to accommodate heavy truck activity. Main Street is considered as an alternative location for the proposed site access as it does not pose any physical or safety concerns. However, Main Street is the primary north-south connection to /from Alton serving local residents. Additionally, there are no physical or safety concerns for Charleston Sideroad and moreover, the haulage route travels primarily along this roadway; therefore, Charleston Sideroad is another preferred alternative for the future site access location.

After conducting the site access consideration review, TYLin recommends the future site access to be located along the segment of Charleston Sideroad (Regional Road 24) between Mississauga Road and Main Street / Cataract Road. The potential location for the site access adhere to TAC's guidelines of minimum intersection spacing. This will allow for any future left and right-turn facilities and their associated storage and taper lengths to be accommodated by adjacent intersections and will not interfere with the snow storage facility. Therefore, the proposed site access is to be located at least 400 metres from Mississauga Road and 160 metres from Main Street/Cataract Road.

5 FUTURE BACKGROUND CONDITIONS

5.1 Study Horizon Years

As per pre-consultation correspondence and in order to satisfy Caledon Official Plan Section 5.11.2.4.14, a planning horizon study period of 2037 was assumed for future conditions traffic analysis, which correlates to 10 years post-baseline 2022 conditions. Although revised counts were undertaken in 2023, the 2037 horizon was kept to maintain consistency previous versions of this report allowing for comparative analysis.

5.2 Study Area Road Network Improvements

The Region of Peel and the Town of Caledon confirmed there are no current planning capital roadwork improvements in the study area within the 2037 planning horizon.

5.3 Background Developments

During pre-consultation, Town staff confirmed there are no significant background developments within the vicinity of the site that is anticipated to impact the traffic analysis during the planning horizon period. However, background corridor growth rates, compounded annually (see **Section 5.4**), were applied to future traffic projections to account for population and employment forecasts. A portion of these growth rates includes background development outside of the Town's jurisdiction to account for future commuter traffic travelling through the study area.

5.4 Background Corridor Growth

All traffic was grown from the year the data was collected to predict future non-quarry related traffic volumes along the haul routes for the future horizon years using the following growth rates that were agreed upon through pre-consultation correspondence:

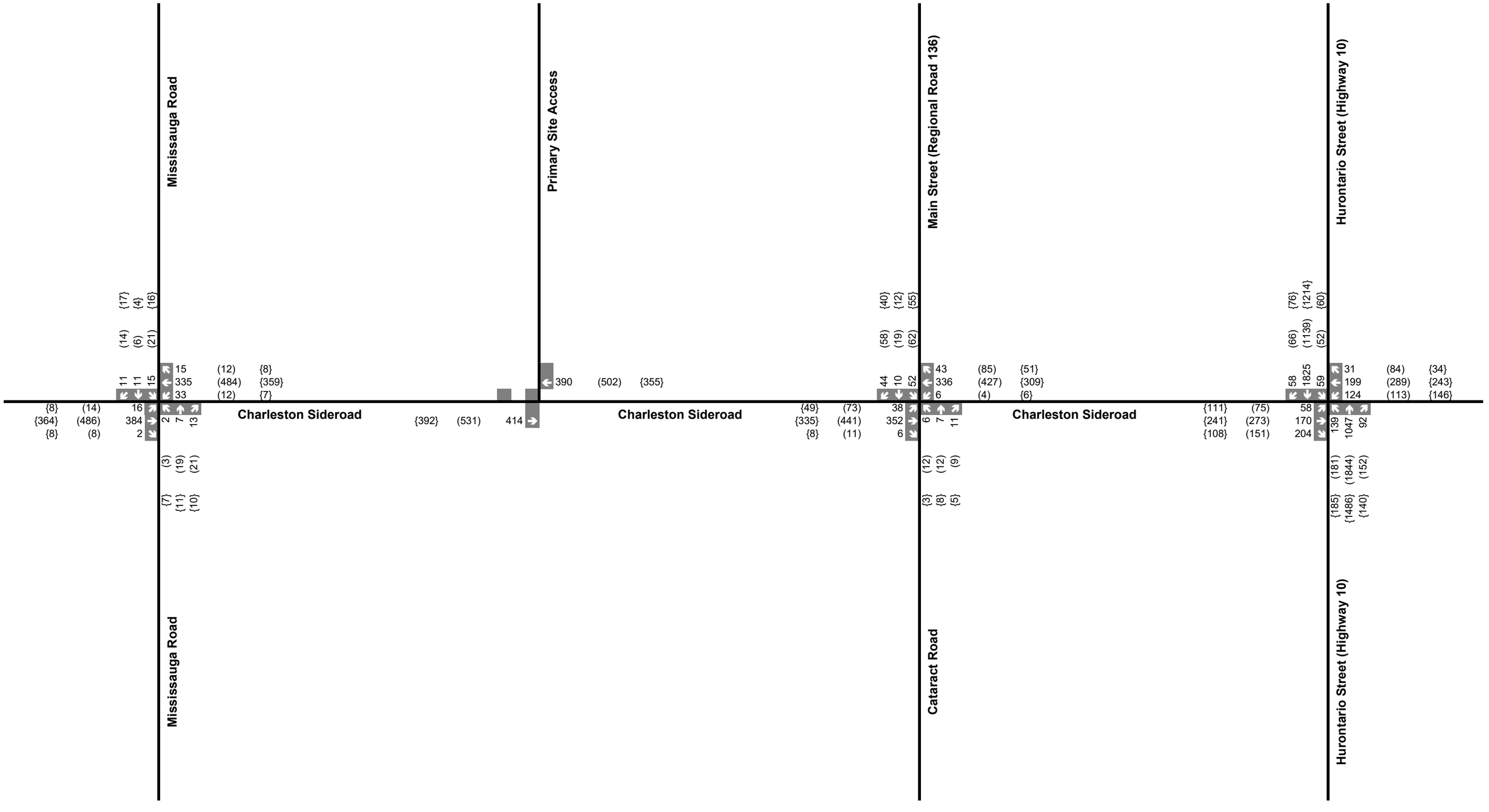
- 2% for Hurontario Street
- 0.5% for Charleston Sideroad
- 0.5% for Main Street
- 2% for Cataract Road
- 2% for Mississauga Road

Utilizing the calculated growth factors, compounded annually, traffic counts for the study area intersections were grown and balanced to the horizon year. Pre-consultation correspondence can be found in **Appendix A**.

5.5 Future Background Traffic Volumes

The 2023 baseline traffic plus the corridor growth were combined to produce the 2037 background weekday a.m., p.m., and Saturday peak hour traffic volumes.

The future background 2037 traffic volumes are presented in **Figure 5-1**.



TYLin

Legend

xx A.M. Peak Hour Traffic
(xx) P.M. Peak Hour Traffic
{xx} Saturday Peak Hour Traffic

Figure 5-1

Future Background
2037 Traffic Volumes

6 SITE GENERATED TRAFFIC

6.1 Site Trip Generation

New employee (passenger car) and truck trips were generated using the following methodology based on data received through pre-consultation correspondence.

6.1.1 Passenger Car Peak Hour Trips

CBM estimates the quarry will employ approximately 30 staff during the day shift between 5:00 a.m. to 5:00 p.m. and 20 employees during the night shift between 5:00 p.m. to 5:00 a.m., should one be needed for public authority projects. As shift change occurs at 5:00 p.m., it is assumed that there will be no employee trips during the a.m. or Saturday peak hours. Although night shift staff members are not intended to be onsite regularly, 20 employees were included during the p.m. peak hour as a conservative measure. Additionally, approximately 20 contractors are estimated to be on site for non-haulage operations during the day shift. It is assumed that these contractors will be entering and exiting the site at different off-peak hours during the day shift, and as a conservative measure, these trips were split 75%-25% between the a.m. and p.m. peak hour, respectively. Transportation Tomorrow Survey (TTS) queries used can be found in **Appendix F**

Table 6-1 summarizes the new employee passenger car trips generated for all peak hours.

Table 6-1 Passenger Car Peak Hour Trips

Employee Passenger Car Trips								
AM Peak Hour			PM Peak Hour			Saturday Peak Hour		
In	Out	Total	In	Out	Total	In	Out	Total
15	15	30	25	35	60	0	0	0

As seen in **Table 6-1**, there are a total of 30 passenger car trips generated during the a.m. peak hour consisting of 15 inbound and 15 outbound trips. During the p.m. peak hour, a total of 60 trips are generated consisting of 25 inbound and 35 outbound trips. Staff members will be entering and exiting the site outside of the adjacent street peak on Saturdays. Additionally, CBM confirmed contractors are not expected to be onsite on Saturdays. However, on the rare occurrence contractors visit the site on Saturday they would be entering/exiting during the opening hours of the site, outside of the adjacent street Saturday peak hours. Therefore, no passenger car trips are generated on Saturday.

6.1.2 Truck Peak Hour Trips

Caledon Pit / Quarry is proposed to ship approximately 2,000,000 tonnes of aggregate per year with an average of truck aggregate capacity of approximately 30 tonnes.

The haulage hours of operation are between 6:00 a.m. and 7:00 p.m. on weekdays and Saturdays, with no haulage activity occurring on Sundays and holidays; thus, totaling to 78 hours per week (minimum of 312 hours per month) of haulage activity.

The quarry is proposed to operate year-round from January to December with variable amounts of material extraction and shipping depending on the month. Based on historical shipping data records archived by TYLin, peak shipping generally occurs during the 'construction season' between the months of May and October. **Table 6-2** summarizes the average monthly breakdown of material extraction based on archived historical data from existing quarry operations in southern Ontario shipped per month for 2019 and 2020. Based on data received, it was determined that the month of July had the highest percentage of the total haulage activity and therefore will generate the largest volume of new truck trips.

Table 6-2 Monthly Material Shipping Estimates

Month	2019	2020
January	4%	6%
February	4%	5%
March	7%	5%
April	8%	5%
May	10%	6%
June	9%	12%
July	11%	12%
August	10%	10%
September	11%	11%
October	11%	11%
November	9%	11%
December	6%	7%
Total	**100%**	**100%**

It has been our experience that additional peaking occurs during early morning shipping activity, to provide material to construction sites in the morning. As a result, additional outbound loaded

trucks could occasionally occur creating a short-lived 'peak within a peak' condition (generally occurring prior to the adjacent street peak).

It is expected that during the a.m. peak hour, truck traffic surges occur shortly after haulage hours begin because the trucks will often arrive at quarries prior to when shipping hours commence and are permitted to pre-load, pre-weigh, and pre-permit before entering the road network external to the site. Such 'pre-loaded' trucks will wait on-site until shipping hours commence. To account for this peaking, the a.m. peak hour outbound truck volume was increased by an additional 50%, equating to 45 loaded outbound truck trips per hour. We have adopted this peak trip generation as the design-hour vehicle volume for our site-impact analysis. As alluded to above, these 'peak within a peak' activities are predicted to occur largely outside of the adjacent street peak hours, so in this respect we are predicting an unlikely (and conservative) scenario of the quarry and adjacent street peaks coinciding.

Table 6-3 summarizes the new truck trips generated.

Table 6-3 Truck Peak Hour Trips

Truck Trips								
AM Peak Hour			PM Peak Hour			Saturday Peak Hour		
In	Out	Total	In	Out	Total	In	Out	Total
30	45	75	30	30	60	30	30	60

As seen in **Table 6-3**, there are a total of 75 new truck trips generated during the a.m. peak hour consisting of 30 inbound and 45 outbound trips. During both of the p.m. and Saturday peak hours, a total of 60 new tuck trips are generated consisting of 30 inbound and 30 outbound trips.

6.1.3 Passenger Car Equivalent Factors

In order to satisfy Caledon Official Plan Section 5.11.2.4.14, a comparison between the percentage of heavy vehicle peak hour generation and passenger car equivalent (PCE) was completed for the purpose of the heavy truck impact analyses. PCE factors were applied to account for the additional time it takes a heavy vehicle (in this case, different PCE's for each of the loaded and empty gravel trucks) to travel through an intersection. Based on TYLin's previous pit / quarry traffic study experience, a PCE of 3.0 for outbound loaded trucks and a PCE of 2.0 for inbound empty trucks was adopted. The subsequent PCE adjusted volumes are summarized in **Table 6-4**.

Table 6-4 Passenger Car Equivalent (PCE) Adjusted Vehicle Peak Hour Trips

Truck Trips								
AM Peak Hour			PM Peak Hour			Saturday Peak Hour		
In	Out	Total	In	Out	Total	In	Out	Total
60	135	195	60	90	150	60	90	150

Heavy vehicle volumes generated by the site are accounted for in the future total conditions using the heavy vehicle percentage parameter in the traffic analysis model. Therefore, a PCE factor was not included in the future total volumes for the purpose of traffic capacity analysis. However, it is noted that the PCE factor was applied to future total traffic volumes when conducting a signal warrant at the future proposed site access. Further details are provided in **Section 8.1**.

6.2 Site Trip Distribution and Assignment

Truck trips were distributed throughout the network based on the proposed haulage route as outlined in **Section 2.4**: 95% heading east on Charleston Sideroad towards Hurontario Street (with 90% travelling south and 5% travelling north on Hurontario Street) and the remaining 5% heading west on Charleston Sideroad.

Distribution of employee trips was derived from a review of 2016 Transportation Tomorrow Survey (TTS) summary data and existing travel patterns. Site traffic was assigned to the road network based on these distributions and have been provided in **Table 6-5**.

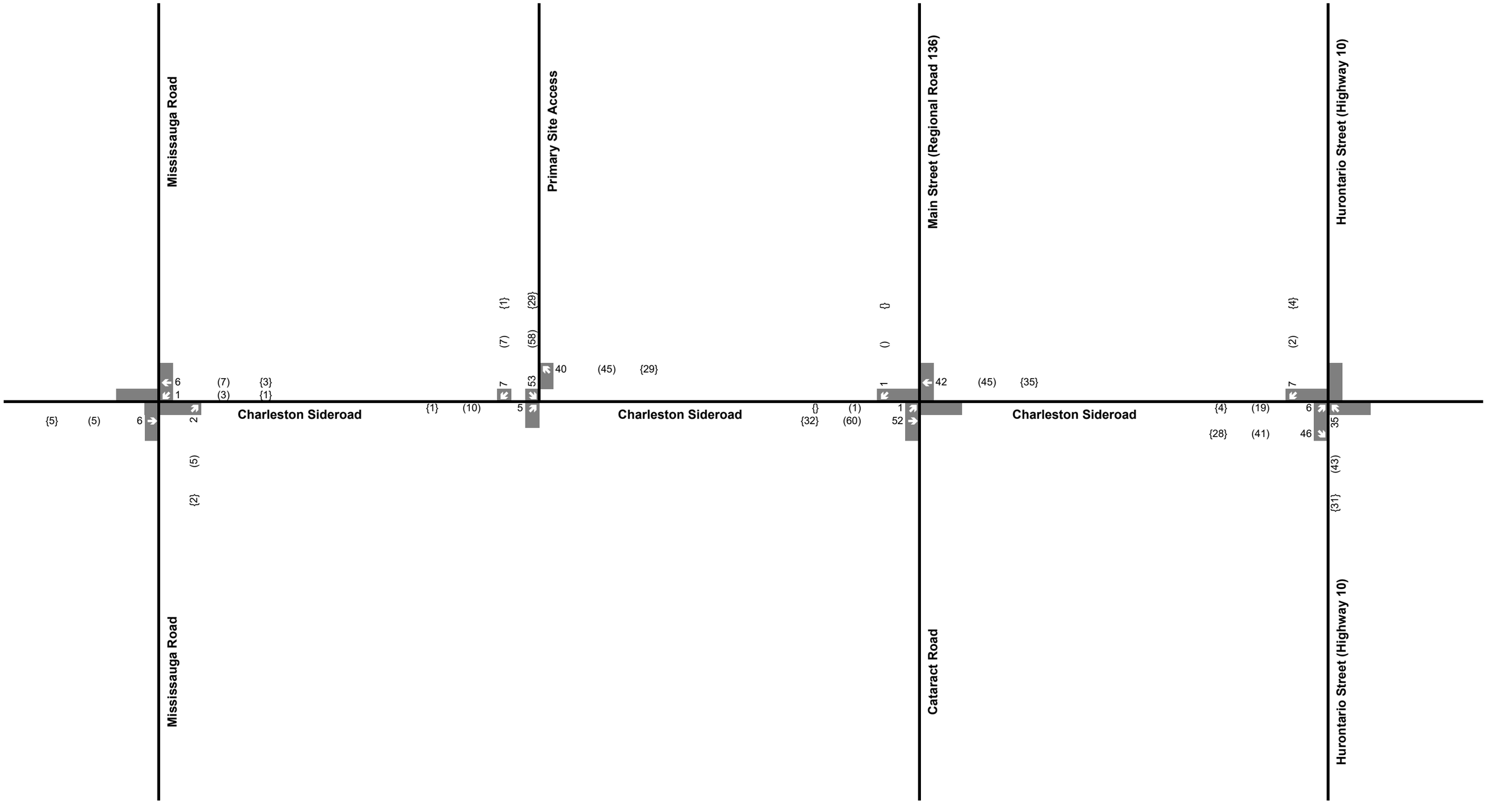
Table 6-5 Passenger Site Trip Distribution

Directions	AM Peak Hour		PM Peak Hour		Saturday Peak Hour	
	In	Out	In	Out	In	Out
North	21%	28%	0%	26%	0%	26%
East	18%	19%	0%	35%	0%	35%
South	47%	29%	100%	34%	100%	34%
West	13%	24%	0%	5%	0%	5%
Total	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

The total proposed site trips during the a.m., p.m., and Saturday peak periods are shown in **Figure 6-1**. Separate site traffic for passenger cars and trucks are shown in **Figure 6-2** and **Figure 6-3**, respectively.

6.3 Existing Access to 1420 Charleston Sideroad

A heritage property is currently located at 1420 Charleston Sideroad with a single driveway access. The property is currently in use as a residence and is proposed to be adaptively reused as an office and laboratory during the license period with intention to revert the property back to residential use following surrender of the license. The proposed office/lab space will employ a total of 6 employees. Based on the number of employees provided, TYLin has assumed a maximum of 6 trips to/from the study area network. Due to the nominal number of site-generated trips to/from the existing heritage access, no further traffic analysis at this site access will be required. Separate site traffic to/from 1420 Charleston Sideroad is shown in **Figure 6-4.**

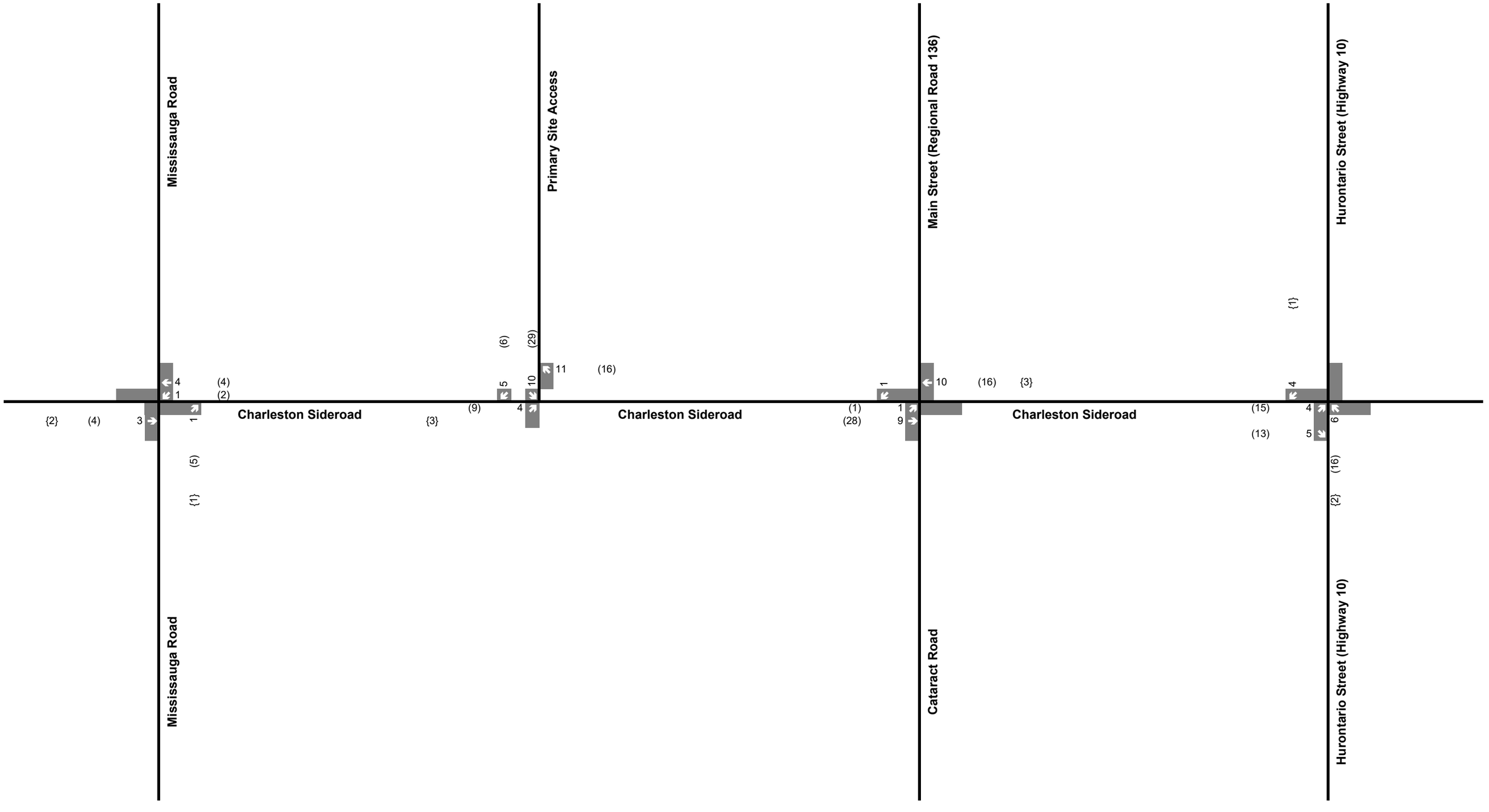


Legend

xx A.M. Peak Hour Traffic
(xx) P.M. Peak Hour Traffic
{xx} Saturday Peak Hour Traffic

TYLin

Figure 6-1
Caledon Quarry Site
Generated Traffic Volumes
(Total)

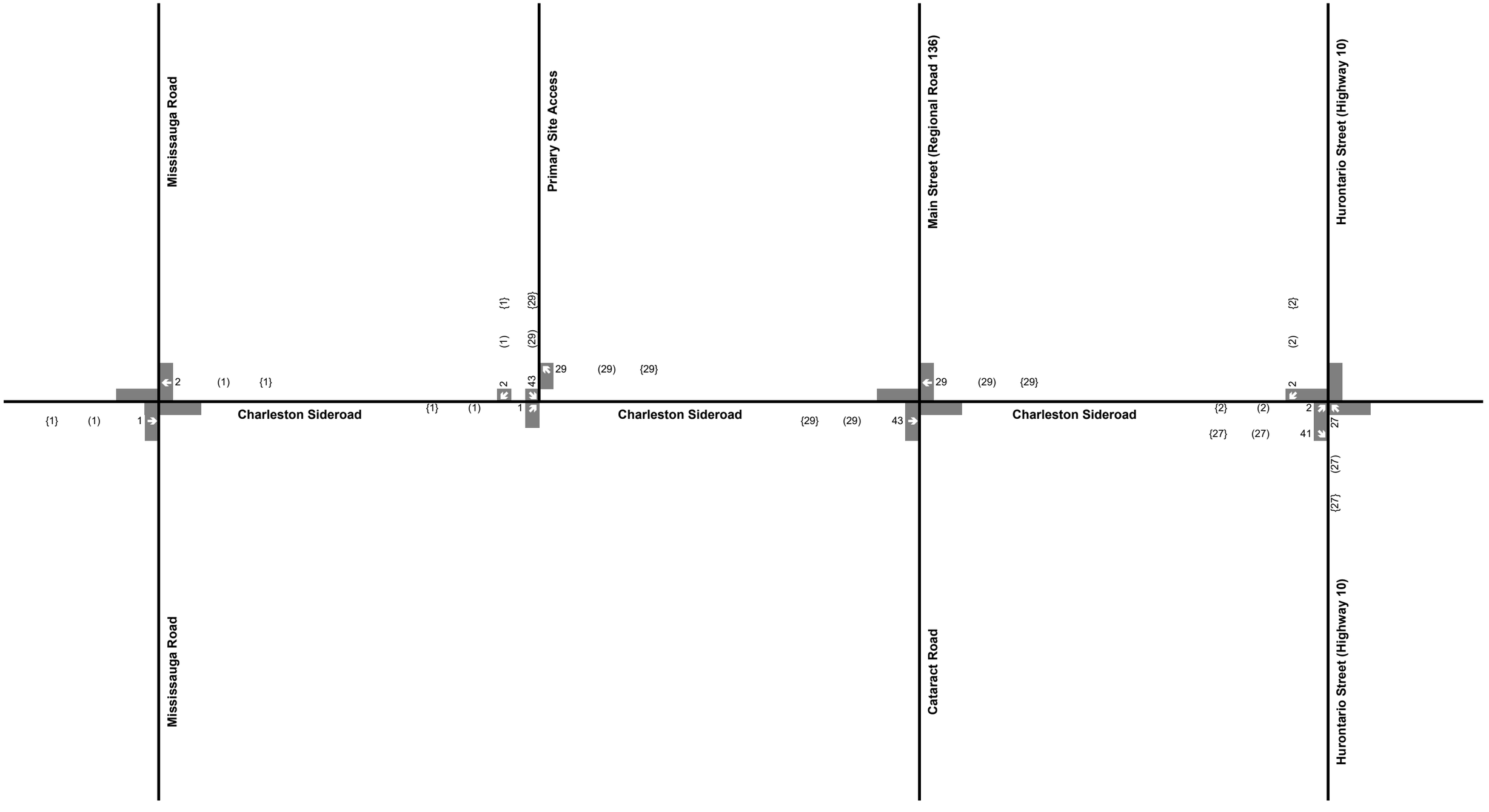


Legend

xx A.M. Peak Hour Traffic
(xx) P.M. Peak Hour Traffic
{xx} Saturday Peak Hour Traffic

TYLin

Figure 6-2
Caledon Quarry Site
Generated Traffic Volumes
(Passenger Cars)

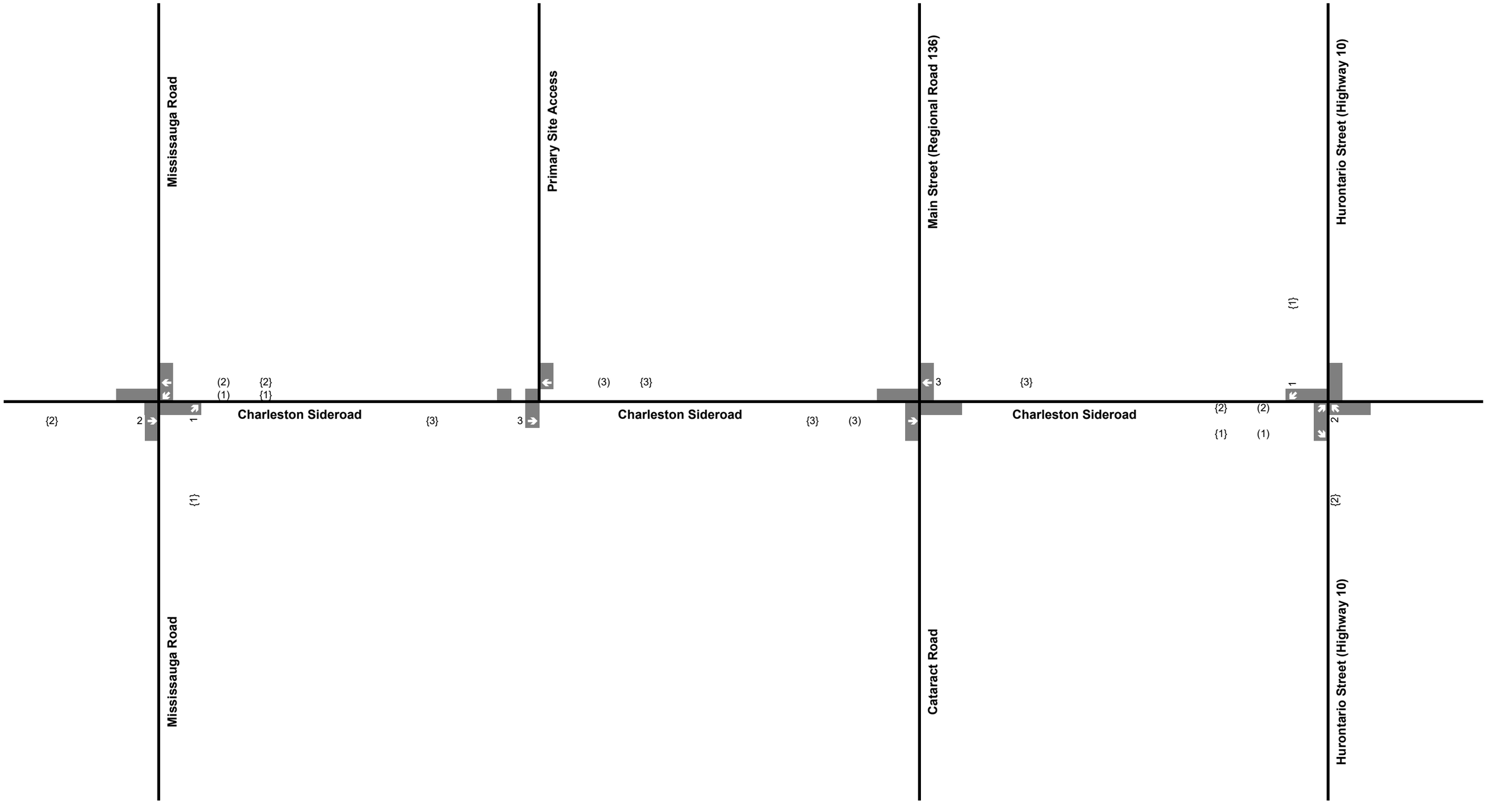


TYLin

Legend

xx A.M. Peak Hour Traffic
(xx) P.M. Peak Hour Traffic
{xx} Saturday Peak Hour Traffic

Figure 6-3
Caledon Quarry Site
Generated Traffic Volumes
(Trucks)



Legend

xx A.M. Peak Hour Traffic
(xx) P.M. Peak Hour Traffic
{xx} Saturday Peak Hour Traffic

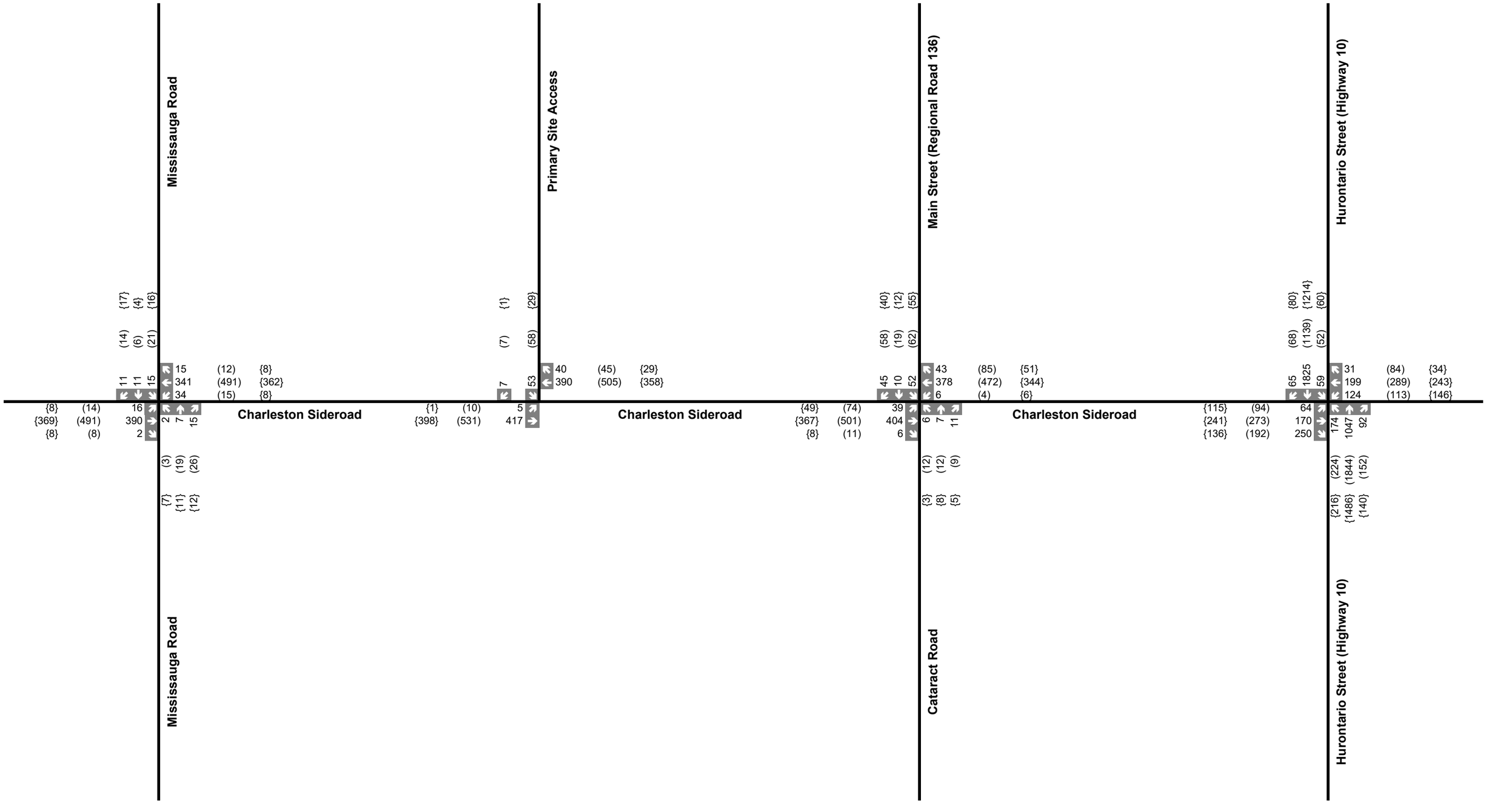
TYLin

Figure 6-4

1420 Charleston Sideroad
Site Traffic Volumes

7 FUTURE TOTAL TRAFFIC CONDITIONS

The future total traffic conditions for the peak study hours in the 2037 planning horizon was derived by combining the projected future background traffic with the corresponding estimate of the total site generated traffic. **Figure 7-1** summarizes the future total traffic volumes for the 2037 planning horizon during the weekday a.m., p.m., and Saturday peak hours.



Legend

xx A.M. Peak Hour Traffic
(xx) P.M. Peak Hour Traffic
{xx} Saturday Peak Hour Traffic

TYLin

Figure 7-1

Future Total 2037 Traffic Volumes

8 SITE ACCESS WARRANT ANALYSIS

8.1 Signal Warrant

A signal warrant was conducted under future total 2037 conditions to determine if a signal is warranted at the proposed site access on Charleston Sideroad from a capacity standpoint. It was determined that a signal warrant was not satisfied. An additional signal warrant was completed using PCE factors to account for the heavy vehicle trips and was also not satisfied under future total conditions. Results of the signal warrant can be found in **Appendix G**.

Although a signal warrant is not explicitly satisfied at the site access, it is recommended that the site access is signalized in future conditions in order to improve operations and allow for ease of traffic flow onto Charleston Sideroad.

It is noted that if signalization of the future site access on Charleston Sideroad is desired by the Region, a signal can be installed at the cost of the client accordingly, as agreed to by CBM.

8.2 Left-Turn Warrant Analysis

Left-turn warrants were conducted using MTO's Ontario Geometric Design Standards (OGDS) Chapter E – At Grade Intersections guidelines. Under future total 2037 conditions, southbound left-turn warrant analysis was conducted at the site access. It was determined that from a capacity standpoint, a left-turn warrant was not satisfied. Therefore, a southbound left-turn lane is not proposed at the site access.

An eastbound left-turn warrant was also conducted under future total conditions with a design speed of 100 km/h (posted speed at Charleston Sideroad is 80 km/h). It was determined that an eastbound left-turn lane is warranted with a minimum storage length of 25 metres during the p.m. peak hour in accordance with OGDS Chapter E and 15 metre storage warranted in the a.m. peak hour). Additionally, as per the Region's RCS, an auxiliary eastbound left-turn lane is recommended to provide increased safety on the road mitigating slower-moving turning vehicles from the higher-speed vehicles in the through lanes. See **Appendix H** for the results of the left-turn lane warrants.

8.3 Auxiliary Right-Turn Lane

TAC Chapter 9 – Intersections states that a right-turn lane (without a separate signal indication) is recommended when the right-turning volume is 10% to 20% of the total approaching volume. Under future total conditions, the right-turning volume is approximately 12% during the a.m. peak hour.

Furthermore, the Region's RCS, recommends including an auxiliary right-turn lane at a new access in order to mitigate traffic flow. Therefore, a right-turn lane at the site access is proposed under future total conditions.

Design criteria for the auxiliary left and right-turn lanes at the site access are discussed in further detail in **Section 9**.

9 PROPOSED SITE ACCESS CONCEPTUAL DESIGN

As part of this study, a conceptual design was considered for the future site access. As mentioned in **Section 4**, Charleston Sideroad is the preferred location for the site access in order to have the least traffic impact on the adjacent study network. The proposed site access is planned to be modelled as a 'T' intersection with access to the site north of Charleston Sideroad proposed within the horizon period.

Region of Peel Public Works Standard Drawings, Peel Region RCS, as well as TAC Chapter 8 – Access and Chapter 9 – Intersections guidelines were referenced when designing the future site access at Charleston Sideroad. The criteria that were used are summarized below. Excerpts from the relevant studies and guidelines is found in **Appendix I**.

9.1 Left-Turn and Right-Turn Auxiliary Lane Requirements

Table 6 in the RCS states some design criteria for auxiliary left and right-turn lanes for rural roads (note that Charleston Road is classified as a rural road as per the RCS).

The minimum RCS storage length for both the left and right-turn lanes is 30 metres. The lane width is required to be a minimum of 3.5 metres for both the left and right-turn lanes.

In accordance with TAC Table 9.14.2, the minimum right-turn taper for a 3.50-metre-wide right-turn lane with a design speed of 100 km/h (based on an 80 km/h posted speed, for higher design speeds, the 100 km/h design speed dimensions are used) is between 60 metres and 84 metres. The minimum parallel deceleration length is between 60 and 130 metres. Furthermore, the minimum storage length was determined to be 15 metres. Therefore, the total minimum auxiliary lane (storage plus deceleration) is required to be between 75 metres and 145 metres. TYLin proposes an auxiliary lane length of 75 metres and a taper length of 85 metres for the dedicated westbound right-turn lane at the site access.

For the dedicated left-turn lane with a width of 3.50 metres, a minimum 15-metre storage length is required as per Section 9.17.4.3 of the TAC guideline. The left-turn lane warrant conducted in **Section 8.2** identifies that a storage length of 25 metres is warranted in the PM peak hour, though based on the queueing analysis conducted (**Section 11**), it is expected that a storage length of 15 metres would satisfy the 95th percentile queues and would therefore be sufficient. Notwithstanding, from a safety perspective, a 25 metres storage length is recommended. The minimum approach taper for a design speed of 100 km/h is 105 metres as per TAC table 9.17.1. A minimum braking distance is required to be a minimum of 115 metres as per Table 2.5.2 of the TAC guideline. Therefore, TYLin proposes an auxiliary lane length of 140 metres (25 metre storage

plus 115-metre braking distance) and a taper length of 105 metres for the dedicated eastbound left-turn lane at the site access.

9.2 Access Spacing and Snow Storage Facility Access Considerations

As mentioned in **Section 4.2**, a minimum of 400 metres is recommended between full-moves intersections/accesses along Charleston Sideroad from curb extension to curb extension. As such, the access was proposed approximately 530 metres east of Mississauga Road and approximately 880 metres west of Main Street. It is noted that a snow storage facility is located on Charleston Sideroad with 'enter only' and 'exit only' accesses located approximately 820 metres and 710 metres east of Mississauga Road, respectively.

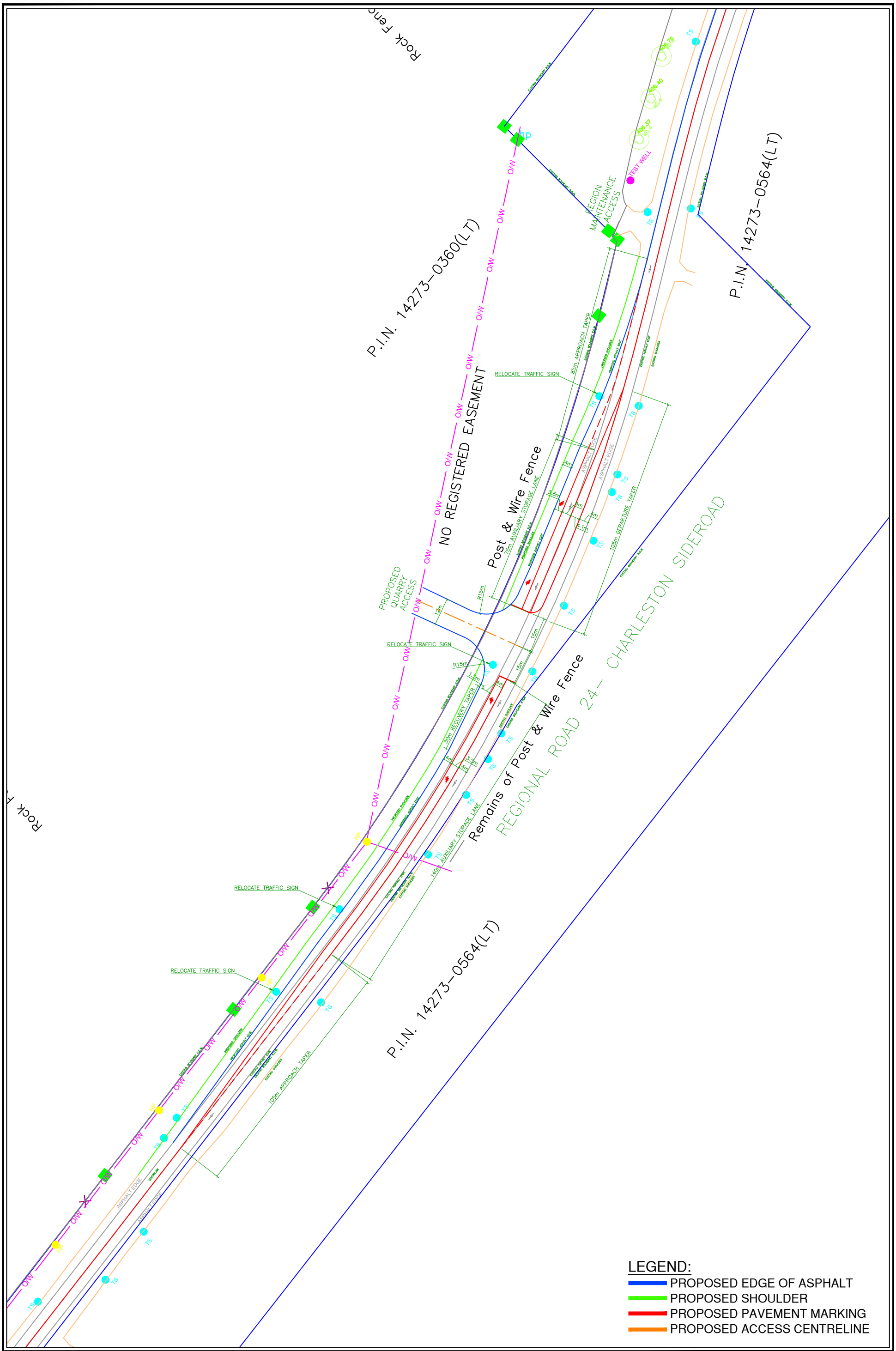
Sound transportation engineering design recommends locating right-turn lane tapers beyond a driveway curb return to mitigate any driver confusion. Therefore, the access design proposes that the 85-metre westbound right-turn lane taper begins west of the inbound (easterly) and ahead of the outbound (westerly) snow storage facility accesses.

It is expected that the snow storage facility will be gated and not in use during the peak operational months of the quarry (during the spring, summer, and fall seasons); thus, the 160-metre spacing between the outbound access of the snow storage facility and the proposed site access (from curb extension to curb extension) is deemed sufficient and is not expected to negatively impact the operations at the snow storage facility or the operations at the quarry access.

9.3 Left-Turn Lane Design and Curb Radii

Figure 9.17.2 in the TAC guidelines provided three alternatives for an auxiliary left-turn lane. As per TAC, it is preferred that the left-turn lane be designed right of the road centerline. Therefore, the conceptual design of the left-turn lane was modelled after Figure 9.17.2a of the TAC guideline.

A minimum curb radius of 15 metres is required at the site access. In order to accommodate truck maneuvers in and out of the site, a curb radius of 15 metres and 18 metres was proposed for the inbound and outbound curb radii, respectively. Additionally, in order for trucks to exit the site without encroaching onto the incoming lane, a 30-metre departure taper was proposed for trucks turning right out of the site. **Figure 9-1** illustrates the conceptual design for the proposed site access on Charleston Sideroad. **Appendix J** shows the swept path analysis of dump trucks and trucks with pony trailers entering and exiting the site. It is concluded that the design trucks can maneuver the site without conflict and do not encroach onto adjacent lanes.



TYLin

CALEDON QUARRY - CONCEPTUAL DESIGN
FUTURE SITE ACCESS AT CHARLESTON SIDEROAD

SCALE: 1:1500		PROJECT No. 10042
DATE: FEBRUARY 2025		
DESIGNED BY: JH	N	FIGURE No. 9-1
CHECKED BY: MD		

10 CAPACITY ANALYSIS

The capacity analysis identifies how well the intersections and access driveways are operating and how they are expected to operate in the future. The analysis contained in this report utilized the Highway Capacity Manual (HCM) 2000 techniques within the Synchro Software package. The reported intersection volume-to-capacity ratios (v/c) are a measure of the saturation volume for each turning movement, while the levels-of-service (LOS) are a measure of the average delay for each turning movement. Queueing characteristics are reported as the predicted 95th percentile queues, derived using SimTraffic micro-simulation software using the following methodology: 10 minutes seeding time, one-hour recording, and 10 runs.

The analysis includes identification of all intersections and for all movements; volume to capacity (v/c) ratios, LOS indicators and 50th and 95th percentile queue lengths. 'Critical' intersections and movements are shown in bold below, in accordance with the Region of Peel's Traffic Impact Study Guidelines for signalized and unsignalized intersections:

- V/C ratios for overall intersection operations, through movements or shared through/turning movements increased to 0.90 or above
- V/C ratios for exclusive movements that shall exceed 1.00

All detailed Synchro intersection capacity sheets are found in **Appendix K**

10.1 Baseline 2023 Capacity Analysis

The Synchro / HCM capacity results for study intersections during the weekday a.m., p.m., and Saturday peak hours under existing traffic conditions are shown in **Table 10-1**.

Table 10-1 Baseline 2023 Capacity Analysis Summary

Intersection	Movement	AM Peak Hour			PM Peak Hour			Saturday Peak Hour		
		V/C	Delay (s)	LOS	V/C	Delay (s)	LOS	V/C	Delay (s)	LOS
Hurontario Street (Highway 10) & Charleston Sideroad (RR 24)	*Overall*	*0.75*	*30*	*C*	*0.82*	*33*	*C*	*0.68*	*29*	*C*
	EBL	0.30	44	D	*0.43*	42	D	0.59	48	D
	EBT	0.68	59	**E**	0.86	71	E	0.78	64	**E**
	EBR	0.25	49	D	0.10	44	D	0.07	46	D
	WBL	0.54	46	D	0.63	47	D	0.76	61	**E**
	WBT	0.69	58	**E**	0.82	64	E	0.79	65	**E**
	WBR	0.02	45	D	0.06	42	D	0.02	56	D
	NBL	0.73	41	D	0.55	14	B	0.56	13	B
	NBTR	0.51	17	B	0.83	28	C	0.64	20	B
	SBL	0.20	12	B	0.43	23	C	0.27	14	B
	SBTR	0.78	26	C	0.55	22	C	0.53	19	B

Intersection	Movement	AM Peak Hour			PM Peak Hour			Saturday Peak Hour		
		V/C	Delay (s)	LOS	V/C	Delay (s)	LOS	V/C	Delay (s)	LOS
Charleston Sideroad (RR 24) & Main Street (RR 136) / Cataract Road	*Overall*	*0.29*	*9*	*A*	*0.26*	*9*	*A*	*0.26*	*9*	*A*
	EBL	0.05	4	A	0.07	4	A	0.07	4	A
	EBTR	0.29	6	A	0.26	5	A	0.26	5	A
	WBL	0.01	4	A	0.01	4	A	0.01	4	A
	WBT	0.30	6	A	0.23	5	A	0.23	5	A
	WBR	0.03	4	A	0.03	4	A	0.03	4	A
	NBL	0.03	30	C	0.01	30	C	0.01	30	C
	NBTR	0.03	30	C	0.03	30	C	0.03	30	C
	SBL	0.25	32	C	0.26	32	C	0.26	32	C
	SBTR	0.06	30	C	0.07	30	C	0.07	30	C
Charleston Sideroad (RR 24) & Mississauga Road	EBL	0.01	8	A	0.01	8	A	0.01	8	A
	EBTR	0.22	0	A	0.22	0	A	0.22	0	A
	WBL	0.04	9	A	0.01	8	A	0.01	8	A
	WBTR	0.20	0	A	0.21	0	A	0.21	0	A
	SBLTR	0.05	14	B	0.07	14	B	0.07	14	B
	NBLTR	0.10	17	C	0.09	14	B	0.09	14	B

As seen in **Table 10-1**, under baseline conditions all intersections operate acceptably with reserve capacity and acceptable delays. No intersections or movements are considered critical, though notable delays are experienced in the AM/PM/Saturday peak hours for the intersection of Hurontario Street (Highway 10) at Charleston Sideroad (RR 24) for the eastbound through (59/71/64 seconds), westbound through movements (58/64/65 seconds), and Saturday westbound left turn movements (64 seconds) with a level of service "E". Notwithstanding, these operations are still considered acceptable from a traffic capacity standpoint under baseline conditions.

10.2 Future Background 2037 Capacity Analysis

The Synchro / HCM capacity results for study intersections during the weekday a.m., p.m. and Saturday peak hours under future background 2037 traffic conditions are shown in **Table 10-2**. All timings and calibrations from the Baseline 2023 scenario were carried forward.

Table 10-2 Future Background 2037 Capacity Analysis Summary

Intersection	Movement	AM Peak Hour			PM Peak Hour			Saturday Peak Hour		
		V/C	Delay (s)	LOS	V/C	Delay (s)	LOS	V/C	Delay (s)	LOS
Hurontario Street (Highway 10) & Charleston Sideroad (RR	*Overall*	*0.92*	*46*	*D*	*1.01*	*56*	*E*	*0.84*	*33*	*C*
	EBL	0.30	44	D	0.45	42	D	0.60	48	D
	EBT	0.71	60	**E**	0.89	77	**E**	0.80	66	**E**
	EBR	0.30	49	D	0.10	43	D	0.07	46	D
	WBL	0.54	45	D	0.65	48	D	0.78	63	**E**

Intersection	Movement	AM Peak Hour			PM Peak Hour			Saturday Peak Hour		
		V/C	Delay (s)	LOS	V/C	Delay (s)	LOS	V/C	Delay (s)	LOS
24)	WBT	0.72	59	**E**	0.86	68	**E**	0.81	66	**E**
	WBR	0.02	45	D	0.06	42	D	0.02	45	D
	NBL	0.81	64	**E**	0.75	30	C	0.76	31	C
	NBTR	0.67	21	C	**1.08**	75	**E**	0.83	27	C
	SBL	0.28	13	B	0.43	31	C	0.43	22	C
	SBTR	**1.03**	58	**E**	0.73	26	C	0.69	24	C
Hurontario Street (Highway 10) & Charleston Sideroad (RR 24) (Optimized)	*Overall*	0.92	40	D	0.98	*50*	*D*	-	-	-
	EBL	0.39	51	D	0.55	50	D	-	-	-
	EBT	0.84	84	F	**0.99**	107	F	-	-	-
	EBR	0.37	56	E	0.10	49	D	-	-	-
	WBL	0.67	60	E	0.80	75	E	-	-	-
	WBT	0.85	81	F	**1.00**	111	F	-	-	-
	WBR	0.02	51	D	0.06	49	D	-	-	-
	NBL	0.79	66	E	0.66	22	C	-	-	-
	NBTR	0.61	17	B	**1.00**	49	D	-	-	-
	SBL	0.26	12	B	0.49	35	D	-	-	-
	SBTR	**0.96**	41	D	0.70	25	C	-	-	-
Charleston Sideroad (RR 24) & Main Street (RR 136) / Cataract Road	*Overall*	*0.30*	*9*	*A*	*0.37*	*10*	*A*	*0.27*	*9*	*A*
	EBL	0.06	4	A	0.11	5	A	0.07	4	A
	EBTR	0.31	6	A	0.39	7	A	0.28	6	A
	WBL	0.01	4	A	0.01	4	A	0.01	4	A
	WBT	0.32	6	A	0.37	6	A	0.25	5	A
	WBR	0.03	4	A	0.06	4	A	0.03	4	A
	NBL	0.03	30	C	0.06	30	C	0.01	30	C
	NBTR	0.03	30	C	0.05	30	C	0.03	30	C
	SBL	0.25	32	C	0.29	32	C	0.26	32	C
	SBTR	0.07	30	C	0.11	31	C	0.07	30	C
Charleston Sideroad (RR 24) & Mississauga Road (Unsignalized)	EBL	0.01	8	A	0.01	9	A	0.01	8	A
	EBTR	0.24	0	A	0.30	0	A	0.23	0	A
	WBL	0.04	9	A	0.01	9	A	0.01	8	A
	WBTR	0.22	0	A	0.30	0	A	0.23	0	A
	SBLTR	0.06	15	C	0.15	19	C	0.08	16	C
	NBLTR	0.13	18	C	0.18	24	C	0.10	15	C

As seen in **Table 10-2**, under 2037 future background conditions all intersections operate acceptably with reserve capacity and acceptable delays, except the intersection of Hurontario Street (Highway 10) and Charleston Sideroad (RR24). Under 2037 future background conditions Hurontario Street (Highway 10) and Charleston Sideroad (RR24) is at critical capacity for the southbound through-right (v/c ratio of 1.03) during the AM peak hour. During the PM peak hour, northbound through-right is at critical capacity (v/c ratio of 1.08). The critical movements are likely the result of the anticipated growth in north-south volumes along Highway 10. The signal timings have been optimized for Hurontario Street (Highway 10) and Charleston Sideroad (RR24) and the

results are summarized in table for comparison. As under baseline conditions, notable delays are experienced at the Hurontario Street (Highway 10) and Charleston Sideroad (RR24) intersections with few movements having a level of service "E". Notwithstanding, the intersection is shown to operate acceptably from a traffic capacity and delay standpoint under future background conditions. The signal timings have been optimized for Hurontario Street (Highway 10) and Charleston Sideroad (RR24) and the results are summarized in table for comparison. TYLin recommends that the Region consider future monitoring as needed in order to determine if adjustments to the signal timing plan and intersection operation parameters (e.g. cycle length adjustments, split optimizations) are required to accommodate an increase in background traffic.

10.3 Future Total 2037 Capacity Analysis

The Synchro/HCM capacity results for study intersections during the weekday a.m., p.m. and Saturday peak hours under future total 2037 traffic conditions are shown in **Table 10-3**. The calibrations that were made Hurontario Street (Highway 10) and Charleston Sideroad (RR 24) under baseline conditions were carried forward to future total conditions, with no additional modifications or adjustments were made under future total conditions.

Additionally, as mentioned in **Section 8.1**, a signal is proposed at the site access on Charleston Sideroad. The signal timing plan has been modeled as per the Region of Peel Synchro Guidelines (December 2010).

Table 10-3 Future Total 2037 Capacity Analysis Summary

Intersection	Movement	AM Peak Hour			PM Peak Hour			Saturday Peak Hour		
		V/C	Delay (s)	LOS	V/C	Delay (s)	LOS	V/C	Delay (s)	LOS
Hurontario Street (Highway 10) & Charleston Sideroad (RR 24)	*Overall*	*0.97*	*58*	*E*	*1.03*	*58*	*E*	*0.94*	*38*	*D*
	EBL	0.34	44	D	0.57	45	D	0.61	47	D
	EBT	0.71	60	**E**	**0.91**	81	**F**	0.85	72	**E**
	EBR	0.56	53	D	0.18	45	D	0.11	45	D
	WBL	0.54	45	D	0.67	51	D	0.80	67	**E**
	WBT	0.72	59	**E**	**0.92**	82	**F**	0.82	67	**E**
	WBR	0.02	45	D	0.06	43	D	0.02	44	D
	NBL	0.89	78	**E**	0.98	79	**E**	0.95	75	**E**
	NBTR	0.67	21	C	**1.07**	72	**E**	0.85	28	C
	SBL	0.28	15	B	0.43	31	C	0.48	24	C
	SBTR	**1.09**	83	**F**	0.74	27	C	0.78	29	C
Hurontario Street (Highway 10) & Charleston Sideroad (RR 24) (Optimized)	*Overall*	0.96	47	D	*0.99*	*51*	*D*	-	-	-
	EBL	0.44	52	D	0.70	60	E	-	-	-
	EBT	0.84	84	F	0.99	107	F	-	-	-
	EBR	0.68	68	E	0.15	50	D	-	-	-
	WBL	0.67	60	E	0.80	75	E	-	-	-
	WBT	0.85	81	F	**1.00**	111	F	-	-	-
	WBR	0.02	51	D	0.06	49	D	-	-	-
	NBL	0.96	103	F	0.83	44	D	-	-	-
	NBTR	0.61	17	B	**1.00**	49	D	-	-	-
	SBL	0.26	13	B	0.49	35	C	-	-	-
	SBTR	**1.00**	50	D	0.73	29	C	-	-	-
Charleston Sideroad (RR 24) & Main Street (RR 136) / Cataract Road	*Overall*	*0.36*	*9*	*A*	*0.43*	*10*	*A*	*0.36*	*9*	*A*
	EBL	0.06	4	A	0.13	5	A	0.07	4	A
	EBTR	0.38	7	A	0.47	7	A	0.38	7	A
	WBL	0.01	4	A	0.01	4	A	0.01	4	A
	WBT	0.38	7	A	0.43	7	A	0.37	6	A
	WBR	0.03	4	A	0.06	4	A	0.03	4	A
	NBL	0.03	30	C	0.06	30	C	0.04	30	C
	NBTR	0.03	30	C	0.05	30	C	0.03	30	C
	SBL	0.25	32	C	0.29	32	C	0.27	32	C
	SBTR	0.07	30	C	0.11	31	C	0.08	30	C
Charleston Sideroad (RR 24) & Mississauga Road	EBL	0.01	8	A	0.01	9	A	0.01	8	A
	EBTR	0.24	0	A	0.31	0	A	0.24	0	A
	WBL	0.04	9	A	0.02	9	A	0.01	8	A
	WBTR	0.22	0	A	0.31	0	A	0.27	0	A
	SBLTR	0.06	15	B	0.17	19	C	0.07	16	C
	NBLTR	0.13	18	C	0.20	26	D	0.07	17	C
Charleston Sideroad (RR 24) & Site Access	*Overall*	*0.34*	*16*	*B*	*0.41*	*19*	*B*	*0.30*	*16*	*B*
	EBL	0.02	11	B	0.05	12	B	0.01	11	B
	EBT	0.55	17	B	0.69	20	C	0.52	16	B
	WBT	0.51	16	B	0.66	19	B	0.47	15	B

Intersection	Movement	AM Peak Hour			PM Peak Hour			Saturday Peak Hour		
		V/C	Delay (s)	LOS	V/C	Delay (s)	LOS	V/C	Delay (s)	LOS
(Signalized)	WBR	0.04	11	B	0.05	11	B	0.04	11	B
	SBLR	0.14	12	B	0.13	12	B	0.08	12	B
Charleston Sideroad (RR 24) & Site Access (Unsignalized)	EBL	0.00	9	A	0.01	9	A	0.00	10	A
	EBT	0.25	0	A	0.31	0	A	0.23	0	A
	WBT	0.23	0	A	0.30	0	A	0.21	0	A
	WBR	0.02	0	A	0.03	0	A	0.02	0	A
	SBLR	0.22	22	A	0.33	30	D	0.11	20	C

As seen in **Table 10-3**, under 2037 total conditions all intersections operate acceptably with reserve capacity and acceptable delays, except for the Hurontario Street (Highway 10) and Charleston Sideroad (RR24) intersection. Under 2037 future total conditions Hurontario Street (Highway 10) and Charleston Sideroad (RR24) is at critical capacity for the southbound through-right (v/c ratio of 1.09) during the AM peak hour. During the PM peak hour, northbound through-right is at critical capacity (v/c ratio of 1.07). The critical movements are likely the result of the anticipated growth in north-south volumes along Highway 10. The signal timings have been optimized for Hurontario Street (Highway 10) and Charleston Sideroad (RR24) and the results are summarized in table for comparison. As previously noted, the critical movements are likely the result of the anticipated growth in north-south volumes along Highway 10.

As under baseline conditions, notable delays are experienced at the Hurontario Street (Highway 10) and Charleston Sideroad (RR24) intersections with few movements having a level of service "E". With the addition of site traffic, there is an increase in delay for the northbound left movement across all peak hours, with the AM peak hour having a notable delay of 78 seconds (level of service "E") and the PM and SAT peak hours with 79 and 75 seconds respectfully; however, as these movements have not yet met critical capacity, the movement is still considered to operate acceptably.

The proposed signalized site access is projected is operate well under future total conditions with no capacity or delay concerns. The unsignalized site access results are summarized in the table for comparison.

Overall, under future total conditions, the intersections in the study network are shown to operate acceptably from a traffic capacity and delay standpoint, and the overall impact of site traffic is considered reasonably immaterial and acceptable. As under future background conditions, TYLin recommends that the Region consider future monitoring as needed in order to determine if adjustments to the signal timing plan and intersection operation parameters (e.g. cycle length adjustments, split optimizations) are required to accommodate an increase in traffic.

11 QUEUEING ANALYSIS

Queueing analysis was conducted using SimTraffic micro-simulation software using the following methodology: 10 minutes seeding time, one-hour recording, and 10 runs. A summary of the average (50th percentile) and 95th percentile queue lengths derived from microsimulation of baseline, future background 2037 (optimized), and future total 2037 (optimized) traffic conditions. 95th percentile queues from Synchro (HCM) and SimTraffic (SIM) have been included for comparison. The 95th percentile queue lengths that are bolded are predicted to extend beyond available storage of a dedicated turn lane or extend beyond an upstream intersection and/or major access point. Queueing analysis detailed conditions are provided in **Appendix L**.

Table 11-1 Queueing Analysis Summary - Baseline

Intersection	Movement	Storage (m)	Queue Length (m)								
			AM			PM			Saturday		
			50th	95th		50th	95th		50th	95th	
			HCM	HCM	SIM	HCM	HCM	SIM	HCM	HCM	SIM
Hurontario Street (Highway 10) & Charleston Sideroad (RR 24)	EBL	80	12	22	39	15	27	**84**	23	37	**80**
	EBR	65	7	30	64	0	18	**100**	0	16	**67**
	WBL	40	27	**42**	**49**	23	39	**124**	31	**48**	**116**
	WBR	55	0	0	17	0	14	**107**	0	0	62
	NBL	85	17	53	50	18	27	57	16	28	44
	NBTR	-	71	101	85	179	221	162	115	152	121
	SBL	40	5	10	37	5	12	33	5	11	34
	SBTR	-	162	197	139	86	106	112	86	111	106
Charleston Sideroad (RR 24) & Main Street (RR 136) / Cataract Road	EBL	125	2	5	13	4	9	18	3	7	13
	EBTR	-	21	34	40	29	45	52	20	32	35
	WBL	60	1	2	4	1	2	3	1	2	4
	WBR	90	0	3	9	0	5	14	0	4	10
	NBL	70	1	4	7	2	6	10	1	3	4
	NBTR	-	1	6	10	2	7	10	1	6	9
	SBL	85	7	18	21	9	20	22	8	18	21
	SBLTR	-	2	11	15	3	13	18	2	11	14
Charleston Sideroad (RR 24) & Mississauga Road	EBL	30	-	1	5	-	1	6	-	1	4
	WBL	30	-	1	15	-	1	6	-	1	3
	WBTR	-	-	0	1	-	0	2	-	0	0
	NBLTR	-	-	2	17	-	3	16	-	2	12
	SBLTR	-	-	3	12	-	5	14	-	3	11

Table 11-2 Queueing Analysis Summary – Future Background (2037)

Intersection	Movement	Storage (m)	Queue Length (m)								
			AM			PM			Saturday		
			50th	95th		50th	95th		50th	95th	
			HCM	HCM	SIM	HCM	HCM	SIM	HCM	HCM	SIM
Hurontario Street (Highway 10) & Charleston Sideroad (RR 24)	EBL	80	13	25	56	17	30	**93**	23	37	**88**
	EBR	65	0	22	**87**	0	19	**113**	0	16	**88**
	WBL	40	29	**47**	**71**	26	**53**	**75**	30	**48**	**74**
	WBR	55	0	0	**67**	0	11	**123**	0	**90**	**92**
	NBL	85	26	48	66	17	33	**124**	17	52	**101**
	NBTR	-	110	136	104	364	364	345	183	237	189
	SBL	40	5	10	**59**	15	15	**57**	5	13	**54**
	SBTR	-	306	374	278	172	172	148	133	161	144
Charleston Sideroad (RR 24) & Main Street (RR 136) / Cataract Road	EBL	125	2	6	13	4	9	20	3	7	14
	EBTR	-	23	37	42	31	49	54	22	34	35
	WBL	60	1	2	4	1	2	3	1	2	4
	WBR	90	0	3	8	0	5	13	0	4	9
	NBL	70	1	4	7	2	6	13	1	3	5
	NBTR	-	1	7	11	2	8	12	2	6	11
	SBL	85	8	18	20	9	20	21	8	18	20
	SBLTR	-	2	11	14	3	14	20	2	11	13
Charleston Sideroad (RR 24) & Mississauga Road	EBL	30	-	1	6	-	1	6	-	1	4
	WBL	30	-	1	15	-	1	8	-	1	4
	WBTR	-	-	0	1	-	0	1	-	0	0
	NBLTR	-	-	2	18	-	4	16	-	16	12
	SBLTR	-	-	4	12	-	5	14	-	16	12

Table 11-3 Queueing Analysis Summary – Future Total (2037)

Intersection	Movement	Storage (m)	Queue Length (m)								
			AM			PM			Saturday		
			50th	95th		50th	95th		50th	95th	
			HCM	HCM	SIM	HCM	HCM	SIM	HCM	HCM	SIM
Hurontario Street (Highway 10) & Charleston Sideroad (RR 24)	EBL	80	15	28	51	21	40	**93**	23	39	**88**
	EBR	65	29	**72**	**97**	0	22	**110**	0	**78**	**96**
	WBL	40	30	**49**	**67**	26	**53**	**69**	30	**53**	**66**
	WBR	55	0	0	**63**	0	11	**156**	0	0	**138**
	NBL	85	**85**	**85**	**113**	30	**61**	**123**	37	**90**	**123**
	NBTR	-	123	123	181	323	364	311	193	246	197
	SBL	40	9	7	**65**	5	14	**59**	5	14	**61**
	SBTR	-	342	342	359	142	175	154	141	171	169
Charleston Sideroad (RR 24) & Main Street (RR 136) / Cataract Road	EBL	125	3	6	11	5	10	17	3	6	11
	EBTR	-	28	45	50	38	60	60	28	44	51
	WBL	60	1	2	4	1	2	4	1	2	5
	WBR	90	0	3	9	0	5	12	0	4	10
	NBL	70	1	4	5	2	6	12	2	5	8
	NBTR	-	1	7	8	2	8	7	2	5	6
	SBL	85	8	18	20	9	20	24	8	19	21
	SBLTR	-	2	11	15	3	14	19	2	12	18
Charleston Sideroad (RR 24) & Mississauga Road	EBL	30	-	1	6	-	1	6	-	1	4
	WBL	30	-	1	16	-	1	7	-	1	6
	WBTR	-	-	0	0	-	0	2	-	0	1
	NBLTR	-	-	2	17	-	5	16	-	2	12
	SBLTR	-	-	4	11	-	6	14	-	2	10
Charleston Sideroad (RR 24) & Site Access	EBL	130	1	2	7	1	4	9	1	1	4
	WBR	75	0	5	22	0	5	21	0	5	21
	SBLR	-	4	10	29	5	12	24	2	7	22

As shown in all tables, the average queue length for all movements at all intersections is expected to be accommodated by the storage for all horizons, except for the Hurontario Street (Highway 10) and Charleston Sideroad (RR24) intersection . Driver behaviour, available vehicle space within the painted medians, and effective storage lengths were observed and confirmed during the site visit on December 10, 2024. Effective storage lengths are considered, though not added in as "storage" for the Syncrho/SimTraiffic analysis for the Hurontario Street and Charleston Sideroad intersection. A comparison of painted versus effective storage is provided in **Table 11-4.**

Table 11-4 Painted and Effective Storage Length of Exclusive Turn Lanes

Lane	Painted Storage (m)	Painted Taper (m)	Effective Storage (m)	Notes
EBL	80	-	35	While the storage ends at 80m, there is a painted median that can accommodate the length of a full vehicle up to 35m without blocking the adjacent through lane.
EBR	65	20	-	-
WBL	40	15	-	-
WBR	55	75	-	-
NBL	85	30	20	While the painted storage and taper ends at 115m, there is a taper that can accommodate the length of a full vehicle up to 20m without blocking the adjacent through lane.
SBL	40	35	-	-

Under baseline conditions, at the intersection of Charleston Sideroad (RR 24) and Hurontario Street (Highway 10) intersection, the 95th SimTraffic percentile queue for the westbound left movement is expected to exceed the available storage for all peak periods. Additionally, under PM and Saturday conditions, the 95th SimTraffic percentile queues for the eastbound left and right, and westbound right, movements are expected to exceed available storage.

All 95th percentile queues noted as exceeding the storage under baseline conditions are also expected to exceed the available storage under future background conditions, with the inclusion of the southbound left queue in the AM/Saturday peak hour and the northbound left queue in the PM/Saturday peak hour. It is expected that increase in critical queues is due to the anticipated growth along both corridors.

All 95th percentile queues noted as exceeding the storage under future background conditions are also expected to exceed the available storage under future total conditions. The northbound left queue in the AM peak hour is also shown to be exceeding the storage length. Given that only one movement is significantly impacted between future background and future total conditions, it is suggested based on the analysis that the impact of the projected site traffic on future operations at this intersection is reasonably immaterial and acceptable. Furthermore, it is noted again that the average queues at this intersection are expected to be accommodated within the effective storage.

Based on the results of the queueing analysis, it is recommended that the intersection of Charleston Sideroad at Hurontario Street (Highway 10) continued to be monitored as needed by the Town, Region, and Province for existing/future queueing issues prior to evaluating potential mitigation measures for the intersection.

12 COLLISION HISTORY REVIEW

The Transportation Impact Study and Haul Route Assessment was submitted to the Town of Caledon dated August 2023. As part of their review the following preliminary comment was provided in a letter dated November 17, 2023:

"During pre-submission consultation with the Town, the proponent's traffic consultant completed Terms of Reference for the Transportation Impact Assessment which included a requirement related to reviewing available collision data. The Town reiterates its concerns related to safety along the proposed haul route, particularly the adequacy of the intersection of Charleston Sideroad and Highway 10. Further review of the safety and adequacy of the haul route is required in this regard."

In addition, the Transportation Impact Study and Haul Route Assessment was submitted to HDR (Peer Reviewer). As part of their review the following preliminary comment was provided in a letter dated October 10, 2024:

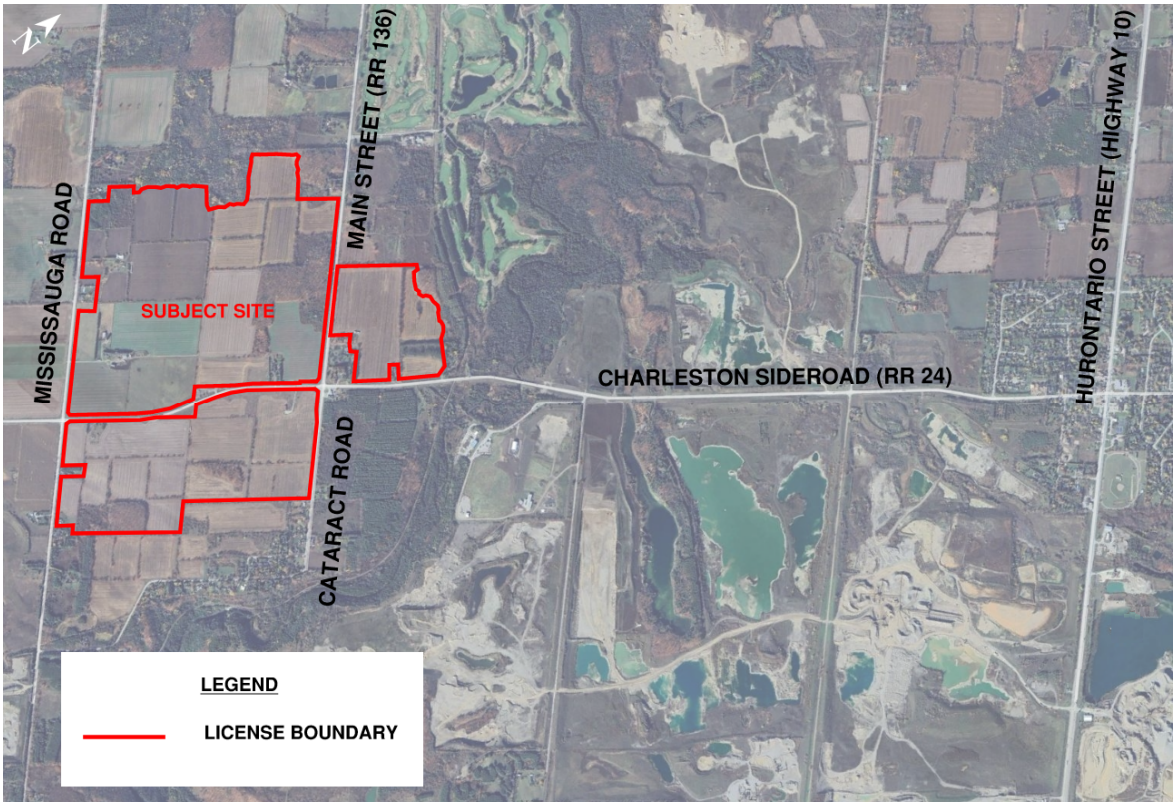
"Should be updated to capture 5 years before/after the Covid-19 period to ensure the analysis is based on typical conditions. The analysis should also focus on specific turning movements and intersections to identify 'hotspots' and to identify potential mitigation. The analysis should be extended to include all intersections along the haul route from the site entrance to Highway 10, as well as the midblock segments."

As part of the response to comments the following collision history review has been prepared.

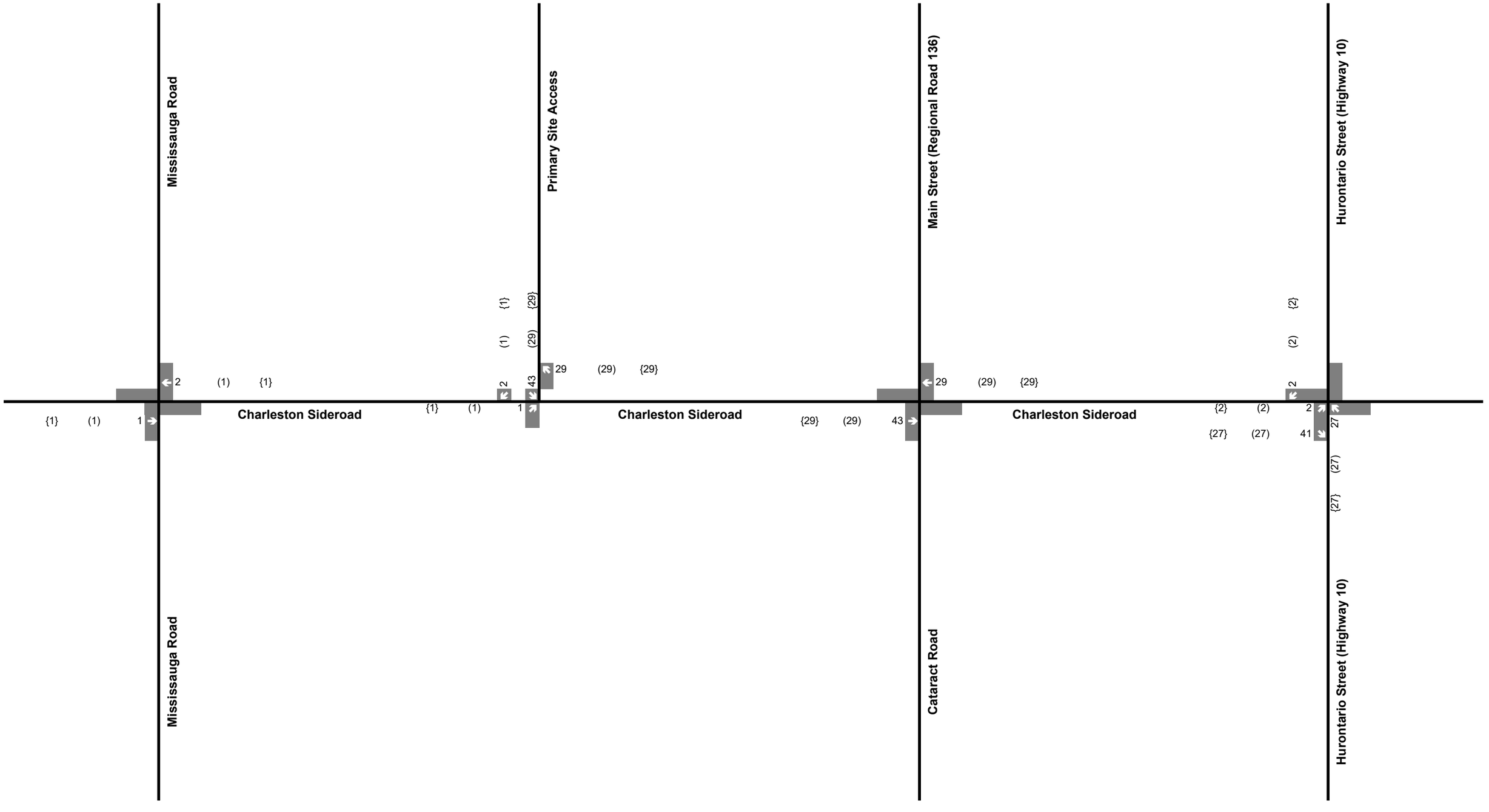
12.1 Background

The lands proposed to be licensed under the Aggregate Resources Act are referred to as the "Subject Site" and are legally described as Part of Lots 15-18, Concession 4 WSCR and Part of Lot 16, Concession 3 WSCR (former Geographic Township of Caledon). The Subject Site is approximately 261 hectares, and extraction is proposed on approximately 200 hectares. The remaining approximate 61 hectares within the Subject Site are the "Setback / Buffer Lands". The Setback / Buffer Lands are used to provide setbacks to surrounding land uses and natural heritage features and most of these lands include a 5-metre visual / acoustic berm and visual plantings. The proposed pit / quarry location is shown in **Figure 12-1**.

Figure 12-1 Proposed Pit / Quarry Location



The proposed tonnage limit for the proposed CBM Caledon Pit / Quarry is 2.5 million tonnes per year and on average CBM anticipates shipping approximately 2.0 million tonnes per year. The primary haul route for the proposed CBM Caledon Pit / Quarry includes trucks travelling eastward on Regional Road 24 and then southward on Highway 10. The proposed haul route is an existing aggregate haul route and is designated as an aggregate haul route in the Town of Caledon Official Plan. The following distribution of trucks was proposed for the Haul Route Assessment: 95% of truck traffic is anticipated to head east on Charleston Sideroad towards Hurontario Street per hour (with 90% travelling south and 5% travelling north on Hurontario Street) and the remaining 5% is proposed to head west on Charleston Sideroad. The site is expected to add a maximum of 41 trucks per hour (AM peak) to the eastbound right turn at the intersection of Charleston Sideroad and Hurontario Street (Highway 10). This is considered to be the worst-case scenario during peak operation periods and is not expected to be consistent throughout the year. **Figure 12-2** shows the estimated site generated truck traffic volumes in the study network.



TYLin

Legend

xx A.M. Peak Hour Traffic
(xx) P.M. Peak Hour Traffic
{xx} Saturday Peak Hour Traffic

Figure 12-2
Caledon Quarry Site
Generated Traffic Volumes
(Trucks)

The entrance / exit for the CBM Caledon Pit / Quarry is proposed to be located on Regional Road 24, approximately 720m west of Regional Road 136, measured from curb extension-to-curb extension. The entrance / exit is proposed to be controlled by a new traffic signal and the installation of auxiliary turn lanes and tapers on Regional Road 24 at CBM's expense.

The CBM Caledon Pit / Quarry is proposed to operate (extraction, processing, and drilling) 7:00 am to 7:00 pm Monday to Saturday, excluding statutory holidays and shipping is proposed from 6:00 am to 7:00 pm Monday to Saturday consistent with other mineral aggregate operations in Caledon. CBM is also proposing to permit limited shipping in the evening (7:00 pm to 6:00 am) to support public authority contracts that require the delivery of aggregates during these hours to complete public infrastructure projects. These activities will be limited to only highway trucks and shipping loaders and no other operations will be permitted during evening hours. Site preparation and rehabilitation is proposed to be permitted 7:00 am to 7:00 pm Monday to Friday.

CBM is expected to employ approximately 30 staff members during the day shift (5:00 a.m. to 5:00 p.m.) and 20 members during the night shift (5:00 p.m. to 5:00 a.m.), should a public authority project require a night shift. Additionally, approximately 20 contractors will be on site for non-haulage operations during the day shift should one be needed for public authority contracts, when the site is at full operations.

12.2 Site Access

As part of the initial Transportation Impact Study prepared by TYLin, a detailed site access consideration analysis was conducted which reviewed potential access locations for the development. The analysis included review of existing heavy vehicle restrictions, access spacing requirements, vertical and horizontal sightlines, and physical constraints. The review concluded that the preferred access location would be along Charleston Sideroad approximately halfway between Mississauga Road and Main Street.

Signal warrant analysis for the proposed access was prepared in the initial Transportation Impact Study. The results of the analysis confirmed that from a traffic capacity perspective, a signal is not warranted under 2032 future total conditions. However, in the interest of safety and operations, CBM has agreed to signalize the access at their own expense. The signal will provide adequate gaps in through traffic to allow for trucks to enter and exit the site and accelerate safely without posing risk to vehicles along Charleston Sideroad.

12.3 Collision Data

Collision history data was obtained from the Region of Peel on April 12, 2024, and November 19, 2024, for the intersection of Main Street (RR136) and Charleston Sideroad (RR24) as well as the

segment of Main Street (RR136) between Charleston Side Road (RR24) and Beech Grove Sideroad for the period of January 1, 2015 to December 31, 2023.

Collision history data was obtained from the Ministry of Transportation Ontario on March 21, 2024, and January 15, 2025, for the intersection of Charleston Sideroad (RR24) and Hurontario Street (Highway 10) as well as the segments of Hurontario Street 100 m north and south of the intersection for the period of January 1, 2015 to December 31, 2023.

The collision records were analyzed to identify collision patterns and understand the impact the proposed development may have on the area. The raw data for dump truck collisions provided by the Region and Ministry can be found in **Appendix M**. The full set is available as requested.

12.4 Collision Data Analysis

The Ontario Road Safety Annual Report (ORSAR) was reviewed to identify any trends in the number of collisions in Ontario compared to Caledon and the haul route. The reports for 2021 – 2023 are not available as of writing. Relevant excerpts of the ORSAR are included in **Appendix M.** A summary of the latest annual collision trends is shown in **Table 12-1**.

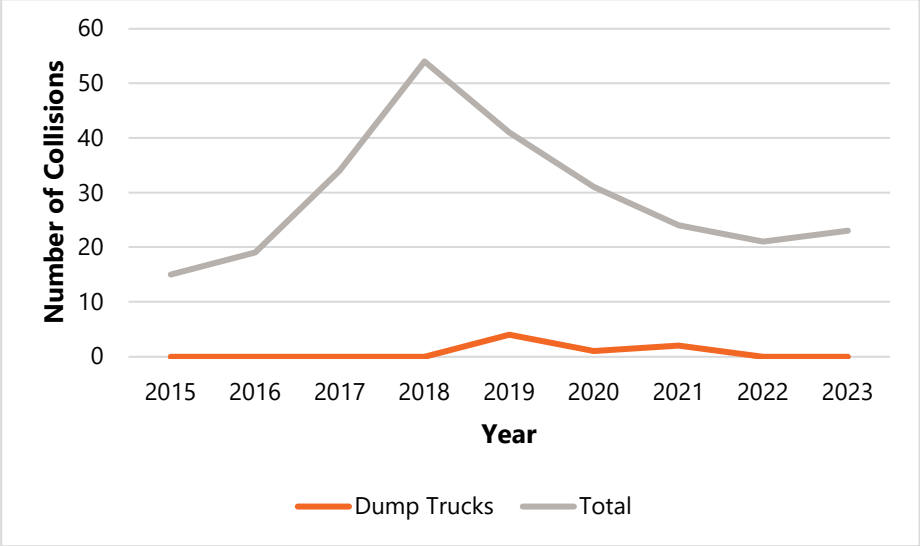
Table 12-1 Collision Frequency for Ontario, Caledon, and Subject Route

	Ontario		Caledon		Haul Route	
Year	**Collisions**	**% Change**	**Collisions**	**% Change**	**Collisions**	**% Change**
2015	221,385	-	896	-	15	-
2016	208,389	-5.87%	988	10.26%	19	26.67%
2017	209,075	0.33%	1,009	2.13%	34	78.95%
2018	214,847	2.76%	1,027	1.78%	54	58.85%
2019	221,785	3.23%	1,188	15.68%	41	-24.07%
2020	147,750	-33.38%	803	-32.41%	31	-24.39%
2021	-	-	-	-	24	-22.58%
2022	-	-	-	-	21	-12.5%
2023	-	-	-	-	23	-9.52%

The collision data for the Province, Town, and haul route generally follow the same trend with collisions increasing from 2015 – 2019, dropping significantly after 2018. The percent change calculated in 2021 – 2023 for the haul route suggests that the trend continues as travel patterns

do not return to pre-COVID conditions. This is likely due to the change in commuting behaviour with work-from-home becoming more prevalent. It should be noted that since there is a relatively low number of accidents along the haul route, the calculated percent change can appear more drastic. **Figure 12-3** further illustrates the decline in collisions over a 9-year period.

Figure 12-3 Total Collisions Versus Dump Truck Collisions over 9-years



The chart suggests that post-COVID travel patterns have reduced the frequency of collisions in the Region including the proposed haul route.

A review of the data shows that for the period of 2015 – 2023 there were 172 accidents along Highway 10 at the intersection with Charleston Sideroad or within 100 m north or south of the intersection. Of those accidents only 5 involved dump trucks which represents 2.9% accident rate and approximately 0.56 dump truck collisions per year. A review of available historical turning movement count data shows that the haul route intersection was active with aggregate truck hauling within the study period. This shows that although the route has an elevated volume of dump truck traffic due to its haul route designation and the abundance of quarry operations surrounding the route, dump trucks contribute to a relatively small proportion of the accidents at the key intersections. **Figure 12-4** illustrates the proportion of dump truck collisions at intersections along the haul route. Figure 12-5 further illustrates the proportion of dump truck collisions at mid-block segments along the haul route.

Figure 12-4 Dump Truck Collisions at Intersections by Collision Location

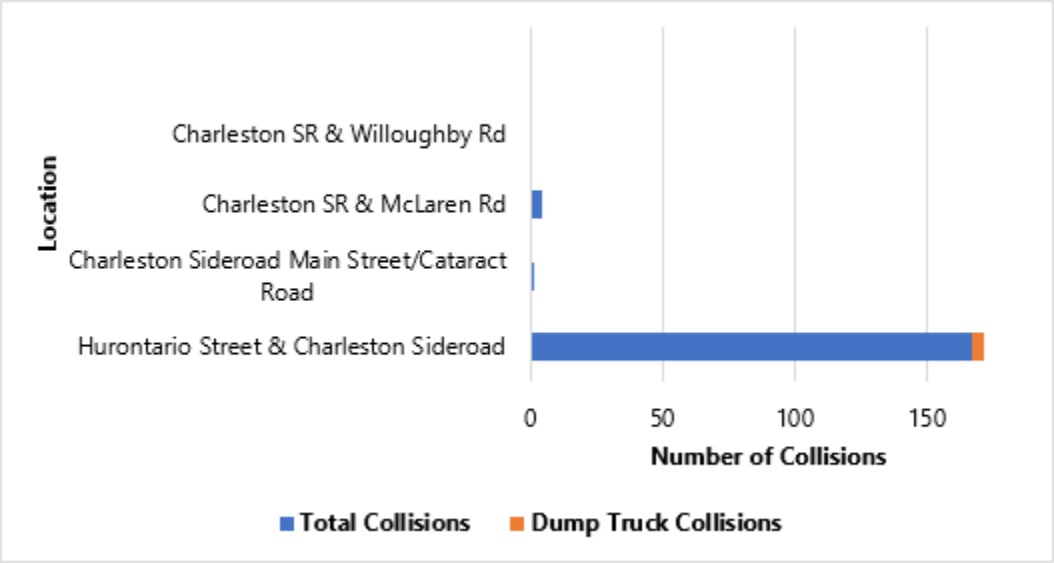
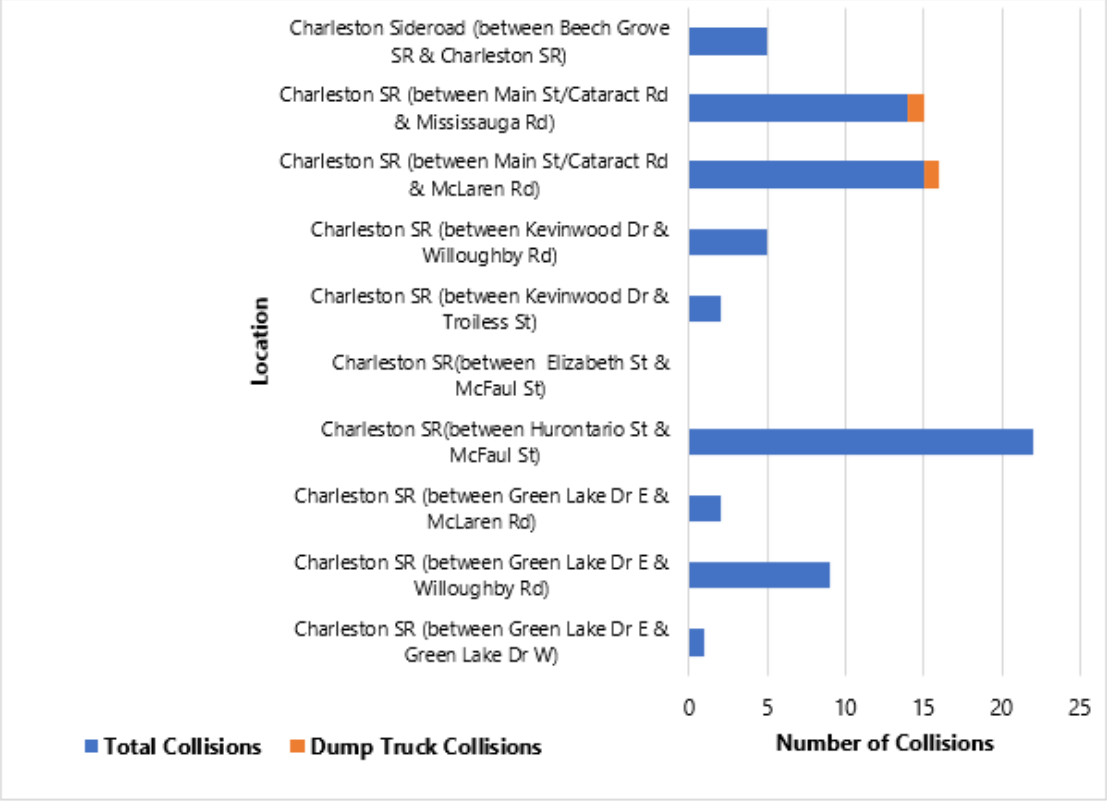


Figure 12-5 Dump Truck Collisions at Mid-Block Segments by Collision Location



The collision data available from 2015 – 2023 was analyzed further to identify the types of collisions and severity of collisions (results) in general as well as specifically for dump trucks. The

results of the analysis are summarized in **Table 12-2**.

Table 12-2 Summary of Total and (Truck) Collisions by Location and Collision Type

Locations	Type of Collision							Result of Collision			
	Angle	Rear End	Sideswipe	Turning Movement	SMV/Other	Approaching	Total	Fatal-Injury	Non-Fatal Injury	P.D. Only	Non-Reportable
Hurontario St & Charleston SR	9	82 (1)	21 (2)	30 (1)	27 (1)	3	**172 (5)**	-	32 (2)	140 (3)	-
Charleston SR & Main St/Cataract Rd	-	-	-	-	1	-	**1**	-	1	-	-
Charleston SR & McLaren Rd	-	1	-	-	3	-	**4**	-	2	2	-
Charleston SR & Willoughby Rd	6	-	-	-	2	-	**8**	-	2	6	-
Charleston SR (between Green Lake Dr E & Green Lake Dr W)	-	-	1	-	-	-	**1**	-	-	1	-
Charleston SR (between Green Lake Dr E & Willoughby Rd)	-	4	1	-	4	-	**9**	-	1	8	-
Charleston SR (between Green Lake Dr E & McLaren Rd)	-	-	-	-	2	-	**2**	-	-	2	-
Charleston SR (between Hurontario St & McFaul St)	10	3	2	6	-	1	**22**	-	3	19	-
Charleston SR (between Elizabeth St & McFaul St)	-	-	-	-	-	-	**0**	-	-	-	-

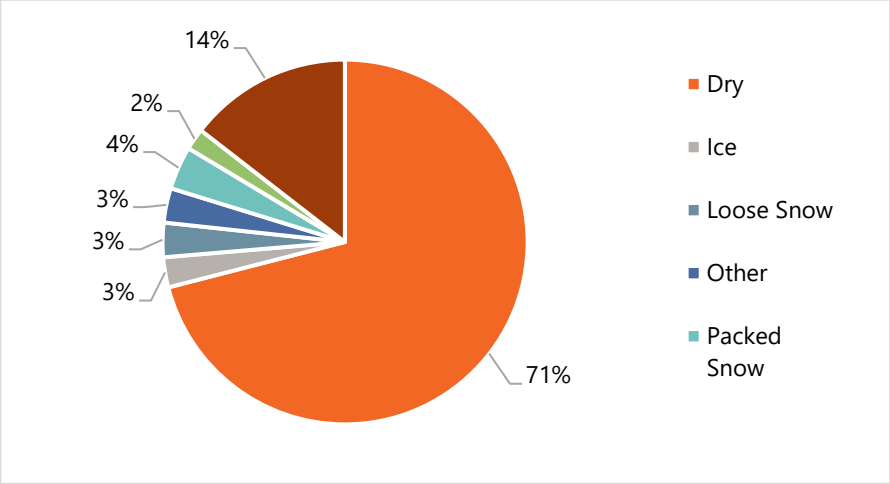
Locations	Type of Collision							Result of Collision			
	Angle	Rear End	Sideswipe	Turning Movement	SMV/Other	Approaching	Total	Fatal-Injury	Non-Fatal Injury	P.D. Only	Non-Reportable
Charleston SR (between Kevinwood Dr & Troiless St)	-	-	-	-	2	-	**2**	-	-	2	-
Charleston SR (between Kevinwood Dr & Willoughby Rd)	-	-	-	1	2	2	**5**	-	-	5	-
Charleston SR (between Main St/Cataract Rd & McLaren Rd)	1	2	1 (1)	1	11	-	**16 (1)**	1	-	15 (1)	-
Charleston SR (between Main St/Cataract Rd & Mississauga Rd)	-	-	-	-	12 (1)	3	**15 (1)**	-	3	12 (1)	-
Charleston Sideroad (between Beech Grove SR & Charleston SR)	-	-	-	-	5	-	**5**	-	1	4	-
Total	**26**	**92 (1)**	**26 (3)**	**38 (1)**	**71 (2)**	**9**	**262 (7)**	**(1)**	**46 (2)**	**216 (5)**	**0**
Collison Frequency by Type (%)	10%	35% (>1%)	10% (1%)	15% (>1%)	27% (1%)	3%	100% (3%)	1% (>1%)	18% (1%)	82% (2%)	0%

The Table above suggests that the type of collisions that occurred most frequently was rear-end type collisions with a frequency of 35%, followed by collisions involving only single motor vehicle (SMV) with a frequency of 27% over the past five years. Of the 262 collisions reported, 18% resulted in non-fatal injury, while 82% resulted in property damage only. In 2019, there was 1 fatal injury reported on Charleston Sideroad (between Main Street/Cataract Road & Mississauga Road).

For dump truck collisions the most frequent type are sideswipes and single motor vehicle/other collisions with 3 and 2 collisions reported, respectively. Of the 7 recorded dump truck collisions, 2 resulted in non-fatal injuries, while 5 resulted in property damage only (P.D. Only). This is similar to the distribution of the total collisions. This data suggests that the results of dump truck collisions are generally the same as all other collisions occurring on the route and do not increase the severity of collisions.

The figure below illustrates the number of collisions categorized by road surface conditions.

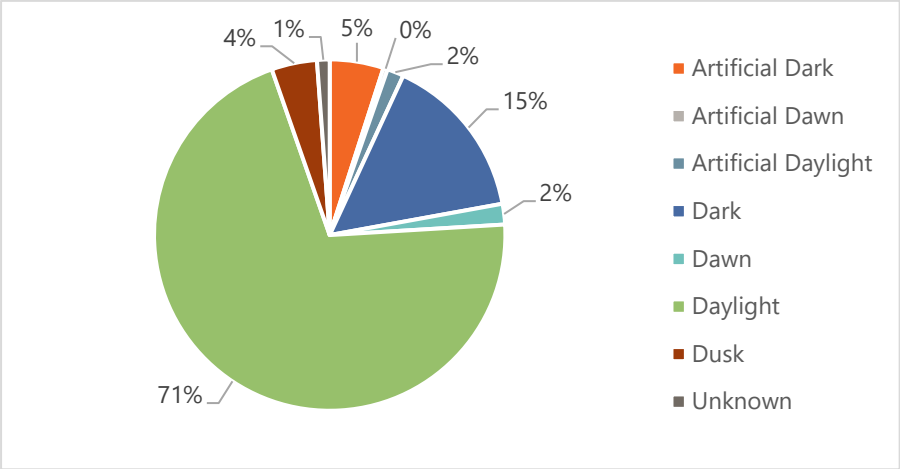
Figure 12-6 Total Collisions by Road Surface Conditions



Approximately 71% of the reported collisions occurred on dry road surface conditions, 14% on a wet surface, and 4% on both packed road surface conditions. Based on the results of the analysis, it has been determined that poor road surface conditions may not be a contributing factor, as majority of collisions occurred during dry road surface conditions.

Figure 12-7 illustrates the number of collisions categorized by lighting conditions. Artificial indicates that there were streetlights turned on at the time of the accident.

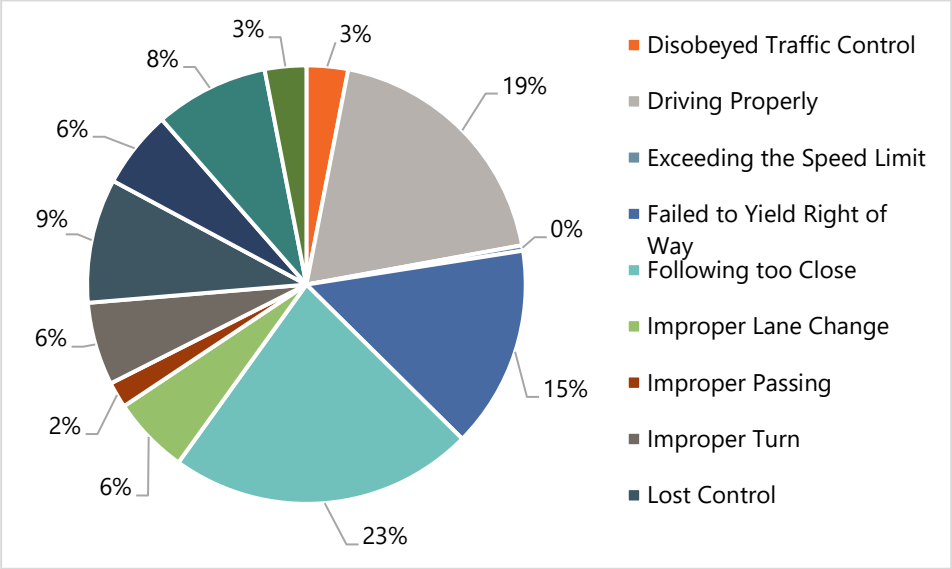
Figure 12-7 Total Collisions by Light Conditions



Approximately 71% of collisions occurred during daylight conditions, 15% in dark conditions, and 5% in dawn conditions. Based on the results of the analysis, it has been determined that poor lighting conditions may not be a contributing factor, as majority of collisions occurred during good visibility conditions.

Figure 12-8 illustrates the driver action of the first vehicle in each of the recorded collisions. Since collisions could involve one or several vehicles, the driver action of the first vehicle shows the general driving behaviour of all collisions in the area.

Figure 12-8 Collision Driver Action

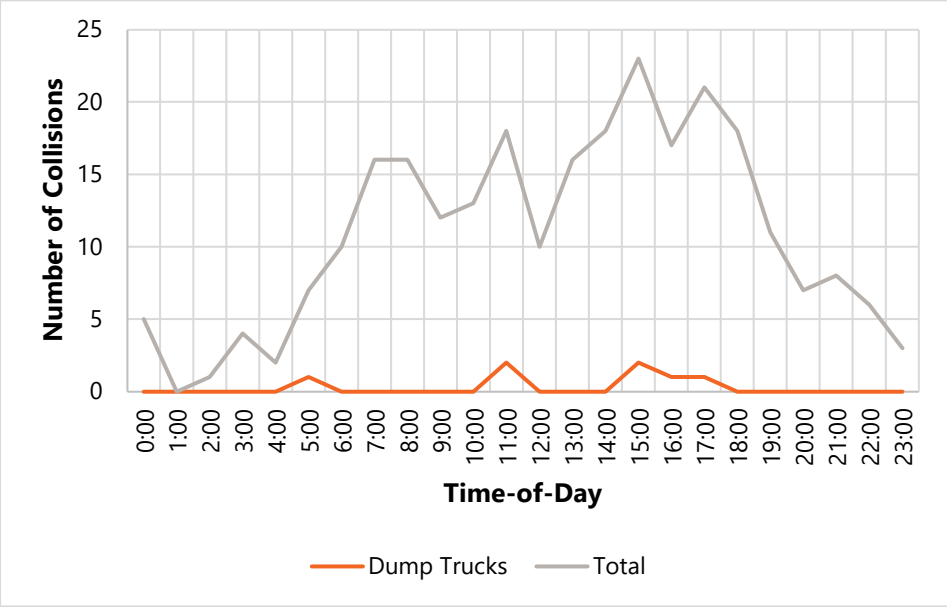


Approximately 19% of drivers were driving properly at the time of their collision. Most of the driver action proceeding collisions were driver error such as speeding, improper maneuvers, following too close, and failing to yield. This indicates that poor driving behaviour is likely the leading cause

of collisions in the area. This is further supported by **Figure 12-6** and **Figure 12-7** which show that the majority of collisions happen under good road conditions removing environmental factors.

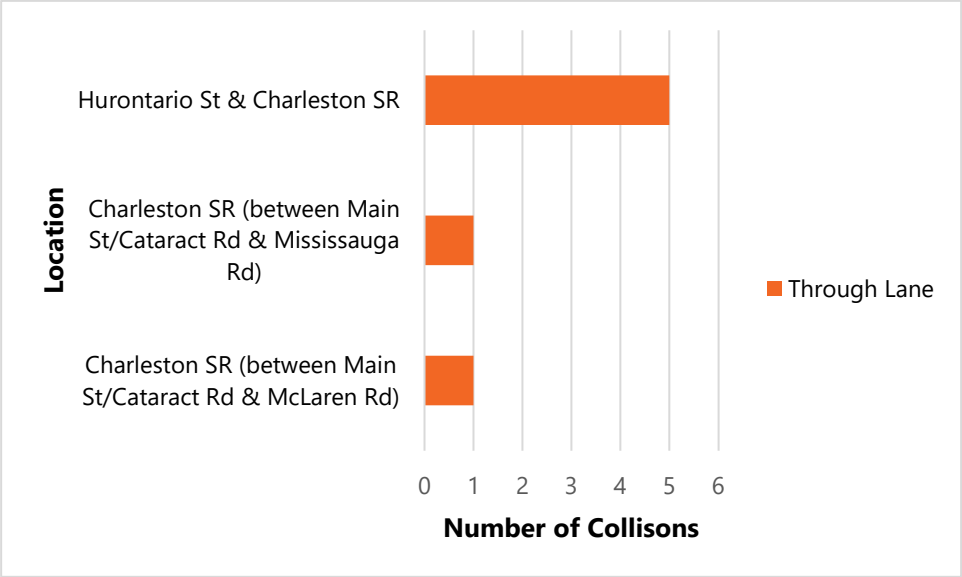
The figure shows the number of collisions by time of day.

Figure 12-9 Total Collisions Versus Dump Truck Collisions by Time-of-Day



Generally, collisions occur during the daytime with peaks that coincide with the established peak hours of traffic. Dump truck collisions also follow a similar pattern with only 1 collision occurring at mid-day rather than around the peak hours. No dump trucks collisions were recorded outside of the established hauling times proposed by the development. This establishes that the proposed dump truck hauling schedule would not create any additional risk of collisions throughout the day.

Figure 12-10 Dump Truck Collisions by Impact Location



As illustrated in the above figure all 7 dump truck collisions occurred in the through lanes, with 5 collisions at Hurontario Street and Charleston Sideroad. Of the 7 collisions, 6 reported during day light conditions and 1 during dark conditions. All 7 reported collisions occurred during clear and dry conditions. This data indicates that poor driving behaviour is likely the leading cause of dump truck collisions in the area.

13 CONCLUSIONS AND RECOMMENDATIONS

Haul Route Assessment and Transportation Impact Study

The Caledon Pit / Quarry is expected to ship approximately 2,000,000 tonnes of aggregate annually with an assumed average truck aggregate capacity of 30 tonnes. The Quarry is proposed to operate during weekdays and Saturdays during the year, with haulage operation hours being from 6:00 a.m. to 7:00 p.m. Using historical haulage activity data, it was determined that July has the typical highest haulage activity.

During pre-consultation with the Town, no background developments within the vicinity of the study area were identified within the horizon year. However, background corridor growth rates, compounded annually, were applied to future traffic projections to account for population and employment forecasts. A portion of these growth rates include background development outside of the Town's jurisdiction to account for future commuter traffic travelling through the study area. A growth rate of 2% was applied to Hurontario Street, Mississauga Road and Cataract Road, whereas a growth rate of 0.5% was applied to Charleston Sideroad and Main Street (Regional Road 136).

During the a.m. peak hour, a total of 30 new passenger car trips were estimated consisting of 15 inbound and outbound trips. During the p.m. peak hour, a total of 60 new trips were generated consisting of 25 inbound and 35 outbound trips. As employees are entering and exiting the site outside of peak hours on Saturdays, no passenger car trips were generated during the Saturday peak hour.

During the a.m. peak hour, a total of 75 new truck trips were generated consisting of 30 inbound and 45 outbound trips. During each of the p.m. and Saturday peak hours, a total of 60 new truck trips are generated consisting of 30 inbound and 30 outbound trips.

The proposed truck distribution includes 95% of truck traffic heading east on Charleston Sideroad towards Hurontario Street (with 90% travelling south and 5% travelling north on Hurontario Street) and the remaining 5% truck traffic heading west on Charleston Sideroad.

A haul route assessment was undertaken to determine the location of the new future site access for the Caledon Pit / Quarry and include several site access considerations including existing haul route restrictions, impact to existing residents, access spacing requirements in accordance with Region of Peel Road Characterization Study (RCS) and TAC guidelines, physical constraints, and safety considerations. It was determined that the preferred location of the proposed site access is along Charleston Sideroad (Regional Road 24) between Mississauga Road and Main Street (Regional Road 136) / Cataract Road. TYLin recommends the site access be located approximately 530 metres east of Mississauga Road, measured between curb extensions.

Horizontal and vertical sightline assessments were conducted in the field. Based on a 100 km/h design speed, the proposed Charleston Sideroad access location satisfies Transportation Association of Canada combination truck stopping sight distance and intersection sight distance requirements. It is recommended to keep clear low-lying landscape or other obstructions near the edge of the property to ensure driver's sightlines are not encumbered in the future.

A traffic signal warrant was not explicitly satisfied at the proposed Charleston Sideroad site access under future total conditions based on a traffic volume. However, signalization of the access is recommended to improve the operation of the intersection by providing suitable gaps for trucks to enter and exit the site and accelerate safely without posing risk to other vehicles using Charleston Sideroad. It is noted that if the Region desires a signalized site access, the installation of the signal can be implemented at CBM's expense. Additionally, Charleston Sideroad is classified as rural road and satisfies Transportation Association of Canada Geometric Design Guide for Canadian Roads minimum 400-metre full movement intersection spacing design criteria, preserving the arterial function of Charleston Sideroad.

Additionally, a dedicated eastbound left-turn and westbound right-turn lane is proposed at the site access using requirements from the Region's RCS as well as TAC Chapter 9 – Intersections. It is recommended to include a dedicated westbound right-turn lane with an auxiliary lane (storage plus deceleration) length of 75 metres and a taper length of 85 metres. Furthermore, a dedicated eastbound left-turn lane with an auxiliary lane length of 140 metres and a taper length of 105 metres is recommended.

Under baseline conditions, all study intersections operate with reserve capacity and low delays with the exception of long delays for the eastbound through and westbound through movements in the PM and Saturday peak hours, though overall operations are still considered acceptable.

During future background conditions, with the addition of background corridor growth, all intersections are expected to operate well and within capacity. However, southbound and northbound movements at Hurontario Street and Charleston Sideroad are expected to be at critical capacity but still with acceptable delay and with reserve capacity available. Long delays are again noted for the eastbound and westbound movements. As a result, TYLin recommends that the Region considers future monitoring as needed in order to determine if adjustments to the signal timing plan and intersection operation parameters (e.g. cycle length adjustments, split optimizations) are required to accommodate an increase in background traffic.

Under future total conditions, overall all intersections operate well with reserve capacity and acceptable delays with the addition of projected site traffic, except for except for the Hurontario Street (Highway 10) and Charleston Sideroad (RR24) intersection. The westbound, northbound, and southbound movements at the Hurontario Street and Charleston Sideroad intersection continue to operate at capacity . It was observed the addition of site traffic does not materially

impact the operation of the intersection. The remaining study intersections, including the proposed site access, are expected to operate with reserve capacity and relatively low delays. As under future background conditions, TYLin recommends that the Region consider future monitoring as needed in order to determine if adjustments to the signal timing plan and intersection operation parameters (e.g. cycle length adjustments, split optimizations) are required to accommodate an increase in traffic.

Queueing analysis for all intersections projected that the average queues can be accommodated across all horizons within the effective storage. With the exception of Hurontario Street and Charleston Sideroad, the queueing analysis shows that the 95th percentile queues can be accommodated by the available storage. However, at Hurontario Street and Charleston Sideroad, it is observed under baseline and future background conditions that 95th percentile queues exceed the available storage length for multiple movements and is expected to continue under future total conditions. As previously discussed, TYLin recommends that the Region consider future monitoring as needed in order to determine if adjustments to the signal timing plan and intersection operation parameters (e.g. cycle length adjustments, split optimizations) are required to accommodate future increases in traffic.

Overall based on this assessment it is concluded that:

- The proposed haul route is an existing and identified haul route in the Town of Caledon Official Plan;
- With the implementation of the recommendations, the proposed truck traffic from the CBM Pit / Quarry will not have unacceptable impacts on the safe and efficient use of the road network; and
- From an overall transportation perspective, the proximity of the site to market will result in minimizing the length and number of vehicle trips required to transport an essential raw material needed for the construction and maintenance of communities.

The results of the assessment provide the basis for the following technical recommendation to be included on the Aggregate Resources Act Site Plan for the proposed Caledon Pit / Quarry:

- Prior to shipping the licensee shall enter into an agreement with the Region of Peel for the construction of the: a) entrance / exit, b) Charleston Sideroad improvements,
- Prior to below water operations commencing in the Main Area and prior to operations commencing in the South Area, the licensee shall enter into an agreement with the Region of Peel for a crossing underneath Main Street and Charleston Sideroad, respectively.

Collision History Review

Based on a detailed review of the available and recent collision history for the intersections of Charleston Sideroad at Hurontario Street (Highway 10) and Charleston Sideroad at Main Street, it can be concluded that the proposed pit / quarry development and haul route will not create any additional safety concerns to the surrounding road network.

Collisions in the area have been trending lower due to changes in traffic patterns, and the majority of collisions occur in good lighting and dry road conditions showing that the route is not deficient in any way. Driver behaviour appears to be the leading cause of collisions with only 19% of drivers reported to be driving properly at the time of their collisions. The Town and Region should explore additional signage and driver education to improve driver behaviour as mitigation measures aiming to reduce collisions in the area.

Dump truck collisions make up a very small proportion of the total collisions along the route at approximately 0.55 dump truck collisions per year, despite being an active haul route that experiences elevated levels of dump truck activity. The dump truck collisions that did occur show a similar distribution of outcomes compared to regular vehicle collisions in the area. No fatalities have occurred, and the majority of collisions result in property damage only. Based on the analysis of dump truck collisions, all 7 occurred in the through lanes, indicating poor driving behaviour is likely the leading cause of dump truck collisions in the area. Finally, the dump truck collisions generally coincided with the peak hours of traffic and the peak hours of collisions which shows that dump truck hauling activities do not change when collisions typically happen.

It is TYLin's opinion that the proposed development would not pose any additional risk of collisions to the existing haul route through its operations and supports the proposed development.

Transportation Study Version

A summary of the changes made to the "Revised July 2023" and the "Revised March 2025" Caledon Quarry Transportation Impact Study and Haul Route Assessment is provided in **Appendix N**.

APPENDIX A

Pre-Consultation Correspondence

Michael Dowdall

Subject: FW: Transportation Study - Terms of Reference - Input Request

---

From: Arash Olia <Arash.Olia@caledon.ca>
Sent: Saturday, December 19, 2020 8:22 PM
To: Alycia Gruchalla <AGruchalla@tmig.ca>
Cc: Michael Dowdall <MDowdall@tmig.ca>
Subject: RE: Transportation Study - Terms of Reference - Input Request

Hi Alycia,

Based on the terms of reference for the TIS, the subject application is located on Charleston Sideroad between Mississauga Road and Main Street (RR 136). Since Charleston Sideroad is a regional road, and the other intersections mentioned in the TIS are either regional or MTO highways (with the possible exception of Cataract Road and any proposed internal roads) review of the TIS ToR's should primarily be addressed by the Region of Peel.

Regarding first principals vs ITE guidelines for trip generation, note the following, I would recommend to take a conservative approach regarding trip generation and use whatever methodology would result in the higher trip generation numbers.

Regards,

Arash Olia, P.Eng., Ph.D.
Manager, Transportation Engineering
Engineering Services Department

Office: 905.584.2272 x.4073
Cell: 416.452.7091
Email: arash.olia@caledon.ca

Town of Caledon | www.caledon.ca | www.visitcaledon.ca | Follow us @YourCaledon

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From: Alycia Gruchalla <agruchalla@tmig.ca>
Sent: Thursday, December 17, 2020 3:03 PM
To: Arash Olia <Arash.Olia@caledon.ca>
Cc: Michael Dowdall <mdowdall@tmig.ca>
Subject: Transportation Study - Terms of Reference - Input Request

Hello Arash,

TMIG has been retained to perform a haul route assessment and transportation impact study in support of the proposed CBM Aggregates, a division of St. Marys Cement Inc., Caledon Quarry project in the Town of Caledon.

Michael Dowdall

From: Khan, Ayesha <ayesha.khan@peelregion.ca>
Sent: Friday, January 15, 2021 9:20 AM
To: Alycia Gruchalla
Cc: Michael Dowdall; Hamdani, Hashim
Subject: RE: Transportation Study - Terms of Reference - Input Request

Good morning Alycia,
We've reviewed your terms of reference submitted in support of the Caledon Quarry Project and wish to offer the following comments:

- We are satisfied with the study area scope/road network;
- We are satisfied with the horizon of 10 years post full build-out for the analyses;
- Please contact Transportation to confirm growth rates along the subject Regional road(s).
- Please contact Damian Jamroz (damian.jamroz@peelregion.ca), Supervisor of Traffic Operations to obtain the most recent TMCs and/or average annual daily traffic (AADT).
- Please contact Rick Laing (rick.laing@peelregion.ca), Supervisor of Traffic Signals and Streetlighting, to obtain traffic signal timing parameters and ensure that the information includes the appropriate walk/don't walk splits, recall modes and offsets.
- Please contact Development Services Planning staff to obtain details on surrounding developments in the area that would affect traffic capacity in the planning horizon year(s)
- Please see the following link for further details on our website for the preferred general layout and requirements of the TIS -https://www.peelregion.ca/pw/transportation/business/traffic-impact-study.asp

Feel free to reach out to me if you have any further questions.

Thank you,

Ayesha Khan
Technical Analyst, Traffic Development & Permits
Traffic Engineering
Region of Peel
10 Peel Centre Drive, Suite B, 4th Floor
Brampton, ON L6T 4B9
(905) 791 - 7800 ext. **7909**

Region of Peel
working with you

From: Alycia Gruchalla <AGruchalla@tmig.ca>
Sent: January 5, 2021 2:22 PM
To: Khan, Ayesha <ayesha.khan@peelregion.ca>
Cc: Carrick, Sean <sean.carrick@peelregion.ca>; Michael Dowdall <MDowdall@tmig.ca>
Subject: Transportation Study - Terms of Reference - Input Request

Michael Dowdall

From: Yousaf, Kamran (MTO) <Kamran.Yousaf@ontario.ca>
Sent: Friday, June 25, 2021 5:00 PM
To: Sara Rahman
Cc: Alycia Gruchalla; Aurini, Shawn (MTO); Lau, Wes (MTO); Zivkovic, Branko (MTO); Hakomaki, Eric (MTO)
Subject: RE: Terms of Reference Contact
Attachments: 16470 - 10 & RR24 - 26-09-18.pdf; Signalized_Hwy 10 at RR 24 - Charleston Sideroad - Main St.pdf; General Guidelines for the Preparation of Traffic Impact Studies Feb 2021.pdf

Hi Sara,

After review of the draft TIS submitted for the proposed quarry in Caledon, MTO would recommend the following:

Since Highway 10 and RR24 intersection is mentioned in the analysis of the study, MTO recommends utilizing the following documents listed in preparation of the TIS:

- Ministry's TIS guideline;
- Ministry's TMC from 2018;
- Ministry's signal timing plan at Hwy 10/RR24 intersection.
- Published traffic volume data: https://www.library.mto.gov.on.ca/SydneyPLUS/TechPubs/Portal/tp/tvSplash.aspx

All documents have been attached for your reference.

Thank you,
Kamran Yousaf

From: Sara Rahman <SRahman@tmig.ca>
Sent: June 24, 2021 12:22 PM
To: Yousaf, Kamran (MTO) <Kamran.Yousaf@ontario.ca>
Cc: Alycia Gruchalla <AGruchalla@tmig.ca>; Aurini, Shawn (MTO) <Shawn.Aurini@ontario.ca>
Subject: RE: Terms of Reference Contact

Hi Kamran,

I am following up on my previous email about the proposed terms of reference for the new Caledon Quarry project (please see attached). I wanted to confirm if you had any questions or comments about the proposed scope of work.

Thanks,

Sara Rahman
TMIG | **TYLI**
+1.905.738.5700 x261 | c: +1.403.862.8438

Date: May 6, 2021
From: Sara Rahman, The Municipal Infrastructure Group Ltd.
Re: Growth Rates Data Request – Charleston Road between Mississauga Road and Hurontario Street

Sara,
Here are the estimated CAGR values for Charleston Road between Mississauga Road and Hurontario Street:

2016 – 2021	2021 – 2031
0.5%	0.5%

These growth rates are estimated based on multiple sources including Peel Travel Demand forecasting model, ATR and land use/forecasts data. Please note that this area may be further affected by future growth (after 2031 and beyond). Please use your professional judgement when using these values.

If you require further assistance, please contact me at (905) 791-7800 ext. 4810.

Regards,

Tiggy Chen
Co-op Student, Transportation System Planning
Transportation Division, Public Works Services, Region of Peel
10 Peel Centre Drive, Suite B, 4th Floor
Brampton, ON L6T 4B9
W: (905) 791-7800 x4810 C: (647) 918-2827
E: tiggy.chen@peelregion.ca

Date: May 6, 2021
From: Sara Rahman, The Municipal Infrastructure Group Ltd.
Re: Growth Rates Data Request – Main Street north of Charleston Road

Sara,
Here are the estimated CAGR values for Main Street north of Charleston Road:

2016 – 2021	2021 – 2031
0.5%	0.5%

These growth rates are estimated based on multiple sources including Peel Travel Demand forecasting model, ATR and land use/forecasts data. Please note that this area may be further affected by future growth (after 2031 and beyond). Please use your professional judgement when using these values.

If you require further assistance, please contact me at (905) 791-7800 ext. 4810.

Regards,

Tiggy Chen
Co-op Student, Transportation System Planning
Transportation Division, Public Works Services, Region of Peel
10 Peel Centre Drive, Suite B, 4th Floor
Brampton, ON L6T 4B9
W: (905) 791-7800 x4810 C: (647) 918-2827
E: tiggy.chen@peelregion.ca

Michael Dowdall

From: Arash Olia <Arash.Olia@caledon.ca>
Sent: Thursday, May 6, 2021 3:19 PM
To: Sara Rahman
Cc: Alycia Gruchalla
Subject: RE: Transportation Study - Terms of Reference - Input Request

Hi Sara – assume 2% for Cataract Road and for Highway 10; I have no contact person. You should reach out to MTO for that.

Arash Olia, Ph.D., P.Eng.
Manager, Transportation Engineering
Engineering Services Department

Office: 905.584.2272 x.4073
Cell: 416.452.7091
Email: arash.olia@caledon.ca

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---

From: Sara Rahman <SRahman@tmig.ca>
Sent: Thursday, May 6, 2021 2:30 PM
To: Arash Olia <Arash.Olia@caledon.ca>
Cc: Alycia Gruchalla <AGruchalla@tmig.ca>
Subject: RE: Transportation Study - Terms of Reference - Input Request

Hi Arash,

As per the correspondence below, I was wondering if you have information about growth rate data, or if you could direct me to the appropriate contact regarding this information? Please see below the sections of roadways we are interested in.

Roadway	Interested Roadway Section	
	From	To
Hurontario Street (Highway 10)	Beechgrove Side Road	Escarpment Side Road
Cataract Road	Charleston Sideroad (Peel Regional Road 24)	Mississauga Road

Please let me know if you have any questions!

Thanks,

Sara Rahman, B.A.Sc, E.I.T.
Transportation Planner

TMIG | **TYLI**

Michael Dowdall

From: Arash Olia <Arash.Olia@caledon.ca>
Sent: Thursday, May 6, 2021 3:54 PM
To: Sara Rahman; Kant Chawla
Cc: Alycia Gruchalla
Subject: RE: [Update] RE: Growth Rate Request for Transportation Study

You can assume 2%.

Arash Olia, Ph.D., P.Eng.
Manager, Transportation Engineering
Engineering Services Department

Office: 905.584.2272 x.4073
Cell: 416.452.7091
Email: arash.olia@caledon.ca

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---

From: Sara Rahman <SRahman@tmig.ca>
Sent: Thursday, May 6, 2021 3:37 PM
To: Kant Chawla <Kant.Chawla@caledon.ca>; Arash Olia <Arash.Olia@caledon.ca>
Cc: Alycia Gruchalla <AGruchalla@tmig.ca>
Subject: RE: [Update] RE: Growth Rate Request for Transportation Study

Thank you, Kant!

Arash, thank you for providing me with growth rate information for Cataract Road, as per our previous correspondence. I have contacted the MTO about growth rate information regarding Hurontario Street. All that is left is the growth rate for Mississauga Road. Please see in the correspondence below for the sections of Mississauga Road that we are interested in.

Let me know if you have any questions.

Best,

Sara Rahman
TMIG | **TYLI**
+1.905.738.5700 x261 | c: +1.403.862.8438

From: Kant Chawla <Kant.Chawla@caledon.ca>
Sent: Thursday, May 6, 2021 3:30 PM
To: Sara Rahman <SRahman@tmig.ca>
Cc: Alycia Gruchalla <AGruchalla@tmig.ca>; Arash Olia <Arash.Olia@caledon.ca>
Subject: RE: [Update] RE: Growth Rate Request for Transportation Study

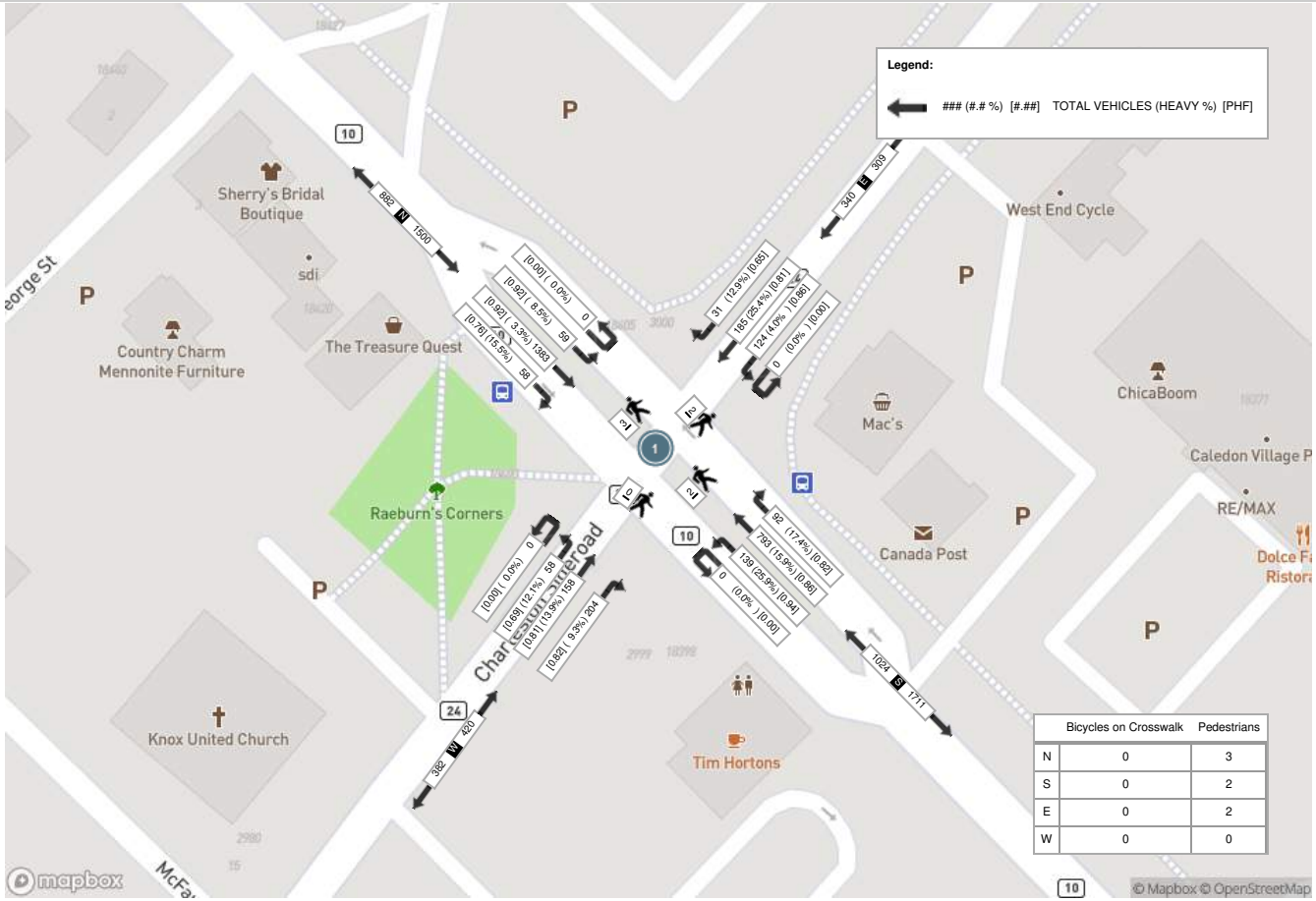
Sara , thank you for your email! By way of copy , I am requesting Arash and his section to assist you with your data request as appropriate.

APPENDIX B

Existing Traffic Data

TYLin
200 8800 DUFFERIN STREET
VAUGHAN ONTARIO, L4K 0C5
CANADA

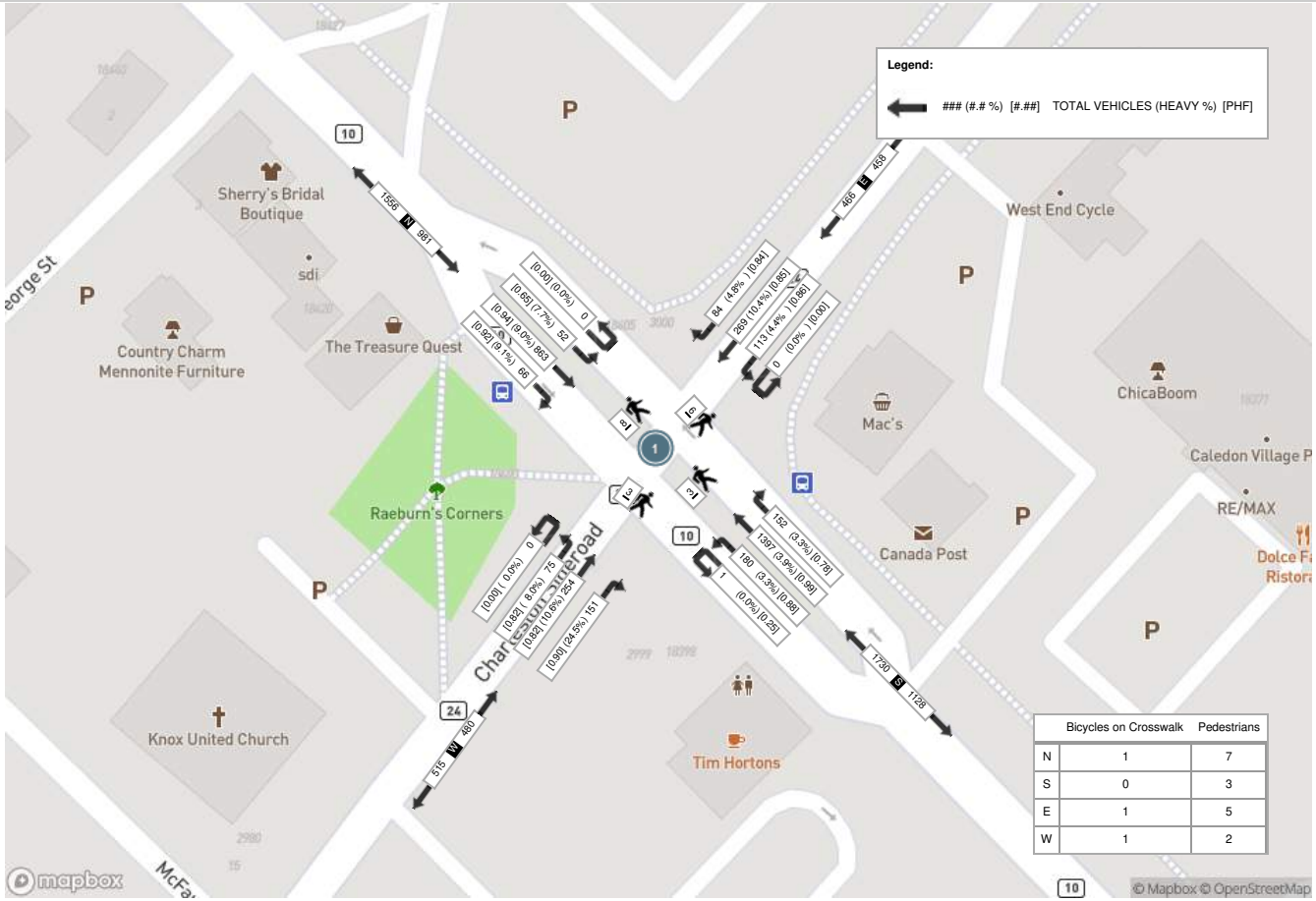
Peak Hour: 07:15 AM - 08:15 AM **Weather: Clear Sky (14.12 °C)**



	Bicycles on Crosswalk	Pedestrians
N	0	3
S	0	2
E	0	2
W	0	0

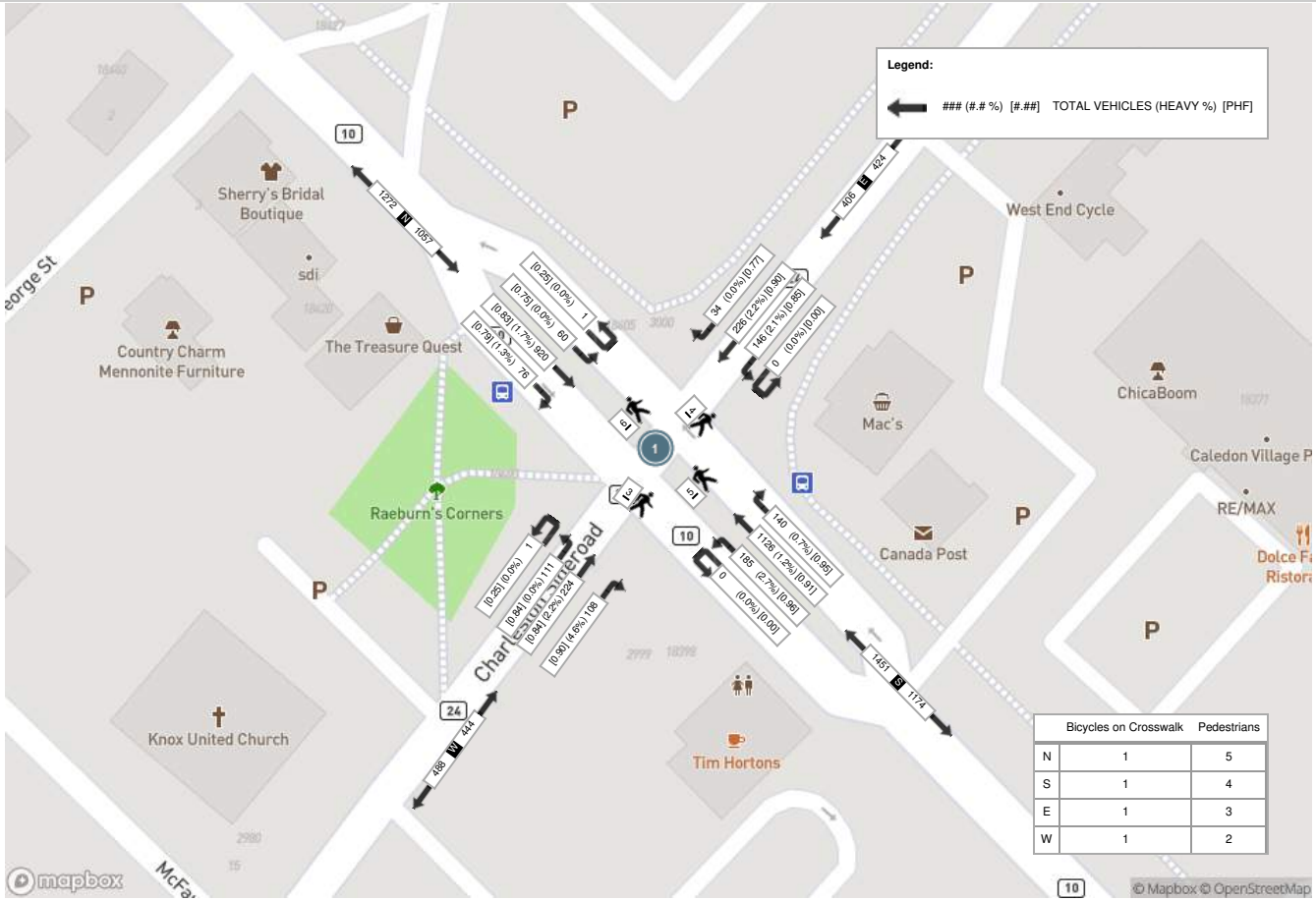
TYLin
200 8800 DUFFERIN STREET
VAUGHAN ONTARIO, L4K 0C5
CANADA

Peak Hour: 04:00 PM - 05:00 PM **Weather: Broken Clouds (23.66 °C)**

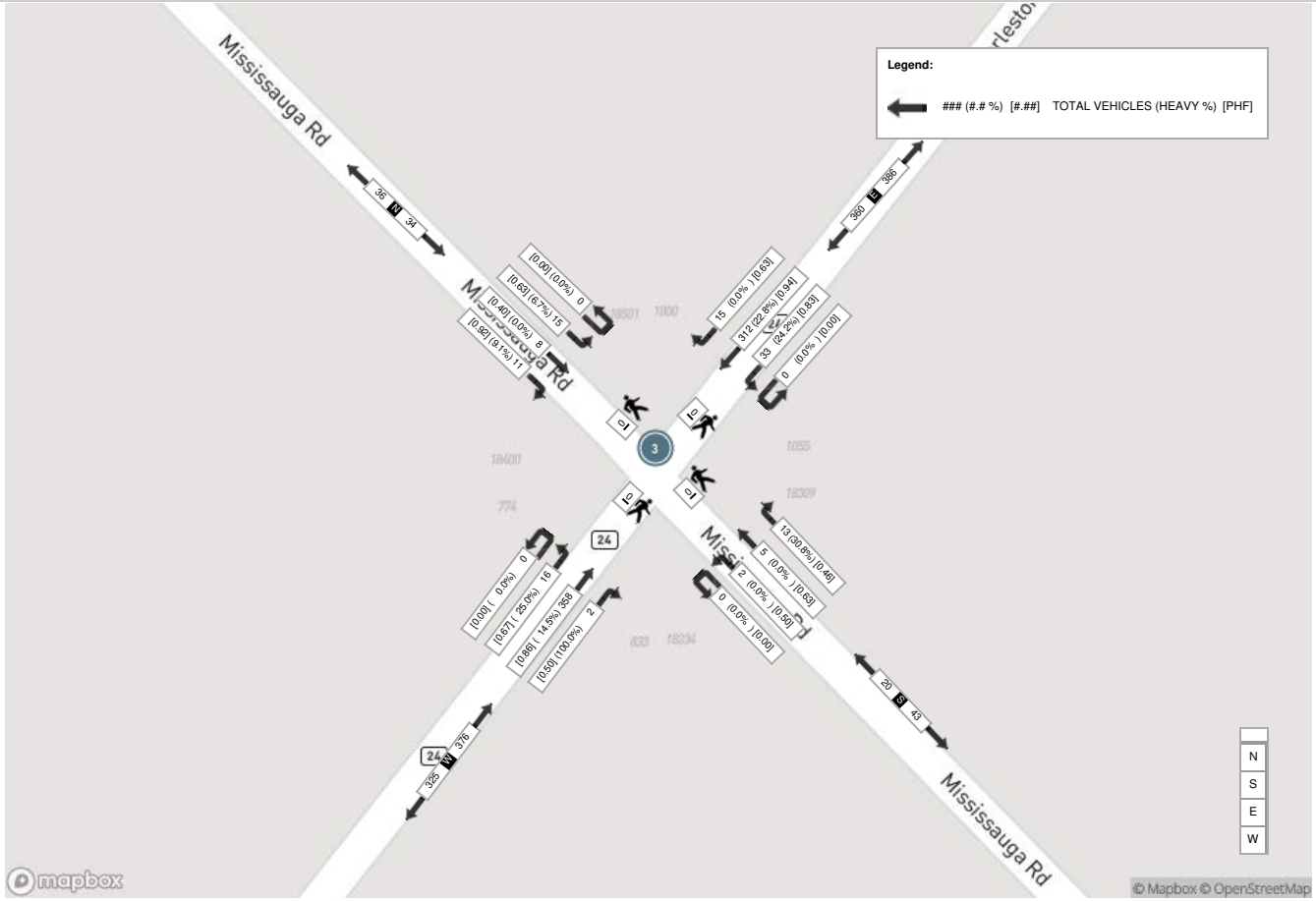


TYLin
200 8800 DUFFERIN STREET
VAUGHAN ONTARIO, L4K 0C5
CANADA

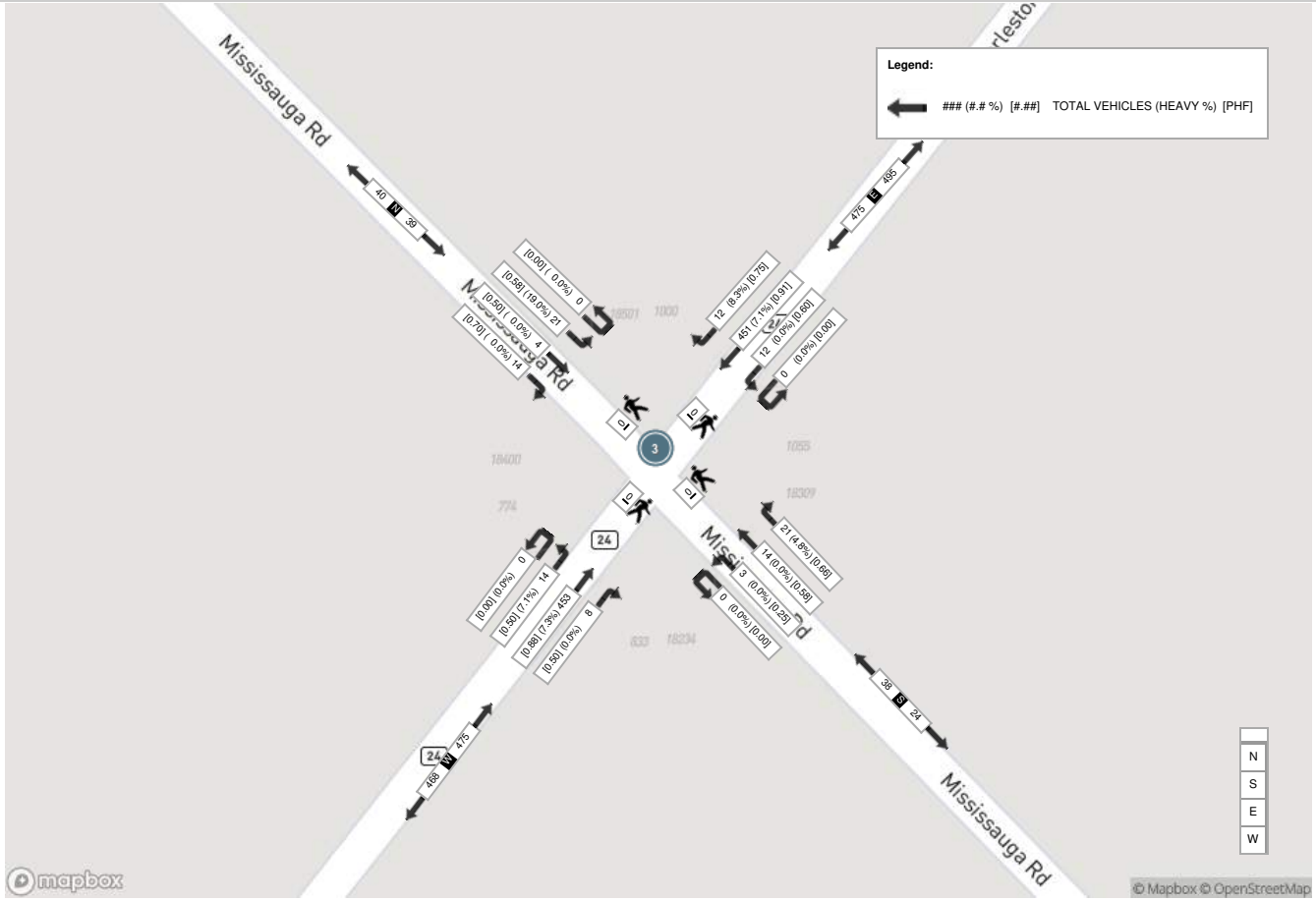
Peak Hour: 12:30 PM - 01:30 PM **Weather: Light Rain (17.81 °C)**



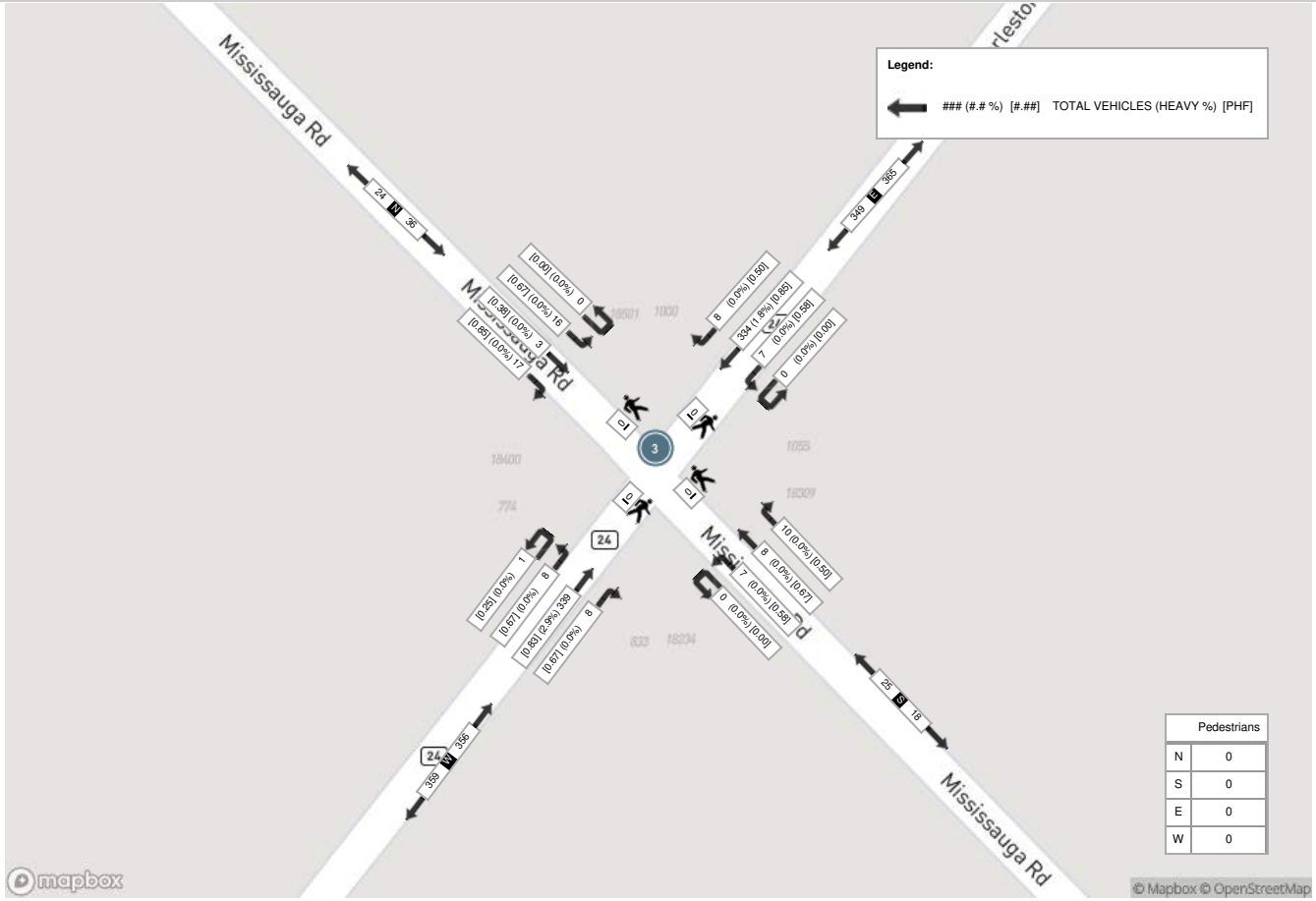
Peak Hour: 07:45 AM - 08:45 AM **Weather: Clear Sky (14.12 °C)**



Peak Hour: 04:30 PM - 05:30 PM **Weather: Broken Clouds (23.66 °C)**

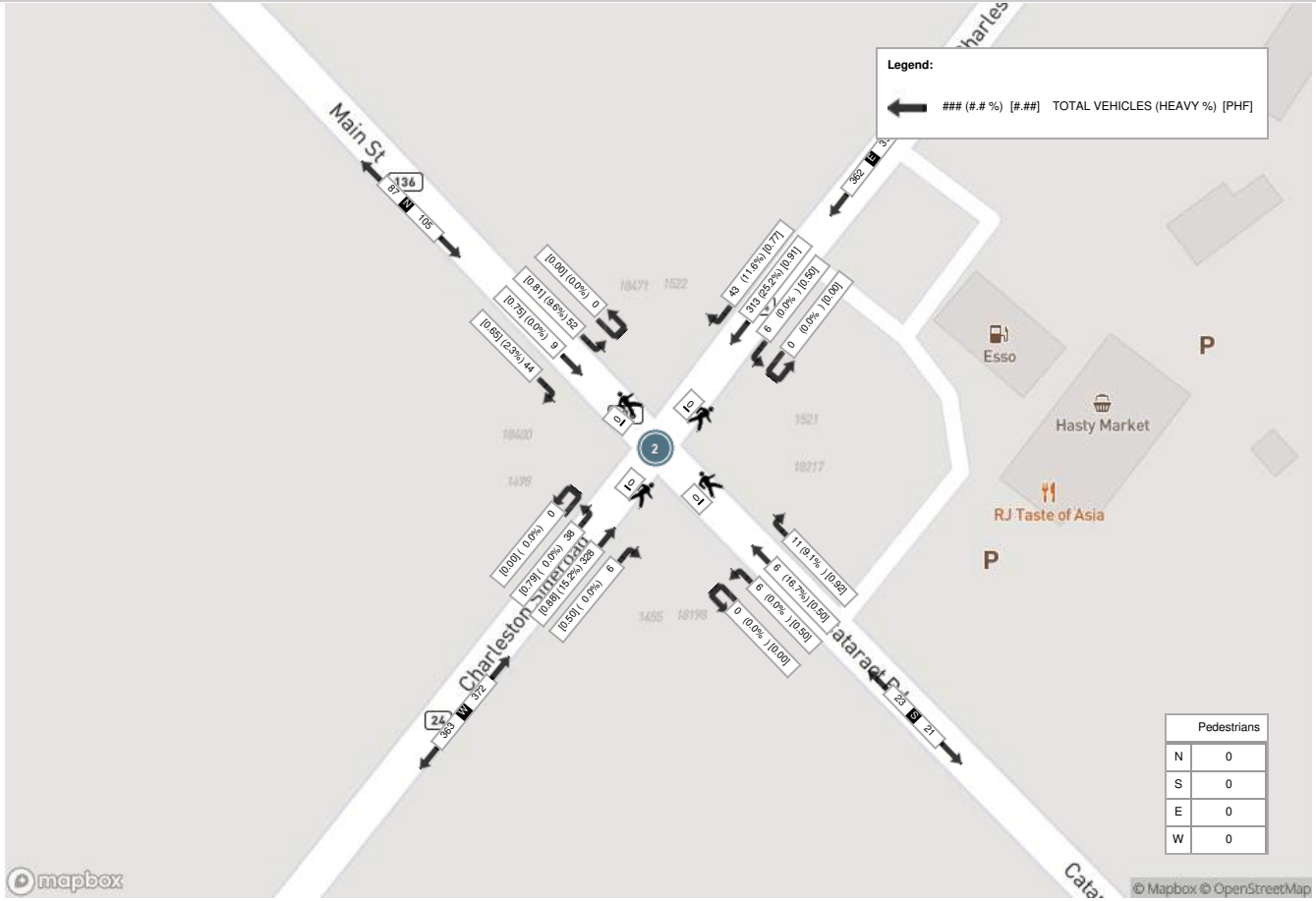


Peak Hour: 02:00 PM - 03:00 PM **Weather: Moderate Rain (22.45 °C)**



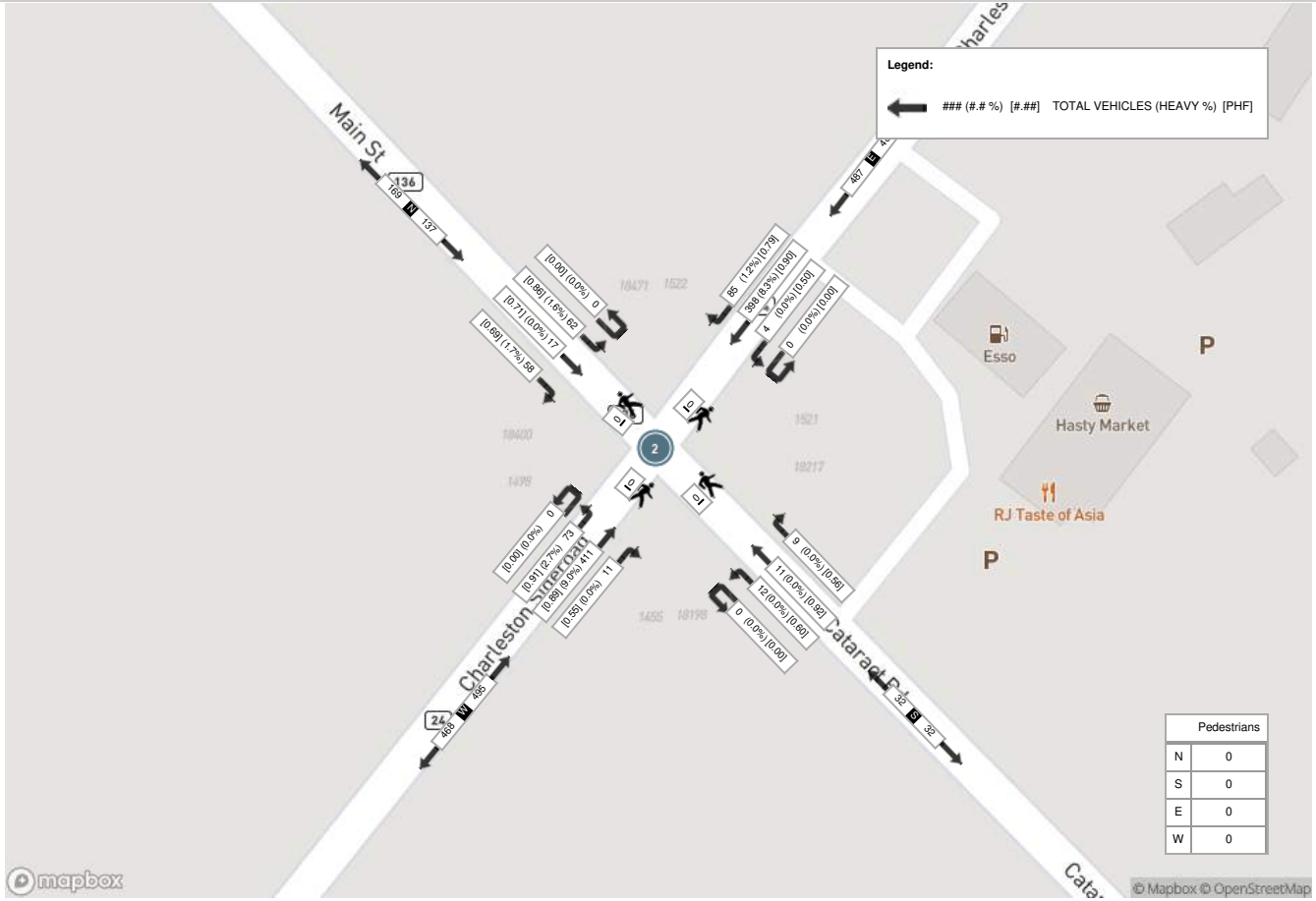
TYLin
200 8800 DUFFERIN STREET
VAUGHAN ONTARIO, L4K 0C5
CANADA

Peak Hour: 07:45 AM - 08:45 AM **Weather: Clear Sky (14.12 °C)**



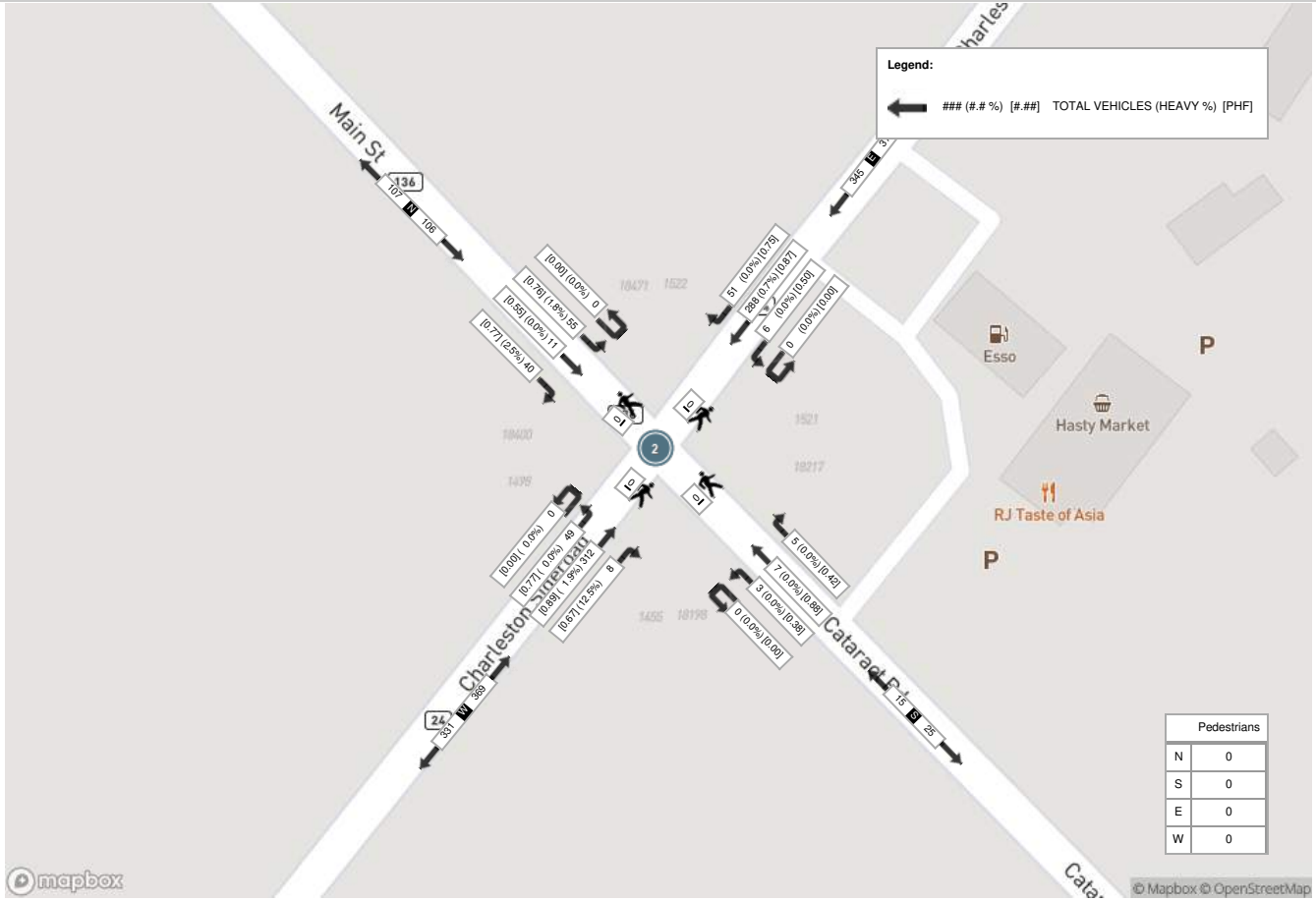
TYLin
200 8800 DUFFERIN STREET
VAUGHAN ONTARIO, L4K 0C5
CANADA

Peak Hour: 04:30 PM - 05:30 PM **Weather: Broken Clouds (23.66 °C)**



TYLin
200 8800 DUFFERIN STREET
VAUGHAN ONTARIO, L4K 0C5
CANADA

Peak Hour: 02:45 PM - 03:45 PM **Weather: Moderate Rain (22.45 °C)**



GENERIC SIGNAL TIMING SHEET

ACTUATED [X] PRE-TIMED [ ] SIGNAL TO BE MAINTAINED BY Peel Region

LOCATION: Highway 10 at Charleston Side Road SIGNAL TO BE OPERATED BY: MTO

MAINSTREET (HWY): Highway 10 TIMING DEVELOPED BY: MTO

DATE TIMING DEVELOPED : 2018-09-26

GENERIC TIMING IDENTIFIED HERE SHALL BE TRANSCRIBED ONTO "OFFICIAL" TIMING SHEETS FOR THE TRAFFIC SIGNAL CONTROLLER BEING USED AT THIS SIGNALIZED INTERSECTION. A COPY OF THE "OFFICIAL" LOCAL TIMING SHEETS AND COORDINATION SHEETS IF USED, SHALL BE ATTACHED TO THIS FORM AND FILED IN THE MTO REGIONAL TRAFFIC OFFICE

OPERATIONAL NOTES:

1. All Prot/Perm left turn movements shall be followed by parent through movements without exception
2. If serving F2 and F6 the signal must cycle to F4 and/or F8 prior to serving a call for F1 and/or F5 if these left turn movements are protected/permissive.
3. If serving F4 and F8, the signal must cycle to F2 and/or F6 prior to serving a call for F3 and /or F7 if these left turn movements are protected/permissive.
4. Through Movements shall lag left turn movements unless otherwise specified.
5. 70 km/h operating speed used for Highwy 10 calculations, 60 km/h for RR 24.

FUNCTION/OPERATION	MOVEMENT (FAZE)							
	NB LEFT	NB THRU	WB LEFT	WB THRU	SB LEFT	SB THRU	EB LEFT	EB THRU
PERMITTED MOVEMENTS	X	X	X	X	X	X	X	X
RED LOCK								
AMBER LOCK								
VEHICLE RECALL								
PEDESTRIAN RECALL		X				X		
VEHICLE MAX RECALL								
OVERLAP A								
OVERLAP B								
PROT/PERM LEFT TURN ARROW	X		X		X		X	
PROT/PERM FAST FLASH ADVANCE GREEN								
FULLY PROTECTED LEFT TURN								
DISPLAY AMBER ON STARTUP		X				X		
PLACE PED CALLS ON STARTUP		X		X		X		X
PLACE VEHICLE CALLS ON STARTUP	X	X	X	X	X	X	X	X
REST IN WALK								
MOVEMENTS MUST GAP OUT SIMULTANEOUSLY		X		X		X		X
DOUBLE ENTRY		X		X		X		X
EXCLUSIVE (SEPERATE) PHASING BY APPORACH								

Region of Peel
Working for you

FIELD COPY

Intersection Name	Road Code	Int. #	Sys #	Rev.
Hwy. 10 @ Charleston	00000013	9939	0	9

Controller Make	Model	Firmware Rev. No.
McCain	2070ATC	

*- Start From Main Menu 0

Revision

NO	Date Y	Date M	Date D	Description	Field Chg by
9	18			Implement Timing Provided by MTO	GUILD

*- Start From Main Menu

PHASE DESCRIPTION

Ph1	Hwy. 10 - S/B L.T.	Ph5	Hwy. 10 - N/B L.T.
Ph2	Hwy. 10 - N/B	PH6	Hwy. 10 - S/B
Ph3	Charleston - W/B L.T.	Ph7	Charleston - E/B L.T.
Ph4	Charleston - E/B	Ph8	Charleston - W/B

CONFIGURATION SU phase 2 & 6 jumpered to recall main street ped

Port Protocol.....:	Terminal
Port 2 Enable.....:	X
Telemetry Address.....:	0
System Detector address....:	0
Telem response delay.....:	8700
Duplex - Half or Full.....:	Full
Modem Data Rate (BPS).....:	19.2 k
Data, Parity, Stop.....:	8,N,1

CONFIGURATION SUBMENU - controller sequence

	..1	..2	..3	..4	..5	..6
R1	1	2	3	4	9	10
R2	5	6	7	8	11	12

CONFIGURATIUON SUBMENU - PHASES IN USE

Phase:	1	2	3	4	5	6	7	8
Phase in use :	X	X	X	X	X	X	X	X
Exclusive Ped :	0	0	0	0	0	0	0	0

CONTROLLER SUBMENU - TIMING DATA

Phase:	1	2	3	4	5	6	7	8
Minimum Green..... :	7	20	7	10	7	20	7	10
Walk..... :	0	21	0	22	0	21	0	22
Pedestrian Clearance. :	0	16	0	17	0	16	0	17
Veh. Ext. :	3	4.4	3	3	3	4.4	3	3
Veh. Ext. 2 :	0	0	0	0	0	0	0	0
Max. Ext. :	0	0	0	0	0	0	0	0
Maximum No 1..... :	10	55	7	20	10	55	7	20
Maximum No 2..... :	0	67	0	25	19	67	0	25
Maximum No 3..... :	0	0	0	0	0	0	0	0
Yellow .... :	3	5.0	3	4.5	3	5.0	3	4.5
Red Clr..... :	0	2.4	0	2.4	0	2.4	0	2.4
Detector Delay...	5	0	10	10	5	0	10	10

CONTROLLER SUBMENU - RECALL DATA

Phase:	1	2	3	4	5	6	7	8
Locking Memory :	0	0	0	0	0	0	0	0
Vehicle Recall :	0	X	0	0	0	X	0	0
Ped Recall	0	X	0	0	0	X	0	0
Recall to Max	0	0	0	0	0	0	0	0
Soft Recall	0	0	0	0	0	0	0	0
Don't Rest Here	0	0	0	0	0	0	0	0
Ped Dark n/call	0	0	0	0	0	0	0	0

CONTROLLER SUBMENU - START/FLASH DATA

Phase:	1	2	3	4	5	6	7	8
Power Start	0	X	0	0	0	X	0	0
External Start:	0	X	0	0	0	X	0	0
Power start All Red Time	0	0	0	0	0	0	0	0
Power Start Flash time	0	15	0	0	0	15	0	0
Out of Flash Yellow	0	X	0	0	0	X	0	0
Out of Flash All Red	0	0	0	0	0	0	0	0

CONTROLLER SUBMENU - OPTION DATA

Phase:	1	2	3	4	5	6	7	8
Guar Passage :	0	0	0	X	0	0	0	X
Nonactuated 1 :	0	0	0	0	0	0	0	0
Nonactuated 2	0	0	0	0	0	0	0	0
Dual Entry	0	X	0	X	0	X	0	X
Cond Service	X	0	X	0	X	0	X	0
Rest in Walk	0	X	0	0	0	X	0	0
Flashing Walk	0	0	0	0	0	0	0	0
Phase Omit..... :	2	0	4	0	6	0	8	0
Phase - Yellow..... :	0	0	0	0	0	0	0	0

Enable Programming options Dual Entry..... X

NIC/TOD - NIC PROGRAM STEPS * - 5 - 5

Step	PGM	Time	Pattern	Override
1	1	00:00	0	
2	1	05:30	1	
3	1	09:30	2	
4	1	15:00	~~3~~	
5	1	19:00	2	
6	2	00:00	0	

NIC/TOD - TOD PROGRAM STEPS * - 5 - 6

TOD PROG Step 1
DAY PGM NUM....1
Step Begins....00:00

PHASE	1	2	3	4	5	6	7	8
MAX 2 ENABLE	.	.	.	.	.	.	.	.
MAX 3 ENABLE	.	.	.	.	.	.	.	.
VEH RECALL	.	.	.	.	.	.	.	.
VEH MAX RECALL	.	.	.	.	.	.	.	.
PED RECALL	.	.	.	.	.	.	.	.
PHASE OMIT	.	.	.	.	.	.	.	.

PATTERN 2

TOD PROG Step 2
DAY PGM NUM....1
Step Begins....05:30

PHASE	1	2	3	4	5	6	7	8
MAX 2 ENABLE	.	X	.	X	.	X	.	X
MAX 3 ENABLE	.	.	.	.	.	.	.	.
VEH RECALL	.	.	.	.	.	.	.	.
VEH MAX RECALL	.	.	.	.	.	.	.	.
PED RECALL	.	.	.	.	.	.	.	.
PHASE OMIT	.	.	.	.	.	.	.	.

PATTERN 1

TOD PROG Step 3
DAY PGM NUM....1
Step Begins....09:30

PHASE	1	2	3	4	5	6	7	8
MAX 2 ENABLE	.	.	.	.	.	.	.	.
MAX 3 ENABLE	.	.	.	.	.	.	.	.
VEH RECALL	.	.	.	.	.	.	.	.
VEH MAX RECALL	.	.	.	.	.	.	.	.
PED RECALL	.	.	.	.	.	.	.	.
PHASE OMIT	.	.	.	.	.	.	.	.

PATTERN 2

TOD PROG Step 4
DAY PGM NUM....1
Step Begins....15:00

PHASE	1	2	3	4	5	6	7	8
MAX 2 ENABLE	.	X	.	X	X	X	.	X
MAX 3 ENABLE	.	.	.	.	.	.	.	.
VEH RECALL	.	.	.	.	.	.	.	.
VEH MAX RECALL	.	.	.	.	.	.	.	.
PED RECALL	.	.	.	.	.	.	.	.
PHASE OMIT	.	.	.	.	.	.	.	.

PATTERN 3

TOD PROG Step 5
DAY PGM NUM....1
Step Begins....19:00

PHASE	1	2	3	4	5	6	7	8
MAX 2 ENABLE	.	.	.	.	.	.	.	.
MAX 3 ENABLE	.	.	.	.	.	.	.	.
VEH RECALL	.	.	.	.	.	.	.	.
VEH MAX RECALL	.	.	.	.	.	.	.	.
PED RECALL	.	.	.	.	.	.	.	.
PHASE OMIT	.	.	.	.	.	.	.	.

PATTERN 2

TOD PROG Step 6
DAY PGM NUM....2
Step Begins....00:00

PHASE	1	2	3	4	5	6	7	8
MAX 2 ENABLE	.	.	.	.	.	.	.	.
MAX 3 ENABLE	.	.	.	.	.	.	.	.
VEH RECALL	.	.	.	.	.	.	.	.
VEH MAX RECALL	.	.	.	.	.	.	.	.
PED RECALL	.	.	.	.	.	.	.	.
PHASE OMIT	.	.	.	.	.	.	.	.

NIC/TOD - WEEKLY PROGRAMS *-5-2

WEEK	SUN	MON	TUE	WED	THU	FRI	SAT
1	2	1	1	1	1	1	2
2							
3							
4							
5							
6							
7							
8							
9							
10							

comments: MAX II Active in AM & PM
05:30 to 09:30
15:00 to 19:00

Authorized Signature: R. Laing Date: OCT. 10/18

PLEASE IMPLEMENT THESE TIMING WHEN LOOPS FAILED.

GENERIC SIGNAL TIMING SHEET

ACTUATED ☐ PRE-TIMED ☒ SIGNAL TO BE MAINTAINED BY Peel Region

LOCATION: Highway 10 at Charleston Side Road SIGNAL TO BE OPERATED BY: MTO

MAINSTREET (HWY): Highway 10 TIMING DEVELOPED BY: MTO

DATE TIMING DEVELOPED : 2018-09-26

GENERIC TIMING IDENTIFIED HERE SHALL BE TRANSCRIBED ONTO "OFFICIAL" TIMING SHEETS FOR THE TRAFFIC SIGNAL CONTROLLER BEING USED AT THIS SIGNALIZED INTERSECTION. A COPY OF THE "OFFICIAL" LOCAL TIMING SHEETS AND COORDINATION SHEETS IF USED, SHALL BE ATTACHED TO THIS FORM AND FILED IN THE MTO REGIONAL TRAFFIC OFFICE

OPERATIONAL NOTES:

1. All Prot/Perm left turn movements shall be followed by parent through movements without exception
2. If serving F2 and F6 the signal must cycle to F4 and/or F8 prior to serving a call for F1 and/or F5 if these left turn movements are protected/permissive.
3. If serving F4 and F8, the signal must cycle to F2 and/or F6 prior to serving a call for F3 and /or F7 if these left turn movements are protected/permissive.
4. Through Movements shall lag left turn movements unless otherwise specified.
5. 70 km/h operating speed used for Highwy 10 calculations, 60 km/h for RR 24.

FUNCTION/OPERATION	MOVEMENT (FAZE)							
	NB LEFT	NB THRU	WB LEFT	WB THRU	SB LEFT	SB THRU	EB LEFT	EB THRU
PERMITTED MOVEMENTS	X	X	X	X	X	X	X	X
RED LOCK								
AMBER LOCK								
VEHICLE RECALL	X		X	X	X		X	X
PEDESTRIAN RECALL		X				X		
VEHICLE MAX RECALL								
OVERLAP A								
OVERLAP B								
PROT/PERM LEFT TURN ARROW	X		X		X		X	
PROT/PERM FAST FLASH ADVANCE GREEN								
FULLY PROTECTED LEFT TURN								
DISPLAY AMBER ON STARTUP		X				X		
PLACE PED CALLS ON STARTUP		X		X		X		X
PLACE VEHICLE CALLS ON STARTUP	X	X	X	X	X	X	X	X
REST IN WALK								
MOVEMENTS MUST GAP OUT SIMULTANEOUSLY		X		X		X		X
DOUBLE ENTRY		X		X		X		X
EXCLUSIVE (SEPERATE) PHASING BY APPORACH								

INTERVAL TIMES	MOVEMENT (FAZE)							
	NB LEFT	NB THRU	WB LEFT	WB THRU	SB LEFT	SB THRU	EB LEFT	EB THRU
WALK		21		22		21		22
FLASHING DON'T WALK		16		17		16		17
MINIMUM GREEN	7.0	50.0	7.0	18.0	7.0	50.0	7.0	18.0
VEHICLE EXTENSION (PASSAGE TIME)	3.0	4.4	3.0	3.0	3.0	4.4	3.0	3.0
MAXIMUM GREEN (INCLUDES MIN GREEN)	10.0	60.0	7.0	25.0	10.0	60.0	7.0	25.0
MAXIMUM GREEN 2 (ALTERNATE MAX GREEN)	19.0	67.0		25.0		67.0		25.0
AMBER CLEARANCE	3.0	5.0	3.0	4.5	3.0	5.0	3.0	4.5
ALL RED CLEARANCE		2.4		2.4		2.4		2.4
MAX GAP (VEH. EXTENSION)	3.0	4.4	3.0	3.0	3.0	4.4	3.0	3.0
MIN GAP (VEH. EXTENSION)	3.0	4.4	3.0	3.0	3.0	4.4	3.0	3.0
REDUCE GAP BY								
REDUCE GAP EVERY								
MAX INITIAL GREEN TIME (VARIABLE INIT)		25				25		
TIME ADDED/VEHICLE (VARIABLE INIT)		1				1		

DETECTOR SETUP	MOVEMENT (FAZE)							
	NB LEFT	NB THRU	WB LEFT	WB THRU	SB LEFT	SB THRU	EB LEFT	EB THRU
DELAY TIME ON PRESENCE DETECTION	5.0		10.0	10.0	5.0		10.0	10.0
DELAY ON LONG DISTANCE DETECTION								
CARRY-OVER ON PRESENCE DETECTION								
CARRY-OVER ON LONG DISTANCE DETECTION								

PRE-EMPTION	MOVEMENT (FAZE)							
	NB LEFT	NB THRU	WB LEFT	WB THRU	SB LEFT	SB THRU	EB LEFT	EB THRU
1ST EMERG. PRE-EMPT MOVEMENTS		X				X		
1ST EMERG. PRE-EMPT DELAY TIME								
1ST EMERG. PRE-EMPT CLEARANCE TIME								
2ND EMERG. PRE-EMPT MOVEMENTS				X				X
2ND EMERG. PRE-EMPT DELAY TIME								
2ND EMERG. PRE-EMPT CLEARANCE TIME								
RR PRE-EMPT TRACK CLEARANCE MOVEMENTS								
RR PRE-EMPT CLEARANCE TIME								
RR PRE-EMPT DELAY TIME								
RR PRE-EMPT LIMITED SERVICE MOVEMENTS								

TIME OF DAY OPERATIONS	TIME OF DAY		DAY OF WEEK							MOVEMENT (FAZE)							
	START	END	S	M	T	W	T	F	S	NB LEFT	NB THRU	WB LEFT	WB THRU	SB LEFT	SB THRU	EB LEFT	EB THRU
PHASE OMIT																	
MAX RECALL	05:30	09:30		X	X	X	X	X			X		X		X		X
MAX RECALL	15:00	19:00		X	X	X	X	X		X	X		X		X		X
PED RECALL																	
MIN RECALL																	
MAX GREEN 2																	
REST IN WALK																	
AMBER LOCK																	
RED LOCK																	

GENERIC SIGNAL TIMING SHEET

ACTUATED [X] PRE-TIMED [ ] SIGNAL TO BE MAINTAINED BY Peel Region

LOCATION: Highway 10 at Charleston Side Road SIGNAL TO BE OPERATED BY: MTO

MAINSTREET (HWY): Highway 10 TIMING DEVELOPED BY: MTO

DATE TIMING DEVELOPED : 2018-09-26

GENERIC TIMING IDENTIFIED HERE SHALL BE TRANSCRIBED ONTO "OFFICIAL" TIMING SHEETS FOR THE TRAFFIC SIGNAL CONTROLLER BEING USED AT THIS SIGNALIZED INTERSECTION. A COPY OF THE "OFFICIAL" LOCAL TIMING SHEETS AND COORDINATION SHEETS IF USED, SHALL BE ATTACHED TO THIS FORM AND FILED IN THE MTO REGIONAL TRAFFIC OFFICE

OPERATIONAL NOTES:

1. All Prot/Perm left turn movements shall be followed by parent through movements without exception
2. If serving F2 and F6 the signal must cycle to F4 and/or F8 prior to serving a call for F1 and/or F5 if these left turn movements are protected/permissive.
3. If serving F4 and F8, the signal must cycle to F2 and/or F6 prior to serving a call for F3 and /or F7 if these left turn movements are protected/permissive.
4. Through Movements shall lag left turn movements unless otherwise specified.
5. 70 km/h operating speed used for Highwy 10 calculations, 60 km/h for RR 24.

FUNCTION/OPERATION	MOVEMENT (FAZE)							
	NB LEFT	NB THRU	WB LEFT	WB THRU	SB LEFT	SB THRU	EB LEFT	EB THRU
PERMITTED MOVEMENTS	X	X	X	X	X	X	X	X
RED LOCK								
AMBER LOCK								
VEHICLE RECALL								
PEDESTRIAN RECALL		X				X		
VEHICLE MAX RECALL								
OVERLAP A								
OVERLAP B								
PROT/PERM LEFT TURN ARROW	X		X		X		X	
PROT/PERM FAST FLASH ADVANCE GREEN								
FULLY PROTECTED LEFT TURN								
DISPLAY AMBER ON STARTUP		X				X		
PLACE PED CALLS ON STARTUP		X		X		X		X
PLACE VEHICLE CALLS ON STARTUP	X	X	X	X	X	X	X	X
REST IN WALK								
MOVEMENTS MUST GAP OUT SIMULTANEOUSLY		X		X		X		X
DOUBLE ENTRY		X		X		X		X
EXCLUSIVE (SEPERATE) PHASING BY APPORACH								

INTERVAL TIMES	MOVEMENT (FAZE)							
	NB LEFT	NB THRU	WB LEFT	WB THRU	SB LEFT	SB THRU	EB LEFT	EB THRU
WALK		21		22		21		22
FLASHING DON'T WALK		16		17		16		17
MINIMUM GREEN	7.0	20.0	7.0	10.0	7.0	20.0	7.0	10.0
VEHICLE EXTENSION (PASSAGE TIME)	3.0	4.4	3.0	3.0	3.0	4.4	3.0	3.0
MAXIMUM GREEN (INCLUDES MIN GREEN)	10.0	55.0	7.0	20.0	10.0	55.0	7.0	20.0
MAXIMUM GREEN 2 (ALTERNATE MAX GREEN)	19.0	67.0		25.0		67.0		25.0
AMBER CLEARANCE	3.0	5.0	3.0	4.5	3.0	5.0	3.0	4.5
ALL RED CLEARANCE		2.4		2.4		2.4		2.4
MAX GAP (VEH. EXTENSION)	3.0	4.4	3.0	3.0	3.0	4.4	3.0	3.0
MIN GAP (VEH. EXTENSION)	3.0	4.4	3.0	3.0	3.0	4.4	3.0	3.0
REDUCE GAP BY								
REDUCE GAP EVERY								
MAX INITIAL GREEN TIME (VARIABLE INIT)		25				25		
TIME ADDED/VEHICLE (VARIABLE INIT)		1				1		

DETECTOR SETUP	MOVEMENT (FAZE)							
	NB LEFT	NB THRU	WB LEFT	WB THRU	SB LEFT	SB THRU	EB LEFT	EB THRU
DELAY TIME ON PRESENCE DETECTION	5.0		10.0	10.0	5.0		10.0	10.0
DELAY ON LONG DISTANCE DETECTION								
CARRY-OVER ON PRESENCE DETECTION								
CARRY-OVER ON LONG DISTANCE DETECTION								

PRE-EMPTION	MOVEMENT (FAZE)							
	NB LEFT	NB THRU	WB LEFT	WB THRU	SB LEFT	SB THRU	EB LEFT	EB THRU
1ST EMERG. PRE-EMPT MOVEMENTS		X				X		
1ST EMERG. PRE-EMPT DELAY TIME								
1ST EMERG. PRE-EMPT CLEARANCE TIME								
2ND EMERG. PRE-EMPT MOVEMENTS				X				X
2ND EMERG. PRE-EMPT DELAY TIME								
2ND EMERG. PRE-EMPT CLEARANCE TIME								
RR PRE-EMPT TRACK CLEARANCE MOVEMENTS								
RR PRE-EMPT CLEARANCE TIME								
RR PRE-EMPT DELAY TIME								
RR PRE-EMPT LIMITED SERVICE MOVEMENTS								

TIME OF DAY OPERATIONS	TIME OF DAY		DAY OF WEEK							MOVEMENT (FAZE)							
	START	END	S	M	T	W	T	F	S	NB LEFT	NB THRU	WB LEFT	WB THRU	SB LEFT	SB THRU	EB LEFT	EB THRU
PHASE OMIT																	
MAX RECALL																	
PED RECALL																	
MIN RECALL																	
MAX GREEN 2	05:30	09:30		X	X	X	X	X			X		X		X		X
MAX GREEN 2	15:00	19:00		X	X	X	X	X		X	X		X		X		X
REST IN WALK																	
AMBER LOCK																	
RED LOCK																	

REGIONAL MUNICIPALITY OF PEEL

Traffic Signal Timing Parameters

Database Date	**August 1, 2001**		**Prepared Date**	**May 7, 2021**	
Database Rev	**1**		**Completed By**	**MA**	
Timing Card / Field rev	**1**		**Checked By**	**BL**	
Location	**Charleston Sideroad @ Main Street/Cataract Road**				

Phase #	Street Name - Direction	Vehicle Minimum (s)	Pedestrian Minimum (s)		Amber (s)	All Red (s)	TIME PERIOD (s) SPLITS = Green + Amber + All Red MAX = Green Only		
			WALK	FDWALK			AM MAX	OFF MAX	PM MAX
1	Not In Use	-	-	-	-	-	-	-	-
2	Charleston Sideroad - E/W	20	8	16	4.6	2.0	40	40	40
3	Not In Use	-	-	-	-	-	-	-	-
4	Main Street/Cataract Road - N/S	16	8	16	4.6	2.0	30	30	30
5	Not In Use	-	-	-	-	-	-	-	-
6	Not In Use	-	-	-	-	-	-	-	-
7	Not In Use	-	-	-	-	-	-	-	-
8	Not In Use	-	-	-	-	-	-	-	-

Note: Phase 2 is set to min. recall

System Control

No

Semi-Actuated Mode

No

TIME (M-F)	PEAK	CYCLE LENGTH (s)	OFFSET (s)
FREE	AM	0	0
FREE	OFF	0	0
FREE	PM	0	0

INTERVAL TIMES	MOVEMENT (FAZE)							
	NB LEFT	NB THRU	WB LEFT	WB THRU	SB LEFT	SB THRU	EB LEFT	EB THRU
WALK		21		22		21		22
FLASHING DON'T WALK		16		17		16		17
MINIMUM GREEN	7.0	20.0	7.0	10.0	7.0	20.0	7.0	10.0
VEHICLE EXTENSION (PASSAGE TIME)	3.0	4.4	3.0	3.0	3.0	4.4	3.0	3.0
MAXIMUM GREEN (INCLUDES MIN GREEN)	10.0	55.0	7.0	20.0	10.0	55.0	7.0	20.0
MAXIMUM GREEN 2 (ALTERNATE MAX GREEN)	19.0	67.0		25.0		67.0		25.0
AMBER CLEARANCE	3.0	5.0	3.0	4.5	3.0	5.0	3.0	4.5
ALL RED CLEARANCE		2.4		2.4		2.4		2.4
MAX GAP (VEH. EXTENSION)	3.0	4.4	3.0	3.0	3.0	4.4	3.0	3.0
MIN GAP (VEH. EXTENSION)	3.0	4.4	3.0	3.0	3.0	4.4	3.0	3.0
REDUCE GAP BY								
REDUCE GAP EVERY								
MAX INITIAL GREEN TIME (VARIABLE INIT)		25				25		
TIME ADDED/VEHICLE (VARIABLE INIT)		1				1		

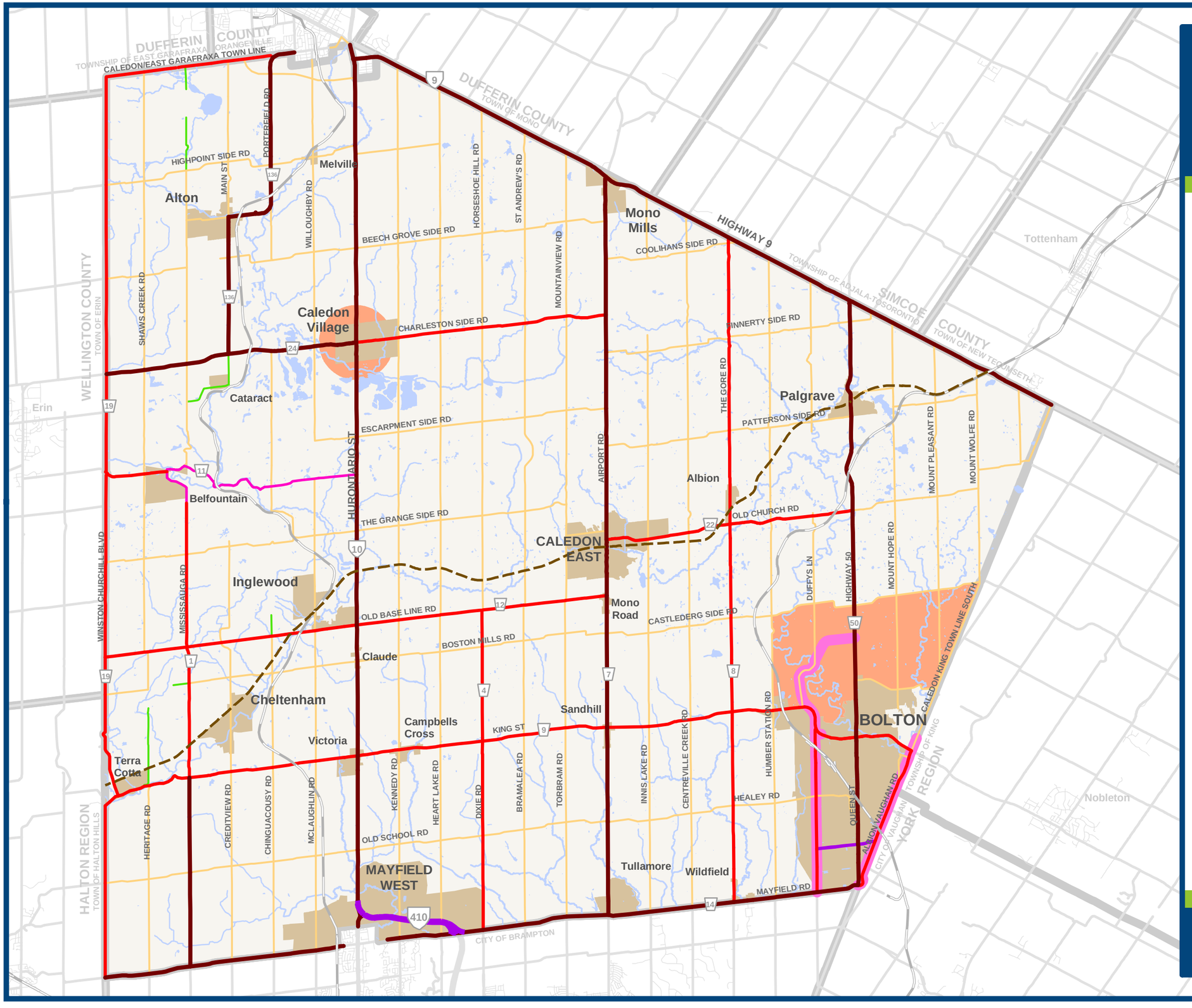
DETECTOR SETUP	MOVEMENT (FAZE)							
	NB LEFT	NB THRU	WB LEFT	WB THRU	SB LEFT	SB THRU	EB LEFT	EB THRU
DELAY TIME ON PRESENCE DETECTION	5.0		10.0	10.0	5.0		10.0	10.0
DELAY ON LONG DISTANCE DETECTION								
CARRY-OVER ON PRESENCE DETECTION								
CARRY-OVER ON LONG DISTANCE DETECTION								

PRE-EMPTION	MOVEMENT (FAZE)							
	NB LEFT	NB THRU	WB LEFT	WB THRU	SB LEFT	SB THRU	EB LEFT	EB THRU
1ST EMERG. PRE-EMPT MOVEMENTS		X				X		
1ST EMERG. PRE-EMPT DELAY TIME								
1ST EMERG. PRE-EMPT CLEARANCE TIME								
2ND EMERG. PRE-EMPT MOVEMENTS				X				X
2ND EMERG. PRE-EMPT DELAY TIME								
2ND EMERG. PRE-EMPT CLEARANCE TIME								
RR PRE-EMPT TRACK CLEARANCE MOVEMENTS								
RR PRE-EMPT CLEARANCE TIME								
RR PRE-EMPT DELAY TIME								
RR PRE-EMPT LIMITED SERVICE MOVEMENTS								

TIME OF DAY OPERATIONS	TIME OF DAY		DAY OF WEEK							MOVEMENT (FAZE)							
	START	END	S	M	T	W	T	F	S	NB LEFT	NB THRU	WB LEFT	WB THRU	SB LEFT	SB THRU	EB LEFT	EB THRU
PHASE OMIT																	
MAX RECALL																	
PED RECALL																	
MIN RECALL																	
MAX GREEN 2	05:30	09:30		X	X	X	X	X			X		X		X		X
MAX GREEN 2	15:00	19:00		X	X	X	X	X		X	X		X		X		X
REST IN WALK																	
AMBER LOCK																	
RED LOCK																	

APPENDIX C

Access Spacing Excerpts from TAC Chapter 9 and Peel RCS



Schedule J

LONG RANGE ROAD NETWORK

- Provincial Freeway
- High Capacity Arterial
- Medium Capacity Arterial
- Low Capacity Arterial
- Collector
- East-West Industrial Collector
- Local
- Trailway
- Proposed Bolton Arterial Route (BAR)

- Transportation Study Area
- Settlement

- Provincial Road
- Regional Road
- Railway

Base Data Source: Town of Caledon

0 0.5 1 2 3 4 5 km

SAVED: 2 April 2018

FILE: S:\POLICY SECTION\GIS\official_plan\mxd\9-april_2018

SAVED BY: bloverock

April 2018 Office Consolidation

5.11.2.5 Aggregate Traffic

5.11.2.5.1 Haul routes for new aggregate operations shall only be located, except as provided for in Section 5.11.2.5.2, on the High Capacity Arterials as are identified on Schedule J to this Plan and on Charleston Sideroad, Old Church Road between Regional Road 7 and Regional Road 50 and King Street between Highway 10 and Regional Road 50. Use of other roads for haul routes by existing aggregate operations can continue.

5.11.2.5.2 Access to a new or expanded aggregate operation should be via an existing entrance onto a road identified in Section 5.11.2.5.1 either directly or through the use of an inter-pit road. Where this is not possible, access via a new entrance onto a road identified in Section 5.11.2.5.1 may be considered. Access onto a road that is not a road identified in Section 5.11.2.5.1 will only be considered where there is no practical alternative and subject to satisfying the requirements of Sections 5.11.2.4.2(b) and 5.11.2.4.4(c). Such access may only be considered subject to the road being improved to a standard considered appropriate by the road authority.

Any required improvement shall be a condition of planning application approval and recommended to the appropriate authority to be a condition on the issuance of any access permit. The Applicant shall prepare a Road Improvement Study for approval by the applicable road authority to indicate the measures proposed to minimize the impacts of any road improvement. This Road Improvement Study shall include the following:

a) Existing road right-of-way characteristics, particularly vertical alignments, should be maintained as closely as possible, subject to safety considerations with an understanding that many of these roads possess inherent traffic calming characteristics;

b) Existing trees and other vegetation within the road right-of-way shall be retained wherever possible, including any scrub-like settings. Introduction of manicured boulevards as "landscaping elements" should be avoided;

c) Wood, wire, stump, and stone fence lines shall be retained wherever possible as historical landscape remnants and incorporated as "new" design elements;

d) Traditional open grassed ditches shall be used at every reasonable opportunity; and,

e) New lighting elements, such as poles or standards and luminaires shall be as unobtrusive as possible within the road right-of-way and lighting should be directed downward and shielded.

5.11.2.5.3 The identification of roads upon which haul routes shall be located in Section 5.11.2.5.1 shall be reviewed and updated as necessary by the Town of Caledon. As part of this review, the Town of Caledon will work with adjacent municipalities and the Region of Peel to minimize impacts from traffic from outside of the Town of Caledon.

9.4.2.1 Arterials

Along signalized arterial roads, vehicular traffic volumes are generally high. It is therefore desirable to provide spacing between signalized intersections that is consistent with the desired vehicular traffic progression speed and signal cycle lengths. By spacing the intersections uniformly, based on known or assumed running speeds and appropriate cycle lengths, signal progression in both directions can be achieved. Progression allows platoons of vehicles to travel through successive intersections without stopping. For a progression speed of about 50 km/h and a cycle length of 60 s, the corresponding desired spacing between signalized intersections is approximately 400 m. As speeds increase, the optimal intersection spacing increases proportionately.

Where an arterial corridor must accommodate a variety of road users (e.g., vehicles, cyclists, and pedestrians), vehicle operations and the consequent intersection designs must balance the various needs while recognizing that the priority of arterial roadways is generally servicing vehicular traffic movement.

A typical minimum intersection spacing along arterial roadways is 200 m, generally only applicable in areas of intense existing development or restrictive physical controls where feasible alternatives do not exist. The 200 m spacing allows for minimum lengths of back to back storage for left turning vehicles at the adjacent intersections.

The close spacing does not permit signal progression; therefore, it is normally preferable not to signalize the intersection that interferes with progression along a major arterial. Intersection spacing at or near the 200 m minimum is normally only acceptable along minor arterials, where optimizing traffic mobility is not as important as along major arterials.

Where intersection spacing along an arterial does not permit an adequate level of traffic service, many alternatives can be considered to improve traffic flow. These include, but are not limited to:

- Converting two-way to one-way operation
- Implementing cul-de-sacs for minor connecting roads
- Introducing channelization to restrict turning movements at selected intersections to right turns only.

The designer's options may be substantially limited by the policies of the local jurisdiction.

On divided arterial roads, a right-in, right-out intersection without a median opening may be permitted at least 100 m from an adjacent all-directional intersection. The distance is measured between the closest edges of pavement of the adjacent intersecting roads.

In retrofit situations, the desired spacing of intersections along an arterial is sometimes compromised in consideration of other design controls, such as the nature of existing adjacent development and the associated access needs.

9.4.2.2 Collectors

The typical minimum spacing between adjacent intersections along a collector road is 60 m.

9.4.2.3 Locals

Along local roads, the minimum spacing between four-legged intersections is normally 60 m. Where the adjacent intersections are three-legged, a minimum spacing of 40 m is acceptable.

on such actions given to arterial roads (because of their importance for mobility) and with less attention given to collector and local streets. Typically in past access control practice, no distinctions were made as to the character of the roads (other than their functional class).The scope of access control measures depends on the road's functional class, reflecting the blend of mobility and property access intended for the road context. The roads addressed in the RCS are all classified as arterial and all of them are important for movement of through traffic (traffic with neither origin nor destination adjacent to the road).

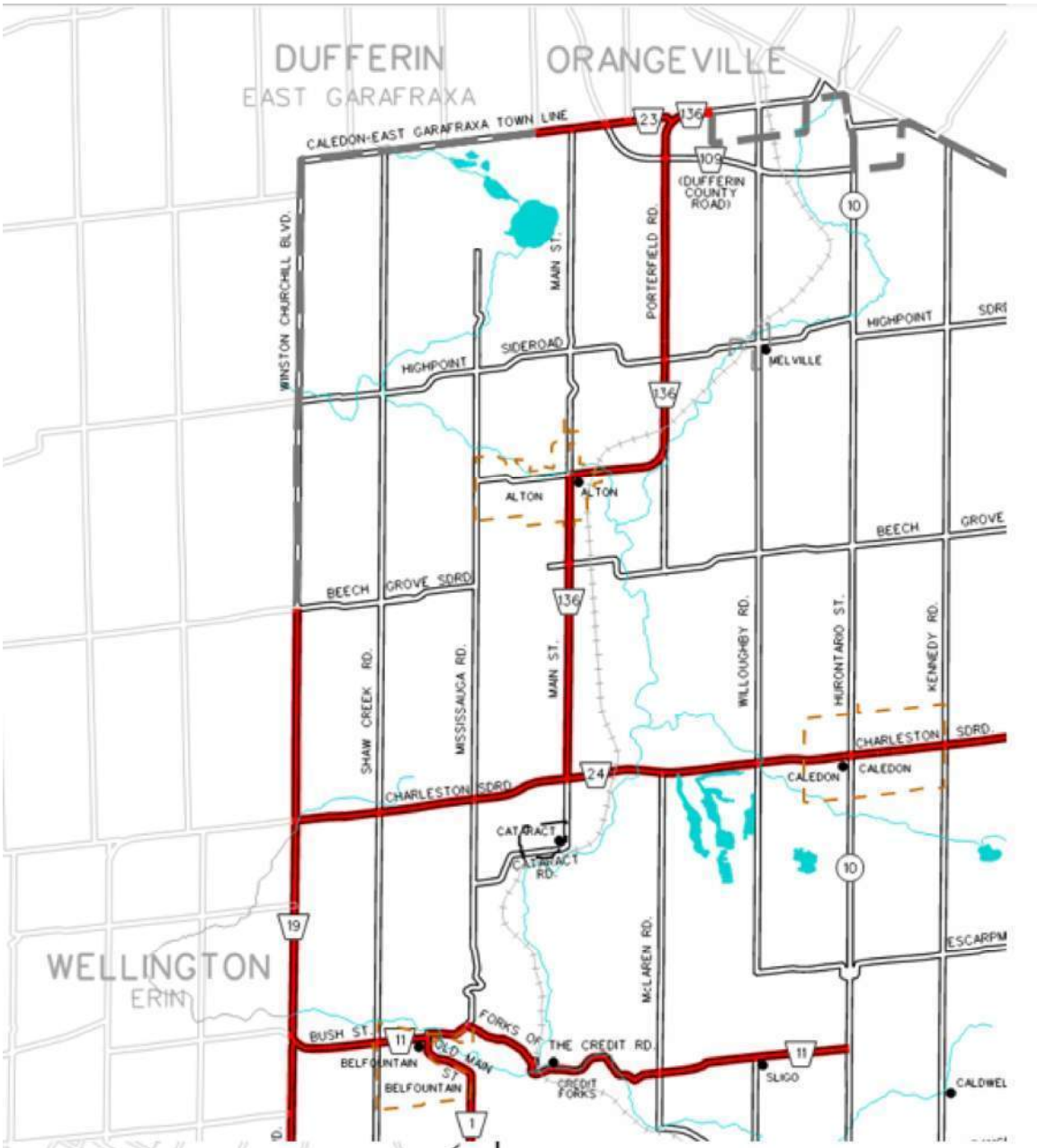
To more effectively consider road character in our access control approach and to address growth and development over time we referenced block dimensions in other successful urban places. This approach reaffirmed that as land uses develop, intersection spacing should decrease. Our new access control approach aligns with the block dimensions of successful places; approximately 150 m x 75 m, closely corresponding to the existing block dimensions in Port Credit, Mississauga and downtown Brampton, among others.

Minimum Spacing Between (metres)	Rural Road	Industrial Connector	Suburban Connector	Commercial Connector	Rural Main Street	Urban Main Street
Full to Full	600	450	300	300	150	150
Full to Left-In/Right-In/Right-Out	ISR	225	150	150	75	75
Left-In/Right-In/Right-Out to Left-In/Right-In/Right-Out	ISR	225	150	150	75	75

Table 1: Median Opening Spacing (from RCS Section 3: Access Control, Table 2)

Legend: ISR – Individual Site Review

Note: Spacing measured from curb extension to curb extension (See Figures 24-26 in RCS Section 3).
All spacing to be verified by a Transportation Impact Assessment and/or sightline analysis.



LEGEND

KING'S HIGHWAY — 10

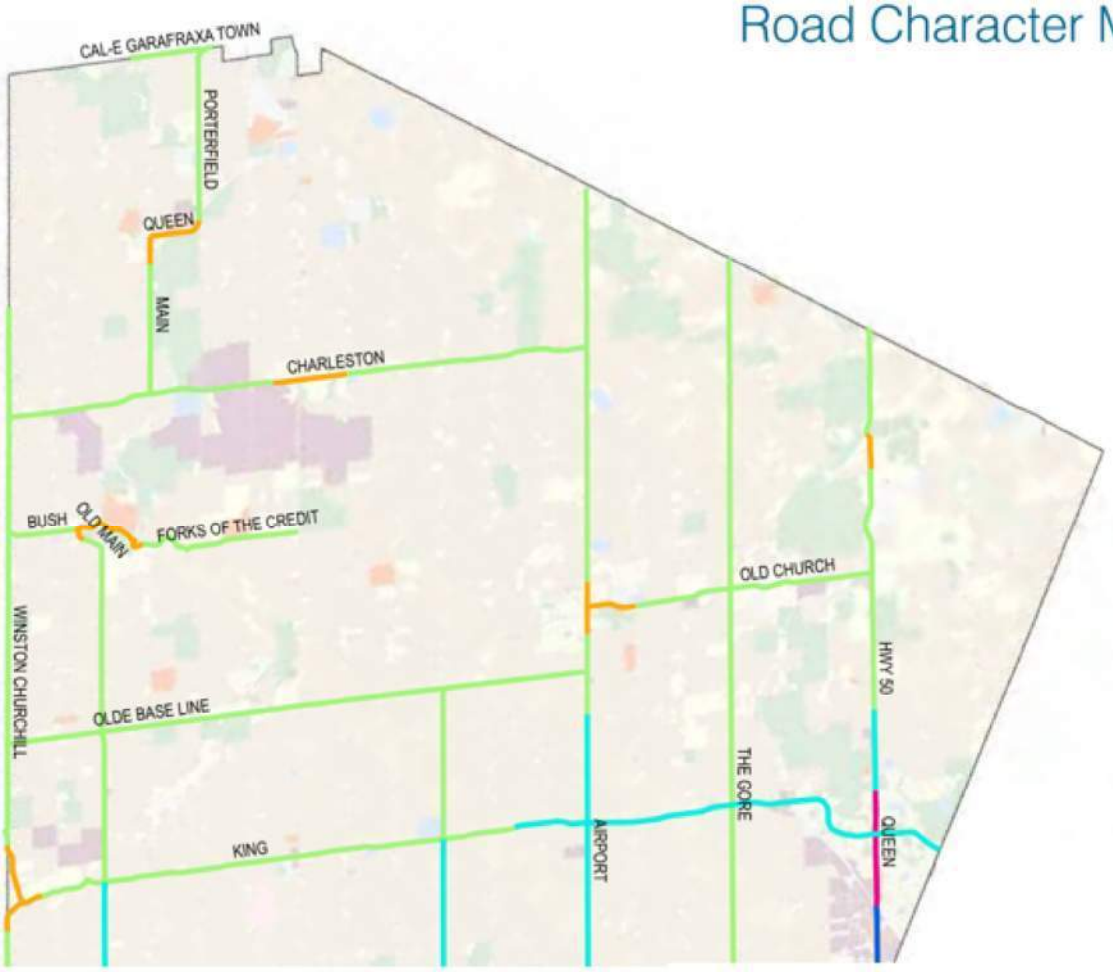
REGIONAL ROAD — 1

SCALE 1000 0 1000 2000 3000 4000 5000 METRES

Region of Peel
Working for you

SCALE:	DATE REVISED:
AS SHOWN	April 2010
DRAWN BY:	DWG. NAME:
P.W.	REGION ROAD MAP NAD83

Road Character Map



5.0 Road Character Map

The Road Character Map shows Regional Roads and their associated road typologies. Further detail is provided in the Road Character Matrix.

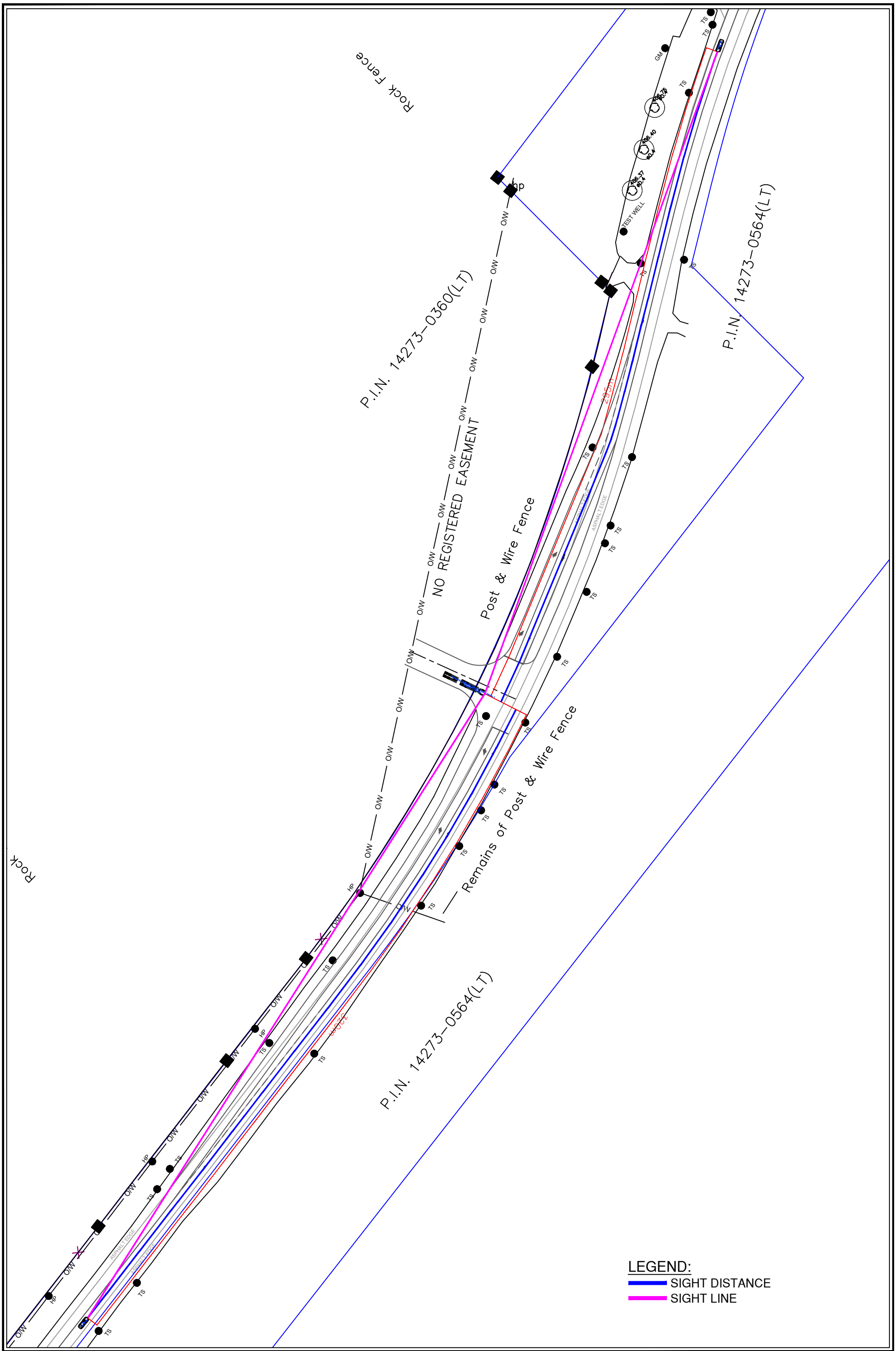
The RCS map will be updated approximately every 5 years, or when there is greater certainty regarding changes in land use or transportation plans, including the GTA West Corridor.

- Rural Road
- Rural Main Street
- Urban Main Street
- Suburban Connector
- Commercial Connector
- Industrial Connector

N

APPENDIX D

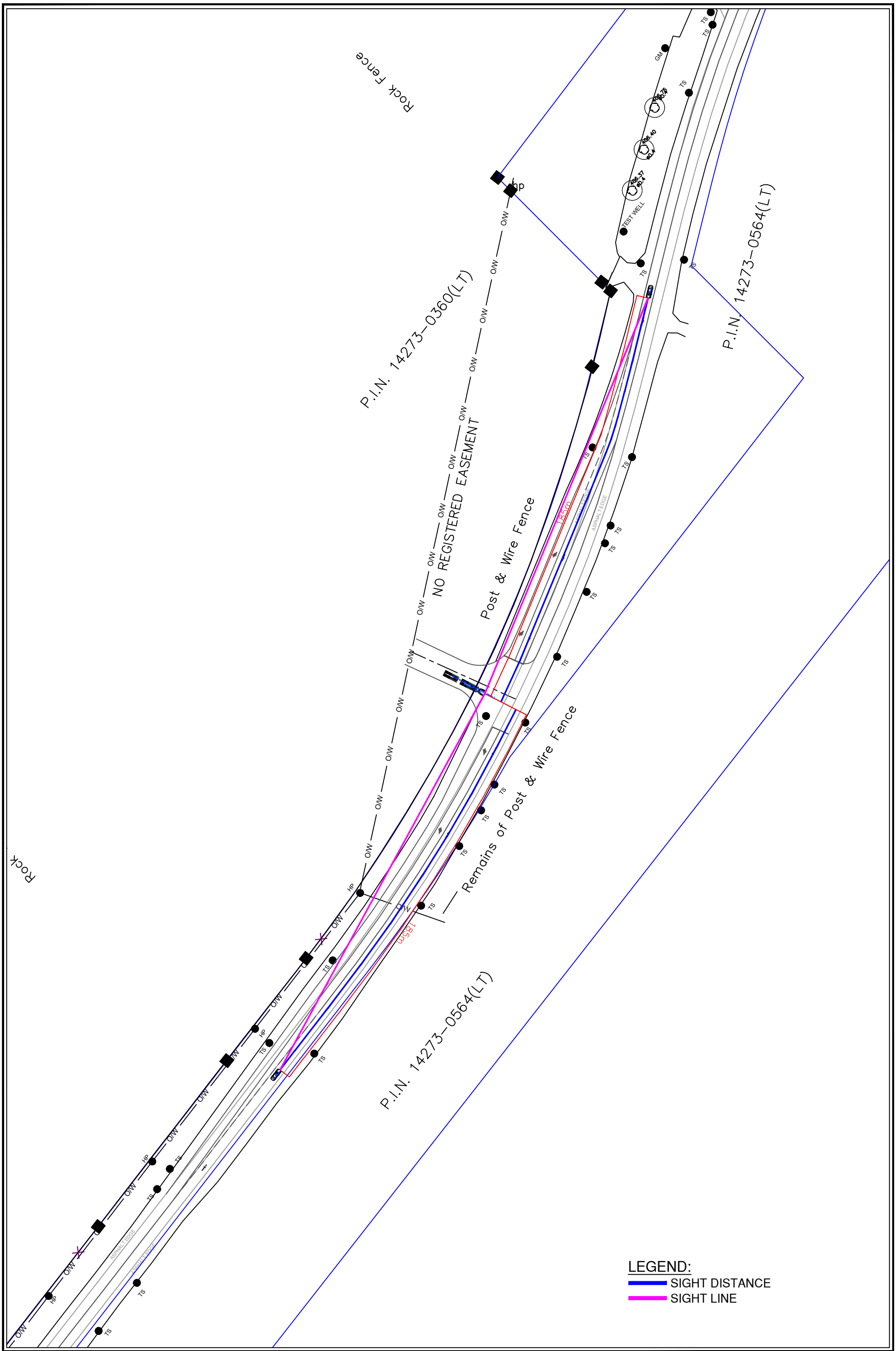
Sightline Analysis



TYLin

CALEDON QUARRY - SIGHTLINE REVIEW
INTERSECTION SIGHT DISTANCE

SCALE: NTS	PROJECT No. 10042
DATE: FEBRUARY 2025	
DESIGNED BY: JH	FIGURE No. 01
CHECKED BY: MD	N



TYLin

CALEDON QUARRY - SIGHTLINE REVIEW
STOPPING SIGHT DISTANCE

SCALE: NTS	PROJECT No. 10042
DATE: FEBRUARY 2025	
DESIGNED BY: JH	FIGURE No. 02
CHECKED BY: MD	N

APPENDIX E

Site Visit and Sightline Details

Caledon Quarry Site Visit Summary

On November 16, 2021, the Caledon Quarry site was visited to assess the sight lines of potential access locations based on Intersection sight distance (ISD) and stopping sight distance (SSD).

Update: On October 29, 2024 and December 10, 2024, a site visit was conducted to confirm sight lines, storage lengths, and assess the potential of shifting the proposed site access based on Intersection sight distance (ISD) and stopping sight distance (SSD). This summary has been updated to include sight line photos.

A review of the TAC manual provided the ISD and SSD distances that were used during the site investigation.

Left Turn ISD	**90 kph**	**100 kph**
Passenger Car	190 m	210 m
Single-Unit Truck	240 m	265 m
Combination Truck	290 m	320 m
Right Turn ISD		
Passenger Car	165 m	185 m
Single-Unit Truck	215 m	240 m
Combination Truck	265 m	295 m
Left/Right Turn SSD		
Passenger Car	160 m	185 m

Source TAC eqn 9.9.1, table 9.9.4, table 9.9.6

ISD values are derived from equation 9.9.1 in the TAC manual which is a function of design speed and time gap for minor vehicle. TAC only provides SSD values for passenger vehicles but notes in paragraph 2.5.3.1 that truck SSD is generally longer due to additional distance required to stop but also generally have a longer sightline due to cabin position.

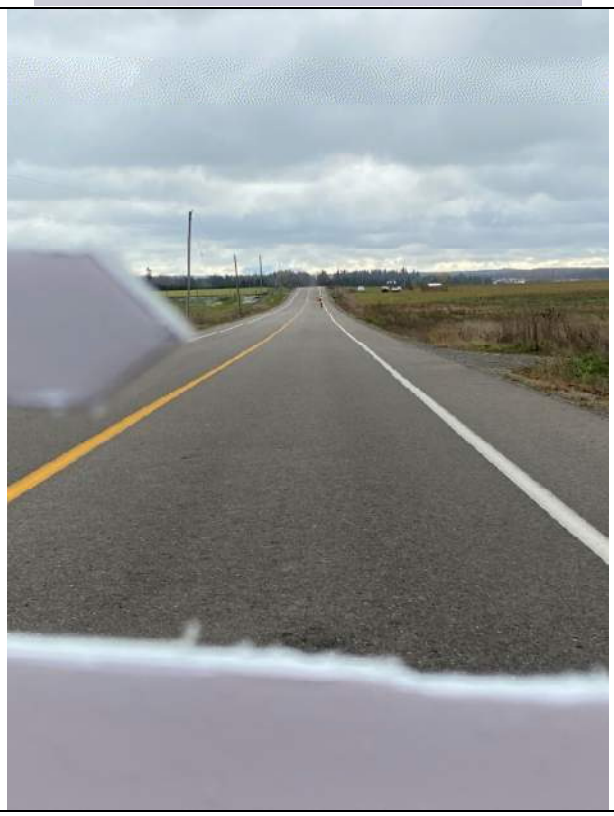
The 100kph combination truck stopping distance was measured on site for most conservative analysis.

The following figure shows the approximate location where each set of measurements were taken.

1. **Mississauga Road south access**

The right turn ISD does not meet the truck standards for both design speeds due to a crest in the road at approximately 200m. With the access location moved further to the North, it will improve the sight distance for right turn ISD. All other sightlines met the required standard.

Movement	Distance (m)	Image
Right turn ISD	Available 210 Only meets passenger car ISD	
Right turn SSD	185	

Left turn ISD	320	
Left turn SSD	185	

2. Mississauga Road north access

For the alternative north access on Mississauga Road, only the right turn ISD was checked due to limited sightline at the proposed south access. Right turn ISD meets All other sightline distances were deemed acceptable based on the measurements recorded from the southern proposed access

Movement	Distance (m)	Image
Right turn ISD	295	
Left Turn ISD	320	

3. Charleston sideroad access

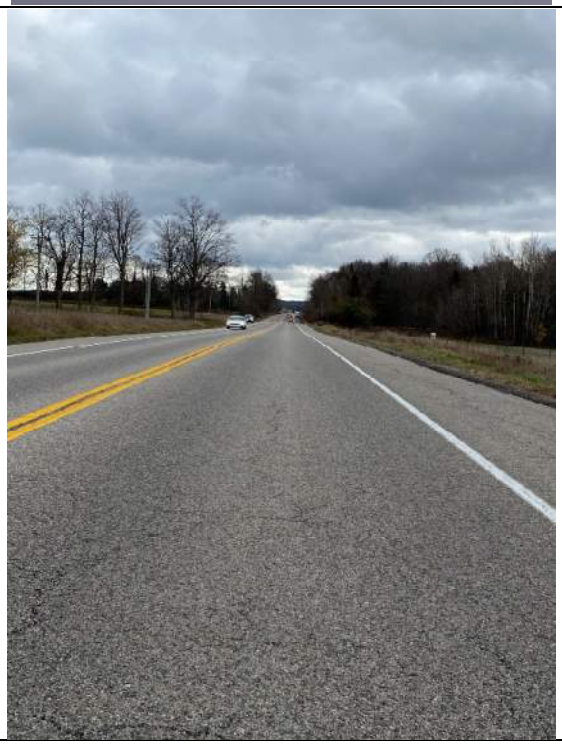
All sightline distances from the Charleston Sideroad access meet the required standards. It was observed that some road signs cause slight visual obstructions for due to the horizontal curve. It is recommended to clear all landscape or other obstructions near the edge of the property as driver's sightline may go through the property line in the future.

Movement	Distance (m)	Image
Right turn ISD	295	
Right turn SSD	185	

Left turn ISD	320	
Left turn SSD	185	

4. Main Street north access

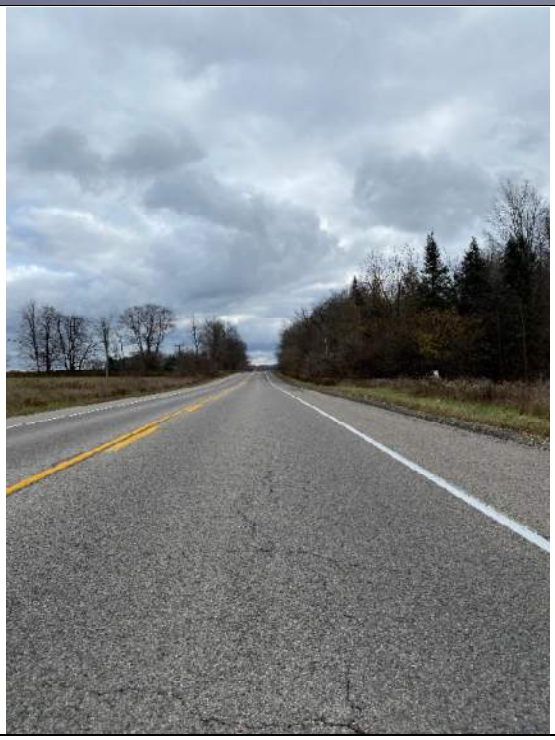
Right turn ISD only meets standard for single unit truck due to crest in road. All other sightline distances meet the required standard.

Movement	Distance (m)	Image
Right turn ISD	Available 270 Only meets the single unit truck sightline distance requirement	
Right turn SSD	185	

Left turn ISD	320	
Left turn SSD	185	

5. Main Street south access

All sightline distances meet the required standard

Movement	Distance (m)	Image
Right turn ISD	295	
Right turn SSD	185	

Left turn ISD	320	
Left turn SSD	185	

APPENDIX F

Transportation Tomorrow Survey (TTS) Queries

AM (IN)

Tue Jul 27 2021 13:44:26 GMT-0400 (Eastern Daylight Time) - Run Time: 2621ms

Cross Tabulation Query Form - Trip - 2016 v1.1

Row: 2006 GTA zone of origin - gta06_orig
Column: 2006 GTA zone of destination - gta06_dest

Filters:
2006 GTA z 3103 3105 3106 3107 3108
and
Start time of trip - start_time In 0630-0930
and
Trip purpos

Trip 2016
Table:

	3102	3103	3105	3106	3107	3108
3102	26	0	0	0	0	54
3103	0	0	21	0	0	0
3107	0	0	0	0	4	0
3108	0	0	0	0	0	13
3194	0	32	0	0	0	0
3377	0	0	23	0	0	0
3459	0	0	0	24	0	0
3467	0	0	40	0	0	0
3489	6	0	0	0	0	0
3500	0	13	0	0	0	0
3515	0	0	7	0	0	0
3674	0	0	25	0	0	0
4160	33	0	0	0	0	0
4163	32	0	0	0	0	0
8092	0	9	0	0	0	0
8102	37	0	0	0	0	0
8344	0	0	0	0	0	19
8369	0	0	18	0	0	0
8401	0	0	0	0	0	22
8402	0	0	0	16	0	0
8404	0	28	0	0	0	40
8412	0	12	12	0	0	0
8509	0	0	21	0	0	0

8563	0	0	13	0	0	0
8648	0	0	26	0	0	0

AM (OUT)

Tue Jul 27 2021 13:46:29 GMT-0400 (Eastern Daylight Time) - Run Time: 2345ms

Cross Tabulation Query Form - Trip - 2016 v1.1

Row: 2006 GTA zone of destination - gta06_dest
Column: 2006 GTA zone of origin - gta06_orig

Filters:
2006 GTA z 3103 3105 3106 3107 3108
and
Start time of trip - start_time In 0630-0930
and
Trip purpos

Trip 2016
Table:

	3102	3103	3105
3102	26	0	0
3108	6	0	0
3194	0	0	21
8372	26	0	0
8402	0	31	0

PM (IN)

Tue Jul 27 2021 13:45:07 GMT-0400 (Eastern Daylight Time) - Run Time: 2474ms

Cross Tabulation Query Form - Trip - 2016 v1.1

Row: 2006 GTA zone of origin - gta06_orig
Column: 2006 GTA zone of destination - gta06_dest

Filters:
2006 GTA z 3103 3105 3106 3107 3108
and
Start time of trip - start_time In 1530-1830
and
Trip purpos

Trip 2016
Table:

	3102
3102	4

PM (OUT)

Tue Jul 27 2021 13:47:06 GMT-0400 (Eastern Daylight Time) - Run Time: 3437ms

Cross Tabulation Query Form - Trip - 2016 v1.1

Row: 2006 GTA zone of destination - gta06_dest
Column: 2006 GTA zone of origin - gta06_orig

Filters:
2006 GTA z 3103 3105 3106 3107 3108
and
Start time of trip - start_time In 1530-1830
and
Trip purpos

Trip 2016
Table:

	3102	3103	3105	3106	3107	3108
2654	0	0	0	57	0	0
2760	0	50	0	0	0	0
3102	0	0	0	0	0	82
3107	0	0	0	0	4	0
3108	0	0	0	0	0	13
3194	0	32	0	0	0	0
3363	0	0	0	0	0	14
3377	0	0	23	0	0	0
3459	0	0	0	24	0	0
3467	0	0	40	0	0	0
3500	0	13	0	0	0	0
3674	0	0	25	0	0	0
4163	32	0	0	0	0	0
8092	0	9	0	0	0	0
8344	0	0	0	0	0	19
8366	0	0	14	0	0	0
8401	0	0	12	0	0	0
8402	0	31	0	0	0	40
8403	0	0	0	16	0	0
8404	0	0	0	12	0	0
8405	0	0	0	12	0	0
8412	0	12	0	0	0	0
8415	0	28	0	16	0	0
8553	113	0	0	0	0	0
8563	0	0	13	0	0	0
8664	0	13	0	0	0	0
8807	0	0	7	0	0	0

APPENDIX G

Signal Warrant Results

Traffic Signal Warrant - Input Sheet
Justification 7 - Projected Volumes

Based Ontario Traffic Manual Book 12 - Traffic Signals (March 2012)

Project and Scenario Summary

Project:	Caledon Quarry			**Project No.:**	10042
				Date:	2025-01-15
Horizon:	Future Total	**Horizon Year:**	2037	**Analyst:**	JH

Study Intersection Summary

Major Street:	Charleston SR	**Direction:**	East/West
Minor Street:	Site Access	**Direction:**	North/South

Intersection Details for Warrant Parameters

Flow Conditions:	Restricted Flow (Urban)	**Number of Lanes:**	1
Number of Legs:	Three ("T" Intersection)	**Intersection Type:**	New

Notes: "Free Flow" is used when the operating speed is greater than or equal to 70km/h, "Restricted Flow" otherwise.
The Number of Lanes greater than 1 only needs to be for one direction along the major road.
An intersection is considered "New" if at least 1-leg is added to an existing intersection.

Input Volumes and Average Hourly Volume Determination

Peak Hour	Major: Charleston SR						Minor: Site Access						Pedestrians Crossing Major
	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
AM	5	417	0	0	390	40	0	0	0	53	0	7	0
PM	10	531	0	0	505	45	0	0	0	58	0	7	0
AHV[1]	**4**	**237**	**0**	**0**	**224**	**21**	**0**	**0**	**0**	**28**	**0**	**4**	**0**

1. The AHV is determined by the availability of the peak hour estimates. If both the AM and PM Peak Hour Volume estimate is available then AHV = $(AM_{PHV} + PM_{PHV}) / 4$. In the case that only one estimate is available then AHV = $AM_{PHV} / 2$ **or** AHV = $PM_{PHV} / 2$.

Determination of Justification Volumes (Based on AHV)

Justification 1A: All Approach Lanes	518	Justification 2A: Major Street Both Approaches	486
Justification 1B: Minor Street Both Approaches	32	Justification 2B: Traffic Crossing Major Street	28

Note: The crossing volume is defined as the sum of:

(1) Left turns from both minor street approaches:			28
(2) The heaviest through volume from the minor street:			0
(3) 50% of the heavier left turn movement from major street when both of the following criteria are met:			0
(a) The left turn volume > 120 vph	4	FALSE	
(b) The left turn volume plus the opposing volume > 720 vph	228	FALSE	
(4) Pedestrians crossing the major street:			0
		Total	**28**

Traffic Signal Warrant - Output Sheet
Justification 7 - Projected Volumes

Based Ontario Traffic Manual Book 12 - Traffic Signals (March 2012)

Project and Scenario Summary

Project:	Caledon Quarry			**Project No.:**	10042
				Date:	2025-01-15
Horizon:	Future Total	**Horizon Year:**	2037	**Analyst:**	JH

Study Intersection Summary

Major Street:	Charleston SR	**Direction:**	East/West
Minor Street:	Site Access	**Direction:**	North/South

Summary of Base Justification Thresholds

Justification	1 Approach Lane		2 or More Approach Lanes	
	Free Flow	Restricted Flow	Free Flow	Restricted Flow
1A: All Approach Lanes	480	**720**	600	900
1B: Minor Street Both Approaches	120	**170**	120	170
2A: Major Street Both Approaches	480	**720**	600	900
2B: Traffic Crossing Major Street	50	**75**	50	75

The above values are taken from Table 12 and Table 13 from OTM Book 12 (March 2012).
The grey shaded values are provided for reference only, and are not applicable to the study intersection.

Adjusted Justification Thresholds for Study Intersection Conditions

Justification	Base Threshold	New Intersection	"T" Intersection	Final Threshold
1A: All Approach Lanes	720	150%	-	**1080**
1B: Minor Street Both Approaches	170	150%	150%	**382.5**
2A: Major Street Both Approaches	720	150%	-	**1080**
2B: Traffic Crossing Major Street	75	150%	-	**113**

The above adjustments are taken from OTM Book 12 (March 2012) the "T" Intersection adjustment only applies to Justification 1B, and is a 50% increase on the threshold when the study intersection is a "T' intersection. Otherwise a value of 100% is used.

Warrant Calculation

Justification	Study Intersection Justification Volume	Justification Threshold	Percentage Warrant	Warrant Met?
1A: All Approach Lanes	518	**1080**	48%	**No**
1B: Minor Street Both Approaches	32	**383**	8%	
2A: Major Street Both Approaches	486	**1080**	45%	**No**
2B: Traffic Crossing Major Street	28	**113**	25%	

Notes: In the case of Justification 7 based on AHV both Warrant 1 and 2 must be met 100%, which requires both the A and B part of each warrant being equal to 100%.
When calculating the percentage, any value greater than 100% is expressed as 100%.

Based on OTM Book 12's Signal Warrant Justification 7 and the estimated AHV for the subject study intersection a signal is:

Not Warranted

Traffic Signal Warrant - Input Sheet
Justification 7 - Projected Volumes

Based Ontario Traffic Manual Book 12 - Traffic Signals (March 2012)

Project and Scenario Summary

Project:	Caledon Quarry			**Project No.:**	10042
				Date:	2025-01-15
Horizon:	Future Total	**Horizon Year:**	2037	**Analyst:**	JH

Study Intersection Summary

Major Street:	Charleston SR	**Direction:**	East/West
Minor Street:	Site Access	**Direction:**	North/South

Intersection Details for Warrant Parameters

Flow Conditions:	Restricted Flow (Urban)	**Number of Lanes:**	1
Number of Legs:	Three ("T" Intersection)	**Intersection Type:**	New

Notes: "Free Flow" is used when the operating speed is greater than or equal to 70km/h, "Restricted Flow" otherwise.
The Number of Lanes greater than 1 only needs to be for one direction along the major road.
An intersection is considered "New" if at least 1-leg is added to an existing intersection.

Input Volumes and Average Hourly Volume Determination

Peak Hour	Major: Charleston SR						Minor: Site Access						Pedestrians Crossing Major
	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
AM	1	398	0	0	358	29	0	0	0	29	0	1	0
PM	0	0	0	0	0	0	0	0	0	0	0	0	0
AHV[1]	**1**	**199**	**0**	**0**	**179**	**15**	**0**	**0**	**0**	**15**	**0**	**1**	**0**

1. The AHV is determined by the availability of the peak hour estimates. If both the AM and PM Peak Hour Volume estimate is available then AHV = $(AM_{PHV} + PM_{PHV}) / 4$. In the case that only one estimate is available then AHV = $AM_{PHV} / 2$ **or** AHV = $PM_{PHV} / 2$.

Determination of Justification Volumes (Based on AHV)

Justification 1A: All Approach Lanes	410	Justification 2A: Major Street Both Approaches	394
Justification 1B: Minor Street Both Approaches	16	Justification 2B: Traffic Crossing Major Street	15

Note: The crossing volume is defined as the sum of:

(1) Left turns from both minor street approaches:			15
(2) The heaviest through volume from the minor street:			0
(3) 50% of the heavier left turn movement from major street when both of the following criteria are met:			0
(a) The left turn volume > 120 vph	1	FALSE	
(b) The left turn volume plus the opposing volume > 720 vph	180	FALSE	
(4) Pedestrians crossing the major street:			0
		Total	**15**

Traffic Signal Warrant - Output Sheet
Justification 7 - Projected Volumes

Based Ontario Traffic Manual Book 12 - Traffic Signals (March 2012)

Project and Scenario Summary

Project:	Caledon Quarry			**Project No.:**	10042
				Date:	2025-01-15
Horizon:	Future Total	**Horizon Year:**	2037	**Analyst:**	JH

Study Intersection Summary

Major Street:	Charleston SR	**Direction:**	East/West
Minor Street:	Site Access	**Direction:**	North/South

Summary of Base Justification Thresholds

Justification	1 Approach Lane		2 or More Approach Lanes	
	Free Flow	Restricted Flow	Free Flow	Restricted Flow
1A: All Approach Lanes	480	**720**	600	900
1B: Minor Street Both Approaches	120	**170**	120	170
2A: Major Street Both Approaches	480	**720**	600	900
2B: Traffic Crossing Major Street	50	**75**	50	75

The above values are taken from Table 12 and Table 13 from OTM Book 12 (March 2012).
The grey shaded values are provided for reference only, and are not applicable to the study intersection.

Adjusted Justification Thresholds for Study Intersection Conditions

Justification	Base Threshold	New Intersection	"T" Intersection	Final Threshold
1A: All Approach Lanes	720	150%	-	**1080**
1B: Minor Street Both Approaches	170	150%	150%	**382.5**
2A: Major Street Both Approaches	720	150%	-	**1080**
2B: Traffic Crossing Major Street	75	150%	-	**113**

The above adjustments are taken from OTM Book 12 (March 2012) the "T" Intersection adjustment only applies to Justification 1B, and is a 50% increase on the threshold when the study intersection is a "T' intersection. Otherwise a value of 100% is used.

Warrant Calculation

Justification	Study Intersection Justification Volume	Justification Threshold	Percentage Warrant	Warrant Met?
1A: All Approach Lanes	410	**1080**	38%	**No**
1B: Minor Street Both Approaches	16	**383**	4%	
2A: Major Street Both Approaches	394	**1080**	36%	**No**
2B: Traffic Crossing Major Street	15	**113**	13%	

Notes: In the case of Justification 7 based on AHV both Warrant 1 and 2 must be met 100%, which requires both the A and B part of each warrant being equal to 100%.
When calculating the percentage, any value greater than 100% is expressed as 100%.

Based on OTM Book 12's Signal Warrant Justification 7 and the estimated AHV for the subject study intersection a signal is:

Not Warranted

Traffic Signal Warrant - Input Sheet
Justification 7 - Projected Volumes

Based Ontario Traffic Manual Book 12 - Traffic Signals (March 2012)

Project and Scenario Summary

Project:	Caledon Quarry - PCE			**Project No.:**	10042
				Date:	2025-01-15
Horizon:	Future Total	**Horizon Year:**	2037	**Analyst:**	JH

Study Intersection Summary

Major Street:	Charleston SR	**Direction:**	East/West
Minor Street:	Site Access	**Direction:**	North/South

Intersection Details for Warrant Parameters

Flow Conditions:	Restricted Flow (Urban)	**Number of Lanes:**	1
Number of Legs:	Three ("T" Intersection)	**Intersection Type:**	New

Notes: "Free Flow" is used when the operating speed is greater than or equal to 70km/h, "Restricted Flow" otherwise.
The Number of Lanes greater than 1 only needs to be for one direction along the major road.
An intersection is considered "New" if at least 1-leg is added to an existing intersection.

Input Volumes and Average Hourly Volume Determination

Peak Hour	Major: Charleston SR						Minor: Site Access						Pedestrians Crossing Major
	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
AM	5	417	0	0	390	40	0	0	0	53	0	7	0
PM	10	531	0	0	505	45	0	0	0	58	0	7	0
AHV[1]	**4**	**237**	**0**	**0**	**224**	**21**	**0**	**0**	**0**	**28**	**0**	**4**	**0**

1. The AHV is determined by the availability of the peak hour estimates. If both the AM and PM Peak Hour Volume estimate is available then AHV = $(AM_{PHV} + PM_{PHV}) / 4$. In the case that only one estimate is available then AHV = $AM_{PHV} / 2$ **or** AHV = $PM_{PHV} / 2$.

Determination of Justification Volumes (Based on AHV)

Justification 1A: All Approach Lanes	518	Justification 2A: Major Street Both Approaches	486
Justification 1B: Minor Street Both Approaches	32	Justification 2B: Traffic Crossing Major Street	28

Note: The crossing volume is defined as the sum of:

(1) Left turns from both minor street approaches:			28
(2) The heaviest through volume from the minor street:			0
(3) 50% of the heavier left turn movement from major street when both of the following criteria are met:			0
(a) The left turn volume > 120 vph	4	FALSE	
(b) The left turn volume plus the opposing volume > 720 vph	228	FALSE	
(4) Pedestrians crossing the major street:			0
		Total	**28**

Traffic Signal Warrant - Output Sheet
Justification 7 - Projected Volumes

Based Ontario Traffic Manual Book 12 - Traffic Signals (March 2012)

Project and Scenario Summary

Project:	Caledon Quarry - PCE			**Project No.:**	10042
				Date:	2025-01-15
Horizon:	Future Total	**Horizon Year:**	2037	**Analyst:**	JH

Study Intersection Summary

Major Street:	Charleston SR	**Direction:**	East/West
Minor Street:	Site Access	**Direction:**	North/South

Summary of Base Justification Thresholds

Justification	1 Approach Lane		2 or More Approach Lanes	
	Free Flow	Restricted Flow	Free Flow	Restricted Flow
1A: All Approach Lanes	480	**720**	600	900
1B: Minor Street Both Approaches	120	**170**	120	170
2A: Major Street Both Approaches	480	**720**	600	900
2B: Traffic Crossing Major Street	50	**75**	50	75

The above values are taken from Table 12 and Table 13 from OTM Book 12 (March 2012).
The grey shaded values are provided for reference only, and are not applicable to the study intersection.

Adjusted Justification Thresholds for Study Intersection Conditions

Justification	Base Threshold	New Intersection	"T" Intersection	Final Threshold
1A: All Approach Lanes	720	150%	-	**1080**
1B: Minor Street Both Approaches	170	150%	150%	**382.5**
2A: Major Street Both Approaches	720	150%	-	**1080**
2B: Traffic Crossing Major Street	75	150%	-	**113**

The above adjustments are taken from OTM Book 12 (March 2012) the "T" Intersection adjustment only applies to Justification 1B, and is a 50% increase on the threshold when the study intersection is a "T' intersection. Otherwise a value of 100% is used.

Warrant Calculation

Justification	Study Intersection Justification Volume	Justification Threshold	Percentage Warrant	Warrant Met?
1A: All Approach Lanes	518	**1080**	48%	**No**
1B: Minor Street Both Approaches	32	**383**	8%	
2A: Major Street Both Approaches	486	**1080**	45%	**No**
2B: Traffic Crossing Major Street	28	**113**	25%	

Notes: In the case of Justification 7 based on AHV both Warrant 1 and 2 must be met 100%, which requires both the A and B part of each warrant being equal to 100%.
When calculating the percentage, any value greater than 100% is expressed as 100%.

Based on OTM Book 12's Signal Warrant Justification 7 and the estimated AHV for the subject study intersection a signal is:

Not Warranted

Traffic Signal Warrant - Input Sheet
Justification 7 - Projected Volumes

Based Ontario Traffic Manual Book 12 - Traffic Signals (March 2012)

Project and Scenario Summary

Project:	Caledon Quarry - PCE			**Project No.:**	10042
				Date:	2025-01-15
Horizon:	Future Total	**Horizon Year:**	2037	**Analyst:**	JH

Study Intersection Summary

Major Street:	Charleston SR	**Direction:**	East/West
Minor Street:	Site Access	**Direction:**	North/South

Intersection Details for Warrant Parameters

Flow Conditions:	Restricted Flow (Urban)	**Number of Lanes:**	1
Number of Legs:	Three ("T" Intersection)	**Intersection Type:**	New

Notes: "Free Flow" is used when the operating speed is greater than or equal to 70km/h, "Restricted Flow" otherwise.
The Number of Lanes greater than 1 only needs to be for one direction along the major road.
An intersection is considered "New" if at least 1-leg is added to an existing intersection.

Input Volumes and Average Hourly Volume Determination

Peak Hour	Major: Charleston SR						Minor: Site Access						Pedestrians Crossing Major
	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
AM	1	398	0	0	358	29	0	0	0	29	0	1	0
PM	0	0	0	0	0	0	0	0	0	0	0	0	0
AHV[1]	**1**	**199**	**0**	**0**	**179**	**15**	**0**	**0**	**0**	**15**	**0**	**1**	**0**

1. The AHV is determined by the availability of the peak hour estimates. If both the AM and PM Peak Hour Volume estimate is available then AHV = $(AM_{PHV} + PM_{PHV}) / 4$. In the case that only one estimate is available then AHV = $AM_{PHV} / 2$ **or** AHV = $PM_{PHV} / 2$.

Determination of Justification Volumes (Based on AHV)

Justification 1A: All Approach Lanes	410	Justification 2A: Major Street Both Approaches	394
Justification 1B: Minor Street Both Approaches	16	Justification 2B: Traffic Crossing Major Street	15

Note: The crossing volume is defined as the sum of:

(1) Left turns from both minor street approaches:			15
(2) The heaviest through volume from the minor street:			0
(3) 50% of the heavier left turn movement from major street when both of the following criteria are met:			0
(a) The left turn volume > 120 vph	1	FALSE	
(b) The left turn volume plus the opposing volume > 720 vph	180	FALSE	
(4) Pedestrians crossing the major street:			0
		Total	**15**

Traffic Signal Warrant - Output Sheet
Justification 7 - Projected Volumes

Based Ontario Traffic Manual Book 12 - Traffic Signals (March 2012)

Project and Scenario Summary

Project:	Caledon Quarry - PCE			**Project No.:**	10042
				Date:	2025-01-15
Horizon:	Future Total	**Horizon Year:**	2037	**Analyst:**	JH

Study Intersection Summary

Major Street:	Charleston SR	**Direction:**	East/West
Minor Street:	Site Access	**Direction:**	North/South

Summary of Base Justification Thresholds

Justification	1 Approach Lane		2 or More Approach Lanes	
	Free Flow	Restricted Flow	Free Flow	Restricted Flow
1A: All Approach Lanes	480	**720**	600	900
1B: Minor Street Both Approaches	120	**170**	120	170
2A: Major Street Both Approaches	480	**720**	600	900
2B: Traffic Crossing Major Street	50	**75**	50	75

The above values are taken from Table 12 and Table 13 from OTM Book 12 (March 2012).
The grey shaded values are provided for reference only, and are not applicable to the study intersection.

Adjusted Justification Thresholds for Study Intersection Conditions

Justification	Base Threshold	New Intersection	"T" Intersection	Final Threshold
1A: All Approach Lanes	720	150%	-	**1080**
1B: Minor Street Both Approaches	170	150%	150%	**382.5**
2A: Major Street Both Approaches	720	150%	-	**1080**
2B: Traffic Crossing Major Street	75	150%	-	**113**

The above adjustments are taken from OTM Book 12 (March 2012) the "T" Intersection adjustment only applies to Justification 1B, and is a 50% increase on the threshold when the study intersection is a "T' intersection. Otherwise a value of 100% is used.

Warrant Calculation

Justification	Study Intersection Justification Volume	Justification Threshold	Percentage Warrant	Warrant Met?
1A: All Approach Lanes	410	**1080**	38%	**No**
1B: Minor Street Both Approaches	16	**383**	4%	
2A: Major Street Both Approaches	394	**1080**	36%	**No**
2B: Traffic Crossing Major Street	15	**113**	13%	

Notes: In the case of Justification 7 based on AHV both Warrant 1 and 2 must be met 100%, which requires both the A and B part of each warrant being equal to 100%.
When calculating the percentage, any value greater than 100% is expressed as 100%.

Based on OTM Book 12's Signal Warrant Justification 7 and the estimated AHV for the subject study intersection a signal is:

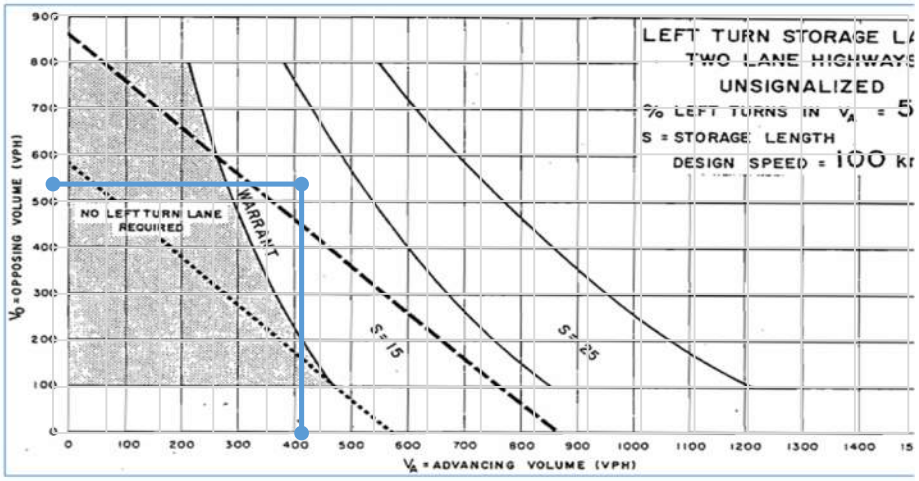
Not Warranted

APPENDIX H

Left-Turn Warrant Results

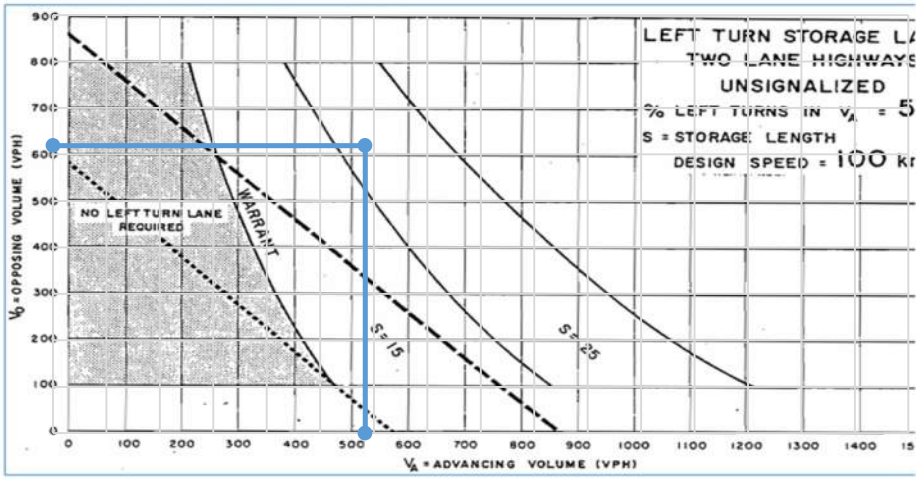
Eastbound Left-Turn AM Peak Hour

AM	Peak Period
EB	Analysis Approach
5	%LT
100_5	Scenario
465	Advancing Volumes
536	Opposing Volumes



Eastbound Left-Turn PM Peak Hour

PM	Peak Period
EB	Analysis Approach
5	%LT
100_5	Scenario
584	Advancing Volumes
619	Opposing Volumes



APPENDIX I

TAC Chapter 9 Excerpts and Peel Region Standard Drawings

Right-turn taper lengths are a function of design speed and are calculated based on the ratios presented in **Table 9.14.1**. Lane widths (w) vary (see **Chapter 4**). Some agencies use reduced taper ratios in constrained urban environments where lower speeds are desired and where property constraints exist.

Table 9.14.1: Right-Turn Tapers without Auxiliary Lanes

Design Speed (km/h) (through roadway)	Taper Ratio	Taper Length for w = 3.5 (m)	Horizontal Curve[a] (R)
50	15:1	53	500
60	18:1	63	750
70	21:1	74	1,000
80	24:1	84	1,200

Note : a) Flat radii as indicated can be used rather than tangent alignment for right-turn tapers.

The taper can be a straight line or a larger radius curve (see **Table 9.14.1** for suggested horizontal curve values); curves are typically used in an urban environment where curb and gutter is provided and straight tapers in a rural environment where curb and gutter is not used.

Shortened taper lengths may be considered for intersections on curve to provide a visible break from the through lanes. On high-speed roads, the taper length should generally conform to that discussed in **Chapter 10**.

9.14.4 DESIGN ELEMENTS FOR RIGHT-TURN TAPERS WITH AUXILIARY LANES

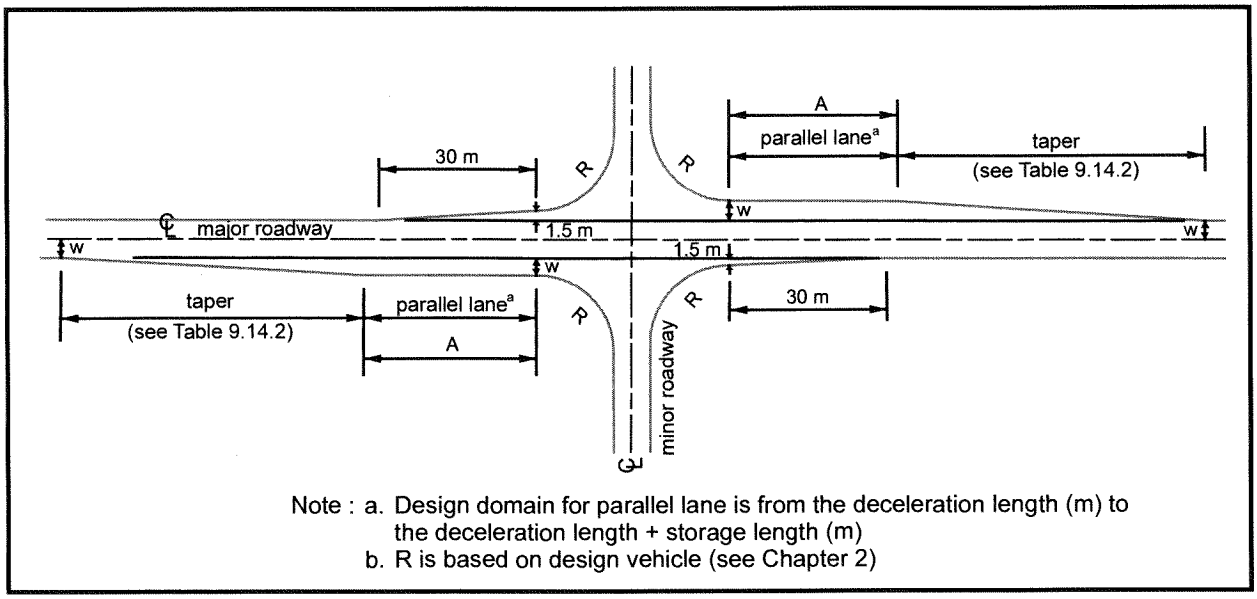
The length of an auxiliary lane is based on deceleration and storage requirements. Deceleration should occur exclusively within the auxiliary lane, although in an urban environment, deceleration (up to 15 km/h) over the bay taper is normally tolerable (especially in a peak-hour condition).

Suggested taper and parallel lengths are shown in **Table 9.14.2** and illustrated in **Figure 9.14.4**. Adjustments for intersections on curves are discussed in **Section 18.8**.

Table 9.14.2: Right-Turn Taper with Parallel Deceleration Lane Design

Design Speed (km/h)	Taper Ratio[a] Design Domain	Radius for Reverse[a] Curves (m)	Parallel Lane Length[b] Design Domain
50	11:1–17:1	90–150	35–75
60	14:1–17:1	150	40–90
70	17:1–20:1	150–220	50–110
80[c]	17:1–24:1	150–300	60–130

Notes:
a) Taper may be straight line or may be symmetrical reverse curves; length is derived from design values calculated for a 3 s lane change criterion for the appropriate operating speed.
b) Additional parallel lane length may be required for storage.
c) For higher design speeds, refer to **Chapter 10**.



Note : a. Design domain for parallel lane is from the deceleration length (m) to the deceleration length + storage length (m)
b. R is based on design vehicle (see Chapter 2)

Figure 9.14.3: Right-Turn with Parallel Deceleration Lane Design

Auxiliary lanes can be developed using reverse curves or straight line tapers; reverse curves are typically used in an urban environment with curb and gutter. On high-speed roads, the taper length to the auxiliary lane should generally conform to that discussed in **Chapter 10**. Where auxiliary lanes are used for the storage of turning vehicles at unsignalized intersections, the length of the lane in addition to deceleration length and exclusive of taper is usually based on the number of vehicles that are likely to accumulate in two minutes. The storage length required is calculated by the following formula and can be used for right- or left-turning vehicles:

$$S = \frac{NL}{30} \qquad (9.14.1)$$

Where:

S = Storage length (m)

N = Design volume of turning vehicles (v/h)

L = Length (m) occupied by each vehicle (see **Chapter 2**)

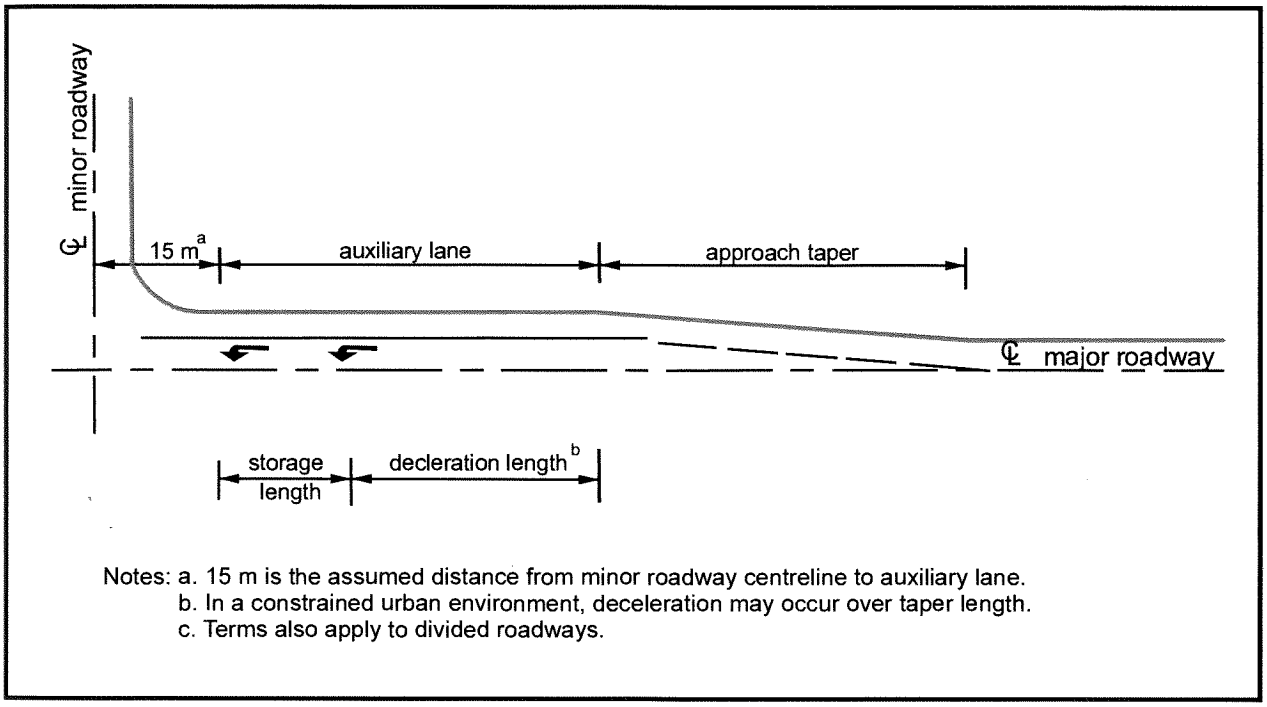
At signalized intersections, the storage lane length should accommodate about 1.5 times the average number of vehicles to be stored per cycle for roadways with design speeds of 60 km/h or less, and about twice the average number of vehicles for design speeds greater than 60 km/h.

The storage length calculated above should be checked against capacity analysis to ensure an acceptable level of service. The required storage for two-lane operation is one half that for a single-lane operation.

Where there is a possibility that an auxiliary lane may be used for either storage or deceleration, the length is determined for both conditions and the total is used in design. For urban and suburban roads, the right-turn lane length tends to be used mainly for storage during peak hours (typically slower peak

The tapers can be made smooth by using horizontal curves at the beginning and end of transitions. The radii of the horizontal curves typically vary from about 500 m for tapers at a design speed of 50 km/h, to 3,000 m for tapers at a design speed of 120 km/h.

Where space to develop tapers is limited, the taper length could also be based on running speed rather than design speed. Gradual approach and departure tapers are particularly important for the higher design speeds. It is also desirable to provide decision sight distance for the taper areas to enhance safe operation. Combinations of minimum sight distance and minimum taper ratios should be avoided.



Notes: a. 15 m is the assumed distance from minor roadway centreline to auxiliary lane.
b. In a constrained urban environment, deceleration may occur over taper length.
c. Terms also apply to divided roadways.

Figure 9.17.1: Left-Turn Lane, Pictorial Description of Terms

Table 9.17.1: Approach and Departure Taper Ratios and Lengths for Left Turns at Intersections

Design Speed (km/h)	Design Domain for Taper Ratio	Horizontal Curve to Smooth Taper R (m)
50	8:1 – 30:1	500
60	15:1 – 36:1	750
70	15:1 – 42:1	1,000
80	15:1 – 48:1	1,200
90	27:1 – 54:1	1,500
100	30:1 – 60:1	2,000
110	33:1 – 66:1	2,500
120	36:1 – 72:1	3,000

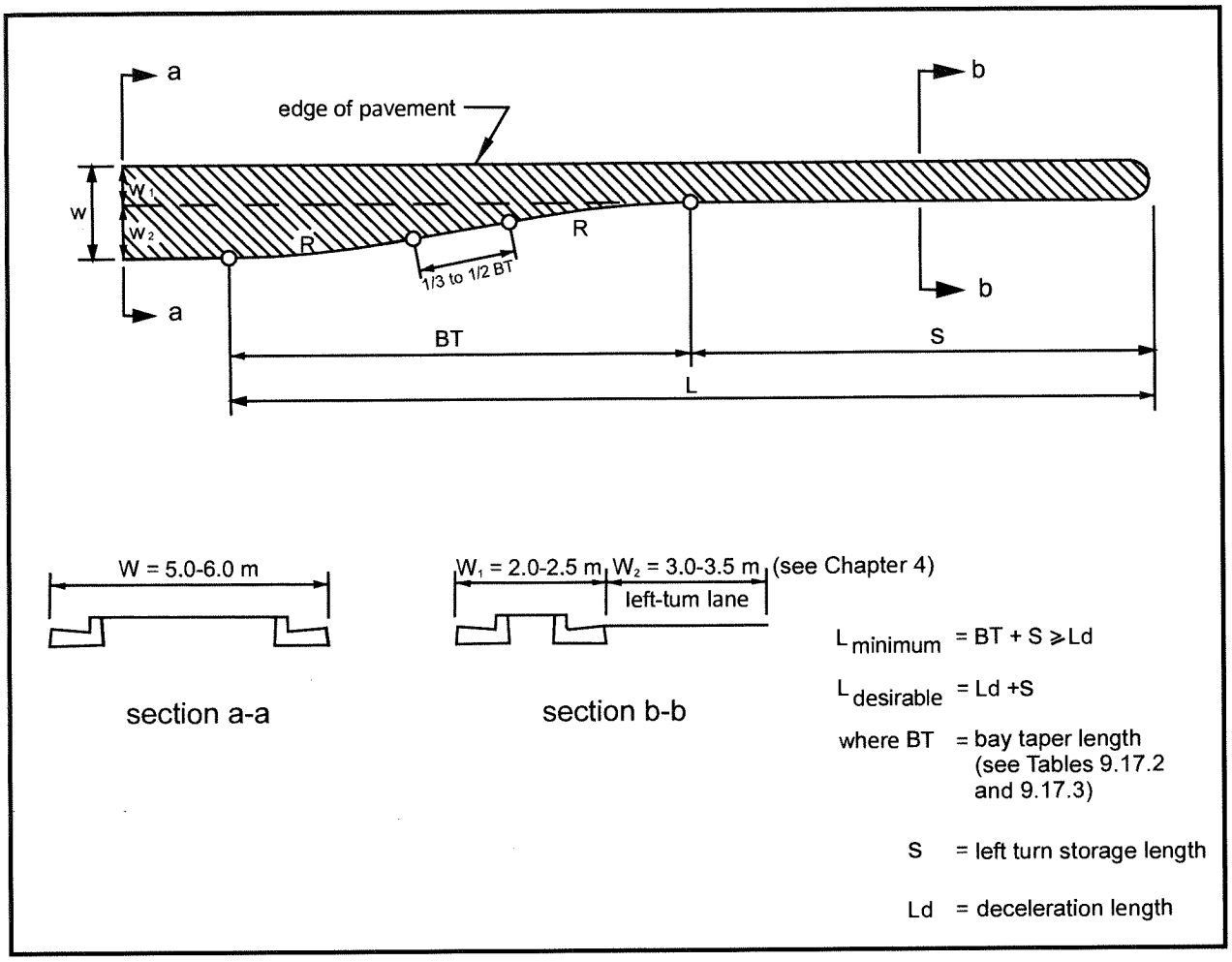


Figure 9.17.4: Left-Turn Lane and Taper with Symmetrical Reverse Curves

Bay taper designs are a function of design speed and the width of the left-turn auxiliary lane. **Table 9.17.2** provides suggested straight-line bay taper ratios for a range of design speeds. **Table 9.17.3** provides suggested taper ratios and radii for bay tapers designed using symmetrical reverse curves. Both tables are applicable to tangent main line alignments. Where the main line alignment is on curve, adjustments to the bay taper may be required.

Table 9.17.2: Bay Tapers Straight Line

Design Speed (km/h)	Taper Ratio Design Domain
50	10:1
60	10:1–12:1
70	10:1–18:1
80	13:1–20:1

Note: For higher design speeds, the 80 km/h design speed dimensions are used and the storage length is increased to provide deceleration length.

Table 9.17.3: Bay Tapers Symmetrical Reverse Curves

Design Speed (km/h)	Taper Ratio Design Domain	Radii (m)
50	10:1	90–150
60	10:1–12:1	150
70	10:1–18:1	150–220
80	13:1–20:1	150–300

Note: For higher design speeds, the 80 km/h design speed dimensions are used and the storage length is increased to provide deceleration length.

9.17.4.2 Deceleration Requirements

In the design of left-turn auxiliary lanes, it is important to consider the deceleration requirements. The minimum deceleration length is based on the distance needed for the driver to brake comfortably to come to a full stop at the intersection. Desirably, the distance needed for deceleration is provided by the auxiliary lane, exclusive of storage requirements. In urban conditions, it is often not feasible to provide both the deceleration distance and storage length due to other considerations, such as intersection spacing, access needs, and other physical controls. In these cases, the taper length may be used for deceleration distance. The deceleration distances for a range of speeds are provided in **Chapter 2**.

9.17.4.3 Storage Length

The storage length is normally designed to accommodate not only left-turning vehicles. It is also made sufficiently long so that vehicles queued in the through lanes do not block the entrance to the turning lane. As a minimum, the auxiliary lane length should be determined by checking that the storage length plus the bay taper length is equal to the deceleration length required for the design speed. Ideally, however, storage length should be provided in addition to deceleration length.

The storage length required to accommodate the left-turning vehicles depends on the number of left-turning vehicles approaching the intersection and whether or not the intersection is, or will be, signalized.

For an unsignalized intersection, storage length can be calculated using the equation outlined in Section 9.14. If the intersection is to be signalized, either initially or in the future, the turn lane provided is normally sufficiently long to store the left-turning traffic and to clear the equivalent per-lane volume of traffic stored on the through lanes, during unsaturated flow conditions. Additional storage length must be provided for larger design vehicles. The minimum storage length that should be provided is 15 m (see Section 9.17.2).

9.17.4.4 Run-out Lane

The run-out lane terminates the bypass lane on the far side of the intersection. The width of the parallel section of the run-out lane is the same as that of the bypass lane. The taper length varies with the design speed and is the same as that applied to the acceleration lane (see **Chapter 10**). The run-out lane is shown in **Figure 9.17.2** and **Figure 9.17.3**.

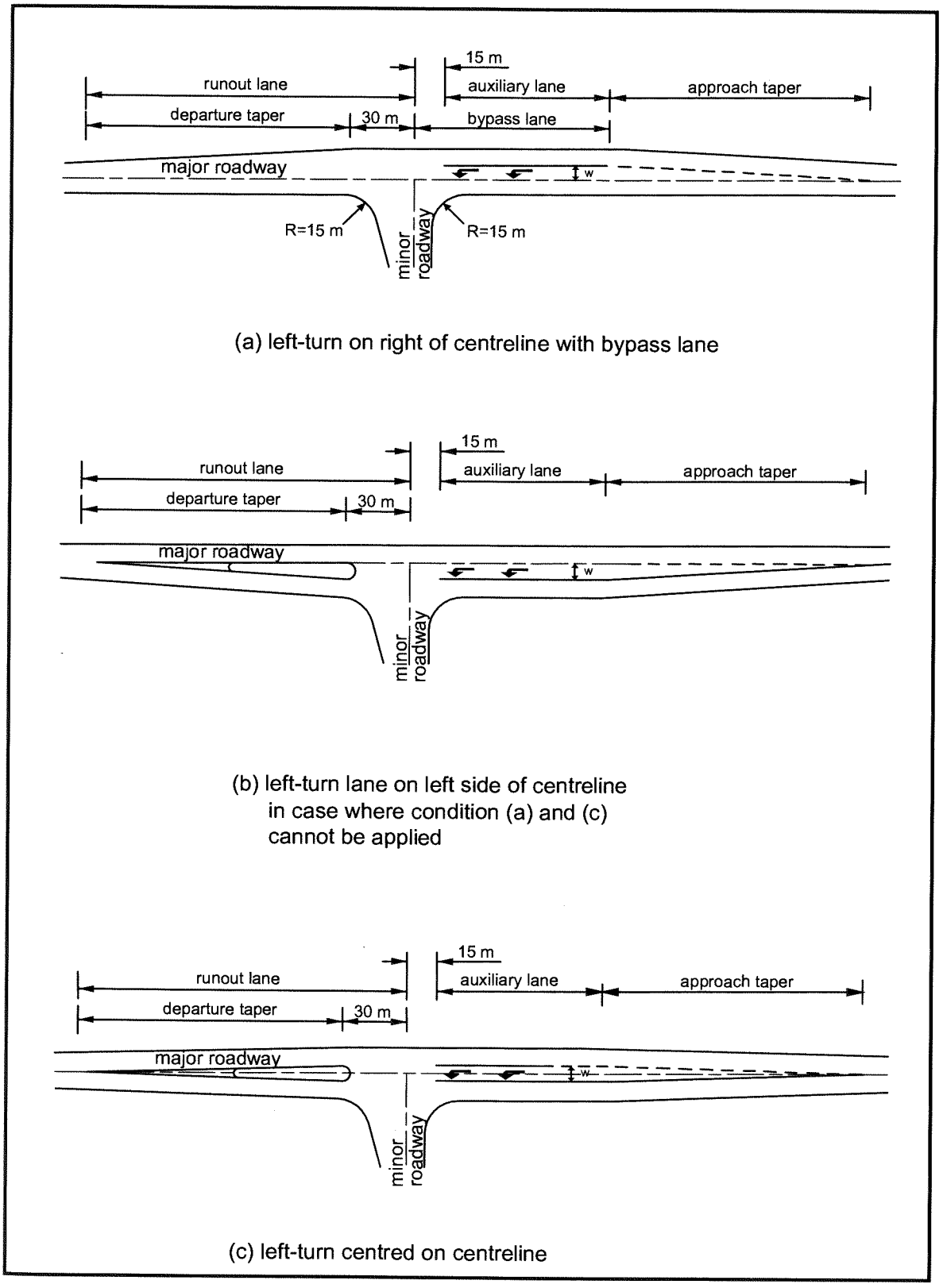
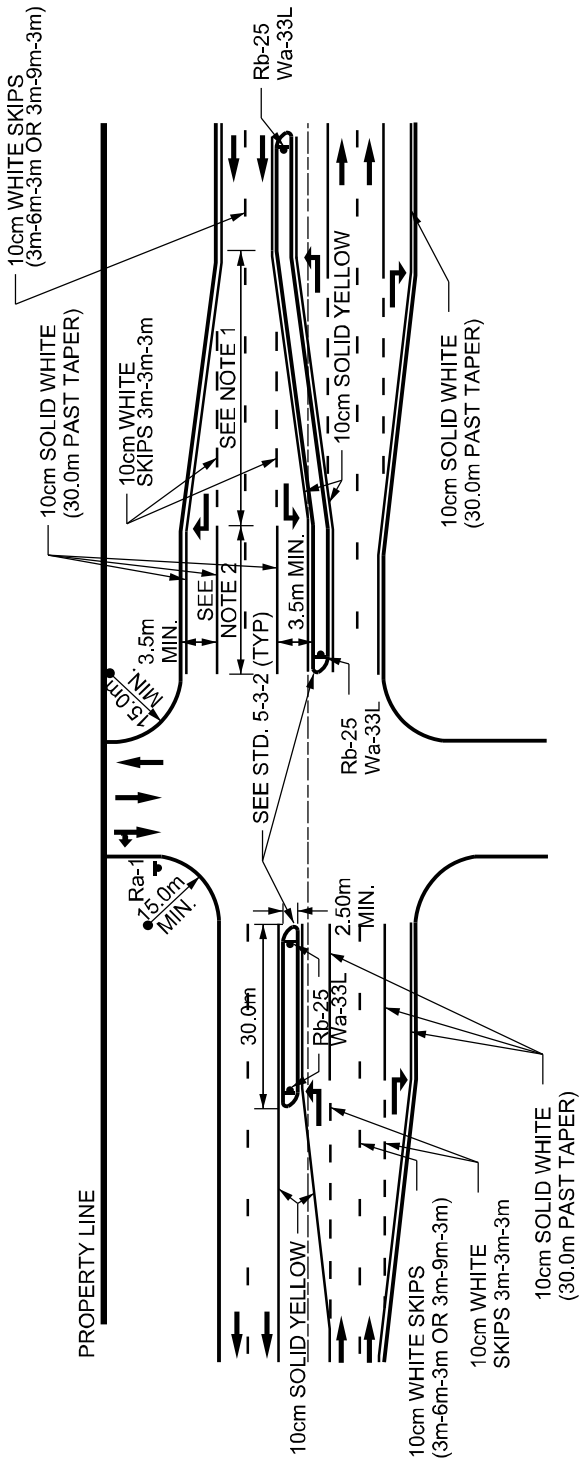


Figure 9.17.2: Left-Turn Lanes at T-Intersections



NOTES

1. THE TAPER LENGTH IS BASED ON DESIGN SPEED OF THE ROADWAY UTILIZING THE TAC MANUAL AND THE ONTARIO TRAFFIC MANUAL
2. THE MINIMUM STORAGE IS 30.0 METERS, HOWEVER ACTUAL LENGTH WILL BE DETERMINED BASED ON PROPOSED TURNING VOLUMES
3. ALL PERMANENT LINE PAINTING APPLICATIONS SHALL BE DONE WITH DURABLE, THERMOPLASTIC PAINT
4. PROPOSED DESIGN AND LOCATION OF ALL ISLANDS SHALL BE VERIFIED AND DESIGNED USING PROPER TURNING TEMPLATES

Region of Peel
Working for you

PUBLIC WORKS
STANDARD DRAWING

REV. DATE: JUNE 2016

TYPICAL DESIGN FOR A FULL MOVES ACCESS

APPROVED BY	DRAWN BY
G.K./S.L.	C.B.
STD. DWG. NUMBER	SCALE
5-1-6	N.T.S.

5.6 Design Criteria for Access

Design criteria for access are summarized in the following table and the four supporting diagrams:

- Table 6: Design Criteria for Access.
- Figure 31: Typical Layout for Right-In/ Right-Out Access (with Median Island).
- Figure 32: Typical Layout for Right-In/ Right-Out Access (without Median Island).
- Figure 33: Typical Layout for Full Moves Median Opening.
- Figure 34: Typical Layout for Left-In, Right-In/Right-Out Access.

Design Criteria (metres)		Rural Road	Industrial Connector	Suburban Connector	Commercial Connector	Rural Main Street	Urban Main Street
Access Width (AW)		ISR	9.0 min	9.0 min	9.0 min	ISR	ISR
Access Throat Length (TL)		ISR	i	i	i	ISR	ISR
Corner Radius, Min (CR)		5.0***	9.0***	9.0***	9.0***	5.0***	5.0***
Median Barrier Length, Min (BL)		30.0*	30.0*	30.0*	30.0*	N/A	N/A
Left Turn Lane Transition (LT)		TAC	TAC	TAC	TAC	TAC	TAC
Left Turn Lane Storage, Min (LS)		30.0	30.0/vol	30.0/vol	30.0/vol	30.0	30.0
Right Turn Lane Transition (RT)		TAC	TAC	TAC	TAC	N/A	N/A
Right Turn Lane Storage, Min (RS)		30.0/vol	30.0/vol	30.0/vol	30.0/vol	N/A	N/A
Auxiliary Lane Width, Min (AW)	L	3.5 **	3.5**	3.5**	3.5**	3.5**	3.5**
	R	3.25***	3.25***	3.25***	3.25***	3.25***	3.25***
Pedestrians		Design of all accesses must consider pedestrians and the continuity of existing or planned Active Transportation facilities.					

Table 6: Design Criteria for Access

NOTES: * 30m on either side of access control as per current by-law.
** Match through-lane if less or determined based on design vehicle needs.
*** Pending Design Vehicle Needs.
i) Conditional based on needs as identified in Transportation Impact Assessment or at the discretion of the Region. Minimum 30m from curb, except for single residential lots.

LEGEND: TAC: Transition length based on design speed of roadway utilizing the TAC Manual and geometric design standards.
Vol: Determined based on projected turning volumes ISR: Individual Sight Review
N/A: Not Applicable L: Left Turn R: Right Turn

APPENDIX J

Truck Swept Path Analysis at Future Site Access

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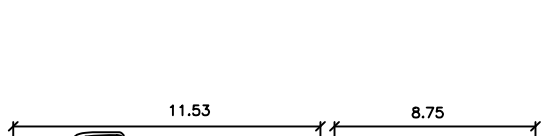
O/W

Kenworth T880 MX (Short) Hood_Config 3

TS

Wire Fence



Kenworth T880 MX (Short) Hood_Config 3

meters

First Unit Width	2.50	Lock to Lock Time	6.0
Trailer Width	2.50	Steering Angle	38.2
First Unit Track	2.50	Articulating Angle	70.0
Trailer Track	2.50		

TYLin

CALEDON QUARRY - SWEPT PATH ANALYSIS
EASTBOUND LEFT INBOUND MANEUVER

SCALE: NTS		PROJECT No. 10042
DATE: FEBRUARY 2025		
DESIGNED BY: JH	N	FIGURE No. 01
CHECKED BY: MD		

File : G:\Projects\2020\10042 - Long Par 5 Haul Route Assessment and TIS\03 Analysis\04 Conceptual Design\20250213\Charleston_Sideroad_Entrance_Location_20250219_Sightline Analysis.dwg, Layout : Fig 1 - VMD Date :Feb 25, 2025 - 11:17am, Edit By : jennifer.huynh

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Kenworth T880 MX (Short) Hood_Config 1

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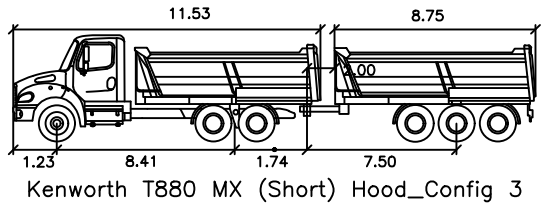

Kenworth T880 MX (Short) Hood_Config 3

meters

First Unit Width	2.50	Lock to Lock Time	6.0
Trailer Width	2.50	Steering Angle	38.2
First Unit Track	2.50	Articulating Angle	70.0
Trailer Track	2.50		

TYLin

CALEDON QUARRY - SWEPT PATH ANALYSIS
SOUTHBOUND RIGHT OUTBOUND MANEUVER

SCALE: NTS		PROJECT No. 10042
DATE: FEBRUARY 2025		
DESIGNED BY: JH	N	FIGURE No. 02
CHECKED BY: MD		

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Kenworth T880 MX (Short) Hood_Config 1

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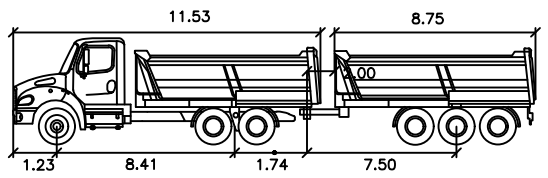

Kenworth T880 MX (Short) Hood_Config 3

meters

First Unit Width	2.50	Lock to Lock Time	6.0
Trailer Width	2.50	Steering Angle	38.2
First Unit Track	2.50	Articulating Angle	70.0
Trailer Track	2.50		

TYLin

CALEDON QUARRY - SWEPT PATH ANALYSIS
WESTBOUND RIGHT INBOUND MANEUVER

SCALE: NTS		PROJECT No. 10042
DATE: FEBRUARY 2025		
DESIGNED BY: JH	N	FIGURE No. 03
CHECKED BY: MD		

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Kenworth T880 MX (Short) Hood_Config 1

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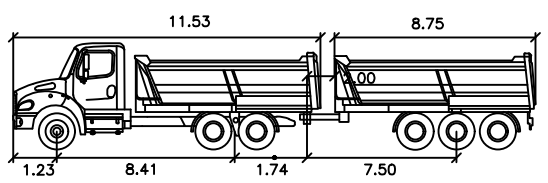

Kenworth T880 MX (Short) Hood_Config 3

meters

First Unit Width	2.50	Lock to Lock Time	6.0
Trailer Width	2.50	Steering Angle	38.2
First Unit Track	2.50	Articulating Angle	70.0
Trailer Track	2.50		

TYLin

CALEDON QUARRY - SWEPT PATH ANALYSIS
SOUTHBOUND LEFT OUTBOUND MANEUVER

SCALE: NTS		PROJECT No. 10042
DATE: FEBRUARY 2025		
DESIGNED BY: JH	N	FIGURE No. 04
CHECKED BY: MD		

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TS

International 5500i Dump Truck
CONSTRUCTION

Chain Link Fence

of Post & Wire

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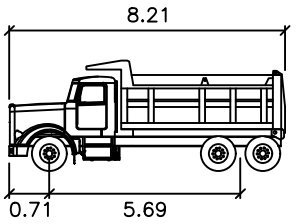

0.71 5.69

International 5500i Dump Truck

	meters
Width	: 2.44
Track	: 2.44
Lock to Lock Time	: 6.0
Steering Angle	: 35.4

TYLin

CALEDON QUARRY - SWEPT PATH ANALYSIS
EASTBOUND LEFT INBOUND MANEUVER

SCALE: NTS
DATE: FEBRUARY 2025
DESIGNED BY: JH
CHECKED BY: MD
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PROJECT No. 10042
FIGURE No. 05

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International 5500i Dump Truck
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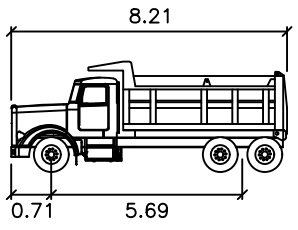

International 5500i Dump Truck

meters

Width	: 2.44
Track	: 2.44
Lock to Lock Time	: 6.0
Steering Angle	: 35.4

TYLin

CALEDON QUARRY - SWEPT PATH ANALYSIS
SOUTHBOUND RIGHT OUTBOUND MANEUVER

SCALE: NTS

DATE: FEBRUARY 2025

DESIGNED BY: JH

CHECKED BY: MD

N

PROJECT No. 10042

FIGURE No. 06

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International 5500i Dump Truck
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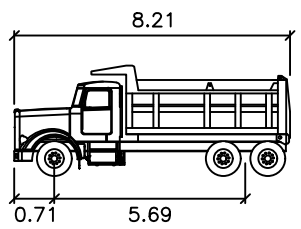

International 5500i Dump Truck

	meters
Width	: 2.44
Track	: 2.44
Lock to Lock Time	: 6.0
Steering Angle	: 35.4

TYLin

CALEDON QUARRY - SWEPT PATH ANALYSIS
WESTBOUND RIGHT INBOUND MANEUVER

SCALE: NTS
DATE: FEBRUARY 2025
DESIGNED BY: JH
CHECKED BY: MD
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PROJECT No. 10042
FIGURE No. 07

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International 5500i Dump Truck
CONSTRUCTION

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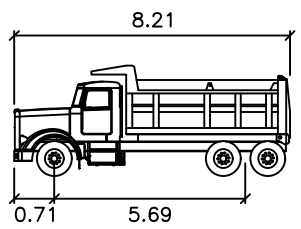

International 5500i Dump Truck

	meters
Width	: 2.44
Track	: 2.44
Lock to Lock Time	: 6.0
Steering Angle	: 35.4

TYLin

CALEDON QUARRY - SWEPT PATH ANALYSIS
SOUTHBOUND LEFT OUTBOUND MANEUVER

SCALE: NTS
DATE: FEBRUARY 2025
DESIGNED BY: JH
CHECKED BY: MD
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PROJECT No. 10042
FIGURE No. 08

File : G:\Projects\2020\10042 - Long Par 5 Haul Route Assessment and TIS\03 Analysis\04 Conceptual Design\20250213\Charleston_Sideroad_Entrance_Location_20250219_Sightline Analysis.dwg, Layout : Fig 8 - VMD Date :Feb 25, 2025 - 11:18am, Edit By : jennifer.huynh

APPENDIX K

Synchro Capacity Analysis Reports

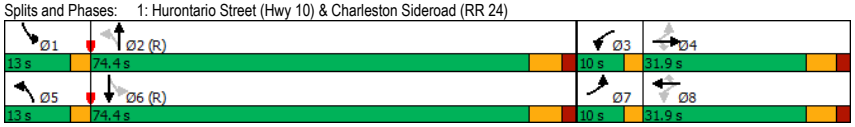
APPENDIX K1

Existing Conditions

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations										
Traffic Volume (vph)	58	158	204	124	185	31	139	793	59	1383
Future Volume (vph)	58	158	204	124	185	31	139	793	59	1383
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	pm+pt	NA
Protected Phases	7	4		3	8		5	2	1	6
Permitted Phases	4		4	8		8	2		6	
Detector Phase	7	4	4	3	8	8	5	2	1	6
Switch Phase										
Minimum Initial (s)	7.0	10.0	10.0	7.0	10.0	10.0	7.0	20.0	7.0	20.0
Minimum Split (s)	10.0	17.9	17.9	10.0	17.9	17.9	10.0	44.4	10.0	44.4
Total Split (s)	10.0	31.9	31.9	10.0	31.9	31.9	13.0	74.4	13.0	74.4
Total Split (%)	7.7%	24.7%	24.7%	7.7%	24.7%	24.7%	10.1%	57.5%	10.1%	57.5%
Yellow Time (s)	3.0	4.5	4.5	3.0	4.5	4.5	3.0	5.0	3.0	5.0
All-Red Time (s)	0.0	2.4	2.4	0.0	2.4	2.4	0.0	2.4	0.0	2.4
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	3.0	6.9	6.9	3.0	6.9	6.9	3.0	7.4	3.0	7.4
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes				Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	C-Max	None	C-Max
Act Effct Green (s)	30.3	19.4	19.4	30.9	21.4	21.4	89.6	77.0	83.6	71.5
Actuated g/C Ratio	0.23	0.15	0.15	0.24	0.17	0.17	0.69	0.60	0.65	0.55
v/c Ratio	0.25	0.71	0.56	0.50	0.70	0.11	0.72	0.51	0.18	0.77
Control Delay	37.9	67.8	16.0	45.3	64.5	0.7	41.2	17.5	8.7	26.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	37.9	67.8	16.0	45.3	64.5	0.7	41.2	17.5	8.7	26.9
LOS	D	E	B	D	E	A	D	B	A	C
Approach Delay		38.5			51.6			20.7		26.2
Approach LOS		D			D			C		C

Intersection Summary		
Cycle Length: 129.3		
Actuated Cycle Length: 129.3		
Offset: 85 (66%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green		
Natural Cycle: 85		
Control Type: Actuated-Coordinated		
Maximum v/c Ratio: 0.77		
Intersection Signal Delay: 28.7	Intersection LOS: C	
Intersection Capacity Utilization 81.9%	ICU Level of Service D	
Analysis Period (min) 15		

Splits and Phases: 1: Hurontario Street (Hwy 10) & Charleston Sideroad (RR 24)



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	61	166	215	131	195	33	146	932	62	1517
v/c Ratio	0.25	0.71	0.56	0.50	0.70	0.11	0.72	0.51	0.18	0.77
Control Delay	37.9	67.8	16.0	45.3	64.5	0.7	41.2	17.5	8.7	26.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	37.9	67.8	16.0	45.3	64.5	0.7	41.2	17.5	8.7	26.9
Queue Length 50th (m)	12.0	40.5	7.4	26.7	48.0	0.0	16.5	70.7	4.6	162.2
Queue Length 95th (m)	22.2	61.7	29.7	41.8	70.8	0.0	#53.1	100.5	10.4	197.2
Internal Link Dist (m)		1351.4			575.0			764.6		536.2
Turn Bay Length (m)	80.0		65.0	40.0		55.0	85.0		40.0	
Base Capacity (vph)	245	304	447	261	328	338	206	1841	365	1960
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.25	0.55	0.48	0.50	0.59	0.10	0.71	0.51	0.17	0.77

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

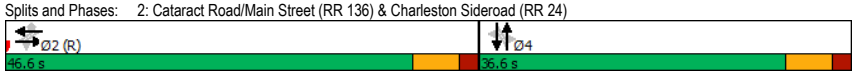
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	58	158	204	124	185	31	139	793	92	59	1383	58
Future Volume (vph)	58	158	204	124	185	31	139	793	92	59	1383	58
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.9	6.9	3.0	6.9	6.9	3.0	7.4		3.0	7.4	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98		1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1690	1575	1555	1772	1700	1384	1534	3086		1484	3539	
Flt Permitted	0.48	1.00	1.00	0.48	1.00	1.00	0.07	1.00		0.27	1.00	
Satd. Flow (perm)	858	1575	1555	898	1700	1384	118	3086		426	3539	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	61	166	215	131	195	33	146	835	97	62	1456	61
RTOR Reduction (vph)	0	0	154	0	0	28	0	6	0	0	2	0
Lane Group Flow (vph)	61	166	61	131	195	5	146	926	0	62	1515	0
Heavy Vehicles (%)	8%	22%	5%	3%	13%	18%	19%	16%	20%	23%	2%	15%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8		8	2			6		
Actuated Green, G (s)	25.6	20.0	20.0	28.4	21.4	21.4	85.0	75.7		77.2	70.9	
Effective Green, g (s)	25.6	20.0	20.0	28.4	21.4	21.4	85.0	75.7		77.2	70.9	
Actuated g/C Ratio	0.20	0.15	0.15	0.22	0.17	0.17	0.66	0.59		0.60	0.55	
Clearance Time (s)	3.0	6.9	6.9	3.0	6.9	6.9	3.0	7.4		3.0	7.4	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	4.4		3.0	4.4	
Lane Grp Cap (vph)	205	243	240	244	281	229	199	1806		305	1940	
v/s Ratio Prot	0.01	0.11		c0.03	c0.11		c0.06	0.30		0.01	c0.43	
v/s Ratio Perm	0.05		0.04	0.09		0.00	0.42			0.11		
v/c Ratio	0.30	0.68	0.25	0.54	0.69	0.02	0.73	0.51		0.20	0.78	
Uniform Delay, d1	43.2	51.7	48.1	43.3	50.9	45.2	27.6	15.9		11.2	23.1	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.8	7.7	0.6	2.3	7.2	0.0	13.1	1.0		0.3	3.2	
Delay (s)	44.1	59.4	48.7	45.6	58.1	45.2	40.6	16.9		11.6	26.3	
Level of Service	D	E	D	D	E	D	D	B		B	C	
Approach Delay (s)		52.0			52.3			20.1			25.7	
Approach LOS		D			D			C			C	

Intersection Summary				
HCM 2000 Control Delay	30.1	HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio	0.75			
Actuated Cycle Length (s)	129.3	Sum of lost time (s)	20.3	
Intersection Capacity Utilization	81.9%	ICU Level of Service	D	
Analysis Period (min)	15			
c Critical Lane Group				

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	38	328	6	313	43	6	6	52	9
Future Volume (vph)	38	328	6	313	43	6	6	52	9
Turn Type	Perm	NA	Perm	NA	Perm	Perm	NA	Perm	NA
Protected Phases		2		2			4		4
Permitted Phases	2		2		2	4		4	
Detector Phase	2	2	2	2	2	4	4	4	4
Switch Phase									
Minimum Initial (s)	20.0	20.0	20.0	20.0	20.0	16.0	16.0	16.0	16.0
Minimum Split (s)	30.6	30.6	30.6	30.6	30.6	30.6	30.6	30.6	30.6
Total Split (s)	46.6	46.6	46.6	46.6	46.6	36.6	36.6	36.6	36.6
Total Split (%)	56.0%	56.0%	56.0%	56.0%	56.0%	44.0%	44.0%	44.0%	44.0%
Yellow Time (s)	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.6	6.6	6.6	6.6	6.6	6.6	6.6	6.6	6.6
Lead/Lag									
Lead-Lag Optimize?									
Recall Mode	C-Min	C-Min	C-Min	C-Min	C-Min	None	None	None	None
Act Effct Green (s)	59.8	59.8	59.8	59.8	59.8	16.0	16.0	16.0	16.0
Actuated g/C Ratio	0.72	0.72	0.72	0.72	0.72	0.19	0.19	0.19	0.19
v/c Ratio	0.05	0.27	0.01	0.28	0.04	0.02	0.05	0.20	0.16
Control Delay	5.6	6.5	5.2	6.7	1.7	27.7	18.2	30.4	12.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	5.6	6.5	5.2	6.7	1.7	27.7	18.2	30.4	12.5
LOS	A	A	A	A	A	C	B	C	B
Approach Delay		6.4		6.0			20.7		21.5
Approach LOS		A		A			C		C

Intersection Summary			
Cycle Length: 83.2			
Actuated Cycle Length: 83.2			
Offset: 22.5 (27%), Referenced to phase 2:EBWB and 6:, Start of Green			
Natural Cycle: 65			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.28			
Intersection Signal Delay: 8.4		Intersection LOS: A	
Intersection Capacity Utilization 63.2%		ICU Level of Service B	
Analysis Period (min) 15			

Splits and Phases: 2: Cataract Road/Main Street (RR 136) & Charleston Sideroad (RR 24)

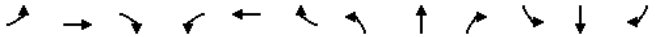


Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	39	344	6	323	44	6	17	54	54
v/c Ratio	0.05	0.27	0.01	0.28	0.04	0.02	0.05	0.20	0.16
Control Delay	5.6	6.5	5.2	6.7	1.7	27.7	18.2	30.4	12.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	5.6	6.5	5.2	6.7	1.7	27.7	18.2	30.4	12.5
Queue Length 50th (m)	2.0	20.9	0.3	19.9	0.0	0.8	0.8	7.3	1.2
Queue Length 95th (m)	5.2	33.5	1.5	32.3	2.9	4.0	6.0	17.1	10.3
Internal Link Dist (m)		1408.9		2789.4			883.0		1179.5
Turn Bay Length (m)	125.0		60.0		90.0	70.0		85.0	
Base Capacity (vph)	758	1254	765	1142	1187	500	632	516	610
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.05	0.27	0.01	0.28	0.04	0.01	0.03	0.10	0.09

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	38	328	6	6	313	43	6	6	11	52	9	44
Future Volume (vph)	38	328	6	6	313	43	6	6	11	52	9	44
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.6	6.6		6.6	6.6	6.6	6.6	6.6		6.6	6.6	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00		1.00	1.00	0.85	1.00	0.90		1.00	0.88	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1772	1745		1825	1588	1633	1825	1735		1825	1614	
Flt Permitted	0.57	1.00		0.55	1.00	1.00	0.72	1.00		0.75	1.00	
Satd. Flow (perm)	1054	1745		1065	1588	1633	1387	1735		1434	1614	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	39	338	6	6	323	44	6	6	11	54	9	45
RTOR Reduction (vph)	0	0	0	0	0	14	0	9	0	0	38	0
Lane Group Flow (vph)	39	344	0	6	323	30	6	8	0	54	16	0
Heavy Vehicles (%)	3%	10%	0%	0%	21%	0%	0%	0%	0%	0%	0%	5%
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		2			2			4			4	
Permitted Phases	2			2		2	4			4		
Actuated Green, G (s)	57.2	57.2		57.2	57.2	57.2	12.8	12.8		12.8	12.8	
Effective Green, g (s)	57.2	57.2		57.2	57.2	57.2	12.8	12.8		12.8	12.8	
Actuated g/C Ratio	0.69	0.69		0.69	0.69	0.69	0.15	0.15		0.15	0.15	
Clearance Time (s)	6.6	6.6		6.6	6.6	6.6	6.6	6.6		6.6	6.6	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	724	1199		732	1091	1122	213	266		220	248	
v/s Ratio Prot		0.20			c0.20			0.00			0.01	
v/s Ratio Perm	0.04			0.01		0.02	0.00			c0.04		
v/c Ratio	0.05	0.29		0.01	0.30	0.03	0.03	0.03		0.25	0.06	
Uniform Delay, d1	4.2	5.1		4.1	5.1	4.1	29.9	29.9		31.0	30.1	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.1	0.6		0.0	0.7	0.0	0.1	0.0		0.6	0.1	
Delay (s)	4.4	5.7		4.1	5.8	4.2	30.0	30.0		31.5	30.2	
Level of Service	A	A		A	A	A	C	C		C	C	
Approach Delay (s)		5.5			5.6			30.0			30.9	
Approach LOS		A			A			C			C	

Intersection Summary					
HCM 2000 Control Delay	9.3	HCM 2000 Level of Service		A	
HCM 2000 Volume to Capacity ratio	0.29				
Actuated Cycle Length (s)	83.2	Sum of lost time (s)		13.2	
Intersection Capacity Utilization	63.2%	ICU Level of Service		B	
Analysis Period (min)	15				
c Critical Lane Group					



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	16	358	2	33	312	15	2	5	13	15	8	11
Future Volume (Veh/h)	16	358	2	33	312	15	2	5	13	15	8	11
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	17	377	2	35	328	16	2	5	14	16	8	12
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	344			379			826	826	378	834	819	336
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	344			379			826	826	378	834	819	336
tC, single (s)	4.1			4.9			7.2	6.5	6.9	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.9			3.6	4.0	3.9	3.5	4.0	3.3
p0 queue free %	99			96			99	98	97	94	97	98
cM capacity (veh/h)	1226			868			257	293	550	268	296	711

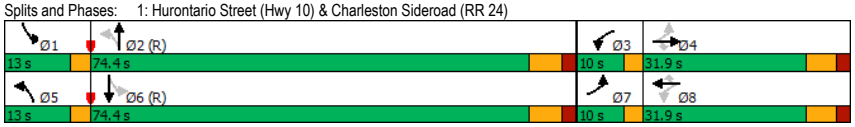
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	17	379	35	344	21	36
Volume Left	17	0	35	0	2	16
Volume Right	0	2	0	16	14	12
cSH	1226	1700	868	1700	417	347
Volume to Capacity	0.01	0.22	0.04	0.20	0.05	0.10
Queue Length 95th (m)	0.3	0.0	1.0	0.0	1.2	2.6
Control Delay (s)	8.0	0.0	9.3	0.0	14.1	16.6
Lane LOS	A		A		B	C
Approach Delay (s)	0.3		0.9		14.1	16.6
Approach LOS					B	C

Intersection Summary				
Average Delay	1.6			
Intersection Capacity Utilization	37.9%	ICU Level of Service		A
Analysis Period (min)	15			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations										
Traffic Volume (vph)	75	254	151	113	269	84	181	1397	52	863
Future Volume (vph)	75	254	151	113	269	84	181	1397	52	863
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	pm+pt	NA
Protected Phases	7	4		3	8		5	2	1	6
Permitted Phases	4		4	8		8	2		6	
Detector Phase	7	4	4	3	8	8	5	2	1	6
Switch Phase										
Minimum Initial (s)	7.0	10.0	10.0	7.0	10.0	10.0	7.0	20.0	7.0	20.0
Minimum Split (s)	10.0	17.9	17.9	10.0	17.9	17.9	10.0	44.4	10.0	44.4
Total Split (s)	10.0	31.9	31.9	10.0	31.9	31.9	13.0	74.4	13.0	74.4
Total Split (%)	7.7%	24.7%	24.7%	7.7%	24.7%	24.7%	10.1%	57.5%	10.1%	57.5%
Yellow Time (s)	3.0	4.5	4.5	3.0	4.5	4.5	3.0	5.0	3.0	5.0
All-Red Time (s)	0.0	2.4	2.4	0.0	2.4	2.4	0.0	2.4	0.0	2.4
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	3.0	6.9	6.9	3.0	6.9	6.9	3.0	7.4	3.0	7.4
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes				Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	C-Max	None	C-Max
Act Effct Green (s)	34.3	23.4	23.4	34.9	25.4	25.4	85.4	73.1	81.2	69.2
Actuated g/C Ratio	0.27	0.18	0.18	0.27	0.20	0.20	0.66	0.57	0.63	0.54
v/c Ratio	0.36	0.88	0.39	0.59	0.82	0.24	0.53	0.82	0.37	0.55
Control Delay	38.7	79.8	9.5	49.1	69.8	10.3	14.0	28.1	17.5	21.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	38.7	79.8	9.5	49.1	69.8	10.3	14.0	28.1	17.5	21.5
LOS	D	E	A	D	E	B	B	C	B	C
Approach Delay		51.3			54.1			26.7		21.3
Approach LOS		D			D			C		C

Intersection Summary		
Cycle Length: 129.3		
Actuated Cycle Length: 129.3		
Offset: 85 (66%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green		
Natural Cycle: 95		
Control Type: Actuated-Coordinated		
Maximum v/c Ratio: 0.88		
Intersection Signal Delay: 31.9	Intersection LOS: C	
Intersection Capacity Utilization 91.0%	ICU Level of Service F	
Analysis Period (min) 15		

Splits and Phases: 1: Hurontario Street (Hwy 10) & Charleston Sideroad (RR 24)



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	79	267	159	119	283	88	191	1631	55	977
v/c Ratio	0.36	0.88	0.39	0.59	0.82	0.24	0.53	0.82	0.37	0.55
Control Delay	38.7	79.8	9.5	49.1	69.8	10.3	14.0	28.1	17.5	21.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	38.7	79.8	9.5	49.1	69.8	10.3	14.0	28.1	17.5	21.5
Queue Length 50th (m)	14.7	65.9	0.0	22.8	70.0	0.0	17.6	178.8	4.7	85.8
Queue Length 95th (m)	27.1	#108.6	18.0	38.9	#114.1	13.9	27.3	221.8	11.6	105.5
Internal Link Dist (m)		1351.4			575.0			764.6		536.2
Turn Bay Length (m)	80.0		65.0	40.0		55.0	85.0		40.0	
Base Capacity (vph)	217	325	423	200	349	376	367	1991	180	1775
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.36	0.82	0.38	0.59	0.81	0.23	0.52	0.82	0.31	0.55

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

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	75	254	151	113	269	84	181	1397	152	52	863	66
Future Volume (vph)	75	254	151	113	269	84	181	1397	152	52	863	66
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.9	6.9	3.0	6.9	6.9	3.0	7.4		3.0	7.4	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00	0.98	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99		1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1753	1685	1527	1658	1762	1544	1771	3516		1601	3312	
Flt Permitted	0.32	1.00	1.00	0.29	1.00	1.00	0.21	1.00		0.06	1.00	
Satd. Flow (perm)	582	1685	1527	513	1762	1544	394	3516		100	3312	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	79	267	159	119	283	88	191	1471	160	55	908	69
RTOR Reduction (vph)	0	0	129	0	0	71	0	6	0	0	4	0
Lane Group Flow (vph)	79	267	30	119	283	17	191	1625	0	55	973	0
Confl. Peds. (#/hr)	5		6	6		5	7		5	5		7
Heavy Vehicles (%)	4%	14%	5%	10%	9%	4%	3%	2%	2%	14%	9%	6%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8		8	2			6		
Actuated Green, G (s)	29.6	24.0	24.0	32.4	25.4	25.4	81.0	71.8		74.7	68.5	
Effective Green, g (s)	29.6	24.0	24.0	32.4	25.4	25.4	81.0	71.8		74.7	68.5	
Actuated g/C Ratio	0.23	0.19	0.19	0.25	0.20	0.20	0.63	0.56		0.58	0.53	
Clearance Time (s)	3.0	6.9	6.9	3.0	6.9	6.9	3.0	7.4		3.0	7.4	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	4.4		3.0	4.4	
Lane Grp Cap (vph)	183	312	283	190	346	303	347	1952		129	1754	
v/s Ratio Prot	0.02	0.16		c0.03	c0.16		c0.04	c0.46		0.02	0.29	
v/s Ratio Perm	0.08		0.02	0.12		0.01	0.30			0.22		
v/c Ratio	0.43	0.86	0.10	0.63	0.82	0.06	0.55	0.83		0.43	0.55	
Uniform Delay, d1	40.8	51.0	43.7	40.6	49.7	42.2	12.5	23.8		20.5	20.2	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.6	19.9	0.2	6.3	13.9	0.1	1.9	4.3		2.3	1.3	
Delay (s)	42.4	70.9	43.9	46.9	63.6	42.3	14.4	28.1		22.8	21.5	
Level of Service	D	E	D	D	E	D	B	C		C	C	
Approach Delay (s)		57.9			55.7			26.7			21.6	
Approach LOS		E			E			C			C	

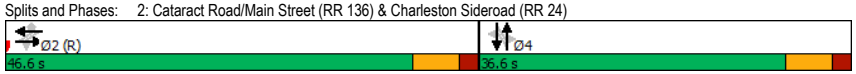
Intersection Summary				
HCM 2000 Control Delay	33.1	HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio	0.82			
Actuated Cycle Length (s)	129.3	Sum of lost time (s)	20.3	
Intersection Capacity Utilization	91.0%	ICU Level of Service	F	
Analysis Period (min)	15			

c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	73	411	4	398	85	12	11	62	17
Future Volume (vph)	73	411	4	398	85	12	11	62	17
Turn Type	Perm	NA	Perm	NA	Perm	Perm	NA	Perm	NA
Protected Phases		2		2			4		4
Permitted Phases	2		2		2	4		4	
Detector Phase	2	2	2	2	2	4	4	4	4
Switch Phase									
Minimum Initial (s)	20.0	20.0	20.0	20.0	20.0	16.0	16.0	16.0	16.0
Minimum Split (s)	30.6	30.6	30.6	30.6	30.6	30.6	30.6	30.6	30.6
Total Split (s)	46.6	46.6	46.6	46.6	46.6	36.6	36.6	36.6	36.6
Total Split (%)	56.0%	56.0%	56.0%	56.0%	56.0%	44.0%	44.0%	44.0%	44.0%
Yellow Time (s)	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.6	6.6	6.6	6.6	6.6	6.6	6.6	6.6	6.6
Lead/Lag									
Lead-Lag Optimize?									
Recall Mode	C-Min	C-Min	C-Min	C-Min	C-Min	None	None	None	None
Act Effct Green (s)	59.8	59.8	59.8	59.8	59.8	16.0	16.0	16.0	16.0
Actuated g/C Ratio	0.72	0.72	0.72	0.72	0.72	0.19	0.19	0.19	0.19
v/c Ratio	0.10	0.35	0.01	0.33	0.08	0.05	0.06	0.23	0.21
Control Delay	6.0	7.2	5.2	6.9	1.5	28.2	20.5	31.0	12.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	6.0	7.2	5.2	6.9	1.5	28.2	20.5	31.0	12.9
LOS	A	A	A	A	A	C	C	C	B
Approach Delay		7.0		6.0			23.4		21.1
Approach LOS		A		A			C		C

Intersection Summary			
Cycle Length: 83.2			
Actuated Cycle Length: 83.2			
Offset: 22.5 (27%), Referenced to phase 2:EBWB and 6:, Start of Green			
Natural Cycle: 65			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.35			
Intersection Signal Delay: 8.7		Intersection LOS: A	
Intersection Capacity Utilization 68.8%		ICU Level of Service C	
Analysis Period (min) 15			

Splits and Phases: 2: Cataract Road/Main Street (RR 136) & Charleston Sideroad (RR 24)

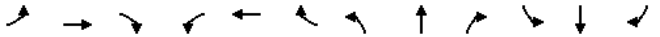


Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	74	430	4	406	87	12	20	63	76
v/c Ratio	0.10	0.35	0.01	0.33	0.08	0.05	0.06	0.23	0.21
Control Delay	6.0	7.2	5.2	6.9	1.5	28.2	20.5	31.0	12.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	6.0	7.2	5.2	6.9	1.5	28.2	20.5	31.0	12.9
Queue Length 50th (m)	3.9	28.1	0.2	26.0	0.0	1.6	1.5	8.5	2.2
Queue Length 95th (m)	8.7	44.1	1.2	40.8	4.3	5.9	6.9	19.1	12.9
Internal Link Dist (m)		1408.9		2789.4			883.0		1179.5
Turn Bay Length (m)	125.0		60.0		90.0	70.0		85.0	
Base Capacity (vph)	711	1221	688	1245	1142	458	651	515	631
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.10	0.35	0.01	0.33	0.08	0.03	0.03	0.12	0.12

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	73	411	11	4	398	85	12	11	9	62	17	58
Future Volume (vph)	73	411	11	4	398	85	12	11	9	62	17	58
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.6	6.6		6.6	6.6	6.6	6.6	6.6		6.6	6.6	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00		1.00	1.00	0.85	1.00	0.93		1.00	0.88	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1825	1699		1825	1731	1555	1706	1791		1825	1646	
Flt Permitted	0.51	1.00		0.50	1.00	1.00	0.71	1.00		0.74	1.00	
Satd. Flow (perm)	989	1699		957	1731	1555	1270	1791		1430	1646	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	74	419	11	4	406	87	12	11	9	63	17	59
RTOR Reduction (vph)	0	1	0	0	0	27	0	8	0	0	50	0
Lane Group Flow (vph)	74	429	0	4	406	60	12	12	0	63	26	0
Heavy Vehicles (%)	0%	13%	0%	0%	11%	5%	7%	0%	0%	0%	0%	4%
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		2			2			4			4	
Permitted Phases	2			2		2	4			4		
Actuated Green, G (s)	57.2	57.2		57.2	57.2	57.2	12.8	12.8		12.8	12.8	
Effective Green, g (s)	57.2	57.2		57.2	57.2	57.2	12.8	12.8		12.8	12.8	
Actuated g/C Ratio	0.69	0.69		0.69	0.69	0.69	0.15	0.15		0.15	0.15	
Clearance Time (s)	6.6	6.6		6.6	6.6	6.6	6.6	6.6		6.6	6.6	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	679	1168		657	1190	1069	195	275		220	253	
v/s Ratio Prot		c0.25			0.23			0.01			0.02	
v/s Ratio Perm	0.07			0.00		0.04	0.01			c0.04		
v/c Ratio	0.11	0.37		0.01	0.34	0.06	0.06	0.05		0.29	0.10	
Uniform Delay, d1	4.4	5.4		4.1	5.3	4.2	30.1	30.0		31.2	30.3	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.3	0.9		0.0	0.8	0.1	0.1	0.1		0.7	0.2	
Delay (s)	4.7	6.3		4.1	6.1	4.3	30.2	30.1		31.9	30.4	
Level of Service	A	A		A	A	A	C	C		C	C	
Approach Delay (s)		6.1			5.8			30.1			31.1	
Approach LOS		A			A			C			C	

Intersection Summary				
HCM 2000 Control Delay	9.6	HCM 2000 Level of Service	A	
HCM 2000 Volume to Capacity ratio	0.35			
Actuated Cycle Length (s)	83.2	Sum of lost time (s)	13.2	
Intersection Capacity Utilization	68.8%	ICU Level of Service	C	
Analysis Period (min)	15			
c Critical Lane Group				



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	14	453	8	12	451	12	3	14	21	21	4	14
Future Volume (Veh/h)	14	453	8	12	451	12	3	14	21	21	4	14
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	14	467	8	12	465	12	3	14	22	22	4	14
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	477			475			1004	1000	471	1019	998	471
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	477			475			1004	1000	471	1019	998	471
tC, single (s)	4.2			4.2			7.2	6.5	6.3	7.1	6.5	6.3
tC, 2 stage (s)												
tF (s)	2.3			2.3			3.6	4.0	3.4	3.5	4.0	3.4
p0 queue free %	99			99			99	94	96	89	98	98
cM capacity (veh/h)	1055			1032			200	239	571	196	240	571

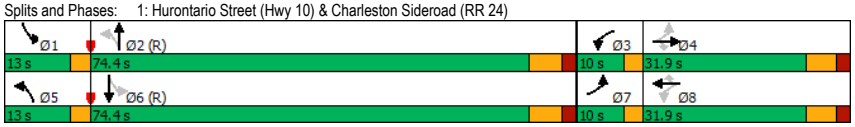
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	14	475	12	477	39	40
Volume Left	14	0	12	0	3	22
Volume Right	0	8	0	12	22	14
cSH	1055	1700	1032	1700	348	260
Volume to Capacity	0.01	0.28	0.01	0.28	0.11	0.15
Queue Length 95th (m)	0.3	0.0	0.3	0.0	2.9	4.1
Control Delay (s)	8.5	0.0	8.5	0.0	16.6	21.3
Lane LOS	A		A		C	C
Approach Delay (s)	0.2		0.2		16.6	21.3
Approach LOS					C	C

Intersection Summary				
Average Delay	1.6			
Intersection Capacity Utilization	39.9%	ICU Level of Service		A
Analysis Period (min)	15			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations										
Traffic Volume (vph)	111	224	108	146	226	34	185	1126	60	920
Future Volume (vph)	111	224	108	146	226	34	185	1126	60	920
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	pm+pt	NA
Protected Phases	7	4		3	8		5	2	1	6
Permitted Phases	4		4	8		8	2		6	
Detector Phase	7	4	4	3	8	8	5	2	1	6
Switch Phase										
Minimum Initial (s)	7.0	10.0	10.0	7.0	10.0	10.0	7.0	20.0	7.0	20.0
Minimum Split (s)	10.0	17.9	17.9	10.0	17.9	17.9	10.0	44.4	10.0	44.4
Total Split (s)	10.0	31.9	31.9	10.0	31.9	31.9	13.0	74.4	13.0	74.4
Total Split (%)	7.7%	24.7%	24.7%	7.7%	24.7%	24.7%	10.1%	57.5%	10.1%	57.5%
Yellow Time (s)	3.0	4.5	4.5	3.0	4.5	4.5	3.0	5.0	3.0	5.0
All-Red Time (s)	0.0	2.4	2.4	0.0	2.4	2.4	0.0	2.4	0.0	2.4
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	3.0	6.9	6.9	3.0	6.9	6.9	3.0	7.4	3.0	7.4
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes				Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	C-Max	None	C-Max
Act Effct Green (s)	31.5	20.6	20.6	31.5	20.6	20.6	88.3	75.9	83.6	71.8
Actuated g/C Ratio	0.24	0.16	0.16	0.24	0.16	0.16	0.68	0.59	0.65	0.56
v/c Ratio	0.53	0.78	0.32	0.68	0.78	0.11	0.54	0.64	0.24	0.53
Control Delay	46.3	69.3	10.3	55.2	70.0	0.6	13.5	20.4	9.7	19.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	46.3	69.3	10.3	55.2	70.0	0.6	13.5	20.4	9.7	19.8
LOS	D	E	B	E	E	A	B	C	A	B
Approach Delay		49.1			58.9			19.6		19.3
Approach LOS		D			E			B		B

Intersection Summary		
Cycle Length: 129.3		
Actuated Cycle Length: 129.3		
Offset: 85 (66%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green		
Natural Cycle: 85		
Control Type: Actuated-Coordinated		
Maximum v/c Ratio: 0.78		
Intersection Signal Delay: 28.1	Intersection LOS: C	
Intersection Capacity Utilization 82.5%	ICU Level of Service E	
Analysis Period (min) 15		

Splits and Phases: 1: Hurontario Street (Hwy 10) & Charleston Sideroad (RR 24)



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	116	233	113	152	235	35	193	1319	63	1037
v/c Ratio	0.53	0.78	0.32	0.68	0.78	0.11	0.54	0.64	0.24	0.53
Control Delay	46.3	69.3	10.3	55.2	70.0	0.6	13.5	20.4	9.7	19.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	46.3	69.3	10.3	55.2	70.0	0.6	13.5	20.4	9.7	19.8
Queue Length 50th (m)	23.1	57.3	0.0	30.9	57.9	0.0	16.1	114.9	4.9	85.6
Queue Length 95th (m)	37.4	82.8	15.7	47.6	83.3	0.0	27.7	152.3	10.5	110.5
Internal Link Dist (m)		1351.4			575.0			764.6		536.2
Turn Bay Length (m)	80.0		65.0	40.0		55.0	85.0		40.0	
Base Capacity (vph)	217	364	398	222	364	381	366	2068	301	1965
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.53	0.64	0.28	0.68	0.65	0.09	0.53	0.64	0.21	0.53

Intersection Summary

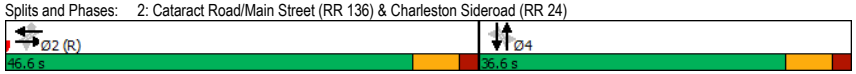
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	111	224	108	146	226	34	185	1126	140	60	920	76
Future Volume (vph)	111	224	108	146	226	34	185	1126	140	60	920	76
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.9	6.9	3.0	6.9	6.9	3.0	7.4		3.0	7.4	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00	0.98	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98		1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1805	1883	1589	1824	1883	1603	1772	3513		1825	3531	
Flt Permitted	0.33	1.00	1.00	0.34	1.00	1.00	0.20	1.00		0.14	1.00	
Satd. Flow (perm)	631	1883	1589	648	1883	1603	373	3513		273	3531	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	116	233	112	152	235	35	193	1173	146	62	958	79
RTOR Reduction (vph)	0	0	95	0	0	29	0	6	0	0	4	0
Lane Group Flow (vph)	116	233	18	152	235	6	193	1313	0	63	1033	0
Confl. Peds. (#/hr)	5		4	4		5	2		3	3		2
Confl. Bikes (#/hr)			1			1			1			1
Heavy Vehicles (%)	1%	2%	1%	0%	2%	0%	3%	2%	1%	0%	2%	2%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8		8	2			6		
Actuated Green, G (s)	27.6	20.6	20.6	27.6	20.6	20.6	84.4	75.4		77.8	71.8	
Effective Green, g (s)	27.6	20.6	20.6	27.6	20.6	20.6	84.4	75.4		77.8	71.8	
Actuated g/C Ratio	0.21	0.16	0.16	0.21	0.16	0.16	0.65	0.58		0.60	0.56	
Clearance Time (s)	3.0	6.9	6.9	3.0	6.9	6.9	3.0	7.4		3.0	7.4	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	4.4		3.0	4.4	
Lane Grp Cap (vph)	198	299	253	201	299	255	347	2048		236	1960	
v/s Ratio Prot	0.03	0.12		c0.04	c0.12		c0.04	c0.37		0.01	0.29	
v/s Ratio Perm	0.09		0.01	0.12		0.00	0.32			0.15		
v/c Ratio	0.59	0.78	0.07	0.76	0.79	0.02	0.56	0.64		0.27	0.53	
Uniform Delay, d1	43.1	52.2	46.2	46.2	52.2	45.9	11.4	17.9		13.0	18.1	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	4.4	12.1	0.1	14.9	12.7	0.0	1.9	1.6		0.6	1.0	
Delay (s)	47.5	64.3	46.3	61.1	65.0	45.9	13.3	19.5		13.6	19.1	
Level of Service	D	E	D	E	E	D	B	B		B	B	
Approach Delay (s)		55.7			62.0			18.7			18.8	
Approach LOS		E			E			B			B	

Intersection Summary				
HCM 2000 Control Delay	28.8	HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio	0.68			
Actuated Cycle Length (s)	129.3	Sum of lost time (s)	20.3	
Intersection Capacity Utilization	82.5%	ICU Level of Service	E	
Analysis Period (min)	15			
c Critical Lane Group				

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	42	333	9	350	45	8	7	57	12
Future Volume (vph)	42	333	9	350	45	8	7	57	12
Turn Type	Perm	NA	Perm	NA	Perm	Perm	NA	Perm	NA
Protected Phases		2		2			4		4
Permitted Phases	2		2		2	4		4	
Detector Phase	2	2	2	2	2	4	4	4	4
Switch Phase									
Minimum Initial (s)	20.0	20.0	20.0	20.0	20.0	16.0	16.0	16.0	16.0
Minimum Split (s)	30.6	30.6	30.6	30.6	30.6	30.6	30.6	30.6	30.6
Total Split (s)	46.6	46.6	46.6	46.6	46.6	36.6	36.6	36.6	36.6
Total Split (%)	56.0%	56.0%	56.0%	56.0%	56.0%	44.0%	44.0%	44.0%	44.0%
Yellow Time (s)	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.6	6.6	6.6	6.6	6.6	6.6	6.6	6.6	6.6
Lead/Lag									
Lead-Lag Optimize?									
Recall Mode	C-Min	C-Min	C-Min	C-Min	C-Min	None	None	None	None
Act Effct Green (s)	59.8	59.8	59.8	59.8	59.8	16.0	16.0	16.0	16.0
Actuated g/C Ratio	0.72	0.72	0.72	0.72	0.72	0.19	0.19	0.19	0.19
v/c Ratio	0.06	0.26	0.01	0.27	0.04	0.03	0.03	0.21	0.17
Control Delay	5.6	6.3	5.2	6.4	1.8	27.8	25.0	30.7	13.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	5.6	6.3	5.2	6.4	1.8	27.8	25.0	30.7	13.1
LOS	A	A	A	A	A	C	C	C	B
Approach Delay		6.2		5.8			26.3		21.8
Approach LOS		A		A			C		C

Intersection Summary			
Cycle Length: 83.2			
Actuated Cycle Length: 83.2			
Offset: 22.5 (27%), Referenced to phase 2:EBWB and 6:, Start of Green			
Natural Cycle: 65			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.27			
Intersection Signal Delay: 8.4		Intersection LOS: A	
Intersection Capacity Utilization 63.2%		ICU Level of Service B	
Analysis Period (min) 15			

Splits and Phases: 2: Cataract Road/Main Street (RR 136) & Charleston Sideroad (RR 24)

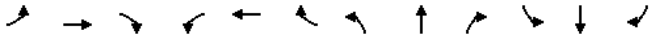


Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	44	357	9	365	47	8	9	59	60
v/c Ratio	0.06	0.26	0.01	0.27	0.04	0.03	0.03	0.21	0.17
Control Delay	5.6	6.3	5.2	6.4	1.8	27.8	25.0	30.7	13.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	5.6	6.3	5.2	6.4	1.8	27.8	25.0	30.7	13.1
Queue Length 50th (m)	2.3	21.5	0.4	22.2	0.0	1.1	0.9	8.0	1.7
Queue Length 95th (m)	5.7	33.7	1.9	34.8	3.2	4.6	4.6	18.2	11.3
Internal Link Dist (m)		1408.9		2789.4			883.0		1179.5
Turn Bay Length (m)	125.0		60.0		90.0	70.0		85.0	
Base Capacity (vph)	751	1350	757	1354	1187	497	671	521	640
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.06	0.26	0.01	0.27	0.04	0.02	0.01	0.11	0.09

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	42	333	10	9	350	45	8	7	2	57	12	45
Future Volume (vph)	42	333	10	9	350	45	8	7	2	57	12	45
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.6	6.6		6.6	6.6	6.6	6.6	6.6		6.6	6.6	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00		1.00	1.00	0.85	1.00	0.97		1.00	0.88	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1825	1877		1825	1883	1633	1825	1857		1825	1695	
Flt Permitted	0.54	1.00		0.55	1.00	1.00	0.72	1.00		0.75	1.00	
Satd. Flow (perm)	1044	1877		1052	1883	1633	1379	1857		1444	1695	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	44	347	10	9	365	47	8	7	2	59	12	47
RTOR Reduction (vph)	0	1	0	0	0	15	0	2	0	0	40	0
Lane Group Flow (vph)	44	356	0	9	365	32	8	7	0	59	20	0
Heavy Vehicles (%)	0%	2%	0%	0%	2%	0%	0%	0%	0%	0%	0%	0%
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		2			2			4			4	
Permitted Phases	2			2		2	4			4		
Actuated Green, G (s)	57.2	57.2		57.2	57.2	57.2	12.8	12.8		12.8	12.8	
Effective Green, g (s)	57.2	57.2		57.2	57.2	57.2	12.8	12.8		12.8	12.8	
Actuated g/C Ratio	0.69	0.69		0.69	0.69	0.69	0.15	0.15		0.15	0.15	
Clearance Time (s)	6.6	6.6		6.6	6.6	6.6	6.6	6.6		6.6	6.6	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	717	1290		723	1294	1122	212	285		222	260	
v/s Ratio Prot		0.19			c0.19			0.00			0.01	
v/s Ratio Perm	0.04			0.01		0.02	0.01			c0.04		
v/c Ratio	0.06	0.28		0.01	0.28	0.03	0.04	0.03		0.27	0.08	
Uniform Delay, d1	4.2	5.0		4.1	5.0	4.1	30.0	29.9		31.1	30.1	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.2	0.5		0.0	0.5	0.0	0.1	0.0		0.6	0.1	
Delay (s)	4.4	5.5		4.1	5.6	4.2	30.0	29.9		31.7	30.3	
Level of Service	A	A		A	A	A	C	C		C	C	
Approach Delay (s)		5.4			5.4			30.0			31.0	
Approach LOS		A			A			C			C	

Intersection Summary				
HCM 2000 Control Delay	9.0	HCM 2000 Level of Service	A	
HCM 2000 Volume to Capacity ratio	0.28			
Actuated Cycle Length (s)	83.2	Sum of lost time (s)	13.2	
Intersection Capacity Utilization	63.2%	ICU Level of Service	B	
Analysis Period (min)	15			
c Critical Lane Group				



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	358	6	13	382	16	5	5	10	7	5	8
Future Volume (Veh/h)	10	358	6	13	382	16	5	5	10	7	5	8
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	11	381	6	14	406	17	5	5	11	7	5	9
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	423			387			852	857	384	859	852	414
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	423			387			852	857	384	859	852	414
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			99			98	98	98	97	98	99
cM capacity (veh/h)	1147			1183			270	291	668	266	293	642

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	11	387	14	423	21	21
Volume Left	11	0	14	0	5	7
Volume Right	0	6	0	17	11	9
cSH	1147	1700	1183	1700	402	366
Volume to Capacity	0.01	0.23	0.01	0.25	0.05	0.06
Queue Length 95th (m)	0.2	0.0	0.3	0.0	1.3	1.4
Control Delay (s)	8.2	0.0	8.1	0.0	14.4	15.4
Lane LOS	A		A		B	C
Approach Delay (s)	0.2		0.3		14.4	15.4
Approach LOS					B	C

Intersection Summary				
Average Delay	0.9			
Intersection Capacity Utilization	31.1%	ICU Level of Service	A	
Analysis Period (min)	15			

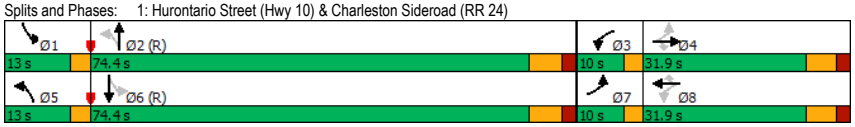
APPENDIX K2

Future Background Conditions

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations										
Traffic Volume (vph)	58	170	204	124	199	31	139	1047	59	1825
Future Volume (vph)	58	170	204	124	199	31	139	1047	59	1825
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	pm+pt	NA
Protected Phases	7	4		3	8		5	2	1	6
Permitted Phases	4		4	8		8	2		6	
Detector Phase	7	4	4	3	8	8	5	2	1	6
Switch Phase										
Minimum Initial (s)	7.0	10.0	10.0	7.0	10.0	10.0	7.0	20.0	7.0	20.0
Minimum Split (s)	10.0	17.9	17.9	10.0	17.9	17.9	10.0	44.4	10.0	44.4
Total Split (s)	10.0	31.9	31.9	10.0	31.9	31.9	13.0	74.4	13.0	74.4
Total Split (%)	7.7%	24.7%	24.7%	7.7%	24.7%	24.7%	10.1%	57.5%	10.1%	57.5%
Yellow Time (s)	3.0	4.5	4.5	3.0	4.5	4.5	3.0	5.0	3.0	5.0
All-Red Time (s)	0.0	2.4	2.4	0.0	2.4	2.4	0.0	2.4	0.0	2.4
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	3.0	6.9	6.9	3.0	6.9	6.9	3.0	7.4	3.0	7.4
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes				Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	C-Max	None	C-Max
Act Effct Green (s)	31.1	20.2	20.2	31.7	22.2	22.2	88.8	76.1	83.0	70.9
Actuated g/C Ratio	0.24	0.16	0.16	0.25	0.17	0.17	0.69	0.59	0.64	0.55
v/c Ratio	0.25	0.73	0.56	0.51	0.72	0.11	0.80	0.66	0.25	1.02
Control Delay	37.4	68.7	18.5	45.0	65.2	0.7	58.5	21.3	10.1	55.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	37.4	68.7	18.5	45.0	65.2	0.7	58.5	21.3	10.1	55.0
LOS	D	E	B	D	E	A	E	C	B	E
Approach Delay		40.8			52.4			25.4		53.7
Approach LOS		D			D			C		D

Intersection Summary		
Cycle Length: 129.3		
Actuated Cycle Length: 129.3		
Offset: 85 (66%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green		
Natural Cycle: 115		
Control Type: Actuated-Coordinated		
Maximum v/c Ratio: 1.02		
Intersection Signal Delay: 43.1	Intersection LOS: D	
Intersection Capacity Utilization 94.9%	ICU Level of Service F	
Analysis Period (min) 15		

Splits and Phases: 1: Hurontario Street (Hwy 10) & Charleston Sideroad (RR 24)



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	61	179	215	131	209	33	146	1199	62	1982
v/c Ratio	0.25	0.73	0.56	0.51	0.72	0.11	0.80	0.66	0.25	1.02
Control Delay	37.4	68.7	18.5	45.0	65.2	0.7	58.5	21.3	10.1	55.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	37.4	68.7	18.5	45.0	65.2	0.7	58.5	21.3	10.1	55.0
Queue Length 50th (m)	11.8	43.6	10.7	26.4	51.4	0.0	21.8	106.8	4.8	~296.2
Queue Length 95th (m)	22.2	66.4	33.8	41.8	75.9	0.0	#62.0	146.2	10.4	#338.3
Internal Link Dist (m)		1351.4			575.0			764.6		536.2
Turn Bay Length (m)	80.0		65.0	40.0		55.0	85.0		40.0	
Base Capacity (vph)	241	304	435	258	328	338	186	1829	275	1945
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.25	0.59	0.49	0.51	0.64	0.10	0.78	0.66	0.23	1.02

Intersection Summary
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

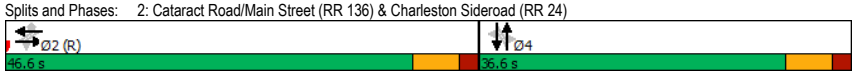
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	58	170	204	124	199	31	139	1047	92	59	1825	58
Future Volume (vph)	58	170	204	124	199	31	139	1047	92	59	1825	58
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.9	6.9	3.0	6.9	6.9	3.0	7.4		3.0	7.4	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99		1.00	1.00	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1690	1575	1555	1772	1700	1384	1534	3100		1484	3548	
Flt Permitted	0.45	1.00	1.00	0.46	1.00	1.00	0.05	1.00		0.18	1.00	
Satd. Flow (perm)	806	1575	1555	851	1700	1384	88	3100		277	3548	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	61	179	215	131	209	33	146	1102	97	62	1921	61
RTOR Reduction (vph)	0	0	140	0	0	27	0	4	0	0	2	0
Lane Group Flow (vph)	61	179	75	131	209	6	146	1195	0	62	1980	0
Heavy Vehicles (%)	8%	22%	5%	3%	13%	18%	19%	16%	20%	23%	2%	15%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8		8	2			6		
Actuated Green, G (s)	26.4	20.8	20.8	29.2	22.2	22.2	84.2	74.9		76.5	70.2	
Effective Green, g (s)	26.4	20.8	20.8	29.2	22.2	22.2	84.2	74.9		76.5	70.2	
Actuated g/C Ratio	0.20	0.16	0.16	0.23	0.17	0.17	0.65	0.58		0.59	0.54	
Clearance Time (s)	3.0	6.9	6.9	3.0	6.9	6.9	3.0	7.4		3.0	7.4	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	4.4		3.0	4.4	
Lane Grp Cap (vph)	202	253	250	242	291	237	180	1795		222	1926	
v/s Ratio Prot	0.01	0.11		c0.03	c0.12		c0.07	0.39		0.01	c0.56	
v/s Ratio Perm	0.05		0.05	0.09		0.00	0.46			0.15		
v/c Ratio	0.30	0.71	0.30	0.54	0.72	0.02	0.81	0.67		0.28	1.03	
Uniform Delay, d1	42.6	51.4	47.8	42.7	50.6	44.5	40.2	18.6		12.6	29.6	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.8	8.7	0.7	2.5	8.2	0.0	23.4	2.0		0.7	28.1	
Delay (s)	43.5	60.1	48.5	45.2	58.8	44.6	63.7	20.6		13.3	57.6	
Level of Service	D	E	D	D	E	D	E	C		B	E	
Approach Delay (s)		52.4			52.8			25.3			56.3	
Approach LOS		D			D			C			E	

Intersection Summary				
HCM 2000 Control Delay	45.7	HCM 2000 Level of Service	D	
HCM 2000 Volume to Capacity ratio	0.92			
Actuated Cycle Length (s)	129.3	Sum of lost time (s)	20.3	
Intersection Capacity Utilization	94.9%	ICU Level of Service	F	
Analysis Period (min)	15			
c Critical Lane Group				

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	38	352	6	336	43	6	7	52	10
Future Volume (vph)	38	352	6	336	43	6	7	52	10
Turn Type	Perm	NA	Perm	NA	Perm	Perm	NA	Perm	NA
Protected Phases		2		2			4		4
Permitted Phases	2		2		2	4		4	
Detector Phase	2	2	2	2	2	4	4	4	4
Switch Phase									
Minimum Initial (s)	20.0	20.0	20.0	20.0	20.0	16.0	16.0	16.0	16.0
Minimum Split (s)	30.6	30.6	30.6	30.6	30.6	30.6	30.6	30.6	30.6
Total Split (s)	46.6	46.6	46.6	46.6	46.6	36.6	36.6	36.6	36.6
Total Split (%)	56.0%	56.0%	56.0%	56.0%	56.0%	44.0%	44.0%	44.0%	44.0%
Yellow Time (s)	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.6	6.6	6.6	6.6	6.6	6.6	6.6	6.6	6.6
Lead/Lag									
Lead-Lag Optimize?									
Recall Mode	C-Min	C-Min	C-Min	C-Min	C-Min	None	None	None	None
Act Effct Green (s)	59.8	59.8	59.8	59.8	59.8	16.0	16.0	16.0	16.0
Actuated g/C Ratio	0.72	0.72	0.72	0.72	0.72	0.19	0.19	0.19	0.19
v/c Ratio	0.05	0.29	0.01	0.30	0.04	0.02	0.05	0.20	0.16
Control Delay	5.6	6.6	5.2	6.8	1.7	27.7	18.7	30.4	12.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	5.6	6.6	5.2	6.8	1.7	27.7	18.7	30.4	12.8
LOS	A	A	A	A	A	C	B	C	B
Approach Delay		6.5		6.2			20.9		21.5
Approach LOS		A		A			C		C

Intersection Summary			
Cycle Length: 83.2			
Actuated Cycle Length: 83.2			
Offset: 22.5 (27%), Referenced to phase 2:EBWB and 6:, Start of Green			
Natural Cycle: 65			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.30			
Intersection Signal Delay: 8.5		Intersection LOS: A	
Intersection Capacity Utilization 63.2%		ICU Level of Service B	
Analysis Period (min) 15			

Splits and Phases: 2: Cataract Road/Main Street (RR 136) & Charleston Sideroad (RR 24)



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	39	369	6	346	44	6	18	54	55
v/c Ratio	0.05	0.29	0.01	0.30	0.04	0.02	0.05	0.20	0.16
Control Delay	5.6	6.6	5.2	6.8	1.7	27.7	18.7	30.4	12.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	5.6	6.6	5.2	6.8	1.7	27.7	18.7	30.4	12.8
Queue Length 50th (m)	2.0	22.9	0.3	21.7	0.0	0.8	0.9	7.3	1.3
Queue Length 95th (m)	5.2	36.2	1.5	35.0	2.9	4.0	6.3	17.1	10.4
Internal Link Dist (m)		1408.9		2789.4			883.0		1179.5
Turn Bay Length (m)	125.0		60.0		90.0	70.0		85.0	
Base Capacity (vph)	741	1256	747	1142	1187	499	635	516	612
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.05	0.29	0.01	0.30	0.04	0.01	0.03	0.10	0.09

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	38	352	6	6	336	43	6	7	11	52	10	44
Future Volume (vph)	38	352	6	6	336	43	6	7	11	52	10	44
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.6	6.6		6.6	6.6	6.6	6.6	6.6		6.6	6.6	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00		1.00	1.00	0.85	1.00	0.91		1.00	0.88	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1772	1745		1825	1588	1633	1825	1745		1825	1619	
Flt Permitted	0.55	1.00		0.54	1.00	1.00	0.72	1.00		0.75	1.00	
Satd. Flow (perm)	1032	1745		1039	1588	1633	1385	1745		1433	1619	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	39	363	6	6	346	44	6	7	11	54	10	45
RTOR Reduction (vph)	0	0	0	0	0	14	0	9	0	0	38	0
Lane Group Flow (vph)	39	369	0	6	346	30	6	9	0	54	17	0
Heavy Vehicles (%)	3%	10%	0%	0%	21%	0%	0%	0%	0%	0%	0%	5%
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		2			2			4			4	
Permitted Phases	2			2		2	4			4		
Actuated Green, G (s)	57.2	57.2		57.2	57.2	57.2	12.8	12.8		12.8	12.8	
Effective Green, g (s)	57.2	57.2		57.2	57.2	57.2	12.8	12.8		12.8	12.8	
Actuated g/C Ratio	0.69	0.69		0.69	0.69	0.69	0.15	0.15		0.15	0.15	
Clearance Time (s)	6.6	6.6		6.6	6.6	6.6	6.6	6.6		6.6	6.6	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	709	1199		714	1091	1122	213	268		220	249	
v/s Ratio Prot		0.21			c0.22			0.00			0.01	
v/s Ratio Perm	0.04			0.01		0.02	0.00			c0.04		
v/c Ratio	0.06	0.31		0.01	0.32	0.03	0.03	0.03		0.25	0.07	
Uniform Delay, d1	4.2	5.2		4.1	5.2	4.1	29.9	29.9		31.0	30.1	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.1	0.7		0.0	0.8	0.0	0.1	0.0		0.6	0.1	
Delay (s)	4.4	5.8		4.1	6.0	4.2	30.0	30.0		31.5	30.2	
Level of Service	A	A		A	A	A	C	C		C	C	
Approach Delay (s)		5.7			5.7			30.0			30.9	
Approach LOS		A			A			C			C	

Intersection Summary				
HCM 2000 Control Delay	9.3	HCM 2000 Level of Service	A	
HCM 2000 Volume to Capacity ratio	0.30			
Actuated Cycle Length (s)	83.2	Sum of lost time (s)	13.2	
Intersection Capacity Utilization	63.2%	ICU Level of Service	B	
Analysis Period (min)	15			
c Critical Lane Group				

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	16	384	2	33	335	15	2	7	13	15	11	11
Future Volume (Veh/h)	16	384	2	33	335	15	2	7	13	15	11	11
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	17	404	2	35	353	16	2	7	14	16	12	12
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	369			406			880	878	405	886	871	361
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	369			406			880	878	405	886	871	361
tC, single (s)	4.1			4.9			7.2	6.5	6.9	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.9			3.6	4.0	3.9	3.5	4.0	3.3
p0 queue free %	99			96			99	97	97	93	96	98
cM capacity (veh/h)	1201			845			233	273	529	244	275	688

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	17	406	35	369	23	40
Volume Left	17	0	35	0	2	16
Volume Right	0	2	0	16	14	12
cSH	1201	1700	845	1700	379	316
Volume to Capacity	0.01	0.24	0.04	0.22	0.06	0.13
Queue Length 95th (m)	0.3	0.0	1.0	0.0	1.5	3.3
Control Delay (s)	8.0	0.0	9.4	0.0	15.1	18.0
Lane LOS	A		A		C	C
Approach Delay (s)	0.3		0.8		15.1	18.0
Approach LOS					C	C

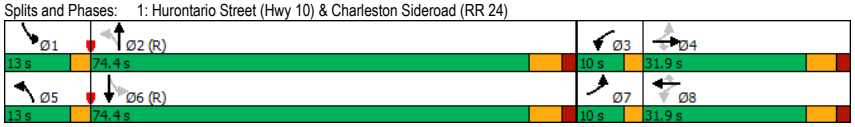
Intersection Summary				
Average Delay	1.7			
Intersection Capacity Utilization	39.6%	ICU Level of Service	A	
Analysis Period (min)	15			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations										
Traffic Volume (vph)	75	273	151	113	289	84	181	1844	52	1139
Future Volume (vph)	75	273	151	113	289	84	181	1844	52	1139
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	pm+pt	NA
Protected Phases	7	4		3	8		5	2	1	6
Permitted Phases	4		4	8		8	2		6	
Detector Phase	7	4	4	3	8	8	5	2	1	6
Switch Phase										
Minimum Initial (s)	7.0	10.0	10.0	7.0	10.0	10.0	7.0	20.0	7.0	20.0
Minimum Split (s)	10.0	17.9	17.9	10.0	17.9	17.9	10.0	44.4	10.0	44.4
Total Split (s)	10.0	31.9	31.9	10.0	31.9	31.9	13.0	74.4	13.0	74.4
Total Split (%)	7.7%	24.7%	24.7%	7.7%	24.7%	24.7%	10.1%	57.5%	10.1%	57.5%
Yellow Time (s)	3.0	4.5	4.5	3.0	4.5	4.5	3.0	5.0	3.0	5.0
All-Red Time (s)	0.0	2.4	2.4	0.0	2.4	2.4	0.0	2.4	0.0	2.4
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	3.0	6.9	6.9	3.0	6.9	6.9	3.0	7.4	3.0	7.4
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes				Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	C-Max	None	C-Max
Act Effct Green (s)	35.0	24.1	24.1	35.6	26.1	26.1	84.7	72.3	80.2	68.2
Actuated g/C Ratio	0.27	0.19	0.19	0.28	0.20	0.20	0.66	0.56	0.62	0.53
v/c Ratio	0.38	0.91	0.38	0.62	0.86	0.23	0.73	1.06	0.37	0.72
Control Delay	39.1	84.8	9.4	51.0	73.0	10.2	29.3	67.9	17.6	26.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	39.1	84.8	9.4	51.0	73.0	10.2	29.3	67.9	17.6	26.4
LOS	D	F	A	D	E	B	C	E	B	C
Approach Delay		55.1			57.1			64.6		26.1
Approach LOS		E			E			E		C

Intersection Summary

Cycle Length: 129.3
Actuated Cycle Length: 129.3
Offset: 85 (66%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 145
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.06
Intersection Signal Delay: 51.8 Intersection LOS: D
Intersection Capacity Utilization 104.2% ICU Level of Service G
Analysis Period (min) 15

Splits and Phases: 1: Hurontario Street (Hwy 10) & Charleston Sideroad (RR 24)



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	79	287	159	119	304	88	191	2101	55	1268
v/c Ratio	0.38	0.91	0.38	0.62	0.86	0.23	0.73	1.06	0.37	0.72
Control Delay	39.1	84.8	9.4	51.0	73.0	10.2	29.3	67.9	17.6	26.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	39.1	84.8	9.4	51.0	73.0	10.2	29.3	67.9	17.6	26.4
Queue Length 50th (m)	14.7	71.8	0.0	22.8	76.3	0.0	17.6	~318.5	4.7	127.5
Queue Length 95th (m)	27.1	#120.7	18.0	#39.2	#126.8	13.9	#44.8	#369.0	11.6	154.1
Internal Link Dist (m)		1351.4			575.0			764.6		536.2
Turn Bay Length (m)	80.0		65.0	40.0		55.0	85.0		40.0	
Base Capacity (vph)	206	325	423	191	355	382	266	1979	179	1756
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.38	0.88	0.38	0.62	0.86	0.23	0.72	1.06	0.31	0.72

Intersection Summary

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

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	75	273	151	113	289	84	181	1844	152	52	1139	66
Future Volume (vph)	75	273	151	113	289	84	181	1844	152	52	1139	66
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.9	6.9	3.0	6.9	6.9	3.0	7.4		3.0	7.4	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00	0.98	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99		1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1754	1685	1527	1658	1762	1544	1772	3530		1601	3321	
Flt Permitted	0.28	1.00	1.00	0.26	1.00	1.00	0.12	1.00		0.06	1.00	
Satd. Flow (perm)	517	1685	1527	459	1762	1544	224	3530		100	3321	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	79	287	159	119	304	88	191	1941	160	55	1199	69
RTOR Reduction (vph)	0	0	129	0	0	70	0	5	0	0	3	0
Lane Group Flow (vph)	79	287	30	119	304	18	191	2096	0	55	1265	0
Confl. Peds. (#/hr)	5		6	6		5	7		5	5		7
Heavy Vehicles (%)	4%	14%	5%	10%	9%	4%	3%	2%	2%	14%	9%	6%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8		8	2			6		
Actuated Green, G (s)	30.3	24.7	24.7	33.1	26.1	26.1	80.3	71.1		73.9	67.7	
Effective Green, g (s)	30.3	24.7	24.7	33.1	26.1	26.1	80.3	71.1		73.9	67.7	
Actuated g/C Ratio	0.23	0.19	0.19	0.26	0.20	0.20	0.62	0.55		0.57	0.52	
Clearance Time (s)	3.0	6.9	6.9	3.0	6.9	6.9	3.0	7.4		3.0	7.4	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	4.4		3.0	4.4	
Lane Grp Cap (vph)	174	321	291	182	355	311	254	1941		129	1738	
v/s Ratio Prot	0.02	0.17		c0.04	c0.17		c0.06	c0.59		0.02	0.38	
v/s Ratio Perm	0.09		0.02	0.13		0.01	0.41			0.22		
v/c Ratio	0.45	0.89	0.10	0.65	0.86	0.06	0.75	1.08		0.43	0.73	
Uniform Delay, d1	40.4	51.0	43.2	40.2	49.8	41.7	17.8	29.1		28.5	23.7	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.9	25.4	0.2	8.2	18.0	0.1	11.8	45.9		2.3	2.7	
Delay (s)	42.2	76.5	43.3	48.3	67.8	41.7	29.6	75.0		30.8	26.4	
Level of Service	D	E	D	D	E	D	C	E		C	C	
Approach Delay (s)		61.3			58.8			71.2			26.6	
Approach LOS		E			E			E			C	

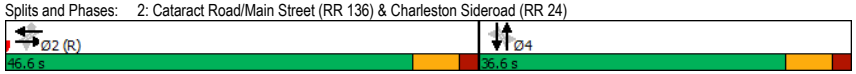
Intersection Summary				
HCM 2000 Control Delay	56.0	HCM 2000 Level of Service	E	
HCM 2000 Volume to Capacity ratio	1.01			
Actuated Cycle Length (s)	129.3	Sum of lost time (s)	20.3	
Intersection Capacity Utilization	104.2%	ICU Level of Service	G	
Analysis Period (min)	15			

c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	73	441	4	427	85	12	12	62	19
Future Volume (vph)	73	441	4	427	85	12	12	62	19
Turn Type	Perm	NA	Perm	NA	Perm	Perm	NA	Perm	NA
Protected Phases		2		2			4		4
Permitted Phases	2		2		2	4		4	
Detector Phase	2	2	2	2	2	4	4	4	4
Switch Phase									
Minimum Initial (s)	20.0	20.0	20.0	20.0	20.0	16.0	16.0	16.0	16.0
Minimum Split (s)	30.6	30.6	30.6	30.6	30.6	30.6	30.6	30.6	30.6
Total Split (s)	46.6	46.6	46.6	46.6	46.6	36.6	36.6	36.6	36.6
Total Split (%)	56.0%	56.0%	56.0%	56.0%	56.0%	44.0%	44.0%	44.0%	44.0%
Yellow Time (s)	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.6	6.6	6.6	6.6	6.6	6.6	6.6	6.6	6.6
Lead/Lag									
Lead-Lag Optimize?									
Recall Mode	C-Min	C-Min	C-Min	C-Min	C-Min	None	None	None	None
Act Effct Green (s)	59.8	59.8	59.8	59.8	59.8	16.0	16.0	16.0	16.0
Actuated g/C Ratio	0.72	0.72	0.72	0.72	0.72	0.19	0.19	0.19	0.19
v/c Ratio	0.11	0.38	0.01	0.35	0.08	0.05	0.06	0.23	0.21
Control Delay	6.1	7.4	5.2	7.1	1.5	28.2	20.8	31.0	13.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	6.1	7.4	5.2	7.1	1.5	28.2	20.8	31.0	13.1
LOS	A	A	A	A	A	C	C	C	B
Approach Delay		7.2		6.2			23.5		21.1
Approach LOS		A		A			C		C

Intersection Summary			
Cycle Length: 83.2			
Actuated Cycle Length: 83.2			
Offset: 22.5 (27%), Referenced to phase 2:EBWB and 6:, Start of Green			
Natural Cycle: 65			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.38			
Intersection Signal Delay: 8.8		Intersection LOS: A	
Intersection Capacity Utilization 70.4%		ICU Level of Service C	
Analysis Period (min) 15			

Splits and Phases: 2: Cataract Road/Main Street (RR 136) & Charleston Sideroad (RR 24)

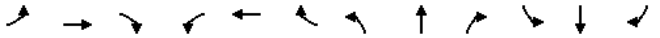


Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	74	461	4	436	87	12	21	63	78
v/c Ratio	0.11	0.38	0.01	0.35	0.08	0.05	0.06	0.23	0.21
Control Delay	6.1	7.4	5.2	7.1	1.5	28.2	20.8	31.0	13.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	6.1	7.4	5.2	7.1	1.5	28.2	20.8	31.0	13.1
Queue Length 50th (m)	3.9	30.9	0.2	28.6	0.0	1.6	1.6	8.5	2.5
Queue Length 95th (m)	8.7	48.3	1.2	44.6	4.3	5.9	7.3	19.1	13.5
Internal Link Dist (m)		1408.9		2789.4			883.0		1179.5
Turn Bay Length (m)	125.0		60.0		90.0	70.0		85.0	
Base Capacity (vph)	682	1221	658	1245	1142	457	654	515	634
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.11	0.38	0.01	0.35	0.08	0.03	0.03	0.12	0.12

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	73	441	11	4	427	85	12	12	9	62	19	58
Future Volume (vph)	73	441	11	4	427	85	12	12	9	62	19	58
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.6	6.6		6.6	6.6	6.6	6.6	6.6		6.6	6.6	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00		1.00	1.00	0.85	1.00	0.94		1.00	0.89	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1825	1699		1825	1731	1555	1706	1798		1825	1653	
Flt Permitted	0.49	1.00		0.48	1.00	1.00	0.71	1.00		0.74	1.00	
Satd. Flow (perm)	949	1699		917	1731	1555	1268	1798		1429	1653	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	74	450	11	4	436	87	12	12	9	63	19	59
RTOR Reduction (vph)	0	1	0	0	0	27	0	8	0	0	50	0
Lane Group Flow (vph)	74	460	0	4	436	60	12	13	0	63	28	0
Heavy Vehicles (%)	0%	13%	0%	0%	11%	5%	7%	0%	0%	0%	0%	4%
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		2			2			4			4	
Permitted Phases	2			2		2	4			4		
Actuated Green, G (s)	57.2	57.2		57.2	57.2	57.2	12.8	12.8		12.8	12.8	
Effective Green, g (s)	57.2	57.2		57.2	57.2	57.2	12.8	12.8		12.8	12.8	
Actuated g/C Ratio	0.69	0.69		0.69	0.69	0.69	0.15	0.15		0.15	0.15	
Clearance Time (s)	6.6	6.6		6.6	6.6	6.6	6.6	6.6		6.6	6.6	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	652	1168		630	1190	1069	195	276		219	254	
v/s Ratio Prot		c0.27			0.25			0.01			0.02	
v/s Ratio Perm	0.08			0.00		0.04	0.01			c0.04		
v/c Ratio	0.11	0.39		0.01	0.37	0.06	0.06	0.05		0.29	0.11	
Uniform Delay, d1	4.4	5.6		4.1	5.4	4.2	30.1	30.0		31.2	30.3	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.4	1.0		0.0	0.9	0.1	0.1	0.1		0.7	0.2	
Delay (s)	4.8	6.6		4.1	6.3	4.3	30.2	30.1		31.9	30.5	
Level of Service	A	A		A	A	A	C	C		C	C	
Approach Delay (s)		6.3			6.0			30.1			31.1	
Approach LOS		A			A			C			C	

Intersection Summary				
HCM 2000 Control Delay	9.6	HCM 2000 Level of Service	A	
HCM 2000 Volume to Capacity ratio	0.37			
Actuated Cycle Length (s)	83.2	Sum of lost time (s)	13.2	
Intersection Capacity Utilization	70.4%	ICU Level of Service	C	
Analysis Period (min)	15			
c Critical Lane Group				



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	14	486	8	12	484	12	3	19	21	21	6	14
Future Volume (Veh/h)	14	486	8	12	484	12	3	19	21	21	6	14
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	14	501	8	12	499	12	3	20	22	22	6	14
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	511			509			1073	1068	505	1090	1066	505
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	511			509			1073	1068	505	1090	1066	505
tC, single (s)	4.2			4.2			7.2	6.5	6.3	7.1	6.5	6.3
tC, 2 stage (s)												
tF (s)	2.3			2.3			3.6	4.0	3.4	3.5	4.0	3.4
p0 queue free %	99			99			98	91	96	87	97	97
cM capacity (veh/h)	1024			1002			178	218	546	170	218	546

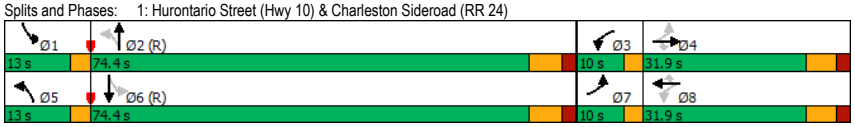
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	14	509	12	511	45	42
Volume Left	14	0	12	0	3	22
Volume Right	0	8	0	12	22	14
cSH	1024	1700	1002	1700	302	230
Volume to Capacity	0.01	0.30	0.01	0.30	0.15	0.18
Queue Length 95th (m)	0.3	0.0	0.3	0.0	3.9	5.0
Control Delay (s)	8.6	0.0	8.6	0.0	19.0	24.1
Lane LOS	A		A		C	C
Approach Delay (s)	0.2		0.2		19.0	24.1
Approach LOS					C	C

Intersection Summary				
Average Delay	1.8			
Intersection Capacity Utilization	41.9%	ICU Level of Service	A	
Analysis Period (min)	15			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations										
Traffic Volume (vph)	111	241	108	146	243	34	185	1486	60	1214
Future Volume (vph)	111	241	108	146	243	34	185	1486	60	1214
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	pm+pt	NA
Protected Phases	7	4		3	8		5	2	1	6
Permitted Phases	4		4	8		8	2		6	
Detector Phase	7	4	4	3	8	8	5	2	1	6
Switch Phase										
Minimum Initial (s)	7.0	10.0	10.0	7.0	10.0	10.0	7.0	20.0	7.0	20.0
Minimum Split (s)	10.0	17.9	17.9	10.0	17.9	17.9	10.0	44.4	10.0	44.4
Total Split (s)	10.0	31.9	31.9	10.0	31.9	31.9	13.0	74.4	13.0	74.4
Total Split (%)	7.7%	24.7%	24.7%	7.7%	24.7%	24.7%	10.1%	57.5%	10.1%	57.5%
Yellow Time (s)	3.0	4.5	4.5	3.0	4.5	4.5	3.0	5.0	3.0	5.0
All-Red Time (s)	0.0	2.4	2.4	0.0	2.4	2.4	0.0	2.4	0.0	2.4
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	3.0	6.9	6.9	3.0	6.9	6.9	3.0	7.4	3.0	7.4
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes				Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	C-Max	None	C-Max
Act Effct Green (s)	32.4	21.5	21.5	32.4	21.5	21.5	87.4	75.0	82.5	70.5
Actuated g/C Ratio	0.25	0.17	0.17	0.25	0.17	0.17	0.68	0.58	0.64	0.55
v/c Ratio	0.56	0.80	0.32	0.71	0.81	0.10	0.74	0.83	0.37	0.69
Control Delay	46.8	71.0	10.1	57.2	71.6	0.6	31.8	27.7	16.4	24.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	46.8	71.0	10.1	57.2	71.6	0.6	31.8	27.7	16.4	24.5
LOS	D	E	B	E	E	A	C	C	B	C
Approach Delay		50.8			61.0			28.1		24.1
Approach LOS		D			E			C		C

Intersection Summary		
Cycle Length: 129.3		
Actuated Cycle Length: 129.3		
Offset: 85 (66%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green		
Natural Cycle: 85		
Control Type: Actuated-Coordinated		
Maximum v/c Ratio: 0.83		
Intersection Signal Delay: 32.8	Intersection LOS: C	
Intersection Capacity Utilization 93.2%	ICU Level of Service F	
Analysis Period (min) 15		

Splits and Phases: 1: Hurontario Street (Hwy 10) & Charleston Sideroad (RR 24)



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	116	251	113	152	253	35	193	1694	63	1344
v/c Ratio	0.56	0.80	0.32	0.71	0.81	0.10	0.74	0.83	0.37	0.69
Control Delay	46.8	71.0	10.1	57.2	71.6	0.6	31.8	27.7	16.4	24.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	46.8	71.0	10.1	57.2	71.6	0.6	31.8	27.7	16.4	24.5
Queue Length 50th (m)	22.7	61.7	0.0	30.4	62.2	0.0	16.7	182.7	5.0	132.6
Queue Length 95th (m)	37.4	89.2	15.7	#48.4	89.8	0.0	#52.2	237.0	13.0	161.3
Internal Link Dist (m)		1351.4			575.0			764.6		536.2
Turn Bay Length (m)	80.0		65.0	40.0		55.0	85.0		40.0	
Base Capacity (vph)	209	364	398	214	364	381	263	2050	204	1934
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.56	0.69	0.28	0.71	0.70	0.09	0.73	0.83	0.31	0.69

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

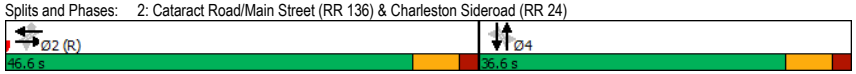
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	111	241	108	146	243	34	185	1486	140	60	1214	76
Future Volume (vph)	111	241	108	146	243	34	185	1486	140	60	1214	76
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.9	6.9	3.0	6.9	6.9	3.0	7.4		3.0	7.4	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00	0.98	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99		1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1806	1883	1589	1824	1883	1603	1772	3527		1825	3542	
Flt Permitted	0.30	1.00	1.00	0.31	1.00	1.00	0.11	1.00		0.06	1.00	
Satd. Flow (perm)	573	1883	1589	589	1883	1603	205	3527		109	3542	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	116	251	112	152	253	35	193	1548	146	62	1265	79
RTOR Reduction (vph)	0	0	94	0	0	29	0	5	0	0	3	0
Lane Group Flow (vph)	116	251	19	152	253	6	193	1689	0	63	1341	0
Confl. Peds. (#/hr)	5		4	4		5	2		3	3		2
Confl. Bikes (#/hr)			1			1			1			1
Heavy Vehicles (%)	1%	2%	1%	0%	2%	0%	3%	2%	1%	0%	2%	2%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8		8	2			6		
Actuated Green, G (s)	28.5	21.5	21.5	28.5	21.5	21.5	83.5	74.4		76.6	70.5	
Effective Green, g (s)	28.5	21.5	21.5	28.5	21.5	21.5	83.5	74.4		76.6	70.5	
Actuated g/C Ratio	0.22	0.17	0.17	0.22	0.17	0.17	0.65	0.58		0.59	0.55	
Clearance Time (s)	3.0	6.9	6.9	3.0	6.9	6.9	3.0	7.4		3.0	7.4	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	4.4		3.0	4.4	
Lane Grp Cap (vph)	193	313	264	196	313	266	253	2029		145	1931	
v/s Ratio Prot	0.03	0.13		c0.04	c0.13		c0.06	c0.48		0.02	0.38	
v/s Ratio Perm	0.10		0.01	0.13		0.00	0.43			0.24		
v/c Ratio	0.60	0.80	0.07	0.78	0.81	0.02	0.76	0.83		0.43	0.69	
Uniform Delay, d1	42.5	51.9	45.5	45.7	51.9	45.1	18.0	22.4		20.2	21.5	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	5.2	13.7	0.1	17.3	14.2	0.0	12.8	4.2		2.1	2.1	
Delay (s)	47.7	65.6	45.6	63.0	66.1	45.1	30.8	26.6		22.3	23.6	
Level of Service	D	E	D	E	E	D	C	C		C	C	
Approach Delay (s)		56.5			63.4			27.0			23.5	
Approach LOS		E			E			C			C	

Intersection Summary				
HCM 2000 Control Delay	33.0	HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio	0.84			
Actuated Cycle Length (s)	129.3	Sum of lost time (s)	20.3	
Intersection Capacity Utilization	93.2%	ICU Level of Service	F	
Analysis Period (min)	15			
c Critical Lane Group				

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	49	335	6	309	51	3	8	55	12
Future Volume (vph)	49	335	6	309	51	3	8	55	12
Turn Type	Perm	NA	Perm	NA	Perm	Perm	NA	Perm	NA
Protected Phases		2		2			4		4
Permitted Phases	2		2		2	4		4	
Detector Phase	2	2	2	2	2	4	4	4	4
Switch Phase									
Minimum Initial (s)	20.0	20.0	20.0	20.0	20.0	16.0	16.0	16.0	16.0
Minimum Split (s)	30.6	30.6	30.6	30.6	30.6	30.6	30.6	30.6	30.6
Total Split (s)	46.6	46.6	46.6	46.6	46.6	36.6	36.6	36.6	36.6
Total Split (%)	56.0%	56.0%	56.0%	56.0%	56.0%	44.0%	44.0%	44.0%	44.0%
Yellow Time (s)	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.6	6.6	6.6	6.6	6.6	6.6	6.6	6.6	6.6
Lead/Lag									
Lead-Lag Optimize?									
Recall Mode	C-Min	C-Min	C-Min	C-Min	C-Min	None	None	None	None
Act Effct Green (s)	59.8	59.8	59.8	59.8	59.8	16.0	16.0	16.0	16.0
Actuated g/C Ratio	0.72	0.72	0.72	0.72	0.72	0.19	0.19	0.19	0.19
v/c Ratio	0.07	0.26	0.01	0.24	0.04	0.01	0.04	0.21	0.15
Control Delay	5.7	6.3	5.2	6.1	1.7	27.3	22.4	30.6	13.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	5.7	6.3	5.2	6.1	1.7	27.3	22.4	30.6	13.6
LOS	A	A	A	A	A	C	C	C	B
Approach Delay		6.2		5.5			23.3		22.3
Approach LOS		A		A			C		C

Intersection Summary			
Cycle Length: 83.2			
Actuated Cycle Length: 83.2			
Offset: 22.5 (27%), Referenced to phase 2:EBWB and 6:, Start of Green			
Natural Cycle: 65			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.26			
Intersection Signal Delay: 8.2		Intersection LOS: A	
Intersection Capacity Utilization 64.6%		ICU Level of Service C	
Analysis Period (min) 15			

Splits and Phases: 2: Cataract Road/Main Street (RR 136) & Charleston Sideroad (RR 24)

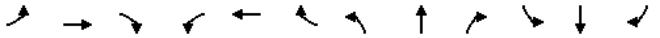


Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	51	357	6	322	53	3	13	57	55
v/c Ratio	0.07	0.26	0.01	0.24	0.04	0.01	0.04	0.21	0.15
Control Delay	5.7	6.3	5.2	6.1	1.7	27.3	22.4	30.6	13.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	5.7	6.3	5.2	6.1	1.7	27.3	22.4	30.6	13.6
Queue Length 50th (m)	2.6	21.5	0.3	19.1	0.0	0.4	1.1	7.7	1.7
Queue Length 95th (m)	6.3	33.6	1.5	30.2	3.4	2.6	5.6	17.7	10.9
Internal Link Dist (m)		1408.9		2789.4			883.0		1179.5
Turn Bay Length (m)	125.0		60.0		90.0	70.0		85.0	
Base Capacity (vph)	781	1352	757	1354	1189	499	655	518	639
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.07	0.26	0.01	0.24	0.04	0.01	0.02	0.11	0.09

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	49	335	8	6	309	51	3	8	5	55	12	40
Future Volume (vph)	49	335	8	6	309	51	3	8	5	55	12	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.6	6.6		6.6	6.6	6.6	6.6	6.6		6.6	6.6	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00		1.00	1.00	0.85	1.00	0.94		1.00	0.89	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1825	1878		1825	1883	1633	1825	1810		1825	1701	
Flt Permitted	0.57	1.00		0.55	1.00	1.00	0.72	1.00		0.75	1.00	
Satd. Flow (perm)	1086	1878		1052	1883	1633	1385	1810		1439	1701	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	51	349	8	6	322	53	3	8	5	57	12	42
RTOR Reduction (vph)	0	1	0	0	0	17	0	4	0	0	36	0
Lane Group Flow (vph)	51	356	0	6	322	36	3	9	0	57	19	0
Heavy Vehicles (%)	0%	2%	0%	0%	2%	0%	0%	0%	0%	0%	0%	0%
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		2			2			4			4	
Permitted Phases	2			2		2	4			4		
Actuated Green, G (s)	57.2	57.2		57.2	57.2	57.2	12.8	12.8		12.8	12.8	
Effective Green, g (s)	57.2	57.2		57.2	57.2	57.2	12.8	12.8		12.8	12.8	
Actuated g/C Ratio	0.69	0.69		0.69	0.69	0.69	0.15	0.15		0.15	0.15	
Clearance Time (s)	6.6	6.6		6.6	6.6	6.6	6.6	6.6		6.6	6.6	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	746	1291		723	1294	1122	213	278		221	261	
v/s Ratio Prot		c0.19			0.17			0.00			0.01	
v/s Ratio Perm	0.05			0.01		0.02	0.00			c0.04		
v/c Ratio	0.07	0.28		0.01	0.25	0.03	0.01	0.03		0.26	0.07	
Uniform Delay, d1	4.3	5.0		4.1	4.9	4.2	29.8	29.9		31.0	30.1	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.2	0.5		0.0	0.5	0.1	0.0	0.0		0.6	0.1	
Delay (s)	4.4	5.5		4.1	5.4	4.2	29.9	30.0		31.6	30.3	
Level of Service	A	A		A	A	A	C	C		C	C	
Approach Delay (s)		5.4			5.2			30.0			31.0	
Approach LOS		A			A			C			C	

Intersection Summary					
HCM 2000 Control Delay	8.9	HCM 2000 Level of Service	A		
HCM 2000 Volume to Capacity ratio	0.27				
Actuated Cycle Length (s)	83.2	Sum of lost time (s)	13.2		
Intersection Capacity Utilization	64.6%	ICU Level of Service	C		
Analysis Period (min)	15				
c Critical Lane Group					



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	8	364	8	7	359	8	7	11	10	16	4	17
Future Volume (Veh/h)	8	364	8	7	359	8	7	11	10	16	4	17
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	9	387	9	7	382	9	7	12	11	17	4	18
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	391			396			826	814	392	822	814	386
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	391			396			826	814	392	822	814	386
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			99			97	96	98	94	99	97
cM capacity (veh/h)	1179			1174			280	310	662	279	310	666

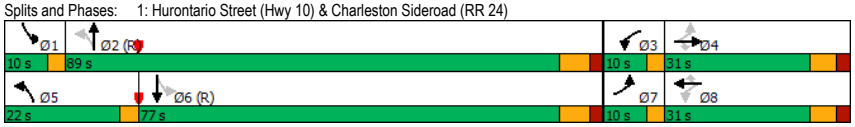
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	9	396	7	391	30	39
Volume Left	9	0	7	0	7	17
Volume Right	0	9	0	9	11	18
cSH	1179	1700	1174	1700	373	386
Volume to Capacity	0.01	0.23	0.01	0.23	0.08	0.10
Queue Length 95th (m)	0.2	0.0	0.1	0.0	2.0	2.5
Control Delay (s)	8.1	0.0	8.1	0.0	15.5	15.4
Lane LOS	A		A		C	C
Approach Delay (s)	0.2		0.1		15.5	15.4
Approach LOS					C	C

Intersection Summary				
Average Delay	1.4			
Intersection Capacity Utilization	30.0%	ICU Level of Service		A
Analysis Period (min)	15			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations										
Traffic Volume (vph)	58	170	204	124	199	31	139	1047	59	1825
Future Volume (vph)	58	170	204	124	199	31	139	1047	59	1825
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	pm+pt	NA
Protected Phases	7	4		3	8		5	2	1	6
Permitted Phases	4		4	8		8	2		6	
Detector Phase	7	4	4	3	8	8	5	2	1	6
Switch Phase										
Minimum Initial (s)	7.0	10.0	10.0	7.0	10.0	10.0	7.0	20.0	7.0	20.0
Minimum Split (s)	10.0	17.9	17.9	10.0	17.9	17.9	10.0	44.4	10.0	44.4
Total Split (s)	10.0	31.0	31.0	10.0	31.0	31.0	22.0	89.0	10.0	77.0
Total Split (%)	7.1%	22.1%	22.1%	7.1%	22.1%	22.1%	15.7%	63.6%	7.1%	55.0%
Yellow Time (s)	3.0	4.5	4.5	3.0	4.5	4.5	3.0	5.0	3.0	5.0
All-Red Time (s)	0.0	2.4	2.4	0.0	2.4	2.4	0.0	2.4	0.0	2.4
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	3.0	6.9	6.9	3.0	6.9	6.9	3.0	7.4	3.0	7.4
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes				Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	C-Max	None	C-Max
Act Effct Green (s)	31.7	20.8	20.8	32.3	22.8	22.8	99.3	86.9	90.1	78.6
Actuated g/C Ratio	0.23	0.15	0.15	0.23	0.16	0.16	0.71	0.62	0.64	0.56
v/c Ratio	0.28	0.77	0.52	0.56	0.76	0.11	0.75	0.62	0.25	0.99
Control Delay	43.3	78.1	11.0	53.1	74.0	0.7	55.9	19.1	10.0	49.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	43.3	78.1	11.0	53.1	74.0	0.7	55.9	19.1	10.0	49.8
LOS	D	E	B	D	E	A	E	B	B	D
Approach Delay		41.7			60.2			23.1		48.6
Approach LOS		D			E			C		D

Intersection Summary		
Cycle Length: 140		
Actuated Cycle Length: 140		
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green		
Natural Cycle: 115		
Control Type: Actuated-Coordinated		
Maximum v/c Ratio: 0.99		
Intersection Signal Delay: 40.8	Intersection LOS: D	
Intersection Capacity Utilization 94.9%	ICU Level of Service F	
Analysis Period (min) 15		

Splits and Phases: 1: Hurontario Street (Hwy 10) & Charleston Sideroad (RR 24)



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	61	179	215	131	209	33	146	1199	62	1982
v/c Ratio	0.28	0.77	0.52	0.56	0.76	0.11	0.75	0.62	0.25	0.99
Control Delay	43.3	78.1	11.0	53.1	74.0	0.7	55.9	19.1	10.0	49.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	43.3	78.1	11.0	53.1	74.0	0.7	55.9	19.1	10.0	49.8
Queue Length 50th (m)	13.0	47.5	0.0	29.1	56.1	0.0	25.6	110.2	5.0	~305.6
Queue Length 95th (m)	24.6	72.9	22.0	46.5	#86.6	0.0	48.0	136.1	10.0	#374.8
Internal Link Dist (m)		1351.4			575.0			764.6		536.2
Turn Bay Length (m)	80.0		65.0	40.0		55.0	85.0		40.0	
Base Capacity (vph)	215	271	445	233	292	324	253	1927	252	1993
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.28	0.66	0.48	0.56	0.72	0.10	0.58	0.62	0.25	0.99

Intersection Summary
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

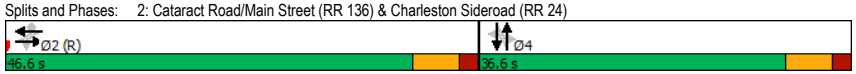
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	58	170	204	124	199	31	139	1047	92	59	1825	58
Future Volume (vph)	58	170	204	124	199	31	139	1047	92	59	1825	58
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.9	6.9	3.0	6.9	6.9	3.0	7.4		3.0	7.4	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99		1.00	1.00	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1690	1575	1555	1772	1700	1384	1534	3100		1484	3548	
Flt Permitted	0.42	1.00	1.00	0.43	1.00	1.00	0.05	1.00		0.19	1.00	
Satd. Flow (perm)	746	1575	1555	801	1700	1384	80	3100		299	3548	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	61	179	215	131	209	33	146	1102	97	62	1921	61
RTOR Reduction (vph)	0	0	182	0	0	28	0	4	0	0	1	0
Lane Group Flow (vph)	61	179	33	131	209	5	146	1195	0	62	1981	0
Heavy Vehicles (%)	8%	22%	5%	3%	13%	18%	19%	16%	20%	23%	2%	15%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8		8	2			6		
Actuated Green, G (s)	27.0	21.4	21.4	29.8	22.8	22.8	94.3	85.6		83.7	78.0	
Effective Green, g (s)	27.0	21.4	21.4	29.8	22.8	22.8	94.3	85.6		83.7	78.0	
Actuated g/C Ratio	0.19	0.15	0.15	0.21	0.16	0.16	0.67	0.61		0.60	0.56	
Clearance Time (s)	3.0	6.9	6.9	3.0	6.9	6.9	3.0	7.4		3.0	7.4	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	4.4		3.0	4.4	
Lane Grp Cap (vph)	181	240	237	219	276	225	192	1895		227	1976	
v/s Ratio Prot	0.01	0.11		c0.03	c0.12		c0.07	0.39		0.01	c0.56	
v/s Ratio Perm	0.05		0.02	0.10		0.00	0.44			0.15		
v/c Ratio	0.34	0.75	0.14	0.60	0.76	0.02	0.76	0.63		0.27	1.00	
Uniform Delay, d1	47.5	56.7	51.3	48.5	56.0	49.2	44.8	17.2		12.7	31.0	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.1	11.9	0.3	4.3	11.3	0.0	16.1	1.6		0.7	20.8	
Delay (s)	48.6	68.6	51.6	52.9	67.2	49.3	61.0	18.8		13.4	51.8	
Level of Service	D	E	D	D	E	D	E	B		B	D	
Approach Delay (s)		57.9			60.6			23.4			50.6	
Approach LOS		E			E			C			D	

Intersection Summary				
HCM 2000 Control Delay	43.6	HCM 2000 Level of Service	D	
HCM 2000 Volume to Capacity ratio	0.92			
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	20.3	
Intersection Capacity Utilization	94.9%	ICU Level of Service	F	
Analysis Period (min)	15			
c Critical Lane Group				

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	38	352	6	336	43	6	7	52	10
Future Volume (vph)	38	352	6	336	43	6	7	52	10
Turn Type	Perm	NA	Perm	NA	Perm	Perm	NA	Perm	NA
Protected Phases		2		2			4		4
Permitted Phases	2		2		2	4		4	
Detector Phase	2	2	2	2	2	4	4	4	4
Switch Phase									
Minimum Initial (s)	20.0	20.0	20.0	20.0	20.0	16.0	16.0	16.0	16.0
Minimum Split (s)	30.6	30.6	30.6	30.6	30.6	30.6	30.6	30.6	30.6
Total Split (s)	46.6	46.6	46.6	46.6	46.6	36.6	36.6	36.6	36.6
Total Split (%)	56.0%	56.0%	56.0%	56.0%	56.0%	44.0%	44.0%	44.0%	44.0%
Yellow Time (s)	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.6	6.6	6.6	6.6	6.6	6.6	6.6	6.6	6.6
Lead/Lag									
Lead-Lag Optimize?									
Recall Mode	C-Min	C-Min	C-Min	C-Min	C-Min	None	None	None	None
Act Effct Green (s)	59.8	59.8	59.8	59.8	59.8	16.0	16.0	16.0	16.0
Actuated g/C Ratio	0.72	0.72	0.72	0.72	0.72	0.19	0.19	0.19	0.19
v/c Ratio	0.05	0.29	0.01	0.30	0.04	0.02	0.05	0.20	0.16
Control Delay	5.6	6.6	5.2	6.8	1.7	27.7	18.7	30.4	12.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	5.6	6.6	5.2	6.8	1.7	27.7	18.7	30.4	12.8
LOS	A	A	A	A	A	C	B	C	B
Approach Delay		6.5		6.2			20.9		21.5
Approach LOS		A		A			C		C

Intersection Summary			
Cycle Length: 83.2			
Actuated Cycle Length: 83.2			
Offset: 22.5 (27%), Referenced to phase 2:EBWB and 6:, Start of Green			
Natural Cycle: 65			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.30			
Intersection Signal Delay: 8.5		Intersection LOS: A	
Intersection Capacity Utilization 63.2%		ICU Level of Service B	
Analysis Period (min) 15			

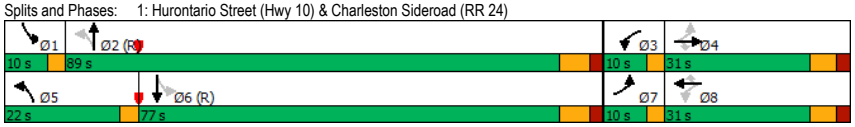
Splits and Phases: 2: Cataract Road/Main Street (RR 136) & Charleston Sideroad (RR 24)



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations										
Traffic Volume (vph)	75	273	151	113	289	84	181	1844	52	1139
Future Volume (vph)	75	273	151	113	289	84	181	1844	52	1139
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	pm+pt	NA
Protected Phases	7	4		3	8		5	2	1	6
Permitted Phases	4		4	8		8	2		6	
Detector Phase	7	4	4	3	8	8	5	2	1	6
Switch Phase										
Minimum Initial (s)	7.0	10.0	10.0	7.0	10.0	10.0	7.0	20.0	7.0	20.0
Minimum Split (s)	10.0	17.9	17.9	10.0	17.9	17.9	10.0	44.4	10.0	44.4
Total Split (s)	10.0	31.0	31.0	10.0	31.0	31.0	22.0	89.0	10.0	77.0
Total Split (%)	7.1%	22.1%	22.1%	7.1%	22.1%	22.1%	15.7%	63.6%	7.1%	55.0%
Yellow Time (s)	3.0	4.5	4.5	3.0	4.5	4.5	3.0	5.0	3.0	5.0
All-Red Time (s)	0.0	2.4	2.4	0.0	2.4	2.4	0.0	2.4	0.0	2.4
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	3.0	6.9	6.9	3.0	6.9	6.9	3.0	7.4	3.0	7.4
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes				Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	C-Max	None	C-Max
Act Effct Green (s)	35.0	24.1	24.1	35.0	24.1	24.1	95.9	83.6	88.0	76.6
Actuated g/C Ratio	0.25	0.17	0.17	0.25	0.17	0.17	0.68	0.60	0.63	0.55
v/c Ratio	0.52	0.99	0.40	0.75	1.00	0.25	0.65	0.99	0.42	0.70
Control Delay	51.9	107.5	10.4	71.1	109.7	7.8	20.6	46.6	25.0	26.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	51.9	107.5	10.4	71.1	109.7	7.8	20.6	46.6	25.0	26.3
LOS	D	F	B	E	F	A	C	D	C	C
Approach Delay		69.8			83.1			44.5		26.2
Approach LOS		E			F			D		C

Intersection Summary		
Cycle Length: 140		
Actuated Cycle Length: 140		
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green		
Natural Cycle: 145		
Control Type: Actuated-Coordinated		
Maximum v/c Ratio: 1.00		
Intersection Signal Delay: 46.4	Intersection LOS: D	
Intersection Capacity Utilization 104.2%	ICU Level of Service G	
Analysis Period (min) 15		

Splits and Phases: 1: Hurontario Street (Hwy 10) & Charleston Sideroad (RR 24)



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	79	287	159	119	304	88	191	2101	55	1268
v/c Ratio	0.52	0.99	0.40	0.75	1.00	0.25	0.65	0.99	0.42	0.70
Control Delay	51.9	107.5	10.4	71.1	109.7	7.8	20.6	46.6	25.0	26.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	51.9	107.5	10.4	71.1	109.7	7.8	20.6	46.6	25.0	26.3
Queue Length 50th (m)	16.8	80.3	0.0	26.0	~85.5	0.0	17.2	~323.0	4.6	127.4
Queue Length 95th (m)	30.4	#137.9	19.4	#52.7	#145.0	10.8	33.1	#364.1	15.3	172.0
Internal Link Dist (m)		1351.4			575.0			764.6		536.2
Turn Bay Length (m)	80.0		65.0	40.0		55.0	85.0		40.0	
Base Capacity (vph)	153	290	394	158	303	351	371	2112	131	1819
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.52	0.99	0.40	0.75	1.00	0.25	0.51	0.99	0.42	0.70

Intersection Summary
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	75	273	151	113	289	84	181	1844	152	52	1139	66
Future Volume (vph)	75	273	151	113	289	84	181	1844	152	52	1139	66
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.9	6.9	3.0	6.9	6.9	3.0	7.4		3.0	7.4	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00	0.98	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99		1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1754	1685	1527	1658	1762	1543	1772	3530		1601	3320	
Flt Permitted	0.18	1.00	1.00	0.22	1.00	1.00	0.13	1.00		0.05	1.00	
Satd. Flow (perm)	328	1685	1527	381	1762	1543	240	3530		88	3320	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	79	287	159	119	304	88	191	1941	160	55	1199	69
RTOR Reduction (vph)	0	0	132	0	0	73	0	4	0	0	3	0
Lane Group Flow (vph)	79	287	27	119	304	15	191	2097	0	55	1265	0
Confl. Peds. (#/hr)	5		6	6		5	7		5	5		7
Heavy Vehicles (%)	4%	14%	5%	10%	9%	4%	3%	2%	2%	14%	9%	6%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8		8	2			6		
Actuated Green, G (s)	31.1	24.1	24.1	31.1	24.1	24.1	91.6	83.0		82.2	76.6	
Effective Green, g (s)	31.1	24.1	24.1	31.1	24.1	24.1	91.6	83.0		82.2	76.6	
Actuated g/C Ratio	0.22	0.17	0.17	0.22	0.17	0.17	0.65	0.59		0.59	0.55	
Clearance Time (s)	3.0	6.9	6.9	3.0	6.9	6.9	3.0	7.4		3.0	7.4	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	4.4		3.0	4.4	
Lane Grp Cap (vph)	144	290	262	148	303	265	288	2092		112	1816	
v/s Ratio Prot	0.03	0.17		c0.04	c0.17		c0.06	c0.59		0.02	0.38	
v/s Ratio Perm	0.09		0.02	0.14		0.01	0.38			0.27		
v/c Ratio	0.55	0.99	0.10	0.80	1.00	0.06	0.66	1.00		0.49	0.70	
Uniform Delay, d1	45.4	57.8	48.9	48.9	58.0	48.5	16.7	28.5		31.8	23.2	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	4.2	49.5	0.2	26.2	52.5	0.1	5.6	20.2		3.4	2.2	
Delay (s)	49.6	107.3	49.0	75.0	110.5	48.5	22.3	48.7		35.2	25.4	
Level of Service	D	F	D	E	F	D	C	D		D	C	
Approach Delay (s)		81.0			91.6			46.5			25.8	
Approach LOS		F			F			D			C	

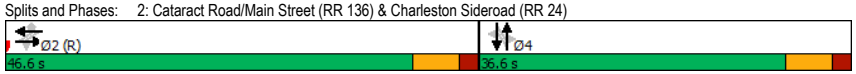
Intersection Summary				
HCM 2000 Control Delay	49.5	HCM 2000 Level of Service	D	
HCM 2000 Volume to Capacity ratio	0.98			
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	20.3	
Intersection Capacity Utilization	104.2%	ICU Level of Service	G	
Analysis Period (min)	15			

c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	73	441	4	427	85	12	12	62	19
Future Volume (vph)	73	441	4	427	85	12	12	62	19
Turn Type	Perm	NA	Perm	NA	Perm	Perm	NA	Perm	NA
Protected Phases		2		2			4		4
Permitted Phases	2		2		2	4		4	
Detector Phase	2	2	2	2	2	4	4	4	4
Switch Phase									
Minimum Initial (s)	20.0	20.0	20.0	20.0	20.0	16.0	16.0	16.0	16.0
Minimum Split (s)	30.6	30.6	30.6	30.6	30.6	30.6	30.6	30.6	30.6
Total Split (s)	46.6	46.6	46.6	46.6	46.6	36.6	36.6	36.6	36.6
Total Split (%)	56.0%	56.0%	56.0%	56.0%	56.0%	44.0%	44.0%	44.0%	44.0%
Yellow Time (s)	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.6	6.6	6.6	6.6	6.6	6.6	6.6	6.6	6.6
Lead/Lag									
Lead-Lag Optimize?									
Recall Mode	C-Min	C-Min	C-Min	C-Min	C-Min	None	None	None	None
Act Effct Green (s)	59.8	59.8	59.8	59.8	59.8	16.0	16.0	16.0	16.0
Actuated g/C Ratio	0.72	0.72	0.72	0.72	0.72	0.19	0.19	0.19	0.19
v/c Ratio	0.11	0.38	0.01	0.35	0.08	0.05	0.06	0.23	0.21
Control Delay	6.1	7.4	5.2	7.1	1.5	28.2	20.8	31.0	13.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	6.1	7.4	5.2	7.1	1.5	28.2	20.8	31.0	13.1
LOS	A	A	A	A	A	C	C	C	B
Approach Delay		7.2		6.2			23.5		21.1
Approach LOS		A		A			C		C

Intersection Summary			
Cycle Length: 83.2			
Actuated Cycle Length: 83.2			
Offset: 22.5 (27%), Referenced to phase 2:EBWB and 6:, Start of Green			
Natural Cycle: 65			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.38			
Intersection Signal Delay: 8.8		Intersection LOS: A	
Intersection Capacity Utilization 70.4%		ICU Level of Service C	
Analysis Period (min) 15			

Splits and Phases: 2: Cataract Road/Main Street (RR 136) & Charleston Sideroad (RR 24)



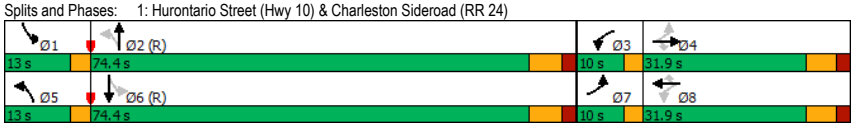
APPENDIX K3

Future Total Conditions

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations										
Traffic Volume (vph)	64	170	250	124	199	31	174	1047	59	1825
Future Volume (vph)	64	170	250	124	199	31	174	1047	59	1825
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	pm+pt	NA
Protected Phases	7	4		3	8		5	2	1	6
Permitted Phases	4		4	8		8	2		6	
Detector Phase	7	4	4	3	8	8	5	2	1	6
Switch Phase										
Minimum Initial (s)	7.0	10.0	10.0	7.0	10.0	10.0	7.0	20.0	7.0	20.0
Minimum Split (s)	10.0	17.9	17.9	10.0	17.9	17.9	10.0	44.4	10.0	44.4
Total Split (s)	10.0	31.9	31.9	10.0	31.9	31.9	13.0	74.4	13.0	74.4
Total Split (%)	7.7%	24.7%	24.7%	7.7%	24.7%	24.7%	10.1%	57.5%	10.1%	57.5%
Yellow Time (s)	3.0	4.5	4.5	3.0	4.5	4.5	3.0	5.0	3.0	5.0
All-Red Time (s)	0.0	2.4	2.4	0.0	2.4	2.4	0.0	2.4	0.0	2.4
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	3.0	6.9	6.9	3.0	6.9	6.9	3.0	7.4	3.0	7.4
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes				Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	C-Max	None	C-Max
Act Effct Green (s)	31.1	20.2	20.2	31.7	22.2	22.2	88.8	76.1	79.1	67.0
Actuated g/C Ratio	0.24	0.16	0.16	0.25	0.17	0.17	0.69	0.59	0.61	0.52
v/c Ratio	0.29	0.73	0.75	0.51	0.72	0.11	0.88	0.66	0.25	1.08
Control Delay	38.3	68.7	32.1	45.0	65.2	0.7	72.3	21.4	10.2	78.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	38.3	68.7	32.1	45.0	65.2	0.7	72.3	21.4	10.2	78.1
LOS	D	E	C	D	E	A	E	C	B	E
Approach Delay		45.8			52.4			28.1		76.0
Approach LOS		D			D			C		E

Intersection Summary		
Cycle Length: 129.3		
Actuated Cycle Length: 129.3		
Offset: 85 (66%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green		
Natural Cycle: 135		
Control Type: Actuated-Coordinated		
Maximum v/c Ratio: 1.08		
Intersection Signal Delay: 55.1	Intersection LOS: E	
Intersection Capacity Utilization 97.0%	ICU Level of Service F	
Analysis Period (min) 15		

Splits and Phases: 1: Hurontario Street (Hwy 10) & Charleston Sideroad (RR 24)



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	67	179	263	131	209	33	183	1199	62	1989
v/c Ratio	0.29	0.73	0.75	0.51	0.72	0.11	0.88	0.66	0.25	1.08
Control Delay	38.3	68.7	32.1	45.0	65.2	0.7	72.3	21.4	10.2	78.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	38.3	68.7	32.1	45.0	65.2	0.7	72.3	21.4	10.2	78.1
Queue Length 50th (m)	13.0	43.6	23.1	26.4	51.4	0.0	33.3	107.1	4.8	~298.4
Queue Length 95th (m)	23.9	66.4	53.0	41.8	75.9	0.0	#89.9	146.5	10.4	#340.6
Internal Link Dist (m)		1351.4			575.0			764.6		536.2
Turn Bay Length (m)	80.0		65.0	40.0		55.0	85.0		40.0	
Base Capacity (vph)	235	304	397	258	328	336	208	1828	273	1837
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.29	0.59	0.66	0.51	0.64	0.10	0.88	0.66	0.23	1.08

Intersection Summary
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

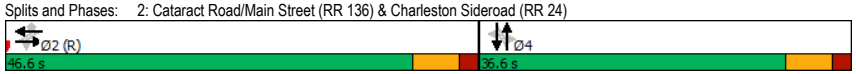
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	64	170	250	124	199	31	174	1047	92	59	1825	65
Future Volume (vph)	64	170	250	124	199	31	174	1047	92	59	1825	65
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.9	6.9	3.0	6.9	6.9	3.0	7.4		3.0	7.4	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99		1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1644	1575	1361	1772	1700	1372	1393	3100		1472	3542	
Flt Permitted	0.45	1.00	1.00	0.46	1.00	1.00	0.06	1.00		0.19	1.00	
Satd. Flow (perm)	784	1575	1361	851	1700	1372	85	3100		290	3542	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	67	179	263	131	209	33	183	1102	97	62	1921	68
RTOR Reduction (vph)	0	0	140	0	0	27	0	4	0	0	2	0
Lane Group Flow (vph)	67	179	123	131	209	6	183	1195	0	62	1987	0
Heavy Vehicles (%)	11%	22%	20%	3%	13%	19%	31%	16%	20%	24%	2%	17%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8		8	2			6		
Actuated Green, G (s)	26.4	20.8	20.8	29.2	22.2	22.2	84.2	74.9		72.7	66.4	
Effective Green, g (s)	26.4	20.8	20.8	29.2	22.2	22.2	84.2	74.9		72.7	66.4	
Actuated g/C Ratio	0.20	0.16	0.16	0.23	0.17	0.17	0.65	0.58		0.56	0.51	
Clearance Time (s)	3.0	6.9	6.9	3.0	6.9	6.9	3.0	7.4		3.0	7.4	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	4.4		3.0	4.4	
Lane Grp Cap (vph)	197	253	218	242	291	235	205	1795		220	1818	
v/s Ratio Prot	0.01	0.11		c0.03	c0.12		c0.10	0.39		0.01	c0.56	
v/s Ratio Perm	0.05		0.09	0.09		0.00	0.48			0.14		
v/c Ratio	0.34	0.71	0.56	0.54	0.72	0.02	0.89	0.67		0.28	1.09	
Uniform Delay, d1	42.8	51.4	50.1	42.7	50.6	44.5	43.0	18.6		13.8	31.5	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.0	8.7	3.3	2.5	8.2	0.0	34.9	2.0		0.7	51.3	
Delay (s)	43.9	60.1	53.4	45.2	58.8	44.6	77.9	20.6		14.5	82.8	
Level of Service	D	E	D	D	E	D	E	C		B	F	
Approach Delay (s)		54.5			52.8			28.2			80.7	
Approach LOS		D			D			C			F	

Intersection Summary				
HCM 2000 Control Delay	58.4	HCM 2000 Level of Service	E	
HCM 2000 Volume to Capacity ratio	0.97			
Actuated Cycle Length (s)	129.3	Sum of lost time (s)	20.3	
Intersection Capacity Utilization	97.0%	ICU Level of Service	F	
Analysis Period (min)	15			
c Critical Lane Group				

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	39	404	6	378	43	6	7	52	10
Future Volume (vph)	39	404	6	378	43	6	7	52	10
Turn Type	Perm	NA	Perm	NA	Perm	Perm	NA	Perm	NA
Protected Phases		2		2			4		4
Permitted Phases	2		2		2	4		4	
Detector Phase	2	2	2	2	2	4	4	4	4
Switch Phase									
Minimum Initial (s)	20.0	20.0	20.0	20.0	20.0	16.0	16.0	16.0	16.0
Minimum Split (s)	30.6	30.6	30.6	30.6	30.6	30.6	30.6	30.6	30.6
Total Split (s)	46.6	46.6	46.6	46.6	46.6	36.6	36.6	36.6	36.6
Total Split (%)	56.0%	56.0%	56.0%	56.0%	56.0%	44.0%	44.0%	44.0%	44.0%
Yellow Time (s)	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.6	6.6	6.6	6.6	6.6	6.6	6.6	6.6	6.6
Lead/Lag									
Lead-Lag Optimize?									
Recall Mode	C-Min	C-Min	C-Min	C-Min	C-Min	None	None	None	None
Act Effct Green (s)	59.8	59.8	59.8	59.8	59.8	16.0	16.0	16.0	16.0
Actuated g/C Ratio	0.72	0.72	0.72	0.72	0.72	0.19	0.19	0.19	0.19
v/c Ratio	0.06	0.36	0.01	0.36	0.04	0.02	0.05	0.20	0.16
Control Delay	5.6	7.3	5.3	7.4	1.7	27.7	18.7	30.4	12.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	5.6	7.3	5.3	7.4	1.7	27.7	18.7	30.4	12.6
LOS	A	A	A	A	A	C	B	C	B
Approach Delay		7.2		6.8			20.9		21.4
Approach LOS		A		A			C		C

Intersection Summary			
Cycle Length: 83.2			
Actuated Cycle Length: 83.2			
Offset: 22.5 (27%), Referenced to phase 2:EBWB and 6:, Start of Green			
Natural Cycle: 65			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.36			
Intersection Signal Delay: 8.9		Intersection LOS: A	
Intersection Capacity Utilization 63.2%		ICU Level of Service B	
Analysis Period (min) 15			

Splits and Phases: 2: Cataract Road/Main Street (RR 136) & Charleston Sideroad (RR 24)



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	40	422	6	390	44	6	18	54	56
v/c Ratio	0.06	0.36	0.01	0.36	0.04	0.02	0.05	0.20	0.16
Control Delay	5.6	7.3	5.3	7.4	1.7	27.7	18.7	30.4	12.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	5.6	7.3	5.3	7.4	1.7	27.7	18.7	30.4	12.6
Queue Length 50th (m)	2.1	28.0	0.3	25.8	0.0	0.8	0.9	7.3	1.3
Queue Length 95th (m)	5.3	44.3	1.5	41.6	2.9	4.0	6.3	17.1	10.5
Internal Link Dist (m)		750.9		2789.4			883.0		1179.5
Turn Bay Length (m)	125.0		60.0		90.0	70.0		85.0	
Base Capacity (vph)	705	1161	696	1087	1187	498	635	516	617
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.06	0.36	0.01	0.36	0.04	0.01	0.03	0.10	0.09

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	39	404	6	6	378	43	6	7	11	52	10	45
Future Volume (vph)	39	404	6	6	378	43	6	7	11	52	10	45
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.6	6.6		6.6	6.6	6.6	6.6	6.6		6.6	6.6	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00		1.00	1.00	0.85	1.00	0.91		1.00	0.88	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1772	1615		1825	1513	1633	1825	1745		1825	1631	
Flt Permitted	0.53	1.00		0.50	1.00	1.00	0.72	1.00		0.75	1.00	
Satd. Flow (perm)	981	1615		968	1513	1633	1384	1745		1433	1631	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	40	416	6	6	390	44	6	7	11	54	10	46
RTOR Reduction (vph)	0	0	0	0	0	14	0	9	0	0	39	0
Lane Group Flow (vph)	40	422	0	6	390	30	6	9	0	54	17	0
Heavy Vehicles (%)	3%	19%	0%	0%	27%	0%	0%	0%	0%	0%	0%	4%
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		2			2			4			4	
Permitted Phases	2			2		2	4			4		
Actuated Green, G (s)	57.2	57.2		57.2	57.2	57.2	12.8	12.8		12.8	12.8	
Effective Green, g (s)	57.2	57.2		57.2	57.2	57.2	12.8	12.8		12.8	12.8	
Actuated g/C Ratio	0.69	0.69		0.69	0.69	0.69	0.15	0.15		0.15	0.15	
Clearance Time (s)	6.6	6.6		6.6	6.6	6.6	6.6	6.6		6.6	6.6	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	674	1110		665	1040	1122	212	268		220	250	
v/s Ratio Prot		c0.26			0.26			0.00			0.01	
v/s Ratio Perm	0.04			0.01		0.02	0.00			c0.04		
v/c Ratio	0.06	0.38		0.01	0.38	0.03	0.03	0.03		0.25	0.07	
Uniform Delay, d1	4.2	5.5		4.1	5.5	4.1	29.9	29.9		31.0	30.1	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.2	1.0		0.0	1.0	0.0	0.1	0.0		0.6	0.1	
Delay (s)	4.4	6.5		4.1	6.5	4.2	30.0	30.0		31.5	30.2	
Level of Service	A	A		A	A	A	C	C		C	C	
Approach Delay (s)		6.3			6.2			30.0			30.9	
Approach LOS		A			A			C			C	

Intersection Summary				
HCM 2000 Control Delay	9.4	HCM 2000 Level of Service	A	
HCM 2000 Volume to Capacity ratio	0.36			
Actuated Cycle Length (s)	83.2	Sum of lost time (s)	13.2	
Intersection Capacity Utilization	63.2%	ICU Level of Service	B	
Analysis Period (min)	15			
c Critical Lane Group				

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	16	390	2	34	341	15	2	7	15	15	11	11
Future Volume (Veh/h)	16	390	2	34	341	15	2	7	15	15	11	11
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	17	411	2	36	359	16	2	7	16	16	12	12
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	375			413			895	893	412	904	886	367
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	375			413			895	893	412	904	886	367
tC, single (s)	4.1			4.8			7.1	6.5	6.8	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.9			3.5	4.0	3.8	3.5	4.0	3.3
p0 queue free %	99			96			99	97	97	93	96	98
cM capacity (veh/h)	1195			846			240	267	537	237	270	683

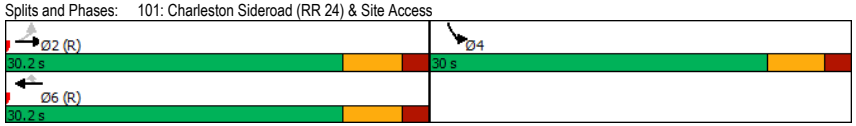
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	17	413	36	375	25	40
Volume Left	17	0	36	0	2	16
Volume Right	0	2	0	16	16	12
cSH	1195	1700	846	1700	388	309
Volume to Capacity	0.01	0.24	0.04	0.22	0.06	0.13
Queue Length 95th (m)	0.3	0.0	1.0	0.0	1.6	3.4
Control Delay (s)	8.1	0.0	9.4	0.0	14.9	18.4
Lane LOS	A		A		B	C
Approach Delay (s)	0.3		0.8		14.9	18.4
Approach LOS					B	C

Intersection Summary				
Average Delay	1.8			
Intersection Capacity Utilization	40.2%	ICU Level of Service	A	
Analysis Period (min)	15			

Lane Group	EBL	EBT	WBT	WBR	SBL
Lane Configurations					
Traffic Volume (vph)	5	417	390	40	53
Future Volume (vph)	5	417	390	40	53
Turn Type	Perm	NA	NA	Perm	Prot
Protected Phases		2	6		4
Permitted Phases	2			6	
Detector Phase	2	2	6	6	4
Switch Phase					
Minimum Initial (s)	12.0	12.0	12.0	12.0	1.0
Minimum Split (s)	30.2	30.2	30.2	30.2	30.0
Total Split (s)	30.2	30.2	30.2	30.2	30.0
Total Split (%)	50.2%	50.2%	50.2%	50.2%	49.8%
Yellow Time (s)	4.2	4.2	4.2	4.2	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.2	6.2	6.2	6.2	6.0
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	C-Max	C-Max	C-Max	C-Max	Max
Act Effct Green (s)	24.0	24.0	24.0	24.0	24.0
Actuated g/C Ratio	0.40	0.40	0.40	0.40	0.40
v/c Ratio	0.02	0.55	0.51	0.10	0.14
Control Delay	11.4	17.2	16.6	5.1	11.7
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	11.4	17.2	16.6	5.1	11.7
LOS	B	B	B	A	B
Approach Delay		17.2	15.5		11.7
Approach LOS		B	B		B

Intersection Summary			
Cycle Length: 60.2			
Actuated Cycle Length: 60.2			
Offset: 37 (61%), Referenced to phase 2:EBTL and 6:WBT, Start of Green			
Natural Cycle: 65			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.55			
Intersection Signal Delay: 16.0		Intersection LOS: B	
Intersection Capacity Utilization 35.5%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 101: Charleston Sideroad (RR 24) & Site Access



Lane Group	EBL	EBT	WBT	WBR	SBL
Lane Group Flow (vph)	5	417	390	40	60
v/c Ratio	0.02	0.55	0.51	0.10	0.14
Control Delay	11.4	17.2	16.6	5.1	11.7
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	11.4	17.2	16.6	5.1	11.7
Queue Length 50th (m)	0.3	34.0	31.3	0.0	3.6
Queue Length 95th (m)	2.0	56.9	52.7	4.7	10.0
Internal Link Dist (m)		610.5	750.9		106.2
Turn Bay Length (m)	130.0			75.0	
Base Capacity (vph)	285	765	765	400	416
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	0.02	0.55	0.51	0.10	0.14

Intersection Summary

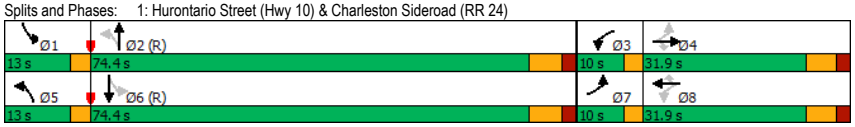
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	5	417	390	40	53	7
Future Volume (vph)	5	417	390	40	53	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.2	6.2	6.2	6.2	6.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	1.00	0.85	0.98	
Flt Protected	0.95	1.00	1.00	1.00	0.96	
Satd. Flow (prot)	1521	1921	1921	944	1035	
Flt Permitted	0.45	1.00	1.00	1.00	0.96	
Satd. Flow (perm)	716	1921	1921	944	1035	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	5	417	390	40	53	7
RTOR Reduction (vph)	0	0	0	24	4	0
Lane Group Flow (vph)	5	417	390	16	56	0
Heavy Vehicles (%)	20%	0%	0%	73%	81%	29%
Turn Type	Perm	NA	NA	Perm	Prot	
Protected Phases		2	6		4	
Permitted Phases	2			6		
Actuated Green, G (s)	24.0	24.0	24.0	24.0	24.0	
Effective Green, g (s)	24.0	24.0	24.0	24.0	24.0	
Actuated g/C Ratio	0.40	0.40	0.40	0.40	0.40	
Clearance Time (s)	6.2	6.2	6.2	6.2	6.0	
Vehicle Extension (s)	5.0	5.0	5.0	5.0	5.0	
Lane Grp Cap (vph)	285	765	765	376	412	
v/s Ratio Prot		c0.22	0.20		c0.05	
v/s Ratio Perm	0.01			0.02		
v/c Ratio	0.02	0.55	0.51	0.04	0.14	
Uniform Delay, d1	11.0	13.9	13.7	11.1	11.5	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.1	2.8	2.4	0.2	0.7	
Delay (s)	11.1	16.7	16.1	11.3	12.2	
Level of Service	B	B	B	B	B	
Approach Delay (s)		16.6	15.6		12.2	
Approach LOS		B	B		B	

Intersection Summary				
HCM 2000 Control Delay	15.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.34		
Actuated Cycle Length (s)	60.2	Sum of lost time (s)	12.2
Intersection Capacity Utilization	35.5%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations										
Traffic Volume (vph)	94	273	192	113	289	84	224	1844	52	1139
Future Volume (vph)	94	273	192	113	289	84	224	1844	52	1139
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	pm+pt	NA
Protected Phases	7	4		3	8		5	2	1	6
Permitted Phases	4		4	8		8	2		6	
Detector Phase	7	4	4	3	8	8	5	2	1	6
Switch Phase										
Minimum Initial (s)	7.0	10.0	10.0	7.0	10.0	10.0	7.0	20.0	7.0	20.0
Minimum Split (s)	10.0	17.9	17.9	10.0	17.9	17.9	10.0	44.4	10.0	44.4
Total Split (s)	10.0	31.9	31.9	10.0	31.9	31.9	13.0	74.4	13.0	74.4
Total Split (%)	7.7%	24.7%	24.7%	7.7%	24.7%	24.7%	10.1%	57.5%	10.1%	57.5%
Yellow Time (s)	3.0	4.5	4.5	3.0	4.5	4.5	3.0	5.0	3.0	5.0
All-Red Time (s)	0.0	2.4	2.4	0.0	2.4	2.4	0.0	2.4	0.0	2.4
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	3.0	6.9	6.9	3.0	6.9	6.9	3.0	7.4	3.0	7.4
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes				Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	C-Max	None	C-Max
Act Effct Green (s)	35.1	24.2	24.2	35.1	24.2	24.2	84.6	72.2	79.0	67.0
Actuated g/C Ratio	0.27	0.19	0.19	0.27	0.19	0.19	0.65	0.56	0.61	0.52
v/c Ratio	0.54	0.91	0.49	0.62	0.92	0.24	0.96	1.06	0.37	0.74
Control Delay	45.5	84.1	11.6	50.9	85.0	10.4	69.0	68.4	17.0	27.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	45.5	84.1	11.6	50.9	85.0	10.4	69.0	68.4	17.0	27.4
LOS	D	F	B	D	F	B	E	E	B	C
Approach Delay		52.7			64.2			68.5		27.0
Approach LOS		D			E			E		C

Intersection Summary		
Cycle Length: 129.3		
Actuated Cycle Length: 129.3		
Offset: 85 (66%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green		
Natural Cycle: 145		
Control Type: Actuated-Coordinated		
Maximum v/c Ratio: 1.06		
Intersection Signal Delay: 54.5	Intersection LOS: D	
Intersection Capacity Utilization 104.2%	ICU Level of Service G	
Analysis Period (min) 15		

Splits and Phases: 1: Hurontario Street (Hwy 10) & Charleston Sideroad (RR 24)



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	99	287	202	119	304	88	236	2101	55	1271
v/c Ratio	0.54	0.91	0.49	0.62	0.92	0.24	0.96	1.06	0.37	0.74
Control Delay	45.5	84.1	11.6	50.9	85.0	10.4	69.0	68.4	17.0	27.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	45.5	84.1	11.6	50.9	85.0	10.4	69.0	68.4	17.0	27.4
Queue Length 50th (m)	18.7	71.8	2.1	22.8	76.3	0.0	29.9	~318.5	4.7	128.2
Queue Length 95th (m)	33.0	#120.7	23.6	38.9	#126.8	13.9	#84.6	#369.0	11.2	154.8
Internal Link Dist (m)		1351.4			575.0			764.6		536.2
Turn Bay Length (m)	80.0		65.0	40.0		55.0	85.0		40.0	
Base Capacity (vph)	185	325	417	191	340	369	246	1976	181	1721
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.54	0.88	0.48	0.62	0.89	0.24	0.96	1.06	0.30	0.74

Intersection Summary
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	94	273	192	113	289	84	224	1844	152	52	1139	68
Future Volume (vph)	94	273	192	113	289	84	224	1844	152	52	1139	68
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.9	6.9	3.0	6.9	6.9	3.0	7.4		3.0	7.4	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00	0.98	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99		1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1737	1685	1359	1658	1762	1544	1601	3530		1615	3314	
Flt Permitted	0.23	1.00	1.00	0.27	1.00	1.00	0.12	1.00		0.06	1.00	
Satd. Flow (perm)	423	1685	1359	470	1762	1544	198	3530		101	3314	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	99	287	202	119	304	88	236	1941	160	55	1199	72
RTOR Reduction (vph)	0	0	156	0	0	72	0	4	0	0	3	0
Lane Group Flow (vph)	99	287	46	119	304	16	236	2097	0	55	1268	0
Confl. Peds. (#/hr)	5		6	6		5	7		5	5		7
Heavy Vehicles (%)	5%	14%	18%	10%	9%	4%	14%	2%	2%	13%	9%	9%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8		8	2			6		
Actuated Green, G (s)	31.2	24.2	24.2	31.2	24.2	24.2	80.8	71.6		73.2	67.0	
Effective Green, g (s)	31.2	24.2	24.2	31.2	24.2	24.2	80.8	71.6		73.2	67.0	
Actuated g/C Ratio	0.24	0.19	0.19	0.24	0.19	0.19	0.62	0.55		0.57	0.52	
Clearance Time (s)	3.0	6.9	6.9	3.0	6.9	6.9	3.0	7.4		3.0	7.4	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	4.4		3.0	4.4	
Lane Grp Cap (vph)	173	315	254	177	329	288	240	1954		129	1717	
v/s Ratio Prot	0.03	0.17		c0.04	c0.17		c0.08	c0.59		0.02	0.38	
v/s Ratio Perm	0.11		0.03	0.13		0.01	0.53			0.22		
v/c Ratio	0.57	0.91	0.18	0.67	0.92	0.06	0.98	1.07		0.43	0.74	
Uniform Delay, d1	40.4	51.5	44.2	41.7	51.6	43.2	26.2	28.9		28.5	24.3	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	4.5	29.0	0.3	9.6	30.6	0.1	53.1	43.1		2.3	2.9	
Delay (s)	44.9	80.5	44.6	51.3	82.3	43.3	79.3	72.0		30.7	27.2	
Level of Service	D	F	D	D	F	D	E	E		C	C	
Approach Delay (s)		62.2			68.3			72.7			27.3	
Approach LOS		E			E			E			C	

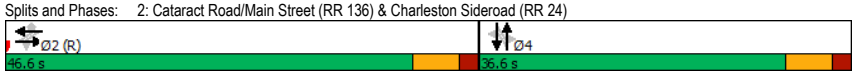
Intersection Summary				
HCM 2000 Control Delay	58.3	HCM 2000 Level of Service	E	
HCM 2000 Volume to Capacity ratio	1.03			
Actuated Cycle Length (s)	129.3	Sum of lost time (s)	20.3	
Intersection Capacity Utilization	104.2%	ICU Level of Service	G	
Analysis Period (min)	15			

c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	74	501	4	472	85	12	12	62	19
Future Volume (vph)	74	501	4	472	85	12	12	62	19
Turn Type	Perm	NA	Perm	NA	Perm	Perm	NA	Perm	NA
Protected Phases		2		2			4		4
Permitted Phases	2		2		2	4		4	
Detector Phase	2	2	2	2	2	4	4	4	4
Switch Phase									
Minimum Initial (s)	20.0	20.0	20.0	20.0	20.0	16.0	16.0	16.0	16.0
Minimum Split (s)	30.6	30.6	30.6	30.6	30.6	30.6	30.6	30.6	30.6
Total Split (s)	46.6	46.6	46.6	46.6	46.6	36.6	36.6	36.6	36.6
Total Split (%)	56.0%	56.0%	56.0%	56.0%	56.0%	44.0%	44.0%	44.0%	44.0%
Yellow Time (s)	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.6	6.6	6.6	6.6	6.6	6.6	6.6	6.6	6.6
Lead/Lag									
Lead-Lag Optimize?									
Recall Mode	C-Min	C-Min	C-Min	C-Min	C-Min	None	None	None	None
Act Effct Green (s)	59.8	59.8	59.8	59.8	59.8	16.0	16.0	16.0	16.0
Actuated g/C Ratio	0.72	0.72	0.72	0.72	0.72	0.19	0.19	0.19	0.19
v/c Ratio	0.12	0.45	0.01	0.41	0.08	0.05	0.06	0.23	0.22
Control Delay	6.2	8.3	5.2	7.8	1.5	28.2	20.9	31.1	13.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	6.2	8.3	5.2	7.8	1.5	28.2	20.9	31.1	13.1
LOS	A	A	A	A	A	C	C	C	B
Approach Delay		8.0		6.8			23.5		21.1
Approach LOS		A		A			C		C

Intersection Summary			
Cycle Length: 83.2			
Actuated Cycle Length: 83.2			
Offset: 22.5 (27%), Referenced to phase 2:EBWB and 6:, Start of Green			
Natural Cycle: 65			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.45			
Intersection Signal Delay: 9.3		Intersection LOS: A	
Intersection Capacity Utilization 73.5%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 2: Cataract Road/Main Street (RR 136) & Charleston Sideroad (RR 24)



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	76	527	4	487	88	12	21	64	80
v/c Ratio	0.12	0.45	0.01	0.41	0.08	0.05	0.06	0.23	0.22
Control Delay	6.2	8.3	5.2	7.8	1.5	28.2	20.9	31.1	13.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	6.2	8.3	5.2	7.8	1.5	28.2	20.9	31.1	13.1
Queue Length 50th (m)	4.1	37.9	0.2	33.8	0.0	1.6	1.6	8.7	2.6
Queue Length 95th (m)	9.1	59.3	1.2	52.9	4.3	5.9	7.3	19.4	13.6
Internal Link Dist (m)		750.9		2789.4			883.0		1179.5
Turn Bay Length (m)	125.0		60.0		90.0	70.0		85.0	
Base Capacity (vph)	635	1181	600	1190	1143	452	654	515	639
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.12	0.45	0.01	0.41	0.08	0.03	0.03	0.12	0.13

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	74	501	11	4	472	85	12	12	9	62	19	58
Future Volume (vph)	74	501	11	4	472	85	12	12	9	62	19	58
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.6	6.6		6.6	6.6	6.6	6.6	6.6		6.6	6.6	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00		1.00	1.00	0.85	1.00	0.94		1.00	0.89	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1825	1642		1825	1656	1555	1690	1798		1825	1667	
Flt Permitted	0.46	1.00		0.43	1.00	1.00	0.70	1.00		0.74	1.00	
Satd. Flow (perm)	884	1642		834	1656	1555	1254	1798		1429	1667	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	76	516	11	4	487	88	12	12	9	64	20	60
RTOR Reduction (vph)	0	1	0	0	0	27	0	8	0	0	51	0
Lane Group Flow (vph)	76	526	0	4	487	61	12	13	0	64	29	0
Heavy Vehicles (%)	0%	17%	0%	0%	16%	5%	8%	0%	0%	0%	0%	3%
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		2			2			4			4	
Permitted Phases	2			2		2	4			4		
Actuated Green, G (s)	57.2	57.2		57.2	57.2	57.2	12.8	12.8		12.8	12.8	
Effective Green, g (s)	57.2	57.2		57.2	57.2	57.2	12.8	12.8		12.8	12.8	
Actuated g/C Ratio	0.69	0.69		0.69	0.69	0.69	0.15	0.15		0.15	0.15	
Clearance Time (s)	6.6	6.6		6.6	6.6	6.6	6.6	6.6		6.6	6.6	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	607	1128		573	1138	1069	192	276		219	256	
v/s Ratio Prot		c0.32			0.29			0.01			0.02	
v/s Ratio Perm	0.09			0.00		0.04	0.01			c0.04		
v/c Ratio	0.13	0.47		0.01	0.43	0.06	0.06	0.05		0.29	0.11	
Uniform Delay, d1	4.4	6.0		4.1	5.8	4.2	30.1	30.0		31.2	30.3	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.4	1.4		0.0	1.2	0.1	0.1	0.1		0.7	0.2	
Delay (s)	4.9	7.4		4.1	6.9	4.3	30.2	30.1		31.9	30.5	
Level of Service	A	A		A	A	A	C	C		C	C	
Approach Delay (s)		7.1			6.5			30.1			31.1	
Approach LOS		A			A			C			C	

Intersection Summary					
HCM 2000 Control Delay	9.9	HCM 2000 Level of Service		A	
HCM 2000 Volume to Capacity ratio	0.43				
Actuated Cycle Length (s)	83.2	Sum of lost time (s)		13.2	
Intersection Capacity Utilization	73.5%	ICU Level of Service		D	
Analysis Period (min)	15				
c Critical Lane Group					

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	14	491	8	15	491	12	3	19	26	21	6	14
Future Volume (Veh/h)	14	491	8	15	491	12	3	19	26	21	6	14
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	15	517	8	16	517	13	3	20	27	22	6	15
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	530			525			1118	1113	521	1140	1110	524
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	530			525			1118	1113	521	1140	1110	524
tC, single (s)	4.2			4.2			7.1	6.5	6.3	7.1	6.5	6.3
tC, 2 stage (s)												
tF (s)	2.3			2.3			3.5	4.0	3.4	3.5	4.0	3.4
p0 queue free %	99			98			98	90	95	86	97	97
cM capacity (veh/h)	1012			983			173	204	536	154	204	531

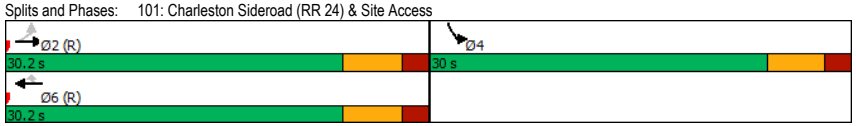
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	15	525	16	530	50	43
Volume Left	15	0	16	0	3	22
Volume Right	0	8	0	13	27	15
cSH	1012	1700	983	1700	301	215
Volume to Capacity	0.01	0.31	0.02	0.31	0.17	0.20
Queue Length 95th (m)	0.3	0.0	0.4	0.0	4.5	5.5
Control Delay (s)	8.6	0.0	8.7	0.0	19.3	25.9
Lane LOS	A		A		C	D
Approach Delay (s)	0.2		0.3		19.3	25.9
Approach LOS					C	D

Intersection Summary				
Average Delay	2.0			
Intersection Capacity Utilization	42.2%	ICU Level of Service	A	
Analysis Period (min)	15			

Lane Group	EBL	EBT	WBT	WBR	SBL
Lane Configurations					
Traffic Volume (vph)	10	531	505	45	58
Future Volume (vph)	10	531	505	45	58
Turn Type	Perm	NA	NA	Perm	Prot
Protected Phases		2	6		4
Permitted Phases	2			6	
Detector Phase	2	2	6	6	4
Switch Phase					
Minimum Initial (s)	12.0	12.0	5.0	5.0	12.0
Minimum Split (s)	30.2	30.2	30.2	30.2	30.0
Total Split (s)	30.2	30.2	30.2	30.2	30.0
Total Split (%)	50.2%	50.2%	50.2%	50.2%	49.8%
Yellow Time (s)	4.2	4.2	4.2	4.2	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.2	6.2	6.2	6.2	6.0
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	C-Max	C-Max	C-Max	C-Max	Max
Act Effct Green (s)	24.0	24.0	24.0	24.0	24.0
Actuated g/C Ratio	0.40	0.40	0.40	0.40	0.40
v/c Ratio	0.05	0.69	0.66	0.11	0.14
Control Delay	11.9	20.9	19.9	4.9	11.6
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	11.9	20.9	19.9	4.9	11.6
LOS	B	C	B	A	B
Approach Delay		20.7	18.6		11.6
Approach LOS		C	B		B

Intersection Summary			
Cycle Length: 60.2			
Actuated Cycle Length: 60.2			
Offset: 34 (56%), Referenced to phase 2:EBTL and 6:WBT, Start of Green			
Natural Cycle: 65			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.69			
Intersection Signal Delay: 19.2		Intersection LOS: B	
Intersection Capacity Utilization 48.1%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 101: Charleston Sideroad (RR 24) & Site Access



Lane Group	EBL	EBT	WBT	WBR	SBL
Lane Group Flow (vph)	10	531	505	45	70
v/c Ratio	0.05	0.69	0.66	0.11	0.14
Control Delay	11.9	20.9	19.9	4.9	11.6
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	11.9	20.9	19.9	4.9	11.6
Queue Length 50th (m)	0.7	46.8	43.8	0.0	4.2
Queue Length 95th (m)	3.1	77.1	72.2	5.0	11.0
Internal Link Dist (m)		610.5	750.9		106.2
Turn Bay Length (m)	130.0			75.0	
Base Capacity (vph)	222	765	765	424	497
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	0.05	0.69	0.66	0.11	0.14

Intersection Summary

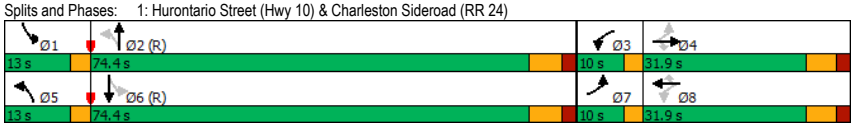
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	10	531	505	45	58	7
Future Volume (vph)	10	531	505	45	58	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.2	6.2	6.2	6.2	6.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	1.00	0.85	0.99	
Flt Protected	0.95	1.00	1.00	1.00	0.96	
Satd. Flow (prot)	1659	1921	1921	996	1239	
Flt Permitted	0.32	1.00	1.00	1.00	0.96	
Satd. Flow (perm)	559	1921	1921	996	1239	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	0.92	1.00
Adj. Flow (vph)	10	531	505	45	63	7
RTOR Reduction (vph)	0	0	0	27	4	0
Lane Group Flow (vph)	10	531	505	18	66	0
Heavy Vehicles (%)	10%	0%	0%	64%	50%	14%
Turn Type	Perm	NA	NA	Perm	Prot	
Protected Phases		2	6		4	
Permitted Phases	2			6		
Actuated Green, G (s)	24.0	24.0	24.0	24.0	24.0	
Effective Green, g (s)	24.0	24.0	24.0	24.0	24.0	
Actuated g/C Ratio	0.40	0.40	0.40	0.40	0.40	
Clearance Time (s)	6.2	6.2	6.2	6.2	6.0	
Vehicle Extension (s)	5.0	5.0	5.0	5.0	5.0	
Lane Grp Cap (vph)	222	765	765	397	493	
v/s Ratio Prot		c0.28	0.26		c0.05	
v/s Ratio Perm	0.02			0.02		
v/c Ratio	0.05	0.69	0.66	0.05	0.13	
Uniform Delay, d1	11.1	15.0	14.8	11.1	11.5	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.4	5.1	4.4	0.2	0.6	
Delay (s)	11.5	20.2	19.2	11.3	12.1	
Level of Service	B	C	B	B	B	
Approach Delay (s)		20.0	18.6		12.1	
Approach LOS		C	B		B	

Intersection Summary				
HCM 2000 Control Delay	18.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.41		
Actuated Cycle Length (s)	60.2	Sum of lost time (s)	12.2
Intersection Capacity Utilization	48.1%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations										
Traffic Volume (vph)	115	241	136	146	243	34	216	1486	60	1214
Future Volume (vph)	115	241	136	146	243	34	216	1486	60	1214
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	pm+pt	NA
Protected Phases	7	4		3	8		5	2	1	6
Permitted Phases	4		4	8		8	2		6	
Detector Phase	7	4	4	3	8	8	5	2	1	6
Switch Phase										
Minimum Initial (s)	7.0	10.0	10.0	7.0	10.0	10.0	7.0	20.0	7.0	20.0
Minimum Split (s)	10.0	17.9	17.9	10.0	17.9	17.9	10.0	44.4	10.0	44.4
Total Split (s)	10.0	31.9	31.9	10.0	31.9	31.9	13.0	74.4	13.0	74.4
Total Split (%)	7.7%	24.7%	24.7%	7.7%	24.7%	24.7%	10.1%	57.5%	10.1%	57.5%
Yellow Time (s)	3.0	4.5	4.5	3.0	4.5	4.5	3.0	5.0	3.0	5.0
All-Red Time (s)	0.0	2.4	2.4	0.0	2.4	2.4	0.0	2.4	0.0	2.4
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	3.0	6.9	6.9	3.0	6.9	6.9	3.0	7.4	3.0	7.4
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes				Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	C-Max	None	C-Max
Act Effct Green (s)	33.6	22.7	22.7	33.6	22.7	22.7	85.9	73.4	79.2	67.0
Actuated g/C Ratio	0.26	0.18	0.18	0.26	0.18	0.18	0.66	0.57	0.61	0.52
v/c Ratio	0.56	0.85	0.41	0.73	0.82	0.10	0.93	0.84	0.41	0.78
Control Delay	46.5	76.6	10.8	59.7	72.1	0.6	68.0	29.4	19.5	29.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	46.5	76.6	10.8	59.7	72.1	0.6	68.0	29.4	19.5	29.2
LOS	D	E	B	E	E	A	E	C	B	C
Approach Delay		51.4			62.2			34.0		28.7
Approach LOS		D			E			C		C

Intersection Summary		
Cycle Length: 129.3		
Actuated Cycle Length: 129.3		
Offset: 85 (66%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green		
Natural Cycle: 95		
Control Type: Actuated-Coordinated		
Maximum v/c Ratio: 0.93		
Intersection Signal Delay: 37.2	Intersection LOS: D	
Intersection Capacity Utilization 93.2%	ICU Level of Service F	
Analysis Period (min) 15		

Splits and Phases: 1: Hurontario Street (Hwy 10) & Charleston Sideroad (RR 24)



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	120	251	142	152	253	35	225	1694	63	1348
v/c Ratio	0.56	0.85	0.41	0.73	0.82	0.10	0.93	0.84	0.41	0.78
Control Delay	46.5	76.6	10.8	59.7	72.1	0.6	68.0	29.4	19.5	29.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	46.5	76.6	10.8	59.7	72.1	0.6	68.0	29.4	19.5	29.2
Queue Length 50th (m)	23.0	61.3	0.0	29.9	61.4	0.0	~36.7	192.6	5.4	141.2
Queue Length 95th (m)	38.9	#99.0	17.6	#52.9	#96.2	0.0	#90.0	#245.5	14.1	170.5
Internal Link Dist (m)		1351.4			575.0			764.6		536.2
Turn Bay Length (m)	80.0		65.0	40.0		55.0	85.0		40.0	
Base Capacity (vph)	215	325	364	207	340	372	241	2006	181	1721
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.56	0.77	0.39	0.73	0.74	0.09	0.93	0.84	0.35	0.78

Intersection Summary
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

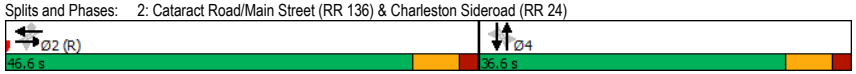
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	115	241	136	146	243	34	216	1486	140	60	1214	80
Future Volume (vph)	115	241	136	146	243	34	216	1486	140	60	1214	80
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.9	6.9	3.0	6.9	6.9	3.0	7.4		3.0	7.4	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00	0.98	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99		1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1737	1685	1294	1658	1762	1557	1573	3524		1615	3313	
Flt Permitted	0.32	1.00	1.00	0.33	1.00	1.00	0.10	1.00		0.06	1.00	
Satd. Flow (perm)	590	1685	1294	572	1762	1557	162	3524		101	3313	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	120	251	142	152	253	35	225	1548	146	62	1265	83
RTOR Reduction (vph)	0	0	117	0	0	29	0	5	0	0	4	0
Lane Group Flow (vph)	120	251	25	152	253	6	225	1689	0	63	1344	0
Confl. Peds. (#/hr)	5		4	4		5	2		3	3		2
Confl. Bikes (#/hr)			1			1			1			1
Heavy Vehicles (%)	5%	14%	24%	10%	9%	3%	16%	2%	2%	13%	9%	9%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8		8	2			6		
Actuated Green, G (s)	29.7	22.7	22.7	29.7	22.7	22.7	82.3	72.9		73.4	67.0	
Effective Green, g (s)	29.7	22.7	22.7	29.7	22.7	22.7	82.3	72.9		73.4	67.0	
Actuated g/C Ratio	0.23	0.18	0.18	0.23	0.18	0.18	0.64	0.56		0.57	0.52	
Clearance Time (s)	3.0	6.9	6.9	3.0	6.9	6.9	3.0	7.4		3.0	7.4	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	4.4		3.0	4.4	
Lane Grp Cap (vph)	197	295	227	190	309	273	237	1986		132	1716	
v/s Ratio Prot	0.03	c0.15		c0.04	0.14		c0.09	0.48		0.02	0.41	
v/s Ratio Perm	0.11		0.02	0.14		0.00	c0.51			0.25		
v/c Ratio	0.61	0.85	0.11	0.80	0.82	0.02	0.95	0.85		0.48	0.78	
Uniform Delay, d1	42.2	51.7	44.8	45.8	51.3	44.1	30.9	23.6		21.5	25.3	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	5.3	20.3	0.2	20.9	15.4	0.0	44.0	4.8		2.7	3.7	
Delay (s)	47.4	72.0	45.0	66.7	66.7	44.2	74.8	28.4		24.2	28.9	
Level of Service	D	E	D	E	E	D	E	C		C	C	
Approach Delay (s)		58.8			64.9			33.9			28.7	
Approach LOS		E			E			C			C	

Intersection Summary				
HCM 2000 Control Delay	38.3	HCM 2000 Level of Service	D	
HCM 2000 Volume to Capacity ratio	0.94			
Actuated Cycle Length (s)	129.3	Sum of lost time (s)	20.3	
Intersection Capacity Utilization	93.2%	ICU Level of Service	F	
Analysis Period (min)	15			
c Critical Lane Group				

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	49	367	6	341	51	3	8	55	12
Future Volume (vph)	49	367	6	341	51	3	8	55	12
Turn Type	Perm	NA	Perm	NA	Perm	Perm	NA	Perm	NA
Protected Phases		2		2			4		4
Permitted Phases	2		2		2	4		4	
Detector Phase	2	2	2	2	2	4	4	4	4
Switch Phase									
Minimum Initial (s)	20.0	20.0	20.0	20.0	20.0	16.0	16.0	16.0	16.0
Minimum Split (s)	30.6	30.6	30.6	30.6	30.6	30.6	30.6	30.6	30.6
Total Split (s)	46.6	46.6	46.6	46.6	46.6	36.6	36.6	36.6	36.6
Total Split (%)	56.0%	56.0%	56.0%	56.0%	56.0%	44.0%	44.0%	44.0%	44.0%
Yellow Time (s)	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.6	6.6	6.6	6.6	6.6	6.6	6.6	6.6	6.6
Lead/Lag									
Lead-Lag Optimize?									
Recall Mode	C-Min	C-Min	C-Min	C-Min	C-Min	None	None	None	None
Act Effct Green (s)	59.8	59.8	59.8	59.8	59.8	16.0	16.0	16.0	16.0
Actuated g/C Ratio	0.72	0.72	0.72	0.72	0.72	0.19	0.19	0.19	0.19
v/c Ratio	0.07	0.34	0.01	0.30	0.05	0.01	0.04	0.21	0.16
Control Delay	5.7	7.1	5.3	6.8	1.7	27.7	22.4	30.6	13.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	5.7	7.1	5.3	6.8	1.7	27.7	22.4	30.6	13.7
LOS	A	A	A	A	A	C	C	C	B
Approach Delay		6.9		6.1			23.4		22.3
Approach LOS		A		A			C		C

Intersection Summary		
Cycle Length: 83.2		
Actuated Cycle Length: 83.2		
Offset: 22.5 (27%), Referenced to phase 2:EBWB and 6:, Start of Green		
Natural Cycle: 65		
Control Type: Actuated-Coordinated		
Maximum v/c Ratio: 0.34		
Intersection Signal Delay: 8.6	Intersection LOS: A	
Intersection Capacity Utilization 65.1%	ICU Level of Service C	
Analysis Period (min) 15		

Splits and Phases: 2: Cataract Road/Main Street (RR 136) & Charleston Sideroad (RR 24)



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	51	390	6	355	53	3	13	57	55
v/c Ratio	0.07	0.34	0.01	0.30	0.05	0.01	0.04	0.21	0.16
Control Delay	5.7	7.1	5.3	6.8	1.7	27.7	22.4	30.6	13.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	5.7	7.1	5.3	6.8	1.7	27.7	22.4	30.6	13.7
Queue Length 50th (m)	2.6	25.1	0.3	22.2	0.0	0.4	1.1	7.7	1.7
Queue Length 95th (m)	6.3	40.1	1.5	35.5	3.4	2.6	5.6	17.7	10.9
Internal Link Dist (m)		750.9		2789.4			883.0		1179.5
Turn Bay Length (m)	125.0		60.0		90.0	70.0		85.0	
Base Capacity (vph)	758	1152	727	1180	1144	442	655	518	621
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.07	0.34	0.01	0.30	0.05	0.01	0.02	0.11	0.09

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	49	367	8	6	341	51	3	8	5	55	12	40
Future Volume (vph)	49	367	8	6	341	51	3	8	5	55	12	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.6	6.6		6.6	6.6	6.6	6.6	6.6		6.6	6.6	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00		1.00	1.00	0.85	1.00	0.94		1.00	0.89	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1825	1601		1825	1642	1570	1615	1810		1825	1651	
Flt Permitted	0.55	1.00		0.53	1.00	1.00	0.72	1.00		0.75	1.00	
Satd. Flow (perm)	1054	1601		1010	1642	1570	1226	1810		1439	1651	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	51	382	8	6	355	53	3	8	5	57	12	42
RTOR Reduction (vph)	0	1	0	0	0	17	0	4	0	0	36	0
Lane Group Flow (vph)	51	389	0	6	355	36	3	9	0	57	19	0
Heavy Vehicles (%)	0%	20%	0%	0%	17%	4%	13%	0%	0%	0%	0%	4%
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		2			2			4			4	
Permitted Phases	2			2		2	4			4		
Actuated Green, G (s)	57.2	57.2		57.2	57.2	57.2	12.8	12.8		12.8	12.8	
Effective Green, g (s)	57.2	57.2		57.2	57.2	57.2	12.8	12.8		12.8	12.8	
Actuated g/C Ratio	0.69	0.69		0.69	0.69	0.69	0.15	0.15		0.15	0.15	
Clearance Time (s)	6.6	6.6		6.6	6.6	6.6	6.6	6.6		6.6	6.6	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	724	1100		694	1128	1079	188	278		221	254	
v/s Ratio Prot		c0.24			0.22			0.00			0.01	
v/s Ratio Perm	0.05			0.01		0.02	0.00			c0.04		
v/c Ratio	0.07	0.35		0.01	0.31	0.03	0.02	0.03		0.26	0.08	
Uniform Delay, d1	4.3	5.4		4.1	5.2	4.2	29.9	29.9		31.0	30.1	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.2	0.9		0.0	0.7	0.1	0.0	0.0		0.6	0.1	
Delay (s)	4.5	6.3		4.1	5.9	4.2	29.9	30.0		31.6	30.3	
Level of Service	A	A		A	A	A	C	C		C	C	
Approach Delay (s)		6.1			5.7			30.0			31.0	
Approach LOS		A			A			C			C	

Intersection Summary					
HCM 2000 Control Delay	9.1	HCM 2000 Level of Service		A	
HCM 2000 Volume to Capacity ratio	0.34				
Actuated Cycle Length (s)	83.2	Sum of lost time (s)		13.2	
Intersection Capacity Utilization	65.1%	ICU Level of Service		C	
Analysis Period (min)	15				
c Critical Lane Group					

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	8	367	8	8	362	8	7	11	11	16	4	17
Future Volume (Veh/h)	8	367	8	8	362	8	7	11	11	16	4	17
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	9	390	9	9	385	9	7	12	12	17	4	18
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	394			399			836	824	394	834	824	390
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	394			399			836	824	394	834	824	390
tC, single (s)	4.2			4.2			7.3	6.5	6.3	7.1	6.5	6.3
tC, 2 stage (s)												
tF (s)	2.3			2.3			3.7	4.0	3.4	3.5	4.0	3.4
p0 queue free %	99			99			97	96	98	94	99	97
cM capacity (veh/h)	1122			1093			254	305	637	273	305	635

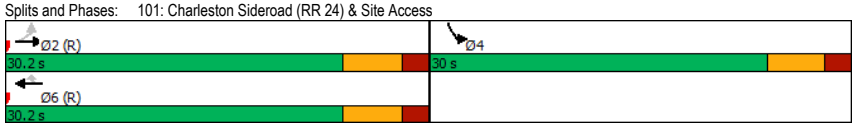
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	9	399	9	394	31	39
Volume Left	9	0	9	0	7	17
Volume Right	0	9	0	9	12	18
cSH	1122	1700	1093	1700	362	376
Volume to Capacity	0.01	0.23	0.01	0.23	0.09	0.10
Queue Length 95th (m)	0.2	0.0	0.2	0.0	2.1	2.6
Control Delay (s)	8.2	0.0	8.3	0.0	15.9	15.7
Lane LOS	A		A		C	C
Approach Delay (s)	0.2		0.2		15.9	15.7
Approach LOS					C	C

Intersection Summary				
Average Delay	1.4			
Intersection Capacity Utilization	30.2%	ICU Level of Service	A	
Analysis Period (min)	15			

Lane Group	EBL	EBT	WBT	WBR	SBL
Lane Configurations					
Traffic Volume (vph)	1	395	358	29	29
Future Volume (vph)	1	395	358	29	29
Turn Type	Perm	NA	NA	Perm	Prot
Protected Phases		2	6		4
Permitted Phases	2			6	
Detector Phase	2	2	6	6	4
Switch Phase					
Minimum Initial (s)	12.0	12.0	12.0	12.0	12.0
Minimum Split (s)	30.2	30.2	30.2	30.2	30.0
Total Split (s)	30.2	30.2	30.2	30.2	30.0
Total Split (%)	50.2%	50.2%	50.2%	50.2%	49.8%
Yellow Time (s)	4.2	4.2	4.2	4.2	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.2	6.2	6.2	6.2	6.0
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	C-Max	C-Max	C-Max	C-Max	Max
Act Effct Green (s)	24.0	24.0	24.0	24.0	24.0
Actuated g/C Ratio	0.40	0.40	0.40	0.40	0.40
v/c Ratio	0.01	0.52	0.47	0.08	0.08
Control Delay	11.0	16.7	15.9	5.6	11.8
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	11.0	16.7	15.9	5.6	11.8
LOS	B	B	B	A	B
Approach Delay		16.7	15.1		11.8
Approach LOS		B	B		B

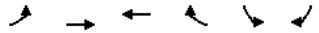
Intersection Summary		
Cycle Length: 60.2		
Actuated Cycle Length: 60.2		
Offset: 33 (55%), Referenced to phase 2:EBTL and 6:WBT, Start of Green		
Natural Cycle: 65		
Control Type: Actuated-Coordinated		
Maximum v/c Ratio: 0.52		
Intersection Signal Delay: 15.8	Intersection LOS: B	
Intersection Capacity Utilization 41.0%	ICU Level of Service A	
Analysis Period (min) 15		

Splits and Phases: 101: Charleston Sideroad (RR 24) & Site Access



Lane Group	EBL	EBT	WBT	WBR	SBL
Lane Group Flow (vph)	1	395	358	29	30
v/c Ratio	0.01	0.52	0.47	0.08	0.08
Control Delay	11.0	16.7	15.9	5.6	11.8
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	11.0	16.7	15.9	5.6	11.8
Queue Length 50th (m)	0.1	31.7	28.1	0.0	1.9
Queue Length 95th (m)	0.9	53.4	47.9	4.1	6.3
Internal Link Dist (m)		610.5	750.9		106.2
Turn Bay Length (m)	130.0			75.0	
Base Capacity (vph)	185	765	765	342	364
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	0.01	0.52	0.47	0.08	0.08

Intersection Summary



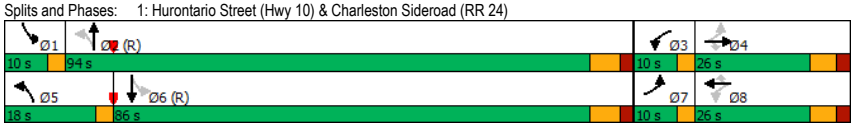
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	1	395	358	29	29	1
Future Volume (vph)	1	395	358	29	29	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.2	6.2	6.2	6.2	6.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	1.00	0.85	1.00	
Flt Protected	0.95	1.00	1.00	1.00	0.95	
Satd. Flow (prot)	913	1921	1921	816	912	
Flt Permitted	0.48	1.00	1.00	1.00	0.95	
Satd. Flow (perm)	465	1921	1921	816	912	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	0.92
Adj. Flow (vph)	1	395	358	29	29	1
RTOR Reduction (vph)	0	0	0	17	1	0
Lane Group Flow (vph)	1	395	358	12	29	0
Heavy Vehicles (%)	100%	0%	0%	100%	100%	100%
Turn Type	Perm	NA	NA	Perm	Prot	
Protected Phases		2	6		4	
Permitted Phases	2			6		
Actuated Green, G (s)	24.0	24.0	24.0	24.0	24.0	
Effective Green, g (s)	24.0	24.0	24.0	24.0	24.0	
Actuated g/C Ratio	0.40	0.40	0.40	0.40	0.40	
Clearance Time (s)	6.2	6.2	6.2	6.2	6.0	
Vehicle Extension (s)	5.0	5.0	5.0	5.0	5.0	
Lane Grp Cap (vph)	185	765	765	325	363	
v/s Ratio Prot		c0.21	0.19		c0.03	
v/s Ratio Perm	0.00			0.01		
v/c Ratio	0.01	0.52	0.47	0.04	0.08	
Uniform Delay, d1	10.9	13.7	13.4	11.0	11.2	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.1	2.5	2.1	0.2	0.4	
Delay (s)	11.0	16.2	15.4	11.2	11.7	
Level of Service	B	B	B	B	B	
Approach Delay (s)		16.2	15.1		11.7	
Approach LOS		B	B		B	

Intersection Summary				
HCM 2000 Control Delay	15.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.30		
Actuated Cycle Length (s)	60.2	Sum of lost time (s)	12.2
Intersection Capacity Utilization	41.0%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations										
Traffic Volume (vph)	64	170	250	124	199	31	174	1047	59	1825
Future Volume (vph)	64	170	250	124	199	31	174	1047	59	1825
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	pm+pt	NA
Protected Phases	7	4		3	8		5	2	1	6
Permitted Phases	4		4	8		8	2		6	
Detector Phase	7	4	4	3	8	8	5	2	1	6
Switch Phase										
Minimum Initial (s)	7.0	10.0	10.0	7.0	10.0	10.0	7.0	20.0	7.0	20.0
Minimum Split (s)	10.0	17.9	17.9	10.0	17.9	17.9	10.0	44.4	10.0	44.4
Total Split (s)	10.0	26.0	26.0	10.0	26.0	26.0	18.0	94.0	10.0	86.0
Total Split (%)	7.1%	18.6%	18.6%	7.1%	18.6%	18.6%	12.9%	67.1%	7.1%	61.4%
Yellow Time (s)	3.0	4.5	4.5	3.0	4.5	4.5	3.0	5.0	3.0	5.0
All-Red Time (s)	0.0	2.4	2.4	0.0	2.4	2.4	0.0	2.4	0.0	2.4
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	3.0	6.9	6.9	3.0	6.9	6.9	3.0	7.4	3.0	7.4
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes				Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	C-Max	None	C-Max
Act Effct Green (s)	29.2	18.3	18.3	29.8	20.3	20.3	101.8	89.4	90.9	79.5
Actuated g/C Ratio	0.21	0.13	0.13	0.21	0.14	0.14	0.73	0.64	0.65	0.57
v/c Ratio	0.36	0.87	0.83	0.63	0.85	0.11	0.95	0.60	0.24	0.99
Control Delay	48.9	96.4	45.0	60.6	88.0	0.8	92.4	16.9	8.4	47.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	48.9	96.4	45.0	60.6	88.0	0.8	92.4	16.9	8.4	47.5
LOS	D	F	D	E	F	A	F	B	A	D
Approach Delay		63.6			70.7			26.9		46.4
Approach LOS		E			E			C		D

Intersection Summary		
Cycle Length: 140		
Actuated Cycle Length: 140		
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green		
Natural Cycle: 135		
Control Type: Actuated-Coordinated		
Maximum v/c Ratio: 0.99		
Intersection Signal Delay: 44.3	Intersection LOS: D	
Intersection Capacity Utilization 97.0%	ICU Level of Service F	
Analysis Period (min) 15		

Splits and Phases: 1: Hurontario Street (Hwy 10) & Charleston Sideroad (RR 24)



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	67	179	263	131	209	33	183	1199	62	1989
v/c Ratio	0.36	0.87	0.83	0.63	0.85	0.11	0.95	0.60	0.24	0.99
Control Delay	48.9	96.4	45.0	60.6	88.0	0.8	92.4	16.9	8.4	47.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	48.9	96.4	45.0	60.6	88.0	0.8	92.4	16.9	8.4	47.5
Queue Length 50th (m)	14.9	49.0	28.5	30.2	57.8	0.0	37.9	101.9	4.5	278.7
Queue Length 95th (m)	28.1	#88.8	#72.1	48.9	#104.0	0.0	#84.8	123.0	8.7	#341.8
Internal Link Dist (m)		1351.4			575.0			764.6		536.2
Turn Bay Length (m)	80.0		65.0	40.0		55.0	85.0		40.0	
Base Capacity (vph)	186	214	323	208	245	287	193	1984	261	2012
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.36	0.84	0.81	0.63	0.85	0.11	0.95	0.60	0.24	0.99

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

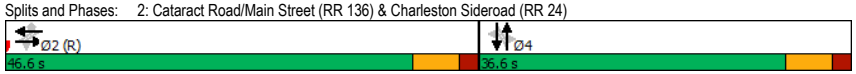
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	64	170	250	124	199	31	174	1047	92	59	1825	65
Future Volume (vph)	64	170	250	124	199	31	174	1047	92	59	1825	65
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.9	6.9	3.0	6.9	6.9	3.0	7.4		3.0	7.4	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99		1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1644	1575	1361	1772	1700	1372	1393	3100		1472	3542	
Flt Permitted	0.38	1.00	1.00	0.39	1.00	1.00	0.05	1.00		0.20	1.00	
Satd. Flow (perm)	659	1575	1361	736	1700	1372	72	3100		312	3542	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	67	179	263	131	209	33	183	1102	97	62	1921	68
RTOR Reduction (vph)	0	0	138	0	0	28	0	4	0	0	2	0
Lane Group Flow (vph)	67	179	125	131	209	5	183	1195	0	62	1987	0
Heavy Vehicles (%)	11%	22%	20%	3%	13%	19%	31%	16%	20%	24%	2%	17%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8		8	2			6		
Actuated Green, G (s)	24.5	18.9	18.9	27.3	20.3	20.3	96.8	88.2		84.4	78.8	
Effective Green, g (s)	24.5	18.9	18.9	27.3	20.3	20.3	96.8	88.2		84.4	78.8	
Actuated g/C Ratio	0.18	0.13	0.13	0.20	0.15	0.15	0.69	0.63		0.60	0.56	
Clearance Time (s)	3.0	6.9	6.9	3.0	6.9	6.9	3.0	7.4		3.0	7.4	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	4.4		3.0	4.4	
Lane Grp Cap (vph)	154	212	183	195	246	198	191	1953		234	1993	
v/s Ratio Prot	0.02	0.11		c0.03	c0.12		c0.10	0.39		0.01	c0.56	
v/s Ratio Perm	0.06		0.09	0.10		0.00	0.56			0.15		
v/c Ratio	0.44	0.84	0.68	0.67	0.85	0.02	0.96	0.61		0.26	1.00	
Uniform Delay, d1	49.9	59.1	57.7	50.9	58.4	51.4	50.1	15.6		12.1	30.5	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	2.0	25.2	10.0	8.8	23.0	0.0	52.4	1.4		0.6	19.5	
Delay (s)	51.8	84.3	67.6	59.7	81.3	51.4	102.6	17.0		12.7	50.0	
Level of Service	D	F	E	E	F	D	F	B		B	D	
Approach Delay (s)		71.4			71.1			28.4			48.9	
Approach LOS		E			E			C			D	

Intersection Summary				
HCM 2000 Control Delay	46.9	HCM 2000 Level of Service	D	
HCM 2000 Volume to Capacity ratio	0.96			
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	20.3	
Intersection Capacity Utilization	97.0%	ICU Level of Service	F	
Analysis Period (min)	15			
c Critical Lane Group				

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	39	404	6	378	43	6	7	52	10
Future Volume (vph)	39	404	6	378	43	6	7	52	10
Turn Type	Perm	NA	Perm	NA	Perm	Perm	NA	Perm	NA
Protected Phases		2		2			4		4
Permitted Phases	2		2		2	4		4	
Detector Phase	2	2	2	2	2	4	4	4	4
Switch Phase									
Minimum Initial (s)	20.0	20.0	20.0	20.0	20.0	16.0	16.0	16.0	16.0
Minimum Split (s)	30.6	30.6	30.6	30.6	30.6	30.6	30.6	30.6	30.6
Total Split (s)	46.6	46.6	46.6	46.6	46.6	36.6	36.6	36.6	36.6
Total Split (%)	56.0%	56.0%	56.0%	56.0%	56.0%	44.0%	44.0%	44.0%	44.0%
Yellow Time (s)	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.6	6.6	6.6	6.6	6.6	6.6	6.6	6.6	6.6
Lead/Lag									
Lead-Lag Optimize?									
Recall Mode	C-Min	C-Min	C-Min	C-Min	C-Min	None	None	None	None
Act Effct Green (s)	59.8	59.8	59.8	59.8	59.8	16.0	16.0	16.0	16.0
Actuated g/C Ratio	0.72	0.72	0.72	0.72	0.72	0.19	0.19	0.19	0.19
v/c Ratio	0.06	0.36	0.01	0.36	0.04	0.02	0.05	0.20	0.16
Control Delay	5.6	7.3	5.3	7.4	1.7	27.7	18.7	30.4	12.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	5.6	7.3	5.3	7.4	1.7	27.7	18.7	30.4	12.6
LOS	A	A	A	A	A	C	B	C	B
Approach Delay		7.2		6.8			20.9		21.4
Approach LOS		A		A			C		C

Intersection Summary			
Cycle Length: 83.2			
Actuated Cycle Length: 83.2			
Offset: 22.5 (27%), Referenced to phase 2:EBWB and 6:, Start of Green			
Natural Cycle: 65			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.36			
Intersection Signal Delay: 8.9		Intersection LOS: A	
Intersection Capacity Utilization 63.2%		ICU Level of Service B	
Analysis Period (min) 15			

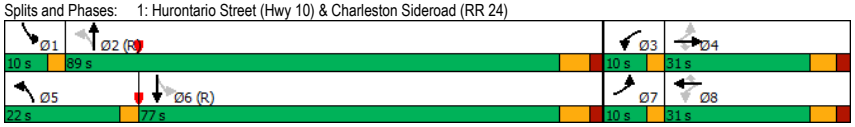
Splits and Phases: 2: Cataract Road/Main Street (RR 136) & Charleston Sideroad (RR 24)



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations										
Traffic Volume (vph)	94	273	192	113	289	84	224	1844	52	1139
Future Volume (vph)	94	273	192	113	289	84	224	1844	52	1139
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	pm+pt	NA
Protected Phases	7	4		3	8		5	2	1	6
Permitted Phases	4		4	8		8	2		6	
Detector Phase	7	4	4	3	8	8	5	2	1	6
Switch Phase										
Minimum Initial (s)	7.0	10.0	10.0	7.0	10.0	10.0	7.0	20.0	7.0	20.0
Minimum Split (s)	10.0	17.9	17.9	10.0	17.9	17.9	10.0	44.4	10.0	44.4
Total Split (s)	10.0	31.0	31.0	10.0	31.0	31.0	22.0	89.0	10.0	77.0
Total Split (%)	7.1%	22.1%	22.1%	7.1%	22.1%	22.1%	15.7%	63.6%	7.1%	55.0%
Yellow Time (s)	3.0	4.5	4.5	3.0	4.5	4.5	3.0	5.0	3.0	5.0
All-Red Time (s)	0.0	2.4	2.4	0.0	2.4	2.4	0.0	2.4	0.0	2.4
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	3.0	6.9	6.9	3.0	6.9	6.9	3.0	7.4	3.0	7.4
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes				Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	C-Max	None	C-Max
Act Effct Green (s)	35.0	24.1	24.1	35.0	24.1	24.1	96.0	83.6	84.4	73.0
Actuated g/C Ratio	0.25	0.17	0.17	0.25	0.17	0.17	0.69	0.60	0.60	0.52
v/c Ratio	0.66	0.99	0.51	0.75	1.00	0.25	0.81	0.99	0.42	0.73
Control Delay	61.6	107.5	11.1	71.1	109.7	7.8	41.0	46.6	24.7	29.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	61.6	107.5	11.1	71.1	109.7	7.8	41.0	46.6	24.7	29.6
LOS	E	F	B	E	F	A	D	D	C	C
Approach Delay		66.7			83.1			46.1		29.4
Approach LOS		E			F			D		C

Intersection Summary		
Cycle Length: 140		
Actuated Cycle Length: 140		
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green		
Natural Cycle: 145		
Control Type: Actuated-Coordinated		
Maximum v/c Ratio: 1.00		
Intersection Signal Delay: 47.9	Intersection LOS: D	
Intersection Capacity Utilization 104.2%	ICU Level of Service G	
Analysis Period (min) 15		

Splits and Phases: 1: Hurontario Street (Hwy 10) & Charleston Sideroad (RR 24)



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	99	287	202	119	304	88	236	2101	55	1271
v/c Ratio	0.66	0.99	0.51	0.75	1.00	0.25	0.81	0.99	0.42	0.73
Control Delay	61.6	107.5	11.1	71.1	109.7	7.8	41.0	46.6	24.7	29.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	61.6	107.5	11.1	71.1	109.7	7.8	41.0	46.6	24.7	29.6
Queue Length 50th (m)	21.3	80.3	0.0	26.0	~85.5	0.0	29.8	~323.0	4.6	142.2
Queue Length 95th (m)	#40.4	#137.9	22.4	#52.7	#145.0	10.8	#60.8	#364.1	14.4	175.0
Internal Link Dist (m)		1351.4			575.0			764.6		536.2
Turn Bay Length (m)	80.0		65.0	40.0		55.0	85.0		40.0	
Base Capacity (vph)	151	290	400	158	303	351	325	2112	132	1731
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.66	0.99	0.51	0.75	1.00	0.25	0.73	0.99	0.42	0.73

Intersection Summary
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

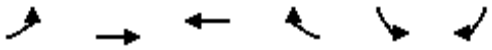
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	94	273	192	113	289	84	224	1844	152	52	1139	68
Future Volume (vph)	94	273	192	113	289	84	224	1844	152	52	1139	68
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.9	6.9	3.0	6.9	6.9	3.0	7.4		3.0	7.4	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00	0.98	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99		1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1737	1685	1358	1658	1762	1543	1601	3530		1615	3314	
Flt Permitted	0.18	1.00	1.00	0.22	1.00	1.00	0.12	1.00		0.05	1.00	
Satd. Flow (perm)	325	1685	1358	381	1762	1543	198	3530		93	3314	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	99	287	202	119	304	88	236	1941	160	55	1199	72
RTOR Reduction (vph)	0	0	167	0	0	73	0	4	0	0	3	0
Lane Group Flow (vph)	99	287	35	119	304	15	236	2097	0	55	1268	0
Confl. Peds. (#/hr)	5		6	6		5	7		5	5		7
Heavy Vehicles (%)	5%	14%	18%	10%	9%	4%	14%	2%	2%	13%	9%	9%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8		8	2			6		
Actuated Green, G (s)	31.1	24.1	24.1	31.1	24.1	24.1	91.6	83.0		78.6	73.0	
Effective Green, g (s)	31.1	24.1	24.1	31.1	24.1	24.1	91.6	83.0		78.6	73.0	
Actuated g/C Ratio	0.22	0.17	0.17	0.22	0.17	0.17	0.65	0.59		0.56	0.52	
Clearance Time (s)	3.0	6.9	6.9	3.0	6.9	6.9	3.0	7.4		3.0	7.4	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	4.4		3.0	4.4	
Lane Grp Cap (vph)	142	290	233	148	303	265	285	2092		113	1728	
v/s Ratio Prot	0.03	0.17		c0.04	c0.17		c0.09	c0.59		0.02	0.38	
v/s Ratio Perm	0.12		0.03	0.14		0.01	0.45			0.25		
v/c Ratio	0.70	0.99	0.15	0.80	1.00	0.06	0.83	1.00		0.49	0.73	
Uniform Delay, d1	46.0	57.8	49.2	48.9	58.0	48.5	26.3	28.5		31.5	26.0	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	13.9	49.5	0.3	26.2	52.5	0.1	17.6	20.2		3.3	2.8	
Delay (s)	59.9	107.3	49.5	75.0	110.5	48.5	43.9	48.7		34.8	28.8	
Level of Service	E	F	D	E	F	D	D	D		C	C	
Approach Delay (s)		79.5			91.6			48.3			29.0	
Approach LOS		E			F			D			C	

Intersection Summary					
HCM 2000 Control Delay	51.4	HCM 2000 Level of Service		D	
HCM 2000 Volume to Capacity ratio	0.99				
Actuated Cycle Length (s)	140.0	Sum of lost time (s)		20.3	
Intersection Capacity Utilization	104.2%	ICU Level of Service		G	
Analysis Period (min)	15				

c Critical Lane Group

APPENDIX K4

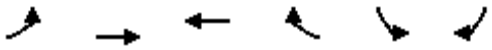
Unsignalized Site Access



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	5	417	390	40	53	7
Future Volume (Veh/h)	5	417	390	40	53	7
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	5	417	390	40	53	7
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	430				817	390
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	430				817	390
tC, single (s)	4.3				7.2	6.5
tC, 2 stage (s)						
tF (s)	2.4				4.2	3.6
p0 queue free %	100				79	99
cM capacity (veh/h)	1040				257	603

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1
Volume Total	5	417	390	40	60
Volume Left	5	0	0	0	53
Volume Right	0	0	0	40	7
cSH	1040	1700	1700	1700	275
Volume to Capacity	0.00	0.25	0.23	0.02	0.22
Queue Length 95th (m)	0.1	0.0	0.0	0.0	6.2
Control Delay (s)	8.5	0.0	0.0	0.0	21.7
Lane LOS	A				C
Approach Delay (s)	0.1		0.0		21.7
Approach LOS					C

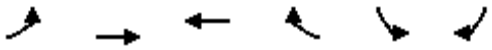
Intersection Summary			
Average Delay	1.5		
Intersection Capacity Utilization	32.0%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	10	531	505	45	58	7
Future Volume (Veh/h)	10	531	505	45	58	7
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	0.92	1.00
Hourly flow rate (vph)	10	531	505	45	63	7
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	550				1056	505
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	550				1056	505
tC, single (s)	4.2				6.9	6.3
tC, 2 stage (s)						
tF (s)	2.3				4.0	3.4
p0 queue free %	99				69	99
cM capacity (veh/h)	981				201	544

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1
Volume Total	10	531	505	45	70
Volume Left	10	0	0	0	63
Volume Right	0	0	0	45	7
cSH	981	1700	1700	1700	215
Volume to Capacity	0.01	0.31	0.30	0.03	0.33
Queue Length 95th (m)	0.2	0.0	0.0	0.0	10.3
Control Delay (s)	8.7	0.0	0.0	0.0	29.7
Lane LOS	A				D
Approach Delay (s)	0.2		0.0		29.7
Approach LOS					D

Intersection Summary			
Average Delay	1.9		
Intersection Capacity Utilization	38.3%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	1	395	358	29	29	1
Future Volume (Veh/h)	1	395	358	29	29	1
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	0.92
Hourly flow rate (vph)	1	395	358	29	29	1
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	387				755	358
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	387				755	358
tC, single (s)	5.1				7.4	7.2
tC, 2 stage (s)						
tF (s)	3.1				4.4	4.2
p0 queue free %	100				89	100
cM capacity (veh/h)	789				265	512

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1
Volume Total	1	395	358	29	30
Volume Left	1	0	0	0	29
Volume Right	0	0	0	29	1
cSH	789	1700	1700	1700	269
Volume to Capacity	0.00	0.23	0.21	0.02	0.11
Queue Length 95th (m)	0.0	0.0	0.0	0.0	2.8
Control Delay (s)	9.6	0.0	0.0	0.0	20.0
Lane LOS	A				C
Approach Delay (s)	0.0		0.0		20.0
Approach LOS					C

Intersection Summary			
Average Delay	0.8		
Intersection Capacity Utilization	30.8%	ICU Level of Service	A
Analysis Period (min)	15		

APPENDIX L

SimTraffic Queueing Analysis Reports

Summary of All Intervals

Run Number	1	2	3	4	5	6	7
Start Time	6:50	6:50	6:50	6:50	6:50	6:50	6:50
End Time	8:00	8:00	8:00	8:00	8:00	8:00	8:00
Total Time (min)	70	70	70	70	70	70	70
Time Recorded (min)	60	60	60	60	60	60	60
# of Intervals	2	2	2	2	2	2	2
# of Recorded Intervals	1	1	1	1	1	1	1
Vehs Entered	3404	3439	3503	3437	3433	3497	3456
Vehs Exited	3404	3444	3492	3453	3411	3501	3469
Starting Vehs	174	202	178	206	165	195	208
Ending Vehs	174	197	189	190	187	191	195
Travel Distance (km)	8687	8935	8901	9021	9007	9056	8990
Travel Time (hr)	184.4	191.8	192.1	192.3	191.0	194.0	192.3
Total Delay (hr)	35.5	38.7	39.2	38.3	37.4	38.9	38.3
Total Stops	2300	2348	2475	2340	2371	2418	2354
Fuel Used (l)	617.1	638.5	637.8	642.4	644.3	650.1	645.1

Summary of All Intervals

Run Number	8	9	10	Avg
Start Time	6:50	6:50	6:50	6:50
End Time	8:00	8:00	8:00	8:00
Total Time (min)	70	70	70	70
Time Recorded (min)	60	60	60	60
# of Intervals	2	2	2	2
# of Recorded Intervals	1	1	1	1
Vehs Entered	3408	3544	3503	3462
Vehs Exited	3426	3525	3479	3460
Starting Vehs	202	187	176	188
Ending Vehs	184	206	200	189
Travel Distance (km)	9030	9128	9001	8976
Travel Time (hr)	191.4	197.6	193.4	192.0
Total Delay (hr)	37.4	40.8	39.3	38.4
Total Stops	2367	2478	2402	2384
Fuel Used (l)	644.2	659.3	643.1	642.2

Interval #0 Information Seeding

Start Time	6:50
End Time	7:00
Total Time (min)	10

Volumes adjusted by Growth Factors.

No data recorded this interval.

Interval #1 Information Recording

Start Time	7:00
End Time	8:00
Total Time (min)	60

Volumes adjusted by Growth Factors.

Run Number	1	2	3	4	5	6	7
Vehs Entered	3404	3439	3503	3437	3433	3497	3456
Vehs Exited	3404	3444	3492	3453	3411	3501	3469
Starting Vehs	174	202	178	206	165	195	208
Ending Vehs	174	197	189	190	187	191	195
Travel Distance (km)	8687	8935	8901	9021	9007	9056	8990
Travel Time (hr)	184.4	191.8	192.1	192.3	191.0	194.0	192.3
Total Delay (hr)	35.5	38.7	39.2	38.3	37.4	38.9	38.3
Total Stops	2300	2348	2475	2340	2371	2418	2354
Fuel Used (l)	617.1	638.5	637.8	642.4	644.3	650.1	645.1

Interval #1 Information Recording

Start Time	7:00
End Time	8:00
Total Time (min)	60

Volumes adjusted by Growth Factors.

Run Number	8	9	10	Avg
Vehs Entered	3408	3544	3503	3462
Vehs Exited	3426	3525	3479	3460
Starting Vehs	202	187	176	188
Ending Vehs	184	206	200	189
Travel Distance (km)	9030	9128	9001	8976
Travel Time (hr)	191.4	197.6	193.4	192.0
Total Delay (hr)	37.4	40.8	39.3	38.4
Total Stops	2367	2478	2402	2384
Fuel Used (l)	644.2	659.3	643.1	642.2

Intersection: 1: Hurontario Street (Hwy 10) & Charleston Sideroad (RR 24)

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	R	L	T	R	L	T	TR	L	T	TR
Maximum Queue (m)	59.7	104.9	80.3	62.1	98.9	21.1	55.7	92.2	100.1	39.9	160.6	159.7
Average Queue (m)	13.4	44.5	34.1	26.2	43.9	6.4	26.8	43.0	51.3	14.4	93.1	94.3
95th Queue (m)	39.2	81.7	64.3	48.8	77.3	16.8	50.2	75.3	84.6	37.2	137.1	138.6
Link Distance (m)		1355.9			586.1			774.3	774.3		547.3	547.3
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)	80.0		65.0	40.0		55.0	85.0			40.0		
Storage Blk Time (%)	0	3	1	4	17			0		0	27	
Queuing Penalty (veh)	0	9	1	8	26			0		1	16	

Intersection: 2: Cataract Road/Main Street (RR 136) & Charleston Sideroad (RR 24)

Movement	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	TR	L	T	R	L	TR	L	TR
Maximum Queue (m)	17.5	61.3	7.2	71.9	12.7	9.1	12.4	22.6	18.1
Average Queue (m)	4.5	19.8	0.5	19.2	2.3	1.0	3.1	8.9	5.7
95th Queue (m)	13.0	43.7	3.5	51.5	8.6	5.4	9.8	18.7	13.1
Link Distance (m)		1418.7		2799.0			898.9		1191.1
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (m)	125.0		60.0		90.0	70.0		85.0	
Storage Blk Time (%)				0					
Queuing Penalty (veh)				0					

Intersection: 3: Mississauga Road & Charleston Sideroad (RR 24)

Movement	EB	WB	NB	SB
Directions Served	L	L	LTR	LTR
Maximum Queue (m)	6.7	19.9	20.0	14.8
Average Queue (m)	0.7	3.7	6.4	5.2
95th Queue (m)	4.1	14.2	17.4	11.9
Link Distance (m)			1222.3	609.3
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)	30.0	30.0		
Storage Blk Time (%)				
Queuing Penalty (veh)				

Network Summary

Network wide Queuing Penalty: 62

Summary of All Intervals

Run Number	1	2	3	4	5	6	7
Start Time	4:50	4:50	4:50	4:50	4:50	4:50	4:50
End Time	6:00	6:00	6:00	6:00	6:00	6:00	6:00
Total Time (min)	70	70	70	70	70	70	70
Time Recorded (min)	60	60	60	60	60	60	60
# of Intervals	2	2	2	2	2	2	2
# of Recorded Intervals	1	1	1	1	1	1	1
Vehs Entered	3901	3863	3926	3918	3959	3878	3965
Vehs Exited	3886	3820	3876	3894	3876	3870	3936
Starting Vehs	239	245	240	272	231	252	255
Ending Vehs	254	288	290	296	314	260	284
Travel Distance (km)	10732	10719	10864	10842	10933	10776	10798
Travel Time (hr)	246.0	243.7	246.2	255.0	270.6	264.0	256.0
Total Delay (hr)	64.3	62.7	62.9	72.0	85.8	82.8	73.9
Total Stops	3114	3075	2965	2959	3290	3398	3123
Fuel Used (l)	775.3	774.4	778.4	789.9	804.3	790.0	788.9

Summary of All Intervals

Run Number	8	9	10	Avg
Start Time	4:50	4:50	4:50	4:50
End Time	6:00	6:00	6:00	6:00
Total Time (min)	70	70	70	70
Time Recorded (min)	60	60	60	60
# of Intervals	2	2	2	2
# of Recorded Intervals	1	1	1	1
Vehs Entered	3909	3905	3942	3917
Vehs Exited	3846	3872	3919	3880
Starting Vehs	220	215	238	241
Ending Vehs	283	248	261	275
Travel Distance (km)	10757	10647	10942	10801
Travel Time (hr)	250.4	247.5	265.8	254.5
Total Delay (hr)	68.6	66.2	81.0	72.0
Total Stops	3137	2982	3424	3151
Fuel Used (l)	784.8	769.0	807.9	786.3

Interval #0 Information Seeding

Start Time	4:50
End Time	5:00
Total Time (min)	10

Volumes adjusted by Growth Factors.

No data recorded this interval.

Interval #1 Information Recording

Start Time	5:00
End Time	6:00
Total Time (min)	60

Volumes adjusted by Growth Factors.

Run Number	1	2	3	4	5	6	7
Vehs Entered	3901	3863	3926	3918	3959	3878	3965
Vehs Exited	3886	3820	3876	3894	3876	3870	3936
Starting Vehs	239	245	240	272	231	252	255
Ending Vehs	254	288	290	296	314	260	284
Travel Distance (km)	10732	10719	10864	10842	10933	10776	10798
Travel Time (hr)	246.0	243.7	246.2	255.0	270.6	264.0	256.0
Total Delay (hr)	64.3	62.7	62.9	72.0	85.8	82.8	73.9
Total Stops	3114	3075	2965	2959	3290	3398	3123
Fuel Used (l)	775.3	774.4	778.4	789.9	804.3	790.0	788.9

Interval #1 Information Recording

Start Time	5:00
End Time	6:00
Total Time (min)	60

Volumes adjusted by Growth Factors.

Run Number	8	9	10	Avg
Vehs Entered	3909	3905	3942	3917
Vehs Exited	3846	3872	3919	3880
Starting Vehs	220	215	238	241
Ending Vehs	283	248	261	275
Travel Distance (km)	10757	10647	10942	10801
Travel Time (hr)	250.4	247.5	265.8	254.5
Total Delay (hr)	68.6	66.2	81.0	72.0
Total Stops	3137	2982	3424	3151
Fuel Used (l)	784.8	769.0	807.9	786.3

Intersection: 1: Hurontario Street (Hwy 10) & Charleston Sideroad (RR 24)

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	R	L	T	R	L	T	TR	L	T	TR
Maximum Queue (m)	79.9	342.5	85.0	105.0	317.1	110.0	91.5	163.0	165.3	39.8	127.0	124.0
Average Queue (m)	35.7	165.0	45.7	71.0	159.2	36.8	24.0	79.3	85.9	13.8	55.9	56.9
95th Queue (m)	84.4	330.5	100.3	123.8	309.8	106.7	57.3	155.1	161.6	33.3	111.3	112.3
Link Distance (m)		1355.9			586.1			774.3	774.3		547.3	547.3
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)	80.0		65.0	40.0		55.0	85.0			40.0		
Storage Blk Time (%)	0	51	0	56	66			8		0	16	
Queuing Penalty (veh)	1	115	1	198	130			14		1	8	

Intersection: 2: Cataract Road/Main Street (RR 136) & Charleston Sideroad (RR 24)

Movement	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	TR	L	T	R	L	TR	L	TR
Maximum Queue (m)	21.8	60.2	5.3	68.3	16.2	14.2	12.5	26.0	23.6
Average Queue (m)	7.6	24.6	0.4	24.2	4.9	2.5	3.1	10.0	8.2
95th Queue (m)	17.4	51.1	2.9	58.4	13.1	9.6	10.0	21.5	17.8
Link Distance (m)		1418.7		2799.0			898.9		1191.1
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (m)	125.0		60.0		90.0	70.0		85.0	
Storage Blk Time (%)				1					
Queuing Penalty (veh)				0					

Intersection: 3: Mississauga Road & Charleston Sideroad (RR 24)

Movement	EB	WB	WB	NB	SB
Directions Served	L	L	TR	LTR	LTR
Maximum Queue (m)	10.3	9.5	2.0	19.0	16.2
Average Queue (m)	1.1	1.2	0.1	6.9	6.1
95th Queue (m)	5.9	6.0	1.1	15.4	13.2
Link Distance (m)			1418.7	1222.3	609.3
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (m)	30.0	30.0			
Storage Blk Time (%)					
Queuing Penalty (veh)					

Network Summary

Network wide Queuing Penalty: 469

Summary of All Intervals

Run Number	1	2	3	4	5	6	7
Start Time	12:50	12:50	12:50	12:50	12:50	12:50	12:50
End Time	2:00	2:00	2:00	2:00	2:00	2:00	2:00
Total Time (min)	70	70	70	70	70	70	70
Time Recorded (min)	60	60	60	60	60	60	60
# of Intervals	2	2	2	2	2	2	2
# of Recorded Intervals	1	1	1	1	1	1	1
Vehs Entered	3483	3440	3621	3458	3523	3540	3503
Vehs Exited	3475	3481	3645	3518	3492	3555	3533
Starting Vehs	187	234	247	265	185	205	229
Ending Vehs	195	193	223	205	216	190	199
Travel Distance (km)	9261	9378	9881	9365	9361	9625	9652
Travel Time (hr)	207.8	206.0	223.5	238.6	211.1	216.8	209.1
Total Delay (hr)	49.2	46.6	55.3	79.0	52.2	53.1	45.7
Total Stops	2419	2357	2590	2710	2549	2590	2304
Fuel Used (l)	656.5	662.6	699.2	688.4	666.1	686.3	678.3

Summary of All Intervals

Run Number	8	9	10	Avg
Start Time	12:50	12:50	12:50	12:50
End Time	2:00	2:00	2:00	2:00
Total Time (min)	70	70	70	70
Time Recorded (min)	60	60	60	60
# of Intervals	2	2	2	2
# of Recorded Intervals	1	1	1	1
Vehs Entered	3505	3492	3527	3510
Vehs Exited	3429	3455	3556	3514
Starting Vehs	213	205	223	219
Ending Vehs	289	242	194	211
Travel Distance (km)	9165	9376	9403	9447
Travel Time (hr)	239.1	213.1	203.0	216.8
Total Delay (hr)	82.9	53.4	42.5	56.0
Total Stops	2545	2383	2455	2488
Fuel Used (l)	674.4	664.2	660.7	673.7

Interval #0 Information Seeding

Start Time	12:50
End Time	1:00
Total Time (min)	10

Volumes adjusted by Growth Factors.

No data recorded this interval.

Interval #1 Information Recording

Start Time	1:00
End Time	2:00
Total Time (min)	60

Volumes adjusted by Growth Factors.

Run Number	1	2	3	4	5	6	7
Vehs Entered	3483	3440	3621	3458	3523	3540	3503
Vehs Exited	3475	3481	3645	3518	3492	3555	3533
Starting Vehs	187	234	247	265	185	205	229
Ending Vehs	195	193	223	205	216	190	199
Travel Distance (km)	9261	9378	9881	9365	9361	9625	9652
Travel Time (hr)	207.8	206.0	223.5	238.6	211.1	216.8	209.1
Total Delay (hr)	49.2	46.6	55.3	79.0	52.2	53.1	45.7
Total Stops	2419	2357	2590	2710	2549	2590	2304
Fuel Used (l)	656.5	662.6	699.2	688.4	666.1	686.3	678.3

Interval #1 Information Recording

Start Time	1:00
End Time	2:00
Total Time (min)	60

Volumes adjusted by Growth Factors.

Run Number	8	9	10	Avg
Vehs Entered	3505	3492	3527	3510
Vehs Exited	3429	3455	3556	3514
Starting Vehs	213	205	223	219
Ending Vehs	289	242	194	211
Travel Distance (km)	9165	9376	9403	9447
Travel Time (hr)	239.1	213.1	203.0	216.8
Total Delay (hr)	82.9	53.4	42.5	56.0
Total Stops	2545	2383	2455	2488
Fuel Used (l)	674.4	664.2	660.7	673.7

Intersection: 1: Hurontario Street (Hwy 10) & Charleston Sideroad (RR 24)

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	R	L	T	R	L	T	TR	L	T	TR
Maximum Queue (m)	79.7	173.2	84.6	104.9	273.0	90.6	53.2	125.2	129.5	39.8	116.1	115.5
Average Queue (m)	38.7	75.9	24.2	63.0	124.8	14.3	23.1	58.5	65.2	13.8	56.3	57.1
95th Queue (m)	80.0	159.0	66.9	116.4	313.2	61.6	43.5	111.4	120.5	34.1	104.8	105.7
Link Distance (m)		1355.9			586.1			774.3	774.3		547.3	547.3
Upstream Blk Time (%)					1							
Queuing Penalty (veh)					0							
Storage Bay Dist (m)	80.0		65.0	40.0		55.0	85.0			40.0		
Storage Blk Time (%)	1	20		50	51		0	2		0	16	
Queuing Penalty (veh)	2	44		131	92		0	4		1	10	

Intersection: 2: Cataract Road/Main Street (RR 136) & Charleston Sideroad (RR 24)

Movement	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	TR	L	T	R	L	TR	L	TR
Maximum Queue (m)	21.1	41.6	7.2	61.4	12.1	12.7	10.2	23.7	21.7
Average Queue (m)	5.1	17.2	0.7	18.1	2.3	2.2	2.0	9.8	6.3
95th Queue (m)	14.9	35.6	4.1	46.0	8.4	8.5	7.7	20.6	15.3
Link Distance (m)		1418.7		2799.0			898.9		1191.1
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (m)	125.0		60.0		90.0	70.0		85.0	
Storage Blk Time (%)				0					
Queuing Penalty (veh)				0					

Intersection: 3: Mississauga Road & Charleston Sideroad (RR 24)

Movement	EB	WB	WB	NB	SB
Directions Served	L	L	TR	LTR	LTR
Maximum Queue (m)	6.6	8.8	0.7	10.0	10.5
Average Queue (m)	0.5	0.7	0.0	3.7	3.4
95th Queue (m)	3.4	4.6	0.7	9.9	9.4
Link Distance (m)			1418.7	1222.3	609.3
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (m)	30.0	30.0			
Storage Blk Time (%)					
Queuing Penalty (veh)					

Network Summary

Network wide Queuing Penalty: 284

Summary of All Intervals

Run Number	1	2	3	4	5	6	7
Start Time	6:50	6:50	6:50	6:50	6:50	6:50	6:50
End Time	8:00	8:00	8:00	8:00	8:00	8:00	8:00
Total Time (min)	70	70	70	70	70	70	70
Time Recorded (min)	60	60	60	60	60	60	60
# of Intervals	2	2	2	2	2	2	2
# of Recorded Intervals	1	1	1	1	1	1	1
Vehs Entered	4137	4298	4261	4210	4190	4215	4271
Vehs Exited	4147	4232	4187	4168	4179	4156	4254
Starting Vehs	234	203	195	211	222	209	233
Ending Vehs	224	269	269	253	233	268	250
Travel Distance (km)	10037	10568	10492	10226	10251	10159	10250
Travel Time (hr)	237.9	258.3	259.4	247.6	235.6	232.8	249.4
Total Delay (hr)	63.3	75.6	78.2	69.6	58.1	56.8	71.1
Total Stops	3214	3629	3823	3417	3099	3087	3715
Fuel Used (l)	733.7	782.1	776.6	754.2	749.8	739.9	755.1

Summary of All Intervals

Run Number	8	9	10	Avg
Start Time	6:50	6:50	6:50	6:50
End Time	8:00	8:00	8:00	8:00
Total Time (min)	70	70	70	70
Time Recorded (min)	60	60	60	60
# of Intervals	2	2	2	2
# of Recorded Intervals	1	1	1	1
Vehs Entered	4159	4077	4314	4211
Vehs Exited	4156	4093	4234	4181
Starting Vehs	214	230	222	212
Ending Vehs	217	214	302	247
Travel Distance (km)	10282	9866	10333	10246
Travel Time (hr)	246.2	228.1	260.6	245.6
Total Delay (hr)	68.7	56.2	81.0	67.9
Total Stops	3391	2995	4098	3446
Fuel Used (l)	759.2	721.4	767.7	754.0

Interval #0 Information Seeding

Start Time	6:50
End Time	7:00
Total Time (min)	10

Volumes adjusted by Growth Factors.
No data recorded this interval.

Interval #1 Information Recording

Start Time	7:00
End Time	8:00
Total Time (min)	60

Volumes adjusted by Growth Factors.

Run Number	1	2	3	4	5	6	7
Vehs Entered	4137	4298	4261	4210	4190	4215	4271
Vehs Exited	4147	4232	4187	4168	4179	4156	4254
Starting Vehs	234	203	195	211	222	209	233
Ending Vehs	224	269	269	253	233	268	250
Travel Distance (km)	10037	10568	10492	10226	10251	10159	10250
Travel Time (hr)	237.9	258.3	259.4	247.6	235.6	232.8	249.4
Total Delay (hr)	63.3	75.6	78.2	69.6	58.1	56.8	71.1
Total Stops	3214	3629	3823	3417	3099	3087	3715
Fuel Used (l)	733.7	782.1	776.6	754.2	749.8	739.9	755.1

Interval #1 Information Recording

Start Time	7:00
End Time	8:00
Total Time (min)	60

Volumes adjusted by Growth Factors.

Run Number	8	9	10	Avg
Vehs Entered	4159	4077	4314	4211
Vehs Exited	4156	4093	4234	4181
Starting Vehs	214	230	222	212
Ending Vehs	217	214	302	247
Travel Distance (km)	10282	9866	10333	10246
Travel Time (hr)	246.2	228.1	260.6	245.6
Total Delay (hr)	68.7	56.2	81.0	67.9
Total Stops	3391	2995	4098	3446
Fuel Used (l)	759.2	721.4	767.7	754.0

Intersection: 1: Hurontario Street (Hwy 10) & Charleston Sideroad (RR 24)

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	R	L	T	R	L	T	TR	L	T	TR
Maximum Queue (m)	66.0	165.2	87.5	59.9	184.1	83.7	82.1	108.5	116.9	74.8	273.4	278.3
Average Queue (m)	20.1	71.4	47.0	43.6	91.7	17.7	35.6	59.2	66.2	20.0	172.1	172.8
95th Queue (m)	56.3	152.2	86.6	70.8	182.4	67.0	66.3	98.7	103.6	59.2	278.2	277.6
Link Distance (m)		1355.9			586.1			774.3	774.3		547.3	547.3
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)	80.0		65.0	40.0		55.0	85.0			40.0		
Storage Blk Time (%)	0	16	3	28	40		1	1		0	35	
Queuing Penalty (veh)	0	43	7	64	63		4	2		0	21	

Intersection: 2: Cataract Road/Main Street (RR 136) & Charleston Sideroad (RR 24)

Movement	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	TR	L	T	R	L	TR	L	TR
Maximum Queue (m)	18.0	55.6	7.3	81.8	11.2	9.1	12.0	26.2	18.9
Average Queue (m)	4.7	18.3	0.7	21.1	2.2	1.2	3.6	8.9	5.9
95th Queue (m)	13.3	40.6	4.1	57.8	8.2	5.8	10.4	20.2	14.1
Link Distance (m)		1418.7		2799.0			898.9		1191.1
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (m)	125.0		60.0		90.0	70.0		85.0	
Storage Blk Time (%)				1					
Queuing Penalty (veh)				0					

Intersection: 3: Mississauga Road & Charleston Sideroad (RR 24)

Movement	EB	EB	WB	NB	SB
Directions Served	L	TR	L	LTR	LTR
Maximum Queue (m)	7.6	1.2	21.1	21.4	14.5
Average Queue (m)	1.1	0.0	5.2	6.0	5.4
95th Queue (m)	5.2	0.8	17.3	16.8	11.8
Link Distance (m)		662.7		1222.3	609.3
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (m)	30.0		30.0		
Storage Blk Time (%)			0		
Queuing Penalty (veh)			0		

Network Summary

Network wide Queuing Penalty: 204

Summary of All Intervals

Run Number	1	2	3	4	5	6	7
Start Time	4:50	4:50	4:50	4:50	4:50	4:50	4:50
End Time	6:00	6:00	6:00	6:00	6:00	6:00	6:00
Total Time (min)	70	70	70	70	70	70	70
Time Recorded (min)	60	60	60	60	60	60	60
# of Intervals	2	2	2	2	2	2	2
# of Recorded Intervals	1	1	1	1	1	1	1
Vehs Entered	4623	4752	4851	4716	4560	4793	4705
Vehs Exited	4495	4607	4764	4615	4390	4711	4598
Starting Vehs	271	280	300	274	278	262	283
Ending Vehs	399	425	387	375	448	344	390
Travel Distance (km)	11861	12129	12340	12392	10946	11949	11886
Travel Time (hr)	349.6	376.6	374.1	357.2	419.3	346.2	382.0
Total Delay (hr)	147.5	170.2	163.3	147.1	230.4	141.5	178.2
Total Stops	4526	4547	5287	4942	3661	5141	4535
Fuel Used (l)	921.6	961.1	970.8	955.7	928.6	929.9	951.1

Summary of All Intervals

Run Number	8	9	10	Avg
Start Time	4:50	4:50	4:50	4:50
End Time	6:00	6:00	6:00	6:00
Total Time (min)	70	70	70	70
Time Recorded (min)	60	60	60	60
# of Intervals	2	2	2	2
# of Recorded Intervals	1	1	1	1
Vehs Entered	4608	4708	4733	4703
Vehs Exited	4438	4638	4700	4594
Starting Vehs	266	288	251	272
Ending Vehs	436	358	284	382
Travel Distance (km)	11634	11906	12192	11923
Travel Time (hr)	386.1	326.9	304.3	362.2
Total Delay (hr)	186.7	122.9	96.0	158.4
Total Stops	4525	5266	4356	4678
Fuel Used (l)	945.5	910.6	905.9	938.1

Interval #0 Information Seeding

Start Time	4:50
End Time	5:00
Total Time (min)	10

Volumes adjusted by Growth Factors.

No data recorded this interval.

Interval #1 Information Recording

Start Time	5:00
End Time	6:00
Total Time (min)	60

Volumes adjusted by Growth Factors.

Run Number	1	2	3	4	5	6	7
Vehs Entered	4623	4752	4851	4716	4560	4793	4705
Vehs Exited	4495	4607	4764	4615	4390	4711	4598
Starting Vehs	271	280	300	274	278	262	283
Ending Vehs	399	425	387	375	448	344	390
Travel Distance (km)	11861	12129	12340	12392	10946	11949	11886
Travel Time (hr)	349.6	376.6	374.1	357.2	419.3	346.2	382.0
Total Delay (hr)	147.5	170.2	163.3	147.1	230.4	141.5	178.2
Total Stops	4526	4547	5287	4942	3661	5141	4535
Fuel Used (l)	921.6	961.1	970.8	955.7	928.6	929.9	951.1

Interval #1 Information Recording

Start Time	5:00
End Time	6:00
Total Time (min)	60

Volumes adjusted by Growth Factors.

Run Number	8	9	10	Avg
Vehs Entered	4608	4708	4733	4703
Vehs Exited	4438	4638	4700	4594
Starting Vehs	266	288	251	272
Ending Vehs	436	358	284	382
Travel Distance (km)	11634	11906	12192	11923
Travel Time (hr)	386.1	326.9	304.3	362.2
Total Delay (hr)	186.7	122.9	96.0	158.4
Total Stops	4525	5266	4356	4678
Fuel Used (l)	945.5	910.6	905.9	938.1

Intersection: 1: Hurontario Street (Hwy 10) & Charleston Sideroad (RR 24)

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	R	L	T	R	L	T	TR	L	T	TR
Maximum Queue (m)	82.4	715.1	90.0	60.0	546.5	100.0	114.9	347.7	347.2	71.7	159.5	153.6
Average Queue (m)	40.3	423.7	53.1	46.2	384.9	50.3	53.6	161.2	167.6	21.1	79.3	77.6
95th Queue (m)	93.3	809.5	113.3	74.7	658.2	122.5	123.6	343.7	345.3	56.8	149.1	147.9
Link Distance (m)		1355.9			586.1			774.3	774.3		547.3	547.3
Upstream Blk Time (%)					20							
Queuing Penalty (veh)					0							
Storage Bay Dist (m)	80.0		65.0	40.0		55.0	85.0			40.0		
Storage Blk Time (%)	0	73	1	45	71	0	0	19		1	21	
Queuing Penalty (veh)	1	165	2	167	140	2	1	35		8	11	

Intersection: 2: Cataract Road/Main Street (RR 136) & Charleston Sideroad (RR 24)

Movement	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	TR	L	T	R	L	TR	L	TR
Maximum Queue (m)	22.8	76.6	5.4	74.1	15.9	16.5	14.5	26.5	29.0
Average Queue (m)	8.4	27.7	0.4	23.0	4.2	2.9	3.8	10.4	8.3
95th Queue (m)	18.9	57.5	2.8	58.4	12.1	11.2	11.4	22.1	19.6
Link Distance (m)		1418.7		2799.0			898.9		1191.1
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (m)	125.0		60.0		90.0	70.0		85.0	
Storage Blk Time (%)		0		1					
Queuing Penalty (veh)		0		1					

Intersection: 3: Mississauga Road & Charleston Sideroad (RR 24)

Movement	EB	WB	NB	SB
Directions Served	L	L	LTR	LTR
Maximum Queue (m)	6.7	10.8	20.8	21.7
Average Queue (m)	0.9	1.1	7.1	6.7
95th Queue (m)	4.5	6.1	15.1	15.4
Link Distance (m)			1222.3	609.3
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)	30.0	30.0		
Storage Blk Time (%)				
Queuing Penalty (veh)				

Network Summary

Network wide Queuing Penalty: 532

Summary of All Intervals

Run Number	1	2	3	4	5	6	7
Start Time	12:50	12:50	12:50	12:50	12:50	12:50	12:50
End Time	2:00	2:00	2:00	2:00	2:00	2:00	2:00
Total Time (min)	70	70	70	70	70	70	70
Time Recorded (min)	60	60	60	60	60	60	60
# of Intervals	2	2	2	2	2	2	2
# of Recorded Intervals	1	1	1	1	1	1	1
Vehs Entered	4163	4233	4268	4236	4219	4410	4274
Vehs Exited	4198	4154	4206	4242	4190	4389	4237
Starting Vehs	233	240	220	250	203	234	263
Ending Vehs	198	319	282	244	232	255	300
Travel Distance (km)	10253	10374	10521	10097	10112	10687	10377
Travel Time (hr)	246.2	290.8	258.3	256.5	245.5	254.6	295.2
Total Delay (hr)	68.7	111.8	76.7	81.1	70.1	68.8	115.6
Total Stops	2994	3436	3322	3212	3197	3508	3481
Fuel Used (l)	743.2	789.0	763.7	745.5	733.5	772.0	791.6

Summary of All Intervals

Run Number	8	9	10	Avg
Start Time	12:50	12:50	12:50	12:50
End Time	2:00	2:00	2:00	2:00
Total Time (min)	70	70	70	70
Time Recorded (min)	60	60	60	60
# of Intervals	2	2	2	2
# of Recorded Intervals	1	1	1	1
Vehs Entered	4210	4277	4277	4257
Vehs Exited	4175	4197	4210	4220
Starting Vehs	238	221	218	227
Ending Vehs	273	301	285	269
Travel Distance (km)	10176	10115	9990	10270
Travel Time (hr)	270.3	264.1	287.6	266.9
Total Delay (hr)	94.2	88.0	112.6	88.7
Total Stops	3453	3235	3596	3344
Fuel Used (l)	762.4	752.8	766.0	762.0

Interval #0 Information Seeding

Start Time	12:50
End Time	1:00
Total Time (min)	10

Volumes adjusted by Growth Factors.

No data recorded this interval.

Interval #1 Information Recording

Start Time	1:00
End Time	2:00
Total Time (min)	60

Volumes adjusted by Growth Factors.

Run Number	1	2	3	4	5	6	7
Vehs Entered	4163	4233	4268	4236	4219	4410	4274
Vehs Exited	4198	4154	4206	4242	4190	4389	4237
Starting Vehs	233	240	220	250	203	234	263
Ending Vehs	198	319	282	244	232	255	300
Travel Distance (km)	10253	10374	10521	10097	10112	10687	10377
Travel Time (hr)	246.2	290.8	258.3	256.5	245.5	254.6	295.2
Total Delay (hr)	68.7	111.8	76.7	81.1	70.1	68.8	115.6
Total Stops	2994	3436	3322	3212	3197	3508	3481
Fuel Used (l)	743.2	789.0	763.7	745.5	733.5	772.0	791.6

Interval #1 Information Recording

Start Time	1:00
End Time	2:00
Total Time (min)	60

Volumes adjusted by Growth Factors.

Run Number	8	9	10	Avg
Vehs Entered	4210	4277	4277	4257
Vehs Exited	4175	4197	4210	4220
Starting Vehs	238	221	218	227
Ending Vehs	273	301	285	269
Travel Distance (km)	10176	10115	9990	10270
Travel Time (hr)	270.3	264.1	287.6	266.9
Total Delay (hr)	94.2	88.0	112.6	88.7
Total Stops	3453	3235	3596	3344
Fuel Used (l)	762.4	752.8	766.0	762.0

Intersection: 1: Hurontario Street (Hwy 10) & Charleston Sideroad (RR 24)

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	R	L	T	R	L	T	TR	L	T	TR
Maximum Queue (m)	82.4	233.5	90.0	60.0	431.1	100.0	114.9	195.9	196.2	74.8	147.6	149.8
Average Queue (m)	42.7	101.9	34.9	52.7	272.2	26.6	43.8	97.0	102.9	18.1	80.1	81.6
95th Queue (m)	88.0	206.4	88.2	73.6	569.6	91.7	101.4	184.1	189.2	53.8	143.1	143.6
Link Distance (m)		1355.9			586.1			774.3	774.3		547.3	547.3
Upstream Blk Time (%)					3							
Queuing Penalty (veh)					0							
Storage Bay Dist (m)	80.0		65.0	40.0		55.0	85.0			40.0		
Storage Blk Time (%)	3	32		61	55		1	12		0	24	
Queuing Penalty (veh)	10	71		169	98		4	22		0	14	

Intersection: 2: Cataract Road/Main Street (RR 136) & Charleston Sideroad (RR 24)

Movement	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	TR	L	T	R	L	TR	L	TR
Maximum Queue (m)	16.2	42.4	6.7	53.8	13.6	8.1	11.0	23.4	17.3
Average Queue (m)	4.8	16.6	0.7	15.4	2.9	0.7	2.4	9.0	5.8
95th Queue (m)	13.1	34.3	3.9	39.0	9.7	4.6	8.7	19.4	13.1
Link Distance (m)		1418.7		2799.0			898.9		1191.1
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (m)	125.0		60.0		90.0	70.0		85.0	
Storage Blk Time (%)				0					
Queuing Penalty (veh)				0					

Intersection: 3: Mississauga Road & Charleston Sideroad (RR 24)

Movement	EB	WB	NB	SB
Directions Served	L	L	LTR	LTR
Maximum Queue (m)	6.1	6.8	10.9	12.6
Average Queue (m)	0.4	0.4	4.4	4.7
95th Queue (m)	2.9	3.2	10.7	10.8
Link Distance (m)			1222.3	609.3
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)	30.0	30.0		
Storage Blk Time (%)				
Queuing Penalty (veh)				

Network Summary

Network wide Queuing Penalty: 388

Summary of All Intervals

Run Number	1	2	3	4	5	6	7
Start Time	6:50	6:50	6:50	6:50	6:50	6:50	6:50
End Time	8:00	8:00	8:00	8:00	8:00	8:00	8:00
Total Time (min)	70	70	70	70	70	70	70
Time Recorded (min)	60	60	60	60	60	60	60
# of Intervals	2	2	2	2	2	2	2
# of Recorded Intervals	1	1	1	1	1	1	1
Vehs Entered	4496	4470	4483	4440	4522	4457	4635
Vehs Exited	4485	4413	4469	4414	4416	4409	4581
Starting Vehs	244	233	289	230	223	234	257
Ending Vehs	255	290	303	256	329	282	311
Travel Distance (km)	10674	11070	10875	10710	10634	10552	10997
Travel Time (hr)	264.3	296.1	273.5	258.3	292.0	263.9	281.3
Total Delay (hr)	79.3	106.0	85.9	73.4	107.9	81.8	91.4
Total Stops	4143	5142	4494	4029	5472	4403	4636
Fuel Used (l)	810.5	861.2	830.9	803.6	828.9	806.5	845.6

Summary of All Intervals

Run Number	8	9	10	Avg
Start Time	6:50	6:50	6:50	6:50
End Time	8:00	8:00	8:00	8:00
Total Time (min)	70	70	70	70
Time Recorded (min)	60	60	60	60
# of Intervals	2	2	2	2
# of Recorded Intervals	1	1	1	1
Vehs Entered	4482	4407	4535	4493
Vehs Exited	4396	4428	4461	4447
Starting Vehs	234	270	249	243
Ending Vehs	320	249	323	288
Travel Distance (km)	10758	10769	10739	10778
Travel Time (hr)	261.3	254.7	303.2	274.9
Total Delay (hr)	76.1	69.1	117.4	88.8
Total Stops	4154	3908	5069	4542
Fuel Used (l)	815.6	808.2	835.2	824.6

Interval #0 Information Seeding

Start Time	6:50
End Time	7:00
Total Time (min)	10

Volumes adjusted by Growth Factors.

No data recorded this interval.

Interval #1 Information Recording

Start Time	7:00
End Time	8:00
Total Time (min)	60

Volumes adjusted by Growth Factors.

Run Number	1	2	3	4	5	6	7
Vehs Entered	4496	4470	4483	4440	4522	4457	4635
Vehs Exited	4485	4413	4469	4414	4416	4409	4581
Starting Vehs	244	233	289	230	223	234	257
Ending Vehs	255	290	303	256	329	282	311
Travel Distance (km)	10674	11070	10875	10710	10634	10552	10997
Travel Time (hr)	264.3	296.1	273.5	258.3	292.0	263.9	281.3
Total Delay (hr)	79.3	106.0	85.9	73.4	107.9	81.8	91.4
Total Stops	4143	5142	4494	4029	5472	4403	4636
Fuel Used (l)	810.5	861.2	830.9	803.6	828.9	806.5	845.6

Interval #1 Information Recording

Start Time	7:00
End Time	8:00
Total Time (min)	60

Volumes adjusted by Growth Factors.

Run Number	8	9	10	Avg
Vehs Entered	4482	4407	4535	4493
Vehs Exited	4396	4428	4461	4447
Starting Vehs	234	270	249	243
Ending Vehs	320	249	323	288
Travel Distance (km)	10758	10769	10739	10778
Travel Time (hr)	261.3	254.7	303.2	274.9
Total Delay (hr)	76.1	69.1	117.4	88.8
Total Stops	4154	3908	5069	4542
Fuel Used (l)	815.6	808.2	835.2	824.6

Intersection: 1: Hurontario Street (Hwy 10) & Charleston Sideroad (RR 24)

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	R	L	T	R	L	T	TR	L	T	TR
Maximum Queue (m)	78.1	192.5	85.0	54.9	182.4	96.8	106.0	171.5	169.7	74.8	352.1	346.4
Average Queue (m)	20.4	79.9	62.8	39.0	96.1	13.7	64.2	77.6	81.7	22.6	220.7	219.3
95th Queue (m)	51.4	168.1	96.9	66.6	227.5	63.2	113.4	184.6	181.8	64.9	366.7	359.2
Link Distance (m)		1355.9			586.1			774.3	774.3		547.3	547.3
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)	80.0		65.0	40.0		55.0	85.0			40.0		
Storage Blk Time (%)	0	9	17	23	39	0	14	2		0	39	
Queuing Penalty (veh)	0	30	39	53	61	0	73	3		1	23	

Intersection: 2: Cataract Road/Main Street (RR 136) & Charleston Sideroad (RR 24)

Movement	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	TR	L	T	R	L	TR	L	TR
Maximum Queue (m)	16.4	57.8	5.3	92.3	11.9	9.6	9.9	26.6	21.3
Average Queue (m)	3.5	22.1	0.5	25.7	2.3	1.0	2.2	9.1	6.6
95th Queue (m)	10.5	48.4	3.2	68.0	8.5	5.4	7.2	19.7	15.8
Link Distance (m)		753.6		2799.0			895.6		1191.1
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (m)	125.0		60.0		90.0	70.0		85.0	
Storage Blk Time (%)				1					
Queuing Penalty (veh)				1					

Intersection: 3: Mississauga Road & Charleston Sideroad (RR 24)

Movement	EB	WB	NB	SB
Directions Served	L	L	LTR	LTR
Maximum Queue (m)	7.8	20.4	20.3	13.0
Average Queue (m)	1.3	4.0	5.5	4.8
95th Queue (m)	5.7	14.5	15.8	10.5
Link Distance (m)			1222.3	607.7
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)	30.0	30.0		
Storage Blk Time (%)		0		
Queuing Penalty (veh)		0		

Intersection: 101: Charleston Sideroad (RR 24) & Site Access

Movement	EB	EB	WB	WB	SB
Directions Served	L	T	T	R	LR
Maximum Queue (m)	8.3	65.3	75.1	25.8	37.6
Average Queue (m)	1.0	34.1	38.1	8.3	11.2
95th Queue (m)	5.3	55.7	64.6	22.0	28.6
Link Distance (m)		623.7	753.6		117.2
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (m)	130.0			75.0	
Storage Blk Time (%)			0		
Queuing Penalty (veh)			0		

Network Summary

Network wide Queuing Penalty: 284

Summary of All Intervals

Run Number	1	2	3	4	5	6	7
Start Time	4:50	4:50	4:50	4:50	4:50	4:50	4:50
End Time	6:00	6:00	6:00	6:00	6:00	6:00	6:00
Total Time (min)	70	70	70	70	70	70	70
Time Recorded (min)	60	60	60	60	60	60	60
# of Intervals	2	2	2	2	2	2	2
# of Recorded Intervals	1	1	1	1	1	1	1
Vehs Entered	4970	4871	5044	4954	4966	4950	5013
Vehs Exited	4750	4786	4877	4857	4705	4757	4944
Starting Vehs	305	282	278	300	276	260	315
Ending Vehs	525	367	445	397	537	453	384
Travel Distance (km)	12368	12155	12737	12345	12203	12200	12478
Travel Time (hr)	450.8	412.9	373.1	386.6	465.5	401.8	374.5
Total Delay (hr)	240.2	205.4	156.6	176.0	258.2	194.4	161.2
Total Stops	5420	5621	5819	5515	5300	5205	5185
Fuel Used (l)	1051.5	1009.7	1009.6	1000.0	1057.6	1010.2	999.6

Summary of All Intervals

Run Number	8	9	10	Avg
Start Time	4:50	4:50	4:50	4:50
End Time	6:00	6:00	6:00	6:00
Total Time (min)	70	70	70	70
Time Recorded (min)	60	60	60	60
# of Intervals	2	2	2	2
# of Recorded Intervals	1	1	1	1
Vehs Entered	5013	4998	4976	4976
Vehs Exited	4893	4852	4898	4832
Starting Vehs	285	295	311	288
Ending Vehs	405	441	389	430
Travel Distance (km)	12313	12311	12343	12345
Travel Time (hr)	362.6	385.6	401.6	401.5
Total Delay (hr)	151.8	174.6	190.6	190.9
Total Stops	5325	6148	4813	5434
Fuel Used (l)	984.5	998.0	1011.2	1013.2

Interval #0 Information Seeding

Start Time	4:50
End Time	5:00
Total Time (min)	10

Volumes adjusted by Growth Factors.

No data recorded this interval.

Interval #1 Information Recording

Start Time	5:00
End Time	6:00
Total Time (min)	60

Volumes adjusted by Growth Factors.

Run Number	1	2	3	4	5	6	7
Vehs Entered	4970	4871	5044	4954	4966	4950	5013
Vehs Exited	4750	4786	4877	4857	4705	4757	4944
Starting Vehs	305	282	278	300	276	260	315
Ending Vehs	525	367	445	397	537	453	384
Travel Distance (km)	12368	12155	12737	12345	12203	12200	12478
Travel Time (hr)	450.8	412.9	373.1	386.6	465.5	401.8	374.5
Total Delay (hr)	240.2	205.4	156.6	176.0	258.2	194.4	161.2
Total Stops	5420	5621	5819	5515	5300	5205	5185
Fuel Used (l)	1051.5	1009.7	1009.6	1000.0	1057.6	1010.2	999.6

Interval #1 Information Recording

Start Time	5:00
End Time	6:00
Total Time (min)	60

Volumes adjusted by Growth Factors.

Run Number	8	9	10	Avg
Vehs Entered	5013	4998	4976	4976
Vehs Exited	4893	4852	4898	4832
Starting Vehs	285	295	311	288
Ending Vehs	405	441	389	430
Travel Distance (km)	12313	12311	12343	12345
Travel Time (hr)	362.6	385.6	401.6	401.5
Total Delay (hr)	151.8	174.6	190.6	190.9
Total Stops	5325	6148	4813	5434
Fuel Used (l)	984.5	998.0	1011.2	1013.2

Intersection: 1: Hurontario Street (Hwy 10) & Charleston Sideroad (RR 24)

Movement	EB	EB	EB	B500	WB	WB	WB	NB	NB	NB	SB	SB
Directions Served	L	T	R	T	L	T	R	L	T	TR	L	T
Maximum Queue (m)	82.4	791.0	85.0	8.8	54.9	602.0	130.0	114.9	383.5	333.6	74.8	162.6
Average Queue (m)	46.1	456.6	61.4	0.3	42.3	480.4	61.6	61.2	152.0	153.9	23.0	81.6
95th Queue (m)	93.3	953.1	110.3	6.6	68.8	730.0	156.3	122.5	322.7	311.0	59.3	154.2
Link Distance (m)		1355.9		2799.0		586.1			774.3	774.3		547.3
Upstream Blk Time (%)		0				45			0			
Queuing Penalty (veh)		2				0			0			
Storage Bay Dist (m)	80.0		65.0		40.0		55.0	85.0			40.0	
Storage Blk Time (%)	3	69	5		40	78	0	2	19		1	24
Queuing Penalty (veh)	12	198	19		149	153	1	17	42		6	12

Intersection: 1: Hurontario Street (Hwy 10) & Charleston Sideroad (RR 24)

Movement	SB
Directions Served	TR
Maximum Queue (m)	164.6
Average Queue (m)	81.6
95th Queue (m)	154.4
Link Distance (m)	547.3
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (m)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 2: Cataract Road/Main Street (RR 136) & Charleston Sideroad (RR 24)

Movement	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	TR	L	T	R	L	TR	L	TR
Maximum Queue (m)	25.0	71.9	6.2	88.3	16.5	12.1	9.7	26.4	25.7
Average Queue (m)	7.9	28.7	0.6	28.1	4.4	2.1	2.5	10.3	8.7
95th Queue (m)	19.0	57.9	3.6	67.6	12.7	8.3	7.9	21.9	19.1
Link Distance (m)		753.6		2799.0			895.6		1191.1
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (m)	125.0		60.0		90.0	70.0		85.0	
Storage Blk Time (%)				1					
Queuing Penalty (veh)				1					

Intersection: 3: Mississauga Road & Charleston Sideroad (RR 24)

Movement	EB	EB	WB	NB	SB
Directions Served	L	TR	L	LTR	LTR
Maximum Queue (m)	8.9	0.6	9.7	20.1	16.8
Average Queue (m)	1.5	0.0	1.5	7.6	5.5
95th Queue (m)	6.4	0.6	6.6	15.8	11.9
Link Distance (m)		662.7		1222.3	607.7
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (m)	30.0		30.0		
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 101: Charleston Sideroad (RR 24) & Site Access

Movement	EB	EB	WB	WB	SB
Directions Served	L	T	T	R	LR
Maximum Queue (m)	14.4	83.2	92.6	22.8	33.2
Average Queue (m)	2.4	43.7	49.7	7.0	10.7
95th Queue (m)	9.4	70.9	82.6	19.5	26.2
Link Distance (m)		623.7	753.6		117.2
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (m)	130.0			75.0	
Storage Blk Time (%)			2		
Queuing Penalty (veh)			1		

Network Summary

Network wide Queuing Penalty: 614

Summary of All Intervals

Run Number	1	2	3	4	5	6	7
Start Time	12:50	12:50	12:50	12:50	12:50	12:50	12:50
End Time	2:00	2:00	2:00	2:00	2:00	2:00	2:00
Total Time (min)	70	70	70	70	70	70	70
Time Recorded (min)	60	60	60	60	60	60	60
# of Intervals	2	2	2	2	2	2	2
# of Recorded Intervals	1	1	1	1	1	1	1
Vehs Entered	4321	4496	4600	4422	4443	4207	4372
Vehs Exited	4268	4411	4523	4399	4385	4119	4334
Starting Vehs	254	233	255	261	234	231	255
Ending Vehs	307	318	332	284	292	319	293
Travel Distance (km)	10267	10582	10715	10423	10630	10008	10210
Travel Time (hr)	293.0	300.9	316.2	279.9	273.6	271.0	336.3
Total Delay (hr)	115.1	116.7	130.4	99.2	89.4	98.6	159.0
Total Stops	4118	4120	4217	3899	4152	3291	3651
Fuel Used (l)	800.2	834.5	850.6	806.4	815.1	777.2	842.1

Summary of All Intervals

Run Number	8	9	10	Avg
Start Time	12:50	12:50	12:50	12:50
End Time	2:00	2:00	2:00	2:00
Total Time (min)	70	70	70	70
Time Recorded (min)	60	60	60	60
# of Intervals	2	2	2	2
# of Recorded Intervals	1	1	1	1
Vehs Entered	4465	4437	4564	4431
Vehs Exited	4379	4398	4491	4370
Starting Vehs	235	283	252	245
Ending Vehs	321	322	325	311
Travel Distance (km)	10727	10349	10676	10459
Travel Time (hr)	334.2	308.1	281.5	299.5
Total Delay (hr)	148.4	128.1	96.0	118.1
Total Stops	4266	3749	4601	4005
Fuel Used (l)	870.7	827.9	822.4	824.7

Interval #0 Information Seeding

Start Time	12:50
End Time	1:00
Total Time (min)	10

Volumes adjusted by Growth Factors.

No data recorded this interval.

Interval #1 Information Recording

Start Time	1:00
End Time	2:00
Total Time (min)	60

Volumes adjusted by Growth Factors.

Run Number	1	2	3	4	5	6	7
Vehs Entered	4321	4496	4600	4422	4443	4207	4372
Vehs Exited	4268	4411	4523	4399	4385	4119	4334
Starting Vehs	254	233	255	261	234	231	255
Ending Vehs	307	318	332	284	292	319	293
Travel Distance (km)	10267	10582	10715	10423	10630	10008	10210
Travel Time (hr)	293.0	300.9	316.2	279.9	273.6	271.0	336.3
Total Delay (hr)	115.1	116.7	130.4	99.2	89.4	98.6	159.0
Total Stops	4118	4120	4217	3899	4152	3291	3651
Fuel Used (l)	800.2	834.5	850.6	806.4	815.1	777.2	842.1

Interval #1 Information Recording

Start Time	1:00
End Time	2:00
Total Time (min)	60

Volumes adjusted by Growth Factors.

Run Number	8	9	10	Avg
Vehs Entered	4465	4437	4564	4431
Vehs Exited	4379	4398	4491	4370
Starting Vehs	235	283	252	245
Ending Vehs	321	322	325	311
Travel Distance (km)	10727	10349	10676	10459
Travel Time (hr)	334.2	308.1	281.5	299.5
Total Delay (hr)	148.4	128.1	96.0	118.1
Total Stops	4266	3749	4601	4005
Fuel Used (l)	870.7	827.9	822.4	824.7

Intersection: 1: Hurontario Street (Hwy 10) & Charleston Sideroad (RR 24)

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	R	L	T	R	L	T	TR	L	T	TR
Maximum Queue (m)	82.3	346.2	85.0	55.0	565.8	130.0	114.9	196.1	199.6	74.8	191.5	186.6
Average Queue (m)	45.8	158.7	45.0	50.6	372.5	43.2	65.8	100.8	106.2	22.1	96.7	95.1
95th Queue (m)	88.3	363.5	95.8	65.5	687.1	137.9	122.6	194.3	197.4	61.4	173.8	168.7
Link Distance (m)		1355.9			586.1			774.3	774.3		547.3	547.3
Upstream Blk Time (%)					22							
Queuing Penalty (veh)					0							
Storage Bay Dist (m)	80.0		65.0	40.0		55.0	85.0			40.0		
Storage Blk Time (%)	2	39	1	72	46		10	11		0	27	
Queuing Penalty (veh)	6	97	4	198	82		71	24		2	16	

Intersection: 2: Cataract Road/Main Street (RR 136) & Charleston Sideroad (RR 24)

Movement	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	TR	L	T	R	L	TR	L	TR
Maximum Queue (m)	18.5	59.9	6.5	63.9	13.9	7.4	10.2	28.7	18.4
Average Queue (m)	3.8	19.9	0.5	16.1	2.3	0.6	1.8	9.3	6.0
95th Queue (m)	11.9	47.0	3.2	45.2	9.0	3.7	6.7	21.4	13.9
Link Distance (m)		753.6		2799.0			895.6		1191.1
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (m)	125.0		60.0		90.0	70.0		85.0	
Storage Blk Time (%)				0					
Queuing Penalty (veh)				0					

Intersection: 3: Mississauga Road & Charleston Sideroad (RR 24)

Movement	EB	WB	NB	SB
Directions Served	L	L	LTR	LTR
Maximum Queue (m)	6.4	6.4	18.8	13.8
Average Queue (m)	0.5	0.5	5.6	4.9
95th Queue (m)	3.3	3.4	13.9	10.9
Link Distance (m)			1222.3	607.7
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)	30.0	30.0		
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 101: Charleston Sideroad (RR 24) & Site Access

Movement	EB	EB	WB	WB	SB
Directions Served	L	T	T	R	LR
Maximum Queue (m)	6.2	55.8	72.3	21.9	31.6
Average Queue (m)	0.3	29.4	29.2	5.3	7.5
95th Queue (m)	3.6	46.8	55.8	18.0	23.0
Link Distance (m)		623.7	753.6		117.2
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (m)	130.0			75.0	
Storage Blk Time (%)			0		
Queuing Penalty (veh)			0		

Network Summary

Network wide Queuing Penalty: 501

APPENDIX M

Collision Data

Agency	LHRS OS Combo	Location	MTO COL F	COL REPORT #	Year	Date	Time	Day
MTO	16470.01932	Hurontario	4523644	E210170985	2021	04/06/2021	17:11	Fri
MTO	16460.13267	Hurontario	2979426	OP19080010	2019	28/02/2019	15:41	Thu
MTO	16460.13628	Hurontario	3284524	OP19234144	2019	07/06/2019	15:45	Fri
MTO	16460.12576	Hurontario	3169343	OP19377285	2019	26/08/2019	11:20	Mon
MTO	16470.00036	Hurontario	3251228	OP19418980	2019	20/09/2019	05:32	Fri

Agency	Geo ID	Accident N	Accident Y	Accident Date	Accident Ti	Accident Location	Municipali	Impact Loc
PEEL	850	20333870	2020	8/14/2020	11:45	01 - Non intersection		02 - Thru la
PEEL	149	210014713	2021	4/6/2021	16:23	01 - Non intersection		02 - Thru la

Classification	Fatalities at Col	Veh #	Fatalities b	Ramp #	Impact Location
Property Damage Only	0	1	0		Thru Lane
Non-Fatal Injury	0	1	0		Thru Lane
Property Damage Only	0	1	0		Thru Lane
Property Damage Only	0	1	0		Thru Lane
Non-Fatal Injury	0	1	0		Thru Lane

Location	Environment Cond. 1	Environme	Same Type	Light	Traffic Control (A)
CHARLESTON SR btwn MAIN ST/CATARACT RD & MCLAREN RD (850)	01 - Clear		0	01 - Dayligh	10 - No control
CHARLESTON SR btwn MAIN ST/CATARACT RD & MISSISSAUGA RD (149)	01 - Clear		0	01 - Dayligh	10 - No control

Road Characteristic	Initial Impact	Light	Collision Location	Travel Dir	Road Alignment
Undivided Two-Way	Sideswipe	Daylight	Non Intersection (on highway)	South	Straight on Level
Undivided Two-Way	Rear End	Daylight	At or Near Private Drive (on highway)	South	Straight on Level
Undivided Two-Way	Turning Movement	Daylight	Intersection Related (on highway)	North	Straight on Level
Undivided Two-Way	Single Motor Vehicle - Other	Daylight	Non Intersection (on highway)	North	Straight on Level
Undivided Two-Way	Sideswipe	Dark	Intersection Related (on highway)	North	Straight on Level

Traffic Ctrl Condition (A)	Road 1 Character	Road 2 Cha	Traffic Control (B)	Road 1 Surface	Road 1 Surface Condition
	02 - Undivided - two-way			01 - Asphalt	01 - Dry
	02 - Undivided - two-way			01 - Asphalt	01 - Dry

Environment 1	Environme	Road Surfa	Driver Action	Driver Condition	Vehicle Type	Vehicle Manoeuvre
Clear		Dry	Driving Properly	Normal	Truck - Dump	Going Ahead
Clear		Dry	Following too Close	Normal	Truck - Dump	Going Ahead
Clear		Dry	Unknown	Unknown	Truck - Dump	Turning Left
Clear		Dry	Driving Properly	Normal	Truck - Dump	Going Ahead
Clear		Dry	Lost Control	Other Driver Condition	Truck - Dump	Going Ahead

Traffic Control (C)	Road 2 Sur	Road 2 Sur	Road 1 Condition	Traffic Ctrl Condition (B)	Road 2 Condition	Traffic Ctrl Condition (
			01 - Good			
			01 - Good			

Sequence of Events 1	Sequence (	Sequence (	RD1 - LAT	RD1 - LONG
Moveable Objects - Other Motor Vehicle			########	########
Moveable Objects - Other Motor Vehicle			########	########
Moveable Objects - Other Motor Vehicle			########	########
Other Events - Other			########	########
Moveable Objects - Other Motor Vehicle	Moveable (	Moveable (	########	########

Road 1 Alignment	Road 2 Alig	Road 1 Pav	Road 2 Pav	Vehicle 1 T	Vehicle 2 T	Vehicle 1 L	Vehicle 2 L	Towed Veh	Towed Veh	Trailer Typ
02 - Straight on hill		01 - Exist		11 - Truck -	01 - Autom	FALSE	FALSE			
01 - Straight on level		01 - Exist		11 - Truck -	01 - Autom	FALSE	FALSE			

Trailer Typ	Trailer Con	Trailer Con	Vehicle 1 Condition	Vehicle 2 Condition	Apparent Driver 1 Action (A)	Apparent Driver 2 Action (A)
			01 - No apparent defect	01 - No apparent defect	09 - Improper passing	01 - Driving properly
			99 - Defect	01 - No apparent defect	01 - Driving properly	01 - Driving properly

Driver 1 Condition (A)	Driver 2 Condition (A)	Pedestrian	Cyclist Invc	Pedestrian	Pedestrian	Pedestrian	Pedestrian	Road Juris	Classificati	Vehicle 1 I	Vehicle 2 I
01 - Normal	01 - Normal	FALSE	FALSE					05 - Region	03 - P.D. or	04 - West	04 - West
08 - Inattentive	01 - Normal	FALSE	FALSE					05 - Region	03 - P.D. or	04 - West	04 - West

Initial Impa	Vehicle 1 M	Vehicle 2 M	Vehicle 1 F	Vehicle 1 S	Vehicle 1 T	Vehicle 2 F	Vehicle 2 S	Vehicle 2 T	Vehicle 1 F	Vehicle 1 S	Vehicle 2 F	Vehicle 2 S	Vehicle 1 F
04 - Sidesw	14 - Pulling	10 - Stoppe	01 - Other	60 - Ditch		01 - Other			08 - Left re		04 - Right r		
99 - Other	01 - Going	01 - Going	28 - Debris			28 - Debris			19 - No cor		17 - Top		

Vehicle 2 F	Vehicle 1 D	Vehicle 2 D	Xml Impor	Validated	Latitude	Longitude	X-Coordina	Y-Coordina	Self Report
			Road 1: CH	TRUE	43.840203	########	########	########	FALSE
			Road 1: CH	TRUE	43.830167	########	########	########	FALSE

APPENDIX N

Transportation Study Submission Summary

TYLin

Summary of the changes made to the "Revised July 2023" and the "Revised March 2025" Caledon Quarry Transportation Impact Study and Haul Route Assessment

Introduction

Town of Caledon comments were received on TYLin's initial report entitled 'Caledon Quarry Transportation Impact Study and Haul Route Assessment' (Transportation Study) dated December 2022. A revised Transportation Study was prepared in July 2023 (referred as #1 listed below) to address; site plan updates, adoption of updated traffic counts, and Town of Caledon request to prepare a 'Collision History Review' letter.

HDR was retained by the Town of Caledon to undertake peer review of the Transportation Study prepared by TYLin dated December 2022 (Revised July 2023). A draft peer review was submitted to the Town, dated July 2, 2024 based on their review.

The Town of Caledon and the Region of Peel reviewed the draft peer review as well as the TYLin Transportation Study and provided comments which were incorporated into the HDR peer review memorandum, dated October 2024 (item #2 below).

In acknowledgement of the peer reviewer's comments, TYLin provides a summary of changes addressed in the Revised July 2023 Transportation Study, and itemized responses to comments below for the Revied March 2025 Transportation Study.

1. Transportation Impact Study and Haul Route Assessment prepared by TYLin dated December 2022 (Revised July 2023)
2. Town of Caledon IFRQ #23-142 Peer Review of the Transportation Impact Study and Haul Route Assessment prepared by HDR dated October 8, 2024

July 2023 Revision

Report Section	Updates/Revisions
General	*Town of Caledon Comment:* While the Town will reserve its main comments related to traffic and transportation impact until issuance of comments under the Planning Act, please note the following. 1. During pre-submission consultation with the Town, the proponent's traffic consultant completed Terms of Reference for the Transportation Impact Assessment which included a requirement related to reviewing available collision data. The Town reiterates its concerns related to safety along the proposed haul route, particularly

TYLin

Report Section	Updates/Revisions
	the adequacy of the intersection of Charleston Sideroad and Highway 10. Further review of the safety and adequacy of the haul route is required in this regard. *TYLin Response:* Acknowledged and addressed. A 'Collision History Review' letter dated August 13, 2024, and submitted under separate cover was prepared by TYLin. (A revised 'Collision History Review' has been incorporated into the March 2025 Transportation Impact Study and Haul Route Assessment for submission.)
General	Address site plan updates; subject site land size, extraction area
Section 3.2	Updated (2023) turning movement counts collected at the study intersections and adopted for the revision and used without adjustment factors applied for COVID-related reductions.
Section 4.8	Consider the heritage property currently located at 1420 Charleston Sideroad with a single driveway access and provide a summary on its expected operation and nominal traffic impact to the study area.
Section 10.1	Update the baseline capacity analysis and recalibrate the traffic model with adopted new traffic data.
Section 10.2	Update the future background capacity analysis.
Section 10.3	Update the future total capacity analysis.
Section 11	Update the queueing analysis.

March 2025 Revision

Comment Number	Report Section	Peer Review Comment	TYLin Response
1.	Page 9, Section 3.2	The Saturday peak hour counts in the report do not match the counts presented in Appendix B. Clarification/explanation of why the counts in the main body of report does not match the counts in the appendix should be provided.	Appendix B has been updated to match the 2023 counts aligning with the AM, PM and Saturday traffic analysis.
2.	Page 10, Section 4.1	A graphic showing the existing truck restrictions and haul routes would be supportive. Figure 4-3 shows roads with truck restrictions in Section 4.7 and may be more appropriate in this section.	Section 4.1 and Section 4.7 has been updated accordingly.
3.	Page 11, Section 4.2	TAC Geometric Design Guide for Canadian Roads (GDG) is 200 metres. However, this	TYLin recommends the proposed site access be located approximately 500

TYLin

Comment Number	Report Section	Peer Review Comment	TYLin Response
		spacing is more appropriate for signal spacing in urban conditions, while for suburban conditions a minimum intersection spacing of 400 metres would be desirable according to TAC.	metres east of Mississauga Road, 160 metres west of the Peel Region snow storage access. Section 4.2 has been updated accordingly.
4.	Page 11, Section 4.2	Based on the Peel Region Road Characterization Study spacing of 600m, a midblock entrance on Charleston Side Road for the subject quarry is preferred. The proposed driveway design could impact the snow storage facility. The location should be evaluated against other criteria in addition to intersection spacing, such as sightlines and the design of the proposed entrance. If other criteria suggest a location outside of the midblock segment may be preferable for an access, then a spacing that is less than 600 metres away may be acceptable based on a comparison of the trade-offs between meeting intersection spacing and avoiding design and operations conflicts with adjacent driveways.	See response to Comment 3 above. The revised access location satisfies TAC minimum intersection spacing and will ensure that storage and taper lengths of the proposed auxiliary turn lanes do not impact the existing accesses, specifically the Charleston Sideroad Peel Region snow storage access. Intersection spacing, sightlines, and the design of the proposed entrance have also been revaluated and updated accordingly to support the access location.
5.	Page 12, Section 4.4	The “Left/Right-Turn SSD” should be characterized as Stopping Sight Distance only as it is not related to turning vehicles.	This has been revised to clarify the SSD is measured for a vehicle approaching the intersection.
6.	Table 4-1 on Page 12 Section 4.4	For a more conservative sightline analysis, the 100 km/h design speed should be selected.	Acknowledged. A 100 km/h design speed was selected for sightline analysis.
7.	Table 4-1 on page 12	The note under the table should be revised mentioning this assertion is not applicable in environments with very little vertical deflection. We do	Acknowledged. The note under Table 4-1 has been revised accordingly.

TYLin

Comment Number	Report Section	Peer Review Comment	TYLin Response
		agree that the use of regular passenger vehicle stopping sight distance requirements is appropriate.	
8.	Page 12, Section 4.4	In our opinion, a range of locations for sight measurements should have been tested to identify all locations within the midblock segment that provide acceptable sight distances, independent of other selection criteria.	TYLin determined this range based on our site visit conducted on December 10, 2024.
9.	Figure 4-1 on page 13	The purpose of the figure is unclear. A legend is required.	Figure 4-1 has been updated to include a legend.
10.	Page 12, Section 4.4	It is unclear why left-turn ISD at the Mississauga Road entrance was not captured, since the majority of trucks will be turning left on to Mississauga Road to continue south towards Charleston Sideroad.	The left-turn ISD has been captured in the revised study. The December 10, 2024 site visit assessed this movement and observed an available intersection sight distance of approximately 200m.
11.	Page 12, Section 4.4	The sightline requirements in addition to the available sight distances should be better documented and additional figures and/or tables may be beneficial to better document the sight distances observed in the field in relation to the required sight distance.	Sightline Analysis has been included in Appendix D.
12.	Page 12, Section 4.4	The sight distances measured in the field should use the existing property line as an obstruction to reflect that in future conditions which can be roughly estimated as being in the same location as the existing fence which runs along the north side of Charleston Sideroad i.e. on the south side of the subject site property.	Acknowledged. Sightline distances measured in the field on December 10, 2024 uses the existing property line.

TYLin

Comment Number	Report Section	Peer Review Comment	TYLin Response
13.	Page 14, Section 4.6	The purpose of providing the available turn lanes and existing driveways at Charleston Sideroad and Main Street does not appear relevant to the discussion related to the proposed entrance. Its suggests that an access to Mississauga Road has already been disqualified. The purpose of this section should be better documented as it appears to be a repeat of Section 4.2 but includes discussion on existing left-turn lanes.	Section 4.2 has been revised to better document the proposed Charleston Sideroad access location and its design in relation to the existing accesses, specifically the Charleston Sideroad Peel Region snow storage access. As a result, Section 4.6 has been removed from the TIS.
14.	Figure 4-2 on page 15	Figure 4-2 depicts locations where the site access is not recommended but requires more details and measurements to describe the purpose and provide more guidance to the reader on the selection criteria.	Section 4.2 and Section 4.1 has been updated accordingly. Text: The revised access location satisfies TAC minimum intersection spacing and will ensure that storage and taper lengths of the proposed auxiliary turn lanes do not impact the existing accesses, specifically the Charleston Sideroad Peel Region snow storage access.
15.	Page 16, Section 4.7	This report section would be better suited with a graphic that captures all the criteria which were considered in the selection of the preferring access location: sightlines, physical constraints, vehicular conflicts, traffic operations, haul routes, roadway classifications. Figure 4-3 appears to be more appropriate for Section 4.1.	Figure has been moved to Section 4.1
16.	Page 16, Section 4.7	The traffic generated from staff working at 1420 Charleston Sideroad (6 employees) should be considered as a component of site traffic.	1420 Charleston SR staff trips have been added as a component of site traffic and assigned to study intersections accordingly. Section 4.7 relocated to Section 6.1.1 -

TYLin

Comment Number	Report Section	Peer Review Comment	TYLin Response
			Passenger Car Peak Hour Trips
17.	Page 17, Section 5.1	The horizon year should be adjusted to represent 10-years post build-out as opposed to 10-years beyond existing conditions.	Traffic analysis has been updated to 10 year-post build out (2037).
18.	Page 20, Section 6.1	Correspondence details relating to the background growth assumptions are missing in Appendix A.	Correspondence details relating to background growth have added to Appendix A.
19.	Page 20, Section 6.1.2	Section 6.1.2 refers to truck data which is not presented in the report. Available weigh scale data or similar data from a proxy site should be provided in greater detail, if available.	The calculated AM peak hour truck traffic was further increased by 50% to reflect the morning surge in truck traffic (please see updated Section 6.1.2 of the Traffic Impact study). This methodology has been used by TYLin for multiple quarry applications and have been approved by multiple agencies across Ontario.
20.	Page 21, Section 6.1.2	More details on the time-of-day distribution of truck trips will be beneficial as opposed to assuming even distribution of trucks throughout the week / year with an arbitrary adjustment factor of a 50% increase applied to the weekday AM peak hour.	See response to Comment 19 above. Furthermore, Section 6.1.2 provide more details on the expected average monthly breakdown of material extraction based on archived historical data from existing quarry operations in southern Ontario shipped per month for 2019 and 2020.
21.	Page 23, Section 6.2	The queries used to support the employee (passenger car) distribution shown in Table 6-4 should be provided in the appendices for review.	Appendix F has been added to include queries used.
22.	Figure 6-1 on page 24	It is preferrable to provide separate site traffic for trucks and passenger cars in Figure 6-1.	Separate site traffic for passenger cars and trucks are shown in **Error! Reference source not found.** and **Error! Reference source not found.**, respectively.

TYLin

Comment Number	Report Section	Peer Review Comment	TYLin Response
			A separate site traffic figure for the Heritage House (1420 Charleston SR) has been shown in Figure 6-4.
23.	Page 29, Section 9.1	The storage requirements should be revisited to ensure that at least one truck length can be accommodated in the proposed storage for all turn lanes at the site access.	Noted. Each storage lane is to be designed to accommodate a minimum of one truck length. Text: Refer to Appendix J for updated Truck Swept Path Analysis.
24.	Page 30, Section 9.2	Access location should be reconsidered towards west of the proposed access as the design elements overlap with snow storage access. Spacing criteria of 600m as advised in Road Characterization Study may not be satisfied but it should not be used as the only criteria.	See response to Comment 3 and Comment 4 above.
25.	Page 30, Section 9.3	It would be more appropriate to use an articulated dump truck that accurately reflects the largest design vehicles anticipated to enter the site.	Noted. The vehicle maneuvering assessment has been revised to assess the largest design vehicle. See Appendix I for updated Truck Swept Path Analysis.
26.	Figure 9-1 on page 30	The figure does not show edge of the existing pavement. The graphic should also indicate the required widening through the section of the roadway where the access is proposed.	Noted. The figure has been updated based on the latest topographic survey.
27.	Page 32, Section 10.1	Lost time adjustment should only be applied if the existing operations are indicating over-capacity operations when the demand is known and can be supported through field observations. Operations without calibration should be showed first for comparison with the calibrated operations.	Lost time adjustment has been removed from all scenarios.

TYLin

Comment Number	Report Section	Peer Review Comment	TYLin Response
28.	Table 10-2 on Page 33	Table 10-2 indicates storage for the intersection of Hurontario Street and Charleston Sideroad only and is not accurately representative of existing conditions. The calculation of effective storage should be revisited so that none of the taper or deceleration components of the turn lanes are reproportioned as storage.	Update table in section 10. Move to Section 11.
29.	Table 10-4 on Page 35	Analyze proposed site access under stop control prior to analysis under signal control to provide for comparison with signalized operations.	Warrant and analysis updated in Section 10 accordingly
30.	Page 38, Section 11	It may be beneficial to include a comparison of 95th percentile queues from Synchro in addition to the SimTraffic queues.	Capacity analysis tables has been updated in Section 11.
31.	General	Site truck traffic is expected to use the available haul routes (Charleston Sideroad and Highway 10) without cutting through side streets or other minor roadways unless there are roadway blockages or conditions which render the haul routes unusable. Congestion and typical delays does not constitute an acceptable reason for trucks to divert from the haul routes along Charleston Sideroad and Highway 10. The report should include discussion about the surrounding non-haul route road network, why it would be used (road closures, local trips, or employee/passenger vehicle traffic), and should provide rationale why the side streets would not be utilized during	Separate site traffic for passenger cars and trucks are shown in **Error! Reference source not found.** and **Error! Reference source not found.**, respectively.

TYLin

Comment Number	Report Section	Peer Review Comment	TYLin Response
		typical operations (truck restrictions, indirect routing etc.)	
32.	Attachment D of Response to the Town of Caledon and Cuesta Planning Consultants Inc. – Aggregate Resources Act Comments of November 17, 2023 - St. Marys Cement Inc. (Canada) - Proposed Caledon Pit/Quarry Class A Licence #626600 OUR FILE 8816AF – Attachment D (Collision History Review by TYLin) dated August 13, 2024	Collision Analysis – should be updated to capture 5 years before/after the Covid-19 period to ensure the analysis is based on typical conditions. The analysis should also focus on specific turning movements and intersections to identify 'hotspots' and to identify potential mitigation. The analysis should be extended to include all intersections along the haul route from the site entrance to Highway 10, as well as the midblock segments.	Collision Memo has been updated to include 5 years before/after Covid-19 (2015-2023).