BURNSIDE

Eighth Line Environmental Assessment

Environmental Study Report

Town of Halton Hills

Eighth Line Environmental Assessment

Environmental Study Report

Town of Halton Hills

R.J. Burnside & Associates Limited
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July 2023
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Record of Revisions

Revision	Date	Description
0	September 13, 2022	Draft Submission to Town of Halton Hills
1	December 14, 2022	Draft Submission to Agencies and Indigenous Communities for Review
2	July 13, 2023	Final Report for Public Review Period

R.J. Burnside & Associates Limited

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Executive Summary

The Town of Halton Hills ('Town') has undertaken a Municipal Class Environmental Assessment (MCEA) to determine the needs of transportation corridor improvement along Eighth Line from Steeles Avenue to Maple Avenue to support future growth. R.J. Burnside & Associates ('Burnside') facilitated the MCEA on behalf of the Town.

The MCEA study follows a comprehensive planning and design process to ensure protection of the environment, facilitate a proactive and meaningful consultation with a broad range of stakeholders, determine a solution that provides the required road corridor improvements to meet future needs while minimizing disruption to the existing residents and business and produces a comprehensive documentation that meets all the requirements of the MCEA process.

Description of Study Area

Eighth Line is a two-lane minor arterial road roadway south of the Georgetown urban core. From Steeles Avenue to 15 Side Road, the road is known as "Eighth Line" and north of 15 Side Road, the road is referred to as "Main Street South". The project limits for this study extend from Steeles Avenue to Maple Avenue for a length of approximately 10.5 km and generally encompasses the lands within 50 m of the existing right-of-way (ROW).

Planning Context Overview

Provincial, regional, and municipal planning documents set the policy and planning framework for consideration in Municipal Class EA studies. These documents include the Provincial Policy Statement, Growth Plan for the Greater Golden Horseshoe, Halton Region Official Plan, Town of Halton Hills Official Plan, Halton Hills Strategic Plan, Town of Halton Hills Transportation Master Plan, Vision Georgetown Secondary Plan, and Premier Gateway Phase 1B Employment Area Secondary Plan.

Transportation Conditions

Existing Traffic Conditions

As part of the transportation analysis completed, the existing transportation system within the Study Area was evaluated. Under existing conditions, the road network and intersections are operating with excess capacity with a few exceptions.

A review of collisions along the corridor was undertaken. In general, most of the study intersections and corridor do not have significant collision history or patterns that will require mitigation. However, several roadway segments and intersections will require attention and possible improvements.

Currently, there are no transit services available in the Study Area. The Town is undertaking the Transit Service Strategy where a “made in Halton Hills” solution is being explored.

Future Traffic Projections

A study horizon year of 2031 was chosen to be consistent with the Halton Hills Official Plan (HHOP). To project future traffic; historical traffic growth on study roads, background traffic from planned future developments and any planned road network connections and improvements need to be considered. Future 2031 traffic volumes consist of the application of growth per annum (up to horizon year 2031) to existing traffic volumes and are provided in Section 3.2 of this report.

Problem / Opportunity Statement

Roadway improvements are required on Eighth Line to meet travel demands from growth in the Town to the year 2031.

- As presently configured, Eighth Line will not be able to accommodate the projected traffic demand by 2031.
- The Town could make improvements on Eighth Line that will provide:
  - Sufficient lane capacity–adequate intersection operations
  - Traffic safety–integration of active transportation (AT) infrastructure
  - Accommodation of future transit

Built Environment

The Study Area is located along Eighth Line between Steeles Avenue and Maple Avenue in the Town of Halton Hills, passing between the historical community of Hornby in the south to the community of Georgetown in the north in a southeast to northwest direction.

Throughout the Study Area, the ROW consists of a single lane of traffic in either direction. Between Steeles Avenue and 10 Side Road, the ROW includes a narrow gravel shoulder and drainage ditches. Between 10 Side Road and Maple Avenue there is a multi-use-path (MUP) on the east side of Eighth Line. Between 15 Side Road and Maple Avenue there is also a sidewalk on the west side of Eighth Line.

The southern segment of the Study Area, between Steeles Avenue and 10 Side Road, is dominated by active agricultural fields. The northern segment of the Study Area is located within the boundaries of the community of Georgetown, which is delineated at 10 Side Road. Residences and residential neighbourhoods dominate the Study Area in this segment.

Physical Environment

The Study Area is situated within the Niagara Escarpment, South Slope, and Peel Plain physiographic regions of southern Ontario. The Study Area intersects with Silver Creek, a subwatershed of the Credit River. South of 15 Side Road the topography of the Study Area is relatively flat. North of 15 Side Road, the topography undulates and slopes steeply on either side of Main Street South.

The north part of the Study Area between Miller Drive and Maple Avenue is located within a Wellhead Protection Area. No Intake Protection Zones were identified in the Study Area. The north part of the Study Area between Miller Drive and Maple Avenue is located within an Issue Contributing Area. The section of the Eighth Line between 5 Side Road and 10 Side Road is located within a Highly Vulnerable Aquifer (HVA) with a high vulnerability score of 6. The north part of the Study Area from Miller Drive to Maple Avenue is located within an HVA with a similar vulnerability score of 6. There is a Significant Groundwater Recharge Area (SGRA) between 15 Side Road and Arborglen Drive with a high vulnerability score of 6. Between Cindebarke Terrace and Maple Avenue there is an SGRA with a moderate vulnerability score of 4.

Natural Environment

Terrestrial Environment

Vegetation communities were characterized using the Ecological Land Classification (ELC) system at the ecosite level for the Study Area. A total of 46 ecosites were observed. A variety of vegetation communities including terrestrial, aquatic, wetland, and constructed ecosites with a broad diversity of dominant plant species were observed.

Evidence of breeding amphibians were identified within the Study Area. A total of four species were identified during the field investigations and are considered common throughout Southern Ontario. There were 35 total avifauna species that exhibited some level of breeding evidence within the Study Area Vicinity (which for the purposes of this MCEA study comprises lands within 120 m of the existing ROW), two of which are currently listed as Species at Risk (SAR). Eastern wood-pewee and Barn Swallow were identified during the breeding bird surveys and are listed as Special Concern and Threatened, respectively. Furthermore, suitable roosting habitat for SAR bats were identified within the Study Area Vicinity.

Aquatic Environment

There are seven watercourse crossings within the Study Area. Six of the watercourses flow beneath Eighth Line/Main Street South and one flows beneath 5 Side Road immediately west of Eighth Line. All watercourses in the Study Area are classified either as cold or cool thermal regime watercourses. A section of Silver Creek is highlighted on the Fisheries and Oceans Canada SAR mapping as being inhabited by Redside dace (*Clinostomus elongatus*), a species that is provincially and federally protected.

Aquatic habitat assessments were performed at all watercourse crossings. Four of the watercourses are considered direct fish habitat. Two watercourses are considered to be indirect fish habitat within the Study Area as they convey water quantity, water quality and nutrients to downstream fish habitat. One watercourse is direct fish habitat downstream (east) of Eighth Line, but upstream it lacks habitat features to support fish.

Provincially Significant Features

Hungry Hollow Provincially Significant Wetland (PSW) Complex and Environmentally Sensitive Area (ESA) was identified within the Study Area north of 15 Side Road and confirmed during field studies. There is potential for Significant Woodlands within the Study Area. Criteria provided in the Halton Region Official Plan should be evaluated to determine significance in the detailed design stage of the project. There were no Significant Valleylands, or Areas of Natural and Scientific Interest identified in the Study Area.

Seven candidates and one confirmed Significant Wildlife Habitats (SWH), as defined by the Ministry of Northern Development, Mines, Natural Resources and Forestry (MNDMNRF), were identified in the Study Area.

Species at Risk

Two SAR were identified during site specific field studies conducted as part of the MCEA study. Barn swallow (Threatened) and Eastern wood-pewee (Special Concern) were observed within suitable breeding habitat in the Study Area. Candidate Habitat is also present for an additional 15 provincially and/or federally listed SAR.

Socio-Economic Environment

Archaeology and Built Heritage

The Stage 1 background study determined that 34 previously registered archaeological sites are located within one kilometre of the Study Area, two of which are within 50 m of the Study Area, and four of which are within the Study Area. The Hornby Wesleyan Methodist Cemetery and Hornby Presbyterian Church Cemetery are also within the Study Area. The property inspection determined that the Study Area exhibits archaeological potential. A Stage 2 Archaeological Assessment is recommended for areas with archaeological potential, which is intended to be completed at the detailed design stage. There are also three areas that retain Cultural Heritage Value and will need to proceed to a Stage 3 Archaeological Assessment. These three areas include the two cemeteries on the north side of the Eighth Line and Steeles Avenue intersection as well as three sites on the west side of Eighth Line north-west of Argyll Road.

A field review of the Study Area confirmed that there are 13 cultural heritage resources consisting of one built heritage resource (BHR) and 12 cultural heritage landscapes (CHLs) within or immediately adjacent to the Study Area. The identified cultural heritage

resources are historically and contextually associated with late nineteenth century land use patterns in the former Township of Esquesing. These resources include: nine farmscapes; two cemeteries, one greenhouse and, and one mixed use property. They include seven listed on the Town of Halton Hills Heritage Register, one identified in the HHOP, and five identified during field review.

Identification and Evaluation of Alternative Solutions

The following alternative solutions were identified to address the Problem/Opportunity Statement:

- Alternative 1 – Do Nothing
- Alternative 2 – Road Improvements
- Alternative 3 – Road Widening
- Alternative 4 – Transportation Demand Management
- Alternative 5 – Active Transportation

A comparative evaluation of these five alternatives was completed for three major road segments of Eighth Line (Steeles Avenue to 10 Side Road, 10 Side Road to 15 Side Road and 15 Side Road to Maple Avenue) based on a set of evaluation criteria grouped under four key areas including, Natural Environment, Technical Environment, Socio-Cultural and Economic Environment, and Financial Environment.

The evaluation of the Alternative Solutions was based on an assessment of potential impacts and a review of input received from the public and regulatory agencies during the MCEA process.

The widening of Eighth Line is identified as the Preferred Solution. Alternative Solutions 2 and 5, which include road improvements and implementation of AT elements can be combined as part of the Preferred Solution.

Identification and Evaluation of Alternative Road Design Concepts

Several road design concepts were identified for four major road segments of Eighth Line (Steeles Avenue to 5 Side Road; 5 Side Road to 10 Side Road; 10 Side Road to 15 Side Road and 15 Side Road to Maple Avenue) to address the Preferred Solution. Road concepts for a three-lane and four-lane roadways were considered for all four major segments. Road concepts for five-lane roadways were also considered for the segments between 5 Side Road and 15 Side Road. All road concepts included active transportation elements; however, some road concepts provided more focus on active transportation by also including on-road bike lanes.

A comparative evaluation was completed for the five major road segments based on a set of evaluation criteria grouped under five key areas including, Natural Environment, Socio-Cultural and Economic Environment, Technical Environment, Implementation and Financial Environment.

Similarly, to the evaluation of the Alternative Solutions, the alternative road design concepts were compared based on an assessment of potential impacts and a review of input received from the public and regulatory agencies during the MCEA process.

The preferred road design concept for three of the four major road segments includes one travel lane in each direction and one bidirectional centre turn lane with MUPs on each side of the roadway. The preferred road design concept for the segment of Eighth Line between 10 Side Road and 15 Side Road varies from the other segments and includes two travel lanes in each direction and one bi-direction centre turn lane with MUPs on each side of the roadway.

A detailed matrix for the evaluation of Alternative Design Concepts is provided in Appendix F of this report.

Technical Support Studies

Air Quality Impact Assessment

The air quality effects due to the Eighth Line improvements were predicted at selected sensitive receptors using Ministry of the Environment, Conservation and Parks (MECP) approved computer modelling. The future predicted air quality levels at sensitive receptor locations (residential properties and the Living Hope Alliance Church) with and without the proposed undertaking were all below the MECP criteria on an annual basis (apart from benzene, which currently has a high background concentration that is already above the criterion).

Noise Impact Assessment

A noise impact assessment was conducted using MECP-developed modelling and the traffic data presented in the Transportation Study Report. The assessment used 21 Points of Reception (POR) at the plane of an open window. Seven Points of Reception also had a corresponding Outdoor Living Area (OLA). Modelled noise levels were calculated for three scenarios: Current, Future No Build and Future Build. The results of this assessment for each of the Current, Future No Build, and Future Build scenarios were compared to the MTO’s Noise Guide. It was determined that no significant increases to traffic noise are expected because of the project and therefore no mitigation measures for noise need to be considered for the project.

Culvert Condition Assessment

As part of the MCEA Study, a Condition Assessment of the municipal culvert and crossing structure inventory within the Study Area was undertaken. A detailed, element by element visual inspection of nineteen structures was completed. Any defects or deficiencies with the structures were identified and recommendations were provided for improvements if warranted. Based on the assessment, eight culverts are recommended to be replaced, four culverts are recommended for repair, four culverts are recommended for maintenance at outlets or upstream channel and three culverts have no recommendations for work.

Stormwater Management Assessment

A Stormwater Management Assessment was completed based on the preferred road design concept.

There are several major and minor/drainage watercourse crossings along the road corridor under study, including five on the urban section and two on the rural section of the Study Area. The Eighth Line is located within the headwaters area of Black, Silver and Sixteen Mile Creek watersheds, which empty into Lake Ontario approximately 30 km southeast of the site.

Existing Drainage Conditions: On the central and southern sections of the road, 10 Side Road to Maple, minor runoff is conveyed via storm sewers, and major overland flow drains to the existing low points and outlets. Aside from an oil/grit separator between 15 Side Road and Arborglen Drive and a grassed-swale/filter bed feature at the southwest corner of Eighth Line and 15 Side Road, there are no existing stormwater management features along the Eighth Line corridor.

Hydrology: A hydrologic analysis was completed to determine the quantity control requirements, and road crossing culvert conveyance capacities. The total flows were determined for the 2-to-100-year storms. Storage required for quantity control is anticipated to be provided within the proposed ditches for the rural cross sections (Steeles Avenue to 10 Side Road), and within the proposed storm sewers in the urban cross sections (10 Side Road to Maple Avenue).

Water Quality: The proposed road widening will result in an increase in impervious area, requiring “enhanced” water quality where possible, prior to discharge into any watercourse or the natural environment. For the rural cross-sections (Steeles Avenue to 10 Side Road), enhanced water quality will be achieved through enhanced grassed swales (EGS) where feasible in the roadside ditches. For the urban cross sections (10 Side Road to Maple Avenue), oil/grit separators in conjunction with catchbasin inserts will achieve the objective of enhanced water quality control.

Stormwater Management Design: The widening will result in an increase in runoff from the ROW, which is to be mitigated so as not to increase existing flow rates.

Hydrologic modeling was completed to determine the storage volumes required to achieve peak flow reduction. A summary of the quantity control design is provided in Section 8.4.4 and Table 8.2 of this report. Outlet locations are illustrated on the Stormwater Management Plans, which are provided in the Stormwater Management Assessment Report (see Appendix J of this report).

Quality and Erosion Control: A treatment train approach is proposed to provide enhanced quality control and erosion control for the hardened surfaces within the ROW.

Hydraulics: Most of the culverts provide conveyance of local drainage, some are associated with more significant watercourse crossings. The culverts have been assessed to confirm the hydraulic capacity against the design criteria. A summary of the proposed culvert dimensions and capacities is provided in Section 8.4.6 and Table 8.2 of this report. In some instances, the recommended culvert improvements noted in the Preferred Design Concept Plans and the Stormwater Management Plans are governed by the culvert structural condition i.e., are recommended for replacement for structural reasons rather than hydraulic capacity needs.

Description of the Preferred Design

Preferred Design Concept Plans have been prepared to illustrate the proposed improvements for the entire Study Area. An overview of the key features of the preferred design concept plans is provided in Section 9.0 of this report. This includes the proposed design criteria, cross-sections, horizontal alignment, vertical alignment, intersections, active transportation elements, grading requirements, considerations for utilities and services and property requirements. The estimated property area impacted (needed to be acquired) is 11.834 hectares. A preliminary cost estimate for the proposed road improvements was also prepared. The project cost for implementing the Eighth Line improvements as detailed in the preferred design concept is estimated at approximately $63.8 million, excluding property, engineering / inspection and HST.

Environmental Impacts, Mitigation Measures, and Monitoring

To mitigate potential impacts of the proposed project on the environmental features of the study area, several mitigation measures are proposed for the construction, operation and maintenance of the proposed road improvements within the Study Area. All mitigation measures and monitoring activities shall be reviewed and confirmed during the detailed design phase of the project. In general, mitigation measures have been proposed for the following aspects of the environment:

- Natural Environment
  - Vegetation
  - Trees
  - Wildlife and Wildlife Habitat (General) – Breeding Birds
  - Wildlife and Wildlife Habitat (General)
  - Woodlands (Including Significant Woodlands)

  - Wetlands (PSW and Unevaluated)
  - Fish Habitat
- Physical Environment
  - Surface Water
  - Surface and Ground Water
  - Surface and Groundwater (Headwater features)
- Socio-Economic Environment
  - Air Quality
  - Noise
  - Property Impacts
  - Agricultural Environment
- Cultural Environment
  - Cultural Heritage
  - Archaeology
- Transportation and Built Environment
  - Human Health and Safety
  - Transportation Infrastructure

Climate Change

There are two types of climate change effects that can be considered. The first is the effect that a project can have on climate change. The second is the effect climate change has on the project.

Effects on Climate Change from the Project

The impact of the proposed road improvements on greenhouse gas (GHG) emissions within Study Area was determined to be negligible as annual concentrations for all GHGs are estimated to be well below 0.1% of the provincial GHG levels associated with the road transportation sector. The Project is not anticipated to produce significant GHG emissions throughout the construction phase.

Existing vegetation will be retained to the extent practicable. Removals will be kept to a minimum to limit direct effects to vegetation communities and vascular plants, as well as indirect effects.

Effects on the Project from Climate Change

As a result of climate change, storm events are predicted to become more intense, which can result in larger volumes of precipitation at one time. It can also lead to increased occurrence of extreme weather events such as floods, droughts, ice storms and heat waves. Precipitation, in any form, is the key climate and weather-related variable of concern with respect to drainage and culvert design.

Issues with the rutting and cracking of the pavement (longitudinal and alligator) will be exacerbated by climate change with transverse cracking becoming less of a problem.

Erosion and Sediment Control (ESC) measures including the development of an ESC Plan, will be initially prepared during detailed design and implemented during construction to ensure stormwater runoff is controlled and sediment is prevented from entering sewers and watercourses. Installation and monitoring of appropriate ESC measures will help mitigate potential effects of climate change on the Project.

Project Implementation

Phase 5 or 'Project Implementation' of the Municipal Class EA process involves the completion of detailed design drawings, specifications and tender documents to be provided to a successful contractor for the construction of the proposed project. During the implementation phase, the Town will need to adhere to several mitigation measures and monitoring plans as documented in this Environmental Study Report, some of which will need to be in place prior to and during construction. Permits will need to be applied for from various regulatory agencies.

Study Consultation

A wide range of stakeholders were identified and contacted at the onset of the study and during the EA process including relevant review agencies and organizations, Indigenous communities and residents who may be affected or have interest in the study. These stakeholders were contacted through direct distribution of notices as well as publications within local newspapers and on the Town of Halton Hills website. Several consultation activities were undertaken including:

- Development of a stakeholder contact list, including federal, provincial ministries/agencies, including Conservation Halton, Credit Valley Conservation, Halton Region, as well as Key Landowners / Developers.
- Confirmation of project interest with identified Indigenous Communities, including Haudenosaunee Confederacy, Haudenosaunee Development Institute (HDI), Nation Huronne-Wendat, Métis Nation of Ontario, Mississaugas of the Credit First Nation, and Six Nations of the Grand River.
- Development of a project specific page on the Town of Halton Hills website (https://www.haltonhills.ca/en/residents/environmental-assessment-ea-studies.aspx#Eighth-Line-Municipal-Class-Environmental-Assessment-study) which was updated throughout the Study.
- Development of a project Let's Talk Halton Hills Engagement Platform (https://letstalkhaltonhills.ca/eighth-line).
- Distribution of project notices, including publishing in the local newspapers and mailings / emails.
- Holding three Public Information Centres (PICs).
- Additional meetings with key stakeholders.
- Communication with Indigenous Communities.

- Public release of the Environmental Study Report (ESR).

Comments received from various interested persons throughout the study were considered in the decision-making process and are summarized in this ESR.

The first PIC was held in person on October 16, 2019, from 6:00 p.m. to 8:00 p.m. It informed the public of the project, background information, problem / opportunity statement, illustrated the existing environment in the Study Area and presented the preliminary preferred solutions for the major road segments of the Study Area.

The second PIC was held online from June 8, 2020, to June 30, 2020, and informed the public of the project progress. It provided a summary of the alternative design concepts considered and the preliminary preferred design concepts for each of the major road segments of the Study Area. A pre-recorded presentation and the preliminary preferred design concept plans were made available through the Let's Talk Halton Hills engagement platform.

The third PIC was held live via Zoom on June 6, 2022, and presented an update on the MCEA Study and the key elements of the preferred design concept plans, discussed the results of additional technical studies completed after PIC#2 and provided a live forum for members of the public to raise questions or comments to the study team members present.

Consultation activities undertaken as part of this study are further detailed in Section 13.0 of this report.

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Note: Appendices available upon request. Contact Ivan Drewnitski at the Town (contact information provided in Section 1.2.3 of this report).

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Disclaimer

Glossary

Abbreviation	Long-Form
AT	Active Transportation
ATMP	Active Transportation Master Plan
BHR	Built Heritage Resource
CH	Conservation Halton
CHL	Cultural Heritage Landscape
CHRA	Cultural Heritage Resource Assessment
CMP	Construction Management Plan
CVC	Credit Valley Conservation
DFO	Fisheries and Oceans Canada
EA	Environmental Assessment
ELC	Ecological Land Classification
ESA	Environmental Sensitive Area
ESC	Erosion and Sediment Control
ESG	Enhanced Grass Swale
ESMC	East Sixteen Mile Creek
ESR	Environmental Study Report
GGH	Greater Golden Horseshoe
GHG	Greenhouse gas
HADD	Harmful Alteration, Disruption or Destruction
HASP	Health and Safety Plan
HHOP	Halton Hills Official Plan
HROP	Halton Region Official Plan
HVA	Highly Vulnerable Aquifer
ICA	Issue Contributing Area
LID	Low Impact Development
MCEA	Municipal Class Environmental Assessment
MECP	Ministry of the Environment, Conservation and Parks
MNDMNRF	Ministry of Northern Development, Mines, Natural Resources and Forestry
MSMC	Middle Sixteen Mile Creek
MTO	Ministry of Transportation
MUP	Multi-use path
NER	Natural Environment Report
NHS	Natural Heritage System
OGS	Oil / grit separator
OLA	Outdoor Living Area
OPSS	Ontario Provincial Standards Specification
PGEA	Premier Gateway Employment Area
PIC	Public Information Centre

Abbreviation	Long-Form
POR	Point of Reception
PPS	Provincial Policy Statement
PSW	Provincially Significant Wetland
ROW	Right-of-way
SAR	Species at Risk
SGRA	Significant Groundwater Recharge Area
SWH	Significant Wildlife Habitat
SWM	Stormwater Management
TMP	Transportation Master Plan
WHPA	Wellhead Protection Area

1.0 Introduction

The Town of Halton Hills ('Town') has undertaken a Municipal Class Environmental Assessment (MCEA) to determine the needs of transportation corridor improvement along Eighth Line from Steeles Avenue to Maple Avenue to support future growth. R.J. Burnside & Associates ('Burnside') facilitated the MCEA on behalf of the Town.

The MCEA study follows a comprehensive planning and design process to ensure protection of the environment, facilitate a proactive and meaningful consultation with a broad range of stakeholders, determine a solution that provides the required road corridor improvements to meet future needs while minimizing disruption to the existing residents and business and produces a comprehensive documentation that meets all the requirements of the MCEA process.

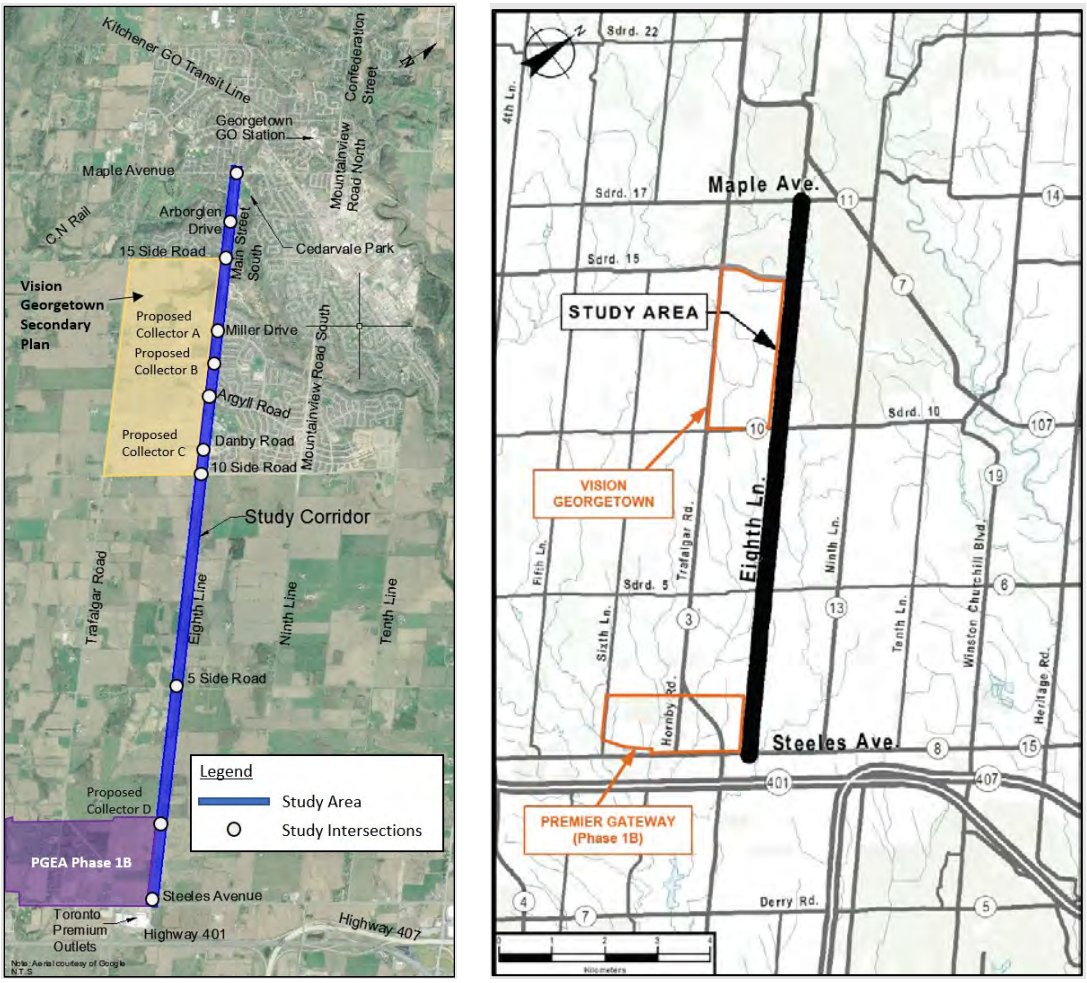
1.1 Description of Study Area

Eighth Line is a two-lane minor arterial road roadway south of the Georgetown urban core. From Steeles Avenue to 15 Side Road, the road is known as "Eighth Line" and north of 15 Side Road, the road is referred to as "Main Street South". The project limits for this study extend from Steeles Avenue to Maple Avenue as shown in Figure 1.1 for a length of approximately 10.5 km and generally encompasses the lands within 50 m of the existing right-of-way (ROW).

The Study Area includes the following intersections along Eighth Line:

- Steeles Avenue
- 5 Side Road
- 10 Side Road
- Danby Road
- Argyll Road
- Miller Drive
- West Branch Drive
- 15 Side Road
- Cromar Court
- Arborglen Drive
- Cindebarke Terrace
- Maple Avenue
- All potential future collector roads as a result of proposed developments in the area:
  - Proposed Collector A (opposite Miller Drive)
  - Proposed Collector B (between Argyll Road and Miller Drive)
  - Proposed Collector C (opposite Danby Road)
  - Proposed Collector D (between Steeles and 5 Side Road)

Figure 1.1: Study Area



The surrounding area consists of primarily rural residential properties and farmlands from Steeles Avenue to 10 Side Road and urban and developed sections from 10 Side Road to Maple Avenue.

Other notable existing land uses within the Study Area include:

- Toronto Premium Outlets located south of Steeles Avenue.
- Hornby Cemeteries on the northeast and northwest quadrants of the Steeles Avenue intersection.
- Heritage Properties including McCallum Farmhouse, Hunter Farmhouse, Reid Farmstead / Allison Farm and Chestnut Tree (former Reed Farmhouse).
- Living Hope Church located south of Arborglen Drive.
- Cedarvale Park located southeast of the Maple Avenue intersection.

1.2 Municipal Class EA Process

The planning of public sector projects or activities that have the potential for environmental effect is subject to an MCEA as required by *Ontario's Environmental Assessment Act, R.S.O. 1990* and requires the proponent to complete an Environmental Assessment (EA).

The MCEA process was developed by the Municipal Engineers Association, in consultation with the Ministry of the Environment, Conservation and Parks (MECP), as an alternative method to Individual EAs for recurring municipal projects that were similar in nature, usually limited in scale and with a predictable range of environmental impacts, which were responsive to mitigating measures. The MCEA solicits input from regulatory agencies, the municipality, Indigenous communities and the public at the local level. This process leads to an evaluation of the alternatives in view of the significance of the environmental effects, including the technical, natural, social / cultural and economic impact of a project, and the choice of effective mitigation measures.

1.2.1 Project Schedules

In March 2023, an update to the MCEA process included revised descriptions of the class of undertakings carried out by municipalities and subject to the MCEA process. Given the timing of the update to the MCEA process and the progress of the project, the Town will complete the project under the transition provisions set out in the 2023 update that allows for a proponent to continue with the MCEA process that was started for the project prior to the 2023 update.

Under the previous Municipal Engineering Association MCEA Document (October 2000, as amended in 2007, 2011 and 2015), there are four categories of assessment within the MCEA process that are dependent on the complexity and potential for environmental impact.

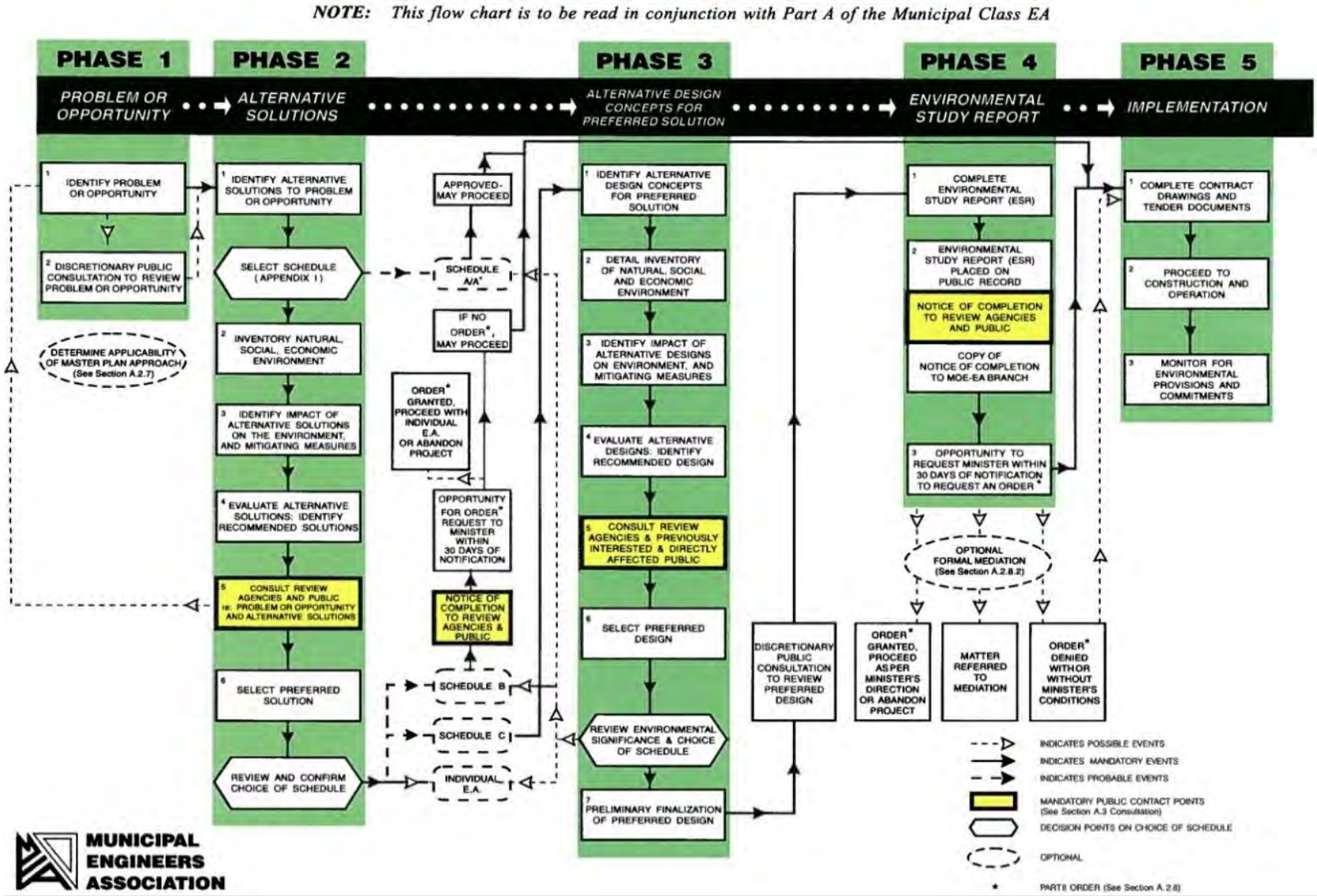
- **Schedule A:** Projects are limited in scale, have minimal adverse environmental impacts and require no public notification or documentation.
- **Schedule A+:** Projects are limited in scale, have minimal adverse environmental impacts and require no documentation. The public is to be advised prior to implementation.
- **Schedule B:** Projects have the potential for some adverse environmental impacts. The proponent is required to undertake a screening process, involving mandatory contact with the directly affected public and regulatory agencies, to ensure that they are aware of the Project and that their concerns are addressed. Schedule B Projects require that a Project File Report be prepared and made available for public review. Proponents undertaking Schedule B Projects are required to complete Phase 1, 2 and 5 of the MCEA process.

- **Schedule C:** Projects have the potential for significant environmental impacts and must proceed under the full planning and documentation procedures of the MCEA document. Schedule C projects require that an Environmental Study Report (ESR) be prepared and filed on the public record for review by the public and regulatory agencies. Proponents undertaking Schedule C Projects are required to complete Phase 1 through 5 of the MCEA process.

The phases of the MCEA process are illustrated in Figure 1.2 and summarized as follows:

- Phase 1: Identify the problem (deficiency) or opportunity.
- Phase 2: Identify alternative solutions to address the problem or opportunity by taking into consideration the existing environment and establish the preferred solution taking into account public and review agency input. At this point, determine the appropriate schedule for the undertaking and document decisions in a Project File for Schedule B projects, or proceed through the following phases for Schedule C projects.
- Phase 3: Examine alternative methods of implementing the preferred solution, based upon the existing environment, public and review agency input, anticipated environmental effects and methods of minimizing negative effects and maximizing positive effects.
- Phase 4: Document, in an ESR, a summary of the rationale, and the planning, design and consultation process of the project as established through the above phases and make such documentation available for scrutiny by review agencies and the public.
- Phase 5: Complete contract drawings and documents and proceed to construction and operation. Monitor construction for adherence to environmental provisions and commitments. Where special conditions dictate, also monitor the operation of the completed facilities.

Figure 1.2: Municipal Class Environmental Assessment Process Flow Chart



1.2.2 Class EA Schedule Confirmation

Based on the description provided in the Municipal Engineers Association MCEA Document (2000, as amended in 2004, 2007, 2011 and 2015) for municipal road and infrastructure project activities, the alternatives being considered, and the presence of sensitive natural heritage features and the potential for environmental effect, it was determined that a Schedule C MCEA with an ESR was appropriate for the Eighth Line undertaking.

As a Schedule C project, the project planning proceeds under the planning and documentation procedures of Phases 1 through 4 of the MCEA process (see Figure 1.2). Through this process, reasonable solutions identified are evaluated with input from agencies, Indigenous communities and stakeholders toward a recommendation for a preferred solution. As a minimum, public consultation is required at three stages under a Schedule C project. At the conclusion of Phase 4, the appropriate MCEA planning Schedule is confirmed and, if there are no outstanding concerns, the proponent may proceed to design and implementation.

1.2.3 Class Environmental Assessment Section 16(6) Order (formerly Part II Order)

Section 16 Order requests were previously known as Part II Order requests. The MECP has the authority and discretion to make an Order under Section 16 of the Environmental Assessment Act. A Section 16 Order may require that the proponent of a project going through a MCEA process:

1. Submit an application for approval of the project before they proceed. This is generally referred to as an Individual Environmental Assessment.
2. Meet further conditions in addition to the conditions in the Class EA. This could include conditions for:
   - Further study;
   - Monitoring; and
   - Consultation.

The minister can also refer a matter in relation to a Section 16(6) Order request to mediation.

A Section 16(6) Order can be requested if:

- You have outstanding concerns that a project going through a Class EA process may have a potential adverse impact on constitutionally protected Aboriginal and treaty rights.
- You believe that an Order may prevent, mitigate, or remedy this impact.

In accordance with the requirements of the MCEA, this ESR is available for public review and comment for a period of 30 calendar days plus an additional 30 calendar days elected to be provided by the Town (for a total of 60 calendar days) following the publication of the Notice of Completion.

Interested persons may provide written comments to our project team within the comment period. All comments and concerns should be sent directly to the Town of Halton Hills contact below:

Ivan Drewnitski, C.Tech.
Transportation Planning Technologist
Town of Halton Hills
Transportation and Public Works
1 Halton Hills Drive
Halton Hills ON L7G 5G2
Tel: 905-873-2601 ext. 2328
Email: idrewnitski@haltonhills.ca

In addition, a request may be made to the MECP for an order requiring a higher level of study (i.e., requiring an individual / comprehensive MCEA approval before being able to proceed), or that conditions be imposed (e.g., require further studies), only on the grounds that the requested order may prevent, mitigate, or remedy adverse impacts on constitutionally protected Aboriginal and Treaty rights. Requests on other grounds will not be considered. Requests should include the requester contact information and full name for the Ministry.

Requests should specify what kind of order is being requested (request for additional conditions or a request for an individual / comprehensive environmental assessment), how an order may prevent, mitigate, or remedy those potential adverse impacts, and any information in support of the statements in the request. This will ensure that the ministry is able to efficiently begin reviewing the request.

The request should be sent in writing or by email to:

Minister of the Environment, Conservation and Parks
Ministry of the Environment, Conservation and Parks
777 Bay Street, 5th Floor
Toronto ON M7A 2J3
minister.mecp@ontario.ca

and

Director, Environmental Assessment Branch
Ministry of the Environment, Conservation and Parks
135 St. Clair Avenue West, 1st Floor
Toronto ON M4V 1P5
EABDirector@ontario.ca

Requests must also be sent to the Town of Halton Hills.

If the Minister does not receive a request for a Section 16 Order within the 30 calendar days, then the project will move forward to Detailed Design, approvals process and subsequent implementation of the Preferred Design Concept.

2.0 Federal, Provincial, Regional and Local Planning Context

2.1 Federal Planning Context

2.1.1 Fisheries Act

Under the federal *Fisheries Act, 2019*, it is prohibited to cause Harmful Alteration, Disruption or Destruction (HADD) of fish habitat, as well as the death of fish by means other than fishing. As defined in subsection 2(1) of the *Fisheries Act*, fish habitat is inclusive of all waters frequented by fish and any other areas upon which fish depend directly or indirectly to carry out life processes. These areas can include, but are not restricted to, spawning grounds and nursery, rearing, food supply, and migration areas.

The Act is administered by Fisheries and Oceans Canada (DFO) and provisions apply to all fish and fish habitat within Canada. Proponents are responsible for planning and implementing works, undertakings or activities in a manner that avoids harmful impacts, specifically the death of fish and HADD. Where proponents believe their work will result in harmful impacts to fish and / or fish habitat, proponents shall work with DFO to assess the risk of their proposed work resulting in the death of fish or HADD of fish habitat and provide guidance on how to comply with the *Fisheries Act*.

Fish habitat is present within the Study Area. Should project activities occur below the highwater mark of any of the identified watercourses or headwater drainage features, an assessment of potential impacts to fish and fish habitat will be completed and submitted to DFO for project review. If DFO determines death of a fish and / or HADD of fish habitat cannot be avoided with appropriate protection and mitigation measures, a letter of approval or authorization form from DFO may be required.

2.1.2 Migratory Birds Convention

The federal *Migratory Birds Convention Act, 1994* protects nests, eggs, and young of bird species from harassment, harm, or destruction. While the Act does not require any permits or approvals, proponents must comply with the Act or face a fine.

Vegetation and tree removal is anticipated due to the nature of the project. To reduce the risk of contravening the *Migratory Bird Convention Act*, timing constraints shall be applied to avoid any limited vegetation clearing (including grubbing) and / or structure works (construction, maintenance) during the breeding bird period – broadly from April 1 to August 31 for most species (regardless of the calendar year). In addition to avoidance of timing windows, mitigation measures will also be implemented.

2.2 Provincial Planning Context

There are several plans that set the context for growth within the Study Area, which is a significant driver for the proposed improvements to Eighth Line. A discussion of these planning documents is provided in the following sections.

2.2.1 Provincial Policy Statement

The 2020 Provincial Policy Statement (PPS) is the complimentary policy document to the *Planning Act, 1990*, issued under Section 3 of the *Planning Act*.

The PPS states that municipal projects should be directed to existing settlement areas, create stronger and improved communities, and have little to no impact on the natural features of the area. In general projects should have consideration for future needs to ensure the benefits of the project are far-reaching. Section 1.6 of the PPS contains specific guidance on Infrastructure and Public Service Facilities:

> *"1.6.1 Infrastructure and public service facilities shall be provided in an efficient and cost-effective manner that prepares for the impacts of a changing climate while accommodating projected needs.*
>
> *Planning for infrastructure and public service facilities shall be coordinated and integrated with land use planning and growth management so that they are:*
>
> *a) financially viable over their life cycle, which may be demonstrated through asset management planning; and*
>
> *b) available to meet current and projected needs.*
>
> *1.6.3 Before consideration is given to developing new infrastructure and public service facilities:*
>
> *a) the use of existing infrastructure and public service facilities should be optimized; and*
>
> *b) opportunities for adaptive re-use should be considered, wherever feasible.*
>
> *1.6.5 Infrastructure and public service facilities should be strategically located to support the effective and efficient delivery of emergency management services, and to ensure the protection of public health and safety in accordance with the policies in Section 3.0: Protecting Public Health and Safety."*

As such, improvements made to public infrastructure, including the potential improvements to Eighth Line are consistent with the PPS.

2.2.2 A Place to Grow: Growth Plan for the Greater Golden Horseshoe

The 2020 Growth Plan for the Greater Golden Horseshoe (GGH) is a Provincial Plan that directs how regional growth in the GGH is to be managed up to 2041. The plan carries policies forward from the PPS, working to reduce development sprawl and providing direction in where intensification should take place. There are several provisions within the policy that are relevant to the proposed improvements to Eighth Line. Section 3.2.2 of the Growth Plan outlines the general provisions of Transportation for the GGH. According to this policy, the transportation system within the GGH will be planned and managed to:

> *a) Provide connectivity among transportation modes for moving people and moving goods;*
>
> *b) Offer a balance of transportation choices that reduces reliance upon the automobile and promotes transit and active transportation.*

Section 4 of the Growth Plan details the protection of natural features within the GGH. Within the Natural Heritage System:

> *iii. the removal of other natural features, not identified as key natural heritage features and key hydrologic features is avoided, where possible. Such features should be incorporated into the planning and design of the proposed use wherever possible.*

Climate change is also addressed in Section 4 of the Growth Plan. According to the growth plan, in planning to reduce greenhouse gas (GHG) emissions and address the impacts of climate change, municipalities are encouraged to:

> a) *"develop strategies to reduce greenhouse gas emissions and improve resilience through the identification of vulnerabilities to climate change, land use planning, planning for infrastructure including transit and energy, green infrastructure, and low impact development, and the conservation objectives in policy 4.2.9.1."*

2.2.3 Provincial Endangered Species Act

The *Endangered Species Act (ESA), 2007* provides protection for SAR and their habitat (MNRF, 2007). The *ESA, 2007* was administered by the Ministry of Natural Resources and Forestry (MNRF) but is now administered by the MECP and provides policies for the protection of extirpated, endangered and threatened species, as well as species of special concern. These four categories of species form the Species at Risk in Ontario

(SARO) List, which are classified by the Committee on the Status of Species at Risk in Ontario (COSSARO). COSSARO is also responsible for maintaining criteria for assessing and classifying SAR (MNRF, 2017b).

The *ESA, 2007* helps protect species (Section 9) and their habitat (Section 10). Section 9(1)(a) of the *ESA, 2007* states:

> *"no person shall kill, harm, harass, capture or take a living member of a species that is listed on the SARO list as extirpated, endangered or threatened". Section 10(1) (a) of the ESA, 2007 states "no person shall damage or destroy the habitat of a species that is listed on the SARO list as an endangered or threatened species".*

The *ESA, 2007* includes a general habitat regulation as well as species specific habitat regulations. Species up-listed to endangered or threatened automatically receive general habitat protection under the *ESA, 2007*. The province is then required to prepare a species recovery strategy and establish a habitat regulation according to requirements of the *ESA, 2007*.

2.3 Regional Planning Context

2.3.1 Halton Region Official Plan

The Halton Region Official Plan (HROP) was adopted by the Council of the Regional Municipality of Halton in December 2009 and is based on The Region Plan (1995). The Region is working on an update to the HROP. The Office Consolidation of the Official Plan (November 10, 2021) was referenced for the purposes of this assessment. The HROP provides clear direction as to how physical development should take place in Halton Region, which is accomplished by adopting to the identified goals and objectives. The HROP conforms with other provincial policies including the Niagara Escarpment Plan, the Greenbelt Plan, and the Growth Plan for the GGH. The overall philosophy and planning vision of the HROP is based on the concepts of sustainable development, and balancing economic development with natural environment, heritage, and culture.

The Regional Natural Heritage System is identified in Map 1G of the HROP and is described as a system of connected natural areas and open space to preserve and enhance the biological diversity and ecological functions within Halton. As part of the Region's review of the OP, the Regional Natural Heritage System is also being reviewed.

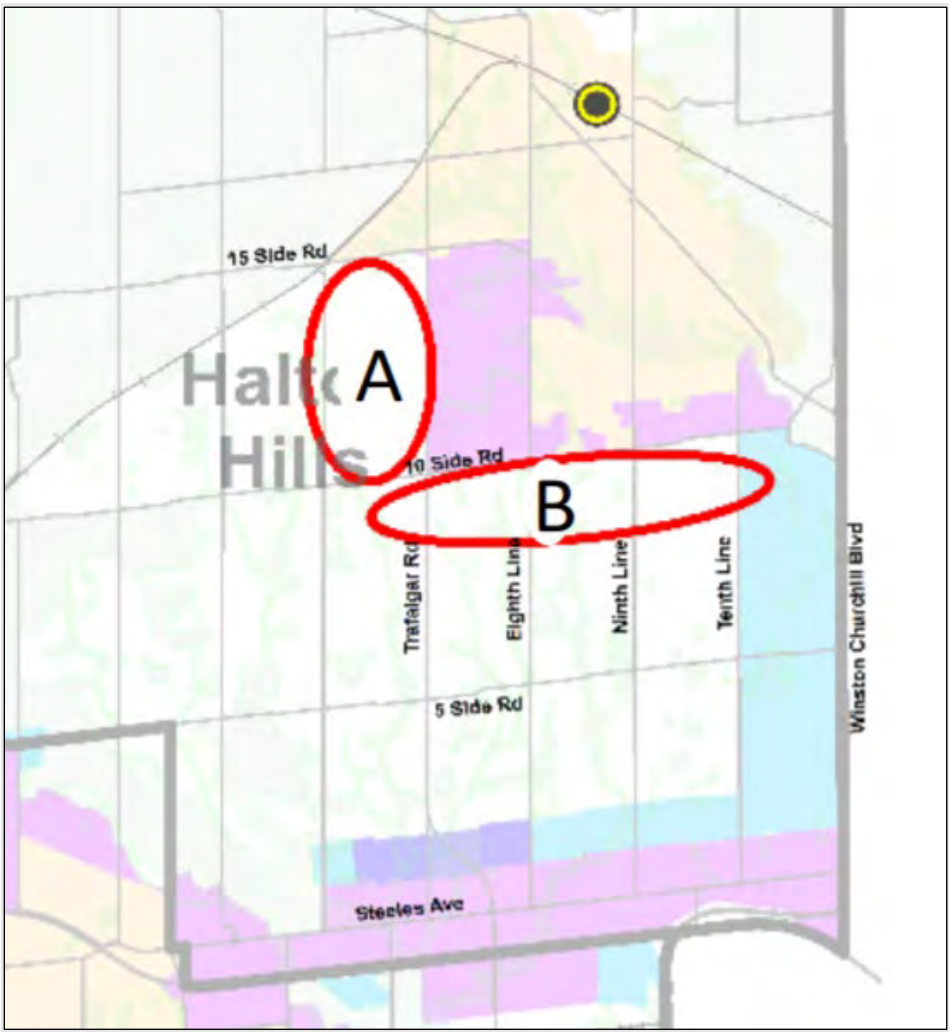
2.3.2 Halton Region Integrated Growth Management Strategy

The Regional Urban Structure Discussion Paper is a component of the Integrated Growth Management Strategy and identifies potential locations for new Community Area Designated Greenfield Area, which provide for the contiguous extension of the existing

urban area, include a westerly (Area A) and / or southerly (Area B) expansion of the Georgetown Urban Area as shown on Figure 2.1. Both Area A and Area B lie along the Eighth Line corridor. As with other potential locations, they were chosen based on the presence of the Future Strategic Employment Area.

The locations (and geographic size) of the areas proposed for new Community Area Designated Greenfield Area, will be refined at the next stage of the Integrated Growth Management Strategy process, in which more detailed Growth Concepts are developed, and the quantum of land finalized through the land needs assessment.

Figure 2.1: Potential Locations for new Community Area Designated Greenfield Area Identified by the Integrated Growth Management Strategy Regional Urban Structure Discussion Paper (June 2020)



2.4 Local Planning Context

2.4.1 Town of Halton Hills Official Plan

The Town of Halton Hills Official Plan (HHOP) was adopted by Town Council in September 2006, approved by Halton Region in March 2008, and consolidated on December 21, 2020. The HHOP provides policies for the development and growth until 2031. The goals and strategic objectives in the official plan are reflective of the Vision developed during the planning and Official Plan process. Eighth Line is a minor arterial road and surrounding roads are identified in Figure 2.2. Eighth Line will connect the Georgetown Urban Area with the Premier Gateway Employment Area (Figure 2.3).

The Study Area largely consists of Low-Density Residential Areas and crosses through Greenlands. Located adjacent to Eighth Line is Future Residential / Mixed Use Area, Major Parks and Open Space Area, Major Institutional Area, and Medium Density Residential Area. Land use designations are shown in Figure 2.4.

The HHOP incorporates aspects of the PPS, the Greenbelt Plan, the NEP, the Growth Plan for the GGH and the HROP into its policies. The OP is to be used along with other provincial and municipal policies, guidelines, and regulations to guide the actions of the Town and to direct growth and development. The HHOP recognizes Halton Hills' unique significant environmental features and has incorporated an "environment-first philosophy" in land use planning.

The lands north of Steeles Avenue, from Eighth Line to Winston Churchill Boulevard are designated Urban Lands in the HHOP to accommodate employment land needs for the 2031 planning horizon. The Town initiated the Phase 2B Secondary Plan in May 2020 and it is scheduled to be completed by spring 2023. The purpose of the project is to develop a comprehensive Secondary Plan with appropriate land use designations, policies and urban design guidelines for the Premier Gateway Phase 2B (PGP2B) Employment Area. The PGP2B lands have also been identified by the Ministry of Municipal Affairs and Housing (MMAH) as a Provincially Significant Employment Zone (PSEZ), which emphasizes their key role in helping drive job growth and prosperity across the region.

Figure 2.2: Schedule B1 - Functional Plan of Major Transportation Facilities Nearby the Study Area (HHOP, December 21, 2020, Consolidation)

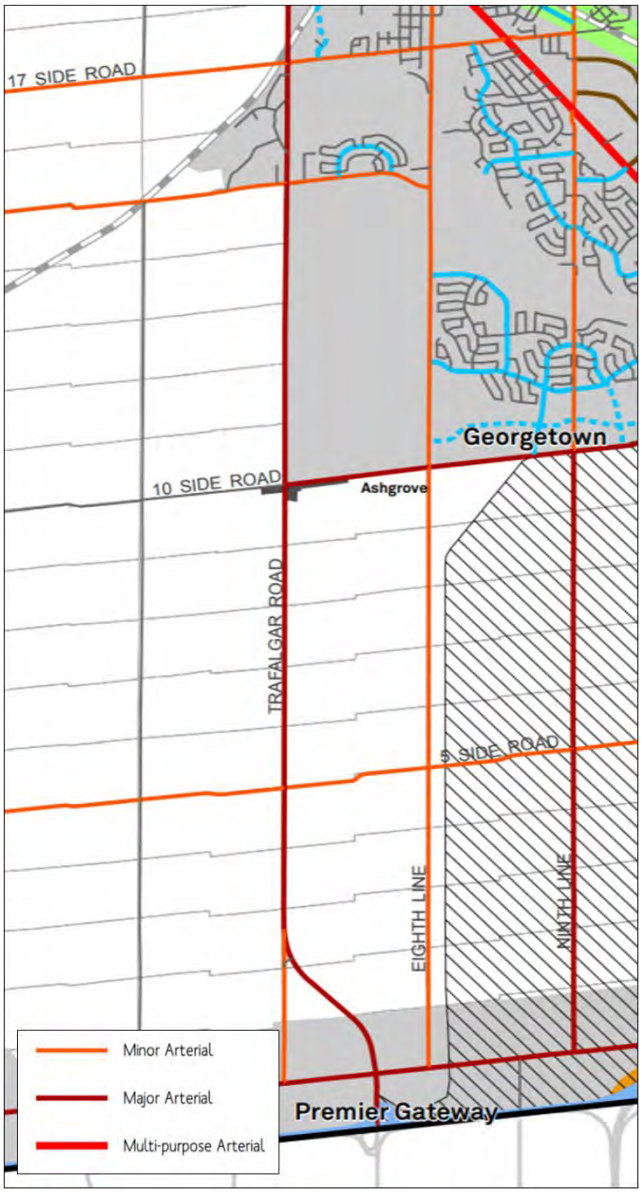


Figure 2.3: Schedule A1 (Land Use Plan)

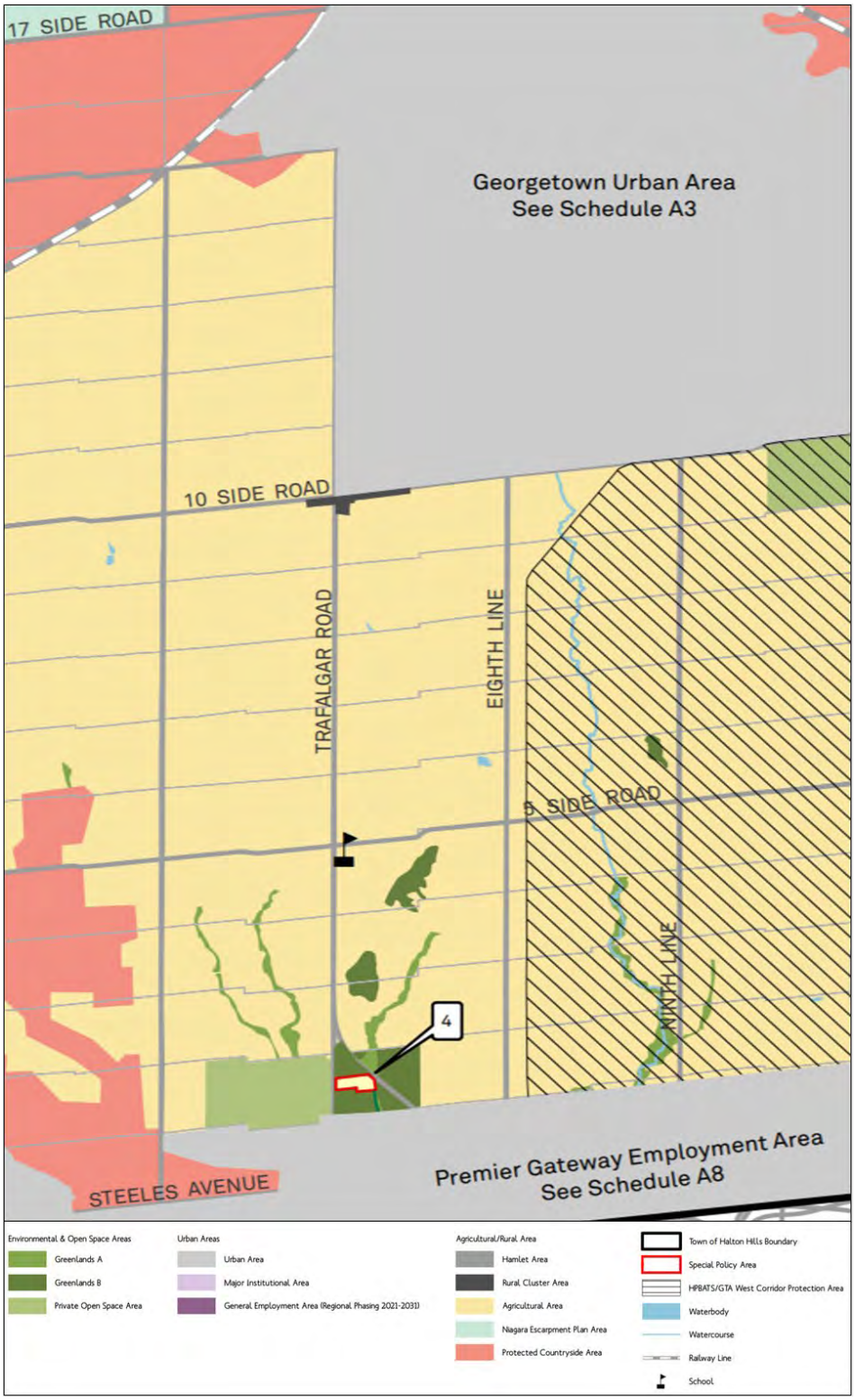


Figure 2.4: Schedule A3 - Georgetown Urban Area Land Use Plan (HHOP, December 21, 2020 Consolidation)

2.4.2 Halton Hills Strategic Plan

The Halton Hills Strategic Plan recognizes the priorities and focus areas:

- Shaping growth.
- Transportation.
- Climate change and the environment.
- Fiscal and corporate management.
- Local autonomy and advocacy.
- Ensure a vibrant agricultural community.
- Youth and senior initiatives.

The goals of the Transportation priority are identified below:

> *People and goods move freely through Halton Hills on well-maintained transportation infrastructure. Getting around is safe for residents of all ages through a combination of traffic calming and active transport priority routes and trails. The municipality has a transit plan that is suitable for moving its residents and workers to where they want to go. Halton Hills advocates for greater regional connectivity for its residents and businesses.*

The Transportation focus area aligns with the vision, mission, and values of the Town of Halton Hills. Focus areas to support the Transportation priority area are Trucks, Bike Lanes, Traffic Safety, and Transit.

2.4.3 Town of Halton Hills Transportation Master Plan

The planned improvements in the Study Area as defined in the 2011 Town of Halton Hills Transportation Master Plan (TMP) identified the need to reconstruct Eighth Line to a rural collector standard. The TMP also identifies the need for geometric improvements for Maple Avenue and Main Street South intersection (which is excluded from this Eighth Line EA Study). However, as discussed in the following sections, through the studies for Vision Georgetown Secondary Plan and Premier Gateway Employment Area (PGEA), additional improvements to Eighth Line were identified to accommodate growth.

The Town will be initiating a review of the TMP in the upcoming year.

2.4.4 Vision Georgetown Secondary Plan

The ‘Vision Georgetown’ Secondary Plan outlines the Town’s vision for a Future Residential / Mixed Use Area in south Georgetown and will play a key role in accommodating the Town’s projected population growth to the year 2031. The Secondary Plan, officially passed by council in June 2018, a result of the ‘Vision Georgetown’, applies to the Southwest Georgetown lands bounded by 10 Side Road to

the south, 15 Side Road to the north, Trafalgar Road to the west, and Eighth Line to the east (see Figure 2.5).

The Analysis documented as part of the Vision Georgetown Transportation Analysis Report (April 2018) identifies widening of Eighth Line from 2 to 4 lanes from 15 Side Road to Steeles Avenue as part of the "further improvements to the road network […] as per directions from the Town [of Halton Hills]'s staff". Based on the analysis performed (considering the Eighth Line road widening as the baseline), the report identified no capacity issues at the Eighth Line intersections with Miller Drive, Argyll Drive, and Danby Drive, under future (2031) conditions. However, it identified requirements for intersection improvements in the study area including Eighth Line / 10 Side Road intersection, Main Street / 15 Side Road intersection, and Main Street / Maple Avenue intersection (under future [2031] conditions).

Figure 2.5: Vision Georgetown Secondary Plan Boundary

2.4.5 Premier Gateway Phase 1B Employment Area Secondary Plan (Official Plan Amendment No. 30)

The PGEA is an important Employment Area and a key part of the Region's Growth Strategy. Part of this area falls in Study Area, more specifically the area known as 'Phase 1B' as illustrated in Figure 2.6 (including the 'replacement lands' [ROPA 47]).

Figure 2.6: Premier Gateway Employment Area Phase 1B

2.4.6 Town of Halton Hills Active Transportation Master Plan

The Town's Active Transportation Master Plan recognizes that while Halton Hills is currently largely auto-centric, there is significant potential to increase active transportation thanks to the beautiful landscape, cyclable destinations and areas of interest, and existing network of trails and other active transportation infrastructure. Seven specific goals were identified in this document, of which the first is to "*Provide a network of on and off-road facilities that is connected and continuous and considered safe and comfortable by bikes*".

2.4.7 Town of Halton Hills Transit Service Strategy (2019)

The Town's Transit Service Strategy expands on the existing transit service to provide an affordable and accessible system tailored to local needs and opportunities. The transit system will continue to evolve to accommodate growth. The document provides a long-term plan for transit needs in Halton Hills and evaluates service delivery alternatives.

2.4.8 Credit Valley Conservation

A portion of the Study Area falls within the Credit Valley Conservation (CVC) Regulated Area due to hazards associated with a tributary of the Credit River which traverses the property and Hungry Hollow Provincially Significant Wetland (PSW). As such, the proposed road improvements would require a permit application under O. Reg. 160/06.

CVC will assess the application in order to determine if the proposed works will be affected by the above, in accordance with their programs and policies.

2.4.9 Conservation Halton

A portion of the Study Area falls within the Conservation Halton (CH) Regulated Area due to presence of a wetland adjacent to the corridor and hazards associated with Sixteen Mile Creek while traverses the Study Area. As such, the proposed road improvements would require a permit application under O. Reg. 162/06. CH will assess the application in order to determine if the proposed works will be affected by the above, in accordance with their programs and policies.

3.0 Transportation Conditions

A Transportation Study Report was completed as part of the MCEA study, which assessed both the existing and future predicted traffic conditions within the Study Area. A copy of the Transportation Study Report is provided in Appendix A of this report. The key findings of the Transportation Study Report are provided in the following sections.

Subsequent to the completion of the Transportation Study Report, the Study Team completed further analysis at the Eighth Line and Danby Road intersection relating to the recommended intersection configuration. This analysis is discussed further in Section 9.5.5. A technical letter was prepared to document this analysis and is provided in Appendix J3.

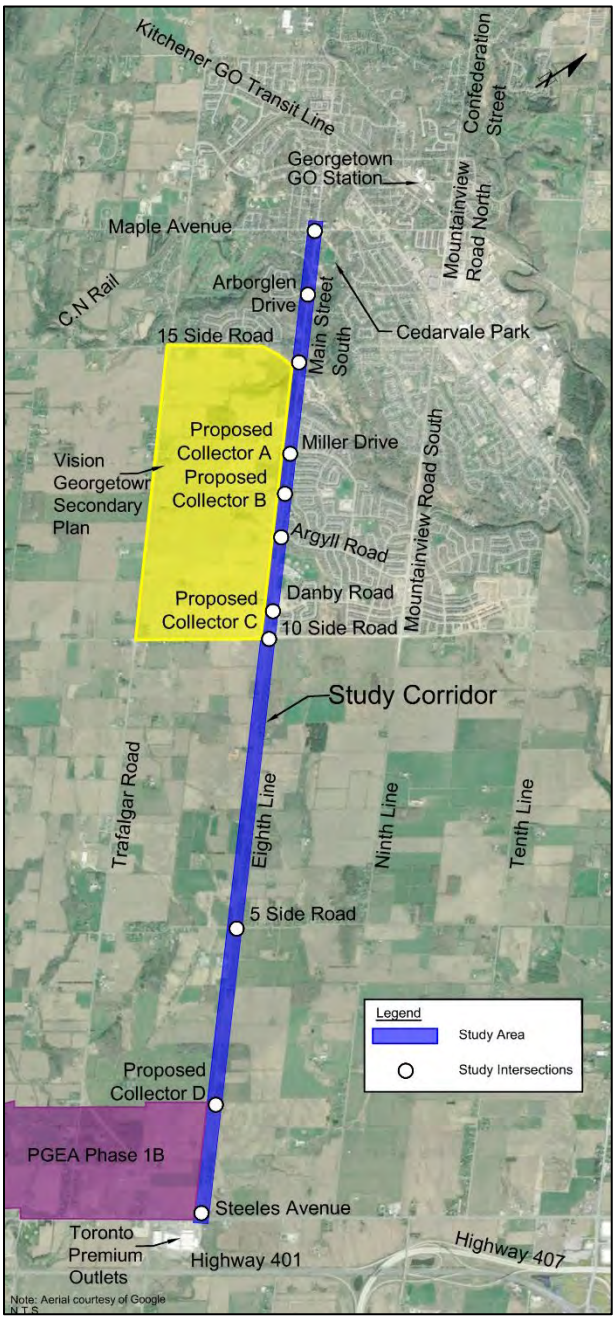
Eighth Line is a two-lane minor arterial road roadway south of the Georgetown urban core. South of Cromar Court, the road is named “Eighth Line”, north of Cromar Court, the road is referred to as “Main Street South.” Through the corridor, Eighth Line is two lanes with turn lanes provided at select intersections. Between Steeles Avenue and 10 Side Road, there are several business and residents located along the corridor. The road has a rural cross-section with minimal shoulders provided. Between 10 Side Road and 15 Side Road, there is development along the east side and the planned Vision Georgetown development is on the west side. There is a multi-use path (MUP) on the east side. Between 15 Side Road and Maple Avenue, development is located along areas on both sides of Eighth Line, which also goes through environmentally sensitive areas. There is a MUP on the east side and sidewalk on the west side, but with some incomplete sections of sidewalk. The Study Area and study intersections assessed in the Transportation Study are shown on Figure 3.1.

The traffic assessment includes the following intersections along Eighth Line:

- Steeles Avenue
- 5 Side Road
- 10 Side Road
- Danby Road
- Argyll Road
- Miller Drive
- 15 Side Road
- Arborglen Drive
- Maple Avenue
- All potential future collector roads resulting from proposed developments in the area:
  - Proposed Collector A (between Steeles and 5 Side Road)
  - Proposed Collector B (opposite Danby Road)
  - Proposed Collector C (between Argyll Road and Miller Drive)
  - Proposed Collector D (opposite Miller Drive)

The surrounding area consists of urban and developed sections from Maple Avenue to 10 Side Road and primarily rural residential properties and farmlands from 10 Side Road to Steeles Avenue.

Figure 3.1: Transportation Study Report Area and Study Intersections



3.1 Existing Traffic Conditions

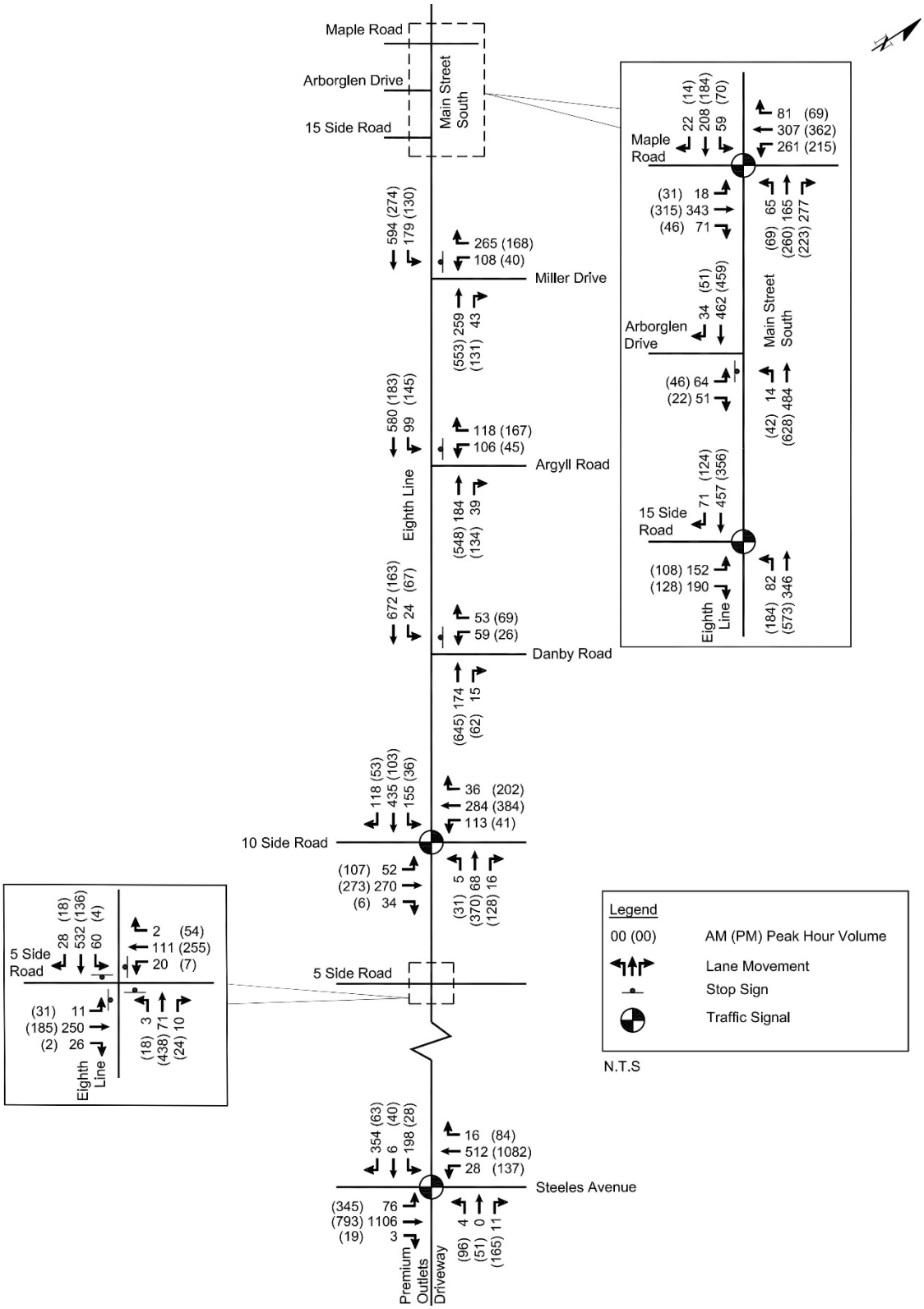
As part of the transportation analysis completed, the existing transportation system within the Study Area shown on Figure 3.1 was evaluated.

Under existing conditions, the road network and intersections are operating with excess capacity with a few exceptions:

- Steeles Avenue / Premium Outlets Driveway / Eighth Line Intersection:
  - The eastbound through queue and southbound left turn queue exceeds the existing link distance / storage.
  - During PM peak hour, the eastbound left turn movement exceeds capacity and experiences a delay of level of service F. Also, the eastbound left turn queue exceeds storage. The issue may be resolved by optimizing the existing signal timing plan and providing more green time to the eastbound movements.
- Miller Drive / Eighth Line Intersection:
  - During the AM peak hour, the westbound left turn experiences a delay resulting in a level of service F. There is adequate capacity to accommodate the demand.
- 5 Side Road / Eighth Line Intersection:
  - As a 4-way stop-controlled intersection, during the AM peak hour, the southbound movement is at capacity and during the PM peak hour, the northbound movement is approaching capacity. The traffic volumes do not warrant a signal under OTM Book 12. However, with future development proposed in the area, it is expected that traffic signals will be warranted at the intersection in the near future given how close to capacity the intersection is for existing conditions.

The existing traffic count volumes during both weekday morning and afternoon peak hours are illustrated in Figure 3.2 and the raw traffic data is provided in the Transportation Study Report provided in Appendix A of this report.

Figure 3.2: Existing Weekday Peak Hour Traffic Volumes



A review of collisions along the corridor was undertaken. In general, most of the study intersections and corridor do not have significant collision history or patterns that will require mitigation. However, the following segments and intersection will require attention and possible improvements:

- 55% of single vehicle accidents occurred between Steeles Avenue and 5 Side Road. Of these, 60% of single vehicle accidents occurred during rain or snowy environments where the road surface was either wet, loose to packed snow or icy, which resulted in 67% of the drivers losing control.
- Most of the collisions at the 5 Side Road / Eighth Line intersection are rear ends and angle collisions. As will be identified in further sections, this intersection has movements approaching capacity and is close to traffic warrants. This could be causing some driver misjudgment or aggressiveness.

Currently, there are no transit services available in the Study Area. The Town is undertaking the Transit Service Strategy where a “made in Halton Hills” solution is being explored. This includes fixed-route solutions with potential service along a section of Eighth Line as well as through Vision Georgetown. The Georgetown GO Station is located approximately 2 km, north of Maple Avenue intersection as illustrated in Figure 3.1.

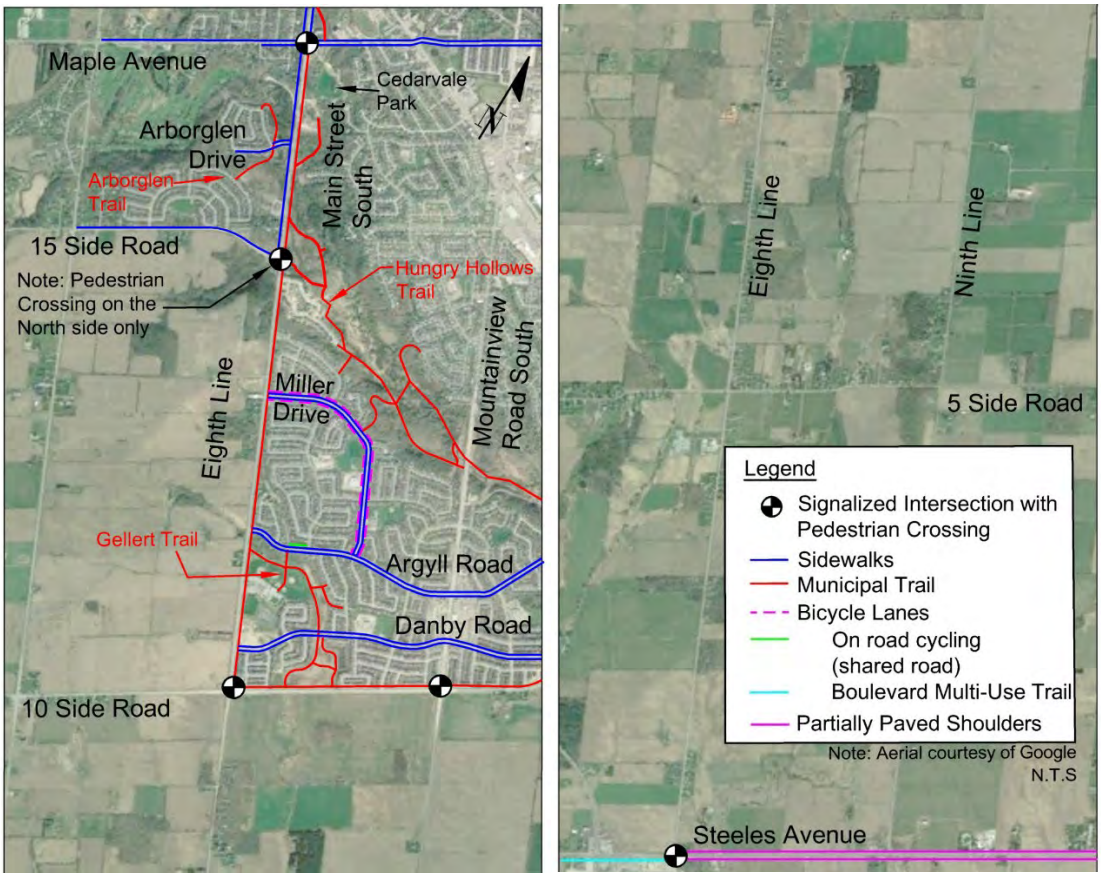
Existing sidewalks, trails and bicycle routes are illustrated in Figure 3.3.

There are three trails located in the urban portion of the Study Area including:

- The Gellert Trail located northeast of 10 Side Road intersection.
- The Hungry Hollow Trail, located east of Miller Drive along Silver Creek, with a connection to the MUP on Eighth Line.
- The Arborglen Trail located west of Main Street South, north and south of Arborglen Drive.

The above trails accommodate both walking and cycling. In addition, there is a MUP in the boulevard on the south side of Steeles Avenue between Eighth Line and Trafalgar Road. The Region’s ATMP has identified a future sidewalk along the north side of Steeles Avenue as well as bike lanes on Steeles Avenue.

Figure 3.3: Existing Active Transportation Facilities



Note: Local sidewalk system has not been shown on the local street system.

3.2 Future Traffic Projections

In reviewing future traffic conditions, a study horizon year of 2031 was chosen to be consistent with the HHOP. To project future traffic; historical traffic growth on study roads, background traffic from planned future developments and any planned road network connections and improvements need to be considered.

An exclusive northbound right turn lane at Maple Avenue was implemented in September 2019. Since this improvement was made after the existing traffic counts were conducted, this roadway improvement included as a future condition for which future traffic projections were calculated.

According to the 2023 Halton Region Budget and Business Plan Capital Report, start of construction for the widening of Steeles Avenue from 4 to 6 lanes from Trafalgar Road to Winston Churchill Boulevard is currently anticipated for 2028 (subject to a Council approved financing plan). The Region will be undertaking a future MCEA Study for improvements to Steeles Avenue from Trafalgar Road to Winston Churchill Boulevard. A range of multi-modal options for corridor improvements will be considered, such as

widening of the roadway, cross-sectional requirements, active transportation, transit infrastructure improvements, intersection improvements, and overall traffic operations. The planned improvements on Steeles Avenue were also included as a future condition.

In addition, there are also proposed road network connections associated with the development applications.

Based on a discussion with the Town, a growth rate of 1.0% compounded annually up to horizon year 2031 was applied to all movements with some exceptions. The movements associated with roadways that have built-up development or will have built-up development, no growth was assumed. This includes the following:

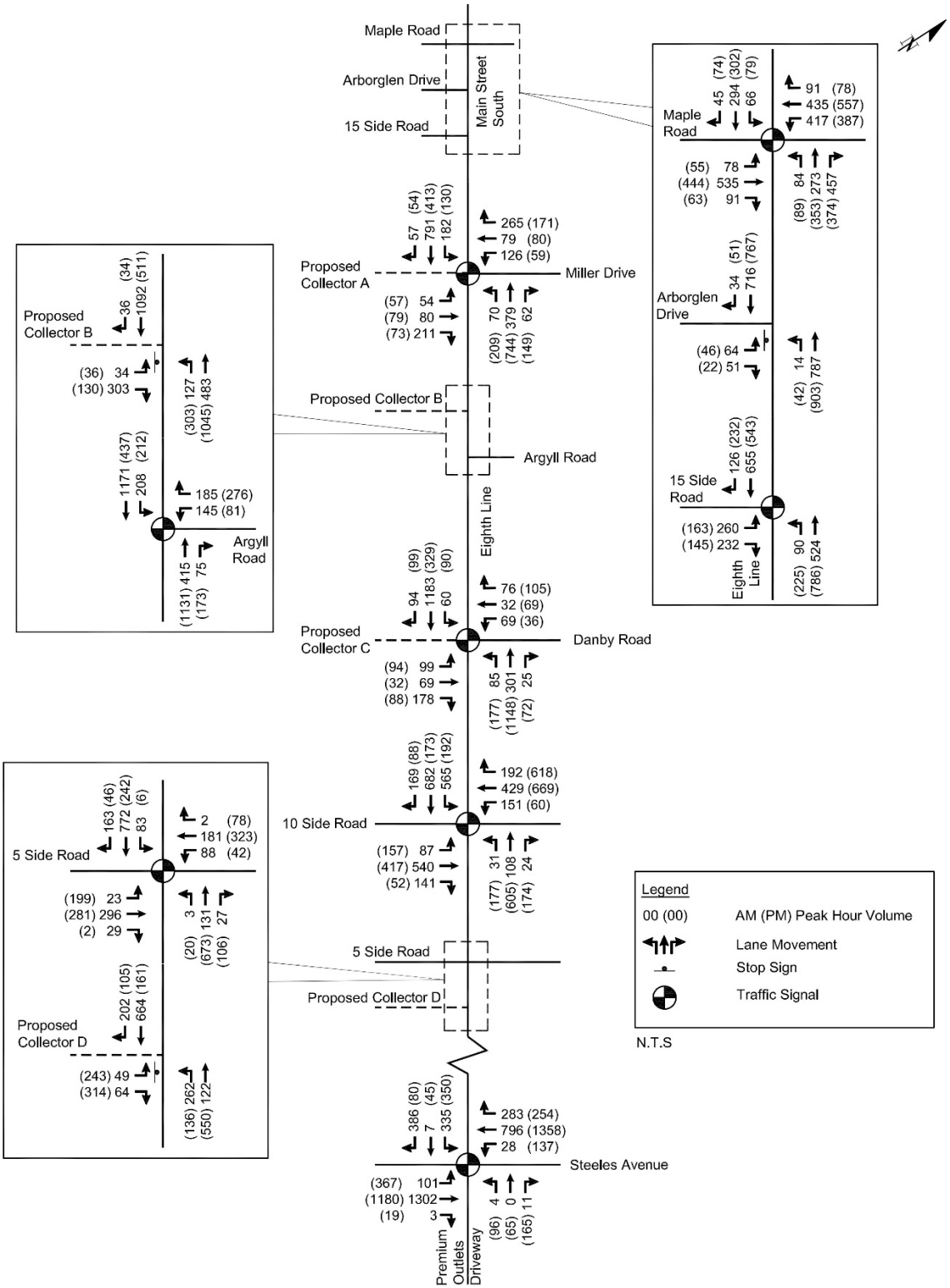
- Arborglen Drive
- 15 Side Road
- Miller Drive
- Argyll Road
- Danby Road
- Premium Outlets Driveway

There are two major development applications identified to be within the vicinity of the Study Area and are an anticipated to be built within the study horizon year – namely Vision Georgetown Secondary Plan and Premier Gateway Phase 1B Employment Areas Secondary Plan.

3.2.1 2031 Traffic Volumes

Future 2031 traffic volumes consist of the application of growth per annum (up to horizon year 2031) to existing traffic volumes as shown in Figure 3.4.

Figure 3.4: 2031 Traffic Volumes



4.0 Need / Justification

The Town is predominately a rural community located in Halton Region ('Region'). In 2016, the population of the Town was 61,161 residents with the majority residing in two major urban centres; Georgetown and Acton. As stated in the 2011 TMP, the Town is anticipating an overall growth of approximately 32,000 people and employment of 42,000 jobs in the next 20 years. There are two key growth areas within the Town located adjacent to Eighth Line: Vision Georgetown Secondary Plan and PGEA.

Vision Georgetown Secondary Plan is the Town's vision for a Future Residential / Mixed Use Area in south Georgetown in the area bounded by 15 Side Road to the north, 10 Side Road to the south, Eighth Line to the east and Trafalgar Road to the west. This area is expected to accommodate a population of 17,749, with employment of 1,465.

In addition to future developments, the PGEA is a future major employment district in the Town, designated for large scale industrial and commercial development. The eastern boundary of Phase 1B (Replacement Employment Lands) of the PGEA meets Eighth Line between 5 Side Road and Steeles Avenue. This area is expected to have 300 hectares of mixed commercial and employment uses. It is intended to accommodate approximately 18,000 new jobs between 2006 and 2031.

The 2011 TMP identified the need to reconstruct Eighth Line to a rural collector standard. Through the studies for Vision Georgetown Secondary Plan and PGEA, additional improvements to Eighth Line were identified to accommodate growth.

4.1 Problem / Opportunity Statement

Roadway improvements are required on Eighth Line to meet travel demands from growth in the Town to the year 2031.

- As presently configured, Eighth Line will not be able to accommodate the projected traffic demand by 2031.
- The Town has the opportunity to make improvements on Eighth Line that will provide:
  - Sufficient lane capacity–adequate intersection operations.
  - Traffic safety–integration of active transportation (at) infrastructure.
  - Accommodation of future transit.

5.0 Description of the Environment

5.1 Built Environment

Study Area is located along Eighth Line between Steeles Avenue and Maple Avenue in the Town of Halton Hills, passing between the historical community of Hornby in the south to the community of Georgetown in the north in a southeast to northwest direction.

Throughout the Study Area, the Eighth Line ROW consists of a single lane of traffic in either direction. Between Steeles Avenue and 10 Side Road, the ROW includes a narrow gravel shoulder and drainage ditches. Between 10 Side Road and Maple Avenue there is a MUP on the east side of Eighth Line. Between 15 Side Road and Maple Avenue there is also a sidewalk on the west side of Eighth Line.

The southern segment of the Study Area, between Steeles Avenue and 10 Side Road, is dominated by active agricultural fields. Several clusters of eight to ten residences are located along Eighth Line. Two historical cemeteries are located on the east and west side of Eighth Line at Steeles Avenue. A greenhouse and orchard are located at 8890 Eighth Line.

The northern segment of the Study Area is located within the boundaries of the community of Georgetown, which is delineated at 10 Side Road. Residences and residential neighbourhoods dominate the Study Area in this segment. Between 10 Side Road and 15 Side Road there is an established residential neighbourhood on the east side of Eighth Line and a few residential properties on the west side. North of 15 Side Road, there are residential properties on the west side of Main Street South with a few small residential neighbourhoods connecting to Eighth Line (from the west) at the intersections of Cromar Court, Arborglen Drive and Cindebarke Terrace. There are a few other built features in this segment of the Study Area, including a fire hall at the northeast corner of Eighth Line and 10 Side Road; the Gellert Community Centre at 10241 Eighth Line (east side); a farm market at 10636 Eighth Line (west side); Living Hope Church at 290 Main Street South (west side) and an autobody shop at 225 Main Street South (east side). A cement slab bridge carries Main Street South over Black Creek and two steel truss bridges carry the east and west sidewalks across.

5.2 Physical Environment

5.2.1 Physiography, Geology and Topography

The Study Area is situated within the Niagara Escarpment, South Slope, and Peel Plain physiographic regions of southern Ontario (Chapman and Putnam 1984).

Figure 5.1 depicts surficial geology for the Study Area. The surficial geology mapping demonstrates that the Study Area is underlain by clay to silt-textured till (derived from

glaciolacustrine deposits or shale); gravelly Glaciofluvial river deposits and delta topset facies; fine-textured glaciolacustrine deposits of silt and clay, and Modern alluvial deposits of clay, silt, sand, gravel, and may contain organic remains (Ontario Geological Survey 2010). Soils in the Study Area consist of Font sandy loam, Guelph loam, and Oneida clay loam, all grey brown luvisols with good drainage; Chinguacousy clay loam, a grey brown luvisol with imperfect drainage; and Gilford loam and Jeddo clay, both humic gleysols with poor drainage (Figure 5.2 and Figure 5.3).

The Study Area intersects with Silver Creek, a subwatershed of the Credit River. The Credit River drains an area of approximately 860 square kilometres from its headwaters in Orangeville, Erin, and Mono, passing through part of the Niagara Escarpment and the Oak Ridges Moraine, and draining into Lake Ontario at the town of Port Credit (CVC 2009).

South of 15 Side Road the topography of the Study Area is relatively flat. North of 15 Side Road, the topography undulates and slopes steeply on either side of Main Street South.

Figure 5.1: Surficial Geology for the Study Area

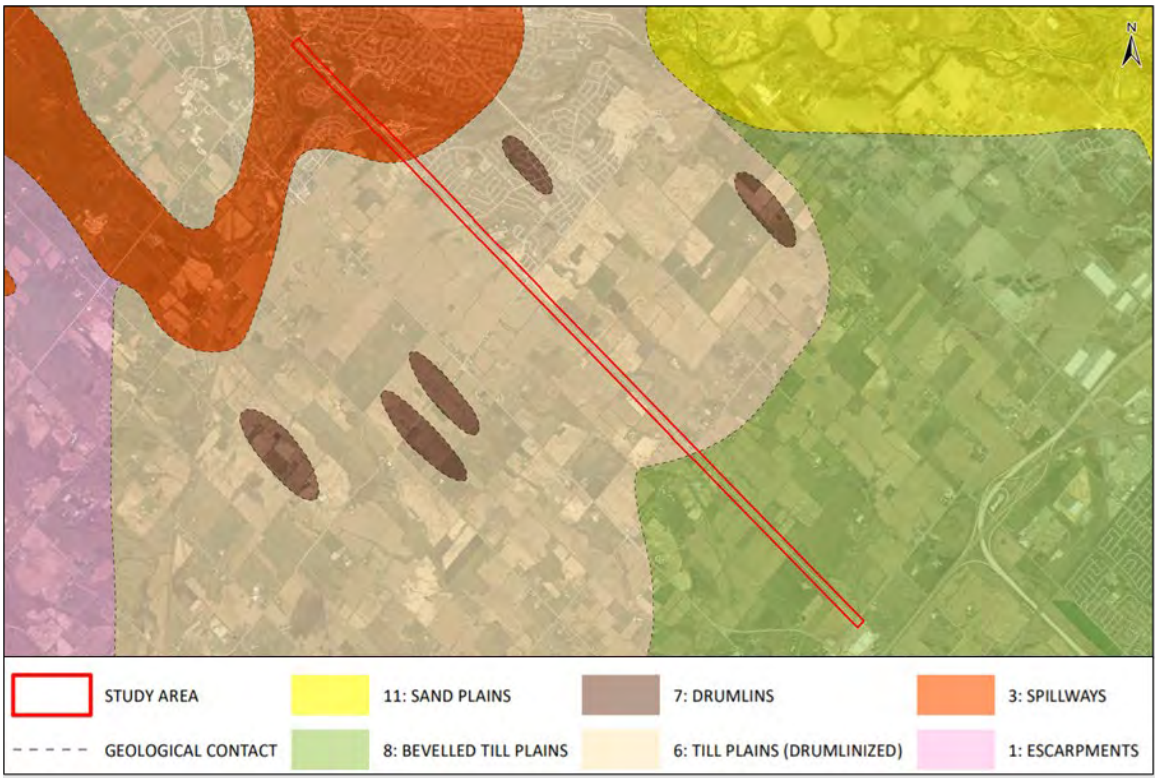


Figure 5.2: Soil Type in the Study Area

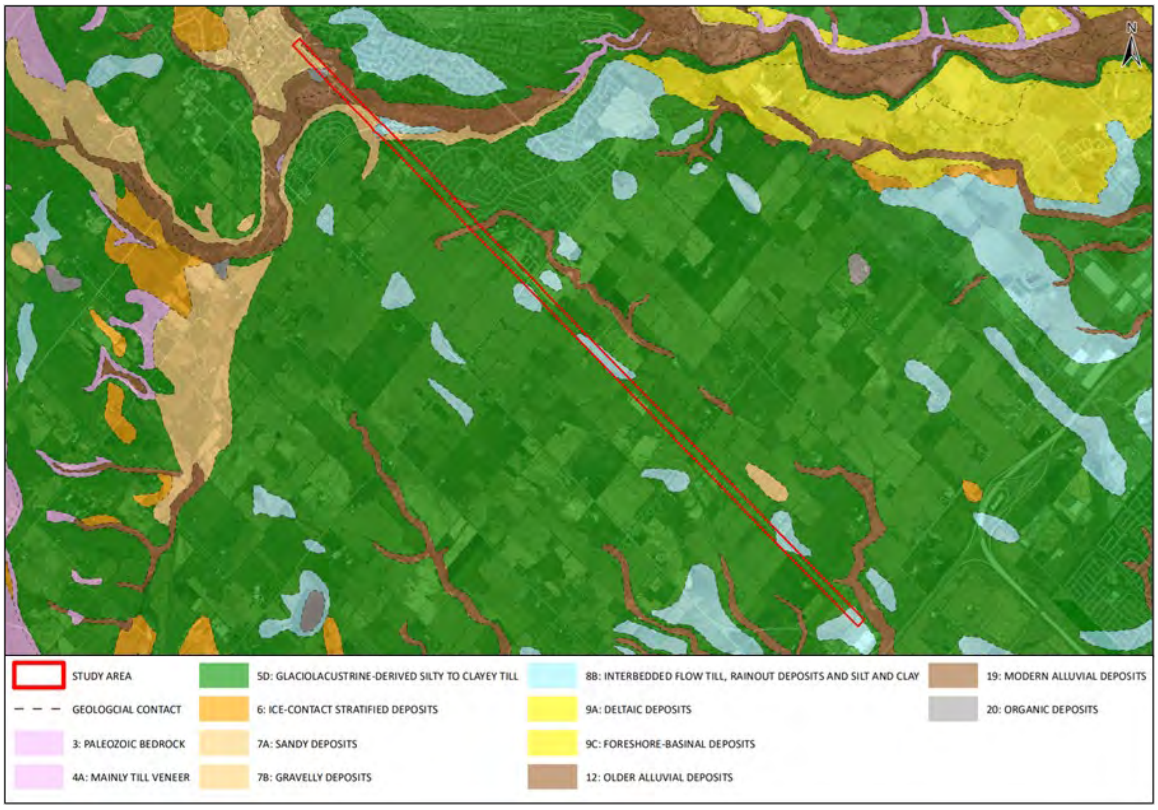
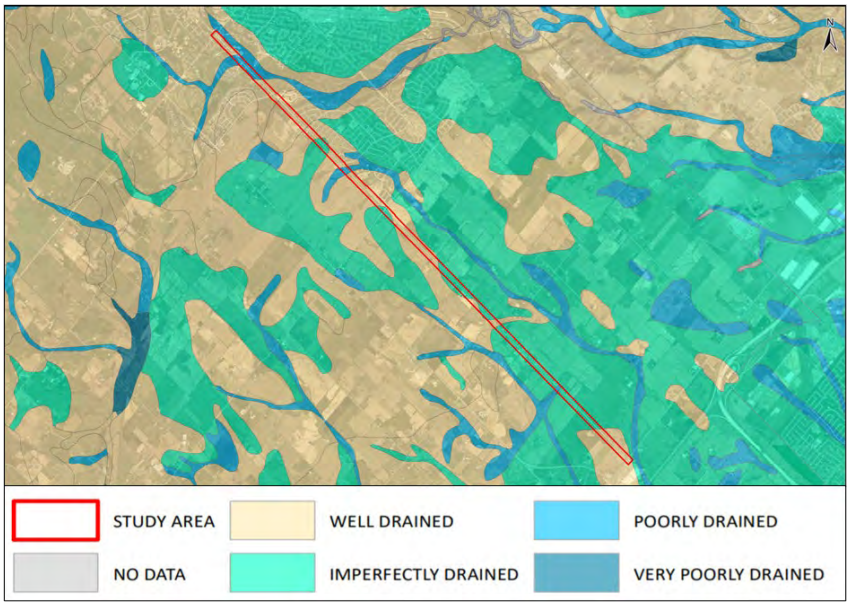


Figure 5.3: Drainage for the Study Area



5.2.2 Source Water Protection

The Study Area falls under the Halton Region Source Protection Area and Credit Valley Source Protection Area and is therefore subject to the approved Halton-Hamilton Source Protection Plan and CTC Source Protection Plan, and relevant policies that may apply.

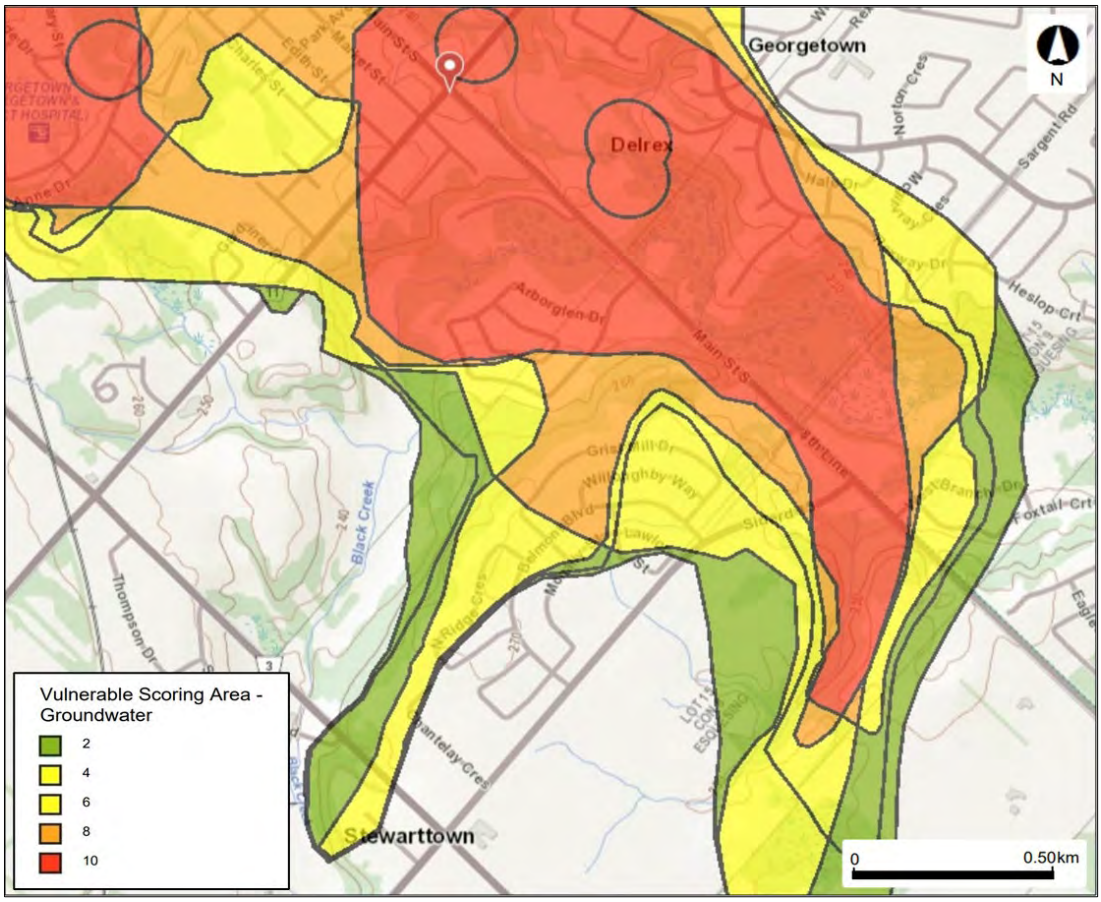
5.2.2.1 Vulnerable Areas

Wellhead Protection Areas

Wellhead Protection Area (WHPA) is an area related to a wellhead and within which it is desirable to regulate or monitor drinking water threats. WHPAs are delineated for threats to quality and quantity.

The north part of the Study Area between Miller Drive and Maple Avenue is located within a WHPA as illustrated in Figure 5.4 with very high vulnerability scores (9 and 10).

Figure 5.4: Wellhead Protection Areas within the Study Area

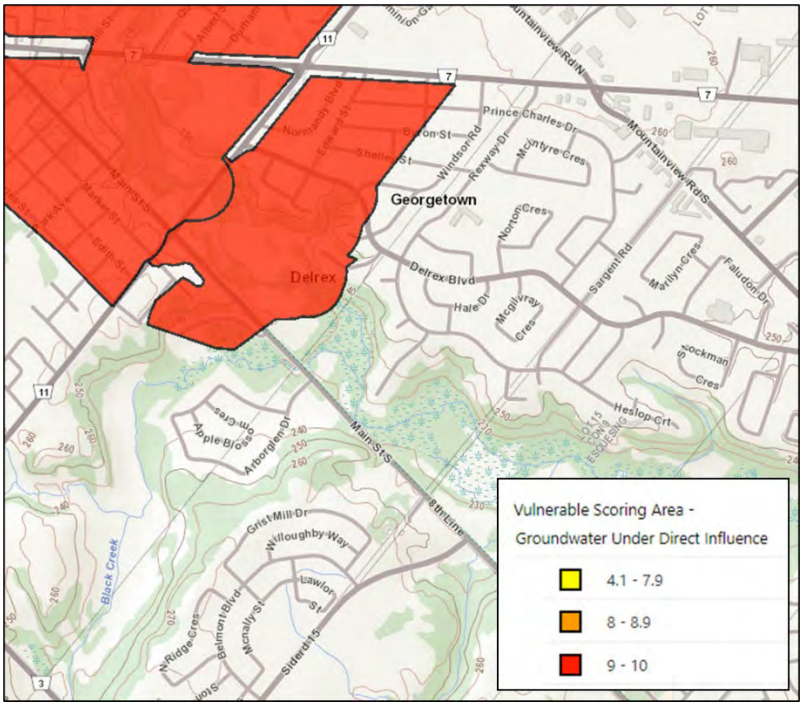


WHPA Groundwater Under Direct Influence (WHPA-E)

WHPA-E is the area on ground surface through which surface water flows in two hours to a point close to the well. This wellhead protection area is only delineated when studies have shown that surface water can relatively easily seep through the soil and impact the quality of the water at the well (e.g., If the interaction between surface water and groundwater has the effect of decreasing the time of travel of water to the well when compared to the time it would take water to travel to the well if the raw water supply for the well was not under the direct influence of surface water). This situation is known as groundwater under the direct influence of surface water, or a GUDI well.

The north part of the Study Area between Arborglen Drive and Maple Avenue is located within a WHPA-E as illustrated in Figure 5.5 with very high vulnerability scores (9 and 10).

Figure 5.5: WHPA-E Areas Within the Study Area

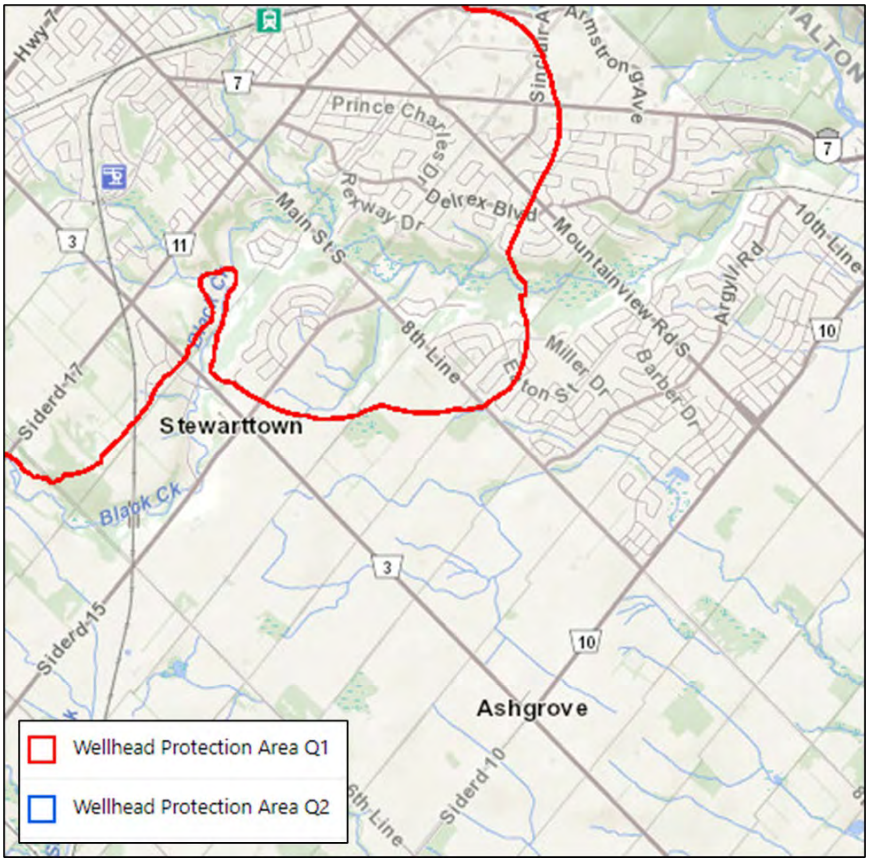


Wellhead Protection Areas for Quantity (WHPA-Q)

Wellhead Protection Areas for Quantity are called WHPA-Q and significant drinking water threat activities are identified. WHPA-Q1 refers to the area where activities that take water without returning it to the same source may be a threat. WHPA-Q2 refers to the area where activities that reduce recharge may be a threat.

The north part of the Study Area between north of Side Road 10 is located within a WHPA-Q1 and WHPA-Q2 as illustrated in Figure 5.6.

Figure 5.6: WHPA-Q Areas Within the Study Area



Intake Protection Zones

An Intake Protection Zone is an area related to a surface water intake and within which it is desirable to regulate or monitor drinking water threats. These areas are either set distances, delineated based on the time it would take to respond to a spill, or based on the catchment area of the intake.

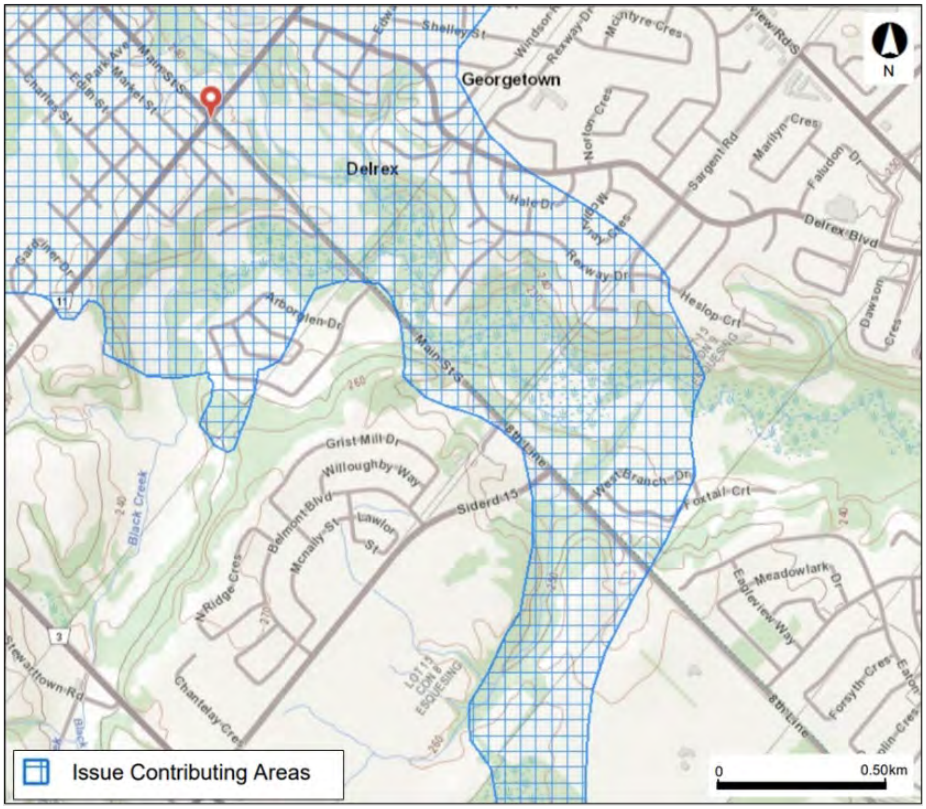
No Intake Protection Zones were identified in the Study Area.

Issue Contributing Areas

An Issue Contributing Area (ICA) is an area within a vulnerable area where presently occurring human activities or conditions resulting from past human activities have or are likely to contribute to the elevated concentration of particular substances in the drinking water source. Issues refer to pathogens and chemically specific substances which commonly include chloride, sodium, and nitrate. If an Issue is identified for a well, then

all prescribed drinking water threat activities related to that particular substance within the ICA are significant drinking water threats, regardless of vulnerability scoring.

Figure 5.7: Issue Contributing Areas within the Study Area



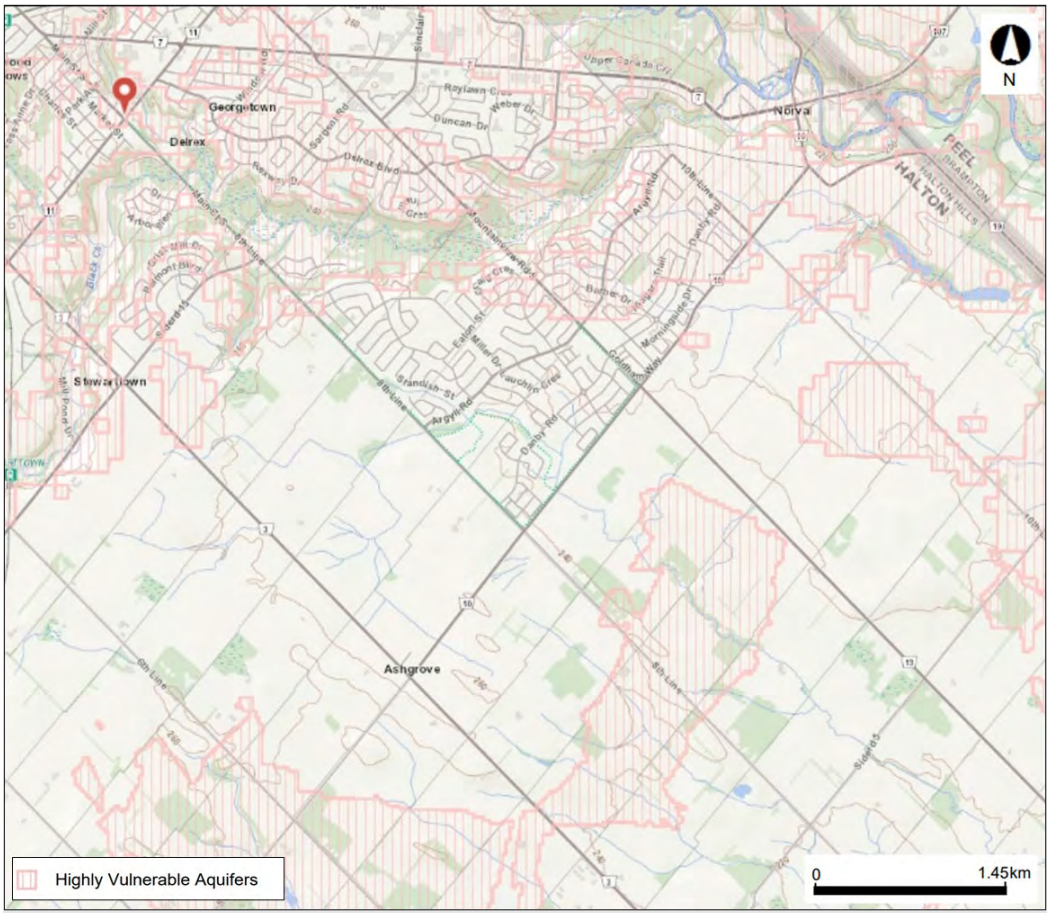
The north part of the Study Area between Miller Drive and Maple Avenue is located within an ICA as illustrated in Figure 5.7.

Highly Vulnerable Aquifers

A Highly Vulnerable Aquifer (HVA) is an aquifer on which external sources have or are likely to have a significant adverse effect and includes the land above the aquifer. An aquifer can be considered highly vulnerable based on several factors, including how deep it is underground, what sort of soil or rock is covering it and the characteristics of the soil or rock surrounding it. The faster water can flow through the ground to an aquifer, the more vulnerable it is to contamination.

The HVAs within the Study Area are illustrated in Figure 5.8. The section of the Eighth Line between 5 Side Road and 10 Side Road is located within an HVA with a high vulnerability score of 6. The north part of the Study Area from Miller Drive to Maple Avenue is located within an HVA with a similar vulnerability score of 6.

Figure 5.8: Highly Vulnerable Aquifers within the Study Area

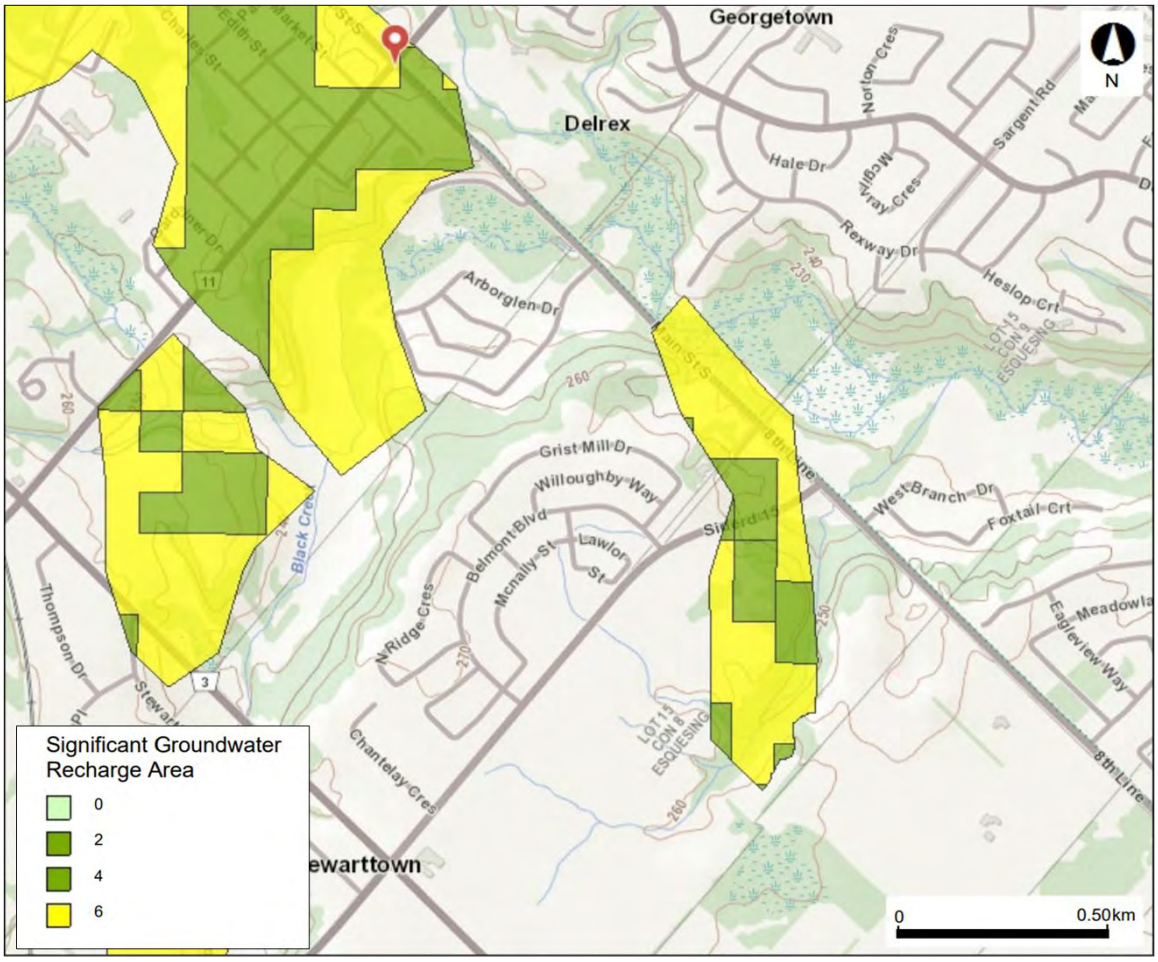


Significant Groundwater Recharge Areas

A Significant Groundwater Recharge Area (SGRA) is a recharge area that helps maintain the water level in an aquifer that supplies a community with drinking water. Recharge areas often have loose or permeable soil such as sand or gravel, which allows the water to seep easily into the ground. Areas with shallow fractured bedrock are also often recharge areas.

As illustrated in Figure 5.9, there is an SGRA between 15 Side Road and Arborglen Drive with a high vulnerability score of 6. Between Cindebarke Terrace and Maple Avenue there is an SGRA with a moderate vulnerability score of 4.

Figure 5.9: Significant Groundwater Recharge Areas within the Study Area



5.3 Natural Environment

An assessment of natural heritage features in the Study Area and Study Area Vicinity was completed by Burnside and is documented in a Natural Environment Report (NER), a copy of which is provided in Appendix B of this report. Summaries of the existing natural heritage features are provided in following sections.

5.3.1 Terrestrial Habitat

Vegetation communities were characterized using the Ecological Land Classification (ELC) system at the ecosite level for the Study Area using protocols outlined in Lee et al. (1998). A total of 46 ecosites were observed. In areas where properties could not be accessed for a field assessment and determination of dominant species composition, a generalized vegetation community was provided. A variety of vegetation communities including terrestrial, aquatic, wetland, and constructed ecosites with a broad diversity of dominant plant species were observed.

Surveys were completed to determine the presence of fauna present within the Study Area Vicinity, which for the purposes of this MCEA study comprises lands within 120 m of the existing ROW. Specific field investigations included surveys for breeding amphibians, breeding birds, and potential roosting habitat for Species at Risk (SAR) bats.

Evidence of breeding amphibians were identified within the Study Area. A total of 4 species were identified during the field investigations and are considered common throughout Southern Ontario.

There were 35 total avifauna species that exhibited some level of breeding evidence within the Study Area Vicinity, 2 of which are currently listed as SAR. Eastern wood-pewee and Barn Swallow were identified during the breeding bird surveys and are listed as Special Concern and Threatened, respectively.

Furthermore, suitable roosting habitat for SAR bats were identified within the Study Area Vicinity. Acoustic monitoring was not conducted to confirm presence of any SAR bats, although their presence is expected due to availability of suitable habitat.

5.3.2 Aquatic Habitat

There are seven watercourse crossings within the Study Area. Six of the watercourses flow beneath Eighth Line / Main Street South and one flows beneath 5 Side Road immediately west of Eighth Line. All watercourses in the Study Area are classified either as cold or cool thermal regime watercourses. A section of Silver Creek is highlighted on the DFO SAR mapping as being inhabited by Redside dace (*Clinostomus elongatus*), a species that is provincially and federally protected.

The two southern-most watercourse crossings in the Study Area are tributaries of Middle Sixteen Mile Creek (MSMC-1 and MSMC-2). MSMC-1 flows beneath 5 Side Road, west of Eighth Line and MSMC-2 flows beneath Eighth Line approximately 1.25 km south of 5 Side Road. There are 3 tributaries of East Sixteen Mile Creek (ESMC-1, ESMC-2, and ESMC-3) in the Study Area, and they are all located between Miller Drive and 5 Side Road. A tributary of Silver Creek crosses Eighth Line approximately 50 m south of 15 Side Road. The northern most watercourse in the Study Area is known as Black Creek and it flows beneath Eighth Line approximately 0.65 km south of Maple Avenue.

Aquatic habitat assessments were performed at all watercourse crossings following the Ministry of Transportation (MTO) Environmental Guide for Fish and Fish Habitat. The watercourses were assessed for form, function, morphology and fish habitat. Subsequent field investigations were conducted in August 2019 to confirm stream permanency and in November 2019 to observe potential Brook trout spawning habitat in the watercourse that flows beneath 5 Side Road. Four of the watercourses are

considered direct fish habitat. Two watercourses are considered to be indirect fish habitat within the Study Area as they convey water quantity, water quality and nutrients to downstream fish habitat. One watercourse is direct fish habitat downstream (east) of Eighth Line, but upstream it lacks habitat features to support fish.

5.3.3 Provincially Significant Features

Hungry Hollow PSW Complex and Environmentally Sensitive Area (ESA) was identified within the Study Area north of 15 Side Road and confirmed during field studies.

There is potential for Significant Woodlands within the Study Area. Criteria provided in the HROP should be evaluated to determine significance in the detailed design stage of the project. Woodlands exceeding 0.5 ha that qualify as potentially Significant Woodlands identified in the HHOP are provided Appendix F of the NER (provided in Appendix B of this report).

There were no significant valleylands or Area of Natural and Scientific Interest identified in the Study Area.

Seven candidate and one confirmed Significant Wildlife Habitats (SWH), as defined by the Ministry of Northern Development, Mines, Natural Resources and Forestry (MNDMNRF), were identified in the Study Area:

- Candidate Bat Maternity Colonies.
- Candidate Turtle Wintering Area.
- Candidate Colonially – Nesting Bird Breeding Habitat (Tree / Shrub).
- Candidate Waterfowl Nesting Area.
- Candidate Amphibian Breeding Habitat (Woodland).
- Candidate Marsh Breeding Bird Habitat.
- Candidate Terrestrial Crayfish.
- Confirmed Special Concern and Rare Wildlife Species:
  - Eastern Wood pewee
  - Barn Swallow.

Generally, where possible, encroachment into the Candidate and Confirmed SWH should be minimized or avoided.

5.3.4 Species at Risk

Two SAR were identified during site specific field studies conducted as part of the MCEA study. Barn swallow (Threatened) and Eastern wood-pewee (Special Concern) were observed within suitable breeding habitat in the Study Area. Candidate Habitat is also present for an additional 15 provincially and / or federally listed SAR.

5.4 Cultural Environment

5.4.1 Archaeological Resources

A Stage 1 Archaeological Assessment was completed by Archaeological Services Inc. ('ASI'). A copy of the Stage 1 Archaeological Assessment Report is provided in Appendix C of this report.

The Stage 1 background study determined that 34 previously registered archaeological sites are located within one kilometre of the Study Area, two of which are within 50 m of the Study Area, and four of which are within the Study Area. The Hornby Wesleyan Methodist Cemetery and Hornby Presbyterian Church Cemetery are also within the Study Area. The property inspection determined that the Study Area exhibits archaeological potential.

In light of these results, the following recommendations are made:

1. The Study Area exhibits archaeological potential. If impacted, these lands require Stage 2 archaeological assessment by test pit / pedestrian survey at five metre intervals, where appropriate, prior to any proposed construction activities.

2. Sites AjGx-269, AjGx-273, and AjGx-282 are identified within the Study Area and retain CHVI (see Figure 5.10). These sites should be subject to Stage 3 assessment, if impacted, prior to any proposed construction activities as per the Standards and Guidelines for Consultant Archaeologists Section 3.2.

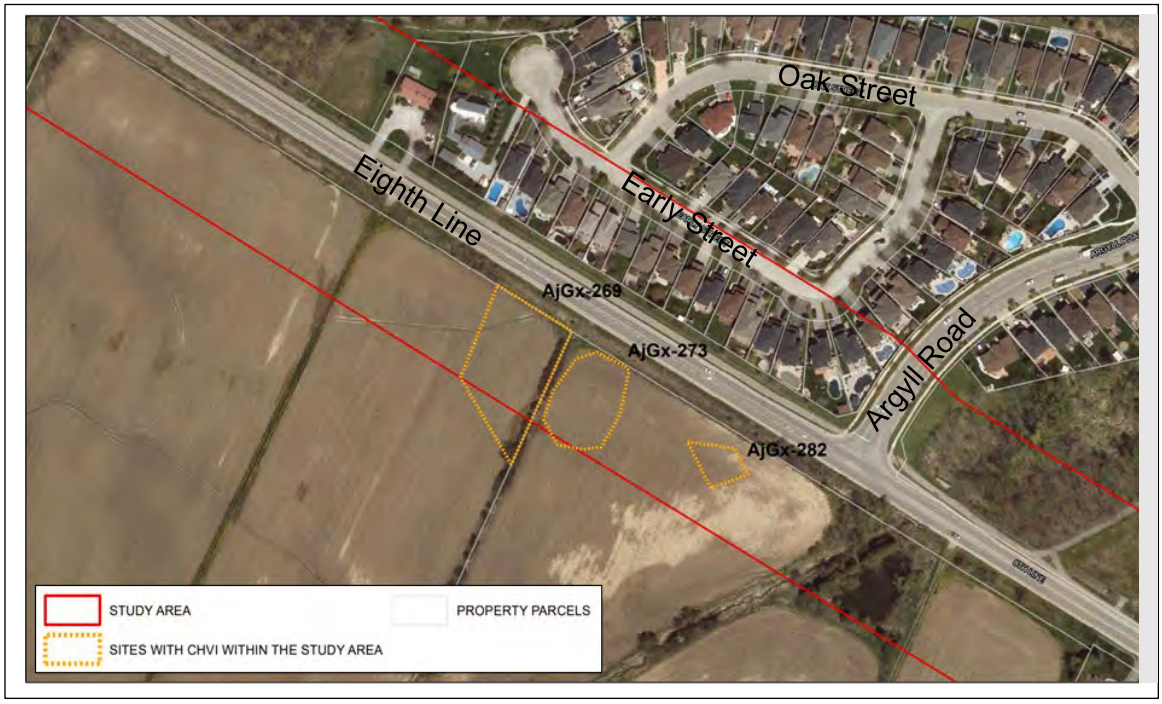
3. The Hornby Wesleyan Methodist Cemetery and Hornby Presbyterian Church Cemetery are within the Study Area. A Stage 3 Cemetery Investigation will be required on any lands within a 10-metre buffer of the cemetery properties that have not been previously assessed, prior to any proposed impacts, to confirm the presence or absence of unmarked graves within the Study Area.

    a) A Stage 2 test-pit survey at five metre intervals should be conducted within the areas of impact between the existing road shoulder and the cemetery properties, to locate any near-surface finds, prior to the Stage 3 assessment.

    b) The Stage 3 entails the mechanical removal of topsoil in a ten-metre buffer around the cemetery, under the supervision of a licensed archaeologist. The exposed subsoil will then be shovel-shined and thoroughly examined for the presence of burial shafts. If unmarked grave shafts or cultural features are uncovered during the Stage 3; mechanical topsoil removal should continue 10 metres beyond such features.

4. The remainder of the Study Area does not retain archaeological potential on account of deep and extensive land disturbance, low and wet conditions, or slopes more than 20 degrees. These lands do not require further archaeological assessment.

Figure 5.10: Sites with CHVI within the Study Area (AjGx-282, AjGx-273, AjGx-269)



5.4.2 Cultural Heritage Resources

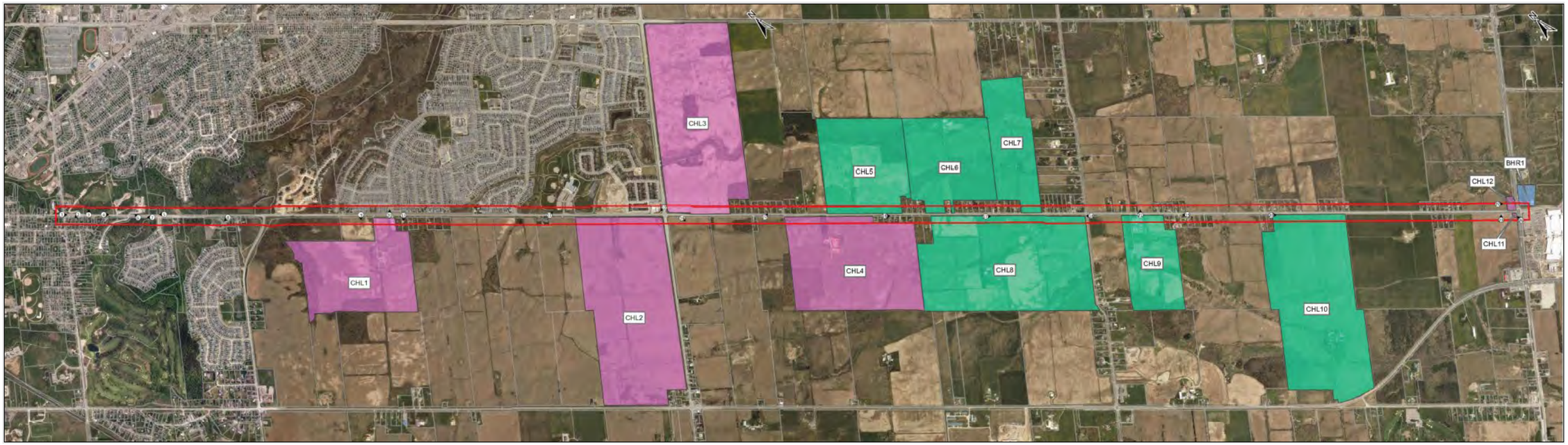
A Cultural Heritage Resource Assessment (CHRA) was completed by Archaeological Services Inc. (ASI). A copy of the CHRA Report is provided in Appendix D of this report.

The results of background historical research and a review of secondary source material, including historical mapping, revealed a study area with a rural land use history dating to the early nineteenth century. A review of federal registers and municipal and provincial inventories revealed that there are eight previously identified feature of cultural heritage value within the Study Area. An additional five resources were identified during the field review. The key findings of the CHRA are summarized below:

- A field review of the Study Area confirmed that there are 13 cultural heritage resources consisting of one built heritage resource (BHR) and 12 cultural heritage landscapes (CHLs) within or immediately adjacent to the Study Area (see Figure 5.11).
- The identified cultural heritage resources include: nine farmscapes (CHLs 1-8 and 10); two cemeteries (CHLs 11 and 12), one greenhouse and orchard (CHL 9), and one mixed use property (BHR 1).

- The identified cultural heritage resources include seven listed on the Town of Halton Hills Heritage Register, one identified in the HHOP, and five identified during field review.
- The identified cultural heritage resources are historically and contextually associated with late nineteenth century land use patterns in the former Township of Esquesing.

Figure 5.11: Cultural Heritage Resources within or adjacent to Study Area



6.0 Identification and Assessment of Alternative Solutions

Phase 2 of the MCEA process requires that a municipal proponent identify and evaluate alternative solutions to the Problem / Opportunity Statement, assessing the impact of the solutions on the general condition of the natural, social / cultural and economic environment including possible mitigating measures. At the conclusion of Phase 2, the appropriate MCEA planning Schedule is confirmed. It is also in this phase that the first mandatory consultation with review agencies and the public is initiated. Details of the consultation activities for this project are provided in Section 13.0.

6.1 Identification of Alternative Solutions

The following alternative solutions were identified to address the Problem / Opportunity Statement:

- Alternative 1 – Do Nothing.
- Alternative 2 – Road Improvements.
- Alternative 3 – Road Widening.
- Alternative 4 – Transportation Demand Management.
- Alternative 5 – Active Transportation.

6.1.1 Alternative 1 – Do Nothing

Alternative 1 – Do Nothing is a mandatory consideration within the MCEA process and serves as a reference point for comparing other alternative solutions.

This alternative may include the following:

- Operate as a two-way road fully open to the public.
- No construction or widening.
- Perform regular maintenance as required.
- No property acquisitions.

The ‘Do Nothing’ alternative means to take no action in addressing the problem / opportunity statement. This Alternative Solution leaves all conditions as they are.

6.1.2 Alternative 2 – Road Improvements

Alternative 2 – Road Improvements could involve the following changes to the road corridor in the Study Area:

- Additional turn lanes.
- Signal timing adjustments.
- Signals at stop-controlled intersections.
- Roundabouts.
- Improved alignments.
- Improved structures.

6.1.3 Alternative 3 – Road Widening

Alternative 3 – Road Widening would involve adding additional travel lanes to the road corridor in the Study Area.

6.1.4 Alternative 4 – Transportation Demand Management

Alternative 4 – Transportation Demand Management would involve implementation of programs / policies to support transportation movement within the Study Area:

- Parking reduction / priced parking.
- Ride matching.
- Flexible / alternative work schedule.
- Bike share.
- Car sharing.
- Transit passes.

6.1.5 Alternative 5 – Active Transportation

Alternative 5 – Active Transportation would involve improvements to the road corridor to support cycling and pedestrian movement.

6.2 Evaluation of Alternative Solutions

An evaluation was completed for the following three road segments on Eighth Line / Main Street South in the Study Area (see Figure 6.1):

- Steeles Avenue to 10 Side Road.
- 10 Side Road to 15 Side Road.
- 15 Side Road to Maple Avenue.

Figure 6.1: Segments of Study Area Considered for Evaluation of Alternative Solutions

6.2.1 Evaluation Criteria

The overall objective of the evaluation was to identify a Preferred Solution among the four alternatives identified that would provide the most favorable solution to the Problem / Opportunity Statement.

To this end, a set of Evaluation Criteria were grouped under four key areas established as part of the MCEA process to comparatively evaluate the Alternative Solutions identified above. The Evaluation Criteria included:

Natural Environment

- Impacts to vegetation and vegetation communities.
- Impacts to fisheries and aquatic habitat.
- Impacts to terrestrial habitat.
- Impacts to trees.
- Impacts to Woodlots, Wetlands and Designated Features (including PSWs, ESAs, ANSIs, Regional NHS).
- Impacts to surface water and groundwater.

- Source Water Protection.
- Natural hazard impacts (erosion, soil stability, flooding).

Technical Environment

- Meets capacity requirements.
- Addresses road geometric deficiencies.
- Readiness for future transit.
- Impacts to utilities.

Socio-Cultural and Economic Environment

- Compatibility with existing and future land uses.
- Construction impact.
- Impacts to cultural heritage resources.
- Impacts to archaeological resources.
- Impacts to air quality and noise levels.
- Property requirements.
- Quality of Life and Community Cohesiveness.
- Aesthetics.
- Impacts to Farms and Business Operations.

Financial Environment

- Capital costs.
- Operation and Maintenance costs.

6.2.2 Evaluation Results

The evaluation of the Alternative Solutions was based on an assessment of potential impacts and a review of input received from the public and regulatory agencies during the MCEA process. Table 6.1, Table 6.2, and Table 6.3 provide summaries of the evaluation of Alternative Solutions for the three road segments identified in Figure 6.1. A detailed matrix for the evaluation of Alternative Solutions is provided in Appendix E.

Table 6.1: Alternative Solutions Evaluation: Steeles Avenue to 10 Side Road

Criteria	Alternative 1: Do Nothing	Alternative 2: Road Improvements	Alternative 3: Road Widening	Alternative 4: TDM	Alternative 5: Active Transportation
Natural Environment	No impacts over existing conditions.	Roundabouts and / or additional turn lanes would result in some impacts to natural environment.	Road widening has potential to have direct impacts on natural heritage features. Mitigation measures can be applied.	TDM does not impact natural environment.	Implementation of Active Transportation on this segment would result in minimal impacts to the natural environment.
Rating	Somewhat Preferred	Less Preferred	Least Preferred	Somewhat Preferred	Somewhat Preferred
Socio-Cultural and Economic Environment	Does not accommodate future growth and traffic congestion will cause impacts to community.	Road improvements will reduce traffic and property impacts can be minimized.	Road widening will fully accommodate future growth and minimize impacts to business. Property impacts will be greater than Alternative 2.	TDM can support future growth but will not reduce traffic impacts.	Existing active transportation will continue to service growing community but will not reduce traffic impacts.
Rating	Least Preferred	Somewhat Preferred	Most Preferred	Somewhat Preferred	Least Preferred
Technical Environment	Does not address capacity needs, road deficiencies, or future transit.	Partially addresses capacity. Does not address road geometrics in comparison to Alternative 3.	Fully addresses capacity, road deficiencies, and future transit. Impacts to utilities would be greater than other alternatives.	Lowers capacity requirements by reducing traffic but does not address road deficiencies.	Lowers capacity requirements by reducing traffic but does not address road deficiencies.
Rating	Least Preferred	More Preferred	Most Preferred	Less Preferred	Less Preferred
Financial Environment	No capital costs, but O&M costs would significantly increase over time with no improvements.	Moderate capital costs, O&M costs would be less over time in comparison to Alternative 1.	High capital costs, O&M costs would be less over time compared to other alternatives.	Minimal capital costs, but O&M costs would significantly increase over time with no improvements.	Capital costs, but O&M costs would significantly increase over time with no improvements.
Rating	Somewhat Preferred	Less Preferred	Least Preferred	Somewhat Preferred	Somewhat Preferred
Meets P/O Statement	No	Partially	Yes	No	Partially
Recommendation	Not Carried Forward	Combined with Alternative 3	Carried Forward	Forms part of Preferred Solution	Combined with Alternative 3

Ranking Order of Preference:

↑ Most Preferred
More Preferred
Somewhat Preferred
Less Preferred
Least Preferred

Table 6.2: Alternative Solutions Evaluation: 10 Side Road to 15 Side Road

Criteria	Alternative 1: Do Nothing	Alternative 2: Road Improvements	Alternative 3: Road Widening	Alternative 4: TDM	Alternative 5: Active Transportation
Natural Environment	No impacts over existing conditions.	Roundabouts and / or additional turn lanes would result in some impacts to natural environment.	Road widening has potential to have direct impacts on natural heritage features. Mitigation measures can be applied.	TDM does not impact natural environment.	Active transportation via existing multi-use trail.
Rating	Somewhat Preferred	Less Preferred	Least Preferred	Somewhat Preferred	Somewhat Preferred
Socio-Cultural and Economic Environment	Does not accommodate future growth and traffic congestion will cause impacts to community.	Road improvements can be made with limited property impacts; however, improvements would not fully address capacity requirements.	Road widening will fully accommodate future growth and minimize impacts to business. Property impacts will be greater than Alternative 2.	TDM can support future growth but will not reduce traffic impacts.	Existing active transportation will continue to service growing community but will not reduce traffic impacts.
Rating	Least Preferred	Least Preferred	More Preferred	More Preferred	Somewhat Preferred
Technical Environment	Does not address capacity needs, road deficiencies, or future transit.	Partially addresses capacity. Does not address road geometrics in comparison to Alternative 3.	Fully addresses capacity, road deficiencies, and future transit. Impacts to utilities would be greater than other alternatives.	Lowers capacity requirements by reducing traffic but does not address road deficiencies.	Lowers capacity requirements by reducing traffic but does not address road deficiencies. Higher use of AT on this segment.
Rating	Least Preferred	More Preferred	Most Preferred	Less Preferred	Less Preferred
Financial Environment	No capital costs, but O&M costs would significantly increase over time with no improvements.	Moderate capital costs, O&M costs would be less over time in comparison to Alternative 1.	High capital costs, O&M costs would be less over time in comparison to Alternative 1.	Minimal capital costs, but O&M costs would significantly increase over time with no improvements.	Minimal capital costs, but O&M costs would significantly increase over time with no improvements.
Rating	Somewhat Preferred	Less Preferred	Least Preferred	Somewhat Preferred	Somewhat Preferred
Meets P/O Statement	No	Partially	Yes	No	Partially
Recommendation	Not Carried Forward	Combined with Alternative 3	Carried Forward	Forms part of Preferred Solution	Combined with Alternative 3

Ranking Order of Preference:

↑ Most Preferred
More Preferred
Somewhat Preferred
Less Preferred
Least Preferred

Table 6.3: Alternative Solutions Evaluation: 15 Side Road to Maple Avenue

Criteria	Alternative 1: Do Nothing	Alternative 2: Road Improvements	Alternative 3: Road Widening	Alternative 4: TDM	Alternative 5: Active Transportation
Natural Environment	No impacts over existing conditions.	Roundabouts and / or additional turn lanes would result in some impacts to natural environment.	Road widening has potential to have direct impacts on natural heritage features. Mitigation measures can be applied.	TDM does not impact natural environment.	Active transportation via existing multi-use trail.
Rating	Somewhat Preferred	Less Preferred	Least Preferred	Somewhat Preferred	Somewhat Preferred
Socio-Cultural and Economic Environment	Does not accommodate future growth and traffic congestion will cause impacts to community.	Road improvements can be made with limited property impacts; however, improvements would not fully address capacity requirements.	Road widening will fully accommodate future growth and minimize impacts to business. Property impacts will be greater than Alternative 2.	TDM can support future growth but will not reduce traffic impacts.	Existing active transportation will continue to service growing community but will not reduce traffic impacts sufficiently.
Rating	Least Preferred	Less Preferred	Most Preferred	More Preferred	Less Preferred
Technical Environment	Does not address capacity needs, road deficiencies, or future transit.	Partially addresses capacity. Does not address road geometrics in comparison to Alternative 3.	Fully addresses capacity, road deficiencies, and future transit. Impacts to utilities would be greater than other alternatives.	Lowers capacity requirements by reducing traffic but does not address road deficiencies.	Lowers capacity requirements by reducing traffic but does not address road deficiencies.
Rating	Least Preferred	More Preferred	Most Preferred	Somewhat Preferred	Less Preferred
Financial Environment	No capital costs, but O&M costs would be less over time with no improvements.	Moderate capital costs, O&M costs would be less over time in comparison to Alternative 1.	High capital costs, O&M costs lower over time compared to other alternatives.	Minimal capital costs, but O&M costs would significantly increase over time with no improvements.	Minimal capital costs, but O&M costs would significantly increase over time with no improvements.
Rating	Somewhat Preferred	Less Preferred	Least Preferred	Somewhat Preferred	Somewhat Preferred
Meets P/O Statement	No	Partially	Yes	No	Partially
Recommendation	Not Carried Forward	Combined with Alternative 3	Carried Forward	Forms part of Preferred Solution	Combined with Alternative 3

Ranking Order of Preference:

↑ Most Preferred
More Preferred
Somewhat Preferred
Less Preferred
Least Preferred

6.2.3 Preferred Solution

The widening of Eighth Line is identified as the Preferred Solution. Alternative Solutions 2 and 5, which include road improvements and implementation of AT elements can be combined as part of the Preferred Solution. This confirmation marks the completion of Phase 2 of the Municipal Class EA Process.

6.2.4 Confirmation of Class EA Project Schedule

Based on the Preferred Solution, the proposed widening of Eighth Line is identified as a Schedule C Road Project under Appendix 1 – Project Schedule of the MCEA Document. Specifically, the widening of Eighth Line meets the definition of Road Project #20:

“20. Reconstruction or widening where the reconstructed road or other linear paved facilities (e.g., HOV lanes will not be for the same purpose, use, capacity or at the same location (e.g., additional motor vehicle lanes, continuous centre turn lanes).”

At the time of conducting this MCEA study, the proposed widening of Eighth Line is anticipated to cost well over the Road Project # 20 threshold amount of $2.4 million to construct. As such, based on the guidance for Road Project #20, this undertaking meets the cost requirement for Schedule C Road Projects.

7.0 Road Improvements Design Concepts

7.1 Steeles Avenue to 5 Side Road

Three alternative design concepts were considered between Steeles Avenue and 5 Side Road as illustrated in Figure 7.1. Consistent among the alternatives are a rural cross-section with roadside ditches, a partially paved shoulder and traffic signals at 5 Side Road.

7.1.1 Alternative Design Concept 1: Three Lanes

Alternative 1 includes two travel lanes (one per direction) plus a bi-directional center left turn lane.

7.1.2 Alternative Design Concept 2: Four Lanes

Alternative 2 includes four travel lanes (two per direction).

7.1.3 Alternative Design Concept 3: Three Lanes and On-Road Bike Lanes

Alternative 3 is the same as Alternative 1 plus a MUP on both sides. The MUP would be an enhancement.

Figure 7.1: Alternative Design Concepts – Steeles Avenue to 5 Side Road

7.2 5 Side Road to 10 Side Road

Three alternative design concepts were considered between 5 Side Road and 10 Side Road as illustrated in Figure 7.2. Consistent among the alternatives are a rural cross-section with roadside ditches and a partially paved shoulder.

7.2.1 Alternative Design Concept 1: Five Lanes

Alternative 1 includes four travel lanes (two lanes per direction) plus a bi-direction center left turn lane.

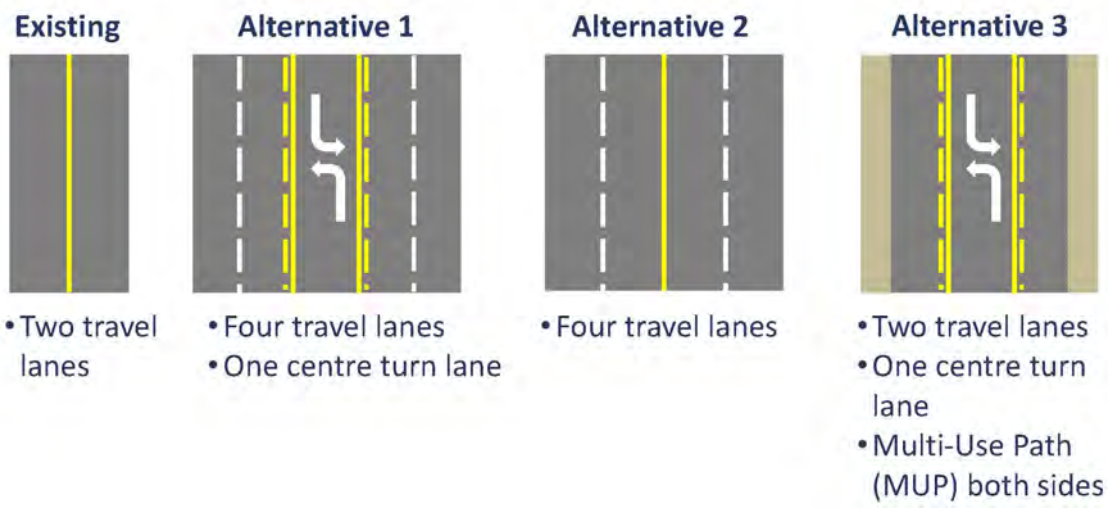
7.2.2 Alternative Design Concept 2: Four Lanes

Alternative 2 includes four travel lanes (two lanes per direction)

7.2.3 Alternative Design Concept 3: Three Lanes and MUP on both Sides

Alternative 3 includes two travel lanes (one lane per direction) plus a bi-direction center left turn lane and a MUP on both sides. The MUP would be an enhancement.

Figure 7.2: Alternative Design Concepts – 5 Side Road to 10 Side Road



7.3 10 Side Road to 15 Side Road

Two alternative design concepts were considered between 10 Side Road and 15 Side Road as illustrated in Figure 7.3. Consistent among the alternative design concepts for the road segment between 10 Side Road and 15 Side Road is maintaining the MUP on the east side, provision of an urban cross-section, new MUP or sidewalk on west side, signals at Miller Drive, Argyll Road and Danby Road and a controlled stop at proposed Collector B.

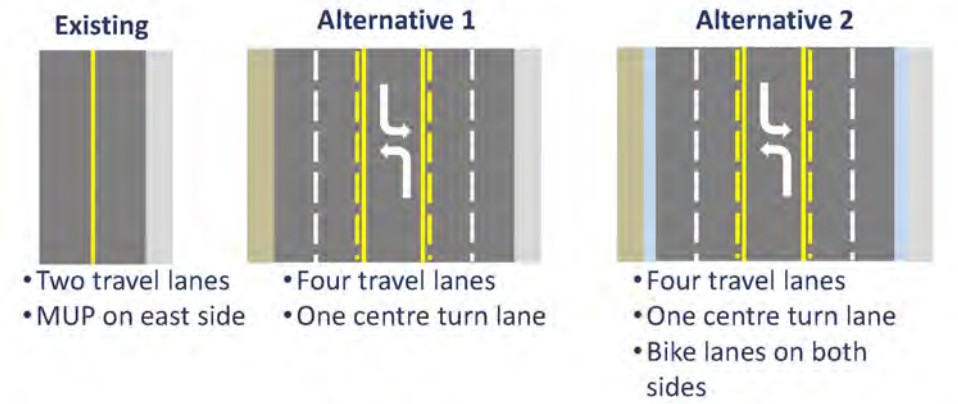
7.3.1 Alternative Design Concept 1: Five Lanes

Alternative 1 includes four travel lanes (two lane per direction) plus a bi-direction or center left turn lane and a MUP on the west side.

7.3.2 Alternative Design Concept 2: Five Lanes and On-Road Bike Lanes

Alternative 2 includes four travel lanes (two lanes per direction) plus a bi-direction or center left turn lane, a MUP on the west side, and the provision of bike lanes on both sides.

Figure 7.3: Alternative Design Concepts – 15 Side Road to 10 Side Road



7.4 15 Side Road to Maple Avenue

Three alternatives design concepts were considered for 15 Side Road to Maple Avenue as illustrated in Figure 7.4. Consistent among the alternatives are maintaining the MUP on the east side and the urban cross-section and include a new MUP / sidewalk on the west side and traffic signals at Arbor Glen Drive.

7.4.1 Alternative Design Concept 1: Three Lanes

Alternative 1 includes two travel lanes (one lane per direction) plus a bi-direction center left turn lane and MUP on the west side.

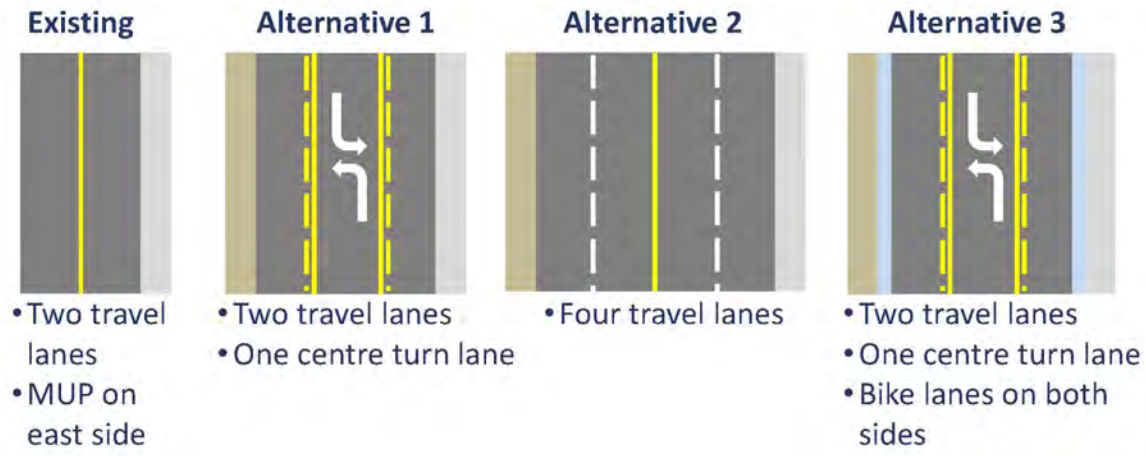
7.4.2 Alternative Design Concept 2: Four Lanes

Alternative 2 includes four travel lanes (two lanes per direction) and a MUP on the west side.

7.4.3 Alternative Design Concept 3: Three Lanes and MUP on both Sides

Alternative 3 includes two travel lanes (one lane per direction) plus a bi-direction center left turn lane and a MUP on the west side, plus bike lanes.

Figure 7.4: Alternative Design Concepts – 15 Side Road to Maple Avenue



7.5 Evaluation of Alternative Design Concepts

7.5.1 Evaluation Criteria

Several criteria and sub-criteria have been established to guide the evaluation of the alternative design concepts. These criteria fall until five major areas including Natural Environment, Socio-Cultural and Economic Environment, Technical Environment, Implementation and Financial Environment.

Natural Environment

- Impacts to vegetation communities.
- Impacts to fisheries and aquatic habitat.
- Impacts to terrestrial habitat.
- Impacts to designated features.
- Natural hazard impacts.

Socio-Cultural and Economic Environment

- Provision of AT facilities.
- Provision of safe access to private properties and businesses.
- Property requirements.
- Nuisance impacts to local residents.

Technical Environment

- Transportation safety.
- Impacts to corridor capacity and level of service.
- Roadside geometry and sightlines.
- Impact to utilities.
- Stormwater management.

Implementation

- Construction complexity.
- Temporary construction impacts.
- Permitting and approval requirements.

Financial Environment

- Capital costs.
- Operation and maintenance costs.

7.5.2 Evaluation Results

For the road segment between Steeles Avenue and 5 Side Road, Alternative 3 received the most favourable overall ranking when compared to Alternatives 1 and 2 as illustrated in Table 7.1. Alternative 3 ranks similarly to the other alternatives for Natural Environment, Technical Environment and Implementation. However, Alternative 3 is most preferred for socio-cultural and economic environment because it provides the most AT features of all three. From a cost perspective, Alternative 3 ranks similar to Alternative 1. On balance, Alternative 3 is recommended to be carried forward into the next stages of the project.

For the road segment between 5 Side Road and 10 Side Road, Alternative 3 received the most favourable overall ranking when compared to Alternatives 1 and 2 as illustrated in Table 7.2. Alternative 2 and 3 rank similarly for Natural Environment because the proposed road platform is narrower than Alternative 1, less overall encroachment into natural areas. Alternative 3 is most preferred for socio-cultural and economic environment because it provides the most AT features of all three. All three alternatives rank similarly for Technical Environment. From an implementation perspective, Alternative 3 ranks somewhat lower than the other alternatives because it may limit traffic to one lane during construction. From a cost perspective, Alternative 3 is most preferred as it is the lowest cost to construct and operate and maintain. On balance, Alternative 3 is recommended to be carried forward into the next stages of the project.

For the road segment between 10 Side Road and 15 Side Road, Alternative 1 received the most favourable overall ranking when compared to Alternative 2 as illustrated in Table 7.3. For most of the major criteria, Alternative 1 ranked similarly to Alternative 2. From a Natural Environment perspective, Alternative 1 is most preferred because it is a narrower road platform, less overall encroachment into natural areas. On balance, Alternative 1 is recommended to be carried forward into the next stages of the project.

For the road segment between 15 Side Road and Maple Avenue, Alternative 1 received the most favourable overall ranking when compared to Alternatives 2 and 3 as illustrated in Table 7.4. From a natural environment perspective, Alternative 1 ranks higher than Alternative 2 and 3 due to its narrower road platform and that it would not require

widening of the Black Creek bridge or impacts to the PSW. Alternative 1 ranks similarly to Alternative 3 for Socio-cultural and economic environment, Technical Environment and Implementation. However, Alternative 1 is more preferred to Alternative 3 from a cost perspective as it will be less expensive to operate and maintain without the bike lanes. Alternative 1 still can accommodate additional AT through the provision of a new MUP on the west side of corridor. On balance, Alternative 1 is recommended to be carried forward into the next stages of the project.

A detailed matrix for the evaluation of Alternative Design Concepts is provided in Appendix F.

Table 7.1: Alternatives Design Concepts Evaluation - Steeles Avenue to 5 Side Road

Criteria	Alternative 1: Three Lanes	Alternative 2: Four Lanes	Alternative 3: Three Lanes and MUP
Natural Environment	Similar impacts to natural features for all alternatives. Opportunities to improve watercourses and crossings. Slightly lower estimated disturbance to SWH and Natural Heritage System (NHS).	Similar impacts to natural features for all alternatives. Opportunities to improve watercourses and crossings. Slightly greater estimated disturbance to SWH and NHS.	Similar impacts to natural features for all alternatives. Opportunities to improve watercourses and crossings. Slightly greater estimated disturbance to SWH and NHS.
Rating	Less Preferred	Somewhat Preferred	Somewhat Preferred
Socio-Cultural and Economic Environment	Paved shoulder provides partial AT. Centre turn lane provides safer private property entry / exit. Property requirements similar for all alternatives.	Paved shoulder provides partial AT. Left turning movements less safe than Alternatives 1 and 3. Property requirements similar for all alternatives.	MUP provides best AT options. Centre turn lane provides safer private property entry / exit. Property requirements similar for all alternatives.
Rating	Somewhat Preferred	Less Preferred	More Preferred
Technical Environment	Safer for vehicles with centre turn lane; paved shoulder less safe for pedestrians and cyclists. Meets 2031 capacity needs. Least SWM controls.	Less safe for vehicles; paved shoulder less safe for pedestrians and cyclists. Provides highest corridor capacity. Somewhat lower SWM controls.	Safer for vehicles with centre turn lane; MUP provides greater protection for pedestrian and cyclists. Meets 2031 capacity needs. Highest SWM controls.
Rating	Somewhat Preferred	Somewhat Preferred	Somewhat Preferred
Financial Environment	Capital and Operation and Maintenance costs similar for both Alt 1 and 3; lower than Alt 2.	Highest capital costs to construct and maintain additional lane.	Capital and Operation and Maintenance costs similar for both Alternatives 1 and 3; lower than Alternative 2.
Rating	Less Preferred	Somewhat Preferred	More Preferred
Implementation	Somewhat more complex to construct as least area for staging traffic. May require limiting traffic to one lane during construction. Permitting requirements.	Somewhat less complex to construct as two-way traffic can be maintained. Permitting requirements.	Somewhat more complex to construct as least area for staging traffic. May require limiting traffic to one lane during construction. Permitting requirements.
Rating	Somewhat Preferred	Somewhat Preferred	Less Preferred
Recommendation	Not Carried Forward	Not Carried Forward	Carried Forward

Ranking Order of Preference:

↑ Most Preferred
More Preferred
Somewhat Preferred
Less Preferred
Least Preferred

Table 7.2: Alternatives Design Concepts Evaluation – 5 Side Road to 10 Side Road

Criteria	Alternative 1: Five Lanes	Alternative 2: Four Lanes	Alternative 3: Three Lanes and MUP
Natural Environment	Wider road platform results in more impacts to vegetation. Highest impact to Middle Sixteen Mile Creek crossing. Slightly higher estimated disturbance to SWH and NHS.	Slightly lower estimated disturbance to SWH and NHS.	Slightly lower estimated disturbance to SWH and NHS.
Rating	Less Preferred	Somewhat Preferred	Somewhat Preferred
Socio-Cultural and Economic Environment	Paved shoulder provides partial AT. Centre turn lane provides safer private property entry / exit. Property requirements similar for all alternatives.	Paved shoulder provides partial AT. Left turning movements less safe than Alternatives 1 and 3. Property requirements similar for all alternatives.	MUP provides best AT options. Centre turn lane provides safer private property entry / exit. Property requirements similar for all alternatives.
Rating	Somewhat Preferred	Less Preferred	More Preferred
Technical Environment	Safer for vehicles with centre turn lane; paved shoulder less safe for pedestrians and cyclists. Provides highest corridor capacity. Highest SWM controls.	Less safe for vehicles; paved shoulder less safe for pedestrians and cyclists. Corridor capacity at level between Alternatives 1 and 3. Somewhat lower SWM controls.	Safer for vehicles with centre turn lane; MUP provides greater protection for pedestrian and cyclists. Meets 2031 capacity needs. Lowest SWM controls.
Rating	Somewhat Preferred	Somewhat Preferred	Somewhat Preferred
Financial Environment	Highest capital costs to construct and maintain additional lane.	Incrementally higher capital costs to construct and maintain additional lane compared to Alternative 3.	Lowest Capital and Operation and Maintenance costs.
Rating	Less Preferred	Somewhat Preferred	More Preferred
Implementation	Somewhat less complex to construct as two-way traffic can be maintained. Permitting requirements.	Incrementally more complex to construct than Alternative 1; two-way traffic can be maintained. Permitting requirements.	Somewhat more complex to construct as least area for staging traffic. May require limiting traffic to one lane during construction. Permitting requirements.
Rating	Somewhat Preferred	Somewhat Preferred	Less Preferred
Recommendation	Not Carried Forward	Not Carried Forward	Carried Forward

Ranking Order of Preference:

↑ Most Preferred
More Preferred
Somewhat Preferred
Less Preferred
Least Preferred

Table 7.3: Alternatives Design Concepts Evaluation – 10 Side Road to 15 Side Road

Criteria	Alternative 1: Five Lanes	Alternative 2: Five Lanes with On Road Bike Lanes
Natural Environment	Some impacts to vegetation communities and terrestrial habitat. Some impacts to SWH and NHS.	Incrementally higher impacts to vegetation communities and terrestrial habitat to accommodate bike lanes. Somewhat higher impacts to SWH and NHS compared to Alternative 1.
Rating	Somewhat Preferred	Less Preferred
Socio-Cultural and Economic Environment	MUP / sidewalk on west side provides additional AT options. Centre turn lane provides safe private property entry/exit. Somewhat less property impacts than Alternative 2.	Bike lanes provides enhanced AT over Alternative 1. Centre turn lane provides safe private property entry/exit. Requires incrementally higher impacts to adjacent properties.
Rating	Somewhat Preferred	Somewhat Preferred
Technical Environment	Both alternatives provide safety along corridor and meet capacity needs. Lower SWM controls.	Both alternatives provide safety along corridor and meet capacity needs. Provides enhanced safety for cyclists. Higher SWM controls.
Rating	More Preferred	More Preferred
Financial Environment	Similar Capital and Operation and Maintenance costs for both alternatives.	Lowest Capital and Operation and Maintenance costs.
Rating	More Preferred	More Preferred
Implementation	Construction complexity and impacts similar for both alternatives. Permitting requirements.	Construction complexity and impacts similar for both alternatives. Permitting requirements.
Rating	Somewhat Preferred	Somewhat Preferred
Recommendation	Carried Forward	Not Carried Forward

Ranking Order of Preference:

↑ Most Preferred
More Preferred
Somewhat Preferred
Less Preferred
Least Preferred

Table 7.4: Alternatives Design Concepts Evaluation – 15 Side Road to Maple Avenue

Criteria	Alternative 1: Three Lanes	Alternative 2: Four Lanes	Alternative 3: Three Lanes with On-Road Bike Lanes
Natural Environment	Least impact to natural features of all alternatives. Potential for indirect impacts to Black Creek and Silver creek during construction; with mitigation impacts can be minimized.	Significant encroachment into Hungry Hollow PSW. Requires realignment of Black Creek to accommodate bridge widening and sidewalk on west side.	Significant encroachment into Hungry Hollow PSW. Requires realignment of Black Creek to accommodate bridge widening and sidewalk on west side.
Rating	Somewhat Preferred	Least Preferred	Least Preferred
Socio-Cultural and Economic Environment	Provision of new MUP on west side increases AT. Centre turn lane provides safer private property entry / exit. Some properties impacted but can be mitigated with retaining walls. Property requirements similar for all alternatives.	Left turning movements less safe than Alt 1 and 3. Highest level of property impacts, some property acquisition may be required.	MUP provides best AT options. Centre turn lane provides safer private property entry / exit. Some properties impacted but can be mitigated with retaining walls.
Rating	Somewhat Preferred	Less Preferred	Somewhat Preferred
Technical Environment	Safer for vehicles with centre turn lane. Meets 2031 capacity needs. Some impacts to utilities. Least SWM controls.	Less safe for vehicles. Provides highest corridor capacity. Highest impact to utilities. Highest SWM controls.	Safer for vehicles with centre turn lane; Meets 2031 capacity needs. Some impacts to utilities. Somewhat lower SWM controls.
Rating	Somewhat Preferred	Less Preferred	Somewhat Preferred
Financial Environment	Capital costs for Alternatives 1 and 3 similar. Lowest Operation and Maintenance costs of all alternatives.	Highest capital costs to construct and maintain additional lane.	Capital costs for Alt 1 and 3 similar. Incrementally higher Operation and Maintenance cost compared to Alt 1 due to bike lanes.
Rating	More Preferred	Less Preferred	Somewhat Preferred
Implementation	Least complex to construct of all alternatives. Several permitting requirements.	Widening Black Creek bridge adds more construction complexity. Several permitting requirements.	Widening Black Creek bridge adds more construction complexity. Several permitting requirements.
Rating	More Preferred	Less Preferred	More Preferred
Recommendation	Carried Forward	Not Carried Forward	Not Carried Forward

Ranking Order of Preference:

- Most Preferred
- More Preferred
- Somewhat Preferred
- Less Preferred
- Least Preferred

8.0 Technical Support Studies

8.1 Air Quality Impact Assessment

8.1.1 Methodology and Assessment Approach

Based on the forecasted 2031 traffic volumes, future predicted air quality levels with and without road improvements were compared to the existing air quality levels to understand the impact of proposed improvements on local air quality. Typical contaminants from automobile exhaust were evaluated including Particulate Matter (PM2.5 and PM10), Total Suspended Particulates (TSP), Nitrogen Dioxide (NO2), Carbon Monoxide (CO), 1,3 Butadiene, Benzene, Acrolein, Acetaldehyde, and Formaldehyde.

Air quality modelling was performed for the above contaminants for three (current and two future) scenarios:

- *The* current scenario shows the current impact of the local roads on selected sensitive receptors.
- The Future No Build scenario shows emissions due to traffic in the vicinity of the Study Area in the future (2031) without the proposed road improvements.
- The Future Build scenario shows future (2031) emissions with the proposed road improvements.

The air quality effects due to the Eighth Line improvements were predicted at selected sensitive receptors (Figure 8.1). The impacts were assessed on 0.5-hour, 1 hour, 8-hour, 24 hour, and annual basis. Modelled impacts from the local roads were added to the background measurements recorded by the MECP for all three scenarios to understand the total cumulative effects of the proposed road improvements on local air quality.

The future predicted air quality levels at sensitive receptor locations (residential properties and the Living Hope Alliance Church) with and without the proposed undertaking were all below the MECP criteria apart from benzene on an annual basis, which is due to high benzene background concentration that is already above the criterion at present.

A copy of the Air Quality Impact Assessment Report is provided in Appendix G of this report.

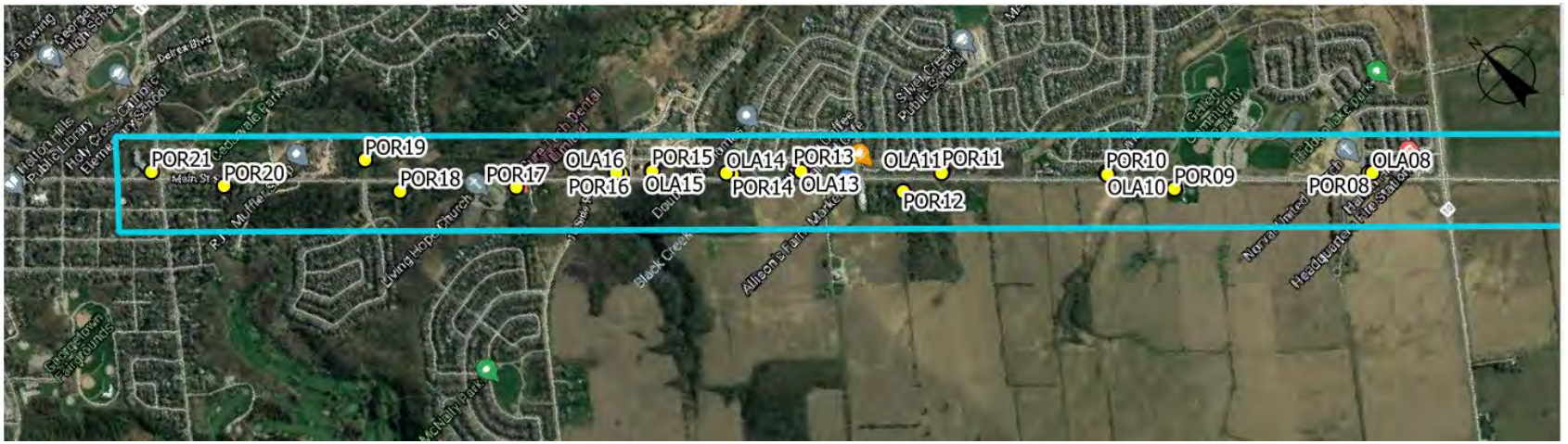
Figure 8.1: Sensitive Receptors along the Corridor (Air Quality)

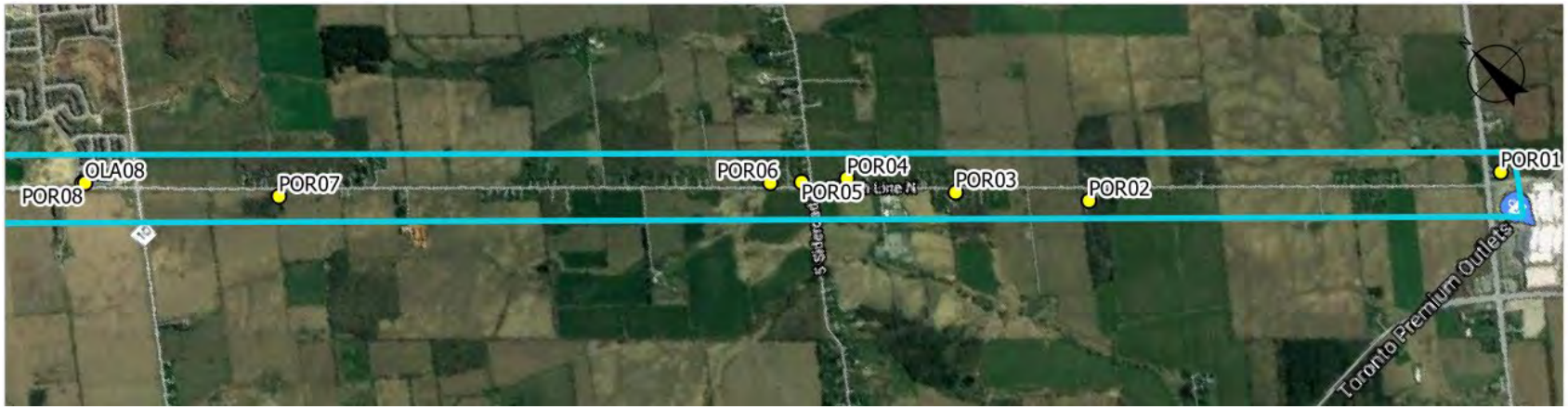
8.2 Noise Impact Assessment

A noise impact assessment was conducted using STAMSON and the traffic data presented in the Transportation Study Report. As illustrated in Figure 8.2, the assessment used 21 Points of Reception (POR) at the plane of an open window. Seven Points of Reception also had a corresponding Outdoor Living Area (OLA).

Modelled noise levels were calculated for three scenarios: Current, Future No Build and Future Build. The Future No Build scenario represents conditions in the future without proposed road improvements, while the Future Build scenario represents conditions with the proposed road improvement. The results of this assessment for each of the Current, Future No Build, and Future Build scenarios were compared to the MTO's Noise Guide to determine whether potential increase in noise levels due to any of the above scenarios would merit mitigation measures under the guidelines.

Figure 8.2: Points of Reception (Noise)





From the noise modelling and assessment work undertaken; it was determined that no significant increases to traffic noise are expected because of the project and therefore no mitigation measures need to be considered for the project.

The determination as to whether mitigation measures need to be considered is based on the difference in predicted sound levels between the Future Build and Future No Build scenarios and comparison with the 65 dBA threshold, which is the Ministry established acceptable noise threshold for PORs and OLAs impacted by road widenings. If the difference in the predicted sound levels between the Future Build and Future No Build scenarios is less than 5 dB and the Future Build predicted sound levels are less than 65 dBA, then mitigation measures do not need to be considered.

For all but two of the PORs considered the future sound levels are equivalent or lower with the implementation of the proposed design. All results showing lower sound levels for the Future Build scenario relative to the Future No Build scenario is directly attributable to the shift of the proposed road alignment westward. This shift moves the center of the noise source away from the dwellings on the east side of the road, which is where most of the dwellings are located in the study area.

Only two PORs out of twenty-eight Plane of Window (POW) and OLA locations showed an increase because of the Future Build scenario. This increase was only 1 dB, which is imperceptible to the average person. The predicted sound levels at these PORs were still low enough to not require mitigation as the sound levels are still below the 65 dBA threshold.

A copy of the Noise Impact Assessment Report is provided in Appendix H of this report.

8.3 Culvert Condition Assessment

As part of the MCEA Study, a Condition Assessment of the municipal culvert and crossing structure inventory within the Study Area was undertaken. A total of nineteen culverts / structures were assessed (see Figure 8.4 for locations). A copy of the Culvert Condition Assessment Report is provided in Appendix I of this report. A detailed, element-by-element visual inspection of each structure was completed. Any defects or deficiencies with the structures were identified and recommendations were provided for improvements if warranted. Table 8.1 provides a summary of the condition assessment and recommendations for each of the structures assessed.

Table 8.1: Culvert Condition Assessment Summary

Structure ID	Structure Type	Summary of Existing Condition	Recommended Work
1	Round Corrugated Steel Plate Culvert	Fair to poor; light to moderate corrosion along water line with severe corrosion and section loss noted at the western end.	Culvert should be replaced as part of the road improvement work.
2	Round Corrugated HDPE Culvert	Good; light sediment build-up; damaged culvert end.	Replace damaged end section as part of the road improvement work.
3	Twin Arched Corrugated Steel Plate Culverts	Fair to Poor; light to moderate corrosion along water line with severe corrosion and section loss noted for lengths at either end of both culverts.	Replace culverts and retaining walls as part of road improvement work.
4	Concrete Box Culvert	Fair; Old structure. Length is short for road profile. Delaminations and cracks noted at various observable locations. Cold pour joints between top slab and barrel walls are in poor condition. Sediment buildup at outlet.	Replace culvert as part of road improvement work.
5	Corrugated Steel Pipe	Fair; the structure itself is in generally good condition with light to medium corrosion along the waterline. Minor deformation with medium corrosion along obvert.	Based on the vintage of the culvert and the breakdown of the galvanized coating, it is recommended that the culvert should be replaced as part of the road reconstruction works.
6	Elliptical Corrugated Steel Pipe	Very Poor; Perforations and barrel separation was observed throughout entire length of the invert. Impact damage also noted at west end. Severe corrosion also noted.	Replace culvert as part of road improvement work.
7	Round Corrugated Steel Pipe	Good to Fair; Light corrosion observed along the waterline. Minor impact damage at the culvert inlet.	No work is recommended at this structure.
8	Round Concrete Pipe	Good; minor concrete deterioration at inlet and headwall.	Minor concrete repairs to headwall around culvert inlet.

Structure ID	Structure Type	Summary of Existing Condition	Recommended Work
9	Round Concrete Pipe	Good; Narrow vertical crack and small spall observed on headwall. No structure defects were observed.	No work is recommended at this structure.
10	Round Corrugated Steel Pipe	Good to Fair; moderate corrosion and minor section loss observed along the waterline. Minor impact damage at the culvert inlet.	Replace culvert as part of road improvement work.
11	Round Corrugated Steel Pipe	Fair; light to severe corrosion noted in observable areas with section loss identified at the outlet. Minor impact damage at the culvert inlet.	Replace culvert as part of road improvement work.
12	Twin Cell Concrete Box Culvert	Fair; Narrow cracking, severe spalls noted at culvert ends. Medium to severe spalls, narrow stained cracking and moisture / damp spots and areas of delamination noted within barrel. Previous repairs were observed.	Maintenance and repairs could be completed as part of road improvement work.
13	Corrugated Steel Pipe Arch Culvert	Fair to Poor; Bold hole cracks observed near inlet with active groundwater leakage. Minor plate separation observed.	Replace culvert as part of road improvement work.
14	Round Corrugated Steel Pipe	Good to Fair; Light to moderate corrosion observed along the waterline. Localized deformation mid-span. Perched culvert outlet.	Consider installing rocky ramp at existing perched outlet to provide ability for fish to pass through culvert.
15	Twin Round HDPE Pipes	Very Good; undersized round stone partially plugging inlet, possibly affecting flow conveyance. Light water staining along water line.	Removed round stone from within and upstream of culvert and replace with suitably sized stone if preferred. No other work is recommended based on physical condition.
16	Twin Round HDPE Pipes	Very Good; Light water staining along water line. Outlet is buried with soil and vegetation inhibiting drainage.	Maintenance (soil removal at outlet) could be completed as part of road improvement work. No other work is recommended.
17	Twin Round HDPE Pipes	Very Good; Sediment build-up observed within culverts near outlets are embedded in soil and rip-rap.	Maintenance (soil removal at outlet) could be completed as part of road improvement work. No other work is recommended.

Structure ID	Structure Type	Summary of Existing Condition	Recommended Work
18	Round HDPE Pipe	Very Good; Light sediment build up.	No work is recommended at this structure.
19	Twin Cell Concrete Box Culvert	Fair; Moisture / damp spots and light scaling, cracking, honeycombing, and spalling in various areas of the culvert and pier. De-bonded patching observed. Impact damage to barrier and railing system.	Repairs to barrier railing system (including posts), as well as patch and repair of concrete at various locations on bridge structure could be completed as part of road improvement work.

8.4 Stormwater Management Assessment

A Stormwater Management Assessment was completed based on the preferred road design concept. The assessment provides a stormwater management (SWM) and conveyance assessment and preliminary design. A copy of the Stormwater Management Assessment Report is provided in Appendix J of this report.

There are several major and minor / drainage watercourse crossings along the road corridor under study, including five on the urban section and two on the rural section of the Study Area.

8.4.1 Existing Drainage Conditions

The Eighth Line is located within the headwaters area of Black, Silver and Sixteen Mile Creek watersheds, which empty into Lake Ontario approximately 30 km southeast of the site.

The southern portion of the road, between Steeles Avenue and 10 Side Road, is drained by a rural cross section to various outlet low points along the route. The road is bounded by rural lands on the east and west side, which generally drain to tributaries of the Sixteen Mile Creek. A relatively small portion of the adjacent lands drain to the ROW.

The central portion of the road, between 10 Side Road and 15 Side Road consists of an urban cross section. The road has curbs and gutters through this section; however, there are some drainage ditches between the ROW limit and the curb. Minor runoff is conveyed via storm sewers, and major overland flow drains to the existing low points and outlets. This segment includes a major watercourse crossing of the Silver Creek Tributary. An urban subdivision exists on the east side of the road, while the west side is currently rural residential. This west side is proposed to be developed into a residential subdivision as outlined in the Vision Georgetown Subwatershed Study prepared by AECOM, May 2017.

The northern portion of the road, between 15 Side Road and Maple Avenue also consists of an urban cross section. Minor runoff is conveyed via storm sewers, and major overland flow drains to the existing low points and outlets. An oil / grit separator (OGS) is located between 15 Side Road and Arborglen Drive, providing quality control for a portion of the road. This segment includes a major watercourse crossing of the Black Creek.

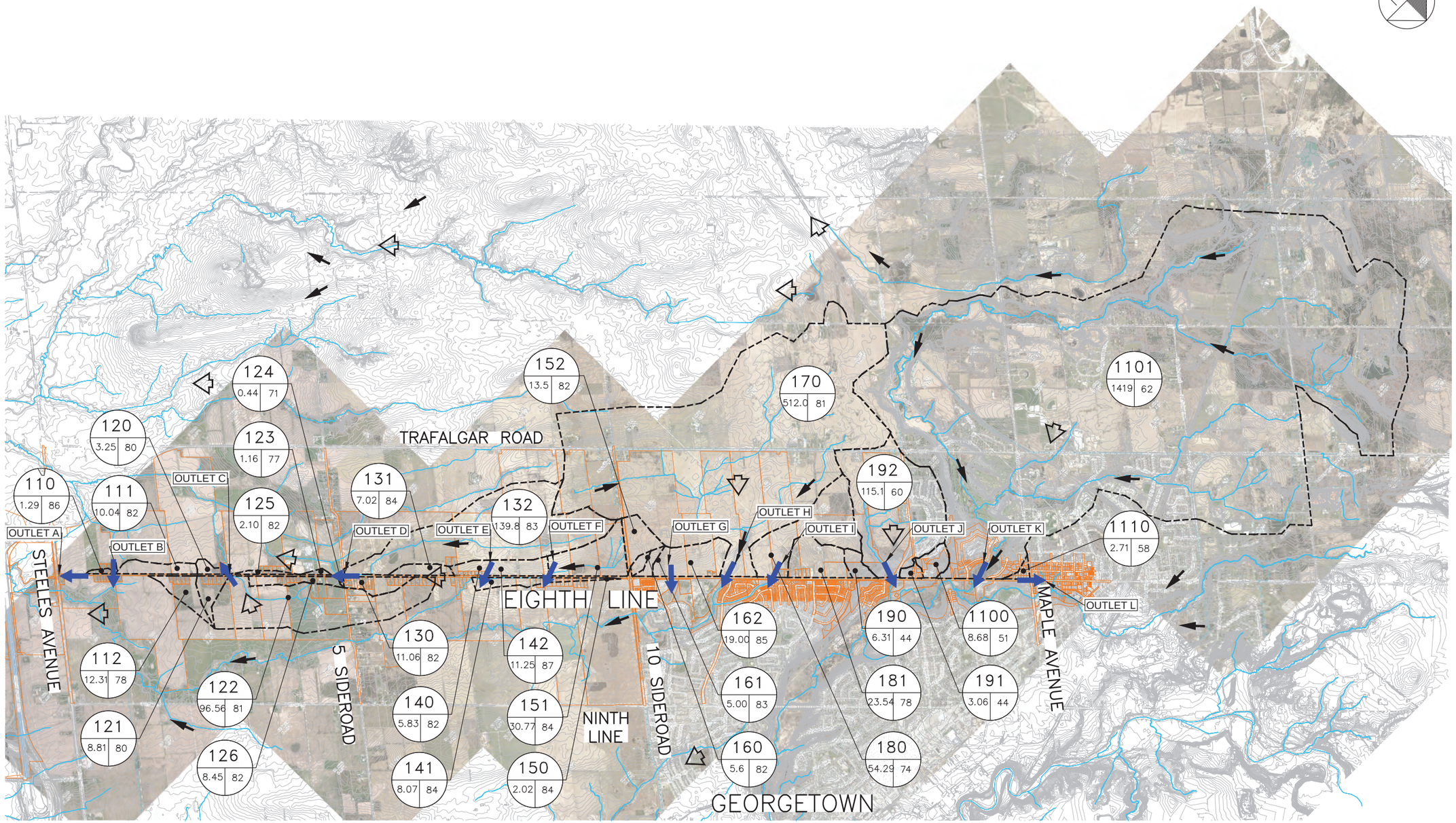
A grassed-swale / filter bed feature exists at the southwest corner of Eighth Line and 15 Side Road, providing quality control for a portion of 15 Side Road. This feature will remain in place, unaffected by the Eighth Line work.

Aside from the existing OGS and grassed-swale / filter bed noted above, there are no other existing SWM features along the Eighth Line corridor.

8.4.2 Hydrology

A hydrologic analysis was completed to determine the quantity control requirements, and road crossing culvert conveyance capacities. The hydrologic model Visual OTTHYMO 3.0 (VO3) was used to assess peak flows for each drainage area based on topography, soil conditions and land use. The drainage areas are illustrated in Figure 8.3.

The total flows were determined for the 2-to-100-year storms. Storage required for quantity control is anticipated to be provided within the proposed ditches for the rural cross sections (Steeles Avenue to 10 Side Road), and within the proposed storm sewers in the urban cross sections (10 Side Road to Maple Avenue). Some of these features may be larger than conventional size to provide the necessary quantity control volumes.



NOTES

1. ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE NOTED.

LEGEND

OUTLET D - OUTLET FLOW

LEGEND

- SUB-CATCHMENT BOUNDARY
- MAJOR SYSTEM FLOW
- MINOR SYSTEM FLOW

SUBCATCHMENT 110 1.29 86 AREA (ha) CURVE NUMBER

BURNSIDE

TOWN OF HALTON HILLS

PRELIMINARY STORM DRAINAGE PLAN
EIGHTH LINE EA
BETWEEN STEELES AVE. TO MAPLE AVE.

TOWN OF HALTON HILLS

SCALE 1:20,000

CONSULTANT FILE NO. 300043880

FIGURE NO. **8.3**

8.4.3 Water Quality

The proposed road widening will result in an increase in impervious area, requiring “enhanced” water quality where possible, prior to discharge into any watercourse or the natural environment. For the rural cross-sections (Steeles Avenue to 10 Side Road), enhanced water quality will be achieved through enhanced grassed swales (EGS) where feasible in the roadside ditches. The gentle slope of the road is well suited for implementing EGS features. For the urban cross sections (10 Side Road to Maple Avenue), OGS in conjunction with catch basin inserts will achieve the objective of enhanced water quality control.

A water balance analysis ensures efforts are made to maintain existing ground infiltration amounts, which may be reduced because of the proposed hardened surface. Site conditions are not ideal for infiltration; however, methods are proposed where feasible to achieve water balance volumes.

The minimum requirement for erosion protection is to detain the first 5 mm of runoff on site. In the rural section, this can be achieved through bioretention / infiltration features proposed beneath the quantity control ponding areas, following pretreatment by the proposed EGS. In the urban section, catch basins will discharge to infiltration galleries, which will overflow to the storm sewer system. Catch basin inserts and deepened sumps will provide pretreatment prior to infiltration.

8.4.4 Stormwater Management Design

The widening will result in an increase in runoff from the ROW, which is to be mitigated so as not to increase existing flow rates. Hydrologic modeling was completed to determine the storage volumes required to achieve the peak flow reduction.

A summary of the quantity control design is provided in Table 8.2 below. Outlet locations are illustrated on the Stormwater Management Plans, which are provided in the Stormwater Management Assessment Report (see Appendix J). Outlets are labeled separate from the established road crossing culverts, as not every culvert represents a separate outlet.

Table 8.2: Quantity Control Summary

Outlet	Receiver	Area (ha)	Model ID	Required 100-Year Volume (m^3)	Proposed Storage
Rural Segments					
B	Culvert 1	27.56	504/504	1,000	Expanded 330 m long ponding area in west ditch north of outlet.
C	Culvert 3	29.81	508/RR603	1,700	Ponding in west roadside ditch over 200 m south of outlet. Ponding in east roadside ditch over 200 m north of outlet. Expanded 330 m long ponding area in west ditch north of outlet.
D	Culvert 4	21.93	510/RR604	1,575	Ponding in east roadside ditch over 60 m north of outlet. Expanded 333 m long ponding area in west ditch north of outlet.
E	Culvert 5	29.00	514/RR605	1,600	Expanded 300m long ponding area in west ditch north of outlet.
F	Culvert 6	6.22	515/RR606	700	Ponding in both roadside ditches over a length of 200 m north of the outlet.
Urban Segments					
A	Steeles Ave. Storm Sewer	0.78	200/701	900	Over-sized storm sewers over 800 m length 1,200 mm diameter.
G	Danby Road Storm Sewer & Culvert 11	32.05	520/RR607	750	Over-sized storm sewers over 680m length 1,200 mm diameter.
H	Culvert 12	1.05	271/RR608	130	Over-sized storm sewers over 200 m length 900 mm diameter.
I	Culvert 13	27.04	522/RR609	900	Over-sized storm sewers over 830 m length 1,200 mm diameter.
J	Culvert 14	11.97	526/RR610	450	Over-sized storm sewers over 705 m length 900 mm diameter.
K	Culvert 19 & Silver Creek	2.18	530/RR611	165	Over-sized storm sewers over 220 m length 1050 mm diameter.
L	Maple Ave. Storm Sewer	3.34	532/RR612	75	Over-sized storm sewers over 75 m length 1,200 mm diameter.

A separate Technical Memorandum provided in Appendix D of Stormwater Management Assessment Report (see Appendix J of this report) has been prepared to address the SWM design for the ROW improvements between Steeles Avenue and proposed Collector Road D. The memo provides a conceptual SWM design for the urbanization of this portion of the Eighth Line and demonstrates overall quantity control to the existing watercourse crossing at Steeles Avenue. The memo also proposes replacement of approximately 120 m of existing storm sewer within the Steeles Avenue right of way.

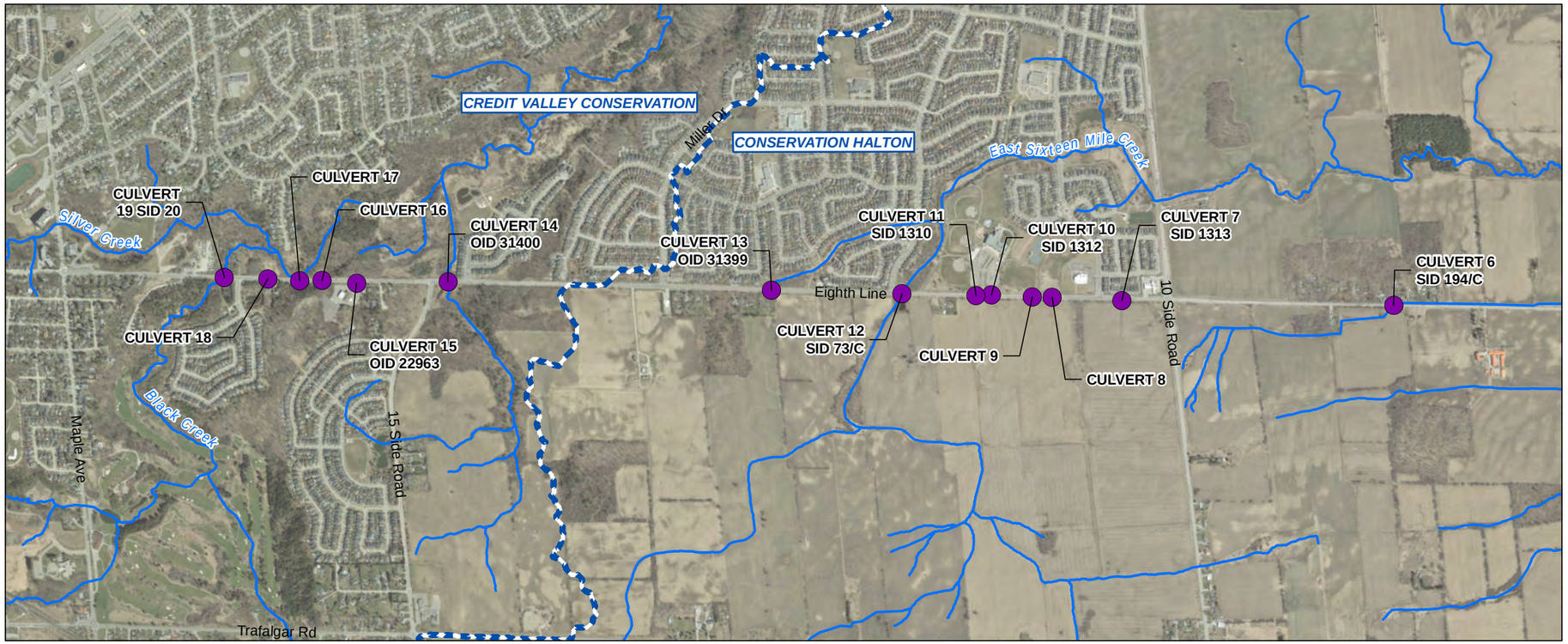
8.4.5 Quality and Erosion Control

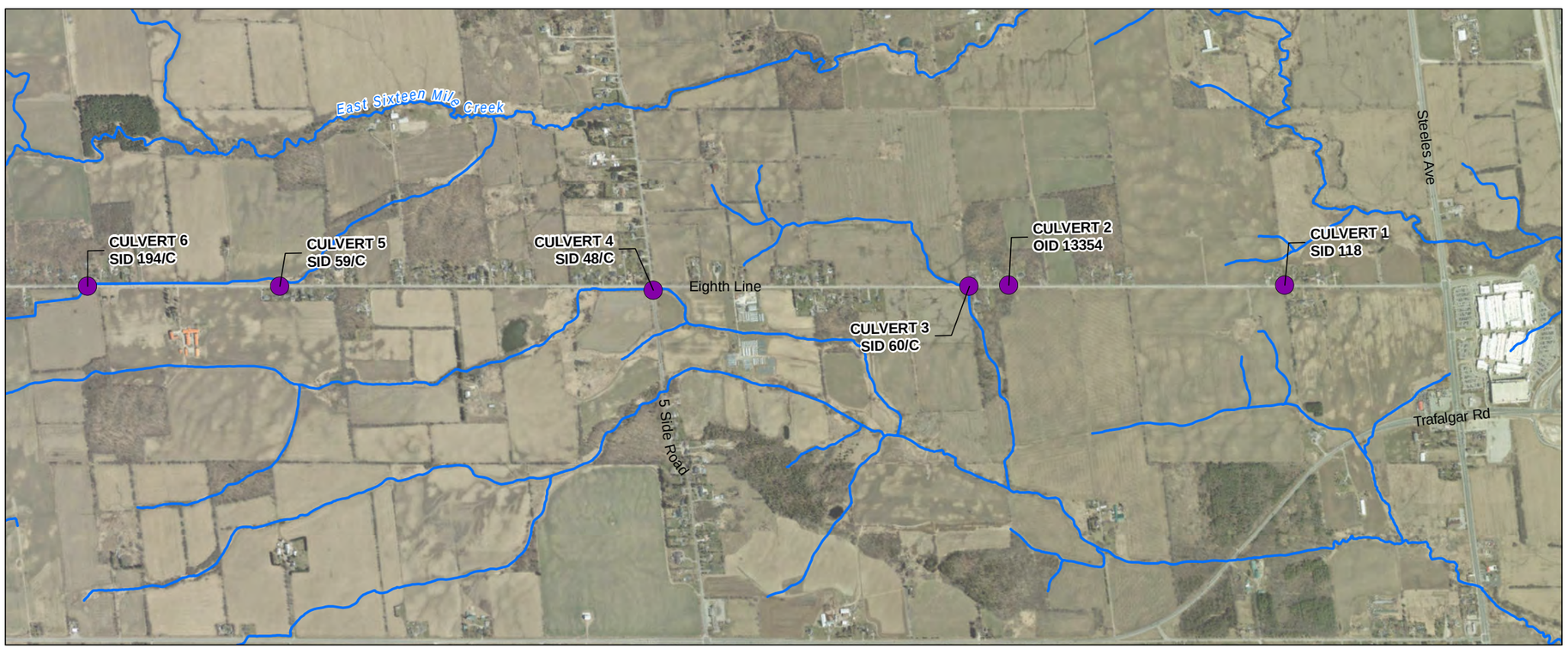
A treatment train approach is proposed to provide enhanced quality control and erosion control for the hardened surfaces within the ROW.

8.4.6 Hydraulics

Road crossing culverts within the Study Area have been identified on Figure 8.4. Most of the culverts provide conveyance of local drainage, some are associated with more significant watercourse crossings. The culverts have been assessed to confirm the hydraulic capacity against the design criteria.

Minor watercourse re-alignments will be required, in areas where the proposed ROW extends beyond the existing watercourse. Under existing conditions, these watercourses are combined with the existing roadside ditches. For these instances, the watercourse will be realigned to merge with the new roadside ditch.

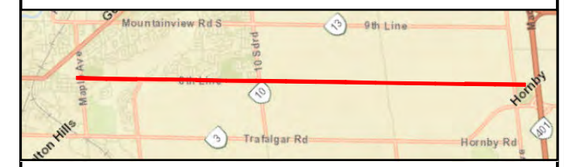




Culvert Location (With Culvert ID and Town Structure ID or Town Object ID)

Watercourse (MNRF)

Conservation Authority Boundary



Sources:

1. Ministry of Natural Resources and Forestry, © Queen's Printer for Ontario.
2. Natural Resources Canada © Her Majesty the Queen in Right of Canada.
3. Town of Halton Hills.

Disclaimer:

R.J. Burnside & Associates Limited and the above mentioned sources and agencies are not responsible for the accuracy of the spatial, temporal, or other aspects of the data represented on this map. It is recommended that users confirm the accuracy of the information represented.

This map is the product of a Geographic Information System (GIS). As such, the data represented on this map may be subject to updates and future reproductions may not be identical.

Datum: North American 1983 CSRS	
Coord. System: NAD 1983 CSRS UTM Zone 17N	
Projection: Transverse Mercator	
Central Meridian: 81°0'0.00"W	
False Easting: 500,000m	False Northing: 0m
Page Orientation: 44.9°	Scale Factor: 0.99960

Grid North

0 250 500 750 1,000 1,250 1,500
Metres

BURNSIDE

Client

TOWN OF HALTON HILLS

Figure Title

EIGHTH LINE EA

ROAD CROSSING
CULVERT LOCATIONS

Drawn	Checked	Date	Figure No.
CD	JV	2022/09/12	8.4
Scale		Project No.	
1:20,000		300043880	

File Path: \\elmo\Shared Work Areas\043880 (8th Line EA)\06_GIS\MapCarto\ESR\043880 Road Crossing Culvert Locations.mxd Print Date: 2022/09/12 Time: 02:28 PM

Hydraulic modeling was completed to analyze several culverts using various software programs including HY-8 (for local culverts) and HEC-RAS (for culverts located within the CH and CVC regulated areas). Other culverts used the analyses provided through models completed by the conservation authority or Vision Georgetown Subwatershed Study.

A summary of the proposed culvert dimensions and capacities is provided in Table 8.3.

Table 8.3: Culvert Assessment Summary (Hydraulic)

ID	Watercourse Name	Existing Pipe	Current Capacity (Without Freeboard)	Proposed Capacity (Freeboard)	Recommendation
1	N/A	0.90 m dia. CSP	25-Year	50-Year (0.26 m)	Replace with 1.0 m dia. CSP, extend to 30 m.
2	N/A	0.60 m dia. HDPE	Extend to 30 m. Culvert 2 is not at a low-point, it appears to have been installed to provide relief for downstream Culvert 3. Without detailed grading, it is not clear how much runoff is conveyed through the culvert. At Detailed Design, hydraulic connectivity with Culvert 3 should be investigated.		
3	Middle 16 Mile Creek Trib.	Twin 1.6 m Span x 1.1 m Rise Arch CSP	10-Year	25-Year (0.41 m) 50-Year (0 m)	Culvert overtops during 25-Year. Proposed to increase to 1.88 m x 1.26 m CSP Arch and extend to 30 m.
4	Middle 16 Mile Creek Trib.	2.55 m Span x 0.65 m Rise Conc. Box	5-Year	25-Year (0.66 m) 50-Year (0.26 m)	Replace with 4.2 m Span x 0.9 m Rise Concrete Box to meet conveyance criteria and improve existing flooding conditions. Extend to 38 m.
5	N/A	1.4 m dia. CSP	100-Year	50-Year (0.40 m) 100-Year (0.23 m)	Culvert has capacity for the 25-Year. Proposed extension only.
6	East 16 Mile Creek Trib.	1.5 m Span x 0.8 m Rise Elliptical CSP	>2-Year	25-Year (0.31 m) 50-Year (0.25 m)	Replace with 2.7 m Span x 0.9 m Rise Concrete Box to meet conveyance criteria. Construct berm at upstream inlet to direct flows to culvert without spilling to the south. At Detailed Design, hydraulic connectivity with Culvert 5 should be investigated.
7	N/A	0.60 m dia. CSP	Minor extensions as necessary to accept external drainage. Culverts 6 through 10 connect to an existing bypass pipe that conveys 10-year flows through the Fernbrook Phase 3 subdivision (VG SWS). The existing culverts have sufficient capacity to convey the 10-year storm.		
8	N/A	0.45 m dia. Conc.			
9	N/A	0.45 m dia. Conc.			

ID	Watercourse Name	Existing Pipe	Current Capacity (Without Freeboard)	Proposed Capacity (Freeboard)	Recommendation
10	N/A	0.50 m dia. CSP			
11	N/A	0.60 m dia. CSP			
12	East 16 Mile Creek Trib. A	Twin 3.75 m Span x 2.35 m Rise Conc. Box	Regional	Regional (2.0 m)	Culvert has capacity for the Regional storm without overtopping. Proposed extension only.
13	East 16 Mile Creek Trib. C	2.0 m Span x 1.42 m Rise Elliptical CSP	0.05 m Regional overtopping	50-Year (1.43 m) 0.05 m Regional overtopping	Culvert has capacity for the 50-Year storm, minimal Regional overtopping. Proposed extension only – no realignment.
14	Silver Creek Trib. B	1.4 m dia. CSP	100-Year, 0.28 m Regional overtopping	50-Year (3.64 m) 100-Year (3.55 m) 0.28 m Regional overtopping	Culvert has capacity for the 50-Year storm, minor Regional overtopping. Proposed extension only.
15	N/A	Twin 0.45 m dia. HDPE	Culverts 15 through 18 provide local conveyance from the west side of 8th Line to the Silver Creek. They were replaced with larger culverts in 2007 (as-build drawings), and Culverts 15 to 17 were twinned. Minor extensions or headwalls may be necessary to accommodated minor grading on the east side of the road.		
16	N/A	Twin 0.60 m dia. HDPE			
17	N/A	Twin 0.375 m dia. HDPE			
18	N/A	0.45 m dia. HDPE			
19	Black Creek	Twin 4.9 m Span x 2.45 m Rise Conc. Box	There are no changes proposed at this crossing, analysis was not warranted.		

The culvert assessment above considers hydraulic capacity only. As discussed in Section 8.3, a condition assessment was completed as part of the Culvert Condition Assessment Report (see Appendix I). In some instances, the recommended culvert improvements noted in the Preferred Design Concept Plans and the Stormwater Management Plans are governed by the culvert structural condition i.e., are recommended for replacement for structural reasons rather than hydraulic capacity needs. Opportunities for increasing culvert sizes to accommodate wildlife or fish passage were considered as part of the impact assessment, which is documented under Section 10.1 of this report.

The SWM designs and culvert capacity assessments completed as part of this EA are preliminary and will be finalized, together with the approach to storing / managing stormwater attributed to the road widening during the detailed design phase of the project. The current calculations are based on the information level of detail available at this conceptual stage.

9.0 Description of the Preferred Design

This section provides an overview of the key features of the preferred design concept plans for the Eighth Line corridor improvements that were developed based on the needs of the project study corridor and feedback received from members of the public and stakeholders throughout the EA Study process.

The preferred design concept plans are provided in Appendix K1 of this report.

9.1 Design Criteria

Currently Eighth Line is posted at 60 km/h between Steeles Avenue and 15 Side Road and 50 km/h between 15 Side Road and Maple Avenue (Main Street South). The design criteria for the Eighth Line corridor are provided in Table 9.1.

Table 9.1: Eighth Line Design Criteria

	Existing Conditions	Design Standard	Proposed Standard	Reference Document
Minimum ROW				
• 15 Sideroad to Maple	20 m	30 m	TBD[1]	Official Plan
• 10 Sideroad to 15 Sideroad	30 m	30 m	TBD[1]	Official Plan
• 5 Sideroad to 10 Sideroad	20 m	30 m	TBD[1]	Official Plan
• Steeles to 5 Sideroad	20 m	30 m	TBD[1]	Official Plan
Posted Speed				
• 15 Sideroad to Maple	50 km/h		50 km/h	
• 10 Sideroad to 15 Sideroad	60 km/h		60 km/h	
• 5 Sideroad to 10 Sideroad	60 km/h		70 km/h	
• Steeles to 5 Sideroad	60 km/h		70 km/h	
Design Speed				
• 15 Sideroad to Maple	60 km/h	80 km/h	60 km/h	Town of Halton Hills Standards[4]
• 10 Sideroad to 15 Sideroad	80 km/h	80 km/h	70 km/h	THH Standards
• 5 Sideroad to 10 Sideroad	80 km/h	80 km/h	80 km/h	THH Standards
• Steeles to 5 Sideroad	80 km/h	80 km/h	80 km/h	THH Standards
Maximum Grade				
• 15 Sideroad to Maple	9.5%	6%	9.5%	THH Standards
• 10 Sideroad to 15 Sideroad	6.0%	6%	6%	THH Standards
• 5 Sideroad to 10 Sideroad	2.2%	6%	6%	THH Standards
• Steeles to 5 Sideroad	2.6%	6%	6%	THH Standards
Minimum Grade				
• 15 Sideroad to Maple	0.7%	0.5 %	0.5%	THH Standards
• 10 Sideroad to 15 Sideroad	0.2%	0.5 %	0.5%	THH Standards
• 5 Sideroad to 10 Sideroad	0.4%	0.5 %	0.5%	THH Standards
• Steeles to 5 Sideroad	0.3%	0.5 %	0.5%	THH Standards
Vertical Curves				
Sag – Non-Illuminated Areas				
• 60 km/h	11	18	11[2]	TAC Table 3.3.4
• 70 km/h		23	23	TAC Table 3.3.4
• 80 km/h	31	30	30	TAC Table 3.3.4

	Existing Conditions	Design Standard	Proposed Standard	Reference Document
Sag –Illuminated Areas				
• 60 km/h	5	8 - 9	5[3]	TAC Table 3.3.5
• 70 km/h		10 - 12	12	TAC Table 3.3.5
• 80 km/h	43	20	20	Town of Halton Hills Standards
Crest				
60 km/h	10	11	11	TAC Table 3.3.2
70 km/h		17	17	TAC Table 3.3.2
90 km/h	35	39	39	TAC Table 3.3.2
Minimum Lane Widths				
• Through Curb Lane	3.5 m	3.3 m to 3.7 m	3.5 m	TAC Table 4.2.3
• Through Centre Lane	3.5 m	3.3 m to 3.7 m	3.3 m	TAC Table 4.2.3
• Right Turn Lane	3.25 m	3.25 m	3.5 m	TAC Section 4.3.2.2
Left Turn Lane				
• Against 1.75 m Median Width		3.0 m	3.25 m	TAC Section 4.3.2.3
• Non-Median	3.5 m	3.3 m	3.5 m	TAC Section 4.3.2.3
• Bi-Directional Left Turn		4.0 m	4.0 m	TAC Section 8.6.2
• Minimum Shoulder Width		2.0 m paved, 0.5 m gravel +0.5 m rounding	2.0 m paved, 0.5 m gravel +0.5 m rounding	TAC Table 4.4.1
Intersection Angle				
• New Roads		85° to 90°	90°	THH Standards
• Existing Roads		Per existing	Per existing	THH Standards
Minimum Stopping Sight Distance				
• 60 km/h		85 m	85 m	TAC Table 2.5.2
• 70 km/h		105 m	105 m	TAC Table 2.5.2
• 90 km/h		160 m	160 m	TAC Table 2.5.2
Minimum Intersection Radius				
• To Local Roads		10 m	10 m	THH Standards
• To Arterial Eoads	15 m	15 m	15 m	THH Standards
• Traffic Signal Requirements			Yes	
• Stormwater			Yes	
Minimum Sight Triangles				
• Arterial to Local / Collector			7.5 m x 7.5 m	
• Arterial to Arterial			15 x 15 m	

1 Determination of final ROW will be based upon cross-section developed to accommodate transportation network.
2 Minimum of 18 will be provided except in one existing location where it is not feasible to adjust the K value.
3 Minimum of 9 will be provided except in one existing location near the intersection of Maple where it is not feasible to adjust the K value.
4 THH = Town of Halton Hill

9.2 Cross-Sections

Typical cross-sections have been prepared for five major segments of the Eighth Line Study Area including:

- Steeles Avenue to Proposed Collector Road D.
- Proposed Collector Road D to 5 Side Road.
- 5 Side Road to 10 Side Road.
- 10 Side Road to 15 Side Road.
- 15 Side Road to Maple Avenue.

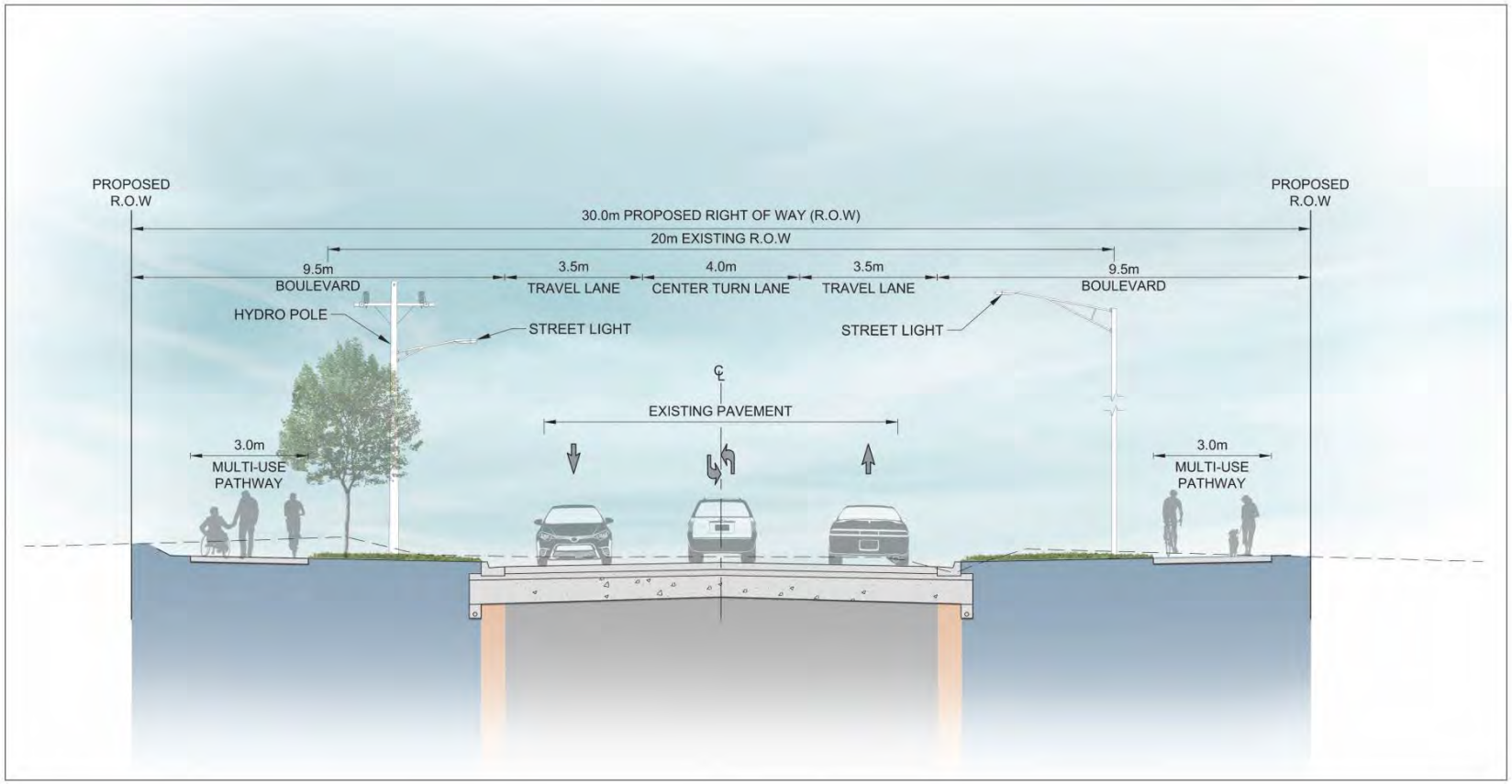
Preliminary preferred cross-sections were presented at the second Public Information Centre (PIC), which maintained a rural cross-section from Steeles Avenue to 10 Side Road and urban cross-section from 10 Side Road to Maple Avenue. Based on feedback from the second PIC, the Study Team modified the cross-section from Steeles Avenue to 5 Side Road to include a segment of urbanized roadway between Steeles Avenue to Proposed Collector Road D to reduce property impacts to adjacent landowners. The preferred cross-sections for each of the five major segments are illustrated on the preferred design concept plans provided in Appendix K1.

9.2.1 Steeles Avenue to Proposed Collector Road D

The preferred cross-section for Steeles Avenue to Proposed Collector Road D as illustrated in Figure 9.1 includes the following elements:

- 30 m proposed ROW.
- One 3.5 m travel lane per direction.
- One 4.0 m bi-directional centre left turn lane.
- Urban cross-section with curbs and catch basins.
- 3.0 m MUP on both sides within 9.5 m boulevards.
- Streetlighting within boulevards.
- Opportunity for street trees plantings within west side boulevard.
- Opportunities for Low Impact Development (LID) features in boulevard.

Figure 9.1: Typical Cross-Section for Steeles Avenue to Proposed Collector Road D



EIGHTH LINE ENVIRONMENTAL ASSESSMENT

CROSS SECTION | STEELES AVENUE TO COLLECTOR D

BURNSIDE

9.2.2 Proposed Collector Road D to 5 Side Road

The preferred cross-section for Proposed Collector Road D to 5 Side Road as illustrated in Figure 9.2 includes the following elements:

- 35 m proposed ROW.
- ROW widens where SWM quality and storage required.
- ROW shifted in areas to limit impact to existing buildings.
- One 3.5 m travel lane per direction.
- One 4.0 m bi-directional centre left turn lane.
- Rural cross-section with roadside ditches.
- Semi-urban cross-section across some properties to limit property impacts.
- 1.2 m buffer between travel lanes and MUPs.
- 3.0 m MUP between 1.2 m buffer and roadside ditch.

Some sections of the roadway will have no streetlighting. Lighting requirements may be reevaluated at a later date and added when warranted.

9.2.3 5 Side Road to 10 Side Road

The preferred cross-section for 5 Side Road to 10 Side Road as illustrated in Figure 9.3 includes the same elements as the cross-section for Proposed Collector Road D to 5 Side Road.

9.2.4 10 Side Road to 15 Side Road

The preferred cross-section for 10 Side Road to 15 Side Road as illustrated in Figure 9.4 include the following elements:

- 35 m proposed ROW.
- Two 3.5 m travel lanes per direction.
- One 5.0 m bi-directional centre left turn lane.
- Urban cross-section with curbs and catch basins.
- 3.0 m MUP on both sides within 8.0 m boulevards.
- Streetlighting within boulevards.

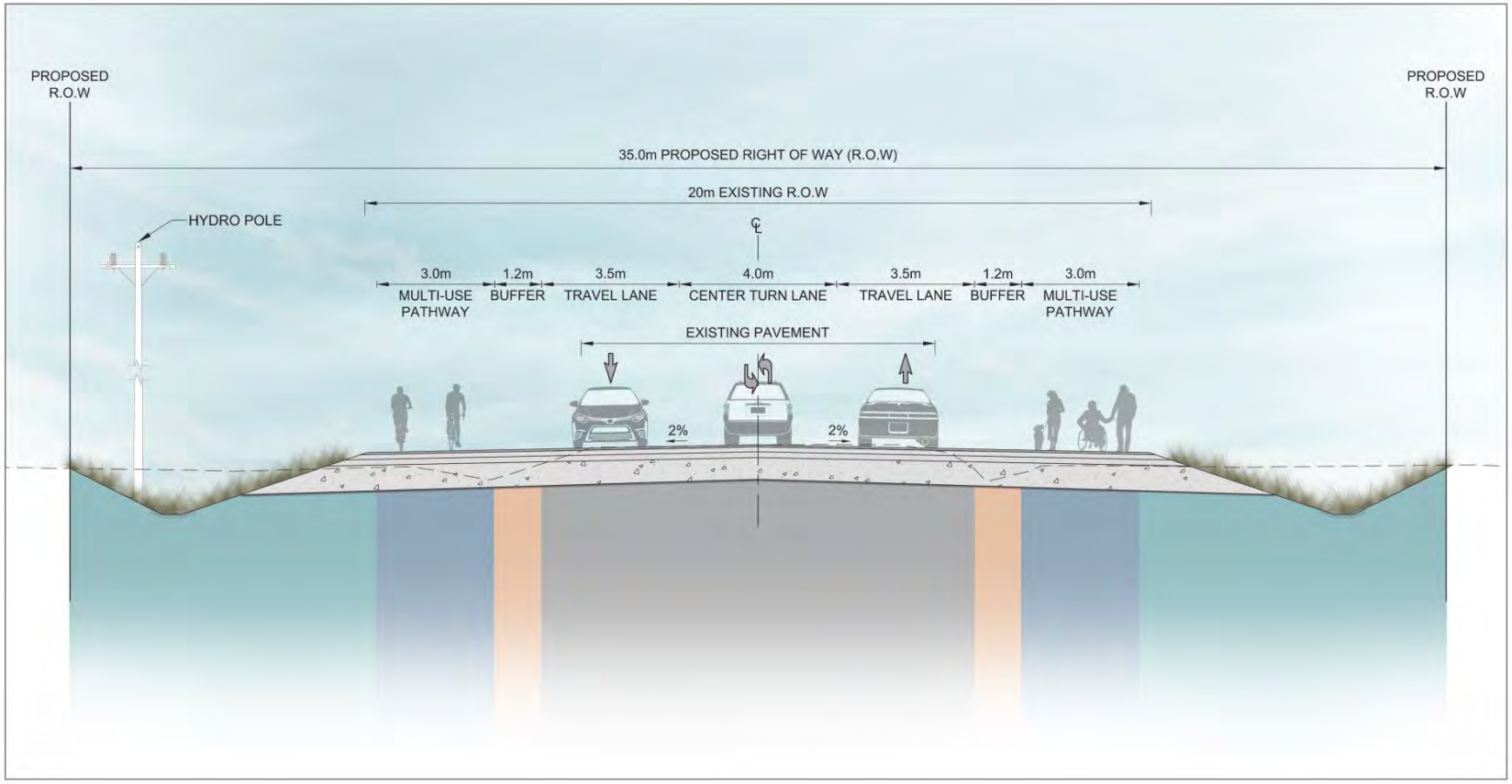
9.2.5 15 Side Road to Maple Avenue

The preferred cross-section for 15 Side Road to Maple Avenue as illustrated in Figure 9.5 include the following elements:

- Proposed ROW varies from 22 m to 31 m.
- Widening varies along corridor to limit impact on properties and environment.
- One 3.5 m travel lane per direction.

- One 4.0 m bi-directional centre left turn lane.
- Urban cross-section with curbs and catch basins.
- 3.0 m MUP on east side.
- Existing sidewalk on west side maintained.

Figure 9.2: Typical Cross-Section for Proposed Collector Road D to 5 Side Road

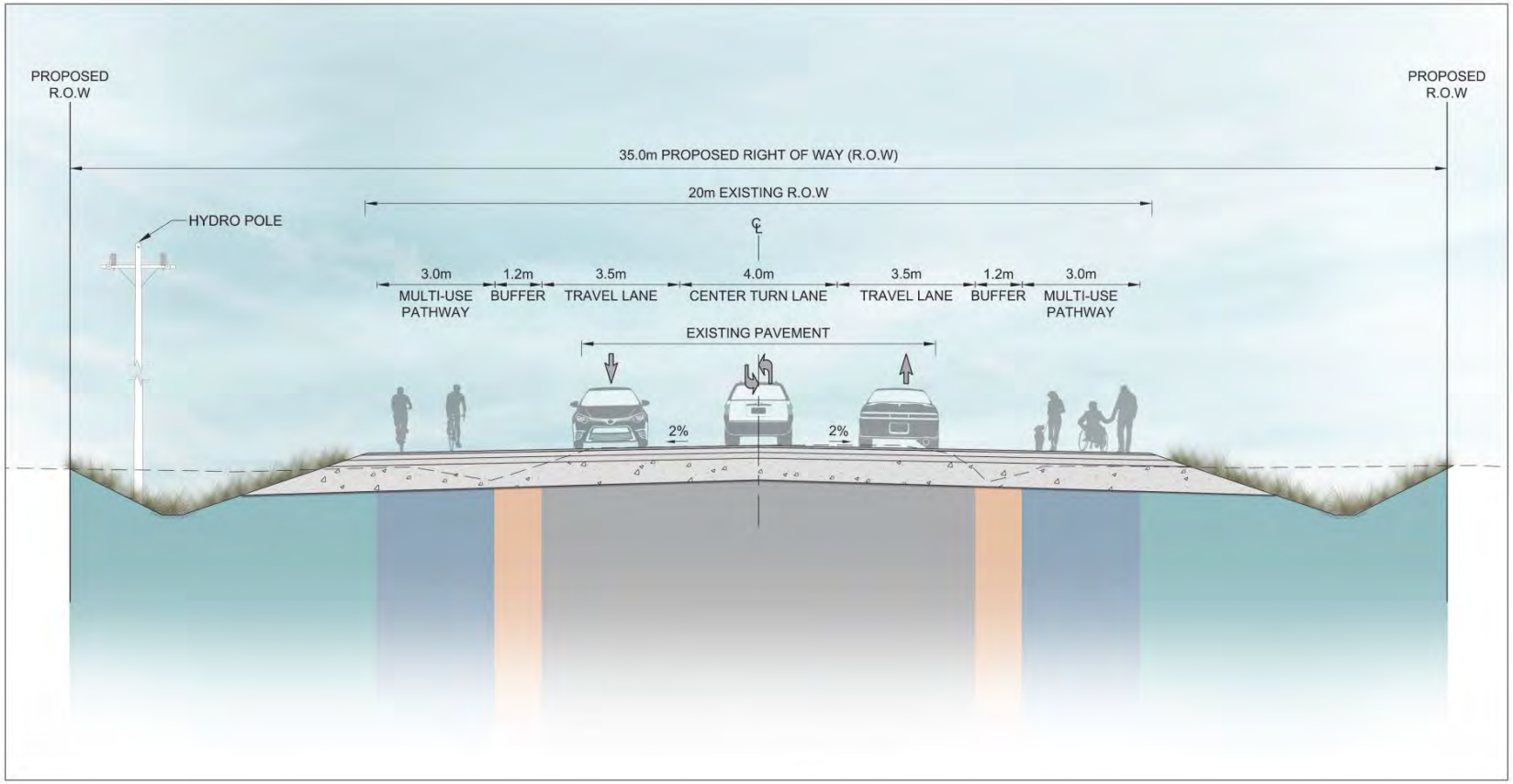


EIGHTH LINE ENVIRONMENTAL ASSESSMENT

CROSS SECTION | COLLECTOR D TO 5 SIDE ROAD

BURNSIDE

Figure 9.3: Typical Cross-Section for 5 Side Road to 10 Side Road

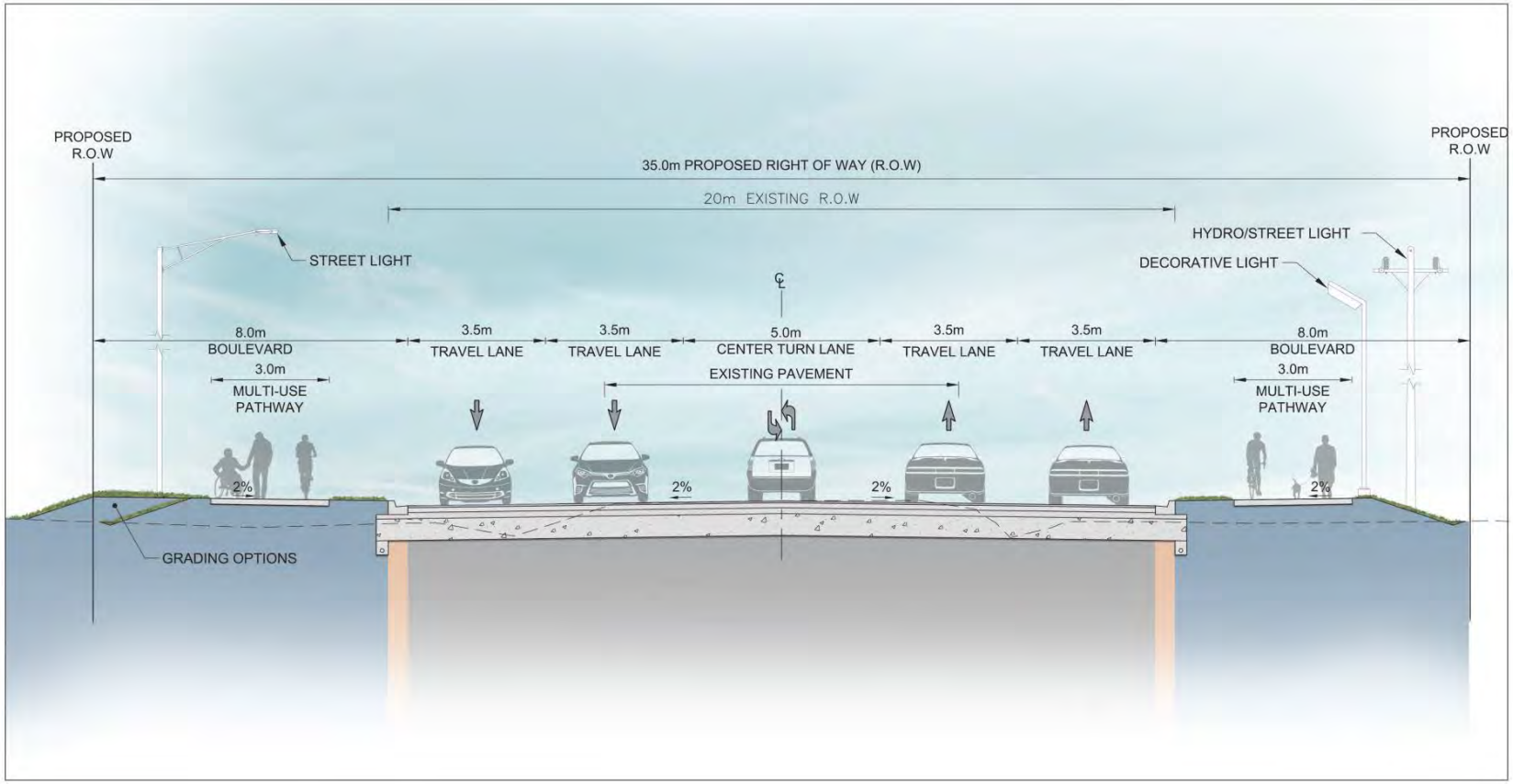


EIGHTH LINE ENVIRONMENTAL ASSESSMENT

CROSS SECTION | 5 SIDE ROAD TO 10 SIDE ROAD

BURNSIDE

Figure 9.4: Typical Cross-Section for 10 Side Road to 15 Side Road

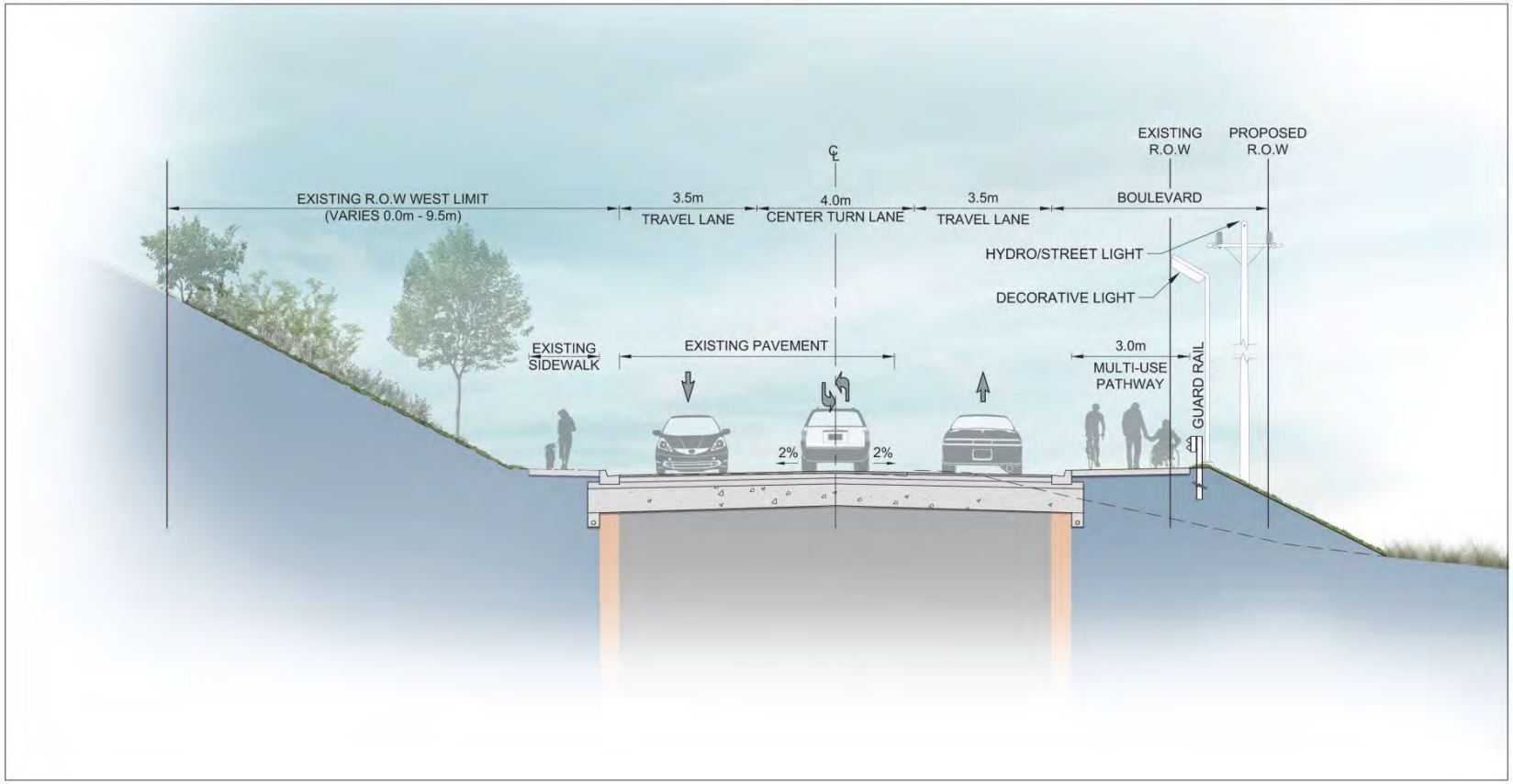


EIGHTH LINE ENVIRONMENTAL ASSESSMENT

CROSS SECTION | 10 SIDE ROAD TO 15 SIDE ROAD

BURNSIDE

Figure 9.5: Typical Cross-Section for 15 Side Road to Maple Avenue



EIGHTH LINE ENVIRONMENTAL ASSESSMENT

CROSS SECTION | 15 SIDE ROAD TO MAPLE AVENUE

BURNSIDE

9.3 Horizontal Alignment

Eighth Line will be widened evenly about the existing centreline through the road corridor, except in certain areas to minimize impacts to adjacent properties. In these areas, widening is greater on one side of Eighth Line, either east or west, depending on where the impacted area is located. In localized areas where there are existing constraints (residences or environmentally sensitive features), the typical cross section for these areas will be modified to minimize impact to adjacent properties / features.

9.4 Vertical Alignment

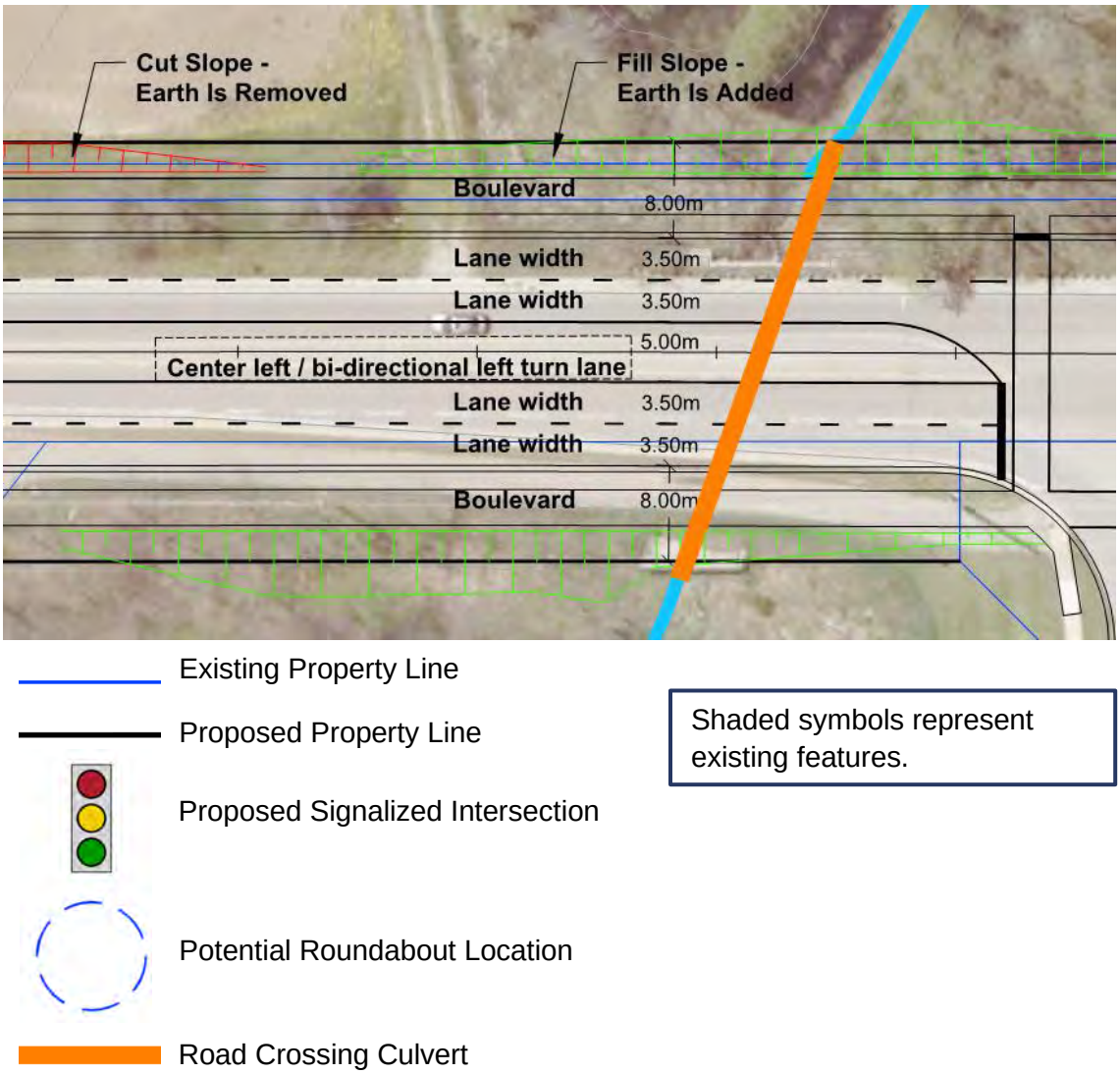
The proposed profile of Eighth Line is generally consistent with the existing profile. As illustrated on the preferred design concept plans (Appendix K1), there are three main areas where the proposed centreline profile of Eighth Line is proposed to be adjusted in the following manner:

- Between Steeles Avenue to Proposed Collector Road D - lowered an average of 0.8 m to reduce grading limits.
- Near Living Hope Alliance Church (290 Main Street South) – lowered by 0.25 m to improve sightlines.
- Between 204 Main Street South and 210 Main Street South – lowered by 0.37 m to improve sightlines.

9.5 Intersections and Access

The illustrations of the various intersections along the study corridor are excerpted from the preferred design concept plans, which are provided in Appendix K1. Figure 9.6 provides a drawing legend for interpreting the details and symbology used in the preferred design concept plans.

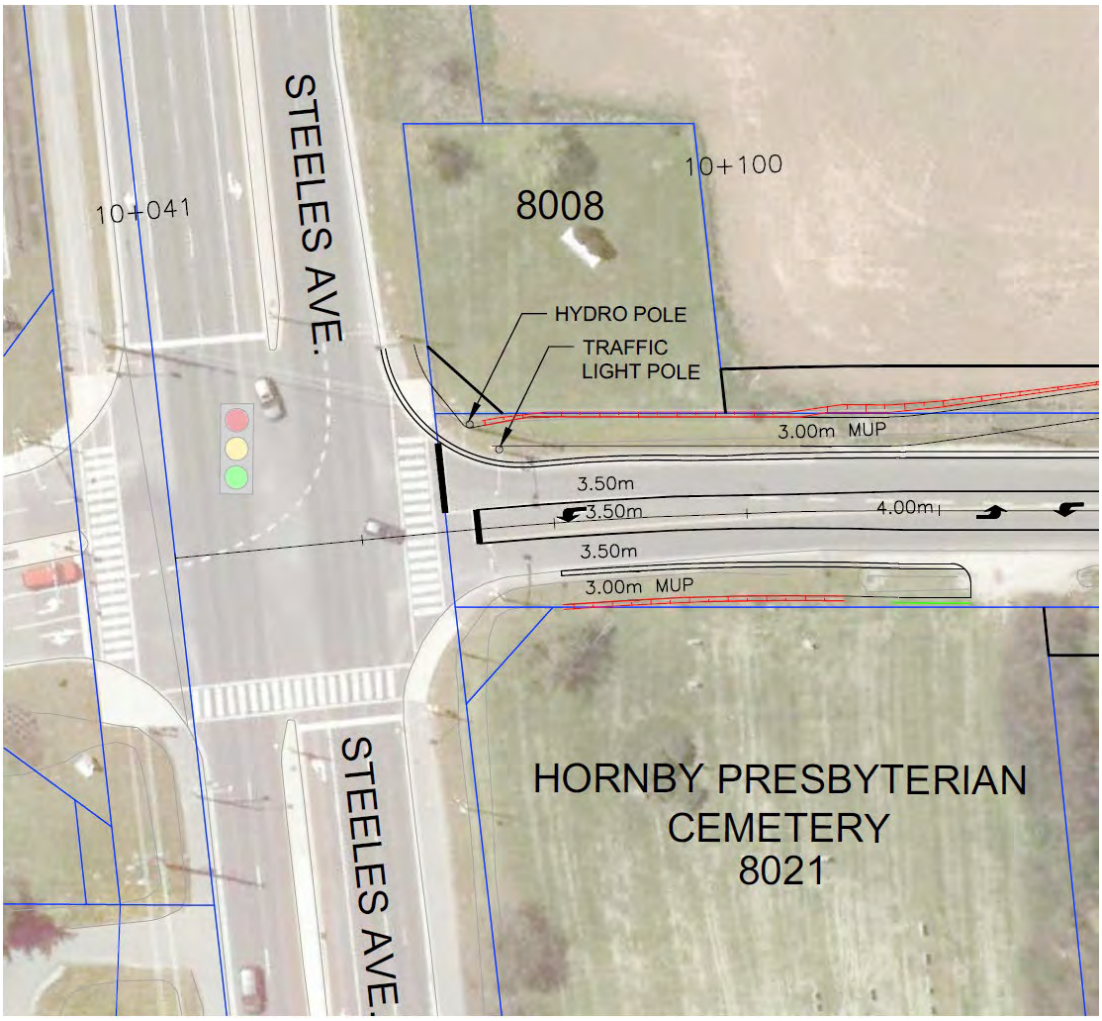
Figure 9.6: Interpretation of Preferred Design Concept Plan Features



9.5.1 Eighth Line and Steeles Avenue

At the intersection with Steeles Avenue, the two cemeteries on either side of Eighth Line limit the ability to make improvements. As illustrated in Figure 9.7, the existing three-lane cross-section on Eighth Line is maintained and MUPs are provided within the boulevard on both sides. The MUP takes up the entire boulevard. Drainage in this area will be captured in an underground system. A daylight triangle in the northwest quadrant is recommended to be obtained.

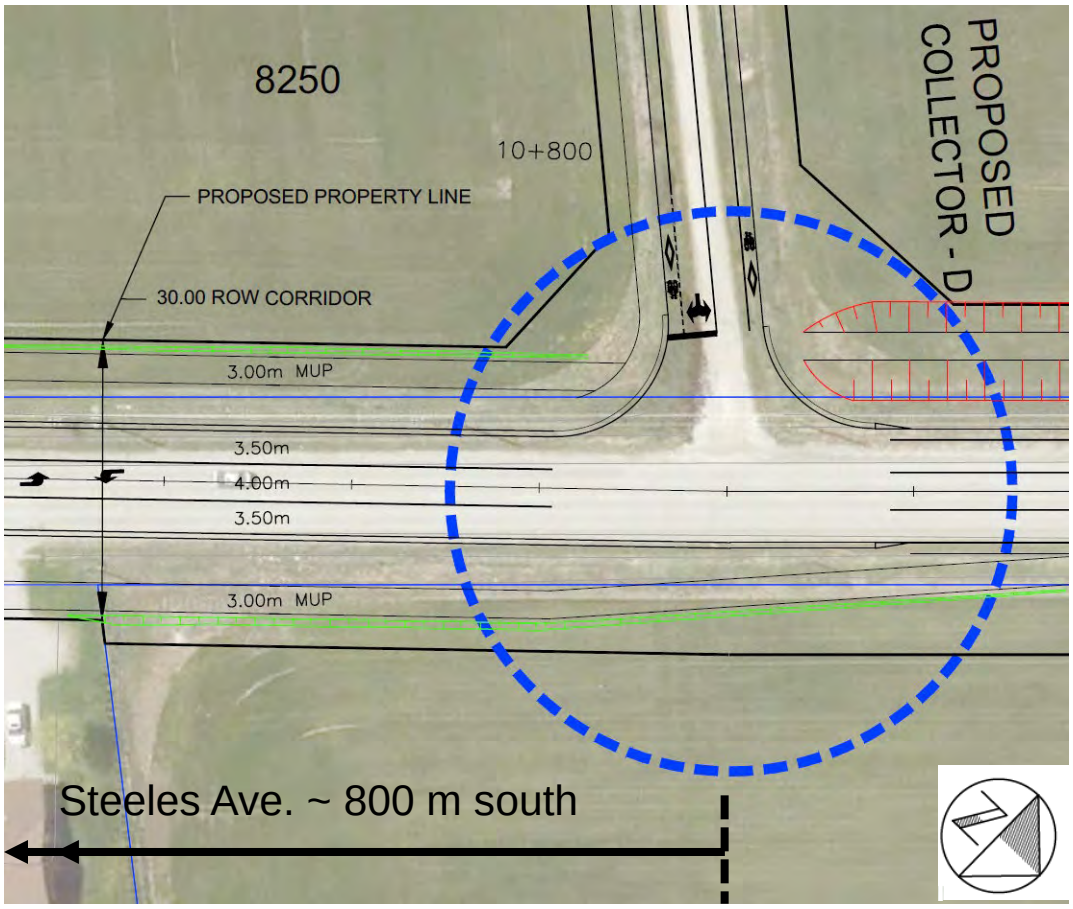
Figure 9.7: Eighth Line and Steeles Avenue Intersection



9.5.2 Eighth Line and Proposed Collector Road D

As illustrated in Figure 9.8, Proposed Collector Road D is proposed to be stop controlled for eastbound traffic. A roundabout configuration for this intersection could be considered at the next phase of the project. North of the intersection, Eighth Line transitions from an urban to rural cross-section.

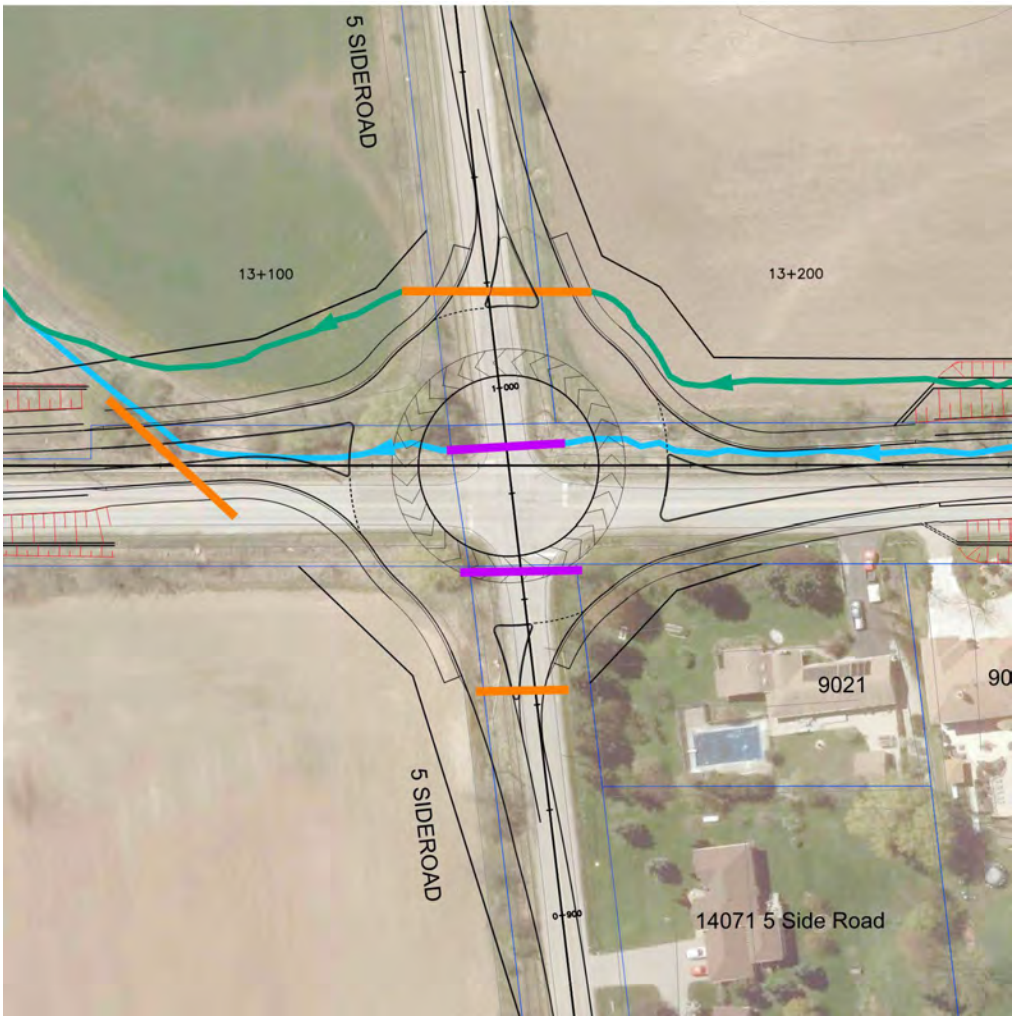
Figure 9.8: Eighth Line and Proposed Collector Road D Intersection



9.5.3 Eighth Line and 5 Side Road

As illustrated on Figure 9.9, the intersection at 5 Side Road is proposed to be a roundabout. Eighth Line is shifted west to limit the impacts on the residential property in the northeast corner of the intersection. The existing watercourse that runs parallel to Eighth Line of the west side of Eighth Line will be realigned to the west to accommodate this shift.

Figure 9.9: Eighth Line and 5 Side Road Intersection

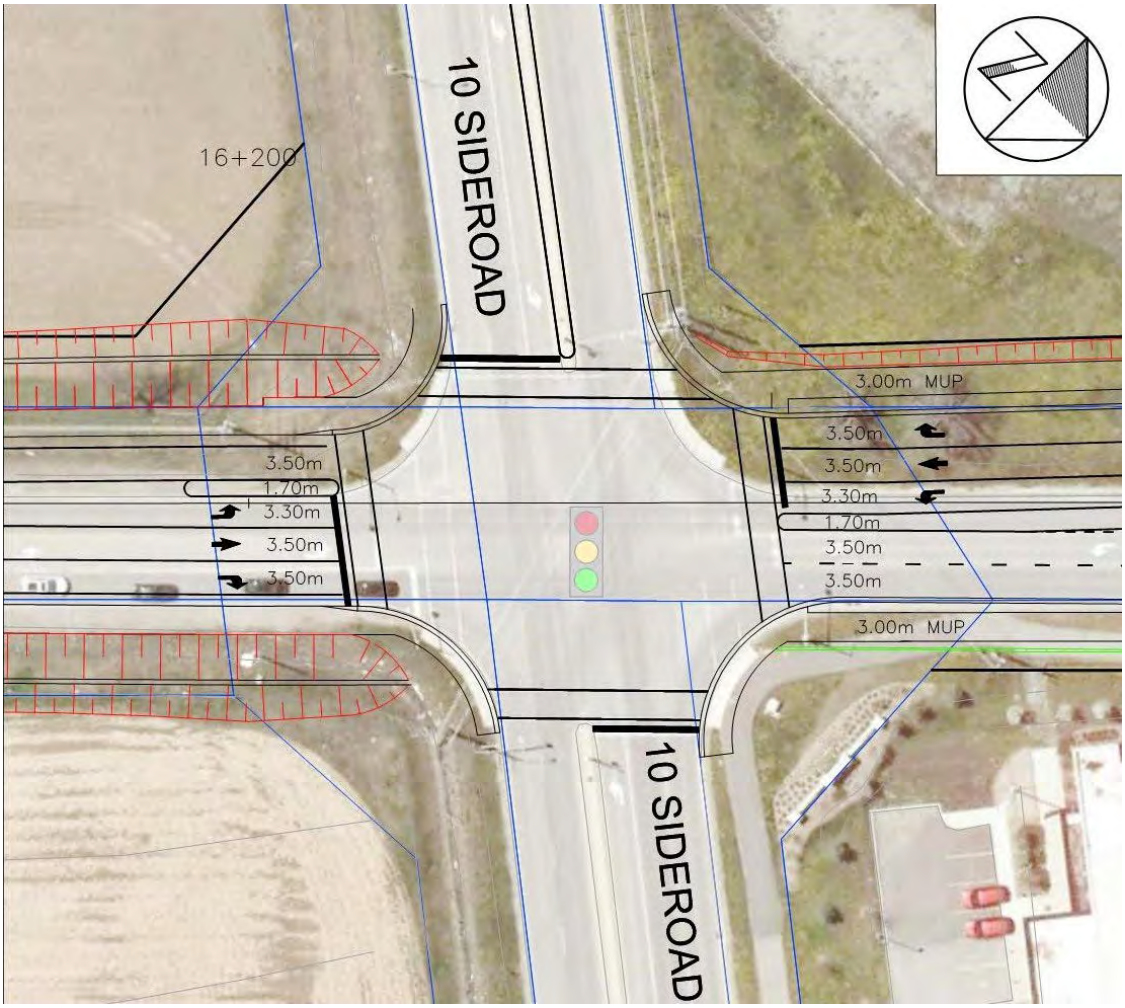


Existing Culverts
New Culverts
Existing Watercourse
Watercourse Re-Alignment

9.5.4 Eighth Line and 10 Side Road

As illustrated in Figure 9.10, on the north side of the intersection with 10 Side Road, Eighth Line transitions to an urban cross-section. There are no changes required on 10 Side Road. Eighth Line is shifted to the west given the existing fire hall in the northeast quadrant that limits widening to the east. A northbound right turn lane is developed at the intersection.

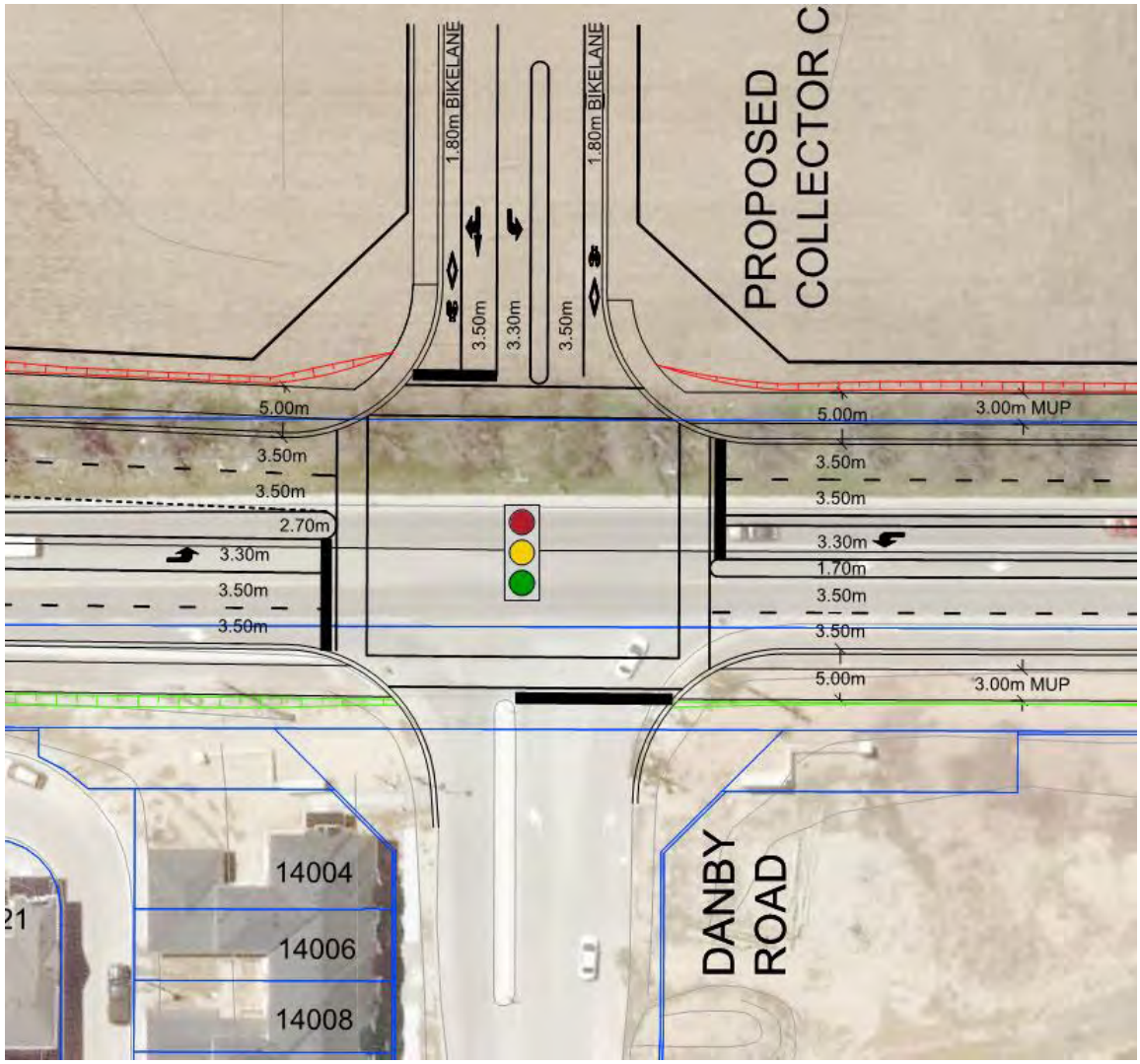
Figure 9.10: Eighth Line and 10 Side Road Intersection



9.5.5 Eighth Line and Danby Road / Proposed Collector Road C

The Eighth Line and Danby Road / Proposed Collector Road C intersection was originally proposed to be a roundabout. Based on feedback from the developers for the Vision Georgetown lands following the second PIC, the Study Team subsequently completed further analysis at the Eighth Line and Danby Road intersection to confirm the suitability of a signalized intersection at this intersection, which would reduce the property impacts to the development lands. The findings of this analysis showed that a signalized intersection was suitable for this intersection. Therefore, this recommendation is to be carried forward to the next phase of the project. A technical letter was prepared to document this analysis and is provided in Appendix K2. The proposed intersection is illustrated in Figure 9.11.

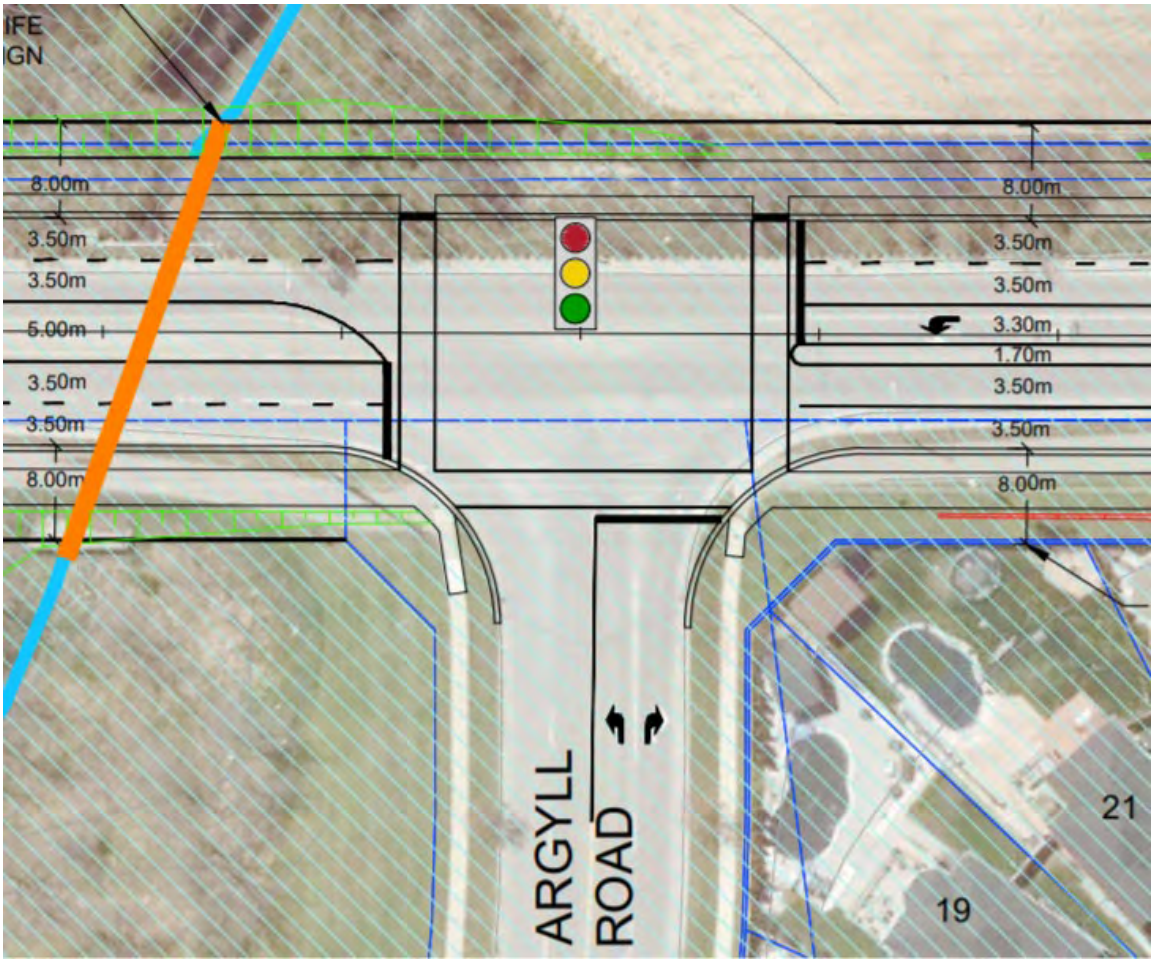
Figure 9.11: Eighth Line and Danby Road / Proposed Collector Road C Intersection



9.5.6 Eighth Line and Argyll Road

As illustrated in Figure 9.12, Argyll Road is proposed to be signalized with pedestrian crossings provided.

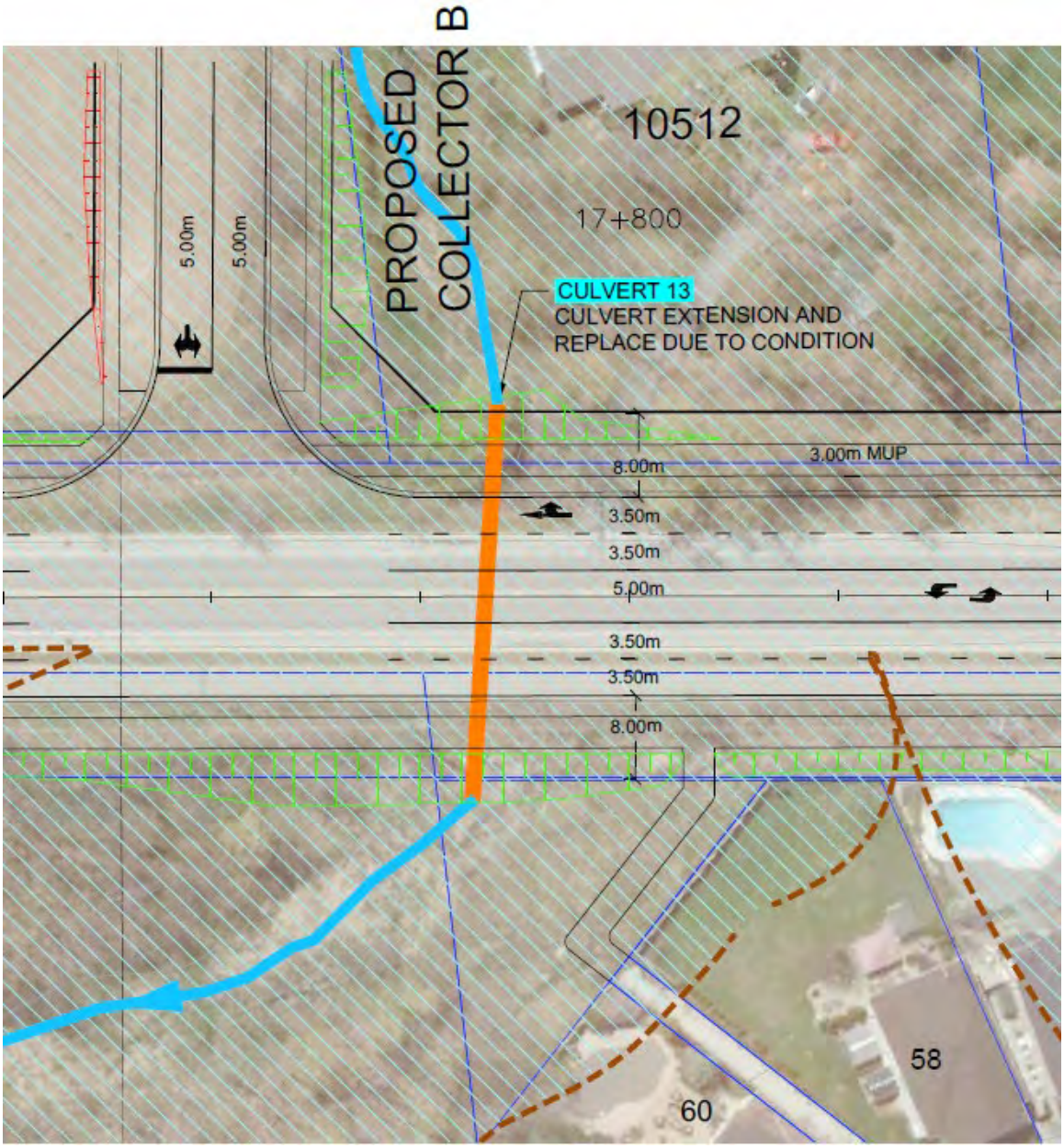
Figure 9.12: Eighth Line and Argyll Road Intersection



9.5.7 Eighth Line and Proposed Collector Road B

As illustrated in Figure 9.13, the intersection with Proposed Collector B is proposed to be stop controlled for eastbound traffic. A roundabout configuration for this intersection was considered and presented in this manner at the third PIC; however, based on stakeholder feedback, the consideration for a roundabout at this intersection was removed and instead is shown as a controlled stop. Signalization of this intersection is not proposed; however, future installation of a traffic signal would not be excluded.

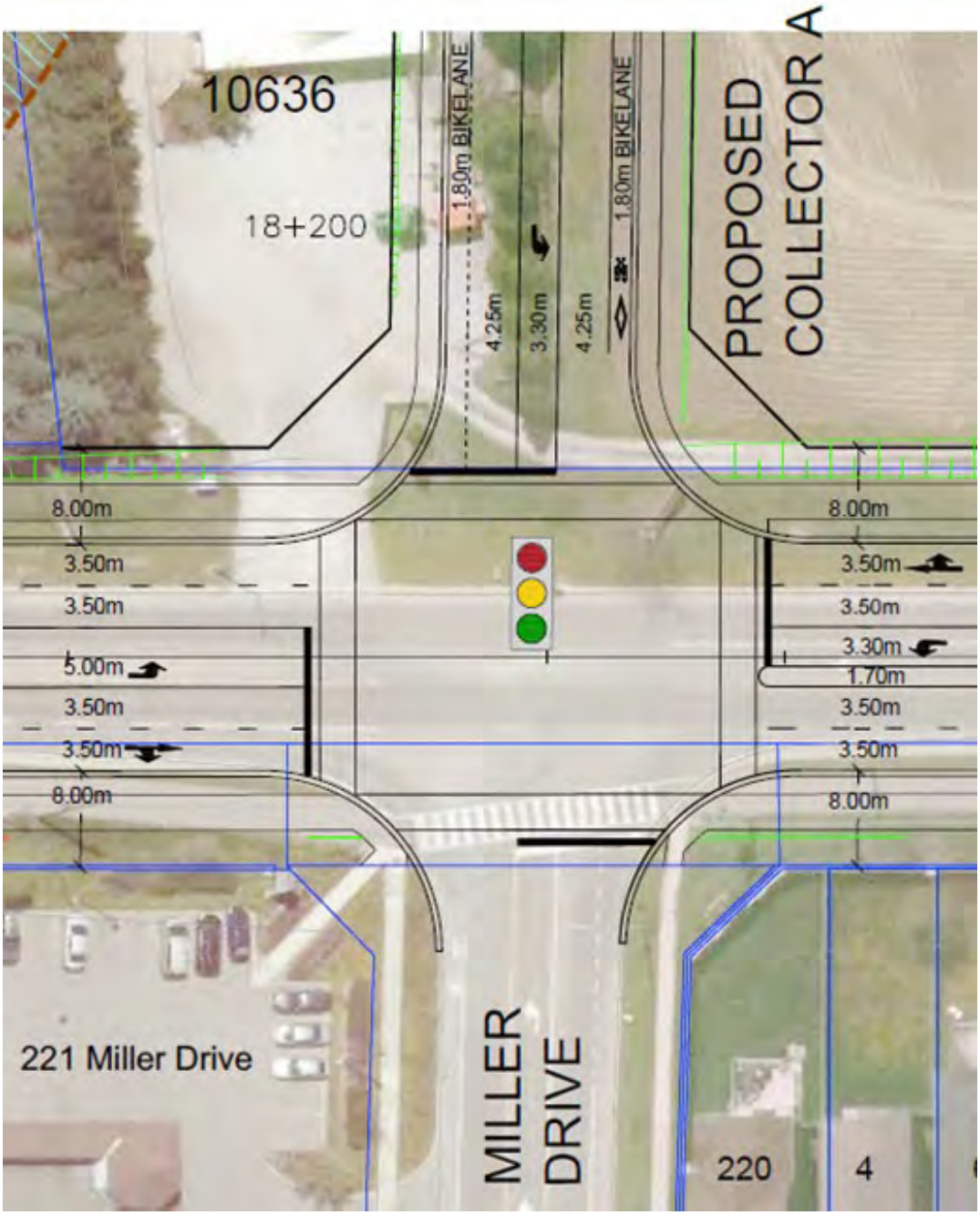
Figure 9.13: Eighth Line and Proposed Collector Road B Intersection



9.5.8 Eighth Line and Miller Drive / Proposed Collector Road A

As illustrated in Figure 9.14, the intersection with Miller Drive / Proposed Collector Road A is proposed to be signalized.

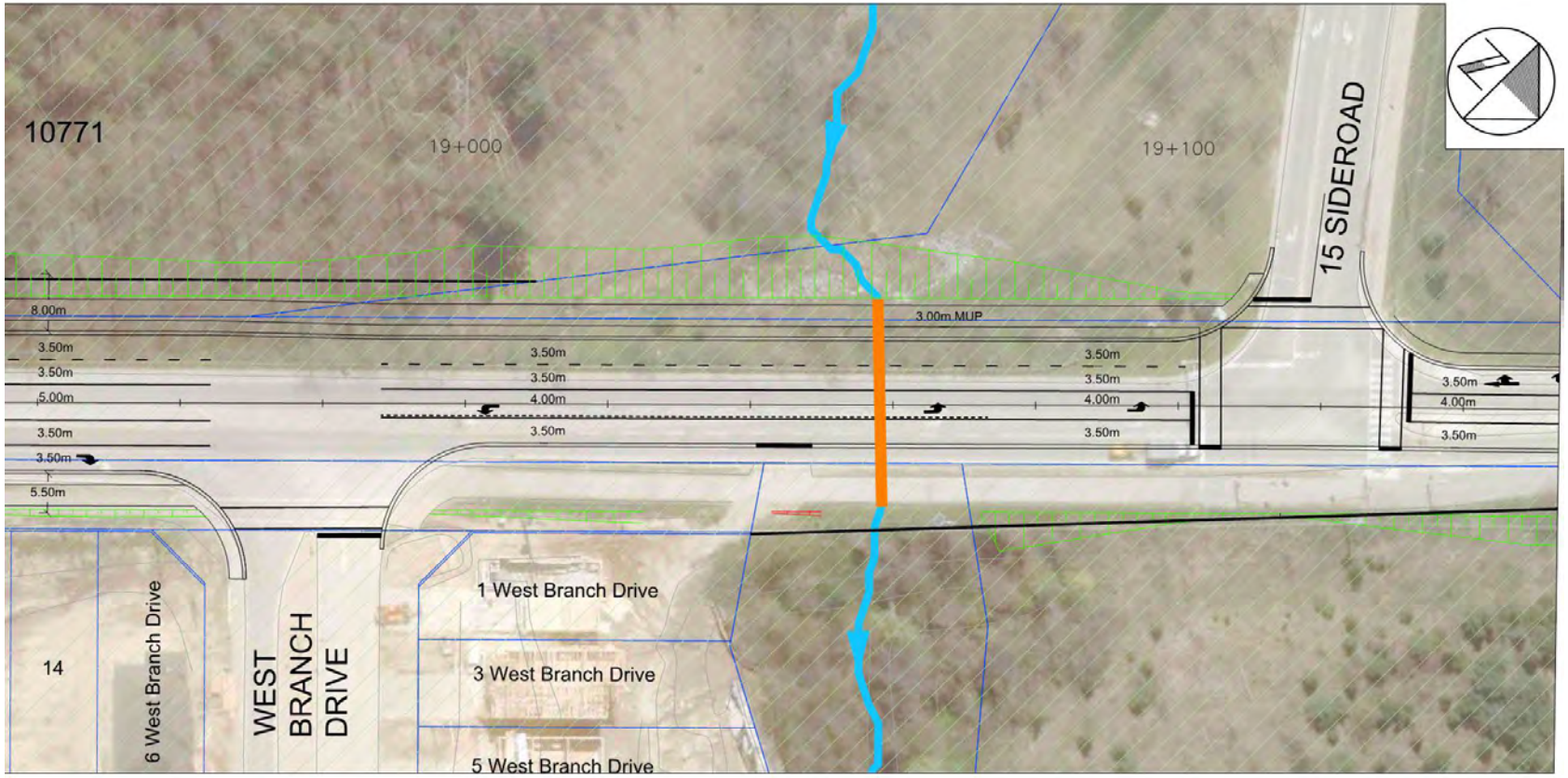
Figure 9.14: Eighth Line and Proposed Collector Road 'A' Intersection



9.5.9 Eighth Line and 15 Side Road

As illustrated in Figure 9.15, at West Branch Drive, one of the northbound travel lanes is discontinued and provides a right turn lane into the Riverwood subdivision. 15 Side Road continues to be a signalized intersection with the two southbound lanes provided to the south. A three-lane cross-section is provided to the north of the intersection.

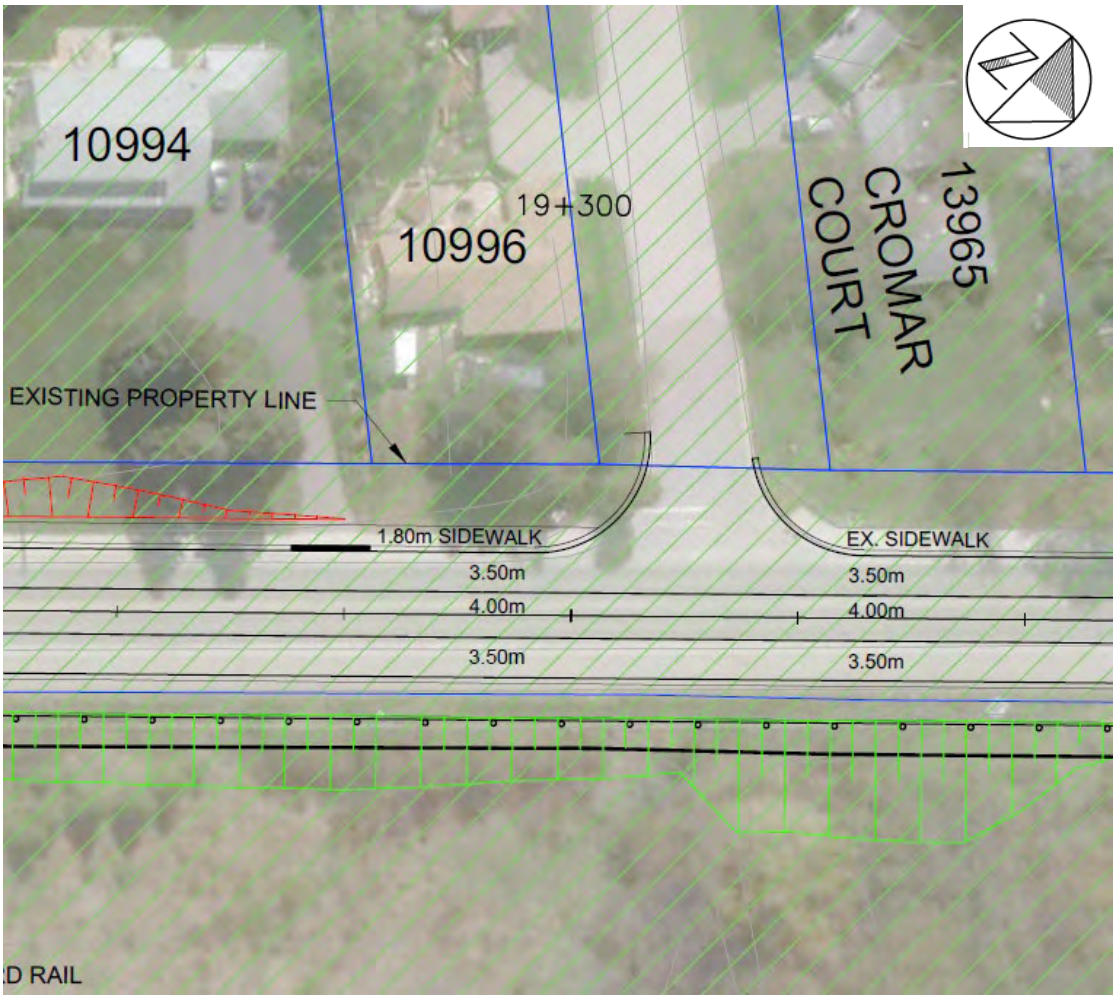
Figure 9.15: Eighth Line and 15 Side Road Intersection



9.5.10 Main Street South and Cromar Court

As illustrated in Figure 9.16, at Cromar Court, the widening of Eighth Line is proposed to the east side to limit the impact to the residential properties that have wells and septic systems. The existing sidewalk is maintained on the west side.

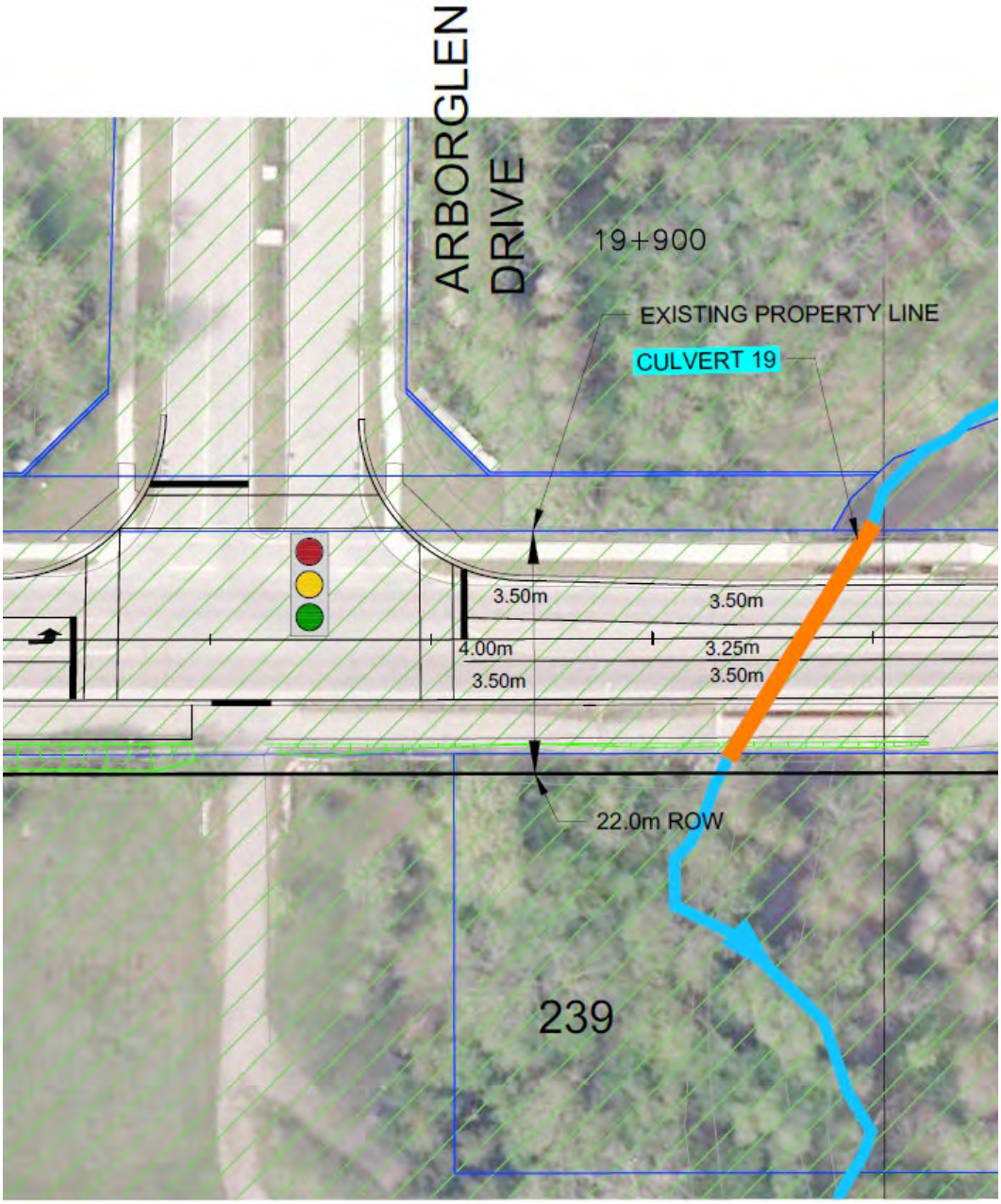
Figure 9.16: Main Street South and Cromar Court Intersection



9.5.11 Main Street South and Arborglen Drive

As illustrated in Figure 9.17, at Arborglen Drive, the intersection is proposed to be signalized as this is the only point of access for this community and traffic could not be accommodated if it remained unsignalized. A southbound left turn lane is provided for access to the residential property on the east side of the intersection, but Main Street South would be narrowed across the bridge to 3.25 m so that the existing structure across Black Creek could be maintained without modifications.

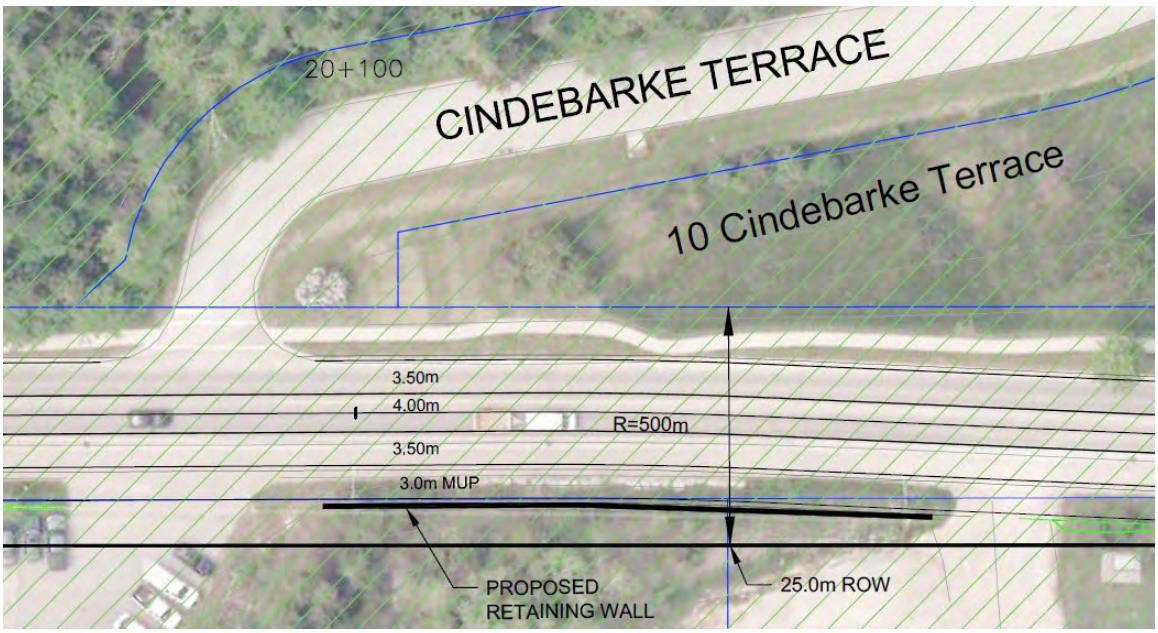
Figure 9.17: Main Street South and Arborglen Drive Intersection



9.5.12 Main Street South and Cindebarke Terrace

As illustrated in Figure 9.18, Main Street South is proposed to be widened to the east near the intersection with Cindebarke Terrace to avoid impacts on the west side.

Figure 9.18: Main Street South and Cindebarke Terrace Intersection



9.5.13 Main Street South and Maple Avenue

As illustrated in Figure 9.19, there are no proposed changes to the intersection of Main Street South and Maple Avenue. Further analysis of the potential improvements to this intersection will be assessed by the Town as part of their TMP, which is planned to be undertaken in 2023.

Figure 9.19: Main Street South and Maple Avenue Intersection

9.6 Active Transportation

The Town completed their first Active Transportation Master Plan (ATMP) through a four-stage process between December 2018 and December 2020. On October 26, 2020, the ATMP was endorsed by Town Council. The seven specific goals of the ATMP are:

1. Provide a network of on and off-road facilities that is connected and continuous and considered safe and comfortable by users.

2. Encourage and educate residents and visitors of the opportunities, objectives and outcomes of AT in Halton Hills.

3. Foster a community of AT enthusiasts across all user groups and generations.

4. Provide guidance on the design of AT facilities and provide an approach that is user focused.

5. Collaborate with internal and external partners to leverage opportunities to expand and enhance AT.

6. Create an action plan for the Town of Halton Hills to guide the planning, design and implementation of AT Town-wide.

7. Identify and evaluate the progress of the AT master plan through performance targets and monitoring tools.

Eighth Line south of 10 Side Road is identified on Map 3a of the ATMP as a proposed on-road AT facility, with a proposed phasing of medium term (6-10 years).

The preferred design concept plans include provision for AT use along the entire road corridor. Table 9.2 lists the planned AT facilities by area including new facilities and continued use of existing facilities.

Table 9.2: Planned Active Transportation Facilities

Area Description	Planned Active Transportation Facilities
Steeles Avenue to Proposed Collector Road D	3.0 m MUP on both sides within 9.5 m boulevards.
Proposed Collector Road D to 5 Side Road	3.0 m MUP between 1.2 m buffer and roadside ditch.
5 Side Road to 10 Side Road	3.0 m MUP between 1.2 m buffer and roadside ditch.
10 Side Road to 15 Side Road	3.0 m MUP on both sides within 8.0 m boulevards. Existing MUP on east side of Eighth Line is maintained; new MUP added to west side of Eighth Line.
15 Side Road to Maple Avenue	Existing 3.0 m MUP on east side of Main Street South maintained. Existing sidewalk on west side of Main Street South maintained.

9.7 Grading

A combination of retaining walls and side slopes were used to minimize property impacts and construction costs. As part of the grading activities for the Eighth Line improvements, temporary property easements will be required. The preferred design concept plans provided in Appendix K1 presents the grading requirements (cut or fill) associated with the preferred design, outside of the proposed ROW. These areas outside the proposed ROW will require temporary grading encroachment agreements with the affected property owners. The temporary easements for grading purposes are illustrated on the property acquisition plans provided in Appendix K3.

9.8 Utilities and Services

There are several existing buried and aerial utilities located on either side along the corridor (varies), including storm sewer, gas main, hydro, and telecom. Halton Region is installing a trunk sanitary sewer along Eighth Line between Steeles Avenue and 10 Side Road. Existing hydro poles along the corridor will have to be relocated because of the proposed widening of Eighth Line. This will be pursued during detailed design in consultation with Halton Hills Hydro Inc., and Hydro One Networks Inc. Other utilities such as Bell, Cogeco and Enbridge Gas may also be impacted because of the widening of Eighth Line. These utilities will be contacted during detailed design to confirm the conflicts and the extent of relocation required.

9.9 Property Requirements

Property requirements (i.e., new proposed property line) based on the preferred design concept plans for the proposed Eighth Line corridor improvements are shown on Sheets 1 to 15 provided in Appendix K3. The existing ROW width of Eighth Line is 20 m and the ROW for the proposed road improvements along Eighth Line ranges from 30 m-35 m for the majority of the road corridor. In some areas, the proposed ROW is expanded to accommodate SWM features, resulting in a wider proposed ROW ranging from 35.5 m-44 m. The Town's OP specifies a 30 m wide proposed future ROW for Eighth Line, therefore the proposed widening beyond 30 m is a departure from the Town's OP. Properties with direct frontage onto Eighth Line will be impacted and property requirements will be based on the proposed ROW and intersection geometric requirements. The approximate amount of property required is specified in Appendix K3.

9.10 Preliminary Cost Estimate

The project cost for implementing the Eighth Line improvements as detailed in the preferred design concept is estimated at $63.8 million, excluding property, engineering / inspection and HST. The preliminary cost estimate is provided in Appendix K4.

10.0 Environmental Impacts, Mitigation Measures and Monitoring

10.1 Environmental Impacts

10.1.1 Natural Environment

The proposed road improvements have the potential to impact the natural heritage features summarized in the Natural Environment Report (Appendix B).

Potential impacts to these features can be categorized as:

- Direct (within the footprint of the proposed road improvements).
- Indirect (adjacent to the proposed road improvements but affected by spin-off effects).

Impacts to natural features are anticipated with excavation, grading and asphalt application as well as vegetation removal in select areas as a result of road widening, improved ditches, and culvert replacement. Improvements are anticipated within and adjacent to lands with natural heritage features that may result in impact to wildlife species, Significant Wildlife Habitat, Unevaluated and PSWs, SAR and associated habitat as a result of vegetation clearing and grading. It is anticipated that direct impact to wildlife species, Species of Special Concern, SAR can be avoided through minimizing the footprint of construction and the timing of certain project activities (i.e., outside of the active season).

An overview of the potential impacts to terrestrial and aquatic environments is provided in Sections 10.1.1.1 and 10.1.1.2 respectively. Proposed mitigation and monitoring activities are presented in Table 10.2.

10.1.1.1 Terrestrial Environment

The proposed road design concept is expected to have direct and indirect impacts on the surrounding terrestrial environment including certain regulated features including Significant Woodlands, Unevaluated Wetlands, PSWs, and Significant Wildlife Habitat. A summary of the potential impacts to the adjacent terrestrial environment is provided below.

Vegetation

Impacts to vegetation are anticipated to include tree removal within the ROW and limited encroachment into adjacent vegetation communities within the identified grading areas of the preferred road design concept. Disturbance of soils in construction areas could allow for non-native and invasive species to establish. Where new forest and wetland edges are created, impacts may include weed invasion, drying of soils and exposure of vegetation within the ground layer and understory to increased light.

Based on the current preferred road design concept, the following vegetation communities will have vegetation removed within the CVC and CH watershed respectfully:

Table 10.1: Estimated Vegetation Community Removal Areas

Vegetation Type	Area (hectares)	
	CVC Watershed	**CH Watershed**
Wetland (Marsh and Swamp ecosites)	0.014	1.35
Wooded Area (Woodland and Forest Ecosites)	0.77	0.90
Thicket (Thicket and Hedgerow Ecosites)	0.07	1.15
Meadows	0.28	1.77

It should be noted that the extent of impact to treed and wetland communities is based on a desktop review of the preferred road design concept and is subject to refinement during the detailed design phase of the project.

Wildlife

There is potential for direct and indirect impacts to wildlife in the area including displacement of and disturbance to wildlife and wildlife habitat during the construction phase (e.g., vegetation removals, siltation, noise, light trespass, limited movement) as well as potential for increased road mortality and mortality during construction activities (e.g., amphibians and turtles).

Removal of natural vegetation (e.g., forests, thickets, wetlands, meadows) may reduce available wildlife habitat. The preferred road design concept would temporarily disturb only the edges of natural vegetation communities in the footprint required for grading and culvert replacement.

Several bird species may inhabit the general Study Area. Many receive protection nationally under the *Migratory Bird Convention Act*.

The proposed works would be subject to timing restrictions to avoid direct impact to bird species. Vegetation and tree removal from the adjacent vegetation communities as a result of grading within the ROW and immediately adjacent areas is not expected to negatively impact habitat for bird species, given the broader extent of suitable habitat in adjacent habitats beyond the ROW.

Significant Wildlife Habitat

Candidate and Confirmed SWH is expected to be impacted because of the proposed road improvements. Vegetation removal because of grading and filling would reduce the availability of certain habitats in addition to increased pollutant runoff to adjacent communities and reduction of permeable surfaces.

The Confirmed SWH was identified as habitat for Species of Special Concern, specifically for Eastern Wood Peewee. The anticipated impacts to this species' habitat are presented in Table 10.2.

Impacts to Candidate SWH are also anticipated as a result of construction activities including grading and filling. The form and function of certain Candidate SWH features are anticipated to be permanently and temporarily impacted. Where impacts to Candidate SWH cannot be avoided, targeted surveys should be completed as needed during the detailed design phase of the project to confirm SWH, identify impacts and prescribe appropriate mitigation measures.

Species of Special Concern

Although species provincially listed as rare or of Special Concern do not receive legal protection under the *ESA, 2007* or the federal *Species at Risk Act, S.C. 2002, c. 29*, they may receive protection from some agencies, such as provincial and national parks, or other Acts, such as the *Fish and Wildlife Conservation Act, 1997*, which prohibits the killing, capturing, injuring, harassment and trapping of specially protected species.

Eastern Wood-pewee (Special Concern) and Barn Swallow (Threatened) have been identified in the study area so there is a potential that nesting habitat may be impacted by vegetation clearing along the margins of the road. Large areas of appropriate habitat will still be available beyond the cleared areas in which appropriate Eastern Wood-pewee nesting habitat will remain. Barn Swallow habitat is not likely to be significantly impacts since no buildings or structures will be removed to accommodate the development.

Species at Risk

Candidate SAR bat roosting habitat may be present within certain forested communities on both sides of the Eighth Line. Edge encroachments into existing vegetation and potential bat maternity roosting habitat is not anticipated to significantly impact the potential habitat of bat species as the relatively limited amount of vegetation to be removed is not expected to have a significant impact on the available overall potential habitat within the greater area for these species. Direct impact to species is to be avoided with appropriate timing of vegetation removal completed outside of the active season for bats.

The preferred road design concept would require the removal of 27 leaf-off and 172 leaf-on potential bat maternity roosting trees i.e., Maples and Oaks over 10 cm in diameter at breast height. Potential bat maternity roosting habitat is not anticipated to be significantly impacted as the amount of vegetation to be removed is not expected to have a significant impact on the available overall potential habitat within the greater area for the species.

The preferred road design concept is not anticipated to directly impact SAR wildlife with the implementation of avoidance measures, including minimizing the footprint of construction, exclusion of the construction area and timing of construction for the removal of vegetation.

10.1.1.2 Aquatic Environment

Fisheries and Fish Habitat

Under the federal *Fisheries Act* it is prohibited to cause HADD of fish habitat, as well as the death of fish. The impacts below outline the potential for HADD of fish habitat or the death of fish to occur during the construction of the proposed road improvements. The preferred road design concept has the potential to impact six watercourse crossings within the Study Area as well as a section of Silver Creek that flows in close proximity to Eighth Line between Maple Avenue and 15 Side Road.

Prevent the Death of Fish

The preferred road design concept will require in-water works to extend or replace watercourse crossing structures (culverts and / or bridges). Working in-water has the potential to kill or harm fish through the demolition of existing and construction of new structures using heavy equipment, pumps, potential dewatering etc.

Removal of Riparian Vegetation

Riparian vegetation will have to be removed or disturbed for the construction of the preferred road design concept. Riparian vegetation provides shading and overhead cover for aquatic life as well as stabilization of the watercourse banks.

Impacts on Fish Passage

The construction of the preferred road design concept will require isolation of the in-water works area, thus limiting the migration of fish species through the watercourse crossing structures. The replacement or rehabilitation of watercourse crossing structures may impact fish passage conditions through them.

Release of Harmful and Deleterious Substances to Fish Habitat

Excavation of the land surrounding the watercourse crossing structures will expose soils. Improper isolation of excavated or exposed soils has the potential to lead to sedimentation of the watercourse which can impact fish species by covering spawning areas and substrate in fine sediment, impairing aquatic life (invertebrates, crayfish, aquatic plants), and increases turbidity levels. The use of equipment in the vicinity of the watercourse also has the potential to lead to the release of deleterious substances including the spills, release of grease from equipment used in the water, and concrete or

other materials used for the construction of new watercourse crossing structures or road works.

10.1.2 Physical Environment

10.1.2.1 Surface Water

The implementation of the proposed road improvements will include grading works to accommodate road widening, roadside ditches, culvert extensions or replacements and watercourse realignments. These proposed works have the potential to generate erosion and sedimentation impacts.

10.1.2.2 Groundwater

Potential for localized surface water or groundwater impacts as a result of spills, discharge or dumping of materials, fluids and other wastes during construction of proposed road extension improvements and associated surface water facilities (e.g., swales).

10.1.3 Socio-Economic Environment

10.1.3.1 Property Impacts

The proposed road improvements will result in a widening of the existing road ROW. This will require the Town to acquire additional property along the road corridor. Plans illustrating the property acquisition needs are provided in Appendix K3. Based on these plans, the estimated property area impacted (needed to be acquired) is 11.834 hectares.

10.1.3.2 Air Quality and Noise

The future predicted air quality levels with and without the proposed undertaking are expected to be below the MECP criteria with the exception of benzene on an annual basis, which is due to high benzene background concentration that is already above the criterion. The change in concentration with and without the proposed undertaking at any location in the Study Area is expected to be is negligible.

Local air quality can be impacted by construction activities including dust emissions from vehicles / machinery and equipment. Potential air quality effects associated with the construction stage are expected to be temporary and localized to the surrounding area.

Based on the MECP interpretation of the noise impact levels, the noise impact due to the widening of the Eighth Line is considered to be insignificant. It was determined that no significant increases to traffic noise are expected as a result of the project and therefore no specific mitigation measures related to traffic noise need to be considered for the project.

The use of large equipment during construction activities may generate noise impacts. Potential noise impacts associated with the construction stage are expected to be temporary and localized to the surrounding area.

10.1.4 Cultural Environment

10.1.4.1 Cultural Heritage

There are 13 cultural heritage resources consisting of one BHR and 12 CHLs within or immediately adjacent to the study area. Most of these resources are farmsteads or farmscapes, while some are rural residential properties. The two cemeteries at the Steeles Avenue intersection are also cultural heritage resources. Based on the preferred design concept, further assessments will be undertaken at the detailed design stage to document the potential impacts to these cultural heritage resources and provide recommendations for mitigation.

10.1.4.2 Archaeological Resources

Based on the Stage 1 Archaeological Assessment completed for this Study, there are a number of areas that exhibit archaeological potential and therefore a Stage 2 Archaeological Assessment is recommended at the detailed design stage. There are also three areas that retain Cultural Heritage Value and will need to proceed to a Stage 3 Archaeological Assessment. These three areas include the two cemeteries on the north side of the Eighth Line and Steeles Avenue intersection as well as three sites on the west side of Eighth Line north-west of Argyll Road.

10.1.5 Transportation and Built Environments

There is a potential safety hazard to human health from construction activities, heavy equipment and increased construction traffic. There is also potential impact to transportation infrastructure through potential safety hazard from construction activities, heavy equipment and increased construction traffic. There will also be temporary traffic flow / access disruptions as a result of road construction works.

10.2 Mitigation Measures and Monitoring

The potential environmental impacts associated with construction, operation and maintenance of the proposed road improvements within the Study Area have been identified and are summarized Table 10.2 below. Proposed measures to mitigate these impacts and monitoring activities to ensure that the mitigation measures are implemented effectively are also provided in the table. All mitigation measures and monitoring activities shall be reviewed and confirmed during the detailed design phase of the project.

Table 10.2: Potential Environmental Effects, Mitigation Measures and Monitoring Activities

Environmental Component	Environmental Sub-Component	Potential Environmental Impacts	Proposed Mitigation Measures	Recommended Monitoring Activities
Natural Environment	Vegetation	Direct effects of construction activities will include the limited clearing and loss of both herbaceous and woody vegetation. Indirect effects include the increase to edge habitats, which includes several potential effects, such as windthrow and sunscald, introduction of invasive plant and wildlife species which may outcompete or predate native species, change in soil moisture regime and water availability to plants and plant communities and increases in light penetration (pollution) and noise.	**General Mitigation** • Vegetation removals should be minimized, characterized, quantified and compensated for appropriately through robust restoration. The CVC's Ecosystem Offsetting Guideline and CH's Guidelines for Landscaping and Rehabilitation Plans should be reviewed when preparing restoration / compensation plans. The CVC Plant Selection Guideline should be consulted for a list of appropriate native tree and shrub species, seed mixes and cover crops. Plants that support Redside dace habitat (overhanging grasses and shrubs) will be used within the 30 m meander belt where feasible. CH and / or CVC seed mixes, as provided through the Ontario Seed Company, should be selected for restoration areas. Invasive plant establishment in new planting areas can be reduced using clean topsoil, use of mulch and post-implementation weed management. • Compensation shall be assessed during the detailed design phase of the project when the full extent of impacts to the Regional Natural Heritage System is known and where avoidance or mitigation is not possible. • An Invasive Species Management Plan and Edge Management Plan will be developed in the detailed design phase of the project. **Construction Mitigation** • Construction hoarding and Erosion and Sediment Control (ESC) should be installed prior to commencement of construction activities according to the approved ESC plan to prevent access, encroachment and stockpile into protected areas during construction and deter wildlife from entering the construction areas. Hoarding should be installed to protect trees to be preserved. • Invasive plants can be controlled through the construction period by following the 'Clean Equipment Protocol for Industry' (2016).	Woody plant and seed establishment should be monitored following installation and within the warranty period for deficiencies. ESC and hoarding used to delineate the construction area shall be inspected regularly to ensure damage is repaired in a timely manner.

Environmental Component	Environmental Sub-Component	Potential Environmental Impacts	Proposed Mitigation Measures	Recommended Monitoring Activities
Natural Environment	Trees	Potential impacts to trees within or adjacent to proposed road ROW resulting in injury or removal of trees.	**General Mitigation** • An inventory of all trees within and adjacent to the proposed road improvements shall be undertaken by a qualified arborist during the detailed design phase of the project once the full extent of the grading needs for the proposed road improvements are known. The tree removals determined by the Arborist Report will be compensated using the tree replacement at a 3:1 ratio or greater within CH regulated areas. Impacts to natural features within CVC regulated areas will follow the Ecosystem Offsetting Guidelines. Off-site compensation will likely be required due to the limited space in the ROW. • Tree removal plans for Region-owned lands developed during detailed design shall consider the direction of the Region's Tree Canopy Replacement Policy. **Construction Mitigation** • Disturbance to trees should be minimized and the extent of tree removal for the vegetation clearing and grubbing contractor should be clearly delineated. All tree work including branch pruning, root pruning, and removal should be completed by an ISA Certified Arborist. • Trees to be retained beyond the limit of clearing should be protected using hoarding installed at the dripline or grading limit, whichever provides the greatest setback from the trees where feasible. • Certain residential properties that are subject to tree removal on the adjacent ROWs may require reinstatement of native woody vegetation to compliment cultural heritage aesthetics and provide privacy. • Protective hoarding shall be installed at dripline + 1 m, or greater, where reasonable.	Inspection of tree protection measures by the site supervisor or environmental inspector to be coordinated with review of ESC measures throughout the construction period. All damaged, sagging or deficient measures must be fixed immediately. Any unintended or unidentified impacts to trees should be assessed by a Certified Arborist. An arborist shall review all trees adjacent to the work zone and prior to opening the road for use by the public. Branches and trunks damaged during the construction period that may cause damage or injury must be mitigated.
Natural Environment	Wildlife and Wildlife Habitat (General) – Breeding Birds	Potential for disturbance or destruction of migratory breeding birds and their habitat by vegetation clearing (protected by the Migratory Bird Convention Act, ESA, 2007 and Fish and Wildlife Conservation Act).	**General Mitigation** • The footprint of the proposed disturbed area should be minimized as much as possible. • Timing constraints shall be applied to avoid any vegetation clearing (including grubbing) and / or structure works (construction, maintenance) during the breeding bird period – broadly from April 1 to August 31 for most species (regardless of the calendar year). • Active nests (nests with eggs or young birds) of protected migratory birds, including SAR protected under the ESA, 2007, cannot be destroyed at any time of the year. The destruction of inactive nests for some species may also be prohibited. • Specify approaches, including timing windows, to protect species identified under the Fish and Wildlife Conservation Act (e.g., non-passerines, game birds, raptors, owls, etc.). **Construction Mitigation** • Nesting birds protected by the listed policies that are identified within or adjacent to the proposed clearing areas must be protected. All activities must stop that may impact the breeding birds and the Contract Administrator (with assistance from an Avian Biologist) shall discuss mitigation measures with the Town and determine the appropriate authority to contact (i.e., MNDMNRF, MECP or Environment Canada).	An Avian Biologist may be required on-site as needed should a nesting bird be identified within or adjacent to the construction Site.

Environmental Component	Environmental Sub-Component	Potential Environmental Impacts	Proposed Mitigation Measures	Recommended Monitoring Activities
Natural Environment	Wildlife and Wildlife Habitat (General)	Temporary displacement of, and disturbance to, wildlife and wildlife habitat during the construction phase (i.e., vegetation removals, noise, light trespass), including SAR. Development in these habitats may limit wildlife movement and reduce useable habitat. Wildlife habitat may be removed as a result of the proposed activities. Removal of approximately 0.014 ha of Confirmed SWH in CVC watershed and 0.037 ha of Confirmed SWH in CH watershed including; Confirmed Special Concern and Rare Wildlife Species: Eastern Wood-pewee (Special Concern). Removal of approximately 1.177 ha of the following Candidate SWH features in CVC watershed and 0.862 ha of the following Candidate SWH features in CH watershed: • Bat Maternity Colonies • Turtle Wintering Area • Nesting Bird Breeding Habitat (Trees / Shrubs) • Waterfowl Nesting Area • Amphibian Breeding Habitat (Woodland) • Marsh Breeding Bird Habitat • Terrestrial Crayfish	**General Mitigation** • Figure 10.1 to Figure 10.4 illustrate locations of candidate and confirmed SWH along the corridor, differentiated by the wildlife supported to assist with mitigation. • Impacts to Confirmed and Candidate SWH should be minimized and avoided where possible. • To reduce the risk of potential impact to wildlife, including Species at Risk, vegetation clearing should not be completed between April 1 to October 31 to avoid the active period for the following: • Breeding birds – Broadly from April 1 to August 31 for most species of any calendar year. • Bat species – Considered to be between April 1 to October 31, of any calendar year • If construction cannot be completed beyond the maternity roosting period for bats, targeted surveys (i.e., acoustic monitoring) may be required to determine presence of SAR and confirm this SWH feature. • Consideration will be given during detailed design phase of the project to facilitate wildlife passage through the new proposed culvert structure crossing under at 5 Side Road (Culvert 4) to reduce road mortality for turtles, amphibians, and other wildlife. Wildlife passage will also be considered at the existing twin box culvert south of Argyll Road (Culvert 12) and Silver Creek culvert (Culvert 14) for movement of species including amphibians and small mammals. Wildlife passage design will consider design recommendations provided in CH's Road Ecology Guideline. • Ideas to be considered will include but not be limited to: – Culvert sizing and design; and, – Permanent amphibian and reptile exclusion fencing. • Design details will be coordinated with CH and CVC during the detailed design phase of the project. • Restoration of an adjacent wetland area is proposed to offset the loss of wetland that will result from construction encroachment into the wetlands. Invasive species management and installation of native shrub and tree species will improve conditions in the existing degraded wetland. • An Invasive Species Management Plan and Edge Management Plan will be developed in the detailed design phase of the project. **Construction Mitigation** • In the event that an animal is encountered during construction and does not move from the construction zone, the Contract Administrator will be notified. If the construction activities are such that continuing construction in the area would result in harm to wildlife, construction activities in that location will temporarily stop and the MNDMNRF shall be contacted for direction. • Temporary silt fence barriers are recommended to exclude wildlife (i.e., terrestrial crayfish, amphibians and turtles) from the earthwork and construction activities in areas adjacent to low-lying areas and potential habitat features and areas such as temporary storage / equipment areas and soil stockpiles. The design of silt fence barriers within the construction area is to be established as per MNRF Best Practices Technical Note – Reptile and Amphibian Exclusion Fencing (Version 1.1) July 2013 (MNR 2013).	Fencing shall be inspected regularly by the site supervisor or environmental inspector to ensure damage is repaired in a timely manner to minimize risk to wildlife.

Environmental Component	Environmental Sub-Component	Potential Environmental Impacts	Proposed Mitigation Measures	Recommended Monitoring Activities
Natural Environment	Woodlands (Including Significant Woodlands)	Removal of approximately 0.33 ha of vegetation within Significant Woodland within CVC watershed and approximately 1.04 ha of vegetation within Significant Woodland within CH watershed to accommodate the preferred road design concept. There is also potential for indirect environmental effects to adjacent woodland features. Potential indirect effects may include noise disturbance as a result of construction and / or operations and maintenance activities. Noise disturbance may impact breeding success of avian species, including SCC (Wood Thrush, Eastern Wood-pewee), whose habitat is considered SWH.	**General Mitigation** • Tree removal within all wooded features should be minimized to the furthest extent possible. An inventory of all trees within and adjacent to the proposed road improvements shall be undertaken by a qualified arborist during the detailed design phase of the project once the full extent of the grading needs for the proposed road improvements are known. All tree removal within Significant Woodlands and required compensation should be coordinated with and permitted by the Region. **Construction Mitigation** • Disturbance to trees should be minimized and clearly delineate the extent of tree removal for the vegetation clearing and grubbing contractor. All tree work including branch pruning, root pruning, and removal should be completed by an ISA Certified Arborist. • A restoration plan to reestablish the woodland limit may be required to reduce edge effects to the remaining woodland, establish an understory layer and enhance species diversity and woodland resiliency. Plantings should be coordinated with tree compensation requirements. • Trees to be retained beyond the limit of clearing should be protected using hoarding installed at the dripline or grading limit, whichever provides the greatest setback from the trees, where feasible.	Woody plant and seed establishment should be monitored following installation and within the warranty period for deficiencies. An arborist shall review all trees adjacent to the work zone and prior to opening the road for use by the general public. Branches and trunks damaged during the construction period that may cause damage or injury must be mitigated.

Environmental Component	Environmental Sub-Component	Potential Environmental Impacts	Proposed Mitigation Measures	Recommended Monitoring Activities
Natural Environment	Wetlands (PSW and Unevaluated)	No vegetation removal is proposed directly within any PSWs. However, approximately 0.014 ha of wetland ecosites (Marsh and Swamp) from CVC watershed and approximately 1.356 ha of wetland ecosites from CH watershed will require removal based on the proposed conceptual road design. Locations of potential encroachment into wetlands are illustrated on Figure 10.5 to Figure 10.8. It should be noted that the extent of impact to wetland communities is based on a desktop review and field verification based on the conceptual design and is subject to refinement during the detailed design phase of the project. Indirect impacts include sedimentation and pollutant runoff, increased adjacent traffic, noise, and light as well as loss of permeable surfaces which may impact water quality and quantity. Where wetland edges are impacted by adjacent construction, impacts may include weed invasion, drying of soils and exposure of vegetation within the ground layer and understory to increased light.	**General Mitigation** • Impacts to all wetland features should be avoided and minimized where possible. Where impacts cannot be avoided, compensation plans are to be prepared in consultation with the respective Conservation Authorities. All work proposed within CH or CVC Regulated Lands will require a permit prior to commencement of work. The CVC's Ecosystem Offsetting Guideline and CH's Guidelines for Landscaping and Rehabilitation Plans should be reviewed when preparing restoration / compensation plans. The CVC Plant Selection Guideline should be consulted for a list of appropriate native tree and shrub species, seed mixes and cover crops. CH and / or CVC seed mixes, as provided through the Ontario Seed Company, should be selected for restoration areas. **Construction Mitigation** • ESC should be installed prior to commencement of construction activities according to the approved ESC plan to prevent access, encroachment and stockpile into protected areas during construction and deter wildlife from entering the construction areas. Hoarding should be installed to protect trees to be preserved. • Construction hoarding and ESC fencing should be installed prior to commencement of construction activities around the limits of a buffers, to be determined through consultation with the respective conservation authorities and according to the approved ESC plan. ESC fencing should be installed at the limit of construction to maximize distance from the adjacent wetland where wetland buffers cannot be accommodated. ESC fencing will prevent access, encroachment and stockpile into protected areas during construction and deter wildlife from entering the construction areas.	ESC or equivalent fencing used to delineate the construction area shall be inspected regularly to ensure damage is repaired in a timely manner and that additional risk to wildlife is minimized.

Environmental Component	Environmental Sub-Component	Potential Environmental Impacts	Proposed Mitigation Measures	Recommended Monitoring Activities
Natural Environment	Fish Habitat	Potential for direct (i.e., the death of fish) and indirect impacts to fish and fish habitat (i.e., spills, sedimentation) from the construction required to lengthen or replace any watercourse crossing structures (bridges and culverts). Alteration to fish habitat through watercourse realignments required for the widening of Eighth Line.	**General Mitigation** • Compliance with the federal Fisheries Act to ensure HADD of fish habitat and the death of fish does not occur during the construction of the preferred road design concept. • DFO shall be consulted during the detailed design phase of the project with regard for the potential of works to impact fish and fish habitat, as appropriate. Specific in-water works timing windows will be applied during construction. • MECP shall be consulted during the detailed design phase of the project with regard to the Redside dace habitat located in Silver Creek between Maple Avenue and 15 Side Road. • An ESC Plan will be developed the during detailed design phase of the project in consultation with CVC and CH and will conform to industry best management practices and recognized standard specifications such as Ontario Provincial Standards Specification (OPSS). • Any construction works within CVC and CH regulated areas will require permits under Ontario Regulation 160/06 and Ontario Regulation 162/06 respectively. • Mitigation for the protection of SAR habitat will be provided in the environmental management plans prepared during the detailed design of the project. **Construction Mitigation** • Wet weather restrictions shall be applied during Site preparation and excavation. Work will be avoided near watercourses and headwater drainage features during periods of excessive precipitation and / or excessive snow melt. • Any in-water works shall occur in isolation of flowing waters, with work zone isolation achieved by placing cofferdams constructed of clean, non-erodible materials at the upstream and downstream limits of a given work area. Stream flows must be maintained downstream of in-water work areas through by-passing flows (by-pass culvert, channel, pumping etc.). Any isolated work areas shall be de-watered and dewatering shall be conveyed to a filtering system and flow dissipation device to mitigate sedimentation and erosion of the receiving waterbody. • Any fish trapped in the isolated work area shall be captured and released outside of it prior to the commencement of in-water works. Any fish rescue shall be performed by a qualified aquatic ecologist / biologist. A License to Collect Fish shall be obtained from the Guelph District MNDMNRF prior to any fish rescue occurring. • In-water works will only be permitted to occur during the appropriate in-water works timing window. The July 1st to Sept 15th timing window will apply if in or near water works are required. This window will be confirmed with DFO and MNDMNRF. • Disturbed roadside embankments will be restored with erosion control blankets, topsoil, CVC / CH approved seeding mixtures, and plantings where appropriate. • A rocky ramp or similar structure will be installed at the outlet of the perched culvert (Culvert 14) that conveys the flow of Silver Creek to improve fish passage conditions through the structure. • Sediment and erosion control measures (such as silt fence barriers, etc.) shall be installed and maintained during the work phase and until the Site has been stabilized. Control measures shall be inspected daily to ensure they are functioning and are maintained as required. If control	An Environmental Inspector shall regularly monitor construction activities to confirm the requirements outlined in various permits and plans are followed. Workers shall report any instances of spills or impacts to surface water features to ensure no impacts to fish and fish habitat.

Environmental Component	Environmental Sub-Component	Potential Environmental Impacts	Proposed Mitigation Measures	Recommended Monitoring Activities
			measures are not functioning properly, no further work shall occur until the problem is resolved. All temporary ESC measures shall be installed in accordance with recognized provincial standards. Extra silt fence / turbidity curtain shall be stored on-Site, should additional sediment control be required. • Any stockpiled material shall be stored and stabilized away from the surface water features. All materials and equipment used for the purpose of Site preparation and road construction shall be operated and stored in a manner that prevents any deleterious substance (e.g., petroleum fuel, hydraulic fluids) from entering the environment.	
Physical Environment	Surface Water	Potential for erosion and sedimentation impacts.	**General Mitigation** • The Town is required to comply with the Ontario Water Resources Act, 1990, c. O.40 with respect to the quality of water discharging into natural receivers. The footprint of disturbed areas shall be minimized to the extent possible. For example, vegetated buffers shall be left in place adjacent to natural vegetation features (forested areas) to the maximum extent possible. • A Soil Management Plan will be prepared by a Qualified Professional as defined in Ontario Regulation 160/06 for managing soil materials on-Site (includes excavation, location of stockpiles, reuse and off-Site disposal). • An ESC Plan will be developed during detailed design in consultation with CVC and CH and will conform to industry best management practices and recognized standard specifications such as OPSS. • Any construction works within CVC or CH regulated areas will require a permit under Ontario Regulation 160/06 and Ontario Regulation 162/06 respectively. **Construction Mitigation** • Any in-water work will be conducted in isolation of flowing water. All work zones will be clearly marked on detailed design drawings and the ESC Plan to indicate that no work should occur outside the work zone. • ESC measures shall be installed and maintained during the construction phase and until all areas of the construction Site have been stabilized. ESC measures shall be inspected daily to confirm they are functioning and maintained as required. If ESC measures are not functioning properly, no further work in the affected areas will occur until the sediment and / or erosion problem is resolved. • All disturbed areas of the construction Site will be stabilized and re-vegetated as soon as conditions allow. • Wet weather restrictions shall be applied during Site preparation and excavation.	A qualified Environmental Inspector shall regularly monitor construction activities to confirm the requirements outlined in the SMP and ESC Plan are being followed. A qualified Environmental Inspector shall inspect, suggest and confirm the repair of ESC measures as needed.

Environmental Component	Environmental Sub-Component	Potential Environmental Impacts	Proposed Mitigation Measures	Recommended Monitoring Activities
Physical Environment	Surface and Ground Water	Potential for localized surface water or groundwater impacts because of spills, discharge or dumping of materials, fluids and other wastes during construction of proposed road improvements and associated surface water facilities (e.g., swales).	**Construction Mitigation** • Refueling and maintenance of construction equipment should occur within designated areas only. Any hazardous materials used for construction will be handled in accordance with appropriate regulations. • A Construction Emergency Response and Communications Plan shall be developed and followed throughout the construction phase (including spill response plans). The Contractor shall develop spill prevention and contingency plans for the construction of road improvements and general Site preparation for proposed road improvements. Personnel shall be trained in how to apply the plans and the plans shall be reviewed to strengthen their effectiveness and continuous improvement. Spills or depositions into watercourses shall be immediately contained and cleaned up in accordance with provincial regulatory requirements and the contingency plan. A hydrocarbon spill response kit will be always on-Site during the work. Spills will be reported to the Ontario Spills Action Centre at 1-800-268-6060. • Road salt will only be used when there is a safety hazard. Winter maintenance contractors will be trained in responsible salt management. Product application practices and rates shall be adjusted to suit current and forecasted conditions for each product application event. The amount of residual road salt on the pavement surface will be considered before applying more. Operators / staff shall respond immediately to clean up spills. Prevention of spilled anti-icing / de-icing agents from reaching drains, sewers, soil, or surface water shall be a priority.	A qualified Environmental Inspector shall regularly monitor construction activities to confirm the requirements outlined in the SMP and ESC are followed. Workers shall report any instances of spills to their supervisors.
Physical Environment	Surface and Groundwater (Headwater features)	Change in water balance to seasonally flooded or wet habitat within natural vegetation communities affecting groundwater recharge functions.	**General Mitigation** • Incorporation of LID to direct surface water flow to grassed swales, bioretention gardens and infiltration galleries near the natural heritage features (refer to CVC Grey to Green Road Retrofits). LID elements should be designed to preserve local predevelopment water balance as they reduce runoff volume through the processes of infiltration and evapotranspiration and improve stormwater quality through a variety of physical and biological treatment processes.	Monitoring of vegetation communities for changes in plant species composition and soil moisture regime.

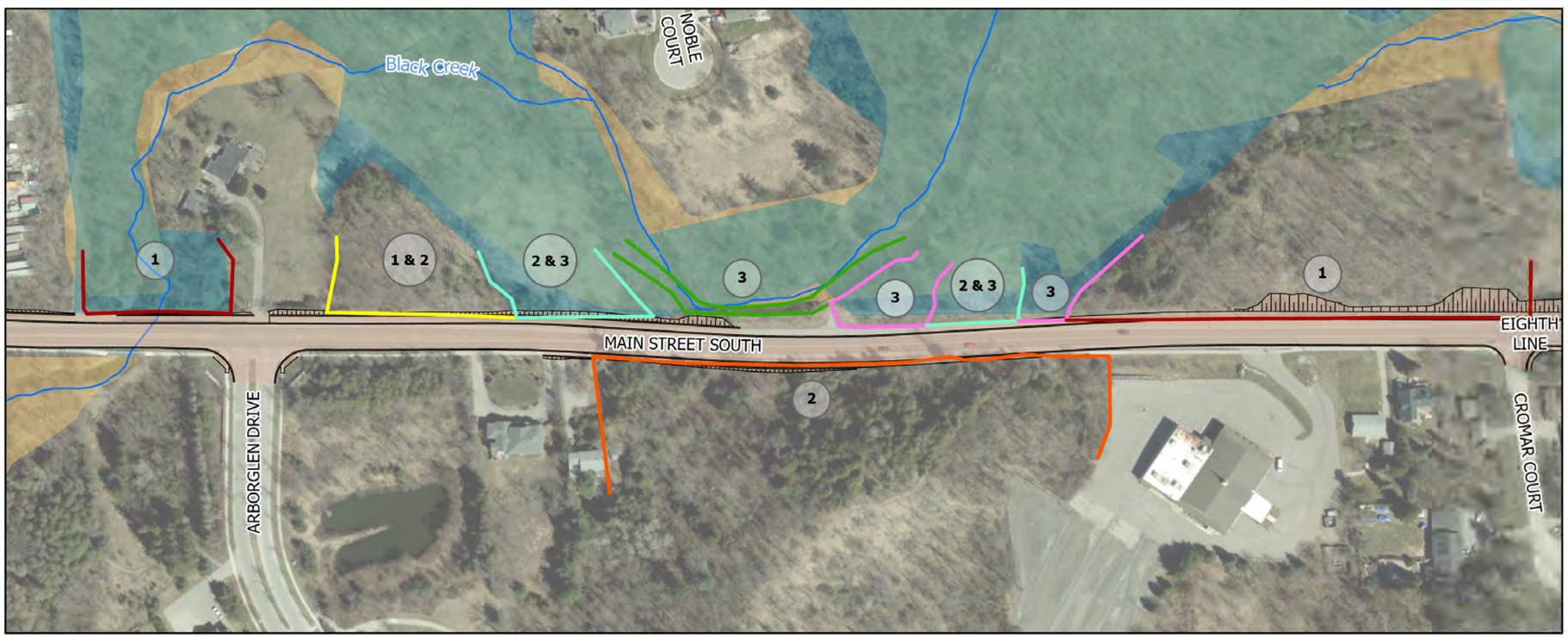
Environmental Component	Environmental Sub-Component	Potential Environmental Impacts	Proposed Mitigation Measures	Recommended Monitoring Activities
Physical Environment	Groundwater (Source Water Protection)	• Potential impacts to other types of drinking water systems that could be affected during the construction or operation of the project that are not explicitly addressed in source protection plans, such as private systems – individual or clusters, and designated facilities within the meaning of O. Reg. 170/03 under the Safe Drinking Water Act – i.e., camps, schools, health care facilities, seasonal users, etc. • Outlets J, K, and L located in the WHPA-B scoring 10 and an ICA for Chloride may be considered significant drinking water threats.	**General Mitigation** • An inventory of water well records and adjacent land uses will be completed to identify potential private water sources. If shallow wells are identified in the project area, an interference / complaint protocol will be established to address impacts to private water wells during construction. • All stormwater management outlets will be managed in accordance with the Town's Salt Management Plan, which addresses applicable Source Water Protection policies.	
Socio-Economic Environment	Air Quality	Potential air quality impacts during construction.	**General Mitigation** • A complaint response protocol for nuisance impacts including dust emissions will be prepared during the detailed design phase of the project and implemented prior to construction. • Vegetation barriers will be considered by the Town during the detailed design phase of the project; however, vehicle sightline considerations for traffic safety will be prioritized. **Construction Mitigation** • During construction, the following mitigation measures shall be used: – The road shall be graded as required to remove potholes, ruts and ripples in the road surface. Efforts to prevent contamination of the road surface, such as spilling sands, silts, and clays, will also help to minimize dust. – If appropriate equipment is available, the roadway should be sprayed with water as required to minimize dust generation prior to paving. • The construction contractor will be required to develop a Construction Management Plan (CMP) that specifically addresses dust controls, and contingency plans to mitigate dust when it occurs. Development of dust controls and contingency plans should be guided by the Best Practices for the Reduction of Air Emissions from Construction and Demolition Activities (Cheminfo, 2005). • Vehicles / machinery and equipment shall be in good repair, equipped with emission controls, as applicable, and operated within regulatory requirements. The contractor shall also be required to implement dust suppression measures to reduce the potential for airborne particulate matter resulting from construction activities. This should be in the form of water applications on exposed soils.	An environmental monitor shall regularly inspect construction work areas to ensure that dust suppression measures are being adequately applied and confirm the requirements outlined in the CMP are being followed. If dust suppression measures are not functioning properly, alternative measures shall be implemented immediately and prioritized above other construction activities.

Environmental Component	Environmental Sub-Component	Potential Environmental Impacts	Proposed Mitigation Measures	Recommended Monitoring Activities
Socio-Economic Environment	Noise	Potential for noise through the use of large equipment for construction of the proposed road extension.	**General Mitigation** • A complaint response protocol for nuisance impacts including construction noise shall be prepared during the detailed design phase of the project and implemented prior to construction. **Construction Mitigation** • Noise control measures shall be implemented where required during the construction phase, such as restricted hours of operation and the use of appropriate machinery and mufflers. The noise produced by the equipment can be limited through proper equipment maintenance. • All construction activities shall conform to the criteria set out in NPC-115 of 83 dB. • The construction contractor will be required to develop a CMP that specifically addresses noise controls, mitigation to be implemented and frequency of equipment inspection.	An environmental monitor shall regularly monitor construction noise to ensure that noise control measures are being adequately applied and confirm the requirements outlined in the CMP are being followed. If noise control measures are not functioning properly, alternative measures shall be implemented immediately and prioritized above other construction activities.
Socio-Economic Environment	Property Impacts	Property loss due to property acquisition to accommodate proposed road ROW.	**General Mitigation** • Property acquisition required for this project will be undertaken by the Town, with the objective being to respect and protect individual rights, and to provide fair compensation within the framework of applicable municipal and provincial policies and associated legislative instruments governing the acquisition of property. • The acquisition process emphasizes negotiation with a willing seller with the objective being to achieve a mutually satisfactory agreement between the Town and the individual property owner. In this regard, Town will compensate for “injurious affection” where land is required. • The Town, together with the Town’s appraiser, will engage and negotiate with affected property owners regarding land acquisition and easements required for the proposed works. • All necessary property acquisitions will be completed prior to construction.	N/A
Socio-Economic Environment	Agricultural Environment	Potential surface water quality impacts that might affect agricultural production. Potential temporary traffic flow / access disruptions to local farm business supply and support services. Potential impact on agricultural tile drainage systems or outlets, or flooding / erosion that might affect surrounding farmland.	**Construction Mitigation** • Mitigation measures noted under ‘surface and groundwater’ to avoid the potential for localized surface water or groundwater impacts because of spills, discharge or dumping of materials, fluids and other wastes during construction. • Consultation with public agency and / or adjacent farm owners regarding temporary access routes. • Contractor shall develop and implement a Traffic Management Plan in coordination with Town. Adequate signage to give advance notice of disruptions and detours shall be provided by the contractor. **Post-Construction Mitigation** • Repair or restoration of any agricultural tile drains, drainage outlets or surface drainage features interrupted or disrupted within farmlands abutting the widened road.	N/A

Environmental Component	Environmental Sub-Component	Potential Environmental Impacts	Proposed Mitigation Measures	Recommended Monitoring Activities
Cultural Environment	Cultural Heritage	Based on the preferred design concept, further assessments will be undertaken at the detailed design stage to document the potential impacts to the cultural heritage resources and provide recommendations for mitigation.	**General Mitigation** • The potential impacts will be identified through further assessment at the detailed design stage and recommendations for mitigation will be provided.	N/A
Cultural Environment	Archaeology	Potential Impacts to archaeological resources. The potential impacts will be identified through the future Stage 2 Archaeological Assessment at the detailed design stage. There are also three areas that retain Cultural Heritage Value and will need to proceed to a Stage 3 Archaeological Assessment. In general, no matter how thorough or carefully completed, can necessarily predict, account for, or identify every form of isolated or deep buried archaeological deposit. Therefore, it is possible that archaeological remains may be found during construction.	**General Mitigation** • The potential impacts will be identified through the future Stage 2 and Stage 3 Archaeological Assessments at the detailed design stage and recommendations for mitigation will be provided. • If archeological remains are found by the Contractor during subsequent construction activities, the consultant archaeologist, approval authority and the Cultural Program Unit of the Ministry of Heritage, Sport, Tourism and Culture Industries shall immediately be notified by the Contractor.	N/A
Transportation and Built Environment	Human Health and Safety	Potential safety hazard to humans from construction activities, heavy equipment and increased construction traffic.	**Construction Mitigation** • The contractor shall develop a Health and Safety Plan (HASP) and have it reviewed and approved by the Town prior to implementing. The HASP shall follow the Occupational Health and Safety Act, 1990 and regulatory requirements.	N/A
Transportation and Built Environment	Transportation Infrastructure	Potential safety hazards on roadways from construction activities, heavy equipment and increased construction traffic.	**General Mitigation** • Operation of construction related vehicles will be done in accordance with all appropriate safety policies and procedures, and based on Canadian Standards (Transport Canada, etc.). **Construction Mitigation** • All contractors will be required to complete and follow appropriate construction site training and adhere to appropriate road safety regulations during construction. Work shall be done in such a manner as to minimize disruption to the adjacent neighbourhoods. Noise and dust emissions shall be controlled. Contract specifications shall ensure that all equipment and vehicles are compliant with noise and air emission standards for applicable equipment.	An environmental monitor shall regularly inspect construction work areas to ensure that noise control measures and dust suppression measures are being adequately applied. If noise control measures and dust suppression measures are not functioning properly, alternative measures shall be implemented immediately and prioritized above other construction activities.

Environmental Component	Environmental Sub-Component	Potential Environmental Impacts	Proposed Mitigation Measures	Recommended Monitoring Activities
Transportation and Built Environment	Transportation Infrastructure	Temporary traffic flow / access disruptions.	**Construction Mitigation** • Consult with public agency and / or adjacent landowners / tenants regarding temporary access routes. Contractor shall develop and implement a Traffic Management Plan in coordination with Town. Adequate signage to give advance notice of disruptions and detours shall be provided by the contractor.	N/A

Mitigation Key:
1. Bat Maternity Habitat: Tree removal to occur outside of active season. No tree removal April 1 to October 31.
2. Protection of nesting birds: No tree or vegetation removal April 1 to August 31.
3. Erosion Sediment Control (ESC) fencing or exclusion measures during construction to prevent further encroachment into habitat of wildlife.



SIGNIFICANT WILDLIFE HABITAT

- Bat Maternity Colonies
- Special Concern and Rare Wildlife Species: Eastern Wood-pewee
- Special Concern and Rare Wildlife Species: Eastern Wood-pewee, Bat Maternity Habitat
- Marsh Breeding Bird Habitat, Terrestrial Crayfish
- Terrestrial Crayfish
- Turtle Wintering Areas
- Turtle Wintering Areas, Terrestrial Crayfish
- Waterfowl Nesting Area
- WATERCOURSE
- DEVELOPMENT LIMITS
- WETLAND (CVC REGULATED)
- WETLAND (PROVINCIALLY SIGNIFICANT)

Sources:

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Datum: North American 1983 CSRS	
Coord. System: NAD 1983 CSRS UTM Zone 17N	
Projection: Transverse Mercator	
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False Easting: 500,000m	False Northing: 0m
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Grid North

0 30 50 80 100 100
Metres

BURNSIDE

Client

TOWN OF HALTON HILLS

Figure Title

EIGHTH LINE EA

SIGNIFICANT WILDLIFE HABITAT AND PRELIMINARY MITIGATION

Drawn	Checked	Date	Figure No.
SV	KB	2022/08/25	10.1
Scale		Project No.	
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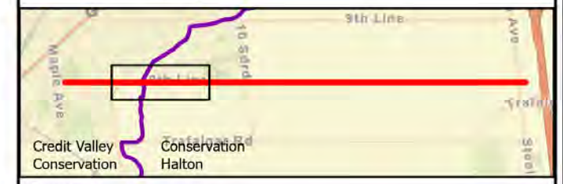
Mitigation Key:
1. Bat Maternity Habitat: Tree removal to occur outside of active season. No tree removal April 1 to October 31.
2. Protection of nesting birds: No tree or vegetation removal April 1 to August 31.
3. Erosion Sediment Control (ESC) fencing or exclusion measures during construction to prevent further encroachment into habitat of wildlife.

SIGNIFICANT WILDLIFE HABITAT
- Bat Maternity Colonies
- Special Concern and Rare Wildlife Species: Eastern Wood-pewee
- Special Concern and Rare Wildlife Species: Eastern Wood-pewee, Bat Maternity Habitat
- Marsh Breeding Bird Habitat, Terrestrial Crayfish
- Terrestrial Crayfish
- Turtle Wintering Areas
- Turtle Wintering Areas, Terrestrial Crayfish
- Waterfowl Nesting Area
- WATERCOURSE
- DEVELOPMENT LIMITS
- CONSERVATION AUTHORITY BOUNDARY



Sources:

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Page Orientation: -45°	Scale Factor: 0.99960

Grid North

0 30 50 80 100 100
Metres

BURNSIDE

Client

TOWN OF HALTON HILLS

Figure Title

EIGHTH LINE EA

SIGNIFICANT WILDLIFE HABITAT AND PRELIMINARY MITIGATION

Drawn	Checked	Date	Figure No.
SV	KB	2022/08/25	10.2
Scale		Project No.	
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Mitigation Key:
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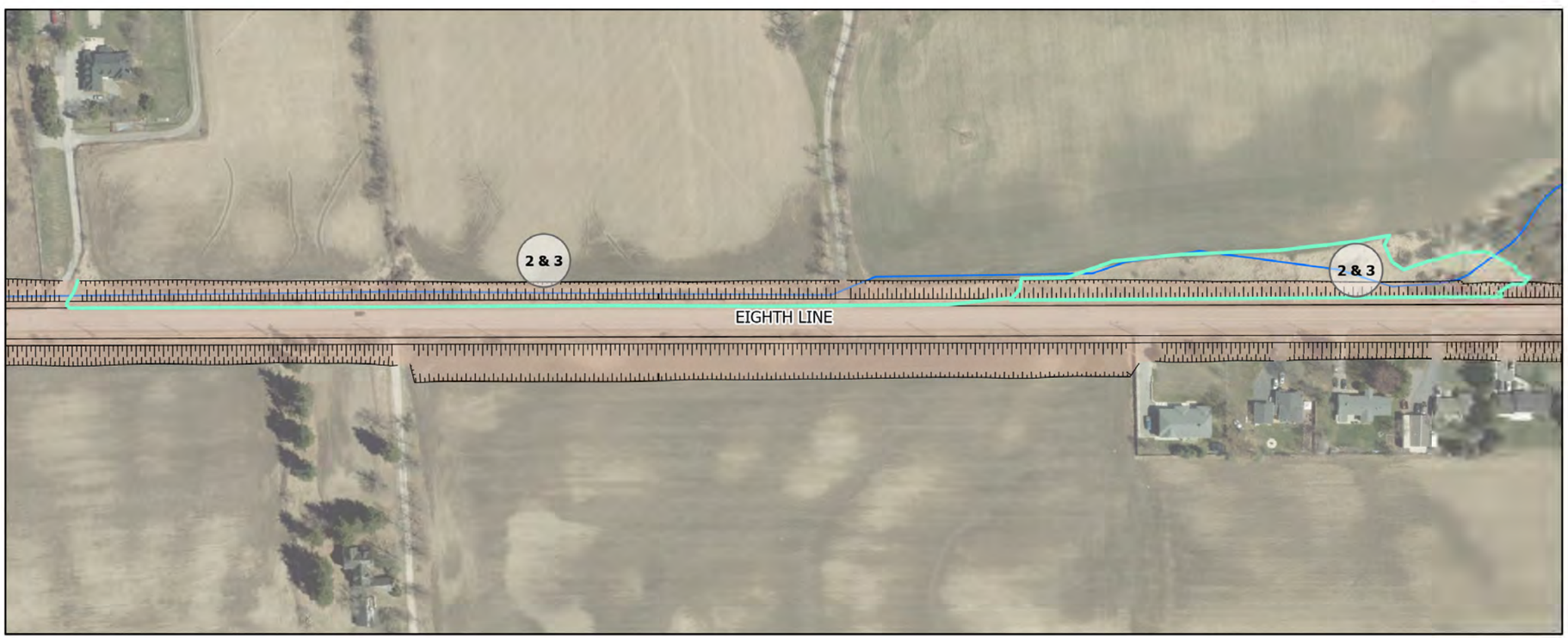
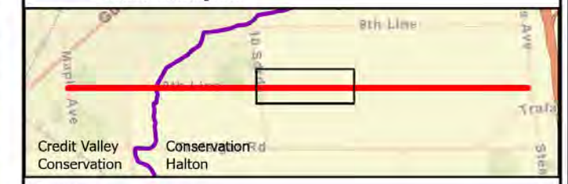
3. Erosion Sediment Control (ESC) fencing or exclusion measures during construction to prevent further encroachment into habitat of wildlife.



SIGNIFICANT WILDLIFE HABITAT

- Bat Maternity Colonies
- Special Concern and Rare Wildlife Species: Eastern Wood-pewee
- Special Concern and Rare Wildlife Species: Eastern Wood-pewee, Bat Maternity Habitat
- Marsh Breeding Bird Habitat, Terrestrial Crayfish
- Terrestrial Crayfish
- Turtle Wintering Areas
- Turtle Wintering Areas, Terrestrial Crayfish
- Waterfowl Nesting Area
- WATERCOURSE
- DEVELOPMENT LIMITS



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Grid North

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Metres

BURNSIDE

Client

TOWN OF HALTON HILLS

Figure Title

EIGHTH LINE EA

SIGNIFICANT WILDLIFE HABITAT AND PRELIMINARY MITIGATION

Drawn	Checked	Date	Figure No.
SV	KB	2022/08/25	10.3
Scale		Project No.	
1:2,250		300043880	

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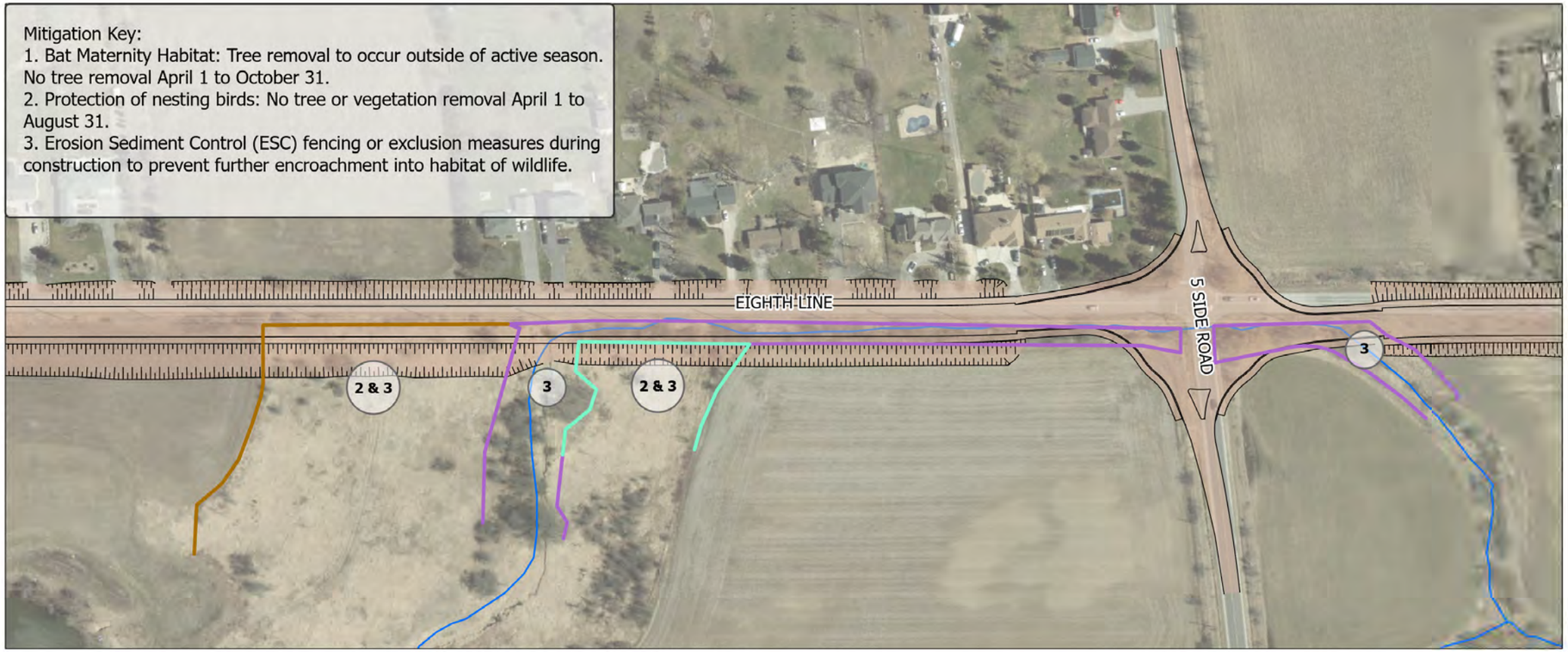
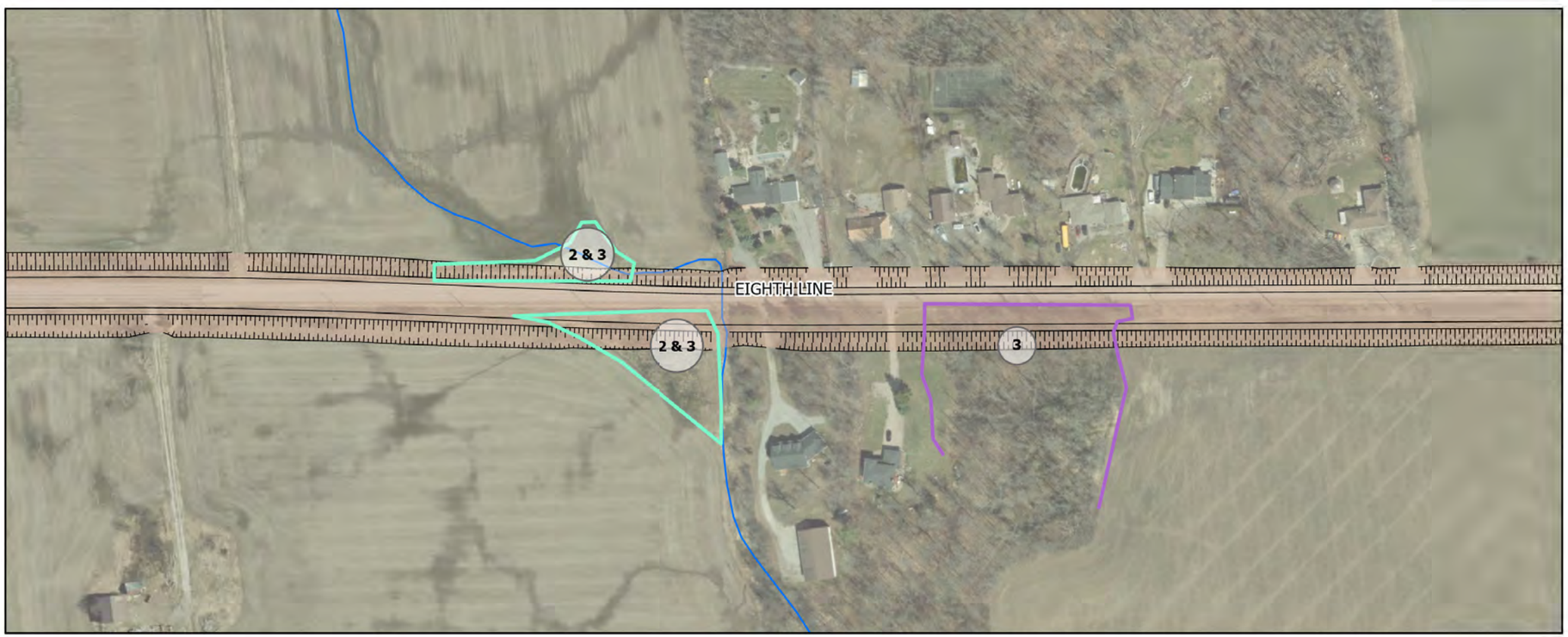
Mitigation Key:
1. Bat Maternity Habitat: Tree removal to occur outside of active season. No tree removal April 1 to October 31.
2. Protection of nesting birds: No tree or vegetation removal April 1 to August 31.
3. Erosion Sediment Control (ESC) fencing or exclusion measures during construction to prevent further encroachment into habitat of wildlife.





SIGNIFICANT WILDLIFE HABITAT

- Bat Maternity Colonies
- Special Concern and Rare Wildlife Species: Eastern Wood-pewee
- Special Concern and Rare Wildlife Species: Eastern Wood-pewee, Bat Maternity Habitat
- Marsh Breeding Bird Habitat, Terrestrial Crayfish
- Terrestrial Crayfish
- Turtle Wintering Areas
- Turtle Wintering Areas, Terrestrial Crayfish
- Waterfowl Nesting Area
- WATERCOURSE
- DEVELOPMENT LIMITS

Sources:

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Grid North

0 30 50 80 100 100
Metres

BURNSIDE

Client

TOWN OF HALTON HILLS

Figure Title

EIGHTH LINE EA

SIGNIFICANT WILDLIFE HABITAT AND PRELIMINARY MITIGATION

Drawn	Checked	Date	Figure No.
SV	KB	2022/08/25	10.4
Scale		Project No.	
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ELC Code	ELC Description	Encroachment Area (m^2)
MAMM3-1	Mixed Mineral Meadow Marsh Type	121
SWCM1	White Cedar Mineral Coniferous Swamp Ecosite	
SWD	Deciduous Swamp	18
SWMM1	White Cedar Mineral Mixed Swamp Ecosite	

ELC WETLAND

WETLAND IMPACTS

WETLAND (CVC REGULATED)

WETLAND (PROVINCIALLY SIGNIFICANT)

DEVELOPMENT LIMITS

CONSERVATION AUTHORITY BOUNDARY

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Grid North

0 30 50 80

Metres

BURNSIDE

Client

TOWN OF HALTON HILLS

Figure Title

EIGHTH LINE EA

WETLAND ENCROACHMENT

Drawn	Checked	Date	Figure No.
SV	KB	2022/08/25	10.5
Scale		Project No.	
1:1,000		300043880	

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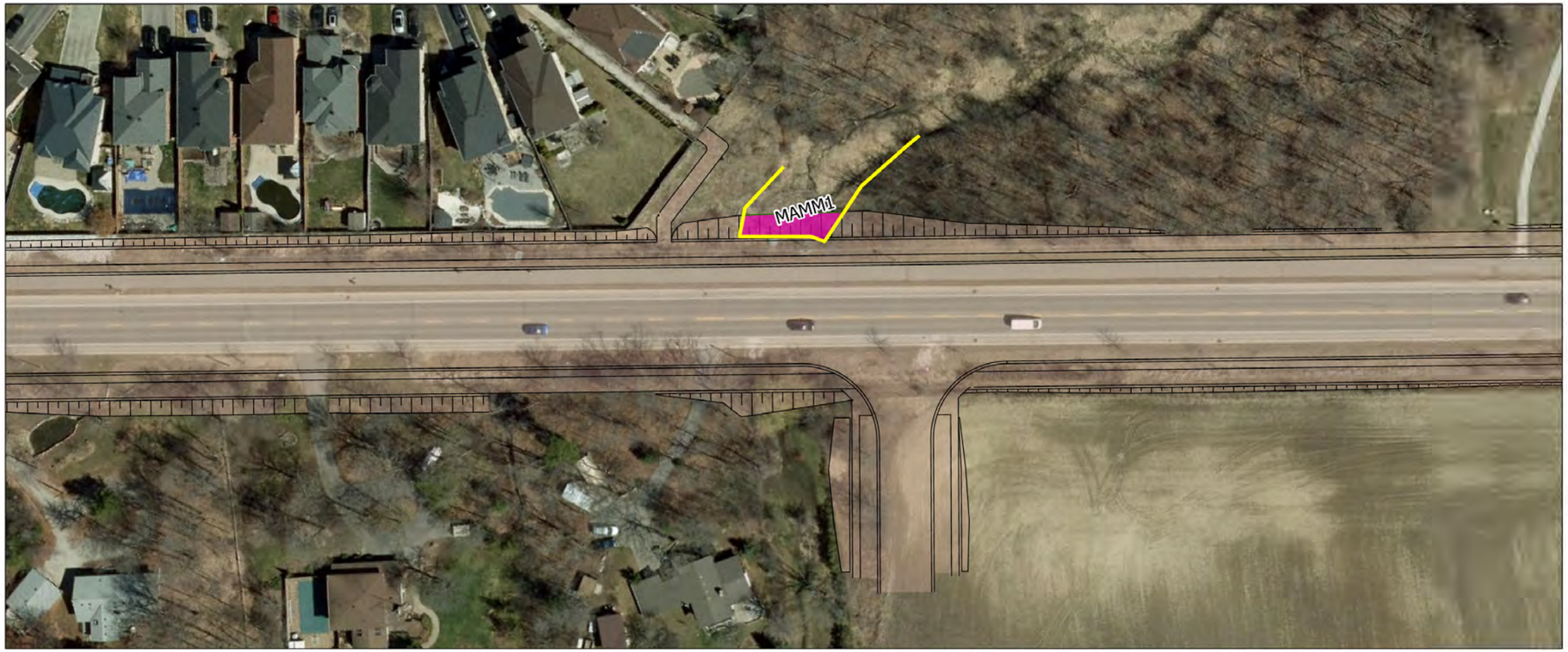

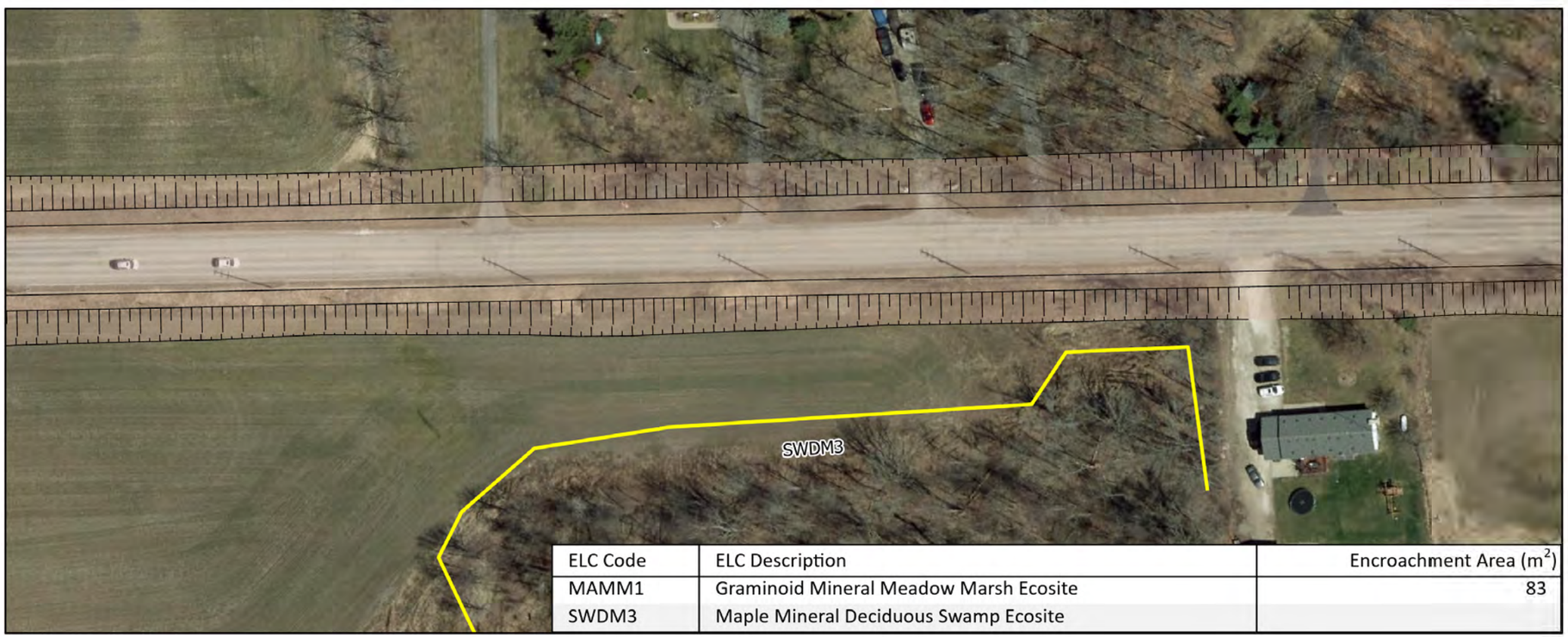

ELC Code	ELC Description	Encroachment Area (m^2)
MAMM1	Graminoid Mineral Meadow Marsh Ecosite	83
SWDM3	Maple Mineral Deciduous Swamp Ecosite	

ELC WETLAND

WETLAND IMPACTS

DEVELOPMENT LIMITS

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Grid North

0 30 50 80

Metres

BURNSIDE

Client

TOWN OF HALTON HILLS

Figure Title

EIGHTH LINE EA

WETLAND ENCROACHMENT

Drawn	Checked	Date	Figure No.
SV	KB	2022/08/25	10.6
Scale		Project No.	
1:1,000		300043880	

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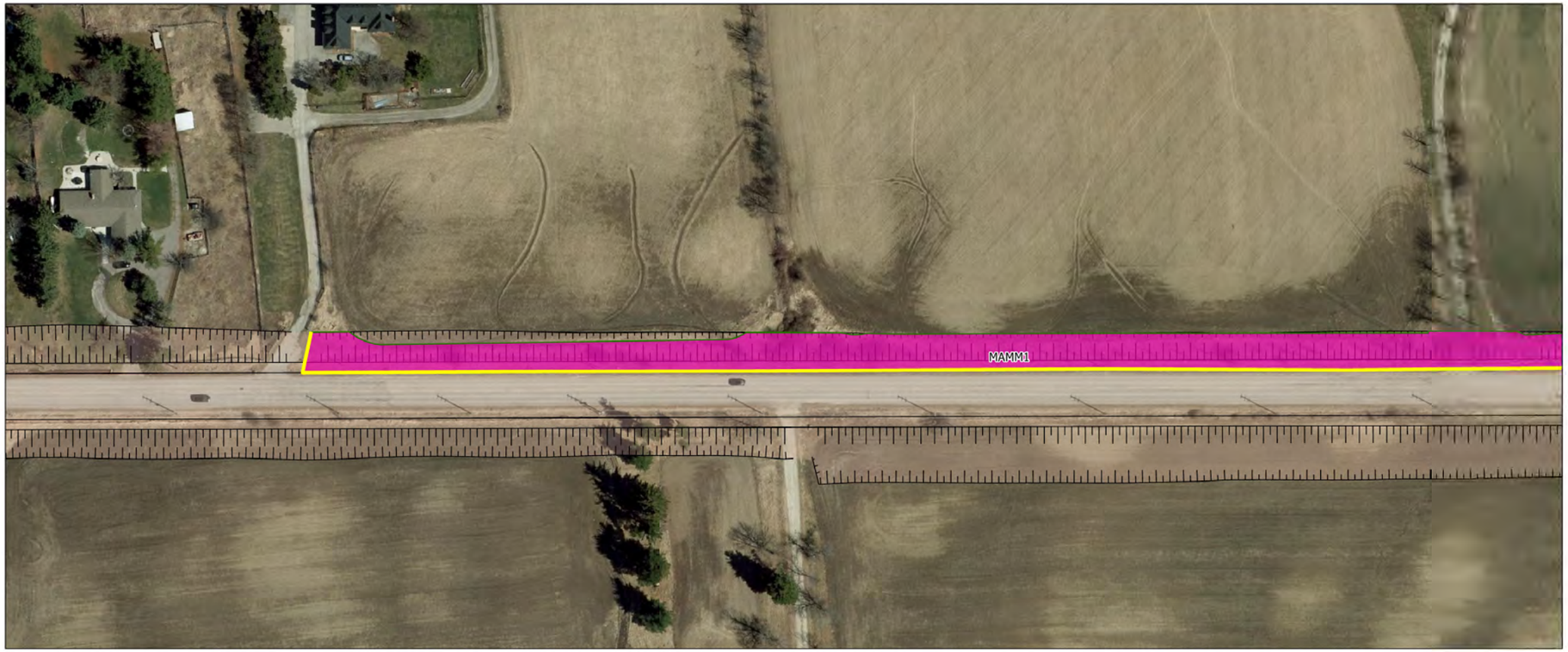

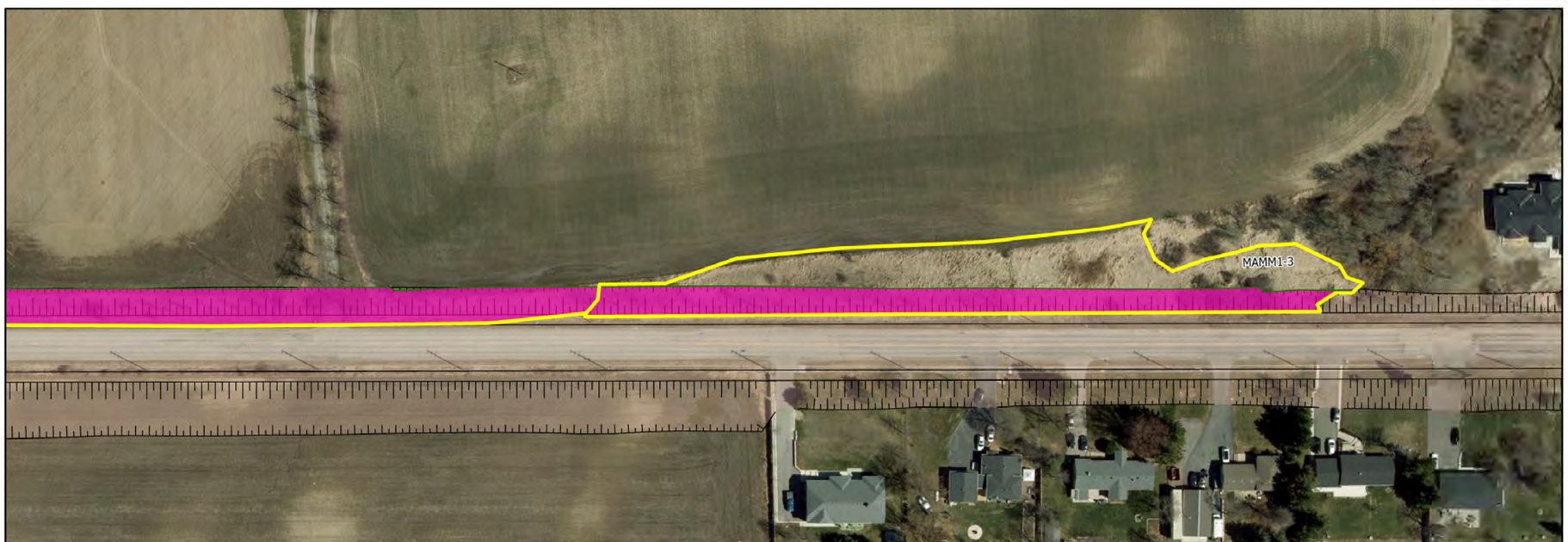

ELC Code	ELC Description	Encroachment Area (m^2)
MAMM1	Graminoid Mineral Meadow Marsh Ecosite	4149
MAMM1-3	Reed-canary Grass Graminoid Mineral Meadow Marsh Type	1617

ELC WETLAND

WETLAND IMPACTS

WETLAND (CVC REGULATED)

WETLAND (PROVINCIALLY SIGNIFICANT)

DEVELOPMENT LIMITS

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Grid North

0 10 20 30 40 50
Metres

BURNSIDE

Client

TOWN OF HALTON HILLS

Figure Title

EIGHTH LINE EA

WETLAND ENCROACHMENT

Drawn	Checked	Date	Figure No.
SV	KB	2022/08/25	10.7
Scale		Project No.	
1:1,500		300043880	

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ELC Code	ELC Description	Encroachment Area (m^2)
MAMM1	Graminoid Mineral Meadow Marsh Ecosite	711
MAMM1-3	Reed-canary Grass Graminoid Mineral Meadow Marsh Type	573
MAMM2	Forb Mineral Meadow Marsh Ecosite	1070
SWDM2	Ash Mineral Deciduous Swamp Ecosite	1688
SWDM4	Mineral Deciduous Swamp Ecosite	2723, 945

ELC WETLAND

WETLAND IMPACTS

WETLAND (CVC REGULATED)

WETLAND (PROVINCIALLY SIGNIFICANT)

DEVELOPMENT LIMITS

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Grid North

0 10 20 30 40 50
Metres

BURNSIDE

Client

TOWN OF HALTON HILLS

Figure Title

EIGHTH LINE EA

WETLAND ENCROACHMENT

Drawn	Checked	Date	Figure No.
SV	KB	2022/08/25	10.8
Scale		Project No.	
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11.0 Climate Change Considerations

11.1 Climate Change

Climate change is defined as any significant change in long-term weather patterns. The term can apply to any major variation in temperature, wind patterns or precipitation that occurs over time. Global warming describes the recent rise in the average global temperature caused by increased concentrations of GHG trapped in the atmosphere. Scientists have concluded that human activity is largely responsible for recently observed changes to our climate since GHG are mainly caused by burning fossil fuels to produce energy.

The MECP finalized a document entitled “Considering Climate Change in the Environmental Assessment Process” in 2017 that provides guidance relating to the Ministry’s expectations for considering climate change during the EA process. This guide is recommended to be consulted if an approved Class EA has no climate consideration method.

There are two types of climate change effects that can be considered. The first is the effect that a project can have on climate change. In this case, the degree to which the project can provide some climate change mitigation measures is to be assessed. The second is the effect climate change has on the project. In this case, the degree to which the project can demonstrate adaptation to climate change impacts is assessed. Climate Change was considered during this MCEA study and is discussed in this Section.

11.1.1 Halton Region Official Plan - Responding to Climate Change

Through its sustainable land use approach, the current HROP policies implicitly respond to climate change risks and threats. They do so by directing growth towards complete communities and away from natural heritage and agricultural lands.

The ongoing HROP Review builds on this sustainability approach by integrating a climate change lens to address climate change explicitly and meaningfully by targeting the most impactful policy areas within the HROP from a GHG emission reduction standpoint and includes both mitigative and adaptive policy directions, as defined in Figure 11.1.

Figure 11.1: Adaptation and Mitigation through HROP

Transportation HROP Policy Area and Climate Change

The current HROP provides strong policy direction to support an efficient transportation network that, among other objectives, minimizes the impact on the environment and promotes energy efficiency. The Region has also undertaken multiple transportation studies to help shape its network and support growth, such as the TMP and ATMP, the Mobility Management Strategy and, recently, the Defining Major Transit Requirements Study.

11.1.2 Town of Halton Hills Climate Change Trend

With the forecasted rapid population growth for the Greater Toronto and Hamilton Area, emissions are anticipated to continue to rise substantially in the absence of control measures. Within this context, the Region is projected to have its emission levels increase by over 80% by the year 2050 if no meaningful GHG emissions control measures are introduced (Report Number LPS54-20 – Halton Region Official Plan Review - Climate Change Discussion, June, 2020).

According to a Study (2018) in the Town, the annual average temperature has risen by approximately 0.6°C between 1960s-2018. Under a business-as-usual high emission scenario the models prediction estimates temperatures rising by 2.0°C in the 2020s, by 3.8°C in the 2050s, and 6.0°C in the 2080s (Klimaat Consulting & Innovation Inc., 2018).

Total annual precipitation has increased by approximately 17–23 mm between the 1960s and 2018. Under a business-as-usual high emission scenario models project an increase of 54 mm in the 2020s, 107 mm in the 2050s, and 142 mm in the 2080s. For context, the Georgetown Wastewater Treatment Plant typically records about 880 mm of precipitation a year.

There has been approximately a 11–12 cm decrease in total annual snowfall between the 1960s and 2018. Under a business-as-usual high emission scenario models project total snow decreases of 26 cm in the 2020s, 49 cm in the 2050s, and 77 cm in the 2080s. For context, the Georgetown Wastewater Treatment Plant typically records about 140 cm of snow a year.

With a higher proportion of precipitation being rain during the winter, the total rainfall is expected to increase greatly. Between the 1960s and 2018, the Town has seen a general increase in rainfall of 29 to 34 mm. A business-as-usual high emission scenario suggests rainfall increases of 80 mm in the 2020s, 157 mm in the 2050s, and 219 mm in the 2080s. For context, the Georgetown Wastewater Treatment Plant typically records about 740 mm of rainfall a year.

According to the April 10, 2017 Climate Change Adaptation Plan Report to Council, the Town is projected to see dramatic increase in average annual temperatures and precipitation over the next 80 years as illustrated in Table 11.1.

Table 11.1: Climate Forecast Adapted from Town of Halton Hills Climate Change Adaptation Plan (2017)

Climate Variable	Observed Measurements	Projected Changes to 2100
Average Annual Temperature	Average overland temperature increase of 1.5°C between 1950 and 2010 (2 times global average).	Further average overland temperature increase between +1.5°C and +4.7°C by 2100.
Hot Days (=/+ 30°C)	Average of 10 days/year between 1971 and 2000.	• 2020s: 25 • 2050s: 31 to 40 • 2080s: 37 to 65
Precipitation	Average annual precipitation of 884.9 mm/year between 1971 and 2000.	Further increase in precipitation above the historically-observed average: • 2020: 17.2 mm to 24.4 mm • 2050: 38.3 mm to 64.5 mm • 2080: 53.1 mm to 97.2 mm

11.1.3 Effects of the Project on Climate Change

In 2019, the Region strengthened its commitment to addressing climate change by declaring a climate emergency. The Region is working on multiple fronts to respond to climate change and reduce GHG emissions.

11.1.3.1 Greenhouse Gas Emissions

An assessment of GHG emissions attributed to proposed improvements to Eighth Line was undertaken as part of the Air Quality Impact Assessment (see Appendix G). The

impact of the proposed road improvement on GHG emissions within Study Area was determined to be negligible as annual concentrations for all GHG are estimated to be well below 0.1% of the provincial GHG levels associated with the road transportation sector. The Project is not anticipated to produce significant GHG emissions throughout the construction phase.

11.1.3.2 Vegetation Compensation

Existing vegetation will be retained to the extent practicable. Removals will be kept to a minimum to limit direct effects to vegetation communities and vascular plants, as well as indirect effects (e.g., soil compaction and changes to topography and drainage). Disturbed areas will be re-stabilized, incorporating revegetation using non-invasive, preferably native plantings and / or seed mix appropriate to the site conditions and adjacent vegetation communities. Seed mixes will be used in conjunction with an appropriate non-invasive cover crop as appropriate.

11.1.4 Effects on the Project from Climate Change

There is potential for the project to be affected by climate change. Climate change is usually associated with any significant change in long-term weather patterns. Changes in the composition of the atmosphere are resulting in processes that alter global temperature and precipitation, in turn affecting local weather patterns. These processes can ultimately lead to increased occurrence of extreme weather events such as floods, droughts, ice storms and heat waves.

Precipitation, whether it is rainfall, snowfall, or other forms of frozen / liquid water, is the key climate and weather-related variable of concern with respect to drainage and culvert design. As a result of climate change, storm events are predicted to become more intense, which can result in larger volumes of precipitation at one time. Other climate variables such as temperature are major inputs to evaporation and snowmelt processes. Increases in temperature are likely to impact precipitation and snowmelt runoff volumes discharged to watercourses.

11.1.4.1 Air Temperature

Impact to the Pavement

Studies show that over the next 50 years, low temperature cracking will become less problematic, structures will freeze later and thaw earlier with correspondingly shorter freeze season lengths, and higher extreme in-service pavement temperatures will raise the potential for rutting. Issues with rutting and cracking (longitudinal and alligator) will be exacerbated by climate change with transverse cracking becoming less of a problem. In general, maintenance, rehabilitation or reconstruction will be required earlier in the design life (The Road Well-travelled, 2007).

11.1.4.2 Precipitation

Precipitation, whether it is rainfall, snowfall, or other forms of frozen / liquid water, is the key climate and weather-related variable of concern in SWM. As a result of climate change, storm events are predicted to become more intense, which can result in larger volumes of precipitation at one time.

Stormwater Management

Some of the potential future climate / weather effects that may warrant steps to reduce vulnerability and enhance resiliency and ongoing adaptive capacity include, but are not limited to:

- Exceedance of storm sewer / culvert and overland flow system capacities resulting in flooding.
- Scour and damage to or failure of culverts, bridges or embankment side slopes; and
- Ice accumulation affecting infrastructure and equipment.

The SWM design for the Project has considered the drainage and SWM objectives of the MECP Stormwater Management Planning and Design Manual (2003), MTO Highway Drainage Design Standards (2008), CVC Stormwater Management Criteria (2012), and CH Guidelines for Stormwater Management Engineering Submissions (2021) among other guidance. This will be supplemented by current guidance such as the runoff volume control targets for Ontario recommended to MECP (Aquafor Beech Ltd. and Earthfx Inc., 2016) from local municipalities and Conservation Authorities.

Erosion and Sediment Control Measures

ESC measures including the development of an ESC Plan, will be implemented during construction to ensure stormwater runoff is controlled and sediment is prevented from entering sewers and watercourses. The ESC Plan will include consideration of the TRCA Erosion and Sediment Control Guide for Urban Construction (2019) and OPSS 805 (Erosion and Sediment Control Measures). Installation and monitoring of appropriate ESC measures will help mitigate potential effects of climate change on the Project.

12.0 Project Implementation

Phase 5 of the Municipal Class EA process involves the completion of detailed design drawings, specifications and tender documents to be provided to a successful contractor for the construction of the proposed project. During the implementation phase, the Town will need to adhere to several mitigation measures and monitoring plans as documented in this ESR, some of which will need to be in place prior to and during construction. Permits will need to be applied for from various regulatory agencies.

12.1 Follow-up Commitments

The following list provides a preliminary set of commitments to be undertaken during the detailed design phase or construction phase of the Project to ensure that work is being completed in accordance with the Project File Report. These commitments shall be revisited during the detailed design phase of the Project at which time any additional commitments or updates to these commitments shall be identified.

12.1.1 Detailed Design Commitments

12.1.1.1 General

- An ESR addendum will be undertaken, if there is a material change in key elements of the project warranting an addendum after the filing of the ESR.
- The Region will be consulted to coordinate proposed urbanization of south end of Eighth Line with existing and proposed regional infrastructure in vicinity of Steeles Avenue intersection.
- Topographic surveys will be completed during the detailed design of drainage features including watercourses, HDFs, ditch lines, culverts, valley slopes, and all other relevant drainage features completed throughout the project limits within the right of way.
- Geotechnical investigations will be undertaken including existing conditions assessment, pavement and road base recommendations, foundation requirements for proposed retaining wall locations and culvert crossing locations as required.
- Establish mitigation measures to ensure existing trail connections to the existing MUP on the east side of Eighth Line are not impacted by grading works and trail slopes are accessible (5-8% or less).
- An inventory of water well records and adjacent land uses will be completed to identify potential private water sources. If shallow wells are identified in the project area, an interference / complaint protocol will be established to address impacts to private water wells during construction.
- All stormwater management outlets will be managed in accordance with the Town's Salt Management Plan, which addresses applicable Source Water Protection policies.

12.1.1.2 Natural Environment

Vegetation and Trees

- A tree inventory will be completed to inventory the extent of tree removals and a compensation plan will be established based on mitigation guideline for tree replacement at a 3:1 ratio or greater within CH regulated areas. Due to limited space in the ROW, off-site compensation will likely be required. The compensation plan may be subject to review by Halton Region.
- Compensation for encroachment into natural features within the CVC watershed will be coordinated with CVC using their Ecosystem Offsetting Guidelines.
- Compensation for replacements in Regulated Areas within the CH watershed will be reviewed by and coordinated with CH.
- Quantify impacts to woodlands.
- An Invasive Species Management Plan with mitigation strategy will be completed.
- An Edge Management Plan will be developed.
- The compensation plans as part of the detailed design may be subject to review by Halton Region.

Wildlife (General) and Significant Wildlife Habitat

- The preliminary mitigation measures for SWH identified in Table 10.2 will be revisited and confirmed. These will include specific mitigation measures for each candidate / confirmed SWH type.
- Detailed design of culverts with watercourses will factor in CH Road Ecology policies and guidelines.
- Mitigation for the protection of SAR habitat will be provided in the environmental management plan at the detailed design stage of the project.
- Due to the presence of Species at Risk within the project area it is recommended that once project details are understood MECP will be contacted to discuss potential permitting requirements under the *ESA, 2007*.

Fish and Fish Habitat

- *Fisheries Act* requirements will be reviewed. DFO will be consulted for the watercourses that require *Fisheries Act* approval. These include improvements and or replacements of the following culverts:
  - Culvert 4 replacement (Middle Sixteen Mile Creek Tributary)
  - Watercourse realignment (Middle Sixteen Mile Creek Tributary, upstream of Culvert 4)
  - Culvert 12 extension (East Sixteen Mile Creek Tributary)
  - Culvert 13 extension (East Sixteen Mile Creek Tributary)
  - Culvert 14 extension (Silver Creek Tributary)
  - Culvert 19 / Bridge repairs, if completed (Black Creek)

- Opportunities to improve existing conditions to support fish passage and habitat improvements will be considered. DFO will be consulted for the watercourses that require *Fisheries Act* approval.
- Cooling opportunities will be investigated due to the sensitive nature of Black Creek and Silver Creek. The related MECP water quality objectives will be considered.
- An ESC will be developed to ensure no negative impact on fish habitat.
- Once detailed design has been determined (at least 90%) the project can be submitted to DFO for Request for Project Review to determine if a *Fisheries Act* Authorization is required.

Significant Natural Features (Wetlands, Woodlands, Valleylands and Natural Heritage System)

- When the full extent of wetland removal area is confirmed, consultation with CH and CVC relating to wetland compensation will be undertaken.
- In consultation with CH and CVC, mitigation measures including compensation plans for impacted wetlands within CH and CVC jurisdiction will be investigated and re-assessed.
- All storm sewer outlets are to be located within the ROW and will be located outside any wetland feature and outside buffers to the extent feasible. For exceptions where storm sewer outlets are located within wetland buffers (if any), site-specific considerations will be developed further with feedback from CH.
- Any impacts to Significant Valleylands resulting from the proposed road works will be identified and addressed through specific mitigation measures if required.
- Any impacts to the Significant Woodlands resulting from the proposed road works will be identified and addressed through specific mitigation measures if required.
- Compensation plans for removals of Significant Woodlands (if applicable) within CVC jurisdiction will be developed in accordance with CVC Ecosystem Offsetting Guidelines and CVC Plant Selection Guideline.
- Any impacts to natural features on lands adjacent to the proposed road ROW resulting from the proposed road works will be identified and addressed through specific mitigation measures if required.
- Halton Region will be contacted to address any impacts to the ESA if required to accommodate the construction.
- If encroachment into sensitive natural features cannot be minimized, mitigation in the form of compensation will be proposed.
- Impacts to Regional NHS will be confirmed during the detailed design once extent of impacts from road improvements are more defined. If avoidance or mitigation is not feasible, a compensation plan will be developed in consultation with Halton Region during detailed design.
- Town staff will engage with Six Nations of the Grand River regarding vegetation and wetland compensation planning.

12.1.1.3 Physical Environment

Stormwater Management and Erosion Control

- Assessments will be completed to demonstrate that there will be no impacts to flooding and erosion hazards.
- Information will be provided to demonstrate the works will have no hydrologic impacts on wetlands in terms of their forms and function.
- The proposed bioretention / infiltration features “beneath” quantity ponding areas will be assessed, and pre-treatment is anticipated in the form of EGS. Infiltration of contaminated runoff (for runoff draining directly to these sections, bypassing pre-treatment), detention times and impacts on quantity control (e.g., storm stacking) will be reviewed as part of this assessment. Infiltration of contaminated runoff will be avoided through considering pre-treatment options and will be demonstrated where it is not feasible.
- OGS units will be incorporated into a multi-component approach for water quality (i.e., combined with other quality control measures such as LIDs) to provide adequate treatment and build infrastructure resiliency. Removal efficiency of OGS units as accredited by ETV Canada are acceptable. For non- accredited units, Credit of 50% TSS removal are recommended for units sized to provide 80% TSS removal. In either case, the remaining fraction of TSS removal must be provided using other methods.
- Where infiltration measures cannot be implemented (i.e., within WHPAs), non-infiltrating filtration features such as media filters will be considered, where technically feasible.
- LIDs considered in this EA will be further examined.
- Trenchless technologies for crossings of all permanent flowing watercourses will be considered.
- Erosion hazard limit assessment will be undertaken at the detailed design to provide information on how the current proposed watercourse realignment would impact / change the erosion hazard limit.
- Outlet controls will be refined to provide quantity control for the full range of storms (2-year through 100-year). The pipe sizes will be confirmed to provide the calculated required storage volumes. Outlet conditions will also be assessed.
- Watercourse crossings will be improved to achieve flood free roadways or at a minimum reducing road overtopping during Regional storm. However, there may be areas that the Town cannot fully reduce overtopping due to topographic and other constraints.
- A slope stability / geotechnical assessment will be conducted, and mitigation measures will be developed if necessary. The assessment will coincide with CVC's Slope Stability Definition and Determination Guideline.
- An ESC Plan will be developed and shall coincide with TRCA's Erosion and Sediment Control Guide for Urban Construction (2019).

12.1.1.4 Socio-Economic Environment

Air Quality and Noise

- Vegetation barriers will be considered by the Town during the detailed design phase of the project; however, vehicle sightline considerations for traffic safety will be prioritized.
- A complaint response protocol for nuisance impacts including dust emissions and construction noise will be prepared and implemented prior to construction.

12.1.1.5 Cultural Environment

Archaeology and Cultural Heritage

- Stage 2 Archaeological Assessment shall be completed for the project areas that exhibit archaeological potential. Stage 3 Archaeological Assessment shall be completed for three areas that retain Cultural Heritage Value. These three areas include the two cemeteries on the north side of the Eighth Line and Steeles Avenue intersection as well as three sites on the west side of Eighth Line north-west of Argyll Road.
- The Cultural Heritage Assessment Report will be updated with a confirmation of impacts of the undertaking on the cultural heritage resources identified within and / or adjacent to the study area and will recommend appropriate mitigation measures. Provincial guidelines should be consulted for advice and further heritage assessment work should be undertaken as necessary.
- Should future work require an expansion of the study area then a qualified heritage consultant shall be contacted to confirm the impacts of the proposed work on potential heritage resources.
- MCFN to be kept informed regarding the future stages of the archaeological assessments.
- HDI to be kept informed regarding the future stages of the archaeological assessments.
- HWN to be kept informed regarding the future stages of the archaeological assessments.

12.1.1.6 Area-specific Commitments

Culvert 3

Consideration for realigning the watercourse to remove the 90-degree bend will be made during detailed design through the engagement of a fluvial geomorphologist to advise on culvert alignment and sizing. A realignment can be considered if recommended through the geomorphology and grading assessments.

Culvert 4

Detailed design of the replacement for Culvert 4 will include input from fluvial geomorphologist. Preliminary Culvert analysis demonstrates reduction of Regional headwater elevation of 0.15 m and reduces road overtopping depth from 0.20 m to 0.05 m. Attempts to eliminate Regional overtopping will be examined.

Consideration will be given to facilitate wildlife passage through the new proposed culvert structure crossing under at 5 Side Road (Culvert 4) to reduce road mortality for turtles, amphibians, and other wildlife. Wildlife passage design will consider design recommendations provided in CH's Road Ecology Guideline.

Culvert 12

Grading in the area of Culvert 12 will be reviewed. If required, a geotechnical assessment of the area would be conducted in support of the grading plan and development of environmental protection measures.

Consideration will be given to facilitate wildlife passage through modifications to the existing twin box culvert south of Argyll Road (Culvert 12) for movement of species including amphibians and small mammals. Wildlife passage design will consider design recommendations provided in CH's Road Ecology Guideline.

Culvert 13

Opportunities will be investigated for reaches C1 and C2 and Culvert 13 to improve conveyance at this location by proposing a larger diameter culvert. Improvements will be considered to the existing creek upstream of Eighth Line to reconnect a fragmented HDF.

Culvert 14 (Storm Water Outlet J)

Considerations for improvement to the perched conditions of the east side of Culvert 14 will be prioritized based on road design requirements and hydraulics with some consideration for the natural environment. The perched conditions can be mitigated through detailed design of a rocky ramp supported by a fluvial geomorphology assessment. Fish and wildlife passage may not be accommodated due to existing conditions (size, location, and type of culvert).

Hydraulic assessment will be conducted to demonstrate no negative impacts upstream and downstream of Culvert 14 and / or that any impacts are limited to Town owned lands.

Details regarding the vertical alignment and over-topping of the future road will be reviewed. The final design will ensure that the future conditions are like the existing or better at the Silver Creek Tributary crossing of Eighth Line.

Fluvial geomorphology studies will be provided for Culvert 14 during the detailed design phase of the project. The Town will follow the recommendations by the fluvial geomorphologist at the detailed design. Fish passage upstream may not occur based on channel slope and existing channel conditions downstream.

Wildlife passage will also be considered at Silver Creek culvert (Culvert 14) for movement of species including amphibians and small mammals. Wildlife passage design will consider design recommendations provided in CVC's Fish and Wildlife Crossing Guidelines.

Terrestrial impacts throughout the disturbance area can be mitigated through restoration of woody plant materials and seeding during construction.

The following mitigation measures will be considered and confirmed at the detailed design phase of the project for the proposed storm sewer Outlet J to reduce erosive velocities at the end of pipe. The sewer outlet could be located further upstream of the watercourse with a plunge pool included to dissipate flows. Overflows from the plunge pool would be conveyed to the watercourse through a swale to reduce the overall slope of the flow path. Depending on the topography, the swale could include an erosion protection lining such as rip rap or a vegetated alternative.

Black Creek (Storm Water Outlet K)

Outlet K consists of a minor outlet and a major outlet. The intent of splitting the outlet K's drainage area and the details of how the flows will be split will be confirmed.

Works in Vicinity of 5 Side Road and South of Station 13+500:

Subsequent technical analysis and impact assessment shall be completed prior to land acquisition in the subject area to support the preferred design concept, to demonstrate that proposed works will have no negative impacts on natural hazards and will not increase risk to life and property from natural hazards to the satisfaction of CH. The analysis will be accompanied by delineation of existing and proposed natural hazards (flooding and erosion).

The Town will make all necessary design modifications, including modifying the preferred design concept and preparing an addendum to the EA as necessary, to address any flooding and erosion hazard impacts, to the satisfaction of CH.

The following subsequent analysis will be provided to support the preferred design concept:

- **Floodplain hazard impacts mitigation:** Identify and assess through hydrologic and hydraulic analysis all potential flood plain impacts, demonstrating maintenance of flood storage, no increased flood levels on adjacent or downstream properties, no

increased on-site flood risks, and appropriate flow velocities under the full range of storm conditions.

- **Erosion hazard impacts mitigation:** Watercourse realignment works will be designed by a qualified fluvial geomorphologist (P.Geo.) in keeping with natural channel design principles. Fluvial geomorphological assessment will identify and assess all potential erosion hazard impacts associated with a watercourse's migration, downcutting and meander belt. Supportive analysis will ensure the following: that the proposed work appropriately addresses all potential erosion hazard impacts, that municipal infrastructure is located to improve on existing conditions and outside the erosion hazard based on 100-year planning horizon if feasible, and that the hazard is not increased on adjacent properties.
- Delineate regulatory flooding and erosion hazards under existing and proposed conditions on all drawings.
- Fluvial geomorphologist should advise on alignment of culverts, where new or replacement of existing watercourse crossings are proposed.
- The road design and related creek works should be designed to ensure that the regulated area does not extend further onto adjacent lands where possible. If regulated features, hazards or associated allowances are proposed to extend into adjacent lands further than existing limits as a result of the works, the Town will acquire all lands within the regulated area to ensure additional risks and / or constraints are not placed on adjacent lands.

The Town is committed to consider Natural Channel Design principles for the proposed realignment of the regulated watercourse in the vicinity of 5 Side Road and south of Station 13 + 500. The Town is also committed to retain a qualified fluvial geomorphologist (P.Geo.) to provide design input for watercourse realignment works.

Should the land use adjacent (west) of the proposed watercourse realignment works be proposed to change from the current agricultural use (e.g., urban expansion), the Town acknowledges that the requirements for the watercourse realignment will be different from the preferred design concept. At that time, responsibility for the watercourse realignment will no longer reside with the Town, but rather with the future development proponent(s) through the planning approval process.

Works north of station 13+500 to CH watershed boundary:

Floodplain hazard impacts mitigation: Filling in the existing floodplain is proposed in the vicinity of Culverts 12 and 13 (design concept plan sheets #11 and #12 of 16). During the detailed design phase of the Project, the Town shall identify and assess through hydraulic analysis all potential flood plain impacts with the intent of maintaining existing flood storage and avoiding negative impacts by demonstrating no increased flood levels on adjacent or downstream properties, no increased on-site flood risks, and appropriate flow velocities under the full range of storm conditions. **The Town will work with parties responsible for construction of Proposed Collector Road B and associated watercourse / flood plain alterations in this area to demonstrate overall**

maintenance of flood storage. The analysis will consist of hydraulic modelling and delineation of flood hazards, identifying existing and proposed conditions.

Works are to be consistent with approved high-level studies (e.g., Town's Southwest Georgetown Subwatershed Study – Vision Georgetown by AECOM, May 2017; Southwest Georgetown Subwatershed Study Addendum by Wood, September 2020; EIR/FSS, if approved).

Future works by others are proposed to facilitate construction of Proposed Collector Road B in the vicinity of Culvert 13 to advance development of Vision Georgetown. The Town shall coordinate works to reflect ultimate future conditions (e.g., filling in the floodplain, alignment of watercourse / culvert, etc.).

Erosion hazard impacts mitigation, unconfined system: Design of the connection between the Headwater Drainage Feature and regulated watercourse (e.g., near station 14+540) as well as alignment of new or replacement culverts shall be based on input from a qualified geomorphologist.

Erosion hazard impacts mitigation, confined system: The Town will retain geotechnical input to assess impacts to valley slope and adjacent properties and to advance detail design of works in / near regulated valley, south of Argyll Road.

12.1.2 General Permitting Requirements

- Contractor will need to obtain an Occupancy Permit from the Town.
- A Permit to Take Water may be required should dewatering be necessary. Requirements for dewatering will be determined during the detailed design phase of the Project.
- The Town is required to comply with the *Ontario Water Resources Act* with respect to the quality of water discharging into natural receivers. The footprint of disturbed area will be minimized as much as possible. For example, minimizing distribution of excavated soil to minimize sedimentation to storm sewers.
- An ESC Plan will be developed in consultation with CVC and CH. Implementation of the erosion and sediment control measures will conform to recognized standard specifications such as OPSS and the requirements of the CVC and CH. The erosion and sediment control plan will also consider the TRCA Erosion and Sediment Control Guide for Urban Construction (2019).

- A permit approval will be required from CVC in accordance with O.Reg. 160/06 Credit Valley Conservation Authority: Regulation of Development, Interference with Wetlands and Alteration to Shorelines and Watercourses for construction works in CVC regulated areas, and O.Reg. 162/06 Halton Region Conservation Authority: Regulation of Development, Interference with Wetlands and Alternations to Shorelines and Watercourses for construction works in CH regulated areas.
- CH Permits are required for any works within the regulated limits including watercourse realignments, culvert works, OGS, storm sewers, and SWM outlets associated with Eighth Line / Steeles Avenue improvements.
- CH Permits will be obtained prior to initiation of all works within the areas regulated pursuant to Ontario Regulation 162/06.
- Permits are required for all new culverts at 5 Side Road.

12.1.3 Construction Commitments

12.1.3.1 Construction Plans

The following plans will need to be prepared by the contractor and implemented prior to construction:

- Erosion and Sediment Control Plan.
- Construction Emergency Response and Communications Plan.
- Complaint Response Protocol.
- Construction Management Plan.
- Health and Safety Plans.
- Traffic Management Plan.

12.1.3.2 Natural Environment

General

The Town will involve HDI staff in the monitoring of construction works within environmentally sensitive areas, including soil movement within these areas as well as construction works around watercourses or culverts.

Vegetation

Construction hoarding and ESC should be installed prior to commencement of construction activities according to the approved ESC plan to prevent access, encroachment and stockpile into protected areas during construction and deter wildlife from entering the construction areas. Hoarding should be installed to protect trees to be preserved.

Invasive plants can be controlled through the construction period by following the '*Clean Equipment Protocol for Industry*' (2016).

Trees

Disturbance to trees should be minimized and the extent of tree removal for the vegetation clearing and grubbing contractor should be clearly delineated. All tree work including branch pruning, root pruning, and removal should be completed by an ISA Certified Arborist.

Trees to be retained beyond the limit of clearing should be protected using hoarding installed at the dripline or grading limit, whichever provides the greatest setback from the trees where feasible.

Certain residential properties that are subject to tree removal on the adjacent ROWs may require reinstatement of native woody vegetation to complement cultural heritage aesthetics and provide privacy.

Protective hoarding shall be installed at dripline + 1m, or greater, where reasonable.

Wildlife and Wildlife Habitat (General) – Breeding Birds

Nesting birds protected by the listed policies that are identified within or adjacent to the proposed clearing areas must be protected. All activities must stop that may impact the breeding birds and the Contract Administrator (with assistance from an Avian Biologist) shall discuss mitigation measures with the Town and determine the appropriate authority to contact (i.e., MNDMNRF, MECP or Environment Canada).

Wildlife and Wildlife Habitat (General)

In the event that an animal is encountered during construction and does not move from the construction zone, the Contract Administrator will be notified. If the construction activities are such that continuing construction in the area would result in harm to wildlife, construction activities in that location will temporarily stop and the MNDMNRF shall be contacted for direction.

Temporary silt fence barriers are recommended to exclude wildlife (i.e., terrestrial crayfish, amphibians and turtles) from the earthwork and construction activities in areas adjacent to low-lying areas and potential habitat features and areas such as temporary storage / equipment areas and soil stockpiles. The design of silt fence barriers within the construction area is to be established as per MNRF Best Practices Technical Note – Reptile and Amphibian Exclusion Fencing (Version 1.1) July 2013 (MNR 2013).

Woodlands (Including Significant Woodlands)

Disturbance to trees should be minimized and clearly delineate the extent of tree removal for the vegetation clearing and grubbing contractor. All tree work including branch pruning, root pruning, and removal should be completed by an ISA Certified Arborist.

A restoration plan to reestablish the woodland limit may be required to reduce edge effects to the remaining woodland, establish an understory layer and enhance species diversity and woodland resiliency. Plantings should be coordinated with tree compensation requirements.

Trees to be retained beyond the limit of clearing should be protected using hoarding installed at the dripline or grading limit, whichever provides the greatest setback from the trees, where feasible.

Wetlands (PSW and Unevaluated)

ESC should be installed prior to commencement of construction activities according to the approved ESC plan to prevent access, encroachment and stockpile into protected areas during construction and deter wildlife from entering the construction areas. Hoarding should be installed to protect trees to be preserved.

Construction hoarding and ESC fencing should be installed prior to commencement of construction activities around the limits of buffers, to be determined through consultation with the respective conservation authorities and according to the approved ESC plan. ESC fencing should be installed at the limit of construction to maximize distance from the adjacent wetland where wetland buffers cannot be accommodated. ESC fencing will prevent access, encroachment and stockpile into protected areas during construction and deter wildlife from entering the construction areas.

Fish Habitat

Wet weather restrictions shall be applied during Site preparation and excavation. Work will be avoided near watercourses and headwater drainage features during periods of excessive precipitation and / or excessive snow melt.

Any in-water works shall occur in isolation of flowing waters, with work zone isolation achieved by placing cofferdams constructed of clean, non-erodible materials at the upstream and downstream limits of a given work area. Stream flows must be maintained downstream of in-water work areas through by-passing flows (by-pass culvert, channel, pumping etc.). Any isolated work areas shall be de-watered and dewatering shall be conveyed to a filtering system and flow dissipation device to mitigate sedimentation and erosion of the receiving waterbody.

Any fish trapped in the isolated work area shall be captured and released outside of it prior to the commencement of in-water works. Any fish rescue shall be performed by a qualified aquatic ecologist / biologist. A License to Collect Fish shall be obtained from the Guelph District MNDMNRF prior to any fish rescue occurring.

In-water works will only be permitted to occur during the appropriate in-water works timing window. The July 1 to September 15 timing window will apply if in or near water works are required. This window will be confirmed with DFO and MNDMNRF.

Disturbed roadside embankments will be restored with erosion control blankets, topsoil, CVC / CH approved seeding mixtures, and plantings where appropriate and as soon as practical after disturbance.

A rocky ramp or similar structure will be installed at the outlet of the perched culvert (Culvert 14) that conveys the flow of Silver Creek to improve fish passage conditions through the structure.

Sediment and erosion control measures (such as silt fence barriers, etc.) shall be installed and maintained during the work phase and until the Site has been stabilized. Control measures shall be inspected daily to ensure they are functioning and are maintained as required. If control measures are not functioning properly, no further work shall occur until the problem is resolved. All temporary ESC measures shall be installed in accordance with recognized provincial standards. Extra silt fence / turbidity curtain shall be stored on-Site, should additional sediment control be required.

Any stockpiled material shall be stored and stabilized away from the surface water features. All materials and equipment used for the purpose of Site preparation and road construction shall be operated and stored in a manner that prevents any deleterious substance (e.g., petroleum fuel, hydraulic fluids) from entering the environment.

12.1.3.3 Physical Environment

Surface Water

Any in water work will be conducted in isolation of flowing water. All work zones will be clearly marked on detailed design drawings and the ESC Plan to indicate that no work should occur outside the work zone.

ESC measures shall be installed and maintained during the construction phase and until all areas of the construction Site have been stabilized. ESC measures shall be inspected daily to confirm they are functioning and maintained as required. If ESC measures are not functioning properly, no further work in the affected areas will occur until the sediment and / or erosion problem is resolved.

All disturbed areas of the construction Site will be stabilized and re-vegetated as soon as conditions allow.

Wet weather restrictions shall be applied during Site preparation and excavation.

Surface and Groundwater

Refueling and maintenance of construction equipment should occur within designated areas only. Any hazardous materials used for construction will be handled in accordance with appropriate regulations.

A Construction Emergency Response and Communications Plan shall be developed and followed throughout the construction phase (including spill response plans). The Contractor shall develop spill prevention and contingency plans for the construction of road improvements and general Site preparation for proposed road improvements. Personnel shall be trained in how to apply the plans and the plans shall be reviewed to strengthen their effectiveness and continuous improvement. Spills or depositions into watercourses shall be immediately contained and cleaned up in accordance with provincial regulatory requirements and the contingency plan. A hydrocarbon spill response kit will be always on Site during the work. Spills will be reported to the Ontario Spills Action Centre at 1 800 268 6060.

Road salt will only be used when there is a safety hazard. Winter maintenance contractors will be trained in responsible salt management. Product application practices and rates shall be adjusted to suit current and forecasted conditions for each product application event. The amount of residual road salt on the pavement surface will be considered before applying more. Operators / staff shall respond immediately to clean up spills. Prevention of spilled anti-icing / de-icing agents from reaching drains, sewers, soil, or surface water shall be a priority.

12.1.3.4 Socio-Economic Environment

Air Quality

During construction, the following mitigation measures shall be used:

The road shall be graded as required to remove potholes, ruts and ripples in the road surface. Efforts to prevent contamination of the road surface, such as spilling sands, silts and clays, will also help to minimize dust.

The roadway should be sprayed with water as required to minimize dust generation prior to paving.

The construction contractor will be required to develop a Construction Management Plan (CMP) that specifically addresses dust controls, and contingency plans to mitigate dust when it occurs.

Vehicles / machinery and equipment shall be in good repair, equipped with emission controls, as applicable, and operated within regulatory requirements. The contractor

shall also be required to implement dust suppression measures to reduce the potential for airborne particulate matter resulting from construction activities. This should be in the form of water applications on exposed soils.

Noise

Noise control measures shall be implemented where required during the construction phase, such as restricted hours of operation and the use of appropriate machinery and mufflers. The noise produced by the equipment can be limited through proper equipment maintenance.

All construction activities shall conform to the criteria set out in NPC 115 of 83 dB.

The construction contractor will be required to develop a CMP that specifically addresses noise controls, mitigation to be implemented and frequency of equipment inspection.

Agricultural Environment

Mitigation measures noted under ‘surface and groundwater’ to avoid the potential for localized surface water or groundwater impacts as a result of spills, discharge or dumping of materials, fluids and other wastes during construction also apply here.

Consultation with public agency and / or adjacent farm owners regarding temporary access routes.

Contractor shall develop and implement a Traffic Management Plan in coordination with Town. Adequate signage to give advance notice of disruptions and detours shall be provided by the contractor.

Post construction, repair or restoration of any agricultural tile drains, drainage outlets or surface drainage features interrupted or disrupted within farmlands abutting the widened road.

12.1.3.5 Cultural Environment

Archaeology and Cultural Heritage

- In the event that archeological remains are found by the Contractor during subsequent construction activities, the consultant archaeologist, approval authority and the Cultural Program Unit of the Ministry of Heritage, Sport, Tourism and Culture Industries shall be immediately notified by the Contractor and construction work in the vicinity shall stop.
- Construction activities and staging should be suitably planned and undertaken to avoid impacts to identified cultural heritage resources.

12.1.3.6 Transportation and Built Environments

Human Health and Safety

The contractor shall develop a HASP and have it reviewed and approved by the Town prior to implementing. The HASP shall follow the *Occupational Health and Safety Act* and regulatory requirements.

Transportation Infrastructure

All contractors will be required to complete and follow appropriate construction site training and adhere to appropriate road safety regulations during construction. Work shall be done in such a manner as to minimize disruption to the adjacent neighbourhoods. Noise and dust emissions shall be controlled. Contract specifications shall ensure that all equipment and vehicles are compliant with noise and air emission standards for applicable equipment.

Consult with public agency and / or adjacent landowners / tenants regarding temporary access routes. Contractor shall develop and implement a Traffic Management Plan in coordination with Town. Adequate signage to give advance notice of disruptions and detours shall be provided by the contractor.

12.2 Permit Requirements

The following list provides a preliminary set of permit requirements that will need to be undertaken by the contractor. A final list of permits shall be determined during the detailed design phase of the Project.

12.2.1 General Permitting Requirements

- Contractor will need to obtain an Occupancy Permit from the Town.
- A Permit to Take Water may be required should dewatering be necessary. Requirements for dewatering will be determined during the detailed design phase of the Project.
- The Town is required to comply with the *Ontario Water Resources Act* with respect to the quality of water discharging into natural receivers. The footprint of disturbed area will be minimized as much as possible. For example, minimizing distribution of excavated soil to minimize sedimentation to storm sewers.
- An ESC Plan will be developed in consultation with CVC and CH. Implementation of the erosion and sediment control measures will conform to recognized standard specifications such as OPSS and the requirements of the CVC and CH. The erosion and sediment control plan will also consider the TRCA Erosion and Sediment Control Guide for Urban Construction (2019).

- A permit approval will be required from CVC in accordance with O.Reg. 160/06 Credit Valley Conservation Authority: Regulation of Development, Interference with Wetlands and Alteration to Shorelines and Watercourses for construction works in CVC regulated areas, and O.Reg. 162/06 Halton Region Conservation Authority: Regulation of Development, Interference with Wetlands and Alternations to Shorelines and Watercourses for construction works in CH regulated areas.
- CH Permits are required for any works within the regulated limits including watercourse realignments, culvert works, OGS, storm sewers and SWM outlets associated with Eighth Line / Steeles Avenue improvements.
- CH Permits will be obtained prior to initiation of all works within the areas regulated pursuant to Ontario Regulation 162/06.
- Permits are required for all new culverts at 5 Side Road.

13.0 Study Consultation

Comprehensive consultation was a key component of this MCEA Study. An effective consultation process was followed. The process was highly visible and maximized opportunities for the public, government agencies, and Indigenous communities to participate, in a constructive manner with a process that was open, traceable, rational, and highly defensible.

The key features of the consultation process included:

- The **identification** of Indigenous communities, agencies, key stakeholders, local residents and other interested or potentially affected parties that would need to be consulted during the MCEA Study. These contacts comprised the Project Contact List, which was used to maintain contact information for interested parties throughout the process and summarize comments received about the project and responses.
- Indigenous communities, agencies, key landowners / developers, local residents and other interested or potentially affected parties of the study were **Notified** results at key points of the MCEA process.
- **Engaging** Indigenous communities, agencies, key landowners / developers, local residents and other interested or potentially affected parties at key points of the MCEA process to gather input and help inform key decision making.
- **Responding** to inquiries or comments in an efficient and timely manner.

13.1 Notification

Notifications were mailed or emailed to all contacts on the Project Contact List created for the Study. Contacts were notified with a Notice of Commencement ('NOCm'), Notices of Public Information Centre (PIC) #1, #2 and #3 and the Notice of Completion ('NOCp'). All Project Notices, public responses to the NOCm and the Project Contact List are provided in Appendix L1. Additional methods of notification are described below.

Newspaper Advertisements: All notices were placed in two consecutive publications of the local Independent and Free Press newspaper and the Town's monthly e-newsletter, The Current.

Let's Talk Halton Hills Engagement Platform: (https://letstalkhaltonhills.ca/eighth-line) – The engagement platform provided a place to post questions, comments and gain access to project information and documents.

Social Media: Town's Facebook and Twitter accounts.

13.2 Consultation Activities

13.2.1 Indigenous Communities

Individual letters and the notices were sent by email / mail to Indigenous communities. MECP has developed guidance on the steps to rights-based consultation with Indigenous communities. Indigenous communities with a potential interest in the project were identified through correspondence and direction provided by the MECP (correspondence: Trevor Bell, Regional Environmental Planner, MECP, dated April 23, 2019). A copy of correspondence is provided in Appendix L11.

Follow-up phone calls were made to identified Indigenous communities following the issuance of study notices to:

- Confirm receipt of Notice.
- Confirm the community's preferred methods to communicate project information via email / mail.
- Ensure the appropriate contact has been identified.
- Ensure the community is aware of the project and the opportunity to participate.
- Determine the community's level and type of interest in the project and their wish for further engagement.

A summary of communication with identified Indigenous communities was maintained by Burnside on the Project Contact List and summarized in Table 13.1. Copies of all correspondence with Indigenous communities is provided in Appendix L2.

Table 13.1: Summary of Indigenous Community Consultation

Indigenous Community	Follow-up Call	Comment Received	Study Team Response
Haudenosaunee Confederacy	Burnside completed five follow up calls to Hohanes Leroy Hill or Misty Hill. None of these calls were returned.		
Haudenosaunee Development Institute (HDI)	Yes	Raechelle Williams confirmed that HDI asks that Halton Hills submit an application for this project and that HDI has concerns about the project. HDI staff requested a monitoring agreement be set up with Halton Hills. HDI staff reviewed draft ESR and noted no specific comments but requested involvement in environmental inspections during construction in sensitive areas.	Burnside will complete an application for HDI to review the project. Monitoring agreement signed between HDI and Town. Burnside provided summary of HDI comments in email.
Nation Huronne-Wendat	No	C. Dupont requested if Archeological Assessments were completed if these could be shared with Nation Huronne-Wendat.	Burnside shared reports with Nation Huronne-Wendat.
Métis Nation of Ontario	Yes	Jesse Fieldwebster confirmed NOCm was received, there are no concerns with the project, however, to continue to share information and keep Métis Nation of Ontario on the contact list.	

Indigenous Community	Follow-up Call	Comment Received	Study Team Response
Mississaugas of the Credit First Nation	Yes	Fawn Sault asked if archaeology and natural heritage studies were completed to share these.	
		Megan DeVries agreed with recommendations in Stage 1 Archaeological Assessment Report; however, believed that the assessment should be more substantial.	After additional information from Burnside, Megan DeVries had no further comment.
		Adam LaForme and Abby LaForme requested to review the ESR and have a copy for informational purposes.	
		Abby LaForme noted MCFN did not have any comments on the draft ESR after review.	Burnside noted they would provide draft ESR to MCFN for review.
Six Nations of the Grand River	Yes	Joanne Thomas indicated Six Nations could not attend PIC#1 but asked to be kept in the loop.	Burnside continued to communicate with various staff throughout staffing changes.
		Robbin Vanstone indicated Six Nations would like to review the draft ESR to review environmental and archaeological impacts of the project.	Burnside followed up with Robbin Vanstone and confirmed the draft ESR will be circulated upon completion and provided the PIC #3 notice.
		Peter Graham provided comments on draft ESR in a letter.	Burnside responded to Peter's letter.
		Peter Graham requested further clarification on some of the comments.	Burnside responded to Peter providing clarification.

13.2.2 Engagement with Mississaugas of the Credit First Nation

Based on feedback from Mississaugas of the Credit First Nation ('MCFN') to be involved in the study, the study team completed the following engagement activities with MCFN during the MCEA Study. These activities are beyond the Study Notices that were circulated to MCFN. Copies of the minutes of meeting are provided in Appendix L2.

- Study team met with representatives from MCFN Department of Consultation and Accommodation ('DOCA') at their office on July 23, 2019.
- A Field Liaison Representative from MCFN participated in natural heritage field work for ELC and Bat Maternity Roosting Habitat Surveys on September 6, 2019.
- MCFN was invited to participate in follow-up field work for ELC and Bat Maternity Roosting Habitat Surveys on September 11, 2019, unfortunately the community needed to decline the invitation.
- A Field Liaison Representative from MCFN participated in a brook trout spawning assessment on November 25, 2019.
- MCFN provided comments on the draft Stage 1 Archaeological Assessment Report on December 6, 2019.
- Study team met virtually with representatives from MCFN's DOCA on October 5, 2021 to provide an update on the MCEA Study including a discussion of the ROW requirements and constraints, archaeological and natural heritage impacts and project timeline. MCFN noted their requirements to participate in future Stage 2 and Stage 3 archaeological assessments.
- Draft ESR circulated to MCFN for review in December 2022.

13.2.3 Engagement with Haudenosaunee Development Institute

Based on feedback from Haudenosaunee Development Institute ('HDI') to be involved in the study, at the time of PIC#3, the following engagement activities were completed with HDI during the MCEA Study. These activities are beyond the Study Notices that were circulated to HDI. Copies of the minutes of meeting are provided in Appendix L2.

- Study team provided a completed Development Application Form and Fee to HDI on August 23, 2022.
- Study team met virtually with representatives from HDI on September 15, 2022 to discuss the status of the project, update HDI on the findings of the MCEA study and discuss next steps to HDI's involvement in the project.
- HDI requested Town sign a Monitoring Agreement with HDI for their participation in the project.
- Study team met virtually with representatives from HDI on October 19, 2022 to clarify the terms of the agreement.
- Town established a Monitoring Agreement with HDI.
- Draft ESR circulated to HDI for review in December 2022.

13.2.4 Public Information Centre #1

PIC#1 was held on October 16, 2019 from 6:00 PM to 8:00 PM. PIC#1 was arranged primarily as an open house style session where participants were given the opportunity to review the display boards and representatives from the Study Team were available to answer questions and discuss the project with interested members of the public on a one-on-one basis or in small groups.

PIC#1 presentation material informed the public of the purpose of the study, gave background information, problem / opportunity statement, illustrated the existing environment in the Study Area and presented the preliminary preferred solutions for the major road segments of the Study Area.

A copy of the display boards for PIC#1 is provided in Appendix L3.

Participants were requested to provide input by completing the available comment sheets. A total of 45 people signed in at PIC#1 excluding the Study Team members. A total of 13 written comment responses were received during the comment period following PIC#1. Comments were provided through paper comment sheets supplied at the PIC, through the Let's Talk Halton Hills engagement platform, or via email. Copies of comment sheets from PIC#1 and public correspondence received during the PIC#1 period or prior to PIC#2 are provided in Appendix L4.

The comments received during the PIC#1 comment period included the following themes:

- Traffic (volume, noise).
- Safety.
- Impact to the environment, including trees and floodplain.
- Impact to business due to road closures during construction period.
- Concerns about well water.
- Desire to be connected to utilities.
- Concerns about property impacts due to acquisitions.

13.2.5 Public Information Centre #2 (Online)

PIC#2 was held online from June 8, 2020 to June 30, 2020. The purpose of PIC#2 was to provide an update on the MCEA Study, the alternative design concepts considered and the preliminary preferred design concepts for each of the major road segments of the Study Area. A pre-recorded presentation and the preliminary preferred design concept plans were made available through the Let's Talk Halton Hills engagement platform during this online PIC period where participants were able to listen to the presentation and post comments on the engagement materials.

A copy of the presentation and preliminary preferred design concept plans included at PIC#2 is provided in Appendix L5.

Participants were requested to provide input providing their comments through the Let's Talk Halton Hills engagement platform or contacting the study team via email. The Let's Talk Halton Hills engagement platform was visited by 463 people during the online PIC period (June 8, 2020 – June 30, 2020). A total of 18 posts were made to the Q&A tab, 20 posts (or reply posts) to the Comment tab and direct email correspondence with 21 people during the PIC#2 comment period. Comments were provided through the Let's Talk Halton Hills engagement platform or via email. A record of the posts made to the Q&A tab, comment tab and the direct email correspondence from PIC#2 is provided in Appendix L6. Copies of public correspondence received during the PIC#2 period or prior to PIC#3 are also provided in Appendix L6.

The comments received during the PIC#2 comment period included the following themes:

- Traffic (speeding, flow, noise) and roundabout suitability.
- Bicycle safety on the MUP.
- Driveway access due to steepness and traffic.
- Impact to the environment, including trees and maintenance of vegetation within boulevards.

A comment / response table was prepared by the study team following the conclusion of the online PIC period and posted on the Let's Talk Halton Hills engagement platform. A copy of the comment / response table is provided in Appendix L7.

13.2.6 Public Information Centre #3 (Online)

PIC#3 was held live via Zoom on June 6, 2022. The purpose of PIC#3 was to provide an update on the MCEA Study, present the key elements of the preferred design concept plans, discuss the results of additional technical studies completed after PIC#2 and provide a live forum for members of the public to raise questions or comments to the study team members present.

A copy of the presentation provided at PIC#3 is provided in Appendix L8. The preferred design plans referenced during the presentation are provided in Appendix K1 of this report.

A total of 78 people attended PIC#3 excluding study team members or Town staff. The live event was also attended by Mayor Bonnette and Councillors Lawlor, Inglis, Lewis, Somerville, Fogal, Albano, Johnson, Brown and Farrow-Reed. A total of 15 PIC registrants provided comments. A total of 26 posts were made to the Q&A tab, eight comments were provided through the Let's Talk Halton Hills engagement platform and four were received via email after PIC #3. A record of the registrant comments, "Chat"

posts and posts made through the engagement platform and the direct email correspondence after PIC#3 is provided in Appendix L9.

The comments received during the PIC#3 comment period included the following themes:

- Traffic (noise, speed, flow).
- Safety.
- AT.
- Impact to the environment, including trees.
- Property acquisition and compensation.

Comment / response tables were prepared by the study team following the conclusion of the online PIC period and posted on the Let's Talk Halton Hills engagement platform in response to the comments received from PIC#3 registration, during the Q&A segment of PIC#3 and through the Let's Talk Halton Hills engagement platform after PIC#3. Copies of these comment / response tables are provided in Appendix L10.

Additionally, Town staff spoke to several residents and attended on-site meetings with some residents following PIC#3 to discuss their property specific comments / concerns. The Town is committed to keeping in touch with residents who have expressed concerns about the impacts to their properties during the detailed design phase of the project.

13.2.7 Agencies

Meetings with agencies were held to gather input to the project, specific to each agencies mandate, at key decision-making points through the EA process. A summary of the topics discussed at each meeting is provided in Table 13.2 and copies of the minutes of meeting are provided in Appendix L11. A record of all correspondence with agencies during the MCEA study is also provided in Appendix L11.

Table 13.2: Summary of Agency Meetings

Agency	Meeting Date	Discussion Topics
Conservation Halton	September 5, 2019	Preferred road and stormwater design concepts, discussion of comments on preliminary natural heritage mitigation measures.
Conservation Halton	March 31, 2020	Alternative design concepts, evaluation criteria, preliminary alternative for three of the four road segments, and update on the supporting studies.
Conservation Halton	June 23, 2020	Discussion of CH Comments on Alternative Design Concepts and fluvial geomorphology (no minutes).
Conservation Halton	May 11, 2021	Overview of preferred design concept plans, discussion of comments on preliminary natural heritage mitigation measures.

Agency	Meeting Date	Discussion Topics
Conservation Halton	September 14, 2021	Update on project timeline, discussion regarding CH's October 6, 2021 letter.
Conservation Halton	November 9, 2021	Clarification discussion regarding CH's October 6, 2021 letter (no minutes).
Conservation Halton	November 17, 2021	Clarification discussion regarding CH's October 6, 2021 letter (Comment #31 only- no minutes).
Conservation Halton	December 2, 2021	Discussion regarding CH's October 6, 2021 letter (comments #3, 15, and 17).
Credit Valley Conservation	August 1, 2019	Project overview and review of alternative solutions, supporting studies and scope.
Credit Valley Conservation	March 27, 2020	Review of alternative design concepts, evaluation criteria, results of preliminary evaluation of alternatives, update on status of supporting studies.
Credit Valley Conservation	May 28, 2020	Discussion of CVC comments relating to fluvial geomorphology (no minutes).
Credit Valley Conservation	May 13, 2021	Overview of CVC comments on natural environment, review of road design concept plans, stormwater report comments.
Credit Valley Conservation	September 2, 2021	CVC comments on the NER.
TAC	September 9, 2019	Project overview, constraints / opportunities in the Study Area, traffic analysis, POS, supporting studies, evaluation criteria, preliminary evaluation of alternative solutions.
Halton Region	April 8, 2020	Review of alternative design concepts and evaluation, supporting studies.
Halton Region	May 27, 2020	Discussion on source water protection (no minutes).
Halton Region	May 5, 2021	Review of preferred road and stormwater design concepts, Region update.
Halton Region	September 15, 2021	Project timeline, review of Halton Region comments, roundabouts (no minutes).

13.2.8 Key Landowners / Developers

Meetings with key landowners and / or developers and developer consultants were held to gather input to the project and hear comments / concerns about proposed plans at key decision-making points through the EA process. A summary of the topics discussed at each meeting is provided in Table 13.3 and copies of the minutes of meeting are provided in Appendix L12. A record of all correspondence with key landowners and / or developers and developer consultants during the MCEA study is also provided in Appendix L12.

Table 13.3: Summary of Key Landowner / Developer Meetings

Landowner Group	Meeting Date	Discussion Topics
SWGLG	May 15, 2020	Alternative design concepts, review of evaluation of alternative design concepts criteria, supporting studies.
SWGLG	August 24, 2021	Design changes, preferred road design concept, ROW / property considerations, drainage, project timeline.
Prologis	May 19, 2020	Review of alternative design concepts and evaluation criteria.
Prologis	August 27, 2021	Preferred design concept, key design concept elements, intersections, typical cross section / key design elements, design changes from PIC#2, project timeline.
8079 Eighth Line	May 15, 2020	Review of alternative design concepts and traffic analysis, review of evaluation criteria and results of preliminary evaluation of alternatives.
8079 Eighth Line, 8223 Eighth Line, 8250 Eighth Line	September 24, 2021	Project overview and context, preferred road design concept, design changes from PIC#2.

14.0 References

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