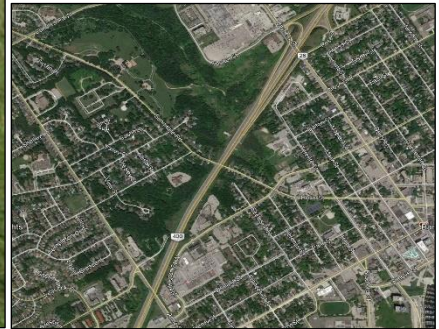


# DESIGN AND CONSTRUCTION REPORT



**Detail Design and Class Environmental Assessment Study  
Replacement of Sunnidale Road Bridge - Highway 400, Barrie, Ontario  
GWP 2445-15-00**

MTO Assignment No. 2017-E-0030  
MP Project No.: 0KM-18-7029-00

Prepared for:



Ministry of Transportation – Central Region  
159 Sir William Hearst Ave. Building D, 2nd Floor  
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**November 17, 2022**

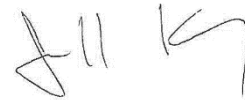
**DESIGN AND CONSTRUCTION REPORT**  
**DETAIL DESIGN AND CLASS ENVIRONMENTAL ASSESSMENT STUDY**  
**REPLACEMENT OF SUNNIDALE ROAD BRIDGE - HIGHWAY 400, BARRIE, ONTARIO**  
**GWP 2445-15-00**

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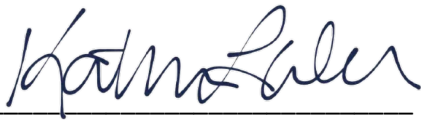


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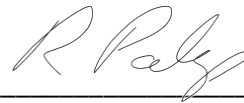
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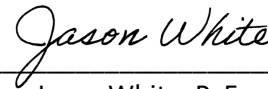


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## THE PUBLIC RECORD

This Design and Construction Report (DCR) has been prepared under the Ministry of Transportation's Class Environmental Assessment for Provincial Transportation Facilities (2000) for a Group 'B' project, in compliance with the requirements of the Ontario *Environmental Assessment Act*. This DCR includes a summary of the Detail Design study and environmental assessment process undertaken for this project, existing environmental conditions, and the mitigation measures developed to address environmental concerns.

A Transportation Environmental Study Report (TESR) was approved in 2004, and a subsequent TESR Addendum was approved in 2017, for the Highway 400 improvements from Highway 89 to Highway 11. The recommendations from the TESR (URS, 2004) and TESR Addendum (AECOM, 2017a) have been built upon as part of the Detail Design for the study area specified within.

This DCR is available for a 30-day public and external agency review period from November 17, 2022 to December 17, 2022 on the project website: <http://highway400dunlopannesunnidale.com>. Interested persons are encouraged to review the DCR and provide comments to the following Project Team members by December 17, 2022:

Mr. Steve Pilgrim, P.Eng.  
Project Manager  
McIntosh Perry Consulting Engineers Ltd.  
1-1329 Gardiners Road,  
Kingston, Ontario, K7P 0L8  
Tel. (613) 542-3788

and

Ms. Rebecca Palys, P. Eng.  
Senior Project Engineer  
Ministry of Transportation  
159 Sir William Hearst Avenue, Building D, 4th Floor  
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**Project E-mail:** [highway400dunlopannesunnidale@mcintoshperry.com](mailto:highway400dunlopannesunnidale@mcintoshperry.com)

The Project Team will respond to all comments generated during the 30-day public review. Outstanding concerns are to be directed to the proponent for a response, unless the outstanding concerns are regarding potential adverse impacts to constitutionally protected Aboriginal or treaty rights, in which case Part II Order requests on these matters should be addressed in writing to the following:

Hon. David Piccini  
Minister of Environment Conservation and Parks  
College Park 5th Flr, 777 Bay St  
Toronto, Ontario M7A 2J3  
[minister.mecp@ontario.ca](mailto:minister.mecp@ontario.ca)

and

Director, Environmental Assessment Branch  
Ministry of Environment Conservation and Parks  
135 St. Clair Avenue West, 1st Floor  
Toronto, Ontario M4V 1P5  
[EABDirector@ontario.ca](mailto:EABDirector@ontario.ca)

If you have accessibility requirements in order to participate in this project, please contact one of the Project Team members listed above. Information will be collected in accordance with *the Freedom of Information and Protection of Privacy Act*. With the exception of personal information, all comments will become part of the public record.

# Notice of Completion – Design and Construction Report

## Detail Design and Class Environmental Assessment Study Replacement of Sunnidale Road Bridge Highway 400, Barrie, Ontario – GWP 2445-15-00

### THE PROJECT

The **Ministry of Transportation of Ontario (MTO)** has retained **McIntosh Perry Consulting Engineers Ltd.** to complete the Detail Design and Class Environmental Assessment (Class EA) Study for the replacement of the Highway 400 Sunnidale Road Underpass Bridge in the City of Barrie, Simcoe County.

The project also includes pavement resurfacing of Highway 400 from south of Sunnidale Road to north of Bayfield Street (including Bayfield Street and ramps), Highway 400 median barrier replacement, drainage improvements and Kidd's Creek culvert extension. The key map shows the Sunnidale Road Underpass Bridge location and limits of pavement resurfacing.

### BACKGROUND

In 2004 a Class EA Study and associated Transportation Environmental Study Report (TESR) was approved, which identified improvements to Highway 400 from 1 km south of Highway 89 to the junction at Highway 11 to accommodate future transportation needs. In 2017, an update to the 2004 Class EA was undertaken, resulting in an approved TESR Addendum. Both studies found that widening of Highway 400 to 10 lanes was required to accommodate future growth.

The MTO is currently undertaking the Detail Design and Class EA Study for the replacement of three bridges on Highway 400 at Dunlop Street, Anne Street and Sunnidale Road, including the reconstruction of the Dunlop Street and Highway 400 interchange. The Sunnidale Road bridge replacement is the second in a series of contracts under this study. The new Sunnidale Road bridge will accommodate future 10-lane widening of Highway 400.

### THE PROCESS

The study has followed the approved planning process under the *Class Environmental Assessment for Provincial Transportation Facilities* (2000) for a Group "B" project. A Design and Construction Report (DCR) has been prepared, which includes a summary of the detail design study and environmental assessment process undertaken for this project, existing environmental conditions, and the mitigation measures developed to address environmental concerns.

The DCR is available for a 30-day public and external agency review period from November 17, 2022, to December 17, 2022, on the project website: <http://highway400dunlopannesunnidale.com/>.

### COMMENTS

Interested persons are encouraged to review the DCR by December 17, 2022. Information requests or comments on the DCR can be emailed to [highway400dunlopannesunnidale@mcintoshperry.com](mailto:highway400dunlopannesunnidale@mcintoshperry.com). Comments and concerns may also be sent directly to the Project Team via one of the methods below:

**Mr. Steve Pilgrim, P.Eng.**  
Project Manager  
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1-1329 Gardiners Road,  
Kingston, ON K7P 0L8  
tel: (613) 542-3788

**Ms. Rebecca Palys, P. Eng.**  
Senior Project Engineer  
Ministry of Transportation  
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Downsview, ON M3M 0B7



The Project Team will respond to all comments generated during the 30-day public review. Outstanding concerns are to be directed to the proponent for a response, unless the outstanding concerns are regarding potential adverse impacts to constitutionally protected Aboriginal or treaty rights, in which case Part II Order requests on these matters should be addressed in writing to the following:

**Hon. David Piccini**  
Ministry of Environment Conservation  
and Parks  
777 Bay Street, 5<sup>th</sup> Floor  
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e-mail: [minister.mecp@ontario.ca](mailto:minister.mecp@ontario.ca)

and

**Director, Environmental  
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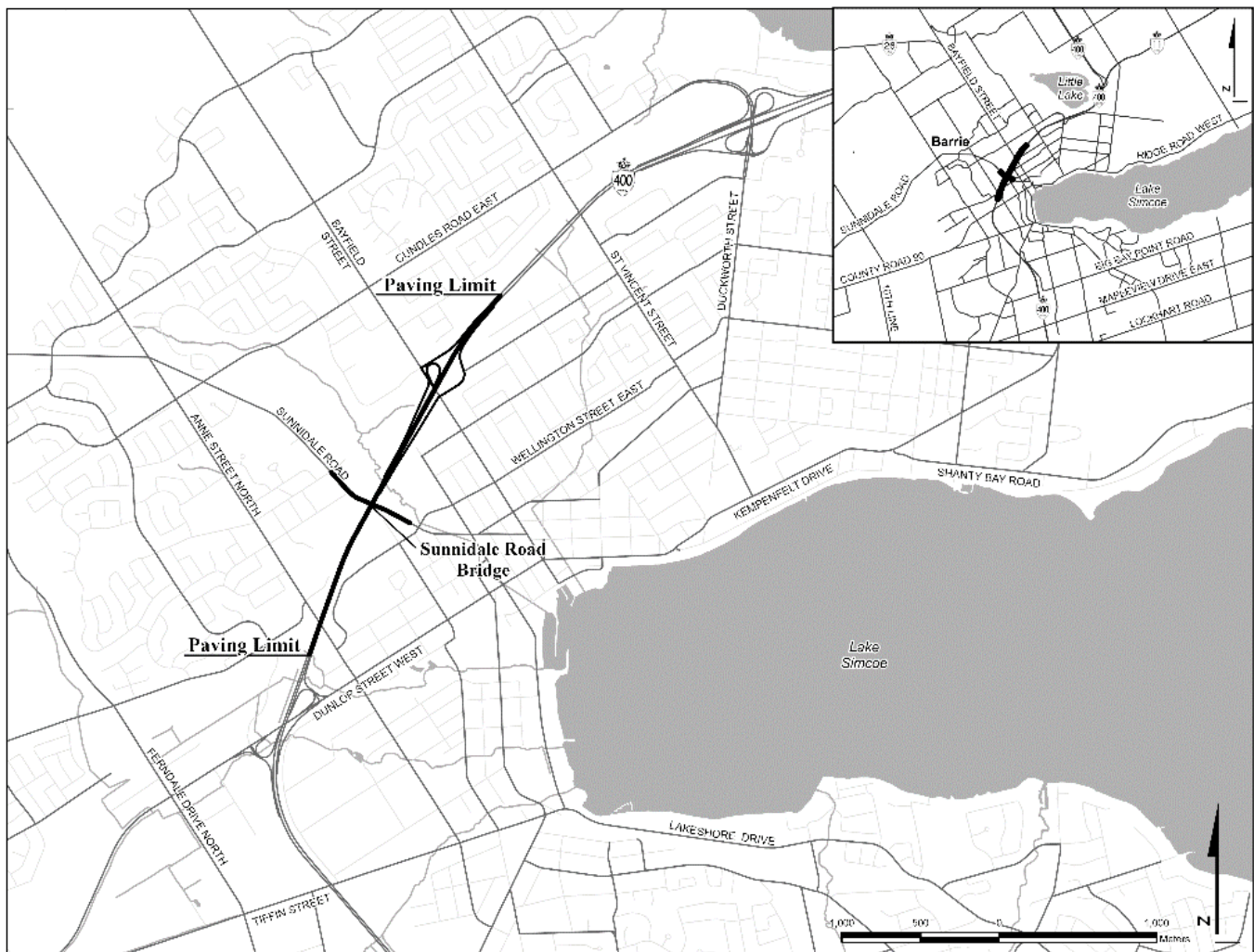
If you have accessibility requirements in order to participate in this project, please contact one of the Project Team members listed above. Information will be collected in accordance with the *Freedom of Information and Protection of Privacy Act*. With the exception of personal information, all comments will become part of the public record.

Cette publication hautement spécialisée n'est disponible qu'en anglais en vertu du règlement 671/92, qui en exempte la traduction selon l'application de la loi sur les services en français. Pour obtenir des renseignements en français, veuillez communiquer avec le ministère des transports, bureau des services en français au: 905-704-2045.



## EXECUTIVE SUMMARY

The Ministry of Transportation of Ontario (MTO) retained McIntosh Perry Consulting Engineers Ltd. to complete the Detail Design and Class Environmental Assessment (Class EA) Study for the replacement of the Highway 400 Sunnidale Road bridge in the City of Barrie, Simcoe County. The project also includes pavement resurfacing of Highway 400 from south of Sunnidale Road to north of Bayfield Street (including Bayfield Street and ramps), Highway 400 median barrier replacement, drainage improvements and Kidd's Creek culvert extension. The key map shows the Sunnidale Road bridge location and limits of pavement resurfacing.



GWP 2445-15-00 – Study Area

In 2004, a Class EA Study and associated Transportation Environmental Study Report (TESR) was approved, which identified improvements to Highway 400 from 1 km south of Highway 89 to the junction at Highway 11 to accommodate future transportation needs. In 2017, an update to the 2004 Class EA was undertaken, resulting in an approved TESR Addendum. Both studies found that widening of Highway 400 to 10 lanes was required to accommodate future growth.

In 2018, The Ministry of Transportation of Ontario (MTO) retained McIntosh Perry to complete the Detail Design and Class Environmental Assessment (Class EA) Study for the replacement of three bridges on Highway 400 at Dunlop Street, Anne Street and Sunnidale Road, including the reconstruction of the Dunlop Street and Highway 400 interchange. The Sunnidale Road bridge replacement is the second in a series of contracts under this assignment.

This study has followed the approved planning process for a Group “B” project under the Class Environmental Assessment for Provincial Transportation Facilities (2000), approved under the Ontario *Environmental Assessment Act* for provincial transportation projects of a defined scope and magnitude. This Design and Construction Report (DCR) presents the results of the transportation engineering and environmental assessment study and has been prepared to document the consultation program, recommended design details, environmental issues and commitments and construction monitoring requirements.

The recommended design consists of the following:

- Replacing the existing Sunnidale Road bridge (Site 30X-0173/B0) at Highway 400;
- Lengthening the new Sunnidale Road bridge to accommodate future widening of Highway 400 to 10 lanes;
- Widening Sunnidale Road to accommodate future active transportation (by others);
- Highway 400 pavement rehabilitation from south of Sunnidale Road to the north of Bayfield Street, including Bayfield Street and interchange ramps;
- Extending Kidd’s Creek culvert (C-78) and constructing a retaining wall to accommodate Highway 400 widening for construction staging purposes, and
- Replacing median storm sewer and median barrier within Highway 400 reconstruction limits.

Upon completion of construction, Highway 400 will be reinstated back to a 6-lane configuration

Commitments have been made to protect environmental features with appropriate mitigation measures for terrestrial and aquatic ecosystems, species at risk, traffic disruptions, and construction staging, among others. A Summary of Existing Environmental Concerns and Commitments Table is included in this document, which outlines the environmental issues and concerns identified during the Class EA process and the measures and approaches that have been developed to address these issues and concerns. All mitigation measures have been incorporated into the Contract Documents for implementation during construction.

The DCR is available for a 30-day public and external agency review period from November 10, 2022 to December 10, 2022 on the project website: <http://highway400dunlopannesunnidale.com>.

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## 1.0 INTRODUCTION AND BACKGROUND

In 2004, a Preliminary Design Study and associated Transportation Environmental Study Report (TESR) was undertaken to document the required improvements and widening requirements along 30 km of Highway 400 from 1 km south of Highway 89 northerly to the Highway 400 junction at Highway 11. That study recommended an ultimate 10-lane cross-section for Highway 400.

In 2014, a subsequent Preliminary Design Study commenced to provide an update of the required widening improvements along the same stretch of Highway 400. The study included a review of the then-present (2013), short-term (2021), and long-term (2031) transportation planning horizons and examined the transportation problems, opportunities, and issues relating to the existing Highway 400 interchanges within the study area. This study reaffirmed the need for widening of the Highway 400 corridor to 10 lanes before the year 2031. An Addendum to the 2004 TERSR was prepared and made available for public review for a period of 30 days, resulting in an approved plan (AECOM, 2017a).

In 2018, The Ministry of Transportation of Ontario (MTO) retained McIntosh Perry to complete the Detail Design and Class Environmental Assessment (Class EA) Study for the replacement of three bridges on Highway 400 at Dunlop Street, Anne Street and Sunnidale Road, including the reconstruction of the Dunlop Street and Highway 400 interchange. The Sunnidale Road bridge replacement is the second in a series of contracts under this assignment. The Sunnidale Road bridge replacement contract also includes pavement resurfacing of Highway 400 from south of Sunnidale Road to north of Bayfield Street (including Bayfield Street and ramps), Highway 400 median barrier replacement, drainage improvements and Kidd's Creek culvert extension. **Figure 1** shows the Sunnidale Road bridge location and limits of pavement resurfacing. The Detail Design is a continuation of the recommendations made during the approved Preliminary Design Study.

This Design and Construction Report (DCR) presents the results of the transportation engineering and environmental assessment study in accordance with the approved environmental planning process for Group 'B' undertakings under the MTO's Class Environmental Assessment (Class EA) for Provincial Transportation Facilities (2000), which has been approved under the *Ontario Environmental Assessment Act* (1990) for provincial transportation projects of a defined scope and magnitude. This DCR has been prepared to document the consultation program, recommended design details, environmental issues and commitments and construction monitoring requirements.

### 1.1 Study Area

The study area for G.W.P. 2445-15-00 is located on Highway 400 from north of Anne Street northerly to the north of the Bayfield Street Interchange (**Figure 1**). The Sunnidale Road bridge is located over Highway 400 approximately 820 m north of Anne Street. Kidd's Creek culvert is located under Highway 400, approximately 160 m north of Sunnidale Road.

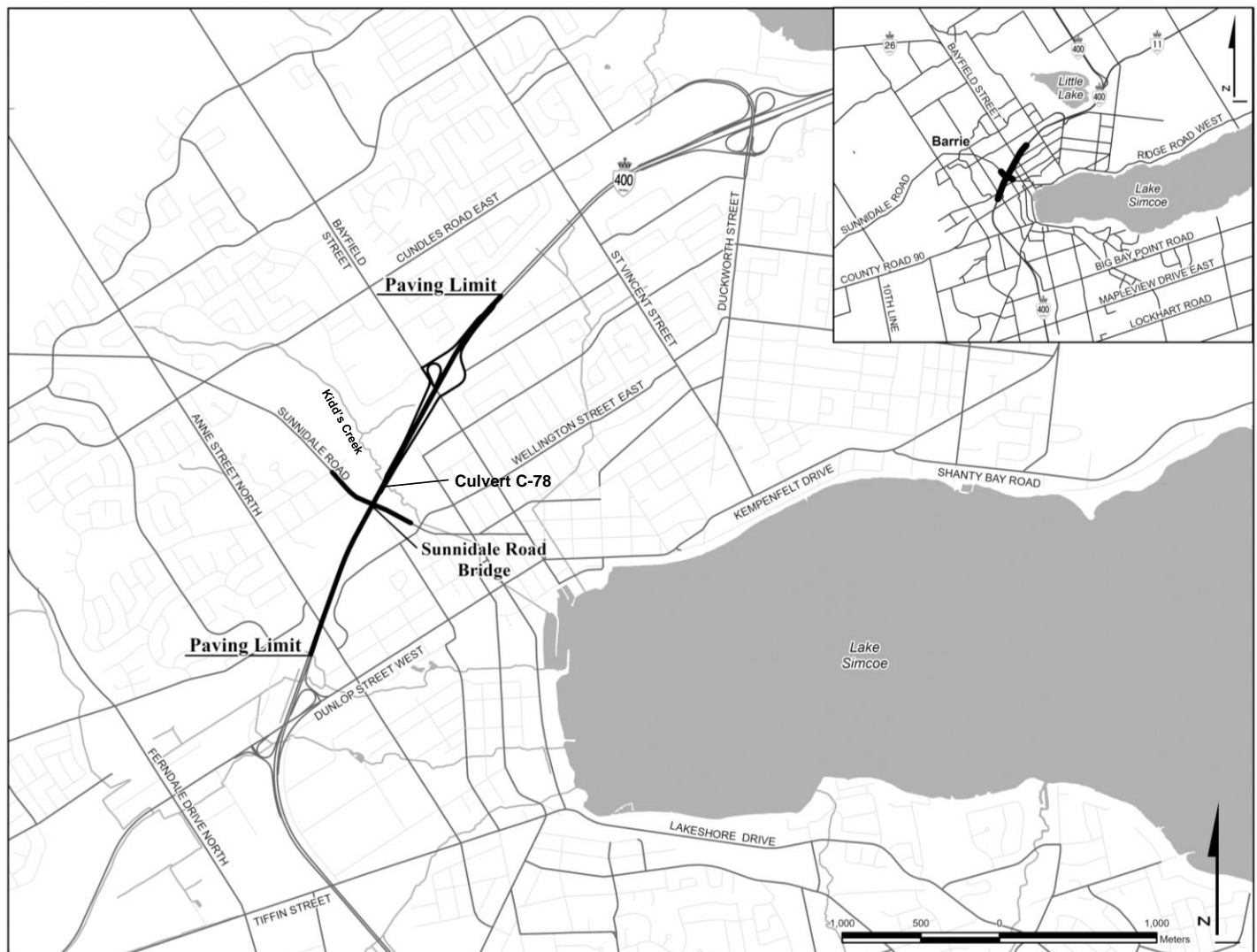


Figure 1: GWP 2445-15-00 – Study Area

## 1.2 Overview of the Environmental Assessment Process

The planning and design of MTO provincial transportation projects follow an approved Provincial Class EA process that has been in place and updated regularly since 1979. The MTO Class EA parent document, *Class Environmental Assessment for Provincial Transportation Facilities*, was approved under the *Environmental Assessment Act* in the fall of 1999 (revised, July 14, 2000). This process is a principal-based approach rather than prescriptive in nature. This means that the Class EA defines *what must be achieved*, rather than defining *how* it should be done.

The MTO Class EA planning process classifies projects into activity ‘groups’ with a primary focus on consultation and environmental documentation. The groups are as follows:

- Group A: projects that are new facilities;

- Group B: projects that are major improvements to existing facilities;
- Group C: projects that are minor improvements to existing facilities, and
- Group D: projects that involve operation, maintenance, administration, and miscellaneous work for provincial transportation facilities.

The Class EA outlines principles and processes that must be followed for applicable projects, including consultation, development and evaluation of alternatives, and documentation. Public participation and consultation with property owners and other interested parties is a significant element of the decision-making process. The commitments to mitigate potential environmental impacts of the project work were made available to external agencies and stakeholders through the public consultation process.

### **1.2.1 Impact Assessment Act**

On August 28, 2019 the *Impact Assessment Act* (IAA) replaced the former *Canadian Environmental Assessment Act* (CEEA), 2012. The projects and activities that are subject to the IAA are very similar to those that were subject to environmental assessment under the CEEA, 2012. However, some changes have been made to the “Project List”, such as new thresholds or projects have been introduced or increased. Under the IAA, only those projects designated by the Physical Activities Regulations or designated by the Minister of Environment on a discretionary basis may be subject to federal environmental assessment.

It has been determined that this project does not include physical activities identified on the list and is therefore not subject to the IAA process.



## **2.0 CONSULTATION**

Consultation is a fundamental component of the Class EA process. Consultation was ongoing throughout the planning of the project in conjunction with the transportation, engineering and environmental protection principles. It is essential for the success of Class EA studies that the consultation program be fully transparent, open and inclusive; all public / stakeholder communication must be clear, timely and accessible to all.

The Consultation Program was developed in collaboration with the MTO and meets or exceeds the mandatory requirement of the MTO Class EA for a Group 'B' project. The primary objective of the consultation program was to keep stakeholders informed throughout the study and encourage comments using effective consultation methods. Opportunities were provided throughout the study for interested agencies, stakeholder groups, and individuals to provide input and obtain information about the study.

The consultation program for this study included the following:

- Maintenance of an external agency/stakeholder contact list and property owner/interested public contact list provided by MTO from the preliminary design process;
- Preparation and publication of Ontario Government Notices (OGNs), including:
  - Notice of Study Commencement;
  - Project Update, and
  - Notice of Filing: Design and Construction Report.
- Preparation and distribution of notification letters to external agency/stakeholders and property owner/interested public contacts;
- Development and maintenance of a project website;
- Ongoing communication, negotiation, and consultation with municipalities, agencies, stakeholders, property owners and local businesses, as required;
- Consultation with Indigenous Communities;
- Online Project Update;
- Stakeholder meetings with affected agencies and stakeholders, and
- Summary of the consultation process in the environmental project documentation.

### **2.1 Project Contact List**

An external Contact List of potentially interested stakeholder groups and individuals used during the Preliminary Design Study was provided by MTO and maintained throughout this study; updated for completeness and accuracy as required. This list includes federal and provincial government agencies and ministries, municipal staff and elected officials, local Member of Provincial Parliament, local Member of Parliament, Indigenous Communities, emergency services, utility companies, public interest groups, businesses, and property owners/tenants who may be directly or indirectly affected by the project. The agency and Indigenous Community contact list used for this project can be found in Appendix A – private stakeholder information is protected under the *Freedom of Information and Protection of Privacy Act*.

## 2.2 Notice of Study Commencement

At the onset of the project a Notice of Study Commencement was produced, which included a brief background of the Highway 400 transportation studies, as well as the subject study and Class EA process. Notifications were distributed as follows:

- Letters were mailed to the project Contact List on March 21, 2019;
- An OGN was posted in the Barrie Advance on March 21, 2019;
- A Project Website was launched, which contained the following information:
  - Overview of the study,
  - Map of the study area;
  - Schedule;
  - Ontario Government Notices (OGNs);
  - Details related to the Class EA process;
  - Background reports;
  - Frequently asked questions (FAQs), and
  - Contact details.

Notice of Study Commencement materials, including example letters and advertisements can be found in Appendix A.

## 2.3 Project Update

On July 29, 2021 a Project Update was posted online to the Project Website for public review. The purpose of this Project Update was to present the study process, recommended design, environmental mitigation, and construction staging and receive comments on the proposed improvements. Notifications of the Project Update were distributed as follows:

- An OGN was mailed to the project Contact List on July 29, 2021;
- An OGN was posted in the Barrie Advance on July 29, 2021;
- The Project Update was posted to the Project Website on July 29, 2021.

Project Update materials including Presentation Materials, example letters and OGN can be found in Appendix A.

## 2.4 Consultation Response

As a result of the Notice of Study Commencement, Project Update and website, over 100 responses were received from the public. Individual responses were provided in an effort to address comments and concerns. Many comments were similar in nature and related to individual properties. The Consultation Responses have been summarized in **Table 1** below.

Table 1: Consultation Response Summary

Stakeholder Comment/Concern	MTO Response
When will the Sunnidale Road bridge be replaced?	The Sunnidale Road Bridge will be replaced after construction is completed on the Anne Street bridge.
<p><b>Highway noise mitigation:</b></p> <p>How was it determined where noise walls would be constructed?</p> <p>Where are the approved noise walls located?</p> <p>What are the height and length of the noise walls?</p> <p>When will the noise walls be constructed?</p> <p>Highway noise is very loud at my house, will the MTO consider installing a new noise wall along the highway near my house?</p>	<p>A noise analysis was completed during Preliminary Design (2017) in accordance with the MTO's Environmental Guide for Noise 2006, for the Highway 400 corridor through Barrie. Under the MTO's noise policy, if future noise levels with the project result in a greater than 5 decibel increase over the future noise level without the project, or if the projected noise level is equal to or greater than 65 decibels, the MTO will investigate noise control measures within the MTO right-of-way in the Outdoor Living Areas (OLAs), which is considered the backyards of houses. Based on the noise analysis, the results concluded that there is a need for noise mitigation measures (noise walls) in various locations throughout the Highway 400 Barrie corridor. For further information related to the noise study, please refer to the 2017 TESR located on the project website: <a href="https://www.highway400dunlopannesunnidale.com/reports.html">https://www.highway400dunlopannesunnidale.com/reports.html</a></p> <p>The approved noise wall locations are illustrated on Figures 30-32 of Appendix A of the 2017 approved TESR.</p> <p>Approved noise walls will be constructed at specified areas to a specific length, as described in the noise analysis reference above. The height of panels will be 5 m tall from the ground surface.</p> <p>Approved noise walls include:</p> <ol style="list-style-type: none"> <li>1) North side of Dunlop Street to Highway 400 northbound on-ramp.</li> <li>2) West side of Highway 400, south of Anne Street.</li> <li>3) East side of northbound Highway 400 at Bayfield Street off-ramp.</li> <li>4) East side of Bayfield Street to Highway 400 northbound on-ramp.</li> <li>5) East side of Highway 400 north of Bayfield Street on-ramp.</li> <li>6) West side of Highway 400 southbound, from north of Bayfield Street off-ramp through to Bayfield Street.</li> <li>7) West side of Highway 400 from southbound Duckworth off-ramp to Little Lake Drive.</li> </ol> <p>Noise walls No. 2, 3 &amp; 7 are under construction as part of the Anne Street bridge replacement project. Noise wall No. 1 will be constructed as part of the Dunlop Street bridge/interchange replacement work. The remaining approved noise walls (No. 4, 5 &amp; 6) north of Bayfield will be constructed in subsequent construction packages.</p> <p>All noise walls have been previously approved through completed Class Environmental Assessment Processes. No new noise walls are being considered at this time.</p>
<p>How will noise during construction be mitigated?</p> <p>Will there be nighttime noise?</p>	<p>Noise during construction will be minimized to the greatest extent possible. The Contractor is required to adhere to strict requirements, including:</p> <ul style="list-style-type: none"> <li>• Equipment shall be maintained in an operating condition that prevents unnecessary noise, including but not limited to non-defective muffler systems, properly secured components, and the lubrication of moving parts.</li> </ul>

Stakeholder Comment/Concern	MTO Response
	<ul style="list-style-type: none"> <li>Idling of equipment shall be restricted to the minimum necessary to perform the specified work.</li> </ul> <p>Nighttime work is required to complete the project work. Nighttime noise will be minimized to the greatest extent possible.</p>
<p>What are the detour routes during the Sunnidale Road closure?</p> <p>What are the detour routes during the Highway 400 closure?</p>	<p>Detour routes will be clearly posted during any road closures. Project Update materials provided three figures illustrating Detour Routes that will be posted during construction: Sunnidale Road, Northbound Highway 400 and Southbound Highway 400.</p> <p>Proposed construction staging to complete Sunnidale Road bridge replacement includes:</p> <ul style="list-style-type: none"> <li>Full closure of Sunnidale Road bridge during all stages of construction.</li> <li>Advanced notification and signage will be set in place to advise motorists of the closures.</li> <li>Detours will be implemented north and south of the Sunnidale Road bridge road closure throughout construction.</li> <li>Construction is expected to last two (2) years.</li> </ul> <p>Highway 400 staging will be completed such that 6-lanes (3 per direction) will remain open at all times, excluding:</p> <ul style="list-style-type: none"> <li>One (1) nighttime full closure of Highway 400 at Sunnidale Road to facilitate demolition of existing bridge.</li> <li>Off-peak (nightly) lane closures on Highway 400 to accommodate bridge construction.</li> <li>Highway 400 lane closures will be communicated with the public well in advance of the closures through the MTO's Information Messaging System and signage</li> </ul>
<p>Will the lengthening and widening of the bridge also widen the highway?</p>	<p>The Highway 400 expansion to the approved 10-lane configuration is currently not scheduled. In preparation for this widening the new Sunnidale Road bridge will be lengthened to accommodate future expansion of Highway 400 to 10 lanes.</p> <p>The highway will be widened during construction to accommodate construction staging; however, the existing 6 lane cross-section will be reinstated.</p>
<p>Will the new bridge include Active Transportation (pedestrian and cycling) facilities?</p>	<p>The new bridge will include a sidewalk on the north side and provisions for a sidewalk on the south side and future bicycle lanes to be installed by others at a later date.</p>
<p>What is the capital cost of the project?</p>	<p>As each component of the project are completed, contract packages are put together and cost estimates are prepared for each. These estimates are not made public as a competitive bidding process is held for construction contracts. After the award of these construction contracts the bid price can be made public.</p>
<p>What is the timing for the future 10-lane expansion?</p>	<p>The timing for the future highway expansion is currently unknown to the project team.</p>



Stakeholder Comment/Concern	MTO Response
Will there be new highway lighting?	Highway lighting is not a part of the current scope of work included in this project.
Will the new bridge be raised?	Yes, the bridges will be raised to accommodate deeper girders and provide appropriate clearance for Highway 400.
What will the new bridge landscaping look like?	Various plantings (trees, shrubs and seeding) will be installed as part of the work to stabilize soils and provide an aesthetically pleasing view. Preliminary Landscape Opportunities Plans can be found on the project website under the Reports tab.
How will the contract be procured?	The project will be delivered by tender posted to the Registry, Appraisal and Qualification System (RAQS) website.
Is there/or are you expecting opportunities for HOV lanes/Bus lanes through Barrie and surrounding areas on the 400 itself?	As indicated in the 2004 and 2017 Transportation Environmental Study Report, an HOV lane will be included in the highway expansion. However, it is beyond the scope of the current study. Upon completion of the Sunnidale Road bridge replacement, Highway 400 will remain in its current 6-lane configuration awaiting future design and construction.
Are there going to be any attempts to make the revamped highways more aesthetically pleasing or provide the overpasses with some forms of 'look' (for lack of a better term)?	The bridges being designed as part of this project may incorporate some rather unique aesthetic features for this stretch of Highway 400. For example, the Sunnidale Road bridge will have tapered piers and a Provincial Coat of Arms formed into the abutments to replicate the existing bridge. These components serve both a structural engineering benefit and will be visually appealing.
The Ministry of Heritage, Sport, Tourism and Culture Industries requested confirmation of Archaeological Assessment project information form (PIF) numbers and Heritage Resource interest.	PIF numbers were provided. Cultural Heritage study information were provided.
The Lake Simcoe Region Conservation Authority provided information related to: <ul style="list-style-type: none"> <li>• Watercourses (Dyments Creek, Bunkers Creek, Kids Creek, Sophia Creek).</li> <li>• Erosion hazard of the watercourses.</li> <li>• Regional floodplain of the watercourses</li> <li>• Wetland and adjacent lands.</li> <li>• Apparent Valleylands.</li> </ul>	Data and information provided was used by the Project Team during detail design.

## **2.5 Public Agency Stakeholder Information Meeting**

A Public Agency Stakeholder Information Meeting (SIM) was held to disseminate information related to the proposed project work and discuss potential impacts that the traffic management proposed during construction may cause to motorists. The meeting was held virtually on July 13, 2021, involving representatives from affected City of Barrie departments and Emergency Services. Topics discussed during the meeting included:

- City of Barrie waste services for the adjacent properties will be considered since Sunnidale Road will be closed on both side of the proposed bridge during construction.
- It was confirmed that the Sunnidale Road bridge replacement work will commence once the Anne Street contract is completed. Anne Street will be utilized as part of the detour route for the Sunnidale Road closure.
- Sunnidale Road will be closed and pedestrian access will not be available. Detour will be in place for traffic. Existing transit that is using Sunnidale as a detour route during Anne Street construction will be diverted back to the original route once Anne Street is opened.
- The Simcoe County School Transportation Consortium (SCSTC) school buses will be detoured during construction.

## **2.6 Notice of Submission – Design and Construction Report**

On November 10, 2022, Notice of Submission – Design Construction Report notification letters were distributed to the project mailing list, MPs/MPPs and Indigenous Communities. The letters contained information about the Detail Design for the bridge replacement and Highway 400 reconstruction project and notified recipients of this DCR being available for a 30-day public review period. In addition, one (1) OGN was placed in the Barrie Advance on November 10, 2022.

Notice of Submission – Design and Construction Report materials, including example letters, contact list, and advertisements, can be found in Appendix A.

### 3.0 DETAILED DESCRIPTION OF THE RECOMMENDED DESIGN

The purpose of this section is to provide a summary of the major features of the Detail Design and construction staging. Emphasis on the environmental protection/mitigation and environmental monitoring are integral components of Detail Design, which are incorporated into the Contract Documents that the Contractor is required to follow. Drawings of the Recommended Design are included in **Appendix B**.

The Sunnidale Road bridge replacement and associated works are components of an upgrade of Highway 400, extending from Highway 89 to Highway 11, as outlined in the Preliminary Design Report and TESR (2004, addendum 2017). This Detail Design is a continuation of the recommendations made during the Preliminary Design Study.

#### 3.1 Major Features of the Proposed Work

This section of Highway 400 was constructed in 1955 and carries three (3) lanes of traffic in each direction. The existing Sunnidale Road bridge is approaching the end of its service life, and bridge replacement is required. The new bridge will be lengthened to span the approved future 10-lane expansion of Highway 400, which is not a part of this project. To accommodate construction staging, the highway will require widening beyond the current roadway platform. The new roadway platform will be built permanently to accommodate the future 10-lane width, including pavement; however, the existing 6 lane cross-section on Highway 400 will be reinstated at the end of construction.

The existing Sunnidale Road bridge was constructed in 1951 and is a 28.9 m single-span rigid frame structure. The bridge is aligned in an east-west orientation and carries one through lane of Sunnidale Road traffic in each direction over Highway 400. The overall width of the bridge is 12.13 m, including concrete barrier walls and a cast-in-place sidewalk along the north side of the structure, with a roadway width of 9.43 m. The existing vertical clearance under the existing bridge is posted at 4.1 m. The bridge underwent a major structural rehabilitation in 1990. In addition, existing sanitary sewer within the north void of the deck slab and watermain in the south void will be replaced. In 2014, the bridge underwent a minor structural rehabilitation as part of a holding strategy until the ultimate replacement.

The proposed Sunnidale Road bridge replacement is an 80.0 m two-span (40.0 m, 40.0 m) precast prestressed NU1600 girder structure, with integral abutments and a fixed pier on spread footings. A minimum vertical clearance of 5.1 m has been provided. The bridge will be constructed with a sufficient span for a future 10 lane configuration on Highway 400; however, the existing 6 lane cross-section on Highway 400 will be reinstated at the end of construction. The new Sunnidale Road bridge lane configuration will match existing, with one lane of traffic in each direction. In addition, a 2.0 m sidewalk on the north side of the road and accommodations for future bicycle lanes and south side sidewalk will be constructed on the bridge. The General Arrangement drawings are included in Appendix B.

## 3.2 Drainage and Stormwater Management

One of the project objectives, with respect to the drainage and stormwater management strategies, is to ensure that there is no negative impact to the receiving watercourses and the City of Barrie infrastructures as a result of proposed works. This will be completed by ensuring that the post-development water levels and peak flows will not have negative impacts to beyond the MTO Right-of-Way.

The drainage strategy considered the needs for flood mitigation, pavement drainage, water quality treatment and erosion protection, using approved methods to meet the design objectives and requirements as outlined in the MTO Drainage Management Manual (1997) and Highway Drainage Design Standards (HDDS) (2008).

The roadway stormwater runoff is captured by storm-sewer networks to ensure that flow spread does not encroach onto travelled lanes. The drainage and stormwater management plan meets the stormwater management requirements for the Sunnidale Road Contract Package with respect to flood mitigation, water quality, erosion plans and environmental consideration as detailed within the MTO HDDS and the Lake Simcoe Region Conservation Authority (LSRCA) Technical Guidelines for Stormwater Management Submissions.

### 3.2.1 Culvert C-78 (Station 12+805)

The existing 2.45 m x 1.56 m single cell rigid frame open-bottom culvert carries flow from Kidd's Creek in a west to east direction, eventually outletting into Lake Simcoe. This culvert will have a permanent culvert extension constructed at both the inlet (west side of the Highway) and outlet (east side of the Highway). The culvert extensions are necessary to accommodate the highway platform widening at the crossing, necessary to facilitate highway staging requirements as part of the Sunnidale Road bridge replacement and future widening of Highway 400. In addition, a retaining wall will be constructed between the inlet of the culvert and the highway, to allow for highway widening at this location.

#### 3.2.1.1 Culvert C-78 (Station 12+805) West Extension

Culvert C-78 will have a permanent 2.45 m wide x 1.80 m high x 8.3 m long cast in place box culvert extension constructed at the inlet end of the existing culvert (west side of Highway 400). As part of the works to install the culvert extension approximately 2.0 m of the existing culvert will be removed. In addition to the shotcrete that had been used to stabilize the slope around the culvert inlet will be removed. A 2.0 m transition will be cast in place to tie the culvert extension into the existing culvert.

In addition, a concrete retaining wall will be constructed as a means to stabilize the slope above the culvert and watercourse. The concrete retaining wall and area of backfill will be constructed in an area where the existing landscape has been altered with concrete and rip rap. Due to observed existing conditions associated with high flow velocities from the small culvert located directly upstream of C-78, the design will include a series of energy dissipaters that will be cast in place within the culvert extension. Waterbody aggregate (300 mm of WB-200 with WB-13.2) will be placed within the new culvert extension between the energy dissipaters. Only a portion of the existing concrete raceway upstream of the existing culvert crossing will be removed to the extent required to install the new culvert extension. Boulders present along the existing watercourse bank



upstream of the culvert crossing will be salvaged for use at the inlet to help armour the new embankment (i.e., area disturbed by construction and coffer dams).

As the culvert is located within an area with known groundwater discharge, several 75 mm seepage holes will be included as part of the design in the bottom of the cast in place box culvert extension (See Appendix B, 'Culvert C-78 Design Details').

The bottom of the ditch line running parallel to the highway on the south side of the watercourse, will be armoured with rip rap. The width of rip rap placement will be approximately 2.0 m. All rip rap placements will be above the high-water mark, whereas waterbody aggregate will be used in-stream as described above.

#### *3.2.1.1 Culvert C-78 (Station 12+805) East Extension*

Culvert C-78 will have a permanent 2.45 m wide x 1.60 m high x 13.0 m long cast in place box culvert extension constructed at the outlet end of the existing culvert (east side of Highway 400). As part of the works to install the culvert extension approximately 2.0 m of the existing culvert will be removed. A 2.0 m transition will be cast in place to tie the culvert extension into the existing culvert.

The works at the outlet will be similar to those at the inlet, however no energy dissipaters will be installed. Waterbody aggregate (300 mm of WB-200 with WB-13.2) will be placed within the new culvert extension. As the culvert is located within an area with known groundwater discharge, several 75 mm seepage holes will be included as part of the design in the bottom of the cast in place box culvert extension (See Appendix B, 'Culvert C-78 Design Details').

Given the observed deposition of sediment within the existing culvert, waterbody materials will be tied into the existing streambed elevation within the culvert and downstream of the culvert crossing, however the 300 mm placement of WB-200 will be lower than the existing watercourse bed.

As the culvert is located within an area with known groundwater discharge, several 75 mm seepage holes will be included as part of the design in the bottom of the cast in place box culvert extension (See Appendix B, 'Culvert C-78 Design Details').

The bottom of the ditch line running parallel to the highway on the south side of the watercourse will be armoured with rip rap. The width of rip rap placement will be approximately 2.0 m. All rip rap placements will be above the high-water mark, whereas waterbody aggregate will be used in-stream as described above.

### **3.3 Electrical/Illumination**

There is no existing illumination along this section of Highway 400. Provisions for future lighting will be provided for high mast lighting along the Highway 400 in this section.

There is currently illumination along the north side of the Sunnidale Road Underpass. Municipal lighting and underpass lighting will be provided at the Sunnidale Road Underpass following structure replacement. The lighting along Sunnidale Road is owned and operated by the City of Barrie.

### **3.4 Commercial Entrances**

There are no commercial entrances being impacted by the project works.

### **3.5 Intersections**

There are no intersections being impacted by the project works.

### **3.6 Active Transportation Infrastructure**

A sidewalk will be installed on the north side of the new Sunnidale Road bridge. Provision for bicycle lanes and an additional sidewalk on the south side of the new Sunnidale Road bridge (to be installed by others at a later date) is being provided.

### **3.7 Utilities and Pipelines**

The following utilities are located within or adjacent to the Highway 400 ROW.

- City of Barrie Sanitary Sewer – Currently within the Sunnidale Road Bridge (within void) – relocation is required;
- City of Barrie Watermain – Currently within the Sunnidale Road Bridge (within void) – relocation is required;
- Bell/Telus – Bundle of 43 ducts crossing under Hwy 400, north of Sunnidale Road Bridge. One (1) duct/cable owned by Telus – relocation is required;
- Enbridge – Minor services to houses along Sunnidale Road – protection required;
- Alectra – Aerial lines run E-W along the north side of Sunnidale Road, crossing Hwy 400 – relocation is required; and
- Rogers – Cable within the bridge - relocation is required.

## 4.0 ENVIRONMENTAL CONDITIONS, ISSUES AND COMMITMENTS

The following sections present an overview of the existing conditions, environmental concerns and potential impacts to the natural, socio-economic and cultural environments associated with the project. Details related to each section are contained in factor-specific reports on file with the MTO (See Section 6.0).

To mitigate the potential impacts on the natural, socio-economic, and cultural environments, the Contractor is responsible for implementing the requirements of referenced Standard Special Provisions (SSP), Non-Standard Special Provisions (NSSP), and Ontario Provincial Standard Specifications (OPSS) prescribed in the Contract Documents. In general, the Contractor is responsible for the protection of people, property and the natural environment from adverse impacts and damage that may result from this work, in accordance with Operational Constraint – Environmental Protection Requirements – General.

### 4.1 Natural Environment

During preliminary design, the MTO's service provider conducted an Existing Environmental Conditions study (FRi Ecological Services, 2015) and Natural Heritage Impact Assessment study (FRi Ecological Services, 2017) for the larger study corridor of Highway 400 from Highway 89 to Highway 11.

McIntosh Perry conducted several field investigations during the 2018 and 2020 field seasons, collecting data related to existing natural environmental conditions throughout the study area. The investigations included identification of the following, where applicable:

- Aquatic habitat and fish communities;
- Vegetation communities;
- Wetland areas;
- Observations of species at risk (SAR) and their habitat;
- Resident or migrant bird and wildlife species;
- Wildlife corridors;
- Significant habitat areas or vegetation communities; and
- Current land uses surrounding the study area.

#### 4.1.1 Aquatic Habitat and Fish Communities

One fish-bearing watercourse will be directly impacted by the project works, identified as Kidd's creek, a cold-water tributary of Kempenfelt Bay of Lake Simcoe. In addition, located in the southern portion of the contract limits, Culverts C-76 and C-77 were previously extended/replaced as part of the Anne Street construction project (GWP 2504-17-00). Ditch lines leading to Culverts C-76 and C-77 will have some temporary impacts during construction and permanent stabilization after construction.

Kidd's Creek is a permanent watercourse offering direct fish habitat for all life stages. As illustrated in **Figure 2**, the watercourse originates west of the flood control berm/spillway, approximately 1800 m upstream of Culvert C-78 and drains stormwater from the surrounding residential area (LSRCA, 2012). Bank hardening,

channelization, and barriers to fish movement are present upstream and downstream of the culvert due to urbanization. The Land Inventory Ontario (LIO) database and LSRCA subwatershed plan indicates that Kidd's Creek is a cold-water watercourse that contains cold and warm-water fish species. The preliminary technical reports indicated that the watercourse has a warm water thermal regime; however, cold-water fish species (i.e., Brook Trout) have been caught and recorded within the study area (Fri Ecological Services, 2017). Midhurst District of Ministry of Northern Development, Mines, Natural Resources and Forestry (MNDMNRF) confirmed that the watercourse is considered a cold-water system.

The section of Kidd's Creek that passes beneath Highway 400 was observed by MP to support several Brook Trout, including juveniles and large (approximately 300 mm) adults. The gravel substrates within the culvert, the water temperature at the time of assessment (7.7°C) and condition/behaviour of adult Brook Trout observed strongly suggest that the area directly upstream of the culvert inlet and within the culvert provides suitable spawning habitat for Brook Trout. Given the known migration barriers to fish passage within the site, this area (including the area within the culvert) may represent some of the only accessible spawning habitat for the identified isolated Brook Trout population within Kidd's Creek.

The ditch lines running parallel to Highway 400 at the culvert inlet were largely dry at the time of the McIntosh Perry field investigations. The ditch line at the north side of Culvert C-78 has been armoured with shotcrete. The ditch line at the south side of Culvert C-78 contained cattails (*Typha angustifolia*) and rip-rap that had been placed at and near the banks of the watercourse as an erosion prevention measure. These areas are indirect fish habitat except under conditions of high flow following snowmelt and heavy rain events where they may be utilized as areas of refuge. Invasive phragmites were observed to the north of the culvert inlet during the 2018 field investigation. The ditchlines at the culvert outlet were vegetated with graminoid and other herbaceous species, such as goldenrod (*Solidago* spp.). These areas were above the high-water mark and are not fish habitat.

Though several Aquatic SAR are known to occur within Simcoe County, no aquatic SAR or evidence of aquatic SAR was observed within the study area during the 2018 field investigations and based on known existing barriers to fish migration. It is unlikely that aquatic SAR may access Kidd's Creek from Lake Simcoe.

#### 4.1.1.1 Culvert C-78 Aquatic Habitat and Fish Communities Impacts and Mitigation

The culvert extensions on Culvert C-78 will result in a change in existing fish habitat composition within Kidd's Creek, including alteration of fish habitat:

- Approximately 23.88 m<sup>2</sup> at the culvert inlet, and
- Approximately 35.56 m<sup>2</sup> at the culvert outlet

Opportunities in construction are available to improve the overall aquatic conditions within the MTO ROW. As illustrated in Appendix B 'Culvert C-78 Design Details', many mitigation and enhancement measures have been included as part of the design to minimize negative impacts to fish and improve the function of fish habitat, including:

- The existing culvert is an open foot culvert that allows influence by groundwater, which is considered vital to southern populations of Brook Trout. This groundwater influence impacts the suitability of available substrate for spawning Brook Trout. Options to use an open foot culvert were investigated; however, it is not feasible to construct footings for such a structure due to the underlying soils found at this location. As such, the preferred option was selected using concrete box culvert extensions both on the upstream and downstream extensions. The concrete bottom of the culvert extensions will include several 75 mm seepage holes throughout the extensions (both upstream and downstream). As the upstream extension is located within an area previously occupied by a concrete channel (i.e., groundwater seepage blocked) this is considered to be an improvement over existing conditions and will at least partially re-instate this function of groundwater seepage within the upstream culvert extension. Though seepage also occurs downstream of the culvert crossing, the substrate within this area is not ideal for the purposes of Brook Trout spawning due to the existing sandy substrates. As such, maintaining groundwater seepage function is important and is anticipated to be maintained through the use of seepage holes as outlined in the Contract Drawings.
- Fish passage will be maintained through Culvert C-78 and the extensions. At present, Brook Trout are able to pass through Culvert C-78 at the 2-year storm flow; however, due to high velocities passage may be impaired during periods when high flows occur (i.e., during storm events or during spring melt etc.). Based on existing and proposed flow velocities, cast in place reinforced energy dissipaters will be installed within the upstream culvert extension. These energy dissipaters are anticipated to promote fish passage (should conditions change outside of the MTO ROW to allow fish to continue traveling upstream) but also ensure existing substrates are stabilized (i.e., not shifted) by storm flows due to the culvert extension. This is important given the use of existing substrates by Brook Trout for the purposes of spawning within the existing culvert crossing. In addition, waterbody aggregate will be placed within the new culvert extensions to provide a naturalized waterbody bed within the new extensions. Only a portion of the existing concrete channel upstream of the existing culvert crossing will be removed to the extent required to install the new culvert extension. Boulders present along the existing watercourse bank upstream of the culvert crossing will be salvaged for use at the inlet to help armour the new embankment (i.e., area disturbed by construction and coffer dams).
- Use of appropriately sized waterbody material has been incorporated into the project design. This includes a gradation of materials, including but not be limited to:
  - WB-200: this material will form the majority of the material size placed within the disturbed channel areas. It is considered large enough to withstand most flows at the site though it may not be suitable within the 10 m area downstream of the small culvert outlet (i.e., upstream of the culvert crossing) due to observed high flows.
  - WB-13.2 to fill the voids: This material is important in its ability to provide function to spawning Brook Trout as suitable substrate due to its size (i.e., pea gravel sized). This material should be included throughout the waterbody material placement area (both upstream and downstream) given its importance to overall habitat function (i.e., may be applied at a higher rate than normal as some material is anticipated to shift over time).
  - Rip-rap will be used along the watercourse banks above the high-water mark and along newly created ditch lines running parallel to Highway 400 (to extent up the slope).

The use of a gradation of waterbody material sizes is considered important here, given that the existing condition suggests that a natural gradation of substrate particle sizes at this location will maintain habitat function for spawning Brook Trout. Though typically fine substrates are important to ensure proper function of placed waterbody materials (i.e., prevent flow through materials) the high rate of deposition at this location



(i.e., sandy substrates) and periodic high flows (i.e., sorting of substrate gradation within the culvert) is anticipated to allow some fine sediments to settle into the placed WB materials.

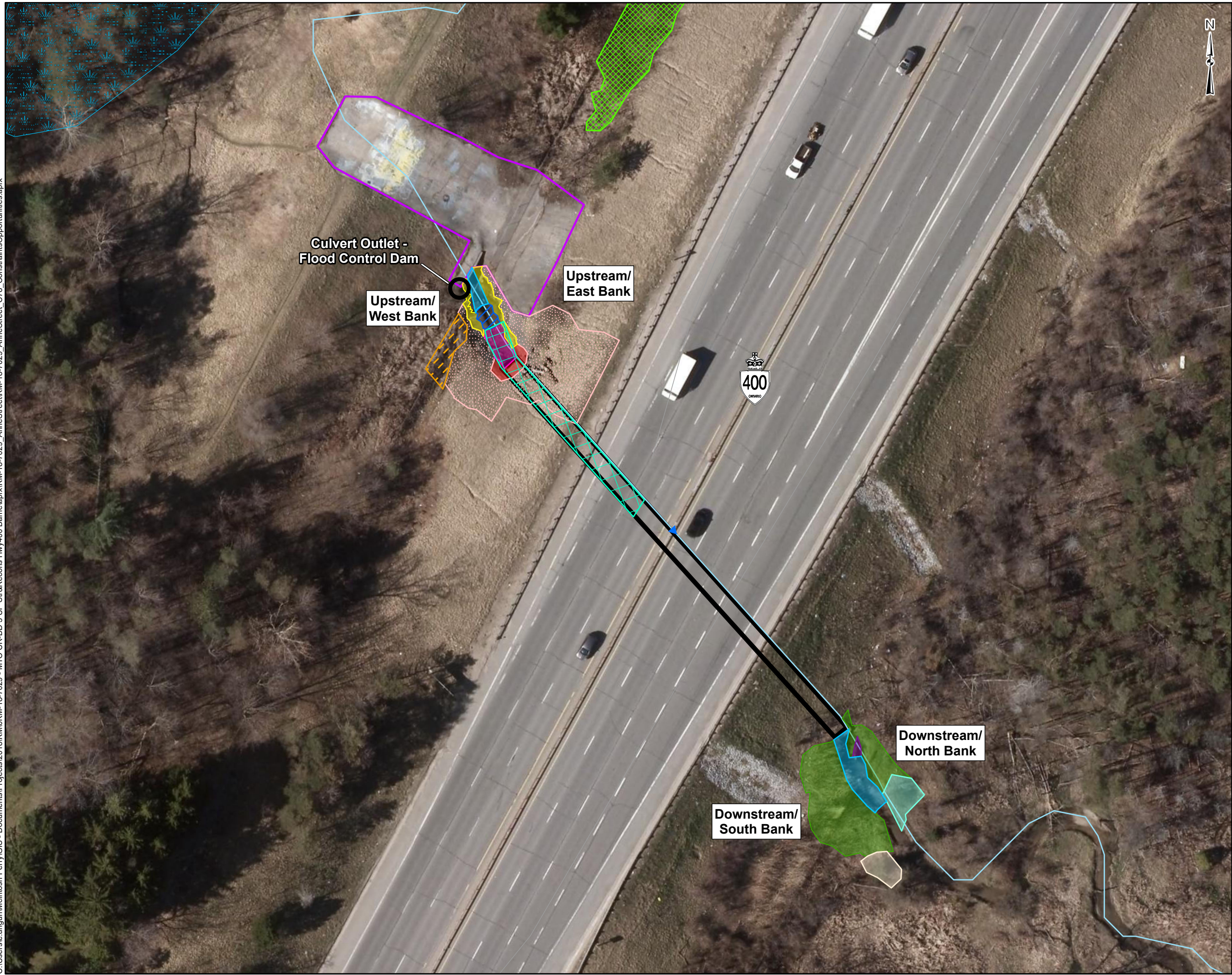
Provided these design considerations are implemented and executed well during construction, it is not anticipated that the proposed culvert extensions and associated works will result in an impairment of habitat function for spawning Brook Trout.

In addition to mitigation measures described above standard construction specifications will be employed, including all aspects of the following:

- OPSS 182 – Environmental Protection for Construction In and Around Waterbodies and On Waterbody Banks
- OPSS 517 – Dewatering
- OPSS 802 – Topsoil
- OPSS 803 – Vegetative Cover
- OPSS 804 – Temporary Erosion Control
- OPSS 805 – Temporary Sediment Control



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**LEGEND**

- Culvert Outlet
- Culvert 78
- Concrete Spillway
- Flat (Downstream)
- Grasses and Forbs
- Large Boulder Bank Armouring
- Mature Coniferous Trees
- Riffle
- Rip Rap Armouring
- Cattails (Typha sp.)
- Upstream Pool
- Upstream and Downstream Run
- Shotcrete-Armoured Culvert C78 Inlet
- Shrubs (Downstream North Bank)
- Brook Trout Spawning Habitat
- Invasive Phragmites
- Unevaluated Wetland
- Watercourse

**REFERENCE**  
GIS data provided by the Ontario Ministry of Natural Resources and Forestry, 2021.

2010020

Scale 1:600Metres

CLIENT: MINISTRY OF TRANSPORTATION CENTRAL REGION		
PROJECT: GWP 2445-17-00		
TITLE: Culvert C-78 Existing Conditions		
McINTOSH PERRY 115 Walgreen Road, RR3, Carp, ON K0A1L0 Tel: 613-836-2184 Fax: 613-836-3742 www.mcintoshperry.com	PROJECT NO: KM-18-7029	FIGURE:
	Date May., 19, 2021	2
	GIS EU	
	Checked By MB	



#### 4.1.2 Vegetation and Vegetation Communities

Vegetation communities based on Ecological Land Classification vegetation types were identified through field review and satellite image interpretation within and adjacent to the study area and were found to be consistent with the Natural Heritage Impact Assessment Report (Fri, 2017), completed during the Preliminary Design Study. Vegetation communities identified throughout the study area include coniferous forest (FOC), deciduous forest (FOD), mixed forest (FOM), cultural meadow (CUM), and swamp (SW).

The study area does not contain significant or rare vegetation or vegetation communities. The surrounding area is dominated by transportation infrastructure, residential and commercial property. The study area contains regenerative and maintained graminoid conditions with sparse deciduous and coniferous shrub and tree species. No Butternuts (*Juglans cinerea*) or other at risk or rare vegetation species or communities were identified within the study area.

The project will result in the removal of approximately 11,775 m<sup>2</sup> of trees/vegetation to accommodate construction activities (see Appendix B 'Removals'). The study area is heavily influenced by human activities and contains a range of native and non-native herbaceous vegetation species. No impacts on SAR plant species are anticipated, as none were identified.

Developed in conjunction with the highway design and staging plans CSW Landscape Architects Ltd. prepared a series of landscape plantings that are designed to integrate infrastructure needs with landscape works to minimise the environmental and visual impact of construction (Appendix B, 'Landscape Plans'). In addition, landscape plantings at the bridge abutments will include heritage bridge crest perennial accent planting, heritage bridge crest signature trees and shrubs (see Appendix B 'Landscape Plans').

##### 4.1.2.1 Invasive and Noxious Plant Species

Invasive species of plants are listed in *Table 2* (prohibited invasive species) and *Table 4* (restricted invasive species) of the *Invasive Species Act* (2015). Noxious plant species are listed in the Noxious Weeds Table under the *Weed Control Act* (1990). In general, invasive and noxious vegetation should always be controlled to avoid spreading.

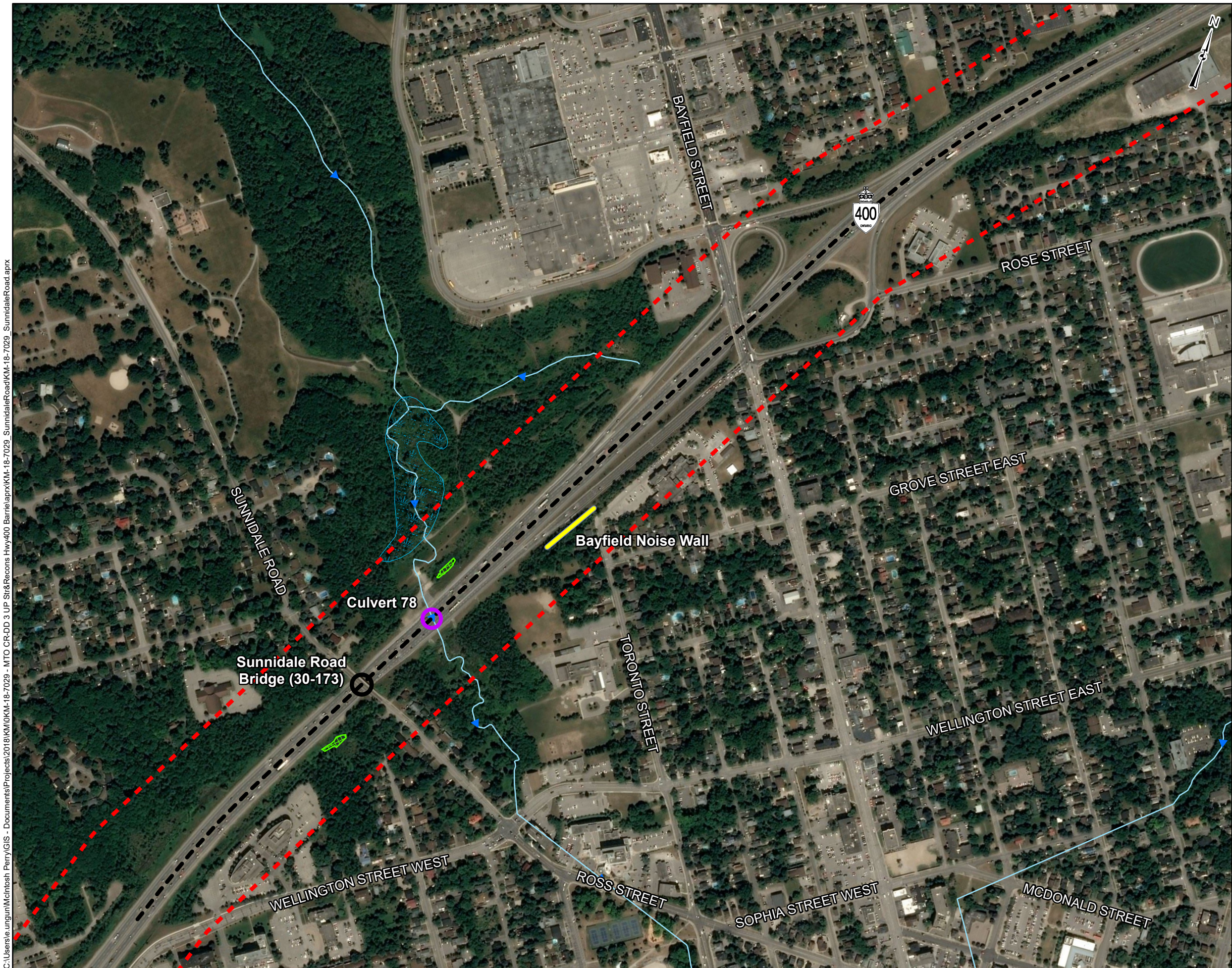
Plant species designated as *invasive* and/or *noxious* that were observed within the study area include: common reed (*Phragmites australis australis*), bull thistle (*Cirsium vulgare*), Canada thistle (*Cirsium vulgare*), coltsfoot (*Tussilago farfara*), common ragweed (*Ambrosia artemisiifolia*), European buckthorn (*Rhamnus carthartica*), poison ivy (*Toxicodendron radicans*) and sow-thistle (*Sonchus* spp.).

One area of an abundance of phragmites has been mapped and included in the Opportunities and Constraints Map (**Figure 3**). The phragmites were observed where construction disturbance is planned. The Contractor will be responsible for the control of the spread of phragmites during construction.

It should be noted that the exact location of other invasive and/or noxious plants within the study area have not been mapped due to the small size of area or limited number of individuals of each species within the study area (i.e., no stands of the species but rather sporadic occurrence of individuals).



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LEGEND

- Site Location
- Culvert
- Study Area
- Paving Limit
- Noise Wall
- Phragmites
- Unevaluated Wetland
- Watercourse

REFERENCE

GIS data provided by the Ontario Ministry of Natural Resources and Forestry, 2021.



CLIENT:	MINISTRY OF TRANSPORTATION CENTRAL REGION	
PROJECT:	GWP 2445-17-00	
TITLE:	Terrestrial Ecosystems Constraints and Opportunities Map	
McINTOSH PERRY 115 Walgreen Road, RR3, Carp, ON K0A1L0 Tel: 613-836-2184 Fax: 613-836-3742 www.mcintoshperry.com	PROJECT NO: KM-18-7029	FIGURE:
	Date	Apr., 26, 2021
	GIS	EU
	Checked By	JA
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#### **4.1.3 Erosion and Sediment Control**

Existing environmental conditions within the study area mainly consist of vegetated areas with several soil types over variable topography. Construction activities required to complete the project work will disturb areas that are currently stable under normal conditions. To mitigate concerns related to erosion and sedimentation an Erosion and Sediment Control Plan was prepared, to be implemented during construction. Erosion and sediment control (ESC) is a multi-layered approach that includes several temporary and permanent components across the site, including (but not limited to):

- Light and heavy-duty sediment fence;
- Light-duty fibre roll;
- Rock and straw bale flow check dams;
- Rip rap spillway protection, and
- Rip rap ditch line protection.

Temporary ESC measures will be maintained by the Contractor and kept in place until 100% of all work has been completed and soils are stabilized. Temporary control measures shall be removed at the completion of the work, but not until permanent erosion control measures, as specified in the contract, have been established.

#### **4.1.4 Wetland Communities**

The Willow Creek/Little Lake PSW (identified through LIO and Fri Ecological Services) is located 2 km northeast of the northern limits of the study. Several unevaluated wetlands occur within the study area (**Figure 3**); however, given the scope of the proposed project works, it is not anticipated that wetland features will be negatively impacted by the project works. As wetlands are home to many species, including SAR, mitigation measures will be implemented to control the release of water and/or sediment during construction to prevent negative impacts to the identified wetlands.

#### **4.1.5 Wildlife and Natural Corridors**

Migratory birds are known to nest within vegetation present within the study area. The period when a bird is actively nesting is considered its most critical life stage as many species are highly dependent on habitat around their nest site to supply food for nestlings and to conceal their nest, eggs, and young. Timing windows allow vegetation removal activities to avoid periods when birds are actively nesting, which has been determined to be April 15 – September 5 (i.e., the period when most birds are anticipated to be actively nesting) in any calendar year for the study area. The study area contains a variety of habitat types, and it is important to note that this timing window will not be applied only to the removal of trees but all vegetation removal as ground nesting species may also be present within the work area associated with this project (i.e., adjacent to wetlands and watercourses, etc.).

During the 2020 field survey, big brown bats were observed traveling along the edge of forested habitat associated with the Sunnidale Road woodland (southwest quadrant of the Sunnidale Road bridge). Most bat species rarely venture more than 40 m from the edge of treed habitats (i.e. woodland edges or fencerows) and



these features are likely important as travel corridors for local bat populations. Due to required tree removals and vegetation clearing, changes to habitat structure are anticipated, which will impact the function of candidate bat maternity colony sites (i.e. snag tree within woodland southwest of Sunnidale Road) and springs and seeps. It is not anticipated that candidate area-sensitive bird breeding habitat will be impacted by the widening (i.e. no interior forest exists within the woodland parcel).

Mid-sized mammals are known to use the various fencerows and woodland edges as a travel corridor; however, these are anticipated to be very local in nature. None of the culverts within the Sunnidale Road package have been observed to be used by traveling wildlife. Raccoons and coyotes are known to use culverts to pass under Highway 400 within the general study area.

#### **4.1.6 Species At Risk**

Background data collection identified the potential presence of several terrestrial (birds, mammals, insects & amphibians, snakes & lizards, turtles and plants) and aquatic SAR within the study area. During the 2018/2020 field investigations, no SAR were observed within the study area. Though SAR have been identified with the potential to be encountered within the study area limits, the proposed project works are not anticipated to impact these species.

#### **4.1.7 Physiography, Bedrock and Soils**

The overall surface topography in the vicinity of the site is on a hill and consists of residential properties to the east and west of Highway 400. The study area crosses a significant valleyland, north of Sunnidale Road, that includes the main channel of Kidd's Creek. Drainage patterns generally follow the topography of the study area, crossing the highway in several locations through centreline culverts, towards Lake Simcoe to the east.

Based on published geological mapping, the study area is located within the Simcoe Lowlands physiographic region (OGS, 2019). This region borders Georgian Bay and Lake Simcoe and can generally be separated into two major divisions: the Nottawasaga basin to the west, consisting of plains draining into Nottawasaga Bay, and the Lake Simcoe basin to the east, consisting of the lowlands which surround Lake Simcoe. These two basins are connected at Barrie by a flat-floored valley which extends from the shores of Kempenfelt Bay. The Simcoe Lowlands region is generally comprised of sand, silt and clay deposits of deltaic and lacustrine origin.

During foundations investigations for design of the Sunnidale Road Bridge, five boreholes were analyzed near the Sunnidale Road underpass bridge. In general, the subsurface stratigraphy encountered at the site consists of pavement structure or topsoil overlying embankment fill which is underlain by an upper layer of silty sand to sand and silt till, and layers of sand, silty sand and sandy silt. Interbedded layers of hard silty clay/clayey silt and clayey silt till were encountered within the cohesionless soils. Bedrock was not encountered in any of the boreholes that were completed within the project limits. Additionally, a review of the MECP Well Records indicated that bedrock was not encountered in any wells within 500 m of the study area.

#### **4.1.8 Soils Management and Excess Materials**

Construction activities are known to generate excess materials on-site that require management and transportation to a facility for storage. Calculations indicate approximately 91,000 m<sup>3</sup> of excess materials as a result of project.

All excess materials will be reused or recycled as construction material or managed as fill within the highway ROW, where appropriate. Excess materials that are not reused will be required to be taken off site. Ontario Regulation 406/19, under the *Environmental Protection Act*, which provides for the transportation and processing of hazardous and non-hazardous waste. On-site and Excess Soil Management (as amended) shall be followed, including:

- Soil testing;
- Planning for reuse of soils off-site (at reuse sites), and
- Tracking and recoding retention.

Site preparation is provided by the imposition of constraints and by mitigation measures suggested to protect the quality of the environment adapted from existing legislation. The constraint on the management of these materials also involves discussions and written agreements with landowners and may involve consultation with MECP and other authorities. Where an excess material management option cannot meet constraints, another option must be pursued, or the material must be disposed of as waste.

#### **4.1.9 Groundwater**

The study area is located within the Lakes Simcoe and Couchiching/Black River (LSCBR) source protection area. City of Barrie municipal wells 11, 12 14 and 15 (Lakeshore Wells) have been combined into one wellhead protection area (WHPA). As illustrated in the Source Protection Information Atlas (MECP 2019b), the study area includes an 'Issues Contributing Area' of the Lakeshore Wells (the area of land where drinking water threats may contribute to a known drinking water issue). Issues include: Chloride and Sodium. Construction activities are not anticipated to pose a significant drinking water threat to the municipal drinking water systems; no approvals from LSCBR Source Protection Authority are required.

Six (6) Well Records were identified within 500 m of the study area. The Well Records were for the following well types: two (2) test wells, one (1) abandoned/other well, one (1) unknown and two (2) observation/monitoring wells (MECP, 2021). Static water level was not encountered, or is not available, within the six wells within the 500 m radius of the Sources, based on the MECP Well Records. It should be noted that the location of the MECP well records are approximate, and therefore water supply wells may be located within the radius of influence. Additionally, based on the MECP well records, some of the wells may be within the ROW.

It is anticipated that the Sunnidale Road underpass abutments and pier installation, Culvert C-78 extension and the storm sewer installations will be accomplished through open excavations. Groundwater seepage and surface water inflow from rain and snow melt events is expected to enter excavated areas. Construction dewatering will be required to ensure that the work areas remain dry to allow access for workers and/or

equipment. The expected typical volume of groundwater and surface water being pumped per day will be in excess of 400,000 L/day. As a result, a Category 3 Permit to Take Water (PTTW) has been obtained. Groundwater that seeps into the excavations, as well as any collected stormwater within the excavations, will be discharged downgradient of the work area as per OPSS 517. It is not anticipated that the water supply wells will be affected during construction dewatering as all the water supply wells are relatively deep, and the water-taking will be in stages of short-term durations.

During the 2018 Natural Sciences field investigations there were indications of groundwater seeps and springs throughout much of the southern study area. The area west of Highway 400, south of Sunnidale Road, contains numerous seepage areas along the toe of the existing hill slope (i.e., vegetated woodland slope), which feed into the existing Highway 400 ditch lines as well as two (2) small headwater watercourses found in this area. In addition, Kidd's Creek, associated with Culvert C-78, was observed to contain watercress, a groundwater spring indicator. The project is anticipated to also impact seeps and springs in the same general area within and adjacent to the woodland southwest of Sunnidale Road. The primary function of these seepage areas is to provide cold-water discharge to the small headwater watercourses present in the study area. This function is anticipated to remain, though the highway expansion will require the re-alignment of ditch lines and headwater watercourses within the study area. Groundwater discharge is anticipated to remain following re-alignment, and use by wildlife is also anticipated to remain following the proposed highway improvements

#### **4.1.10 Surface Water**

Surface water in the study area consists of highway stormwater runoff, Sunnidale Road Bridge stormwater runoff, roadside ditches and Kidd's Creek, associated with centerline culvert C-78. Hydrologic and hydraulic analyses were performed for the study area based on design criteria and guidelines detailed in a variety of MTO and other relevant standards documents. The designs of the new highway drainage features were completed to meet the minimum requirements of the MTO Drainage Management Manual and Highway Drainage Design Standards. The drainage strategy considered the needs for flood mitigation, pavement drainage, water quality treatment and erosion protection, using acceptable methods to meet the design objectives and requirements.

## **4.2 Socio-Economic Environment**

A thorough review of the socio-economic environment within the study area was conducted during Detail Design. The existing conditions outlined in the preliminary design report and TESR were examined and are generally consistent with current conditions. Potential socio-economic impacts of the proposed work to the study area are restricted to the Highway 400 and Sunnidale Road ROW, adjacent land uses, as well as local road detour routes and staging areas.

The following sections describe the potential impacts to the socio-economic environment associated with the project works. A summary of mitigation measures is provided in **Table 3**.

#### 4.2.1 Land Use

The study area is located within the geographic boundaries of the City of Barrie, County of Simcoe. As shown in **Figure 4**, the City of Barrie Official Plan identifies several land use types within the study area including: general commercial, residential, educational institutional, environmental protection area and city centre.

A number of property acquisitions were required to facilitate the Highway 400 Sunnidale Road Bridge replacement and future widening of Highway 400. With the exception of the MTO acquired property, land uses within the study area will not be impacted due to the project work.

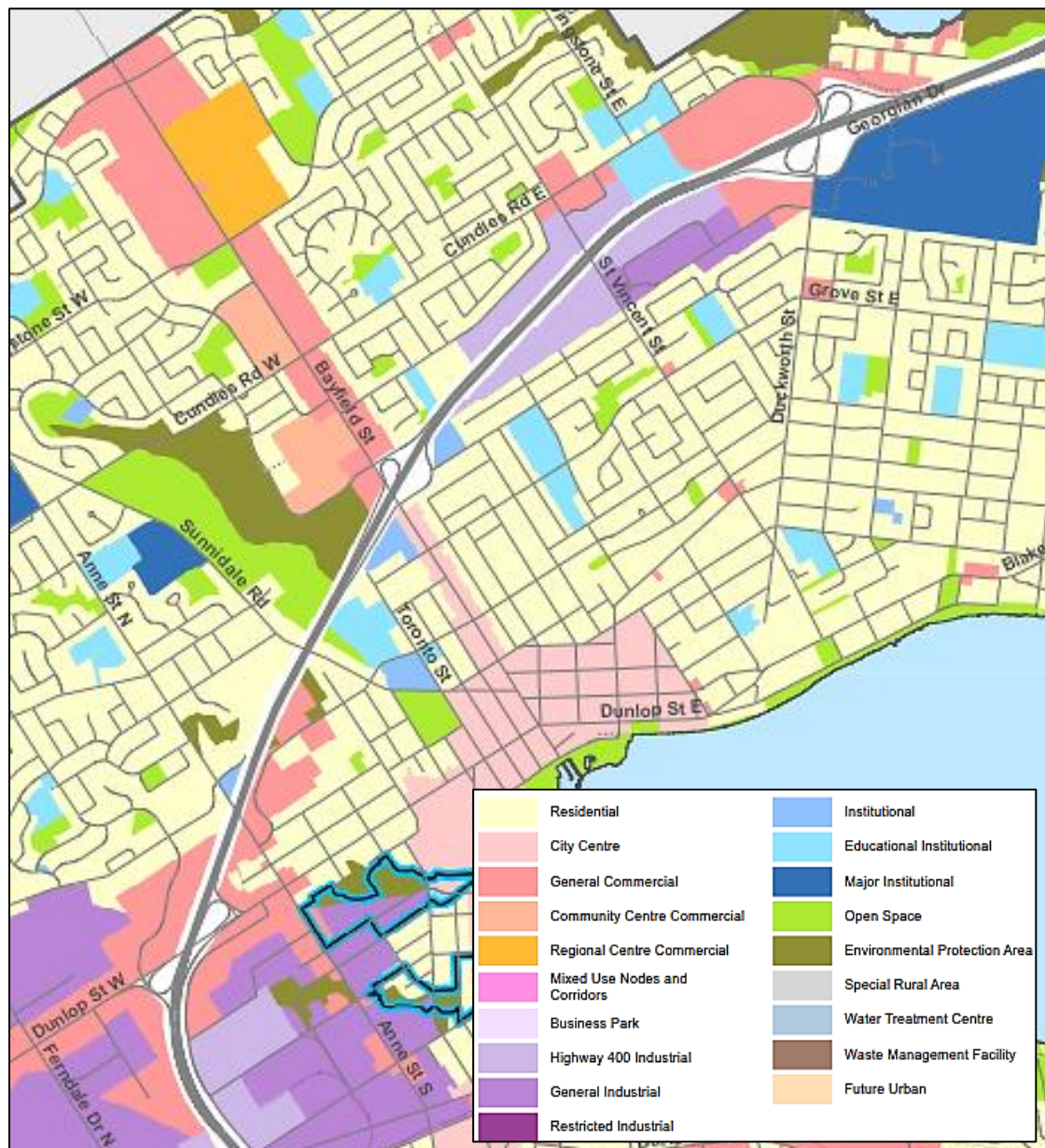


Figure 4: City of Barrie Official Plan – Appendix A – Land Use Map (January 2018)



#### *4.2.2 Designated areas*

The Willow Creek/Little Lake PSW is not anticipated to be impacted due to construction.

#### *4.2.3 Municipal Services and Traffic Operations*

Highway 400 is classified as a Rural Freeway Divided and has a posted speed limit of 100 km/h. Highway 400 begins at Maple Leaf Drive in Toronto, south of Highway 401 and extends northerly to Highway 69, north of Parry Sound. Within the project limits the highway has an urban/suburban surrounding with the main traffic generators expected to be City of Barrie commuters and users travelling to and from the Greater Toronto Area (GTA). MTO has classified this segment of Highway 400 as having a 'Commuter Tourist Recreation' traffic pattern. Highway 400 at this location consists of six lanes (three in each direction) and auxiliary lanes associated with Highway 400 interchanges. The ultimate cross section for Highway 400, as approved in the TESR (URS, 2004) and TESR Addendum (AECOM, 2017a) will include a 10-lane cross section consisting of 4 General Purpose Lanes and 1 High Occupancy Vehicle (HOV) lane in each direction.

Sunnidale Road is a City of Barrie municipal roadway and is classified as a Major Collector, with a posted speed limit of 50km/h. Sunnidale Road originates approximately 300 m south of the Bridge over Highway 400, running generally east-west, terminating 13 km west of the Bridge in the Village of Essa at Simcoe County Road 90.

Provisions for a future bicycle lane and additional sidewalk have been provided on the new Sunnidale Road Bridge, to be installed later by others.

Sunnidale Road is identified in the TMP as a Regionally Significant Trail Route. The Nine Mile Portage Heritage Trail, the Simcoe County Loop Trail and the TransCanada Trail all cross Highway 400 on the Sunnidale Road Bridge. Trail users will be impacted during construction, however future use of the trails crossing the bridge will be unimpeded. 'Cycle Simcoe' (County of Simcoe Tourism) was consulted on this project and did not have any comments.

#### *4.2.4 Construction Staging*

In order to complete the planned work for this project, construction staging is required and has been broken down into three (3) stages expected to last two (2) construction seasons. Highway 400 staging will be completed such that 6-lanes (3 per direction) will remain open at all times, excluding:

- off-peak (nightly) lane closures of Highway 400, and
- one (1) night-time full closure of Highway 400 at Sunnidale Road to facilitate demolition of the existing bridge.

Additional traffic disruptions throughout construction, including temporary Highway 400 lane and ramp closures, long duration shoulder closures, and detours to the adjacent road networks. Highway 400 lane widths will be reduced to 3.5 m during select stages along Highway 400 during construction to facilitate the staging sequencing required for the bridge replacement work. Highway 400 lane closures will be communicated with the public well in advance of the closures through the MTO's Information Messaging System and signage. Detour routes for the Highway 400 closure are illustrated in **Figure 5**.

Sunnidale Road will be closed at the Sunnidale Road bridge for the duration of construction. Local traffic (i.e. residents within the closed section) will be allowed access at either end of Sunnidale Road at all times. During the road closure detour routes, as illustrated in **Figure 6**, will be communicated to the public through signage.

Impacts associated with traffic disruptions include emergency service response times and an anticipated increase to municipal road traffic volumes within the vicinity of the project area (i.e., the City of Barrie) and detour route. The detour routes have been discussed with the affected emergency service providers and the City of Barrie. The contractor will be required to notify the emergency services and City of Barrie a minimum of two weeks in advance of any full road closures. Additionally, Portable Variable Message Signs (PVMS) will be used to provide up-to-date information to drivers regarding construction works on Highway 400, and temporary advanced notification signs will be used to provide drivers with advance notification of lane closures.

Following the completion of construction an interim configuration on Highway 400 will be put in place maintaining a 6-lane configuration (3 per direction). This configuration will be in place until the future 10-lane expansion of Highway 400 construction commences.



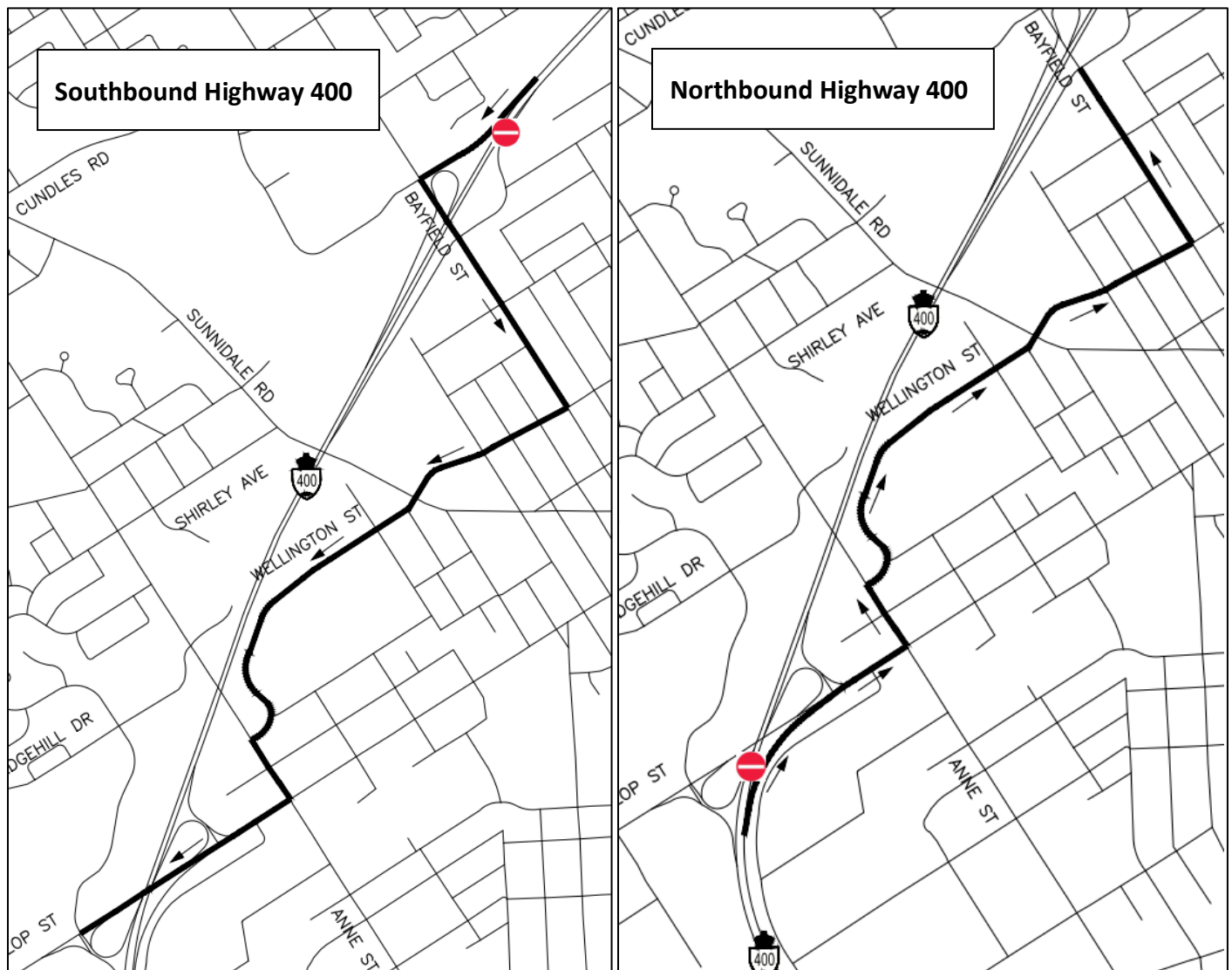


Figure 5: Highway 400 Traffic Detour Routes

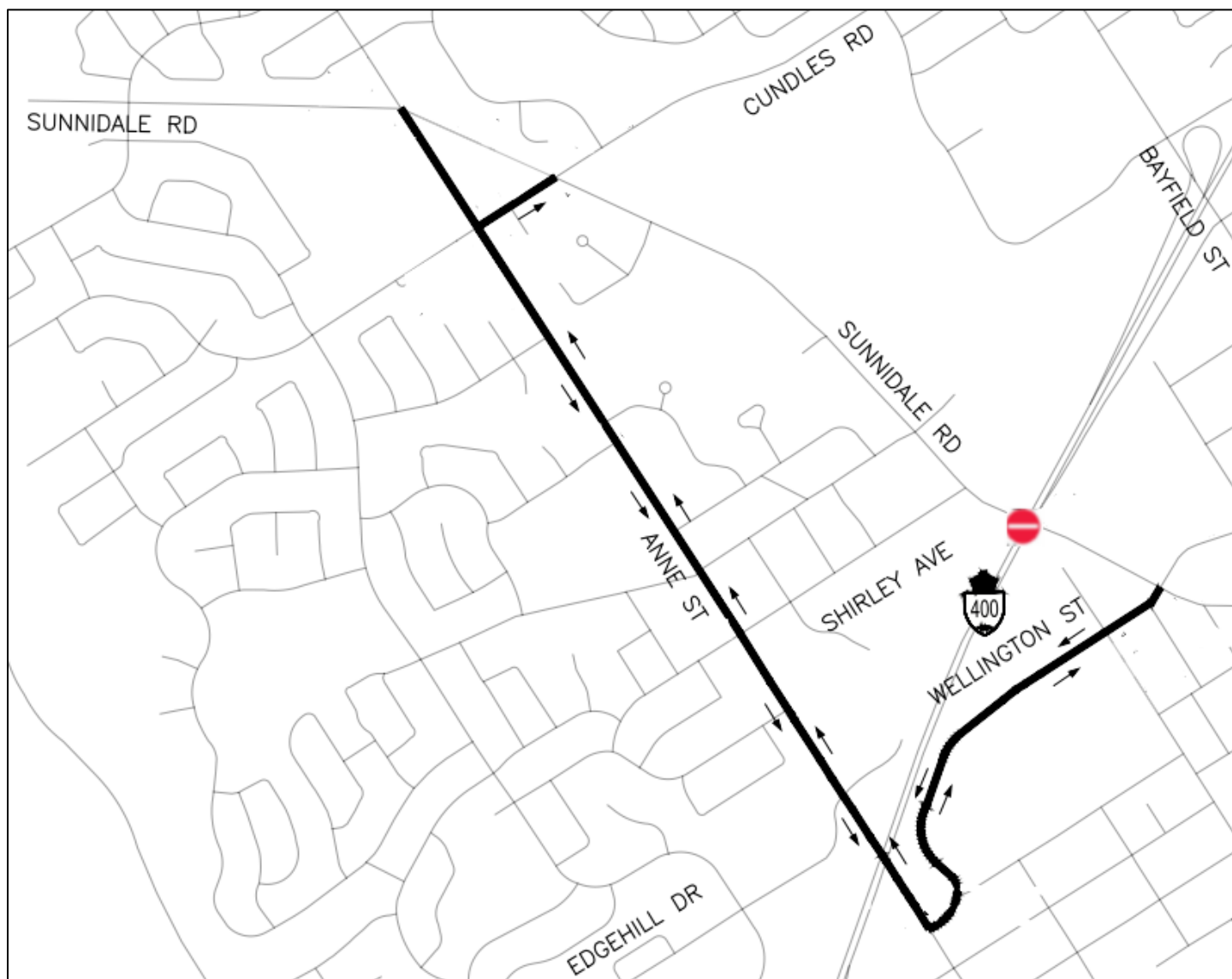


Figure 6: Sunnisdale Road Closure Detour Route

#### 4.2.5 Construction Noise

Unlike operational traffic noise, the MTO does not establish a quantitative threshold noise level to establish construction noise impacts. However, construction noise produced by the Contractor's operations shall be mitigated as shown in **Table 2**.

Table 2: Construction Noise Constraints	
Constraint	Constraint Details
Equipment Maintenance	Equipment shall be maintained in an operating condition that prevents unnecessary noise, including but not limited to non-defective muffler systems, properly secured components, and the lubrication of moving parts.
Equipment Operation	Idling of equipment shall be restricted to the minimum necessary to perform the specified work.

#### 4.2.6 Noise Mitigation Measures

A noise analysis was completed during Preliminary Design (2017) in accordance with the MTO's Environmental Guide for Noise 2006, for the Highway 400 corridor through Barrie. Under the MTO's noise policy, if future noise levels with the project result in a greater than 5 decibel increase over the future noise level without the project, or if the projected noise level is equal to or greater than 65 decibels, the MTO will investigate noise control measures within the MTO right-of-way in the Outdoor Living Areas (OLAs), which is considered the backyards of houses. Based on the noise analysis, the results concluded that there is a need for noise mitigation measures (noise walls) in various locations throughout the corridor.

Approved noise walls will be constructed at specified areas to a specific length, as described in the noise analysis reference above. The height of panels will be 5 m tall from the ground surface.

Approved noise walls include:

- 1) North side of Dunlop Street to Highway 400 northbound on-ramp.
- 2) West side of Highway 400, south of Anne Street.
- 3) East side of northbound Highway 400 at Bayfield Street off-ramp.
- 4) East side of Bayfield Street to Highway 400 northbound on-ramp.
- 5) East side of Highway 400 north of Bayfield Street on-ramp.
- 6) West side of Highway 400 southbound, from north of Bayfield Street off-ramp through to Bayfield Street.
- 7) West side of Highway 400 from southbound Duckworth off-ramp to Little Lake Drive.

Noise walls No. 2, 3 & 7 are being constructed as part of the Anne Street bridge replacement project. Noise wall No. 1 will be constructed as part of the Dunlop Street bridge/interchange replacement work. The remaining approved noise walls (No. 4, 5 & 6) north of Bayfield will be constructed in subsequent construction

packages. All noise walls have been previously approved through completed Class Environmental Assessment Processes. No new noise walls are being considered at this time.

No noise walls are being constructed as part of this contract package.

#### 4.2.7 Air Quality

The MTO has a methodology for assessing local air quality impact, which is set out in the Environmental Guide for Assessing and Mitigating the Air Quality Impacts and Greenhouse Gas Emissions of Provincial Transportation Projects (AQ Guide) (MTO, 2012). During the preliminary design study the Highway 400 corridor from Highway 89 to Highway 11 was analyzed under the AQ Guide. The study determined that proposed work within the study area would have negligible impacts to air quality and no design changes were recommended.

The project work generally has the potential to create dust due to construction activities. Dust suppressants will be required to be used by the contractor during construction to ensure dust is kept to a minimum.

#### 4.2.8 Designated Substances

McIntosh Perry conducted desktop review and field surveys to determine the possible presence of the eleven (11) designated substances identified by Ontario Regulation 490/09 under the *Occupational Health and Safety Act*, including:

- Acrylonitrile
- Arsenic
- Asbestos
- Benzene
- Coke Oven Emissions
- Ethylene Oxide
- Isocyanates
- Lead
- Mercury
- Silica
- Vinyl Chloride

Where available, documentation such as construction drawings and Ontario Structure Manual – Inspection Forms, were reviewed to determine the potential for designated substances to be associated with the bridges slated for replacement. Following documentation review, the bridges were inspected and where accessible sampling was performed for analytical assessment.

The following designated substances were detected through analysis:

- Arsenic – guiderail wood posts
- Lead – guiderail and steel coatings

The following designated substance is likely to be present, but no testing was conducted to confirm this.

- Silica – assumed to be present throughout the project area in the form of but not limited to, concrete, granular materials and asphalt.

The following hazardous substance was detected through analysis:

- Chromium – guiderail wood posts

The remaining designated substances are either not likely to be present or have been polymerized into a form which would no longer be considered as a designated substance.

#### **4.2.9 Snow Drift Assessment**

McIntosh Perry retained RWDI to review the snow drift assessment prepared during preliminary design for this area, under RWDI's June 3, 2016 Highway Snowdrifting Consultation: Highway 400 Improvements from 1 km South of Highways 89 to the Junction at Highway 11, Project #1301130. After reviewing the existing Sunnidale Road crossing, the proposed changes and the results from previous study in this area, the Snow Transport Potential (STP) is expected to be low. This is mainly due to the urban development immediately around the study area. From a global snow drifting perspective, the total volume of snow reaching the highway in these areas is expected to be limited. However, the potential remains for localized finger drifts to occur on the ramps or on the underpass section of the highway adjacent to the embankments. Local landscape plantings have been provided aimed at reducing the potential for significant drifting on the roadways.

### **4.3 Cultural Environment**

#### **4.3.1 Archaeology**

During the preliminary design study, a Stage 1 and 2 Archaeological Assessment Report was prepared to document archaeological potential within the greater study area from Highway 89 to Highway 11 (AECOM, 2017b). McIntosh Perry retained Past Recovery Archaeological Services to conduct further Stage 1 and Stage 2 Archaeological Assessments in the project study area. The Stage 1 and 2 Assessments were conducted within the study area not covered by the AECOM (2017b) Report. The Stage 1 and 2 Assessments found no additional potential archaeological resources within the study area.

#### **4.3.2 Built Heritage and Cultural Heritage Landscape**

##### **4.3.2.1 Sunnidale Road Bridge**

The Ontario Ministry of Culture (now Ministry of Tourism, Culture and Sport) provided a cultural heritage review to the MTO in 2008 that indicated the only remaining original Coat of Arms in the province are on the Highway 400 series of bridges at 9 locations: King Road, Lloydtown/Aurora Road; 5th Line; Simcoe Road (Hwy 88); Coulson Road (11th Line); Hwy 89/Shore Acres Road; 4th Line; Sunnidale Road and Bayfield Street. They expressed their recommendation "that this heritage attribute be retained in any new bridge construction (at these locations only). Notwithstanding the guidelines of the provincial Visual Identity Directive, retention of the stylized Ontario Coat of Arms on these bridges best meets the provincial interest in conservation of Ontario's Cultural Heritage."

The MTO developed a presentation for the Ministry of Culture and Tourism (MCT) (formerly Ministry of Culture) in 2010 outlining the cultural heritage design elements that would be incorporated into the identified 9 bridge locations. MTO and MCT agreed to these recommendations, which have been carried through on the identified 9 bridge locations, including Sunnidale Road.

The new Sunnidale Road bridge will incorporate elements for consistency with other Highway 400 culturally heritage bridges within the Highway 400 corridor. The heritage elements that will be incorporated into the design of the replacement bridge include:

1. Concrete girders, not steel box girders, to mimic the existing concrete rigid frame design.
2. Placement of the Ontario Coat of Arms on all four bridge wingwalls.
3. Radial chamfers of 1.5 m formed at the exterior girder ends at the abutments and pier as a sympathetic design feature to mimic the curved fascia and soffit of the existing rigid frame bridge.
4. Simple clean-lined parapet wall railing in stainless steel or premium painted galvanized steel.
5. Full height vertical precast RSS wall panels with no pattern.

#### *4.3.2.2 Cultural Heritage Assessment Report*

McIntosh Perry retained Underman McPhail Associates (UMA) Heritage Resource Management Consultants to assess the cultural heritage landscapes and built heritage resources for the study area. UMA determined that no cultural heritage landscape or built heritage resources recognized at the municipal, federal or international levels are identified as being located within or adjacent to the study area. Highway 400 is considered to be a cultural heritage landscape of historical/associative interest or value to the provincial history; however, its original highway design has been significantly altered. There are no anticipated impacts to the cultural heritage resources as a result of the proposed MTO work in the study area.

#### *4.3.2.3 Cultural Heritage Evaluation Reports for 49, 80 and 85 Sunnidale Road*

Several residential properties were acquired by the MTO along Sunnidale Road north and south of Highway 400 for the purposes of construction. As a provincially-owned properties of 40 years and older in age, the MTO was required to undertake cultural heritage evaluation reports for 49, 80 and 85 Sunnidale Road. McIntosh Perry retained UMA to conduct the required CHERs under the Ministry of Tourism, Culture and Sport (MTCS) policy known as the Standards & Guidelines for Conservation of Provincial Heritage Properties (S&Gs), approved in 2010 for all provincially-owned property to determine its cultural heritage value or interest (CHVI). If the property meets the “Criteria for Determining Cultural Heritage Value or Interest” as set out in Ontario Regulation 9/06 (O. Reg. 9/06) under the OHA, it is a “provincial heritage property (PHP). If a property is deemed to be a PHP, the “Criteria for Determining Cultural Heritage Value or Interest of Provincial Significance” as set out in Ontario Regulation 10/06 (O. Reg. 10/06) to determine provincial significance is to be applied. If the property meets the criteria in O. Reg. 10/06, it is a “provincial heritage property of provincial significance” (PHPPS).

The heritage evaluations under O. Reg. 9/06 determined the provincially-owned properties at 49, 80 and 85 Sunnidale Road are of minimal physical, functional and visually value under Design and Physical Value, limited historical linkages under Historical and Associative Value and of some contextual value under Context Value. Based on the results of the heritage evaluations, it was concluded the CHVIs for 49, 80 and 85 Sunnidale Road is not considered to be sufficient to meet the intent of the heritage evaluation criteria to qualify as a PHP as defined by the S&Gs. Therefore, a Statement of Cultural Heritage Value or Interest under Ontario Regulation 9/06 is not provided. Since the subject properties are not considered to be eligible to be a PHP, a heritage



evaluation under “Criteria for Determining Cultural Heritage Value or Interest of Provincial Significance” under O. Reg. 10/06 is not required.

No further cultural heritage work, such as a Strategic Conservation Plan (SCP) and/or a Heritage Impact Assessment (HIA), is required under the S&Gs.

#### **4.4 Summary of Environmental Concerns and Commitments**

The environmental protection/mitigation measures identified in the DCR have been incorporated into the contract package to address potential environmental effects resulting from this project. Areas of environmental sensitivity or concern, the sources of those concerns, and the mitigation measures associated with the undertaking are described in **Table 3**.

Table 3: Summary of Environmental Concerns and Commitments				
ID #	Issues/Concerns/Potential Affects	Concerned Agencies	ID #	Mitigation/Protection/Monitoring
1.0	Fish and Fish Habitat			
1.1	Construction activities may result in the suspension of sediments within ditch lines contributing to fish bearing watercourses. This may have negative effects on fish populations by causing respiratory stress, reduced feeding efficiency, and impairment of physiologic processes such as growth and reproduction.	Ministry of Northern Development, Mines, Natural Resources and Forestry (MNDMNRF) Fisheries and Oceans Canada (DFO)	1.1.1	In order to protect fisheries and aquatic habitat resources within the study areas, this Contract includes Ontario Provincial Standard Specification (OPSS) 182 - General Specification for Environmental Protection for Construction in Waterbodies.
			1.1.2	Erosion and sediment control measures, as described on the Contract Drawings, shall remain in place and maintained until all disturbed areas are stabilized and/or vegetation has been re-established, per Contract Drawings and Operational Constraint (OC) – Erosion and Sediment Control.
1.2	In-water work associated with the culvert extensions at CL-78 may negatively impact fish habitat in the study area and downstream.	MNDMNRF DFO	1.2.1	In order to avoid disruption to sensitive fish life stages, in-water work will only be permitted from July 16 to September 30 of any year, per Table A of Special Provision No. 101F23 – Amendment to OPSS 182.
			1.2.2	Under flowing conditions, culvert works shall be conducted under isolated conditions (i.e., through the use of cofferdams, etc.) to prevent the mobilization of sediment within the watercourses, as per OPSS 182 – Environmental Protection for Construction in Waterbodies and on Waterbody Banks. Work activities will follow the removal of fish from isolated areas as per OPSS 182. Flows will be maintained at all times.
			1.2.3	Dewatering will be carried out as per the requirements of OPSS 517 – Construction Specification for Dewatering. Pumps used for clean water by-pass systems must be equipped with the appropriate fish screens, as per <i>OPSS 182</i> - Environmental Protection for Construction in Waterbodies and on Waterbody Banks.
1.3	Culvert extension works at CL78 are anticipated to aggravate flow velocities that which are passible by fish species present in Kidd’s Creek.	MNDMNRF DFO	1.3.1	Energy dissipaters and waterbody material have been designed and incorporated into the Contract Drawings to provide safe fish passage.
1.4	Removal of riparian vegetation has the potential to increase erosion, affect water temperatures, and impact nutrient inputs into Kidd’s Creek.	MNDMNRF DFO Ministry of the Environment, Conservation, and Parks (MECP)	1.4.1	Removal or disturbance of riparian vegetation shall be minimized during construction operations in order to prevent unnecessary loss of stream shading, overhead cover or bank stability, per OPSS 182 - Environmental Protection for Construction in Waterbodies and on Waterbody Banks.
			1.4.2	Construction staging areas will be set back from the watercourse and held on the existing roadway platform wherever possible, as described in the Contract Drawings. The Contractor shall plan access points to minimize the amount of riparian vegetation lost or disturbed. All Access routes to be reviewed and accepted by Contract Administrator prior to vegetation removal and construction of access route, per Operational Constraint (OC) – Construction Ingress, Egress and/or Access Locations.
			1.4.3	Erosion and sediment control measures, as described on the Contract Drawings, shall remain in place and maintained until all disturbed areas are stabilized and/or vegetation has been re-established, per Contract Drawings and OC – Erosion and Sediment Control, OPSS 804 – Construction Specification for Temporary Erosion Control and OPSS 805 – Construction Specification for Temporary Sediment Control.
			1.4.4	Permanent vegetative cover (i.e. landscape plantings) illustrated in the Contract Drawings shall be installed in all disturbed areas associated with the work zone, including access routes.
1.5	Excavations for construction operations will require dewatering, which may lead to sediment entrainment, transport and deposition into downstream fish bearing watercourses.	MNDMNRF MECP DFO	1.5.1	Water from dewatering operations shall be directed to a sediment control measure and/or a vegetated discharge area 30 m away from waterbodies or as far away as practicable from the top of the bank of any waterbody, prior to discharge to the natural environment per OPSS 517 – Dewatering.
			1.5.2	Where the dewatering system involves taking of water from a waterbody, the design shall maintain the flow of water and the natural functions of the waterbody upstream and downstream of the work area, per OPSS 517.
2.0	Erosion and Sediment Control			
2.1	Disturbance of existing vegetation and general grading work in the project area has the potential for erosion and sedimentation concerns due to soil types, slopes and sensitive receptors (watercourses and wetlands).	MNDMNRF MECP DFO	2.1.1	Temporary erosion and sediment control measures shall be installed and removed according to the locations and timing constraints set out in Table A of SSP No. 804F01 – Amendment to OPSS 804 and Table A of SSP 805F01 – Amendment to OPSS 805.
			2.1.2	In order to prevent the entrainment of sediment in watercourses adjacent to the ROW study area, the Contractor shall install appropriate erosion and sediment control measures appropriate to site conditions and stages of Construction as illustrated in the Contract Drawings.

ID #	Issues/Concerns/Potential Affects	Concerned Agencies	ID #	Mitigation/Protection/Monitoring
			2.1.3	All disturbed areas should be protected to limit the time that such areas are exposed prior to final application of topsoil and seed. The Contractor shall apply topsoil; and seed as per OPSS 802 – Construction Specification for Topsoil and OPSS 803 – Construction Specification for Vegetative Cover.
			2.1.4	<i>Operational Constraint (Environmental) – Erosion and Sedimentation Control</i> and <i>Operational Constraint (Environmental) – General – Erosion and Sedimentation Control</i> have been included in the Contract Tender to notify the Contractor of their responsibilities to install, inspect, maintain and remove ESC measures, as specified, during construction.
2.2	Stockpiled construction materials such as aggregate, concrete, and earth may potentially contaminate the study area without proper containment and environmental protection measures.	MNDMNRF MECP DFO	2.2.1	Stockpiled materials shall be located no closer than 30 m from a watercourse in accordance with OPSS 180 – General Specification for the Management of Excess Material. Materials shall be protected from erosion and sedimentation through the installation of erosion and sediment controls designed appropriate to the site.
<b>3.0 Terrestrial Ecosystems</b>				
3.1	Construction activities, including excavation, grading, bridge replacement, and vegetation clearing, etc. have the potential to disturb wildlife, bird and bat habitat such as nesting and foraging. Migratory birds, bats and wildlife may nest/travel through the project area, which may be impacted by construction activities.	MNDMNRF EC	3.1.1	Vegetation clearing during the breeding bird-window (April 15 to September 5) shall not occur in order to prevent disturbance of migratory birds, per OC – Migratory Bird Protection. Should vegetation clearing be required during the timing restriction, a qualified bird specialist must complete an assessment of the site to identify active bird nests, if any.
			3.1.2	The removal of trees and other vegetation shall only occur where specified in the Contract Drawings. Any removals outside of the delineated areas shall be reviewed and approved by the MTO Contract Administrator and MTO Environmental Planner.
			3.1.3	All disturbed areas will be stabilized as soon as possible using appropriate erosion sediment control measures per Contract Drawings, OC – Erosion and Sediment Control and OPSS 804 – Construction Specification for Temporary Erosion Control
			3.1.4	Access routes and staging areas will be delineated on-site to prevent workers from unintentionally straying from the work platform, per OC – Construction Ingress, Egress and/or Access Locations.
			3.1.5	Vegetated areas disturbed during construction shall be stabilized and re-vegetated as soon as possible. Tree and shrub plantings identified in the Contract Drawings’ Plantings Plan shall be implemented per SSP LAND0001 – Requirements for Planting.
3.2	Invasive plant species (common reed) have been identified in the project area. Construction activities have the tendency to spread seeds leading to larger areas of concern.	MNDMNRF MECP DFO	3.2.1	The spread of invasive and noxious vegetation species to, from and within the Working Area must be minimized to the greatest extent possible. NSSP ENVR0011 - Requirements for Herbicide Spraying and Mechanical Cutting of Invasive and Noxious Vegetation Species has been included in the Contract Package for the control of invasive species identified.
<b>4.0 Species at Risk</b>				
4.1	Species at Risk (SAR) may be encountered during construction, which may have negative impacts on the individual(s).	MECP	4.1.1	Fact sheets and identification training must be provided to all onsite personnel for the identification of SAR which may be encountered within or directly adjacent to the work area.
			4.1.2	The Contractor shall perform daily site inspections for SAR for the duration of the project work per Operational Constraint – Protection of Species at Risk. If SAR have entered the site, the Contractor shall: <ul style="list-style-type: none"> <li>- Temporarily stop work - SAR should be allowed a reasonable amount of time to leave the work area.</li> <li>- Report SAR Observations to the MECP - The Contractor will contact MTO’s Contract Administrator and report SAR observations within 24-hours to the MECP to seek advice on how to proceed.</li> </ul>
<b>5.0 Groundwater</b>				
5.1	Construction activities, such as refuelling, can increase the potential for accidental spillage and subsequent contamination of groundwater sources.	MNDMNRF MECP	5.1.1	The Contractor is required to have a spill kit available on site in the event of a spill. All spills that may have an adverse effect should be reported to the MECP Spills Action Centre (1-800-268-6060) in accordance with provincial and federal legislation.
			5.1.2	The Contractor shall have a Spill Prevention and Response Contingency Plan, per OC – Spill Prevention and Response Contingency Plan.
5.2	Groundwater seepage and stormwater inflow into excavations is expected. Construction dewatering will be required to ensure that the work areas remain dry. It is expected that the typical volume of groundwater and stormwater being pumped per day will be in excess of 400,000 L/day. Dewatering operations may lead to	MECP	5.2.1	An Application for Approval of a draft Category 3 Permit to Take Water has been submitted to the MECP by the MTO: Reference Number 2363-C8WMAD, per SSP No. 199F31 - Environmental Exemptions and Permits.
			5.2.2	Groundwater that seeps into the excavations, as well as any collected stormwater within the excavations, will be discharged downgradient of the work area as per OPSS 517. It is recommended that the groundwater and stormwater be directed to a sediment control device installed on a well vegetated area prior to release to the natural environmental (i.e. the surrounding area).

ID #	Issues/Concerns/Potential Affects	Concerned Agencies	ID #	Mitigation/Protection/Monitoring
	suspended sediments, which could ultimately lead off site into sensitive receptors (watercourses and wetlands).			
6.0 Surface Water				
6.1	There is potential for contamination spills entering the surface water and spreading the contamination.	MECP DFO MNDMNRF	6.1.1	The Contractor shall have a Spill Prevention and Response Contingency Plan, per OC – Spill Prevention and Response Contingency Plan. As part of this Plan, the Contractor shall make use of a Spill Containment System. This system shall ensure no deleterious substances, as outlined in the <i>Fisheries Act</i> , enter waterbodies.
			6.1.2	Mobile equipment refuelling shall take place no closer than 30 m from any waterbody in order to prevent water contamination due to accidental fuel spills. For non-mobile equipment, refuelling should be carried out in a controlled manner so as to prevent fuel spillage, and drip pans should be located under the equipment at all times, per OC – Equipment Refueling, Maintenance and Washing.
			6.1.3	Equipment operating near any waterbody shall be in good working condition, properly maintained and free of excess oil/grease to reduce the risk of contaminant leakage. In the event that a spill occurs, proper containment, clean up, and reporting, in accordance with provincial requirements, shall be completed.
			6.1.4	All spills should be reported to the MECP Spills Action Centre (1-800-268-6060) in accordance with provincial and federal legislation.
6.2	Construction activities can lead to the accumulation of litter and debris within watercourses.	MTO	6.2.1	The Contractor shall take all necessary precautions to prevent the accumulation of litter and construction debris within watercourses, per OPSS 182.
7.0 Waste and Contamination				
7.1	Designated substances are present in on-site existing construction materials, which may pose a threat to the health and safety of the construction workers.	MECP	7.1.1	In accordance with the <i>Occupational Health and Safety Act</i> , R.S.O. 1990, c. 0.1, Special Provision No. 101F21, <i>Occupational Health, and Safety Act</i> Compliance, has been added to the Contract Package to advise the Contractor of the presence of the following Designated Substance(s): <ul style="list-style-type: none"><li>Silica is assumed present throughout the working area including, but not limited to, all concrete and masonry products, materials, and finishes;</li><li>Arsenic – guiderail wood posts</li><li>Lead – guiderail and steel coatings</li></ul>
7.2	The removal, storage and disposal of excess materials may transfer contaminants around the study area and possibly off-site.	MECP	7.2.1	Excess material will require proper management (removal, storage and disposal). Materials will be managed in accordance with OPSS 180 – General Specification for the Management of Excess Materials and NSSP ENVR0014 - Amendment to OPSS 180 - Compliance With Ontario Regulation for On-Site and Excess Soil Management.
			7.2.2	Should any contaminated materials be encountered during the undertaking, caution shall be exercised while handling and disposing of contaminated materials in accordance with provincial regulations, and MTO practices (as governed by OPSS 180 or the most current standard at the time of construction).
8.0 Noise During Construction				
8.1	Improper maintenance of construction equipment can cause excessive noise that may disturb neighbouring residents.	Nearby Residents and Businesses City of Barrie	8.1.1	The Contractor is required to maintain equipment in an operating condition that prevents unnecessary noise, including but not limited to non-defective muffler systems, properly secured components, and the lubrication of moving parts, per SSP 199F33 – Construction Noise Constraints.
			8.1.2	Idling of equipment shall be restricted to the minimum necessary to perform the specified work, per SSP 199F33 – Construction Noise Constraints.
9.0 Air Quality				
9.1	It is anticipated that dust and emissions from machinery will be generated during construction.	MECP MTO	9.1.1	Odour and fume impacts will be minimized by ensuring that all equipment is properly maintained and that all pollution control devices on the equipment are operational and properly maintained.
			9.1.2	Dust shall be controlled as per OPSS. PROV 100 – MTO General Conditions of the Contract (GC 7.07).
10.0 Traffic Operations				
10.1	Project work will temporarily disturb normal traffic operations on Highway 400, Sunnidale Road and other	MTO Motorists	10.1.1	Temporary disruption to traffic shall conform to the stipulated access, lane closures, ramp closures, and various restrictions set out on the SSP 199F01 - Temporary Roadway Closures.

ID #	Issues/Concerns/Potential Affects	Concerned Agencies	ID #	Mitigation/Protection/Monitoring
	affected local roads. Safety of construction workers, motorists and pedestrians is of primary concern.	Local Municipalities Nearby Commercial Businesses Emergency Services	10.1.2	Per Notice to Contractor – Notification of Local Authorities of Detours, the Contractor shall notify identified emergency services and the City of Barrie in writing at least 14 days in advance of the implementation of each detour required for the Highway 400 and Sunnidale Road Closures including which detour routes will be used and when and for how long each detour will be in use.
			10.1.3	The Contractor shall notify in writing and provide the detour route and signage plan to the Contract Administrator and City of Barrie at least two (2) weeks in advance of the detour route and signage work on Municipal roads, per Notice to Contractor – Notification of Road Closures and Staging Changes.
11.0 Cultural Environment				
11.1	During construction, there is a chance of encountering buried archaeological material.	Ministry of Tourism, Culture and Sport Ministry of Indigenous Affairs	11.1.1	If this occurs, the Contractor shall immediately stop all construction activities in the area and contact the office of the Heritage Operations Unit MTSTCI (416-314-7159). If unmarked human remains are uncovered, the provisions of the <i>Ontario Cemeteries Act</i> apply. The Contractor shall immediately stop all construction activities in the area and contact the office of the Heritage Operations Unit, MTSTCI the Registrar of Cemeteries (416-326-8394), the local Ontario Provincial Police (OPP) and the local Coroner.
11.2	The Sunnidale Road Bridge was identified as a cultural heritage resource on Highway 400. Heritage features shall be installed as designed to ensure cultural heritage attributes are addressed.	MHSTCI MTO	11.2.1	The replacement bridge will incorporate heritage elements for consistency with other recent heritage bridge replacements within the Highway 400 corridor. The heritage elements that will be incorporated into the design of the replacement bridge include: <div><div>1.</div><div>Concrete girders, not steel box girders, to mimic the existing concrete rigid frame design.</div><div>2.</div><div>Placement of the Ontario Coat of Arms on all four bridge wingwalls.</div><div>3.</div><div>Radial chamfers of 1.5 m formed at the exterior girder ends at the abutments and pier as a sympathetic design feature to mimic the curved fascia and soffit of the existing rigid frame bridge.</div><div>4.</div><div>Simple clean-lined parapet wall railing in stainless steel or premium painted galvanized steel.</div><div>5.</div><div>Full height vertical precast RSS wall panels with no pattern.</div></div>

## 5.0 FOLLOW UP AND COMPLIANCE MONITORING

On-site contract administration/inspection staff (retained by MTO) will be responsible for inspecting the construction area and for ensuring that the construction contractor complies with all environmental, operational constraints, has all required environmental permits/approvals and has all required environmental protection measures properly sited, installed and maintained as per the Construction Contract.

The Contract Administrator and their inspectors will be responsible for monitoring the Contractor's operations on a day-to-day basis as per the MTO *Construction Administration and Inspection Task Manual*. The Contract Administrator's inspectors will be responsible for maintaining an environmental diary, which will include a daily recording of activities related to the environment, such as the condition and effectiveness of erosion and sedimentation control measures and weather conditions.

The Contract Administrator's Environmental Specialty (Environmental Monitor) shall conduct regular site inspections for the duration of construction, to ensure environmental compliance with contract documents.

The Contract Administrator's Fisheries Contract Specialist shall conduct daily site inspections when the Contractor is performing work within 30 m of Kidd's Creek. All components of the watercourse and culvert details shall be inspected by the Fisheries Contract Specialist and a report shall be provided to the Contract Administrator weekly.



## 6.0 REFERENCES

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