MOVING ROADS FORWARD

Niagara Region

Niagara Escarpment Crossing Comprehensive Environmental Assessment
Proposed Terms of Reference

Appendix A
Transportation Planning and Engineering Work Plan

October 2024

Prepared by:

CIMA+ GHD

Table of Contents

1 Introduction 2

2 Purpose of the Project 4

3 Alternatives To the Project 6

3.1 Alternative 1 Do Nothing 7

3.2 Alternative 2 Implement Additional Traffic Management Measures 7

3.3 Alternative 3 Extend Bartlett Avenue Southerly and Utilize Park Road Corridor 8

3.4 Alternative 4 Construct a New North-South Corridor between Grimsby and Beamsville 9

3.5 Conceptual Design for Alternatives 3 and 4 13

3.6 Preliminary Criteria and Indicators 14

4 Alternative Methods of Carrying Out the Project Design 15

4.1 Level 1 Concept Design 15

4.2 Level 2 Concept Design 15

4.3 Preliminary Criteria and Indicators 16

5 Preliminary Design of the Proposed Project 17

5.1 Preliminary Plan 18

6 Documentation 20

List of Tables

Table 3-1: Preliminary Criteria and Indicators for Assessing the Alternatives To the Project 14

Table 4-1: Preliminary Criteria and Indicators for Assessing the Alternatives Methods of Carrying Out the Project 16

List of Figures

Figure 3-1: Extend Barlett Avenue Southerly and Utilize Park Road Corridor 9

Figure 3-2: Construct a New North-South Corridor between Grimsby and Beamsville . 11

Figure 3-3: Preliminary Study Area 13

1 Introduction

This document outlines the proposed work plan that will be carried out during the Niagara Escarpment Crossing Environmental Assessment (EA) to further define the purpose of the proposed project, generate more detailed descriptions of the alternatives, and how they will be assessed from a transportation planning and engineering perspective. This work plan forms **Appendix A** to the proposed Niagara Escarpment Crossing Comprehensive EA Terms of Reference (ToR) and should be read in conjunction with it.

The ToR provides an initial problem/opportunity statement (purpose of the proposed project) with the commitment that it will be reviewed during preparation of the Niagara Escarpment Crossing EA, and a finalized statement will be presented in the EA Report. With this commitment in mind, **Section 2** outlines the proposed policy review framework that will be carried out during the Niagara Escarpment Crossing EA in identifying the policies relevant to the proposed project, which will be considered in finalizing the problem/opportunity statement.

In addition, the ToR presently provides a preliminary list of “alternatives to” the project with the commitment that the brief description of and rationale for each of them will be elaborated upon during preparation of the Niagara Escarpment Crossing EA. To this end, **Section 3** outlines the proposed approach for providing a more detailed description of the alternatives to the project.

Following the identification of the preferred alternative(s) to the project, “alternative methods” for carrying out the project will be generated, possibly screened, assessed, and comparatively evaluated leading to a recommended method(s). Although it is not possible to identify the alternative methods of carrying out the project at this time because the preferred alternative to the project has not been selected, two levels of conceptual design are proposed for alternative methods to be considered during the Niagara Escarpment Crossing EA. **Section 4** provides further details on each of these two conceptual design levels.

Once a preferred method(s) is identified, a preliminary level of design is proposed for detailing the proposed project for impact assessment purposes during the Niagara Escarpment Crossing EA (**Section 5**).

The level of technical or engineering detail will increase with each successive design so that the potential environmental effects can be identified with more certainty, more site-specific avoidance/mitigation/compensation measures can be developed for application,

net environmental effects can be identified with more certainty, and appropriate monitoring requirements can be clearly defined, and specific approval/permitting requirements for constructing the approved project can be identified.

2 Purpose of the Project

The purpose of the project is to provide a north-south transportation corridor crossing of the Niagara Escarpment between the Queen Elizabeth Way (QEW) and Regional Road 20 that:

- Provides for safe and effective commercial vehicle movements and operations;
- Accommodates commercial vehicles and other transportation modes;
- Provides greater safety for local communities;
- Provides for additional transportation system capacity, redundancy and resiliency; and
- Improves the economic vitality with the efficient movement of goods and people.

This purpose / opportunity statement will be reviewed during preparation of the Niagara Escarpment Crossing EA, and a finalized statement will be presented in the EA Report. As part of finalizing the statement, relevant provincial, regional, and municipal planning documents including, but not limited to, the following will be reviewed as part of forming the policy basis for the proposed project:

- Provincial documents:
  - Ministry of Municipal Affairs and Housing: A Place to Grow: Growth Plan for the Greater Golder Horseshoe (2020)
  - Ministry of Transportation: Connecting the GGH: Transportation Plan for the Greater Golden Horseshoe (2022)
  - Ministry of the Environment, Conservation and Parks: Greenbelt Plan (2017)
  - Niagara Escarpment Commission: Niagara Escarpment Plan (2017)
- Niagara Region documents:
  - Official Plan (2022)
  - Transportation Master Plan (2017)
  - Council Strategic Priorities (2023-2026)
  - Complete Streets Design Manual (2017)
- Local Municipalities documents:

- Town of Grimsby, Town of Lincoln, and Township of West Lincoln transportation planning studies and Official Plans (for example, the Smithville Transportation Master Plan)

It should be noted that the preceding documents may be updated and/or added to during preparation of the Niagara Escarpment Crossing EA. As a result, the most current version at the time of the Niagara Escarpment Crossing EA will be considered.

3 Alternatives To the Project

As stated in the proposed Niagara Escarpment Crossing ToR, the alternatives to the project will include, but may not be limited to, the following:

- Alternative 1 - Do Nothing
- Alternative 2 - Implement Additional Traffic Management Measures
- Alternative 3 - Extend Bartlett Avenue Southerly and Utilize Park Road Corridor
- Alternative 4 - Construct a New North-South Corridor between Grimsby and Beamsville

As mentioned, the brief description of and rationale for each of the preceding alternatives provided in the proposed Niagara Escarpment Crossing ToR will be elaborated upon during preparation of the Niagara Escarpment Crossing EA.

With this commitment in mind, available existing sources of information will be collected and reviewed to develop more detailed descriptions of the alternatives, including any data gaps that need to be addressed through subsequent work (e.g., field investigations, modelling, etc.). Presently, the list of existing information sources that will be collected and reviewed as part to the proposed Transportation Planning and Engineering Work Plan includes, but may not be limited to, the following:

- Niagara Region Transportation Master Plan, Niagara Region, October 2017
- Niagara to GTA Draft Transportation Strategy, MTO, February 2011
- Niagara Region Complete Streets Design Guidelines, Niagara Region, June 2017
- TAC Geometric Design Guide for Canadian Roads, 2017
- MTO Design Supplement for TAC Geometric Design Guide for Canadian Roads, 2023
- MTO: Connecting the GGH: Transportation Plan for the Greater Golden Horseshoe, 2022

In addition, documentation prepared during the Niagara Escarpment Crossing EA from the other proposed work plans will also be considered, as appropriate, along with the preceding existing information sources.

The need for field investigations will be based on the level of detail associated with the available existing information sources collected and reviewed, accessibility of the

Niagara Escarpment Crossing EA final study area, and comments received from review agencies, Indigenous Communities, and the public.

A Quality Level C utility locates will be carried out as part of the Niagara Escarpment Crossing EA to gain a better understanding of the overall utility setting within the final study area. A Level C utility locates consist of contacting all service providers and requesting markups based on as-built drawings and correlating against visible surface features. No intrusive fieldwork is currently proposed to be undertaken.

3.1 Alternative 1 Do Nothing

In the “Do Nothing” alternative, the existing transportation crossings of the Niagara Escarpment in the Towns of Grimsby and Lincoln would remain unchanged, and no new transportation crossing would be constructed between the QEW and Regional Road 20.

The “Do Nothing” alternative has been included for consideration during preparation of the Niagara Escarpment Crossing EA and will serve as a benchmark against which to assess other alternatives.

3.2 Alternative 2 Implement Additional Traffic Management Measures

Over the years, several of the traffic management measures recommended for addressing safety and operational problems on the existing north-south crossings of the Niagara Escarpment in the Towns of Grimsby and Lincoln have been implemented. However, there are still several recommended traffic management measures which could still be implemented.

Previous reports (such as the Niagara Escarpment Crossing Transportation, 2016 and the Niagara Escarpment Crossings Traffic Operations and Safety Study, 2019) have recommended improving road and shoulder widths where possible, installing guiderail and illumination treatments, adding traffic control devices (e.g., pavement marking, signing, traffic control), installing traffic calming measures to reduce traffic speeds as well as making active transportation enhancements. The recommendations also included consideration of a prohibitive restriction of truck movements on one or more of the three regional roads crossing the Escarpment serving the western portion of Niagara Region (Regional Roads 12, 18 and 24).

Although other traffic management measures have been planned, several others could still be implemented. As a result, this alternative would consist of confirming those outstanding recommendations from previous planning studies (e.g., the Niagara

Escarpment Crossing Transportation Study, 2016 and the Niagara Escarpment Crossing Traffic Operations and Safety Study, 2019) as still appropriate for implementation and adding to them, as appropriate, based on findings from the Traffic, Operations and Safety Assessment Work Plan (**Appendix B**).

3.3 Alternative 3 Extend Bartlett Avenue Southerly and Utilize Park Road Corridor

As mentioned in the proposed ToR, the Niagara Escarpment Transportation Study (2016) and Niagara Region Transportation Class EA Master Plan (2017) identified or reflected the Bartlett Avenue / Park Road Corridor as the preferred route for crossing the Niagara Escarpment. In light of this, Alternative 3 would extend Bartlett Avenue southerly to Regional Road 20 via the Park Road South/South Grimsby Road 6 corridor.

The proposed corridor for this alternative would be approximately 500 m wide centered on Bartlett Avenue, Park Road South, and South Grimsby Road 6 (approximately 250 m on either side of the roads). The corridor width would allow for the generation of a reasonable/feasible list of alternative methods of carrying out the project. For example, the 500 m wide corridor would be sufficiently sized to accommodate new road alignments located to the east or west of the existing Park Road South/South Grimsby Road 6 alignment and/or utilize a portion(s) of the existing Park Road South/South Grimsby Road 6 alignments. **Figure 3-1** graphically illustrates the proposed corridor.

Alternative 3 would utilize the existing full move access to the QEW at Bartlett Avenue, while having consideration for the need to improve the current configuration from a traffic operations perspective (i.e., address tight turns for commercial vehicles). Any required improvements to the existing Bartlett Avenue/QEW interchange would be coordinated with MTO.

As per the Transportation Plan for the Greater Golden Horseshoe (Map 4) (MTO 2021), the QEW through Niagara Region has been identified for future expansion to accommodate additional capacity and a future managed lane (e.g., High Occupancy Vehicle Lane, Express Toll Lane, Bus-only Lane, Truck-only Lane). The planning of the QEW expansion including the confirmation of lane configuration will be subject to a future MTO EA study; there is no defined initiation timeline for the MTO EA study at the time of this ToR.

As a result, Alternative 3 would make use of existing infrastructure north of the Niagara Escarpment (e.g., the Bartlett Avenue/QEW interchange and the section of Bartlett Avenue to the south of Main Street) and potentially south of the Niagara Escarpment

(e.g., Park Road South and South Grimsby Road 6) for the connection between the QEW and Regional Road 20.

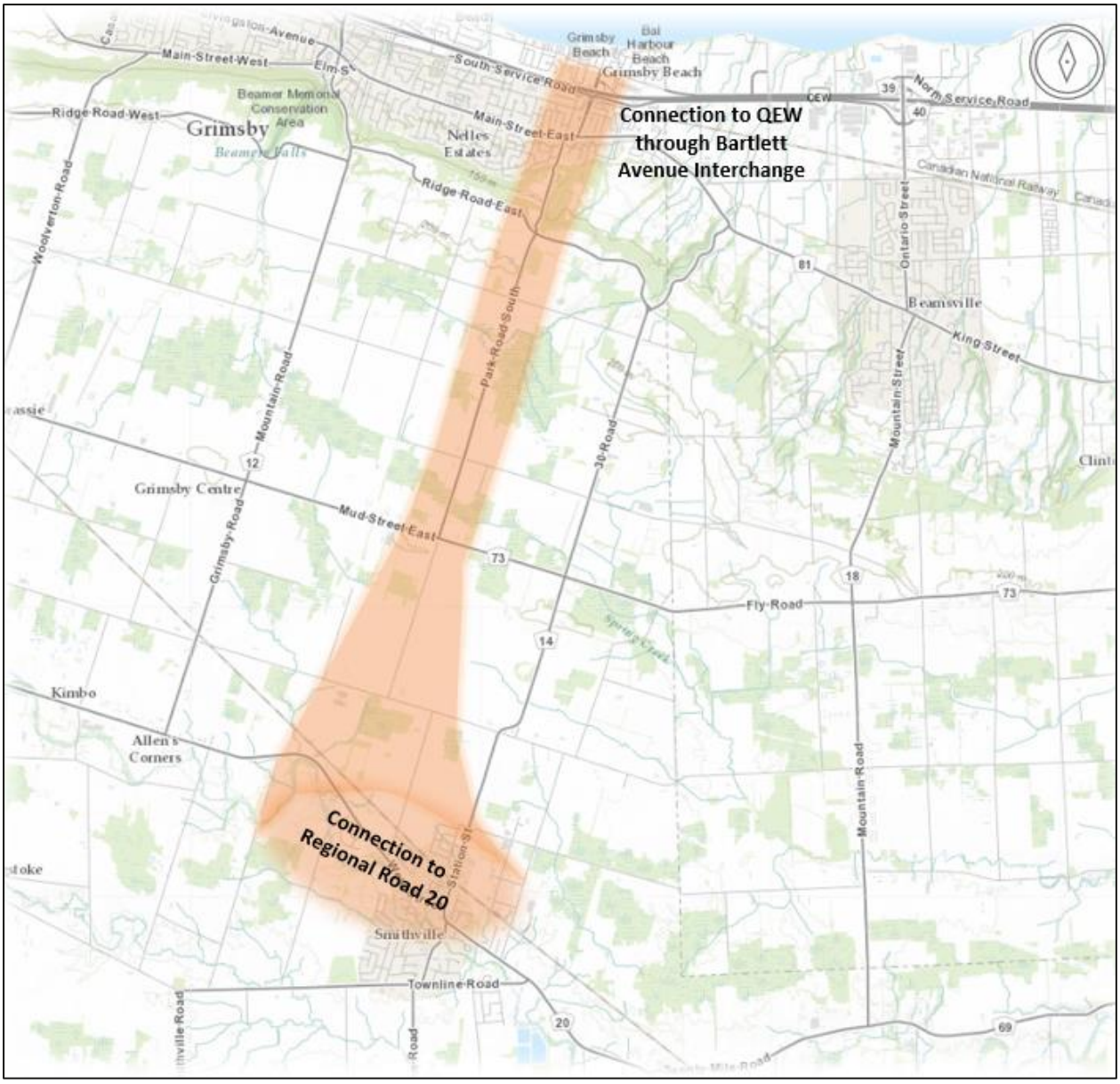

Figure 3-1: Extend Barlett Avenue Southerly and Utilize Park Road Corridor

3.4 Alternative 4 Construct a New North-South Corridor between Grimsby and Beamsville

The Niagara Escarpment Crossing Transportation Study (2016) considered alternative corridors to the preferred Bartlett Avenue / Park Road Corridor for the Niagara

Escarpment Crossing, deferring them from further analysis as "…adequate connection to the QEW which meets the MTO criteria for interchange spacing could not be provided".

Notwithstanding this, since the Niagara Escarpment Crossing EA will be prepared as set out in subsection 17.6.(2) of the *EA Act*, a reasonable range of alternatives needs to be considered by Niagara Region subject to the Minister's approval in accordance with MECP's Code of Practice[1]. The range of alternative(s) put forward by a proponent should address the problem/opportunity and be within the proponent's ability to implement.

In accordance with this guidance, Alternative 4 proposes a new transportation corridor crossing of the Niagara Escarpment between Grimsby and Beamsville considering the Niagara Escarpment Crossing Transportation Study (2016*)*. The new corridor would connect the QEW to Regional Road 20.

The proposed corridor for Alternative 4 would be approximately 2,000 m wide between the communities of Grimsby and Beamsville. This corridor width would allow for the generation of a reasonable/feasible list of alternative methods of carrying out the project. For example, the 2,000 m wide corridor would be sufficiently sized to accommodate a combination of existing roads, realignments of existing roads, and/or new road alignments to connect the QEW to Regional Road 20 across the Niagara Escarpment. **Figure 3-2** graphically illustrates the proposed corridor.

[1] Ministry of the Environment, Conservation and Parks, Code of Practice: Preparing and Reviewing Terms of Reference for Environmental Assessments in Ontario, January 2014, page 31.

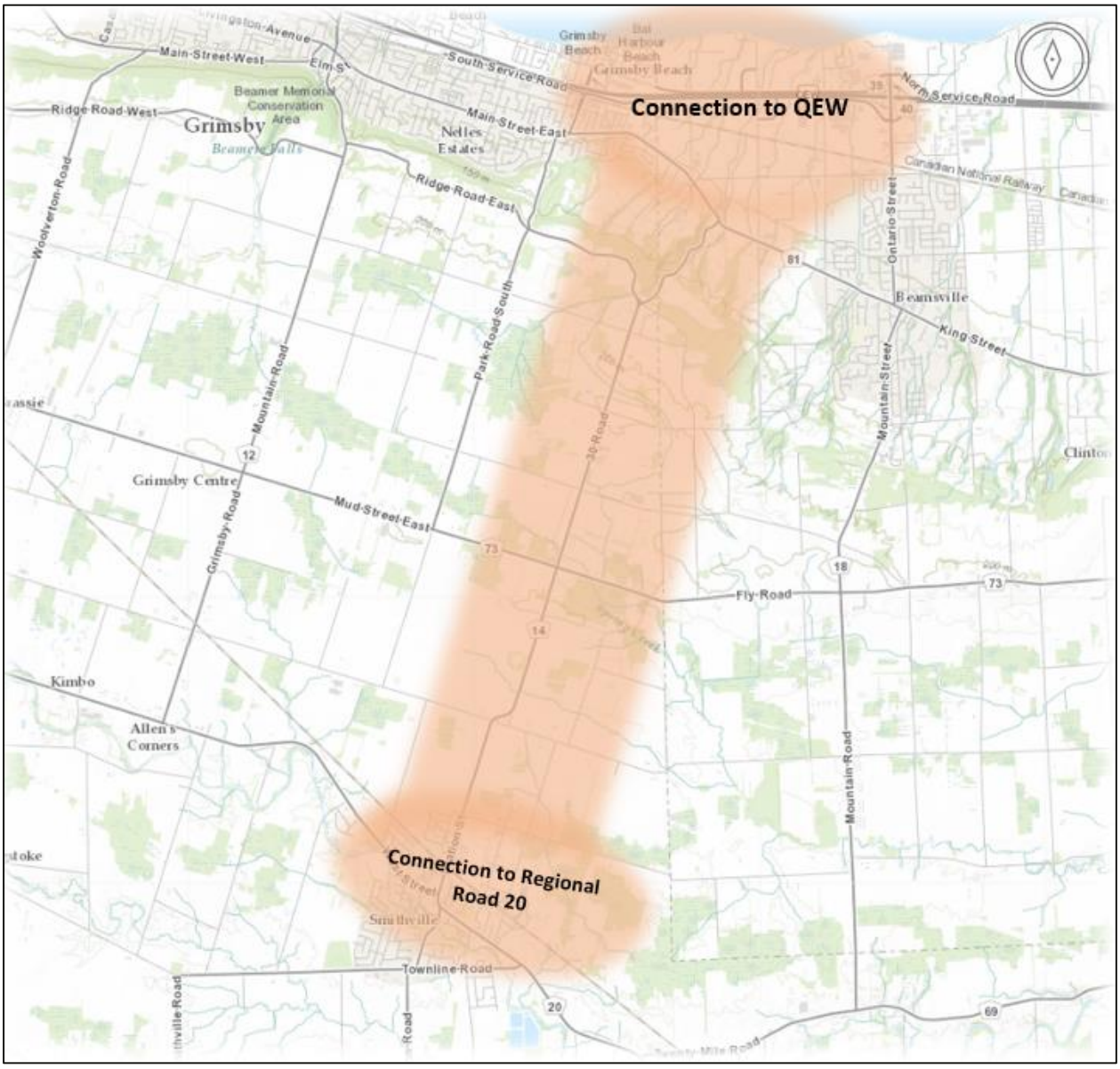

Figure 3-2: Construct a New North-South Corridor between Grimsby and Beamsville

Alternative 4 would require either the development of a new interchange with the QEW and/or the significant reconfiguration of the existing Bartlett Avenue or Ontario Street interchanges to provide full moves access for the new corridor. The location or design of any QEW connection would need to consider MTO's geometric requirements including, but not limited to the following: interchange spacing, merging and weaving distances, setback to adjacent land use, access management, etc. As a result, any changes to the QEW needed to accommodate Alternative 4 would be coordinated with MTO.

As mentioned, the QEW through Niagara Region has been identified for expansion to accommodate additional capacity and a future managed lane (e.g., High Occupancy Vehicle Lane, Express Toll Lane, Bus-only Lane, Truck-only Lane) as per the Transportation Plan for the Greater Golden Horseshoe (Map 4) (MTO 2021). As stated, the planning of the QEW expansion including the confirmation of lane configuration will be subject to a future MTO EA study; there is no defined initiation timeline for the MTO EA study at the time of this ToR.

Generation of the New North-South Corridor:

Within the preliminary study area, there is possibly more than one location where the new north-south corridor could potentially be generated (mainly between Thirty Road and Park Road at an approximate 2,000-metre-wide corridor). As a result, the location of the new corridor will have to consider the potential constraints identified through the proposed investigative studies including, but may not be limited to, the following:

- Topography
- Groundwater and surface water features
- Aquatic features (e.g., critical (Type 1) and important (Type 2) fish habitat, etc.)
- Natural heritage features (e.g., designated lands, wetlands, woodlots, Areas of Natural and Scientific Interest (ANSI), Environmentally Significant Areas, etc.)
- Existing, approved, and planned development (e.g., residential, commercial, industrial, institutional, etc.) and infrastructure and facilities (e.g., major utilities, railways, significant municipal infrastructure, etc.)
- Farms and wineries
- Cemeteries, archaeology and built heritage resources

Notwithstanding this, an approximate 2000-metre-wide corridor is presently proposed as the potential location for accommodating the new north-south corridor based on an initial review of the preliminary study area which would be confirmed during the Niagara Escarpment Crossing EA (**Figure 3-3**). Although highly unlikely due to many constraints as noted above in addition to the need for a new interchange on the QEW, the new corridor could be a completely brand-new corridor or utilize a portion of existing roads or a hybrid of the two.

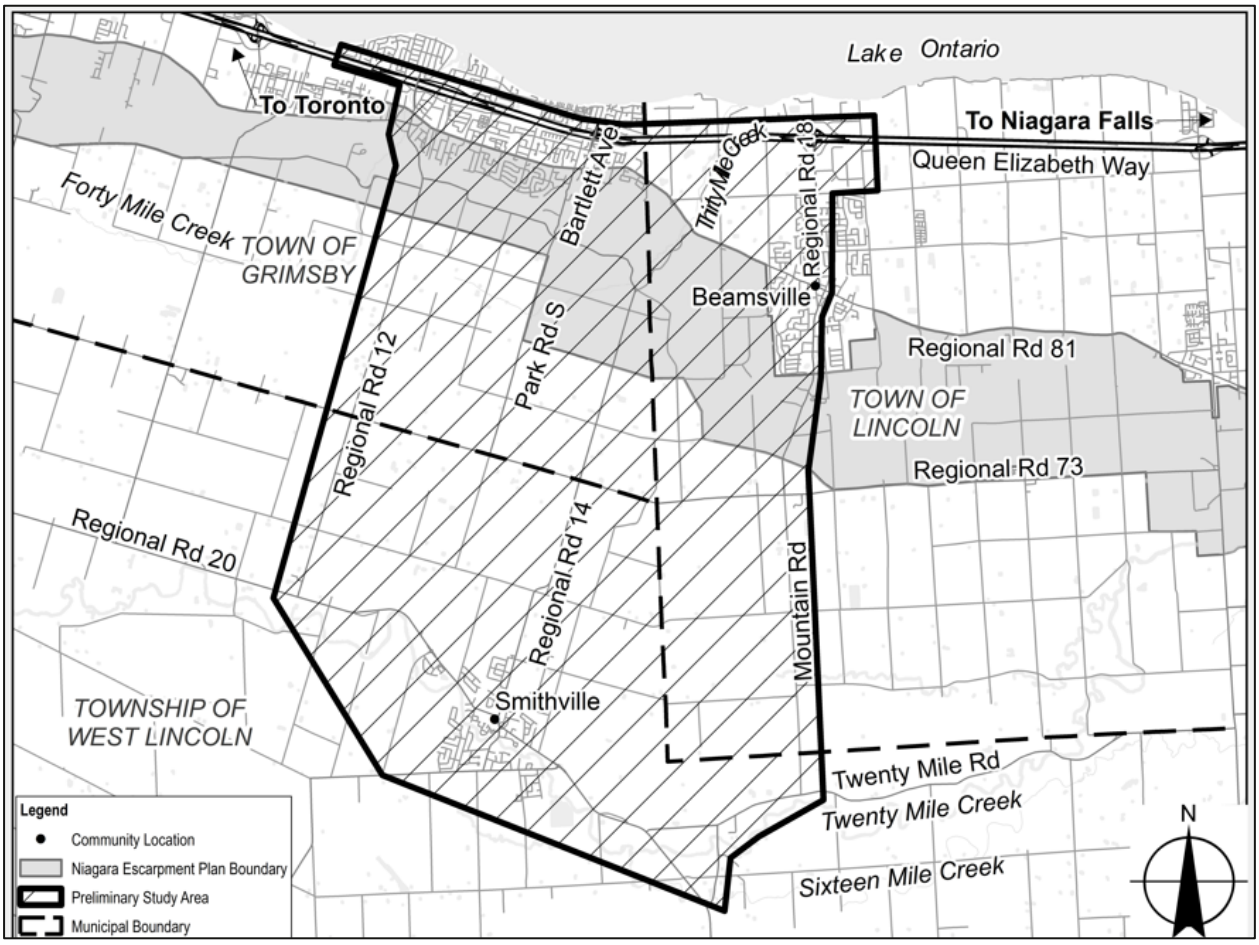

Figure 3-3: Preliminary Study Area

3.5 Conceptual Design for Alternatives 3 and 4

As part of the Niagara Escarpment Crossing EA, a conceptual design for both Alternatives 3 and 4 will be developed within the context of the proposed corridors identified in **Sections 3.3** and **3.4**. Each conceptual design will consist of the following:

- Design Criteria based on the proposed design speed and facility classification
- Facility type:
  - Roadway classification (Arterial/Urban/Rural Thoroughfare as per the Region Complete Streets Design Manual)
  - Active Transportation needs
  - Access management/control
- Drawings of each concept including

- Typical cross section(s)
- Concept plans at 1:5,000 scale
- Intersection locations
- Conceptual interchange layouts
- Identification of notable features such as bridges, culverts, transit-related facilities

3.6 Preliminary Criteria and Indicators

The preliminary evaluation criteria and indicators that will be used for assessing the alternatives to the project from a transportation engineering perspective include, but may not be limited to, those set out in **Table 3-1**. The preliminary evaluation criteria and indicators will be finalized based on comments received during the Niagara Escarpment Crossing EA and documented in the EA Report.

Table 3-1: Preliminary Criteria and Indicators for Assessing the Alternatives To the Project

Category	Criterion	Indicator
Technical	- Conformance to applicable Niagara Region and Ministry of Transportation safety and design standards	- Degree of conformance, or number of design exceptions necessary
Technical	- Constructability	- Number and type of engineering challenges (e.g., water course crossings, potential utility relocations, soil instability, QEW interchange modifications, construction staging and accesses, etc.)

4 Alternative Methods of Carrying Out the Project Design

4.1 Level 1 Concept Design

Following the identification of the preferred alternative(s) to the project, alternative methods of carrying out the project will be generated, possibly screened, assessed, and comparatively evaluated leading to a recommended method(s). Depending upon the preferred alternative(s) to the project selected during the Niagara Escarpment Crossing EA, a “long list” of five or more reasonable or feasible alternatives for implementing the preferred alternative(s) may be generated. If required, then the long list of alternative methods will be generated at a Level 1 Concept Design, which will consist of the following:

- Concept description to a 1:5,000 scale horizontal
- Concept level engineering information with respect to locations/alignment
- Concept level engineering plan drawings of main components
- Concept constructability issues/constraints/requirements
- Concept property requirements

The Level 1 Concept Design will be developed using available existing sources of information and no field investigation work will be conducted. In the situation where a long list is developed, the alternative methods will be screened to arrive at a short list of between three and five alternatives. As stated in the proposed ToR, the screening criteria will be developed during preparation of the Niagara Escarpment Crossing EA for application based on available existing information sources as documented in the Baseline Conditions Reports.

4.2 Level 2 Concept Design

A second, higher level of conceptual design will be undertaken following the identification of the short list of alternative methods or in the situation where no long list is generated because of the preferred alternative(s) selected. This second, higher level of design referred to as the Level 2 Concept Design will include the following:

- Concept description with additional details, including design criteria and key constraints

- Concept level engineering information with respect to the corridor including, but not limited to, typical sections, intersections and interchanges, major utility corridor crossings, rail crossings, bridges and culverts.
- Concept level engineering plan and profile drawings at 1:2000 scale
- Constructability issues/constraints/requirements
- Approximate property requirements

Once developed, the higher level of conceptual designs will be assessed through a net effects analysis based on the finalized evaluation criteria and indicators to arrive at a recommended alternative method(s).

4.3 Preliminary Criteria and Indicators

The preliminary evaluation criteria and indicators that will be used for assessing the alternative methods of carrying out the project from a traffic engineering perspective include, but may not be limited to, those set out in **Table 4-1**. The preliminary evaluation criteria and indicators will be finalized based on comments received during the Niagara Escarpment Crossing EA and documented in the EA Report.

Table 4-1: Preliminary Criteria and Indicators for Assessing the Alternatives Methods of Carrying Out the Project

Category	Criterion	Indicator
Technical	- Conformance to applicable Niagara Region and Ministry of Transportation safety and design standards	- Degree of conformance, or number of design exceptions necessary
Technical	- Constructability	- Number and type of engineering challenges (e.g., water course crossings, potential utility relocations, soil instability, construction staging and accesses, etc.), including understanding of how those challenges will be addressed

5 Preliminary Design of the Proposed Project

Once selected, the preferred method(s) of carrying out the project (i.e., proposed project) will be further developed at a preliminary design level of detail so that the potential environmental effects can be identified with more certainty, more site-specific impact management measures (i.e., avoidance, mitigation, and compensation measures) can be developed for application, net environmental effects can be identified with more certainty, appropriate monitoring requirements can be clearly defined, and specific approval/permitting requirements for constructing the proposed project can be identified.

In concert with preparing the preliminary design level of detail, it may be necessary to undertake additional work (e.g., field investigations, modelling, etc.) at the impact assessment stage of the Niagara Escarpment Crossing EA. The need for field investigations will be based on the level of detail associated with the available existing information sources collected and reviewed, accessibility of the final study area, and comments received from review agencies, Indigenous Communities, and the public. The additional work proposed as part of the Transportation Planning and Engineering Work Plan could include the following subject to preparation of the EA:

- Quality Level B utility locates for the footprint within the Preferred Alternative To the Project
- A topographic survey to confirm existing conditions, constraints at key locations, tie-in and interference points for the footprint within the Preferred Alternative To the Project
- Preliminary geotechnical investigations

The preliminary geotechnical investigation will consist of a series of boreholes placed at appropriate locations within the study area to gather the necessary data. The boreholes will range in depth as required. Specialist drilling contractors will be retained to supply the drilling equipment, conduct the drilling and sampling operations, and appropriately abandon the boreholes, where required. Drilling will be advanced by continuous flight augering in the shallower boreholes and by rotary wash boring/tricone techniques in the deeper boreholes.

All recovered samples will be subjected to visual identification and natural moisture content determinations in the laboratory. Selected samples will be submitted for laboratory testing that includes, but is not limited to, grain size distribution analyses; Atterberg limits tests, and pH and soluble sulphate concentration.

Selected boreholes will be instrumented as monitoring wells to be used during the hydraulic testing (and, if appropriate, incorporated into the long-term groundwater monitoring network for this project). The remaining boreholes will be properly backfilled (grouted) following completion of the borehole advancement.

5.1 Preliminary Plan

A preliminary design level of detail (i.e., 1:1000 scale) is proposed subject to preparation of the Niagara Escarpment Crossing EA. The preliminary design will include the following:

- Preliminary Design Criteria as follows:
  - Design speed
  - Facility type
  - Horizontal and vertical curve parameters
  - Maximum and minimum vertical profile needs
  - Sight distance requirements
  - Typical cross section including number and dimensions of lanes, shoulder dimensions, drainage needs, corridor utility needs, median and/or boulevard needs, and right-o-way requirements
- Horizontal and vertical alignments
- Need/location/type of elements including, but not limited to
  - Interchanges and intersections
  - Bridges and culverts (including span and deck area)
  - Stormwater management facilities
  - Illumination and traffic signals
  - Safety infrastructure
- Environmental impacts, mitigation, and related considerations
- Plan and profile drawings at 1:1000 scale horizontal
- Composite Utility Plan
- Preliminary Utility Relocation Plan

- Summary of impacts to adjacent infrastructure and potential enabling works, if any
- Conceptual construction staging plan
- Preliminary Design Synopsis, including the design intent, key elements, commitments, staging strategy, and notable constructability issues/constraints/requirements
- Permanent property requirements and potential temporary property requirements

6 Documentation

The results of implementing this work plan will be documented in four documents during the Niagara Escarpment Crossing EA:

- **Plans and Policies Review Memo** - will summarize relevant provincial, regional and municipal plans and policies as they relate to the proposed project.
- **Alternatives To the Project Conceptual Design Document** – will summarize the methodology used in generating the alternatives to the project as well as the descriptions of each alternative to including the conceptual design prepared. The document will be used for reference purposes for assessing the alternatives to the project confirmed during the Niagara Escarpment Crossing EA.
- **Alternative Methods of Carrying Out the Project**:
  - Level 1 Concept Design Document – will describe the Level 1 concept designs. This document will be used for reference purposes during the screening of the long list of alternative methods of carrying out the project, if applicable, during the Niagara Escarpment Crossing EA.
  - Level 2 Concept Design Document – will describe the enhanced Level 2 concept designs. This document will be used for reference purposes for assessing the three to five alternative methods of carrying out the project either generated or arrived at through the screening process carried out, if applicable, during the Niagara Escarpment Crossing EA.
- **Proposed Project**
  - Preliminary Design Report - will document the preliminary design of the preferred alternative method. This report will be used for reference purposes during the assessment of impacts associated with the preferred alternative method of carrying out the project (proposed project).

Upon completion, each report will be made available during the Niagara Escarpment Crossing EA to review agencies, Indigenous Communities, and the public for their information via the project website and upon request and will become either a reference or supporting document to the submitted EA Report. The EA Report will be based on and reflect the information contained in the four reports.