



HIGHWAY 401 PLANNING STUDY EAST OF BROCKVILLE

GWP 4111-22-00

May 2026

Ministry of Transportation, Ontario

Transportation Environmental Study Report



TRANSPORTATION ENVIRONMENTAL STUDY REPORT

Highway 401 Planning Study East of Brockville
(GWP 4111-22-00)

May 2026



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THE PUBLIC RECORD
ONTARIO MINISTRY OF TRANSPORTATION
HIGHWAY 401 PLANNING STUDY EAST OF BROCKVILLE (GWP 4111-22-00)
TRANSPORTATION ENVIRONMENTAL STUDY REPORT

This Transportation Environmental Study Report (TESR) is available for review from June 4 to July 6, 2026, on the study website (www.hwy401eastofbrockville.ca) and at the following locations:

- Township of Elizabethtown-Kitley Public Library – Main Branch (4103 County Road 29, Brockville, Ontario)
- Ministry of Transportation Regional Office (1355 John Counter Blvd, Kingston, Ontario)

This project is being conducted in accordance with the *Class Environmental Assessment (EA) for Provincial Transportation Facilities and Municipal Expressways (2024)*, a process approved under Ontario’s Environmental Assessment Act, as outlined in Section 2.0 of this report. Classified as a Group “B” project under the same Class EA framework, this study follows the process accepted and approved under Ontario’s Environmental Assessment Act, which includes major improvements to existing transportation facilities, including highway improvements over land or water that provide a significant increase in traffic capacity or cause a significant widening of the “footprint” beyond the roadbed of an existing highway. This TESR fulfills the documentation requirements of the Class EA. In accordance with the requirements of the Class EA, this report is being submitted for a 30-day comment period from June 4 2026, to July 6, 2026.

Interested persons are encouraged to review this TESR and provide written comments to the study team by July 6, 2026. All comments and concerns should be sent directly to the following study team member:

David Brake
Senior Project Manager
Ministry of Transportation, Eastern Region
1355 John Counter Boulevard
Postal Bag 4000
Kingston, ON K7L 5A3
Tel: (613) 893-3031
Comments@hwy401eastofbrockville.ca

In addition, a request may be made to the Ministry of the Environment, Conservation and Parks (MECP) for an order requiring a higher level of study (i.e., requiring an individual/ comprehensive environmental assessment approval before being able to proceed), or that

conditions be imposed (e.g., requiring further studies), only on the grounds that the requested order may prevent, mitigate or remedy adverse impacts on constitutionally protected Aboriginal and treaty rights. Requests on other grounds will not be considered.

Requests should include the requester’s contact information, full name, and specify what kind of order is being requested (request for conditions or a request for an individual/ comprehensive environmental assessment), how an order may prevent, mitigate or remedy potential adverse impacts on Aboriginal and treaty rights, and any information in support of the statements in the request. This will ensure that the MECP is able to efficiently begin reviewing the request.

The request should be sent in writing or by email to the MECP contacts below, as well as copied to MTO:

Minister of the Environment, Conservation and Parks	Director, Environment Assessment Branch
Ministry of Environment, Conservation and Parks	Ministry of Environment, Conservation and Parks
777 Bay Street, 5 th Floor	135 St. Clair Ave. W, 1 st Floor
Toronto, ON M7A 2J3	Toronto, ON M4V 1P5
Minister.mecp@ontario.ca	EABDirector@ontario.ca

Upon reviewing comments received from the public, the Minister of Environment, Conservation and Parks may make a Section 16 Order on their own initiative within 30 days from the end of the comment period set out in the Notice of Completion. If no concerns or issues are outstanding within 30 days from the end of the comment period set out in the Notice of Completion, the project is considered to have met the requirements of the Class EA, and MTO may proceed to the design stage, subject to the commitments documented in the TESR, and obtain any outstanding environmental approvals.

If you have any accessibility requirements in order to participate in this project, please contact one of the Project Team members listed above. Comments and information are being collected to assist the MTO in meeting the requirements of the Ontario Environmental Assessment Act. Information will be collected in accordance with the Freedom of Information and Protection of Privacy Act. All comments will be maintained on file for use during the study and, with the exception of personal information, may be included in study documentation and become part of the public record.



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Environmental Specialist Reports that are on file with the Ministry and are available on the project website at hwy401eastofbrockville.ca include:

- Terrestrial Ecosystems Existing Conditions and Preliminary Impact Assessment Report (2025)
- Fish and Fish Habitat Existing Conditions and Preliminary Impact Assessment Report (2025)
- Air Quality Impact Assessment for the Highway 401 Planning Study East of Brockville (2026)
- Stage 1 Archaeological Assessment: Highway 401 Planning Study East of Brockville (2025)
- Cultural Heritage Resources Assessment Report: Highway 401 Planning Study East of Brockville (2025)
- Groundwater Assessment Report, Highway 401 Planning Study East of Brockville, Township of Elizabethtown-Kitley (2025)
- Noise Impact Assessment Report, Highway 401 East Brockville (2025)
- Contamination Overview Study – Highway, 401 Planning Study East of Brockville (2025)
- Landscape Composition Report, Highway 401 Planning Study East of Brockville (2026)
- Highway 401 East of Brockville (4111-22-00) – Erosion and Sediment Control Risk Assessment (2025)



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Executive Summary

General Description of Project

Stantec Consulting Ltd. has been retained by the Ministry of Transportation, Ontario (MTO) to undertake a Planning, Preliminary Design and Class Environmental Assessment (Class EA) Study for Highway 401 for the replacement and rehabilitation of one bridge and one culvert, and identifying the future Highway 401 footprint for an interim six lanes and ultimate eight lanes, from 0.75 km east of North Augusta Road to 3.3 km west of Maitland Road (approximately 2.6 km). The purpose of the study is to identify a Recommended Plan that addresses current and future transportation needs in the study area as part of the Ministry’s ongoing review of safety and operational needs for the provincial highway network.

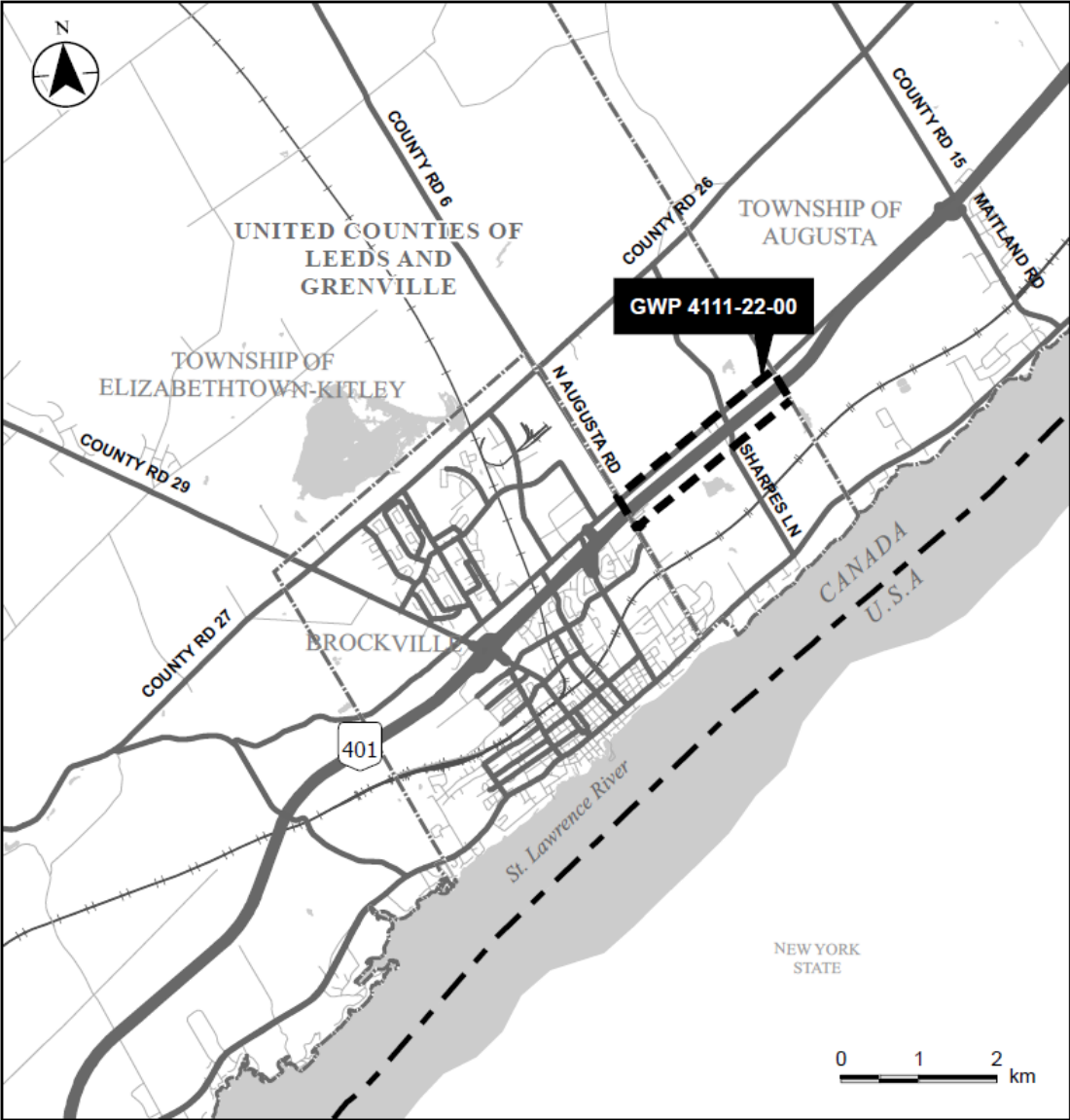
This *Transportation Environmental Study Report* (TESR) documents the decision-making process, and includes a description of the project purpose; the existing technical, natural, social, economic, and cultural environmental factors; identification and evaluation of alternatives that were considered; consultation activities, including a record of the comments received and how they were considered; the Recommended Plan; anticipated environmental effects and proposed mitigation measures; and, commitments to future work and monitoring.

Environmental Assessment Process

This Class EA Study was carried out under the requirements of the *Class Environmental Assessment (EA) for Provincial Transportation Facilities and Municipal Expressways* (2024) as a Group “B” undertaking, which includes major improvements to existing transportation facilities, including highway improvements over land or water that provide a significant increase in traffic capacity or cause a significant widening of the “footprint” beyond the roadbed of an existing highway.

Interested persons are encouraged to review this TESR and provide written comments to the study team by July 6, 2026. All comments and concerns should be sent directly to the following study team member:

David Brake
Senior Project Manager
Ministry of Transportation, Eastern Region
1355 John Counter Boulevard
Postal Bag 4000
Kingston, ON K7L 5A3
Tel: (613) 893-3031
Comments@hwy401eastofbrockville.ca



Study Area

In addition, a request may be made to the Ministry of the Environment, Conservation and Parks (MECP) for an order requiring a higher level of study (i.e., requiring an individual / comprehensive environmental assessment approval before being able to proceed), or that conditions be imposed (e.g., requiring further studies), only on the grounds that the requested order may prevent, mitigate or remedy adverse impacts on constitutionally protected Aboriginal and treaty rights. Requests on other grounds will not be considered.

Requests should include the requester’s contact information, full name, and specify what kind of order is being requested (request for conditions or a request for an individual / comprehensive environmental assessment), how an order may prevent, mitigate, or remedy potential adverse impacts on Aboriginal and treaty rights, and any information in support of the



May 2026

statements in the request. This will ensure that the MECP is able to efficiently begin reviewing the request.

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Minister of the Environment, Conservation and Parks Ministry of Environment, Conservation and Parks 777 Bay Street, 5 th Floor Toronto, ON M7A 2J3 Minister.mecp@ontario.ca	Director, Environment Assessment Branch Ministry of Environment, Conservation and Parks 135 St. Clair Ave. W, 1 st Floor Toronto, ON M4V 1P5 EABDirector@ontario.ca
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Upon reviewing comments received from the public, the Minister of Environment, Conservation and Parks may make a Section 16 Order on their own initiative within 30 days from the end of the comment period set out in the Notice of Completion. If no concerns or issues are outstanding within 30 days from the end of the comment period set out in the Notice of Completion, the project is considered to have met the requirements of the Class EA, and MTO may proceed to the design stage, subject to the commitments documented in the TESR, and obtain any outstanding environmental approvals.

Transportation Needs Assessment

The Transportation Needs Assessment process is part of the ongoing management and administration of the transportation systems by the Province. Assessment of needs can result in a number of recommendations, including initiating a study, initiating major or minor improvements, initiating routine maintenance, monitoring a situation, or doing nothing. Given the range of potential outcomes, the transportation needs assessment process includes the following:

- Identifying transportation challenges and opportunities
- Evaluating and selecting reasonable alternatives
- Developing potential transportation study objectives
- Initiating the study process

Challenges and Opportunities

This Class EA was initiated to address the following challenges and opportunities:

- Challenges

- The bridge and structural culvert in the study area are nearing the end of their service life and will require rehabilitation and/or replacement in the near future.
- The existing Highway 401 platform cannot accommodate the traffic staging required to rehabilitate or replace the bridge and structural culvert
- Opportunities
- Develop appropriate rehabilitation or replacement strategies to maintain the safe operation of the highway corridor for the current and future planning horizons
- Identify the ultimate footprint for the Highway 401 corridor to address current and future transportation needs

Evaluation of Alternatives

The Environmental Assessment Act requires that ‘reasonable alternatives’ be considered in addressing identified challenges and/or opportunities. This involves two (2) levels of analysis. The Alternatives to the Undertaking considers a broad range of alternatives that could address the project’s needs. Once the best alternative is selected, Alternative Methods of Carrying out the Undertaking are studied in greater detail.

Alternatives to the Undertaking

The Alternatives to the Undertaking considered as part of this assignment consisted of:

- Do Nothing
- Transportation Demand Management
- Improve Adjacent Road Systems
- Improve Provincial Transportation Facility

The Do Nothing, Transportation Demand Management, and Improve Adjacent Road Systems alternatives were not carried forward as they did not realistically address all the identified challenges and opportunities. Improving the Provincial Transportation Facility was carried forward, and Alternative Methods were developed as described in the following section.

Alternative Methods of Carrying out the Undertaking

Alternatives were developed to address the identified challenges and opportunities. The alternatives included:

Structure Alternatives – Sharpe’s Lane Bridge



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- Alternative 1a – Replace on Existing Alignment – Bridge Closed with Detour
- Alternative 1b – Replace on Existing Alignment – Bridge Open with Single Lane
- Alternative 2 – Replace on New Alignment – West
- Alternative 3 – Replace on New Alignment – East

Highway 401 Cross-Section

- Alternative 1 – Maintain Existing Median and Widen to the Outside
- Alternative 2 – Standard Median and Widen to the Inside and the Outside

Butler Creek Culvert

- Alternative 1 – Rehabilitate and Line Existing Culvert and Jack and Bore Twin Culverts
- Alternative 2 – Replace with New Culvert at Existing Location
- Alternative 3 – Replace with New Culvert East of Existing Location

All alternatives, further described in **Section 7.0** were carried forward for a detailed evaluation to identify a cost-effective improvement plan that provides safe operations and provides reasonable local access, while minimizing effects on the natural, social, and cultural environments. Following the evaluation of alternatives and consultation with the public, Indigenous communities, agencies, and community stakeholders, a Recommended Plan was selected.

Recommended Plan

The Recommended Plan includes the following:

- The replacement of the Sharpe's Lane underpass structure on the existing alignment, while maintaining a single lane open to traffic
- The replacement of the Butler Creek structural culvert with a new culvert to the east of the existing culvert location
- Future expansion of Highway 401 to an interim six (6) lane and ultimate eight (8) lane cross section
- Drainage improvements
- New noise barrier on the north side of Highway 401 from Oxford Avenue to Sharpe's Lane

A plan depicting the project is shown on **Figure 1**.

Public Consultation

The main objective of consultation in the Class EA process is to ensure that project information is shared in a meaningful way and that consideration is given to all aspects of the environment from the earliest stages of planning. To achieve this, a variety of communication strategies were used to engage the public, agencies, interest groups, property owners, and community members. Numerous opportunities for input were provided at key points during the study process, including two (2) online Public Information Centres (PICs). In addition, direct contact with the Project Team via mail, email, and phone was encouraged throughout the study.

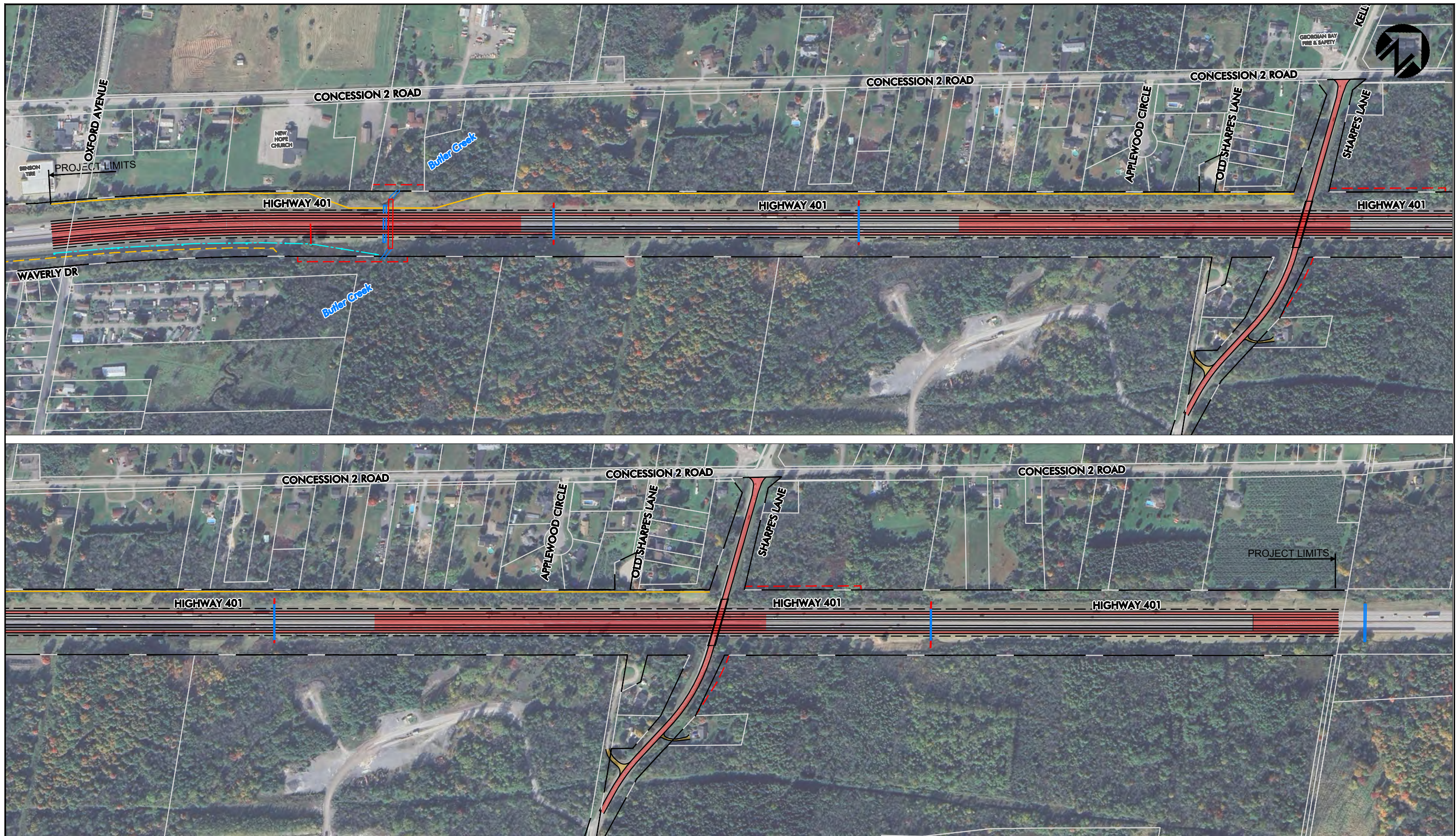
A project website (<https://hwy401eastofbrockville.ca>) was developed at the onset of the study to provide the public with access to project information. The project website was maintained throughout the study process, including project updates, notifications of public events, project team member contact information, online PICs, PIC materials, and links to project-specific documentation.

An outline of the public consultation activities is provided in **Section 4.0**.

Potential Environmental Effects, Proposed Mitigation, and Commitments to Future Work

Overall, due to the scope of the work, the project will result in minor environmental impacts that can be appropriately mitigated through standard protection and mitigation measures. Minor impacts that may occur include potential disturbance to local vegetation and wildlife adjacent to Highway 401 and temporary construction-related issues like noise, erosion, sedimentation, and the management of invasive species. A summary of environmental effects and proposed mitigation measures, as identified during the course of this study, is provided in Section 11.0, and forms a comprehensive list of commitments to be adhered to during the subsequent design phase of the project.





HIGHWAY 401 PLANNING STUDY, EAST OF BROCKVILLE
 from 0.75 km east of North Augusta Rd Interchange
 to 3.3 km west of Maitland Rd Interchange
 Preliminary Design & Class Environmental Assessment
 GWP 4111-22-00

- Limit of existing MTO right of way
- New Roadway - Initial (6-Lane Highway 401)
- New Roadway - Ultimate (8-Lane Highway 401)
- - - Property Required - Ultimate (8-Lane Highway 401)
- Driveway Modification

- Existing Culvert
- New Culvert / Extension
- - - Existing Noise Barrier
- New Noise Barrier
- - - New Storm Sewer

Recommended Plan
 Highway 401
 Elizabethtown-Kitley Township

SCALE 1:5000

Figure
1

May 2026

1.0 Overview of the Undertaking

1.1 Introduction

Stantec Consulting Ltd. has been retained by the Ministry of Transportation, Ontario (MTO) to undertake a Preliminary Design and Class Environmental Assessment (Class EA) Study for Highway 401 for the replacement and rehabilitation of one (1) bridge and one (1) culvert, and identifying the future Highway 401 footprint for an interim six (6) lanes and ultimate eight (8) lanes, from 0.75 km east of North Augusta Road to 3.3 km west of Maitland Road (approximately 2.6 km). This study looked at safety and operational needs for the provincial highway network, such as bridge and culvert rehabilitation / replacement, and implementing a noise barrier.

This study included reviewing existing conditions, developing and evaluating cross-section and bridge improvement alternatives, and developing environmental protection and mitigation measures. A Recommended Plan will be confirmed and designated (protected) at the completion of the study.

1.2 General Description of the Project

The purpose of this study is to identify a Recommended Plan for improvements as part of the Ministry’s ongoing review of safety and operational needs for the provincial highway network.

This study is a “Group B” project under the *Class Environmental Assessment (EA) for Provincial Transportation Facilities and Municipal Expressways* (2024) and includes undertaking environmental and engineering field investigations and seeking input from Indigenous communities, the public, stakeholders, municipalities, and government agencies. This study included a review of existing conditions and a Transportation Needs Assessment to determine the scope and extent of the structural / bridge replacement and the highway expansion. A set of alternatives was developed and evaluated, and a Preferred Plan was selected. The MTO will continue to monitor the facilities in the study area and may implement certain components of the plan when needed to meet provincial transportation needs.

1.2.1 Study Area

The study area is located in the Township of Elizabethtown-Kitley, east of Brockville, in the United Counties of Leeds and Grenville. The project is located along Highway 401 from 0.75 km east of North Augusta Road to 3.3 km west of Maitland Road (approximately 2.6 km), as shown in **Figure 2**.

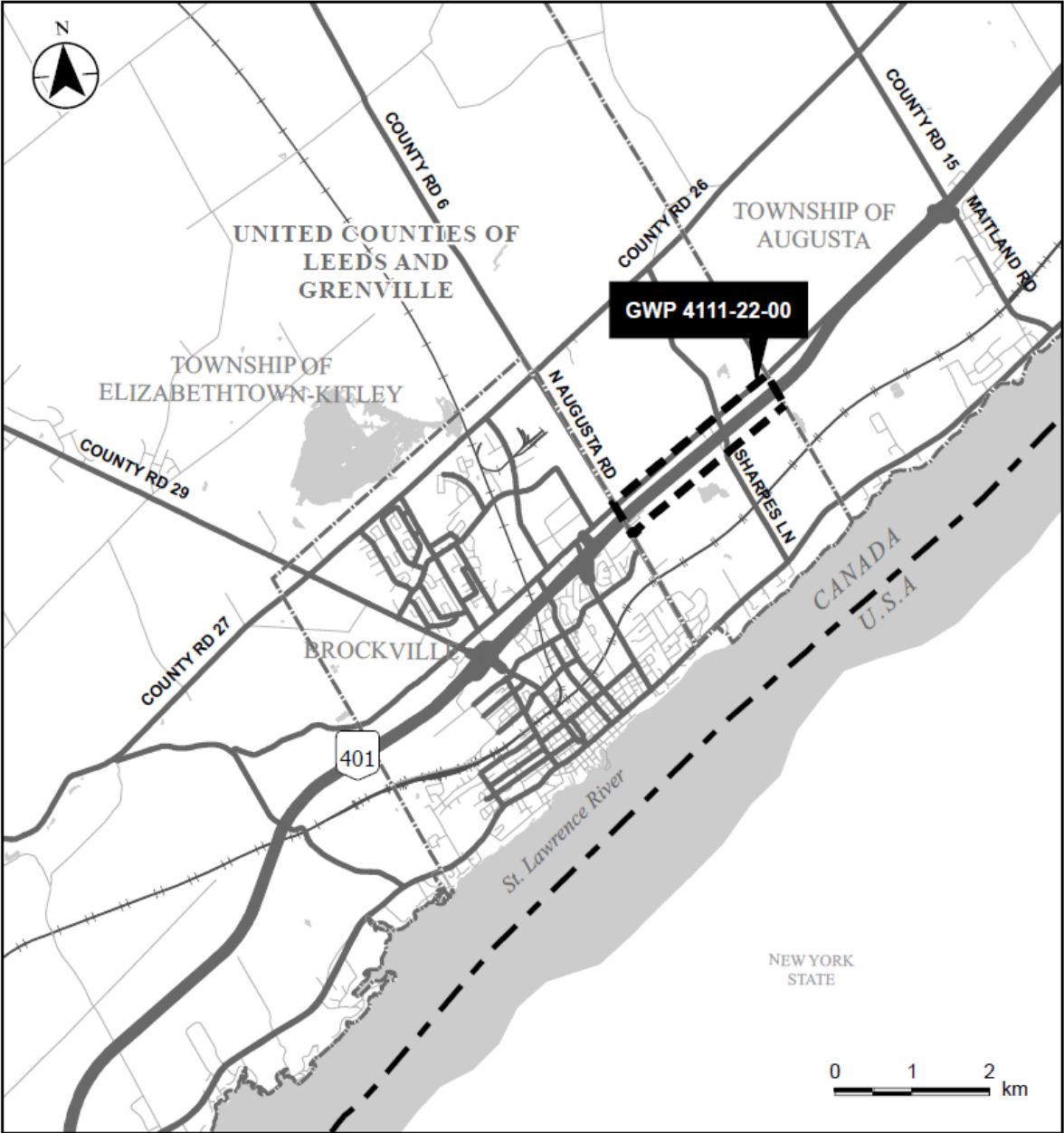


Figure 2: Study Area Location Plan

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1.3 Project Background

Highway 401 is a controlled-access 400-series provincial highway extending 830 km from Windsor in southwestern Ontario to the Quebec border. The highway and its associated structures were originally constructed in the 1950s and 1960s. As several structures are approaching the end of their service life, a comprehensive replacement plan is required. The project area encompasses the established four (4) lane Highway 401 footprint, including the Sharpe's Lane Bridge and the Butler Creek culvert. This study integrates findings from previously completed studies in adjacent areas, and the recommended plans from those studies are taken into account when evaluating alternative solutions, particularly with respect to Highway 401 footprint expansion options.

1.4 Purpose of the Transportation Environmental Study Report

This *Transportation Environmental Study Report* (TESR) documents the decision-making process, and includes a description of the project purpose; the existing technical, natural, social, economic, and cultural environmental factors; identification and evaluation of alternatives that were considered; consultation activities, including a record of the comments received and how they were considered; the Recommended Plan; anticipated environmental effects and proposed mitigation measures; and, commitments to future work and monitoring.

The TESR fulfills the documentation requirements of the Class EA process for a Group "B" project. The TESR is filed for a 30-day comment period. If you have any questions and/or concerns regarding this study, please contact the following individual:

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Senior Project Manager
Ministry of Transportation, Eastern Region
1355 John Counter Boulevard
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Interested persons may provide written comments to the study team by July 6, 2026.

In addition, a request may be made to the Ministry of the Environment, Conservation and Parks (MECP) for an order requiring a higher level of study (i.e., requiring an individual / comprehensive environmental assessment approval before being able to proceed), or that conditions be imposed (e.g., requiring further studies), only on the grounds that the requested order may prevent, mitigate or remedy adverse impacts on constitutionally protected Aboriginal and treaty rights. Requests on other grounds will not be considered.

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Minister of the Environment, Conservation and Parks

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

Director, Environment Assessment Branch

Ministry of Environment, Conservation and Parks
135 St. Clair Ave. W, 1st Floor
Toronto, ON M4V 1P5
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1.4.1 Environmental Clearance

If there are no significant concerns following the Public Comment Period, or once the Minister of the Environment, Conservation and Parks has reviewed and considered any Section 16 Requests, the project may be eligible for Environmental Clearance and continue to move forward. This will permit MTO to:

- Negotiate temporary and permanent property acquisition, consistent with the project needs (including ROW designation)
- Relocate utilities
- Initiate subsequent study stages (i.e., detail design) for the Recommended Plan

Although the timeline for implementing the results of this study is not confirmed, this planning will assist MTO, municipalities, Indigenous communities, business owners, and private landowners with future planning and development within the study area. The improvements identified in the recommended plan are currently not on the Ministry's five (5) year capital construction plan. The implementation of the identified improvements is dependent on regional and provincial priorities and available funding.



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2.0 Class Environmental Assessment Process

2.1 Classification of Project

This Preliminary Design and Class Environmental Assessment (EA) Study was carried out under the requirements of the Class Environmental Assessment for Provincial Transportation Facilities and Municipal Expressways (2024), which is illustrated in **Figure 3**. Based on the nature and extent of the project, the MTO Class EA document specifies different groups under which projects may be planned, and the assessment process required for each. Provided that this process is followed and its requirements are met for a project, the requirements of the Ontario Environmental Assessment Act are considered to be met. This project is being carried out following the requirements of the Class EA as a Group “B” undertaking, which includes major improvements to existing transportation facilities, including highway improvements over land or water that provide a significant increase in traffic capacity or cause a significant widening of the “footprint” beyond the roadbed of an existing highway.

For additional information on the MTO Class EA process, the public may contact the Project Team (contact information provided in **Section 1.4**). In addition, the following documents are available to assist with understanding the process:

- Class Environmental Assessment for Provincial Transportation Facilities and Municipal Expressways, MTO, February 2024
- Environmental Reference for Highway Design, MTO, 2006, updated in June 2013
- Code of Practice for Preparing, Reviewing, and using Class Environmental Assessments in Ontario, MOE, January 2014

These publications are available from the MTO Research Library Online Catalogue (library.mto.gov.on.ca/) and from Publications Ontario (publications.gov.on.ca).

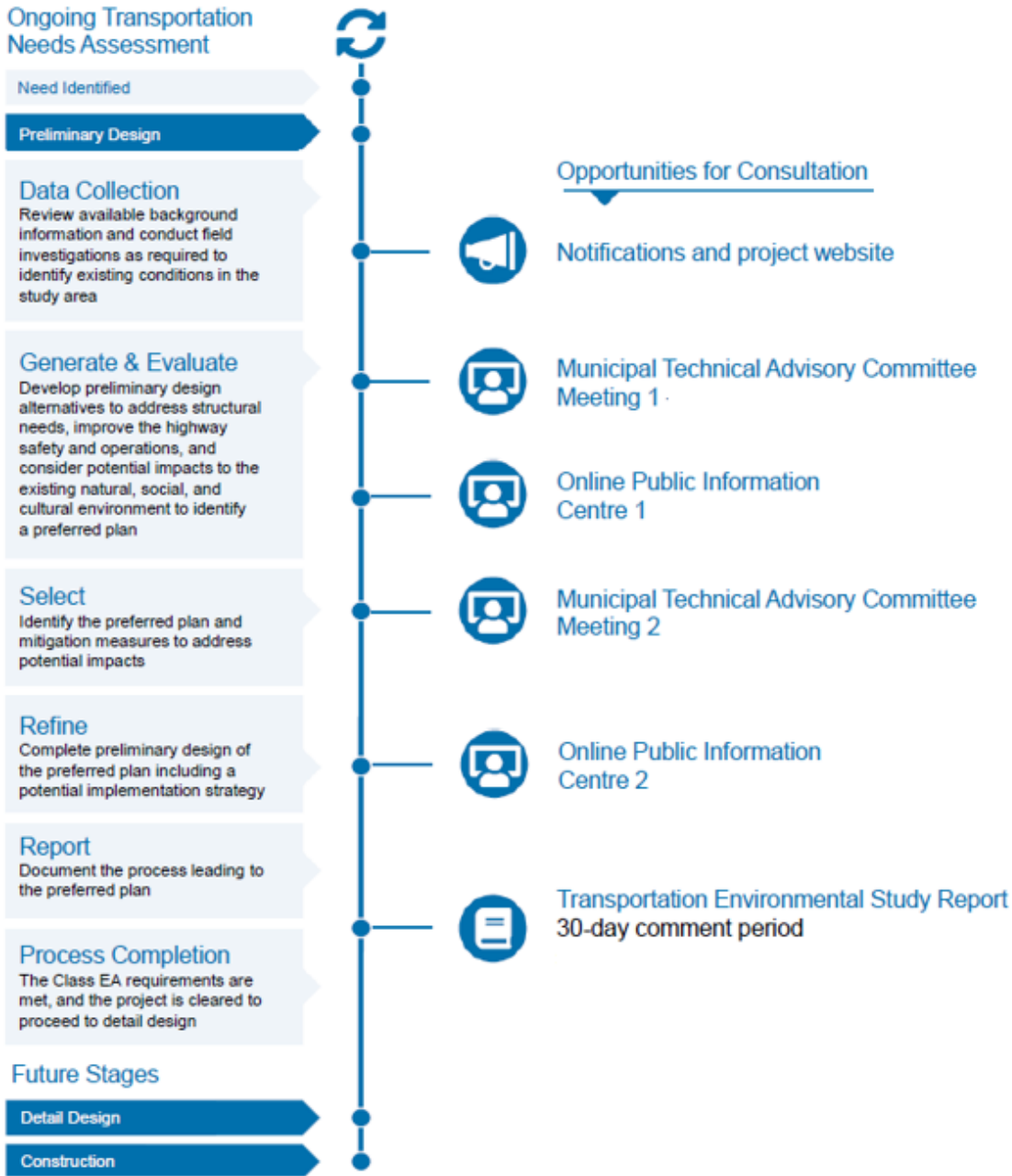


Figure 3: Class EA Process, Group B Undertaking

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2.2 Environmental Assessment Approvals and Regulations

A Preliminary Design and Class EA Study of this type must be carried out in accordance with applicable environmental legislation and the current government policies and procedures. The policies and legislation that apply to this study are described below.

2.2.1 Canadian Impact Assessment Act

The *Canadian Impact Assessment Act*, 2019 (IAA 2019) and its regulations establish the legislative basis for the federal environmental assessment process. Under IAA 2019, an environmental assessment is only required for projects included in the list of “designated projects”. These types of projects are likely to have significant adverse environmental effects and, therefore, may be subject to a federal EA.

A proponent is not required to complete the federal EA process if a project is not on this list. This project does not fall under the list of designated projects.

2.2.2 Ontario Environmental Assessment Act

The Ontario *Environmental Assessment Act* (EAA) governs the conduct of planning studies in the province of Ontario. The purpose of the EAA is to make sure that:

- A reasonable and traceable planning process is followed
- The need for the project is demonstrated
- The public has input into the process and investigations
- The study includes a review of a full range of alternatives
- The selected alternative minimizes any environmental impacts or provides mitigation strategies to minimize impacts resulting from the improvements

2.2.3 Permits and Approvals

Undertaking an EA also requires consideration of other approvals and review agencies, as outlined below.

2.2.3.1 Federal Legislation

- Fisheries Act, Best Management Practices (BMPs), or a detailed Fisheries Assessment and Department of Fisheries and Oceans (DFO) review may be required

2.2.3.2 Provincial Review / Policy Requirements

- Provincial Policy Statement (2024)
- Ministry of the Environment, Conservation and Parks (MECP) – EAA, Environmental Protection Act, Ontario Water Resources Act, Endangered Species Act, Permits to Take Water
- Ontario Access and Privacy Office – Freedom of Information and Protection of Privacy Act and Accessibility for Ontarians with Disabilities Act
- Ministry of Natural Resources (MNR) MTO Fisheries Protocol, Ontario Wetlands Policy, Species Conservation Act (SCA)
- Ministry of Citizenship and Multiculturalism (MCM) – Ontario Heritage Act (OHA)

2.2.3.3 Municipal Policy

While MTO is not required to obtain approvals or exemptions for municipal Official Plans, bylaw exemptions and/or policies, municipal policies and plans are considered as part of the Class EA study process.

2.2.4 Indigenous Rights

Indigenous rights and interests related to the natural and cultural environment have been considered through assessment of potential effects on lands, waters, vegetation, wildlife habitat, and areas that may support traditional or cultural activities, along with targeted Indigenous community consultation undertaken as part of the Class EA process. These activities provided opportunities for Indigenous communities to review and comment on existing conditions, alternatives, potential environmental effects, and proposed mitigation measures. Indigenous consultation has been undertaken in accordance with the Class EA process, as summarized in **Section 5.0** of this report. Engagement will continue during the next stage of design, beginning at the initiation of detailed design and construction planning. For additional details, refer to **Section 9.0**.



3.0 Transportation Needs Assessment

The Transportation Needs Assessment process is part of the ongoing management and administration of the transportation systems by the province. Assessment of needs can result in a number of recommendations, including initiating a study, initiating major or minor improvements, initiating routine maintenance, monitoring a situation, or doing nothing. Given the range of potential outcomes, the transportation needs assessment process includes the following:

- Identifying transportation problems and opportunities
- Evaluating and selecting reasonable alternatives, including ‘do nothing’
- Developing potential transportation study objectives
- Initiating the study process

This section of the report provides an overview of the Transportation Needs Assessment and assessment of Alternatives to the Undertaking that led to the initiation of this study.

3.1 Challenges and Opportunities

This Class EA was initiated to address the following challenges and opportunities with the existing structural/bridge replacement:

- Challenges
 - The bridge and structural culvert in the study area are nearing the end of their service life and will require rehabilitation and/or replacement in the near future.
 - The existing Highway 401 platform cannot accommodate the traffic staging required to rehabilitate or replace the bridge and structural culvert
- Opportunities
 - Develop appropriate rehabilitation or replacement strategies to maintain the safe operation of the highway corridor for the current and future planning horizons
 - Identify the ultimate footprint for the Highway 401 corridor to address current and future transportation needs

3.2 Alternatives to the Undertaking

The Environmental Assessment Act requires that ‘reasonable alternatives’ be considered in addressing identified problems and/or opportunities. This involves two (2) levels of analysis. The Alternatives to the Undertaking considers a broad range of alternatives that could address

the project's needs. Once the best alternative is selected, the Alternative Methods of carrying out the Undertaking are studied in greater detail.

The Alternatives to the Undertaking identified for this study are listed below:

- Do Nothing
- Keep existing facility as is
- Transportation Demand Management (TDM)
 - TDM shifts demand on the highway network by shifting demands to the time periods outside of the critical congestion periods and shifting demand to alternative modes of transportation
- Improve Adjacent Road Systems
- Expansion of existing municipal and regional road networks
- Improve Provincial Transportation Facility
- Replace existing bridge and culvert to accommodate the Highway 401 footprints of interim six (6) and ultimate eight (8) lanes

A process has been developed to evaluate the conceptual options and select only the most reasonable alternatives for more detailed study. This process allows unreasonable alternatives or alternatives that do not meet provincial policy requirements to be eliminated from consideration in advance of the detailed development of alternatives and the evaluation stage.

The preliminary assessment of the alternatives to the undertaking uses the following screening criteria:

- Does the option realistically address all the problems and opportunities?
- Does the option make a significant contribution towards realistically addressing all of the problems and opportunities?

Only those alternatives that satisfy at least one of the above criteria were carried forward.

The assessment of Alternatives to the Undertaking, along with recommendations, is summarized in **Table 1**.



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Table 1: Screening Assessment of Alternatives to the Undertaking

Alternatives to the Undertaking	Does it Address the Challenges / Opportunities?
Do Nothing Keep existing facility as-is.	× Does not address structural replacement needs and anticipated future growth needs Do not carry forward.
Transportation Demand Management (TDM) TDM shifts demand on the highway network by shifting demands to the time periods outside of the critical congestion periods, and shifts demand to alternative modes of transportation.	× Does not address structural replacement needs and anticipated future growth needs. Do not carry forward.
Improve Adjacent Road Systems Expansion of existing municipal and regional road networks.	× Does not address structural replacement needs and anticipated future growth needs. Do not carry forward.
Improve Provincial Transportation Facility Replace existing bridge and culvert to accommodate the Highway 401 footprint of interim six and ultimate eight lanes	✓ Addresses structural replacement needs and anticipated future growth needs. Carry forward.



4.0 Public Consultation

The main objective of consultation in the Class EA process is to ensure that project information is shared in a meaningful way and that consideration is given to all aspects of the environment from the earliest stages of planning. Communication with potentially impacted and/or interested parties is key in the planning process and provides a mechanism for the proponent to define and respond to issues prior to key decisions being made. Recognizing this, the study team initiated a comprehensive program from the onset of the study, as described herein.

All interested parties were offered early and ongoing opportunities to review study information and provide input to the decision-making process. To achieve this, a variety of communication strategies were used to engage the public, agencies, interest groups, property owners, and community members. As a first step, a Consultation Plan was developed and described the following elements:

- Study notifications (Notices of Study Commencement, Online Public Information Centre (PIC) 1, Online PIC 2, and TESR 30 Day Comment Period / Notice of Completion
- Communication with external agencies in order to obtain pertinent technical information and identify the requirement for legislative or regulatory approvals related to the undertaking
- Two (2) Municipal Technical Advisory Committee (September 5, 2024, and July 8, 2025)
- Communication with affected property owners where a temporary or permanent interest in the property is required
- Communication with local residents and businesses
- Two (2) Online Public Information Centres (October 2, 2024 - November 8, 2024, and July 17 – August 30, 2025)

A copy of all public notification materials is provided in **Appendix B**.

All input received was incorporated into the project findings and recommendations, as appropriate, and responses were provided to all input received.

All project correspondence to/from the public was collected in accordance with the *Freedom of Information and Protection of Privacy Act*. Accordingly, with the exception of personal information, all public comments form part of the public record.

4.1 Project Website

A project website (<https://hwy401eastofbrockville.ca>) was developed at the onset of the study to provide the public with easy access to project information, which was maintained throughout the study process, including background information, project team member contact information, PIC

materials, links to project-specific documentation (i.e., study notifications, EA processes, TESR), and supplementary information.

4.2 Project Email Address

The project website allowed interested parties to contact the project team directly through the dedicated project email address (comments@hwy401eastofbrockville.ca).

4.3 Notice of Study Commencement

The purpose of the Notice of Study Commencement was to inform the public and external agencies about the study and to seek initial input in relation to the study. The notice briefly outlined the objective of the study, the Class EA process, the study area location map, and contact information for project team representatives.

The Notice of Study Commencement was communicated via newspaper advertisements in the *Brockville Recorder & Times / Brockville This Week* on May 1, 2024. It was also posted on the project website. A hard copy of the notice was also sent to approximately 2,148 residents and business owners during the week of May 1, 2024, via Canada Post unaddressed admail.

Individual notification letters were also sent to federal, provincial, and municipal agencies, property owners, and stakeholder groups that were expected to have an interest in the study on April 19, 2024. Letters to agencies requested information on the environmental (i.e., natural, social, or cultural) features of the study area and sought their input on the project. The correspondence included a flyer with additional information about the study, including a map of the study area.

The following external agencies and stakeholders also received an agency comment sheet, requesting input:

Provincial Agencies

- | | |
|---|---|
| • Ministry of Natural Resources | • Ministry of the Environment, Conservation and Parks |
| • Ministry of Indigenous Relations and Reconciliation | • Ministry of Citizenship and Multiculturalism |

Municipal Agencies

- Township of Elizabethtown-Kitley – Clerk, Chief Administrative Officer, Planning Administrative Assistant, Planner, Public Works Manager
- United Counties Leeds and Grenville – CAO, Director of Public Works, Public Works – Admin Assistant, Manager of Planning Services, Housing Manager

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- City of Brockville – Supervisor of Engineering, Supervisor of Transportation Services, Director of Operations, Executive Assistant to the Mayor and City Manager, Chief Planning Officer
- Cataraqui Regional Conservation Authority

Local Elected Representatives

- MPP – Leeds and Grenville Thousand Island and Rideau Lakes

Emergency Services

- | | |
|--|--|
| • Ontario Provincial Police, Leeds County (Brockville) | • Leeds and 1000 Islands Fire Department |
| • Ontario Provincial Police, Thousand Islands | • Augusta Fire Department |
| • Ontario Provincial Policy, Rideau Lakes | • Township of Elizabethtown-Kitley Fire Department |
| • Leeds Grenville Paramedic Services | |

School Boards/ Bus Service

- | | |
|--|--|
| • Upper Canada District School Board | • Catholic District School Board of Eastern Ontario |
| • Conseil des écoles catholiques du Centre-Est | • Student Transportation Services of Eastern Ontario |

Other Stakeholders

- | | |
|---|---|
| • Brockville & District Chamber of Commerce | • Grenville County Historical Society Inc |
| • Leeds and Grenville Economic Development | • Grenville Snowmobile Association |
| | • Leeds County Federation of Agriculture |
| • Ontario Trucking Association | • Ontario Federation of Agriculture |
| • Coach Canada | • Lafarge Canada Inc. |

A copy of the agency mailing list is provided within **Appendix B**.

It should be noted that staff from the County of Leeds and Grenville, the Township of Augusta, the City of Brockville, and the Township of Elizabethtown-Kitley were kept informed throughout the duration of the study. Council meetings with the Township of Elizabethtown-Kitley were planned for each PIC. Where required, additional meetings were held with relevant agencies or municipalities to discuss project-specific issues.

A total of 15 letters, emails, and phone calls were received following the Notice of Study Commencement up to and beyond the requested submission date of June 27, 2024. A copy of the comments received from agencies, the public, and associated responses is provided in **Appendix C**. A copy of the notices issued in relation to the study commencement is provided in **Appendix B**. A copy of the public and agency correspondence received following the Notice of Study Commencement is located in **Appendix C**.

4.4 Public Information Centre 1

The first PIC was held online with a pre-recorded presentation on October 2, 2024, on the study website (hwy401eastofbrockville.ca). The purpose of the PIC was to generally introduce the project and associate background information, present and gather feedback on the problems and opportunities, the study area's existing conditions, and the preliminary design alternatives.

The notice and cover letter were sent via mail and email to the MPP for Leeds-Grenville-Thousand Islands and Rideau Lakes on September 17, 2024, and to representatives of external agencies, businesses, and members of the public on September 25, 2024. A hard copy of the notice was also sent to approximately 2,126 residents and business owners during the week of September 23, 2024, via Canada Post unaddressed admail.

Notices to advise the public of the first PIC were published in the following papers:

- Brockville Recorder & Times (October 3, 2024)
- Brockville This Week (October 3, 2024)

The cover letter and Notice of PIC 1 provided information about the PIC, including its purpose, date of uploading of the PIC, as well as information on accessing the presented materials on the study website.

Comments regarding the PIC presentation were requested to be submitted by November 8, 2024.

In total, nine (9) letters and emails were received following PIC 1 and by the requested submission date of November 8, 2024. Additionally, a comment form was available online. In general, comments included concerns for noise impacts and noise barriers, and requests to be added to the project mailing list.

A copy of the information displayed at PIC 1, as well as the feedback received at and following PIC 1, is provided in **Appendix E**.

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4.5 Public Information Centre 2

The second PIC was held online with a pre-recorded presentation on July 17, 2025, on the study website (hwy401eastofbrockville.ca). The purpose of PIC 2 was to present and gather feedback on the study overview and the process being followed; the evaluation of structural / bridge replacement and highway expansion alternatives; the technically preferred plan; and the preliminary environmental protection and mitigation measures.

The notice and cover letter were sent via mail and email to the MPP for Leeds-Grenville-Thousand Islands and Rideau Lakes on July 2, 2025, and to representatives of external agencies, businesses, and members of the public on July 8, 2025. A hard copy of the notice was also sent to approximately 2,126 residents and business owners during the week of July 8, 2025, via Canada Post unaddressed admail.

Four (4) potentially impacted property owners were invited to participate in the second online PIC and to contact the members of the project team and MTO Property Section representatives in advance of the PIC to discuss the preferred plan, the MTO process to purchase property, entrance changes, and potential construction impacts.

Notices to advise the public of the second PIC were published in the following papers:

- Brockville Recorder & Times (July 17, 2025)
- Brockville This Week (July 17, 2025)

The cover letter and Notice of PIC 2 provided information about the PIC, including its purpose, date of uploading of the PIC, as well as information on accessing the presented materials on the study website.

Comments regarding the PIC presentation were requested to be submitted by August 30, 2025.

A total of seven (7) emails and letters were received following PIC and by the requested submission date of August 30, 2025. In general, comments included noise impacts, noise barriers, and potential impacts to property. A copy of the information displayed, as well as the comments received, and the associated responses, is provided in **Appendix C**.

4.6 Municipal Consultation

In addition to providing local municipal staff notification of key study milestones and/or consultation events, virtual presentations were made to the Township of Elizabethtown-Kitley Council in advance of PICs, on September 23, 2024, and August 11, 2025, and included an overview of the information to be shared at the associated PIC, followed by a question-and-answer period. Two Municipal Technical Advisory Committee meetings were also organized in advance of each PIC.

A copy of the information shared at each meeting, including a summary of the feedback received is provided in **Appendix B**.

4.6.1 Municipal Technical Advisory Committee Meeting 1

The first Municipal Technical Advisory Committee (MTAC) meeting was held virtually on September 5, 2024, in advance of the first PIC. Municipal and regional staff members and emergency service providers were invited to attend that meeting, and members of the project team and MTO representatives were present to discuss the project overview for the first PIC. Representatives were present from the Township of Elizabethtown-Kitley, including the Administrator, Clerk, Fire Chief, and Planning Department staff, along with staff from the United Counties of Leeds and Grenville, the City of Brockville, the Augusta Township Fire Chief, the Cataraqui Region Conservation Authority, the Ontario Provincial Police, and local school boards. The following items were discussed at the meeting:

- Stantec staff members provided a presentation on the project, including the study purpose and process, the preliminary alternatives, and the evaluation process and evaluation criteria.
- United Counties of Leeds and Grenville noted that a project Notice indicated that the area west of Maitland is within the study area. They noted that they have a particular interest in improvements to the area around Blue Church Road. The Ministry noted that the area is part of a different MTO Class EA Study and provided the information for that study.
- Ontario Federation of Agriculture indicated that farmers may have concerns with a temporary full closure of the underpass due to reducing access for farm equipment, traffic being detoured into rural areas, and the potential resultant impacts to road safety.
- United Counties of Leeds and Grenville indicated that an aggregate company (Lafarge) has a quarry in the area and that, although the main access is from County Road 2, there is another access road on Sharpe’s Lane due to the need for haul routes to avoid the Town of Prescott. They believe that Lafarge uses Sharpe’s Lane and the underpass significantly and recommend consultation with Lafarge. Lafarge is included on the project mailing list.

A copy of the notes taken at this meeting is provided in **Appendix B**.

4.6.2 Municipal Technical Advisory Committee Meeting 2

The second Municipal Technical Advisory Committee (MTAC) meeting was held virtually on July 8, 2025. Representatives from the Elizabethtown-Kitley Fire Department, the Counties of Leeds and Grenville, including the Manager of Engineering, Chief of Paramedic Services, and Economic Development Manager; the City of Brockville’s Director of Operations and Public Works Supervisor, the Township of Augusta, and the Cataraqui Conservation Authority were present at the meeting.

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The following were discussed at the meeting:

- Stantec presented the evaluation of alternatives, the evaluation process, and preliminary evaluation criteria to be used for the study. Evaluations were presented for Sharpe’s Lane Bridge, Highway 401 Cross-Section, and Bulter Creek Culvert.
- Stantec presented the Technically Preferred Plan, which includes the replacement of Sharpe’s Lane bridge over Highway 401 with one lane open to traffic during construction, and the replacement of Butler Creek Culvert to accommodate the Highway 401 widening.
- The City of Brockville strongly emphasised that the Project team reconsider the detour route due to challenging road conditions (and the need for daily OPP traffic direction) within the City of Brockville. Stantec and MTO indicated that the EDR would still be shown, but details would be confirmed as part of Detail Design. A copy of the notes taken at this meeting is provided in Appendix B.

4.7 Agency Correspondence

A number of agencies were consulted to verify the existing conditions of the study area and to solicit feedback throughout the study on the alternatives and requirements of the area. **Table 2** summarizes the agency correspondence for this project.

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Table 2: Agency Correspondence

Contact Information	Issue / Concern	Response / Action taken by Project Team
Ministry of the Environment, Conservation and Parks (MECP)	- Emailed July 17, 2024 - Confirmed NOSC email - Provided Preliminary comments	- Notice of Study Commencement (NOSC) sent May 1, 2024 - Emailed to note that the Project Information Form has been sent to the eanotification.eregion@ontario.ca (May 1, 2024) - PIC 1 notification sent September 25, 2024 - PIC 2 notification sent July 8, 2025
Infrastructure Ontario	- Emailed June 25, 2024 - Asked to be added to the mailing list	- PIC 1 notification sent September 25, 2024 - PIC 2 notification sent July 8, 2025
Heritage Planner Citizenship, Inclusion and Heritage Division Ministry of Citizenship and Multiculturalism Ontario Public Service (MCM)	- Emailed May 31, 2024 - Confirmed NOSC email - Notified Stantec that cultural heritage matters have been transferred from the Ministry of Tourism, Culture and Sport to the Ministry of Citizenship and Multiculturalism - Asked to confirm that the study area has been screened for potential cultural heritage resources - Emailed July 5, 2024 - Noted that the technical cultural heritage studies should be sent to MCM prior to issuing the Notice of Completion. - Emailed October 21, 2024 - Confirmed PIC 1 notification - Noted that the Stage 1 archaeological assessment (under Project Information Form number P394-0122-2024) has yet to be submitted by your licensed archaeologist for MCM's review	- Notice of Study Commencement (NOSC) sent May 1, 2024 - PIC 1 notification sent September 25, 2024 - Confirmed that a Stage 1 Archaeological Assessment and Cultural Heritage Resource Assessment Report are undergoing internal review and will be submitted to MCM before the Notice of Completion - PIC 2 notification sent July 8, 2025
District Manager Conservation Program Advisor Ministry of Natural Resources, Peterborough District	- Emailed May 2, 2024, noting the following: - MNR confirmed NOSC - MNR did not complete a screening of natural heritage or other resource values	- Notice of Study Commencement (NOSC) sent May 1, 2024 - Confirmed that the project team will review the LIO website, Ontario Oil, Gas and Salt Resources Library, the Public Lands Act & Lakes and Rivers Improvement Act, and the Fish and Wildlife Conservation Act - Confirmed that Natural Environmental studies (terrestrial ecosystems, fish and fish habitat) will be completed for this study and will be documented in the Transportation Environmental Study Report (TESR).

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Contact Information	Issue / Concern	Response / Action taken by Project Team
		• PIC 1 notification sent September 25, 2024 • PIC 2 notification sent July 8, 2025
Cataraqui Region Conservation Authority	• Attended MTAC # 2 (July 8, 2025)	• Notice of Study Commencement (NOSC) sent May 1, 2024 • MTAC #1 (July 3, 2024) Meeting Invite • PIC 1 notification sent September 25, 2024 • MTAC #2 (June 18, 2025) Meeting Invite • Attended MTAC # 2 (July 8, 2025) • PIC 2 notification sent July 8, 2025
St. Lawrence Parks Commission		• Notice of Study Commencement (NOSC) sent May 1, 2024 • PIC 1 notification sent September 25, 2024 • PIC 2 notification sent July 8, 2025
Algonquin to Adirondacks Collaborative		• Notice of Study Commencement (NOSC) sent May 1, 2024 • PIC 1 notification sent September 25, 2024 • PIC 2 notification sent July 8, 2025
Ontario Provincial Police – Leeds County (Brockville)		• Notice of Study Commencement (NOSC) sent May 1, 2024 • MTAC #1 (July 3, 2024) Meeting Invite • PIC 1 notification sent September 25, 2024 • MTAC #2 (June 18, 2025) Meeting Invite • PIC 2 notification sent July 8, 2025
Ontario Provincial Police – Rideau Lakes		• Notice of Study Commencement (NOSC) sent May 1, 2024 • MTAC #1 (July 3, 2024) Meeting Invite • PIC 1 notification sent September 25, 2024 • MTAC #2 (June 18, 2025) Meeting Invite • PIC 2 notification sent July 8, 2025
Ontario Provincial Police – Thousand Islands		• Notice of Study Commencement (NOSC) sent May 1, 2024 • MTAC #1 (July 3, 2024) Meeting Invite • PIC 1 notification sent September 25, 2024

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Contact Information	Issue / Concern	Response / Action taken by Project Team
		• MTAC #2 (June 18, 2025) Meeting Invite • PIC 2 notification sent July 8, 2025
Township of Elizabethtown-Kitley Fire Department	• Attended MTAC # 1 (September 5, 2024) ○ Noted that the Township of Elizabethtown-Kitley has an agreement with the City of Brockville for emergency service response in the area. They noted that although it would be preferable to keep the underpass open, the impact of a temporary full closure would likely be minor. • Attended MTAC # 2 (July 8, 2025)	• Notice of Study Commencement (NOSC) sent May 1, 2024 • MTAC #1 (July 3, 2024) Meeting Invite • Attended MTAC # 1 (September 5, 2024) • PIC 1 notification sent September 25, 2024 • MTAC #2 (June 18, 2025) Meeting Invite • Attended MTAC # 2 (July 8, 2025) • PIC 2 notification sent July 8, 2025
Augusta Fire Department	• Attended MTAC # 1 (September 5, 2024) • Attended MTAC # 2 (July 8, 2025)	• Notice of Study Commencement (NOSC) sent May 1, 2024 • MTAC #1 (July 3, 2024) Meeting Invite • Attended MTAC # 1 (September 5, 2024) • PIC 1 notification sent September 25, 2024 • MTAC #2 (June 18, 2025) Meeting Invite • Attended MTAC # 2 (July 8, 2025) • PIC 2 notification sent July 8, 2025
Leeds and 1000 Islands Fire Department		• Notice of Study Commencement (NOSC) sent May 1, 2024 • MTAC #1 (July 3, 2024) Meeting Invite • PIC 1 notification sent September 25, 2024 • MTAC #2 (June 18, 2025) Meeting Invite • PIC 2 notification sent July 8, 2025
Counties of Leeds Grenville Paramedic Service	• Attended MTAC # 2 (July 8, 2025)	• Notice of Study Commencement (NOSC) sent May 1, 2024 • MTAC #1 (July 3, 2024) Meeting Invite • PIC 1 notification sent September 25, 2024 • MTAC #2 (June 18, 2025) Meeting Invite • PIC 2 notification sent July 8, 2025
Township of Elizabethtown-Kitley Chief Administrator Deputy Clerk		• Notice of Study Commencement (NOSC) sent May 1, 2024 • MTAC #1 (July 3, 2024) Meeting Invite

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Contact Information	Issue / Concern	Response / Action taken by Project Team
Planning Administrative Assistant Planner Public Works Manager		• PIC 1 notification sent September 25, 2024 • MTAC #2 (June 18, 2025) Meeting Invite • PIC 2 notification sent July 8, 2025
United Counties of Leeds and Grenville CAO Director of Public Works Public Works – Admin Assistant Manager of Planning Services Interim Director of Public Works Planner Housing Manager Economic Development Manager	• Attended MTAC # 1 (September 5, 2024) ○ Indicated that an aggregate company (Lafarge) has a quarry in the area and that, although the main access is from County Road 2, there is another access road on Sharpe’s Lane due to the need for haul routes to avoid the Town of Prescott. • Attended MTAC # 2 (July 8, 2025)	• Notice of Study Commencement (NOSC) sent May 1, 2024 • MTAC #1 (July 3, 2024) Meeting Invite • Attended MTAC # 1 (September 5, 2024): Economic Development Manager, Public Works • PIC 1 notification sent September 25, 2024 • MTAC #2 (June 18, 2025) Meeting Invite • Attended MTAC # 2 (July 8, 2025): Economic Development Manager, Manager of Engineering • PIC 2 notification sent July 8, 2025
City of Brockville Supervisor of Engineering Supervisor of Transportation Services Director of Operations Executive Assistant to the Mayor and City Manager Chief Planning Officer	• Attended MTAC # 1 (September 5, 2024) • Attended MTAC # 2 (July 8, 2025)	• Notice of Study Commencement (NOSC) sent May 1, 2024 • MTAC #1 (July 3, 2024) Meeting Invite • Attended MTAC # 1 (September 5, 2024): Supervisor of Transportation Services • PIC 1 notification sent September 25, 2024 • MTAC #2 (June 18, 2025) Meeting Invite • Attended MTAC # 2 (July 8, 2025): Director of Operations, Public Works Supervisor • PIC 2 notification sent July 8, 2025
Leeds Grenville Thousand Islands and Rideau Lakes MPP		• Notice of Study Commencement (NOSC) sent April 19, 2024 • PIC 1 notification sent September 17, 2024 • PIC 2 notification sent July 2, 2025
Director of Education – Upper Canada District School Board		• Notice of Study Commencement (NOSC) sent May 1, 2024. • MTAC #1 (July 3, 2024) Meeting Invite • PIC 1 notification sent September 25, 2024 • MTAC #2 (June 18, 2025) Meeting Invite • PIC 2 notification sent July 8, 2025

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Contact Information	Issue / Concern	Response / Action taken by Project Team
Director of Education – Catholic District School Board of Eastern Ontario	• Attended MTAC # 1 (September 5, 2024)	• Notice of Study Commencement (NOSC) sent May 1, 2024 • MTAC #1 (July 3, 2024) Meeting Invite • Attended MTAC # 1 (September 5, 2024) • PIC 1 notification sent September 25, 2024 • MTAC #2 (June 18, 2025) Meeting Invite • PIC 2 notification sent July 8, 2025
Student Transportation Services of Eastern Ontario		• Notice of Study Commencement (NOSC) sent May 1, 2024 • MTAC #1 (July 3, 2024) Meeting Invite • PIC 1 notification sent September 25, 2024 • MTAC #2 (June 18, 2025) Meeting Invite • PIC 2 notification sent July 8, 2025
Executive Director Brockville & District Chamber of Commerce	• Attended MTAC # 1 (September 5, 2024) • Attended MTAC # 2 (July 8, 2025)	• Notice of Study Commencement (NOSC) sent May 1, 2024 • MTAC #1 (July 3, 2024) Meeting Invite • Attended MTAC # 1 (September 5, 2024) • PIC 1 notification sent September 25, 2024 • MTAC #2 (June 18, 2025) Meeting Invite • Attended MTAC # 2 (July 8, 2025) • PIC 2 notification sent July 8, 2025
Ontario Trucking Association		• Notice of Study Commencement (NOSC) sent May 1, 2024 • PIC 1 notification sent September 25, 2024 • MTAC #2 (June 18, 2025) Meeting Invite • PIC 2 notification sent July 8, 2025
Director of Communications and Stakeholder Relations – Ontario Federation of Agriculture	• Attended MTAC # 1 (September 5, 2024) ○ Informed Stantec of concern with underpass closure – farm equipment access to fields	• Notice of Study Commencement (NOSC) sent May 1, 2024 • MTAC #1 (July 3, 2024) Meeting Invite • PIC 1 notification sent September 25, 2024 • MTAC #2 (June 18, 2025) Meeting Invite • PIC 2 notification sent July 8, 2025

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Contact Information	Issue / Concern	Response / Action taken by Project Team
President – Leeds County Federation of Agriculture		• Notice of Study Commencement (NOSC) sent May 1, 2024 • MTAC #1 (July 3, 2024) Meeting Invite • Attended MTAC # 1 (September 5, 2024) • PIC 1 notification sent September 25, 2024 • MTAC #2 (June 18, 2025) Meeting Invite • PIC 2 notification sent July 8, 2025
President – Grenville Snowmobile Association	• Emailed October 1, 2024 ○ Informed Stantec that Grenville Snowmobile Association does not have any trails within the study area	• Notice of Study Commencement (NOSC) sent May 1, 2024 • MTAC #1 (July 3, 2024) Meeting Invite • PIC 1 notification sent September 25, 2024
Grenville County Historical Society		• Notice of Study Commencement (NOSC) sent May 1, 2024 • MTAC #1 (July 3, 2024) Meeting Invite • PIC 1 notification sent September 25, 2024 • MTAC #2 (June 18, 2025) Meeting Invite • PIC 2 notification sent July 8, 2025
Lafarge Canada Inc.	• Emailed (October 29, 2024) to request to be added to the project mailing list • Emailed (November 25, 2024) to note this will impact the Sharpe’s Lane quarry, and this route is also used by our mixers to get around Brockville without running through town • Emailed (December 10, 2024) to note that all of our trucks that come to the site from the highway enter via the northern portion of Sharpe’s Lane. We have many trucks that use the southern portion of Sharpe’s Lane to access our other side on Leeds and Grenville 2. These sites operate year-round, though winter is the slower season.	• PIC 1 notification sent September 25, 2024 • PIC 2 notification sent July 8, 2025

A copy of all agency correspondence is provided in **Appendix C**.

4.8 Summary of Public Comments

Over the duration of the study, many comments were received from the public that covered various themes, including a previous EA Highway 401 North Augusta Road and Stewart Boulevard, noise barriers and noise impacts, and natural environment impacts. **Table 3** provides a summary of the main comments and themes and the associated responses provided by the project team. All comments have been addressed and resolved, with no outstanding issues. Further consultation will be undertaken during the Detail Design phase to ensure continued engagement. With the exception of correspondence carried out at public consultation events, a copy of all remaining public correspondence is provided within **Appendix C**.



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Table 3: Summary of Public Comments and Responses

Study Commencement Comments	
Comment	Response Provided and/or Action Taken
Previous EA Highway 401 North Augusta Road and Stewart Boulevard	
Thanks for the information mailed out regarding the Notice of Study Commencement in our area. I understand the need for growth and planning for the future. My question is around what is already known as a choke point through Brockville from Stewart Boulevard to North Augusta Road. Post implementation, having six (6) and ultimately eight (8) lanes funnel into a two (2) lane thoroughfare in the heart of the City seems like a bit of a challenge. Kingston, for example, is the opposite. The expansion through the city is where the road is widened and reduces east or west of the City. With the Province increasing highway speeds in some areas of the 401 to 110 km, where many, I suggest most people, now travel at 120 km to 130 km, will develop into a new mentality of what the flow of traffic speed will be. My question is what is going to happen to the area in this chokepoint corridor. What is the action plan and when?	The area you are referring to was part of a separate MTO study, a Planning, Preliminary Design, and Class Environmental Assessment (Class EA) Study for Highway 401 from 2 km west of Stewart Boulevard to 750 m east of North Augusta Road (about 4.5 km), within the City of Brockville (GWP 4003-19-00). https://www.highway401brockville.ca/index.html. That study developed a plan for the rehabilitation and/or replacement of five (5) structures, determine the long-term plans for the Stewart Boulevard and North Augusta Road interchanges, and established the future footprint for interim six (6) lanes and ultimate eight (8) lanes of Highway 401. That Preliminary Design Study was completed in December 2023. Currently, the timing for future study stages, including Detail Design and construction, is not known. Construction timing is dependent on regional and provincial priorities and available funding. This study is part of the MTO's ongoing review of the provincial highway network. Although the timeline for implementing the results of this study is not confirmed, the Brockville planning study will assist the Ministry, municipalities, business owners, and private landowners with future planning and development within the study area. Thank you again for taking the time to share your comments. Your contact information has been added to the project mailing lists, and you will be notified in advance of the PICs and at key project milestones.
Natural Environment Impact	
- Sensitive species present along the project corridor, including Species at Risk - Consulting with First Nations, Conservation Authority, and Queen's University Biodiversity department - He feels it is important for us to consider Eco passages for any culvert or bridge replacements we are looking into due to the abundant habitat on either side of Highway 401, and animal mortality issues on the 401	The specialist will collect existing conditions data and prepare reports documenting this information. Key project context includes: - Multiple environmental disciplines are contributing to the project's development and analysis - Public Information Centres (PICs) will be held to share findings and present the evaluation of alternative designs - A Transportation Environmental Study Report (TESR) will be compiled at the conclusion of the project and made available for public review and comment
Other Comments	
Please add me to the mailing list	

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Study Commencement Comments	
Comment	Response Provided and/or Action Taken
My next-door neighbour received a flyer in his mailbox today, but I did not receive anything. I would like to make sure my name is added to the project mailing list. Especially when the North Augusta overpass is right behind my backyard.	Your contact information has been added to the project mailing list, and you will be notified at key project milestones. You are also encouraged to visit the project website (www.hwy401eastofbrockville.ca) to obtain current project information.

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PIC 1 Comments	
Comment	Response Provided and/or Action Taken
Previous/Adjacent EA Highway 401 North Augusta Road and Stewart Boulevard	
- Questioning how North Augusta Road off ramp is going to accommodate left turns for driving over the overpass - How are we addressing North Augusta and Stewart Boulevard	Thank you for your comments and interest in the Highway 401 Planning Study East of Brockville. The study area is from 0.75 km east of North Augusta Road to 3.3 km west of Maitland Road. A separate study was previously completed from 2 km west of Stewart Boulevard to 750 m east of North Augusta Road, and additional information can be found at the project website: https://www.highway401brockville.ca/. Your comments have been forwarded to the Brockville study team for a response.
Noise Barriers	
- Comment asking if a noise barrier is planned for areas like Old Sharpe's Lane - Worried for noise level along Waverly and Oxford Avenue	Thank you for your comments and interest in the Highway 401 Planning Study East of Brockville. The project team will be completing a Noise Impact Assessment as part of this study. This noise analysis will follow the Ministry of Transportation's Environmental Guide for Noise (the MTO Guide) published in 2022, which complies with the requirements of the Ontario Environmental Assessment Act. This assessment will include a review of previous studies relevant to the area, along with an analysis of Noise Sensitive Areas (NSAs), proposed developments, traffic data, construction equipment and schedules, and any applicable local or municipal noise bylaws. The team will evaluate road traffic noise impacts carefully, and any proposed noise mitigation measures will be assessed for both technical and economic feasibility. Stantec will complete the Noise Impact Assessment Report for the technically preferred plan. Based on the results of this evaluation, the project team will also provide alternative mitigation options, ensuring that various approaches are considered to help minimize noise impacts effectively. Thank you again for your interest in this study.
Other Comments	
Inquired that the North Augusta Road labelling on the site map was incorrect	Thank you for your email and interest in the Highway 401 Planning Study East of Brockville. Thank you for your comment regarding the study area map on the project notice. Please note that due to map size restrictions on our project notice, we are not able to include all road labels, and for this map, we only included the North Augusta label north of Highway 401 and not south of Highway 401 to make sure that other roads were visible on the map. Your contact information has been added to the project mailing list, and you will be notified of key project updates.
Lafarge employee requesting to be included in the project mailing list	Thank you for your email. Your contact information has been added to the project mailing list, and you will be notified of key project updates. The project team for the above-referenced study is hoping to gather feedback and input on the Highway 401 Planning Study East of Brockville. The first online Public Information Centre (PIC) for this study is now available for review on the study website at: http://www.hw401eastofbrockville.ca. The purpose of PIC 1 is to display and seek input on the existing conditions in the study area (i.e., natural, social, economic, and cultural), present the preliminary alternatives and proposed evaluation criteria, and answer questions about

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PIC 1 Comments	
Comment	Response Provided and/or Action Taken
	the study. The presentation includes preliminary bridge improvement alternatives at Sharpe’s Lane Bridge. We encourage you to view the PIC 1 presentation and let us know if you have any questions or comments regarding the study, and in particular, the alternatives presented for Sharpe’s Lane Bridge and how they relate to operations at the Lafarge facility.
Encouraged that the ministry is taking precaution on safety and structural issues	Thank you for your interest in the Highway 401 Planning Study East of Brockville. Your comments have been shared with the project team, and your contact has been added to the mailing list for updates.

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PIC 2 Comments	
Comment	Response Provided and/or Action Taken
Asked why they received a notice of the Public Information Centre 2 and whether their property is impacted	Thank you for your email. Please note that the Highway 401 Planning Study East of Brockville (GWP 4111-22-00), as well as the previously completed Highway 401 Brockville Planning Study (GWP 4003-19-00), do not impact your property, and you would have received the notice for general information purposes only. Please don't hesitate to contact us should you have any further questions.
Noise Barriers	
Comment asking if a noise barrier is planned from Sharpe's Lane to Applewood Circle	Thank you for your comment regarding the implementation of a noise wall. The project team is completing a Noise Impact Assessment as part of this study. This noise analysis will follow the Ministry of Transportation's Environmental Guide for Noise (the MTO Guide) published in 2022, which complies with the requirements of the Ontario Environmental Assessment Act. This assessment includes a review of previous studies relevant to the area, along with an analysis of Noise Sensitive Areas (NSAs), proposed developments, traffic data, construction equipment and schedules, and any applicable local or municipal noise bylaws. The team is evaluating road traffic noise impacts carefully, and any proposed noise mitigation measures will be assessed for both technical and economic feasibility. Recommendations from the noise assessment will be included in the final plan.

Impacted Property Owners	
Comment	Response Provided and/or Action Taken
Comment thanking the project team for the impacted property owner letter and asked whether the team needs to access or expand into their land	A call was held with the property owner and the MTO and was recorded as follows: The owner of the property is open to the property acquisition process. MTO let them know that the 401 is a controlled access highway and access is limited to interchanges, so access to their property would not be approved. The property owner noted they are happy to help where and want to meet with MTO Corridor representatives to discuss what options they have for access. MTO will send them a separate e-mail in this regard. MTO let them know that this is a planning study and that they would not be looking to acquire the property for at least five years.

5.0 Indigenous Community Consultation

The Indigenous communities and/or organizations contacted with respect to this study were provided by the Ministry of Transportation's Indigenous Liaison Specialist during the initial stages of the planning process. Through this review, the following Indigenous communities were identified as having a potential interest within the study, and were notified of the study commencement, Public Information Centres, notification regarding participation in fieldwork being undertaken in the study area, and the study completion:

- Métis Nation of Ontario
- Mohawks of Akwesasne

5.1 Notice of Study Commencement

The Notice of Study Commencement and Request to Consult was sent via mail and email to the above-noted communities on April 19, 2024. The purpose of this correspondence was to provide information related to the study purpose, the Class EA process, and to invite each Indigenous community to participate in the consultation process. The invitation to Indigenous communities to participate in fieldwork was sent as part of the Notice of Study Commencement letters; however, no responses were received from the communities.

A copy of the Notice of Study Commencement is provided within **Appendix B**.

5.2 Archaeology Report Review Request

All the Indigenous communities identified in Section 9.0 were emailed a copy of the Draft Stage 1 Archaeological Assessment Report for review on November 15, 2024. No comments were received from any of the Indigenous communities contacted, and the report was finalized and submitted to the Ministry of Citizenship and Multiculturalism (MCM) in May 2025 and was approved and entered into the Ontario Public Register of Reports on July 14, 2025.

5.3 Notice of PIC 1

The Notice of PIC 1 was sent via mail and email to the above-noted communities on September 18, 2024, for the first PIC held online with a pre-recorded presentation starting on October 2, 2025, on the study website www.hwy401eastofbrockville.ca. The purpose of this correspondence was to provide a general introduction to the project and associated background information, present and gather feedback on the problems and opportunities, the study area's existing conditions, and the Preliminary Design Alternatives. A copy of the Notice of PIC 1 is provided within **Appendix B**. A copy of the information displayed at PIC 1 is provided in **Appendix E**.

5.4 Notice of PIC 2

The Notice of PIC 2 was sent via mail and email to the above-noted communities on July 2, 2025, for the second PIC, which was held online with a pre-recorded presentation starting on July 17, 2025, on the study website www.hwy401eastofbrockville.ca. The purpose of PIC 2 was to present and gather feedback on the study overview and the process being followed; the evaluation of structural / bridge replacement and highway expansion alternatives; the technically preferred plan; and the preliminary environmental protection and mitigation measures.

A copy of the Notice of PIC 2 is provided within **Appendix B**. A copy of the information displayed at PIC 2 is provided in **Appendix E**.

6.0 Existing Conditions

Background studies and site-specific field investigations were carried out to help assess existing environmental conditions, including cultural heritage, archaeology, contamination, fisheries and aquatic resources, terrestrial resources, hydraulics /drainage, landscaping and vegetation, and land use. All work was carried out in accordance with the requirements of the *Environmental Reference for Highway Design* (2013), which provides standards for the scope of work, evaluation of potential impacts, and proposed mitigation measures for MTO undertakings.

The background reviews to identify existing conditions were carried out in the spring of 2024. Significant environmental features and/or constraints identified as a result of the background studies were documented and considered during the development and evaluation of alternatives.

6.1 Natural Environment

An inventory of natural environmental features within the study area was undertaken based on a review of previous and relevant studies, field investigations, and information received from external agencies and the public during the course of this study.

6.1.1 Physiography, Geology, and Soils

The study area is within the Smith Falls Limestone Plain Ecodistrict 6E-11 of Ecoregion 6E Lake Simcoe – Rideau. Forest communities in the Great Lakes / St. Lawrence Forest Region are dominated by hardwood trees such as maple, oak, birch, and basswood, but also commonly include white pine, red pine, hemlock, and white cedar.

More specifically, the Picton Ecodistrict 6E-11 is characterized by shallow calcareous morainal materials with extensive organic deposits across the landscape. Forested habitat is the dominant land cover with deciduous, mixed, and coniferous forests occupying 56% of the land base. Pasture and cropland occupy 35% of the land base.

6.1.2 Sourcewater Protection

A review of Sourcewater Protection Vulnerable Areas was conducted to consider locations for Vulnerable areas, including Wellhead Protection Areas (WHPAs), Highly Vulnerable Aquifers (HVPAs), and Significant Groundwater Recharge Areas (SGRAs) for groundwater supply sources, and Intake Protection Zones (IPZs) for surface water supply sources. Issue Contributing Areas (ICAs) were also defined for municipal sources, as needed, where historical raw water quality data suggested that anthropogenic activity could be deteriorating drinking water quality.

The study area is outside of the locations of WHPAs, and there are no IPZs or ICAs.

The study area does not intercept an SGRA; however, there are medium and high vulnerability SGRAs mapped near the Butler Creek Culvert (16X-0238/C0) and Sharpe's Lane Underpass (16X-0125/B0) and at the western and eastern project limits that intercept segments of the highway corridor within the study area.

6.1.3 Designated Areas

Designated areas are defined by resource agencies, municipalities, the government, and/or the public, and through legislation, policies, or approved management plans, to have special or unique value. These areas may have a variety of ecological, recreational, and/or aesthetic features and functions that are highly valued. Designated Areas typically include but are not limited to: Provincial Land Use and Environmental Plans, the Trans Canada Trail, Provincially Significant Areas of Natural and Scientific Interest (ANSI), heritage rivers, and national and provincial parks.

The South Augusta Wetland Complex Provincially Significant Wetland is located within 1 km of the study area. No ANSIs, Provincial Parks, Conservation Reserves, or known Significant Wildlife Habitat are present within the study area.

6.1.4 Terrestrial and Aquatic Ecosystems

Terrestrial and aquatic ecosystem conditions were assessed as part of this study based on a review of existing / available information and field investigations. Background information was obtained from the Ministry of Natural Resources (MNR) and published resources, and field investigations were carried out from April to July 2024. The findings of these investigations are documented within the Terrestrial Ecosystems Existing Conditions Report and Fish and Fish Habitat Existing Conditions Report, copies of which are on file with MTO. All field investigations were conducted according to the MTO *Environmental Reference for Highway Design* (2013) and the MTO *Environmental Guide for Fish and Fish Habitat* (2009).

6.1.4.1 Fisheries and Aquatic Resources

There are two (2) watercourses in the study area (a tributary to the St. Lawrence River and Butler Creek). Agency correspondence from MNR identified that the Fisheries Management Objectives for the watercourses that provide fish habitat are forage / bait fish production and (Traditional and Non-Traditional) sport fish reproduction.

On April 30 and July 11, 2024, MTO Watercourse Field Record Forms and MTO Fish Habitat Mapping Forms were completed for the mapped watercourses. Forms and documentation were completed following the *Interim Environmental Guide for Fisheries*. Two (2) additional culvert locations under Highway 401 have the potential to provide fish habitat, either



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seasonally or indirectly. No records of provincially or federally regulated aquatic species were identified in watercourses within the study area.

6.1.4.2 Terrestrial Ecosystems

The terrestrial ecosystem is defined as the interaction of land, air, water, and biotic components functioning as an ecological unit over space and time, and includes vegetation, wetlands, wildlife, and wildlife habitat. The primary terrestrial concerns related to transportation projects include loss of habitat or habitat function and habitat fragmentation.

The study area has been influenced by human activity, including agricultural activities, and residential, industrial, and commercial land use. Based on available background data and field investigations carried out as part of the Terrestrial Ecosystems Existing Conditions Report, vegetation units and wildlife habitat were identified.

Species of Conservation Concern

Significant species are considered at a number of levels, including globally, nationally, and provincially. In Ontario, significant species include species that are provincially rare (with a Provincial S rank of S1 to S3) or listed as Endangered, Threatened, or Special Concern on the Species at Risk in Ontario list (SARO) and/or Schedule 1 of the federal *Species at Risk Act* (SARA).

At the time of project initiation, the Endangered Species Act (ESA) of 2007 was in place. In March 2026, the Ontario Species Conservation Act (SCA) 2026 replaced the ESA. The purpose of the SCA is to identify species at risk based on the best available scientific information, including information obtained from community knowledge and Indigenous traditional knowledge, and to provide for the protection and conservation of species at risk while taking into account social and economic considerations, including the need for sustainable economic growth in Ontario. The SCA prohibits the killing, harming, capturing, or taking of a member of a species that is listed on the Protected Species in Ontario List, or damage to or destruction of the habitat of a species that is listed on the Protected Species in Ontario List. The SCA applies to all private and Crown-owned lands in Ontario. Habitat protection under the SCA for animal species typically includes a dwelling place, such as a den, nest, or other similar place, that is occupied or habitually occupied by one (1) or more members of a species for the purposes of breeding, rearing, staging, wintering, or hibernating, and the area immediately around a dwelling place.

Federally protected Endangered, Threatened, and Special Concern species are listed in Schedule 1 of the *Species at Risk Act, 2002*, and apply only to federally owned lands. Fish species are protected under the *Fisheries Act*, and migratory bird species are protected under the *Migratory Bird Convention Act*, both of which are afforded protection on all lands.

Provincial ranks (S-ranks) are used by the Natural Heritage Information Centre (NHIC) to set protection priorities for rare species and vegetation communities. They are based on the number of occurrences in Ontario and are not legal designations. By comparing the global and

provincial ranks, the status, rarity, and the urgency of conservation needs can be determined. Species with provincial ranks of S1 to S3, and those tracked by the MNR, are considered species of conservation concern. Provincial S-ranks are defined as follows:

- S1: Critically imperiled-usually fewer than five (5) occurrences
- S2: Imperiled- usually fewer than 20 occurrences
- S3: Vulnerable- usually fewer than 100 occurrences
- S4: Apparently secure- uncommon but not rare, usually more than 100 occurrences
- S5: Secure- common, widespread, and abundant
- S-rank followed by a “?” indicates that the rank is uncertain

The probability that a Significant Species may be present within the study area was assessed by comparing preferred habitat types to existing conditions documented within the background review and during the April to July 2024 field investigations. SAR and SOCC with suitable habitat and at least one (1) recent record with a range overlapping the study area were considered to have a reasonable probability of occurring. Species with no preferred habitat in the study area were assumed to be absent.

There were four (4) records of SAR and Species of Conservation Concern (SOCC) in the NHIC database that may occur within the study area. This includes three (3) birds and one (1) plant species. An additional 19 species were identified as potentially occurring based on a review of wildlife atlases and other background data sources. Three (3) bat species, Hoary Bat (*Lasiurus cinereus*), Silver-haired Bat (*Lasionycteris noctivagans*), and Eastern Red Bat (*Lasiurus borealis*), have range overlap with the study area. These species are not currently protected under the ESA but are expected to be listed on the SARO List and protected under the ESA by January 31, 2025, and are treated as SAR for the purpose of this report. The detailed findings of the background review are documented within the Terrestrial Ecosystems Existing Conditions Report, which is on file with the Ministry.

Habitat assessments completed for the study area determined that 11 SAR have the potential to occur in the study area based on the presence of suitable habitat and current overlapping observation records. They include Blanding’s Turtle, Gray Ratsnake, Little Brown, Myotis, Northern Myotis, Eastern Small-footed Myotis, Tri-colored Bat, Hoary Bat, Eastern Red Bat, Silver-haired Bat, Butternut, and Black Ash.

Vegetation Communities

The study area is primarily comprised of large contiguous deciduous forests along the south side (eastbound lanes) of Highway 401 and more fragmented deciduous forests with disturbed meadows and developed lands in the form of residential and commercial areas along the north side (westbound lanes) of Highway 401.



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The developed portion of the study area was primarily composed of active agriculture along with rural residential and commercial properties.

The following is a floristic summary for the study area based on botanical assessments completed in 2024:

- 97 species of vascular plants were recorded. This total includes taxa identified to species, subspecies (ssp.), and variation (var.) levels
- 60 of the 97 recorded species are native to Ontario, and 37 are introduced species not native to Ontario
- 56 native species have a provincial rank of S5, indicating they are common with a secure population in Ontario
- Four (4) native species have a provincial rank of S4, indicating they are uncommon to common, but not rare in the province, and populations are apparently secure
- There were no provincially rare species (i.e., S1-S3) observed in the study area
- There were no SAR observed (e.g., butternut or black ash)
- There were no highly sensitive native plant species with a high CC value of 8, 9, or 10 observed in the study area
- Phragmites colonies were not observed in the study area

A detailed inventory of the vegetation communities observed within the study area at the time of the June 2024 field investigations is discussed within the Terrestrial Ecosystems Existing Conditions Report, which is on file with the Ministry.

Rare Vegetation

Rare vegetation was not identified during the 2024 field investigation.

Significant Wildlife Habitat

Significant Wildlife Habitat (SWH) is defined as habitat that is ecologically important in terms of features, functions, representation, or amount of contribution to the quality and diversity of an identifiable geographic area or Natural Heritage System, and is protected under the *Provincial Policy Statement*, 2024.

Significant Wildlife Habitat includes habitats that fall within any of the following four (4) categories:

- Seasonal Concentration Areas - Such as moose aquatic feeding and wintering areas, deer winter yards, colonial bird nesting sites, reptile hibernacula, and heronries

- Rare Vegetation Communities and Specialized Habitats for Wildlife – Such as old-growth forest, areas known to support an unusually high diversity of species or vegetation communities, raptor nesting habitat, areas with concentrations of cavity trees, and moose or bear foraging areas
- Habitats for Species of Conservation Concern – Such as special concern species or species ranked provincially S1-S3, excluding the habitats of endangered and threatened species
- Animal movement corridors

The following candidate SWH features were investigated in the study area:

- Seasonal Concentration Areas – Bat hibernacula, deer wintering congregation areas, and deer yards, colonially. Colonial nesting bird breeding habitat (bank and cliff trees / shrubs and ground), waterfowl stopover and staging areas, shorebird migratory stopover area, raptor wintering areas, bat maternity colonies, reptile hibernacula, turtle wintering area, migratory butterfly stopover area, and landbird migratory stopover area
- Rare Vegetation Communities – Sand barren, alvar, cliffs and talus slopes, prairie and savannah, old growth forest, and other rare vegetation communities
- Habitat for Species of Conservation Concern – Open country bird breeding habitat, shrub/early successional bird breeding habitat, marsh bird breeding habitat, terrestrial crayfish, Special Concern, and provincially rare (S1-S3) wildlife
- Animal Movement Corridors – Amphibian movement corridors, deer movement corridors

Seasonal Concentration Areas

Seasonal Concentration Areas are those sites where large numbers of a species gather at one (1) time of the year, or where several species congregate. Examples include deer yards, snake and bat hibernacula, waterfowl staging and molting areas, raptor roosts, bird nesting colonies, shorebird staging areas, and passerine migration concentrations. Only the best examples of these concentration areas are usually designated as SWH. Areas that support a Species at Risk, or areas where a large proportion of the population may be lost if the habitat is destroyed, are examples of seasonal concentration areas that should be designated as significant.

The following candidate habitat for seasonal concentration areas was identified within the study area during field investigations.



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- Bat Maternity Colonies – Present in forest communities that have the potential to provide habitat for bat maternity colonies, but are considered low quality (i.e., young trees). Species can be found in mixed and deciduous forests and swamps with large-diameter dead or dying trees with cavities
- Raptor Wintering Areas – Present in large fields in combination with woodland communities, overlap with the study area. A combination of fields and woodland (>20 ha).
- Reptile Hibernacula – Present in limestone outcrops and exposed bedrock features were observed along the ROW. Species can be found in Rock piles or slopes, stone fences, or crumbling foundations.
- Turtle Winter Area – Present in Butler Creek, the unnamed tributary, and associated wetlands may provide suitable habitat to support turtle overwintering. Species can be found in permanent waterbodies and large wetlands with sufficient dissolved oxygen; man-made ponds are not considered SWH.

Rare Specialized Habitat

Rare or specialized habitats are two (2) separate components of SWH. Rare habitats are those with vegetation communities that are considered rare in the province. Specialized habitats are microhabitats that are critical to some wildlife species, such as habitat for area-sensitive species, forests providing a high diversity of habitats, amphibian woodland breeding ponds, turtle nesting habitat, highly diverse sites, seeps, and springs. High-quality habitat features generally occur outside of the influence of edge effects and wildlife mortality that are associated with major roadways. The following candidate habitats for rare or specialized habitats were identified within the study area:

- Bald Eagle and Osprey Nesting, Foraging, and Perching Habitat – Present in treed communities adjacent to rivers, lakes, ponds, and other wetlands with stick nests of Bald Eagle or Osprey. Although no stick nests were observed during field investigations, it is possible for nests to appear in subsequent field seasons due to the large forests and adjacency to the St. Lawrence River.
- Woodland Raptor Nesting Habitat – Present in stick nests in forested ELC communities >30 ha with 10 ha of interior habitat. Also, as surveys were predominantly completed within the highway ROW, not all natural areas could be thoroughly searched for stick nests. Although no stick nests were observed during field investigations, it is possible for nests to appear in subsequent seasons due to the large forests in the study area.
- Amphibian Breeding Habitat (woodland and wetland) – Present within treed uplands with vernal pools, and wetland ecosites. Species can be found in forested swamps with vernal pooling may support breeding amphibians.

Animal Movement Corridors

Migration corridors are areas that are traditionally used by wildlife to move from one (1) habitat to another. This is usually in response to different seasonal habitat requirements. There are two (2) types of animal movement corridors in Ecoregion 6E: amphibian and deer movement corridors. These corridors are identified after amphibian breeding habitat (woodlands), and/or deer wintering/yarding areas are confirmed. Amphibian breeding surveys were not conducted for the project and are beyond the scope of this assessment.

Habitat for Species of Conservation Concern (SOCC)

Data from field surveys were used to assess the potential for the habitat of SOCC to occur within the study area. Habitat assessments for these species were completed through a combination of satellite photo interpretation and field investigations to determine whether suitable habitat may be present in the study area.

Migratory Birds

No nests of migratory birds were observed in the study area during field investigations in 2024. However, migratory birds may nest in meadows and forested areas throughout the study area. Vegetation within the ROW may support migratory bird nests during the active nesting season (April 1 – August 31).

6.1.4.3 Summary of Key Terrestrial Features

Detailed terrestrial studies have been conducted as part of this study to confirm information gathered from secondary sources. The main natural heritage features in the study area are included in **Table 4**.



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Table 4: Summary of Natural Heritage Features

Type	Species / Feature	Description
Cataraqui Region Conservation Authority Designation	Regulated Area (feature plus 50 m buffer)	Associated with Butler Creek and unnamed watercourse.
Ecologically Significant Area	Frontenac Arch Biosphere Reserve	Overlaps with the study area but does not occur within the Highway 401 ROW.
Migratory Birds	Bird Nests	May be present in vegetation. There were no nests observed during field investigations, but new nests could be established in subsequent years.
Vegetation	Wetlands	A deciduous swamp, meadow marsh, and unevaluated wetlands are present in the study area. South Augusta Wetland Complex PSW is located within 1 km of the study area.
Candidate SWH	Raptor Wintering Area	Large fields in combination with forests are present in the study area.
	Bat Maternity Colonies	Candidate trees >10 cm DBH were observed in the study area in mature forests, with potentially other suitable candidate trees that could not be observed from the ROW.
	Reptile Hibernacula	Outcrop and bedrock features are present within the Highway 401 ROW.
	Turtle Wintering Area	Butler Creek, unnamed tributary, and surrounding riparian wetland features may provide suitable overwintering habitat within the study area.
	Old Growth Forest	Large, intact forests in the study area have potential to be old growth.
	Bald Eagle and Osprey Nesting, Foraging, and Perching Habitat	Large forests with suitable high-canopy trees are present within the study area and are in proximity to the St. Lawrence River.
	Woodland Raptor Nesting Habitat	Potential for stick nests to be established due to large forests in the study area and adjacency to the St. Lawrence River.
	Amphibian Breeding habitat (woodland)	Potential habitat for breeding amphibians is present within the deciduous forest (FODM8-1), where numerous Green Frogs were observed.
	Woodland Area Sensitive Breeding Bird Habitat	Large contiguous forests may provide suitable breeding habitat for woodland area-sensitive bird species. Red-eyed Vireo and American Redstart were observed.
SAR	Blanding's Turtle Butternut Black Ash	Potential habitat for Blanding's Turtle is present in the unevaluated wetland pockets associated with Butler Creek and an unnamed tributary. Blanding's Turtles may enter the work area when seeking nesting sites (e.g., gravel shoulders) or when moving between habitats.
	Gray Ratsnake	Potential habitat for Gray Ratsnake is present in forests, woodlands, meadows, and agricultural areas in the study area.
	Seven (7) Bat SAR (Little Brown Myotis, Northern Myotis, Eastern Small-footed Myotis, Tri-colored Bat, Hoary Bat, Eastern Red Bat, and Silver-haired Bat)	Potential habitat for Bat SAR is present in mature forests that contain cavity trees adjacent to the Highway 401.
SOCC	Barn Swallow	Potential breeding habitat for Barn Swallow is present in the study area in the form of rural buildings and box culverts.



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Type	Species / Feature	Description
	Eastern Wood-Pewee Tufted Titmouse	Potential breeding habitat for Eastern Wood-Pewee, Tufted Titmouse, and Wood Thrush is present in the study area in the form of contiguous deciduous forests and swamps.
	Eastern Milksnake Eastern Ribbonsnake	Potential snake habitat is present in forests, meadows, and agricultural areas within the study area. Eastern Milksnake and Eastern Ribbonsnake have the potential to enter the work zone.
	Monarch Butterfly	-Habitat is present in the study area for Monarch Butterfly, as an individual was observed within the Highway 401 ROW.
	Snapping Turtle Midland Painted Turtle	Potential habitat for turtles is present in the unevaluated wetland pockets, watercourses, and the adjacency to gravel road shoulders suitable for nesting. Snapping Turtle and Midland Painted Turtle have the potential to enter the work zone.

6.2 Socio-Economic Environment

6.2.1 Land Uses

The study area is located within the United Counties of Leeds and Grenville in the Township of Elizabethtown-Kitley. The immediate study area consists of agricultural land, some wooded areas, and local businesses.

6.2.1.1 Official Plan

The United Counties of Leeds and Grenville Official Plan (2022) and the Township of Elizabethtown-Kitley Official Plan (2018) both describe existing and future land use designations within the region. According to Schedule A (community structure and land use) of the Counties' Plan, most areas outside the MTO right-of-way are designated as rural and Crown lands. In comparison, Schedule A3 (land use and roads) of the Township's Plan identifies the majority of these areas as designated residential, rural, and mineral resource – mineral aggregate.

6.2.1.2 Contamination

Stantec completed a Contamination Overview Study (COS) in September 2024 for the proposed study area to inform future planning for excess soil management. This COS fulfills the requirements and standards for an Assessment of Past Uses (APU). The objective of the COS was to determine if Areas of Potential Environmental Concern (APECs) exist in the study area, which may be present as a result of current and/or past Potentially Contaminating Activities (PCAs) within the study area or on adjacent / neighbouring properties within at least 200 m of the perimeter of the study area. A windshield site reconnaissance was conducted on June 6, 2024.

Based on the findings of the COS, several potential sources of contaminating activities were identified, including records of furnace oil spills, waste disposal and waste management, garages and maintenance, historical spills, pesticides, manufacturing, ore processing, and tailings storage. More detailed information is documented within the COS, a copy of which is on file with MTO.

6.2.1.3 Excess Soil Management

Based on the findings of the COS completed by Stantec in September 2024, several APECs were identified within and adjacent to the study area, associated with historical and current Potentially Contaminating Activities (PCAs), including furnace oil spills, waste disposal and management activities, garages and maintenance operations, pesticide use, manufacturing, ore processing, and tailings storage.

In accordance with MTO's *Environmental Guide for Contaminated Property Identification and Management* (2006) and *Environmental Reference for Highway Design* (2013), a Preliminary Site Screening (PSS), Phase I Environmental Site Assessment (ESA), and Phase II ESA, if warranted, will be completed for any property to be acquired. Where demolition is proposed, designated substance surveys will be undertaken prior to the removal of structures. Soil excavation and management during construction will be carried out in compliance with Ontario Regulation 406/19 and the associated *Rules for Soil Management and Excess Soil Quality Standards*, including development and implementation of a sampling and analysis plan under the supervision of a Qualified Person. Soil characterization will address contaminants of potential concern identified in the APEC summary table, with consideration given to anthropogenic indicators such as debris, staining, and unusual odours. Stockpiling, handling, tracking, reuse, and off-site transport of excess soil and sediment will be conducted in accordance with O.Reg. 406/19 requirements to ensure regulatory compliance and appropriate soil management documentation.



6.2.2 Businesses

The following businesses are located within or near the study area and have been consulted and contacted as part of the consultation program for this study:

- Gibson Timber Frames
- Maple Heights Tree Service
- Hall's Apple Market
- Sunnidell Golf
- Lafarge Canada Inc.

6.2.3 Student Transportation / Education Facilities

The study area is located within the boundaries of two (2) English school boards: Upper Canada District School Board and Catholic District School Board of Eastern Ontario. There are two (2) French School Boards: Conseil des écoles catholiques du Centre-Est and Conseil des écoles publiques de l'Est de l'Ontario.

The highway is utilized year-round as access for students and/or student transportation services requiring access to certain schools in the County, City of Brockville and the Township of Elizabethtown-Kitley. Transportation for the school boards is provided by Student Transportation of Eastern Ontario (STEO). The school boards and transportation services were consulted as part of this study.

6.2.4 Emergency Services

Emergency Services consist of police, fire, and medical response providers. The following is the summary of emergency services within the study area:

- Police service in the study area is provided by the Ontario Provincial Police (OPP), Leeds County Detachment, located in Elizabethtown-Kitley
- Fire services are provided by the Elizabethtown-Kitley Fire & Emergency Services
- Emergency Medical Services are provided by the Leeds-Grenville Paramedic Service, with ambulance bases in Brockville and nearby communities

6.3 Cultural Heritage Environment

6.3.1 Archaeological Resources (Land)

A Stage 1 Archaeological Assessment was conducted under Project Information Form number P394-0220-2024, issued by the Ministry of Citizenship and Multiculturalism (MCM). The

Stage 1 Archaeological Assessment involved background research and a property inspection conducted on June 12, 2024, to evaluate the archaeological potential of the study area. The Stage 1 Archaeological Assessment determined parts of the study area to have archaeological potential.

The Stage 1 property inspection confirmed that the Highway 401 right-of-way and areas developed around the highway have been previously disturbed due to construction activities. No further archaeological assessment is required for parts of the study area evaluated to be disturbed and that hold no or low archaeological potential.

In accordance with Section 1.3.1 and Section 7.7.4 of MCM's 2011 *Standards and Guidelines for Consultant Archaeologists*, a Stage 2 Archaeological Assessment is recommended for portions of the study area, north and south of the right-of-way, which have been identified as retaining archaeological potential. A Stage 2 Archaeological Assessment will involve both test pit survey and pedestrian survey, as per Sections 2.1.1 and 2.1.2 of the *MCM's Standards and Guidelines for Consultant Archaeologists*. The Stage 1 Report is on file with the MTO.

6.3.2 Built Heritage Resources

A Cultural Heritage Resource Assessment Report (CHRAR) was undertaken in 2024 to identify any heritage resources, including built heritage and cultural heritage landscapes, present within and adjacent to the study area. A land use history was completed to provide cultural context for the study area and to inform the evaluation of each property. In addition, the MCM, the Ontario Heritage Trust, and local municipalities were consulted.

A vehicular windshield survey was also undertaken to confirm existing study area conditions, identify potential heritage resources within and adjacent to the study area, and to confirm the presence of previously identified heritage properties.

Potential heritage resources were identified, inventoried, and evaluated according to Ontario Regulation (O. Reg.) 9/06, the criteria for determining cultural heritage value or interest (CHVI) (Government of Ontario).

Based on the findings of the evaluation, four (4) properties were identified to have the potential for cultural heritage value or interest (CHVI) within a 50 m buffer of the study area. The CHRAR is on file with the MTO.

6.4 Transportation Conditions

6.4.1 Highway 401

Highway 401 within the project limits runs east-west and is classified as a four (4) lane, divided freeway.



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6.4.1.1 Posted and Design Speed

The existing posted speed limit on Highway 401 is 100 km/h. The Ministry of Transportation has indicated a desire to increase the posted speed on this section of highway to 110 km/h, and as such, the review of existing conditions if the existing Highway 401 design satisfies the geometric requirements for a design speed of 130 km/h.

6.4.1.2 Horizontal Alignment

The horizontal alignment of Highway 401 was reviewed to identify geometric deficiencies.

There is one existing horizontal curve on Highway 401 within the study limits. The curve exceeds the minimum design standard radius for a design speed of 130 km/h (R=950 m), and it exceeds the *desirable* design radius of R=2300 m.

6.4.1.3 Vertical Alignment

The vertical alignment of Highway 401 was reviewed to identify geometric deficiencies. There are six (6) vertical curves on Highway 401 within the project limits, including three crest and three (3) sag curves.

There are four (4) vertical curves, two (2) crests, and two (2) sags that do not meet the minimum K-value for the design speed of the highway (130 km/h). However, all vertical curves meet the minimum K-value for the existing posted speed of the highway (100 km/h). There is one vertical curve that does not meet the desirable curve length; all other vertical curves exceed the desirable length.

6.4.2 Profile Grades

The maximum profile grade for a freeway with a design speed of 130 km/h is 3%. The existing profile of Highway 401 within the study area is generally flat to rolling, and grades range from 0.68% to a maximum grade of 2.54%.

6.4.3 Cross-Section

The cross-section characteristics of Highway 401 within the study area are summarized in Table 5.

Table 5: Summary of Cross-Section Elements

Cross-Section Element	Width (m)
Lane Width	4 x 3.75 (2 EBL, 2 WBL)
Median Width	Approximately 7.7 to 8.1
Median Shoulder Width	Approximately 3.45 to 3.65 paved

Cross-Section Element	Width (m)
Outside Shoulder Width	Approximately 3.0 paved
Right-of-Way Width	Approximately 91.5

6.4.3.1 Noise Barrier Wall

There is an existing noise barrier wall located at the west end of the study area, on the south side of Highway 401.

6.4.4 Sharpe’s Lane

6.4.4.1 Posted and Design Speed

The posted speed limit on Sharpe’s Lane is 60 km/h. The design speed has been assumed to be 20 km/h above the posted speed limit, 80 km/h.

6.4.4.2 Horizontal Alignment

The horizontal alignment of Sharpe’s Lane within the study area was reviewed to identify geometric deficiencies. There are two (2) existing horizontal curves on Sharpe’s Lane, and both curves meet the minimum design standard (R=250) for the design speed of 80 km/h.

6.4.4.3 Vertical Alignment

The vertical alignment of Sharpe’s Lane within the study area was reviewed to identify geometric deficiencies. There are three (3) vertical curves on Sharpe’s Lane, including two (2) sags and one (1) crest curve. There are two (2) vertical curves, one (1) sag and one (1) crest, on Sharpe’s Lane that do not meet the minimum K-value for the design speed of 80 km/h.

6.4.4.4 Profile Grades

The maximum profile design grade is 6 – 8%. Sharpe’s Lane has a maximum profile grade of 5.16%, which satisfies the design requirements.

6.4.4.5 Cross-Section

The cross-section characteristics of Sharpe’s Lane within the study area are summarized in Table 6.



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Table 6: Summary of Cross-Section Elements Sharpe’s Lane

Cross-Section Element	Width (m)
Lane Width	2 x 3.25 m (1 northbound lane, 1 southbound lane)
Shoulder Width	Approximately 1.0 m

6.4.4.6 Existing Entrances

The existing entrances on Sharpe’s Lane within the study area were reviewed to determine location and type. Table 7 summarizes the existing entrances on Sharpe’s Lane within the study area.

Table 7: Summary of Existing Entrances on Sharpe’s Lane

Entrance No.	Station	Side of Road	Entrance Type	Comment
1	10+178	Left	Residential	
2	10+248	Right	Residential	2 properties

6.4.5 Existing Structures

There are two (2) structures within the study limits (one (1) underpass and one (1) structural culvert) that are summarized in Table 8.

Table 8: Summary of Existing Structures

Structure ID	Name	Type	Description	Year Constructed
Bridge				
16X-0125/B0	Sharpe’s Lane	Underpass	ASSHTO Girder	1967
Culvert				
16X-0238/C0	Butler Creek	Culvert	Open Footing (Rigid Frame)	1959

6.5 Traffic

Traffic data volume for the Highway 401 mainline and turning movement counts for key intersections for the study area were reviewed. Based on historical Annual Average Daily Traffic (AADT) volumes, a low growth rate of 1.5% and a high growth rate of 2.5% were assumed for the traffic analysis. A commercial vehicle percentage of 25% was considered.

The Highway 401 traffic data is summarized in Table 9.

Table 9: Highway 401 AADT Volume Projections

Segment	Existing Conditions (2024)	Growth Rate	Future AADT Volume		
			2029	2034	2044
Between North Augusta Road Interchange and Maitland Road Interchange	41,948	1.5%	48,682	48,682	56,497
Between North Augusta Road Interchange and Maitland Road Interchange	41,948	2.5%	47,460	53,696	68,736

The Level of Service (LOS) is a way to measure the free flow of traffic on a roadway and is used to determine how well a transportation facility is operating from a traveller’s perspective. LOS is expressed in terms of traffic delays and is represented by letters A through F, whereby a LOS of A represents free-flow traffic conditions, and a LOS of F represents a breakdown in traffic flow with stop-and-go traffic conditions.

The preliminary LOS along Highway 401 near North Augusta Road Interchange and Maitland Road Interchange was assessed in consideration of the existing four (4) lane, and future interim six (6) lane and ultimate eight (8) lane configuration for the 2029, 2034, and 2044 horizon years.

Highway 401 between North Augusta Road Interchange and Maitland Road Interchange is expected to operate at LOS C or better until 2029 under the existing four (4) lane configuration.

In consideration of a future interim six (6) lane cross-section, Highway 401 between North Augusta Road Interchange and Maitland Road Interchange is expected to operate at LOS C or better until 2044.

Considering a future ultimate eight (8) lane cross-section, Highway 401 between North Augusta Road Interchange and Maitland Road Interchange is expected to operate at LOS B or better until 2044.

6.5.1 Road Safety

A total of 65 collisions were reported on mainline segments in the study area between January 2019 and December 2023. Most mainline collisions involved a signal motor vehicle (62%), followed by rear-end (23%) and sideswipe (15%). There was one (1) fatal collision that occurred 5.55 km west of the Maitland Road interchange in 2019 in the westbound direction,



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with winter road surface conditions, and reported apparent driver action indicated as “speed too fast for conditions”.

The section within 5 km west of the Maitland Road interchange in the eastbound direction has the highest concentration of injury collisions (three (3) injury collisions out of seven (7) total collisions along the segment). Non-daylight collisions presented higher proportions at 4 km west of the Maitland Road interchange (58%). Winter-related road surface conditions presented higher proportions in the westbound direction, correlating with the distribution of collisions with apparent driver actions of “speed too fast”. These findings suggest that the drivers may not be adapting their speeds to the road conditions, and/or the pavement condition might be too slippery in this area.

6.6 Drainage

A Preliminary Drainage and Hydrology Report was completed as part of this study to assess existing drainage conditions and to develop a strategy for the Recommended Plan, as described herein.

6.6.1 Centreline Culverts

Within the study area, there are a total of four (4) centreline culverts. Based on culvert condition (i.e., not hydraulic capacity), it is recommended that all four (4) be retained with minor maintenance and rehabilitation work. In addition, there is one (1) culvert located 50 m east of the study area that was reviewed because this culvert provides drainage for approximately 600 m of Highway 401 within the study area. It is recommended that this culvert be retained with minor maintenance and rehabilitation work as well. Based on the condition of the culverts at the time of the interim six (6) lane widening of Highway 401, replacement of the culverts may be recommended.

6.6.2 Median Drainage

A median storm sewer is present throughout the study area. This storm sewer collects runoff from the passing lanes and median, and discharges directly to centerline culverts or to the roadside ditch. This median storm sewer was not inspected as part of this study and would require a CCTV inspection to assess the existing condition of the pipes.

6.6.3 Ditch Drainage

Ditches exist north and south of Highway 401 within the study area. A previous inspection completed in 2015 did not comment on the existing ditch condition throughout the entire study area. However, culvert repairs in 2017 included cleanouts at culvert ends to remove excess sedimentation. During the 2025 field inspection, it was confirmed that the ditches in the study area are generally in fair condition. Ditch modifications are required to accommodate the proposed Highway widening and will be confirmed during detailed design. Should the

proposed Highway widening allow sections of the existing ditching to remain, additional field inspection to confirm ditch conveyance at these locations is recommended.

6.6.4 Embankment Concerns

The 2015 inspection report found that none of the culverts had any deficiencies, and their embankment condition all scored zero (0). However, this status may have changed. It is recommended that remediation measures be taken to repair any road embankment deficiencies as part of the Ministry’s regular maintenance of the highway to ensure that the culverts operate as designed.

6.6.5 Drainage Concerns

As part of the study, representatives from MTO who are familiar with the study area and local stakeholders were contacted to determine if there were any maintenance concerns regarding culverts within the study area. No flooding or maintenance issues were noted.

6.7 Utilities

Utility companies with plants in the study area were requested to provide existing utility information, including the location and type of existing utility plant. Hydro One and Bell have utilities within the study area.



7.0 Generation and Evaluation of Design Alternatives

The purpose of the study is to identify a recommended plan that addresses current and future transportation needs in the study areas as part of the Ministry's ongoing review of safety and operational needs for the provincial highway network. A set of alternatives was generated and evaluated, as described below.

7.1 Highway 401 Alternatives

The future footprints for the Highway 401 corridor will include widening for interim six (6) and ultimate eight (8) lane cross-sections.

In establishing the future footprint for the interim six (6) and ultimate eight (8) lane configuration of Highway 401, the following highway cross-section alternatives were developed and subjected to an evaluation:

- Alternative 1 – Maintain Existing Median and Widen to the Outside
- Alternative 2 – Standard Median and Widen to the Inside and the Outside

Figure 4 shows the Highway 401 alternatives that were considered.

7.2 Sharpe's Lane Bridge Alternatives

The Sharpe's Lane bridge within the study area is approaching the end of its service life and will need to be rehabilitated or replaced. The bridge will also need to accommodate the future Highway 401 footprints for the interim six (6) and ultimate eight (8) lanes.

The structure is currently in overall good condition, with rehabilitation completed in 2017. However, extensive longitudinal cracking has been observed in the bottom flanges of the girders, which poses a concern for long-term durability. The existing vertical clearance is substandard, reflecting 4.65 m, which is below the minimum requirement of 5.0 m. At present, the structure is 58 years old. It will be 68 years old at the time of the interim highway widening and 78 years old when the ultimate highway widening is anticipated. The current span configuration can accommodate one (1) additional lane in each direction. However, this would result in a reduced shoulder width of approximately 2.2 m, which is below the standard 3.0 m. Furthermore, the addition of a fourth lane would conflict with the existing pier locations. As such, it is recommended that the structure be replaced during the interim six (6) lane widening phase, but it will accommodate the ultimate eight (8) lane configuration.

The following structure replacement alternatives for Sharpe's Lane were developed and subjected to an evaluation:

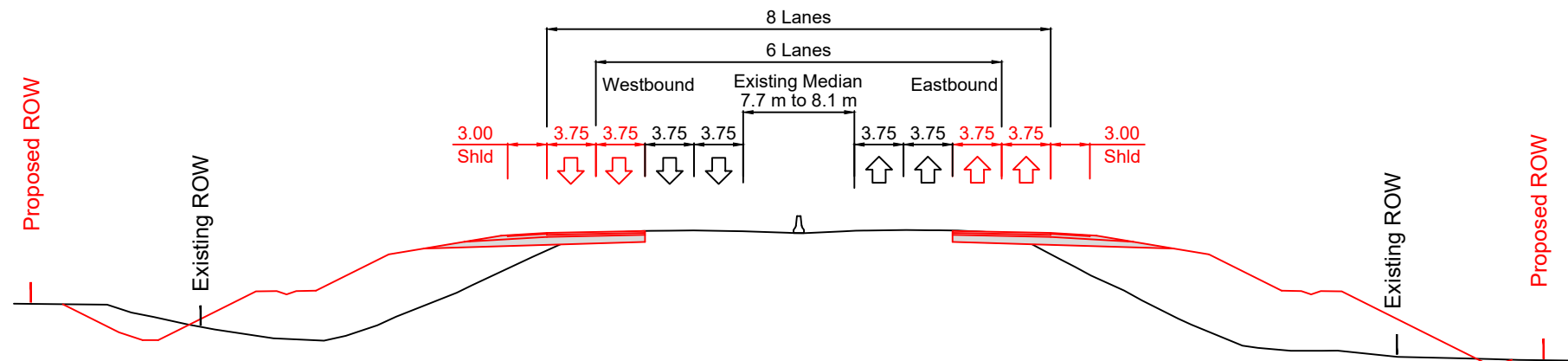
- Alternative 1a – Replacement of Bridge on Existing Alignment – Bridge Closed with Detour
- Alternative 1b – Replacement of Bridge on Existing Alignment – Bridge Open with Single Lane
- Alternative 2 – Replacement of Bridge – New Alignment – West
- Alternative 3 – Replacement of Bridge – New Alignment - East

Figure 5 shows the Sharpe's Lane Alternatives that were considered.



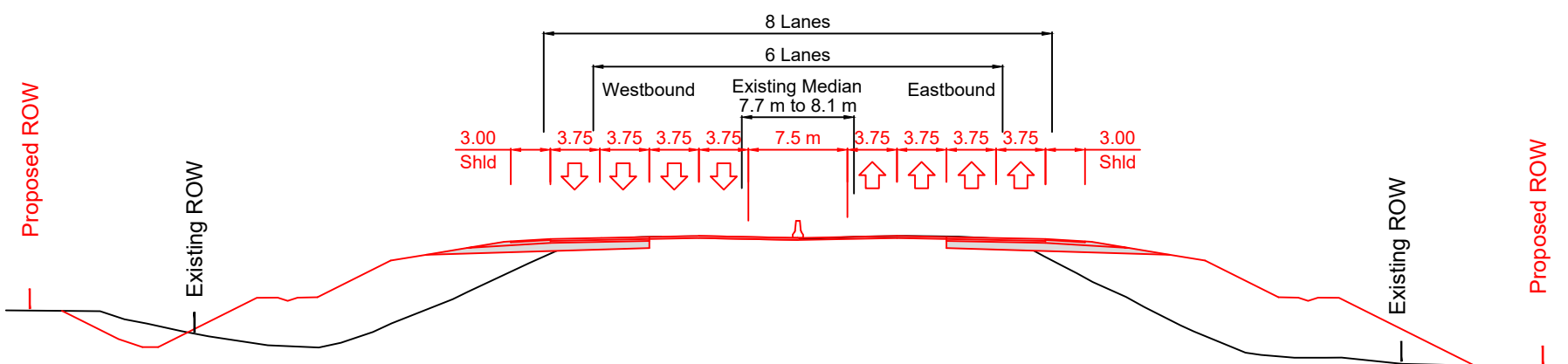
1

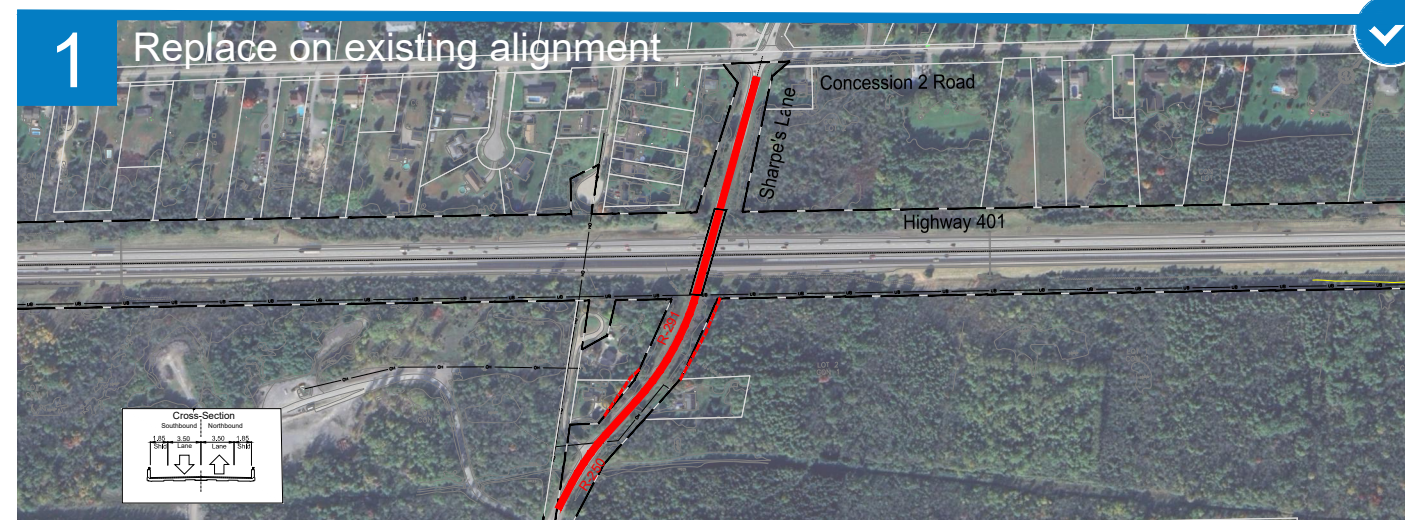
Maintain Existing Median Widen to the Outside



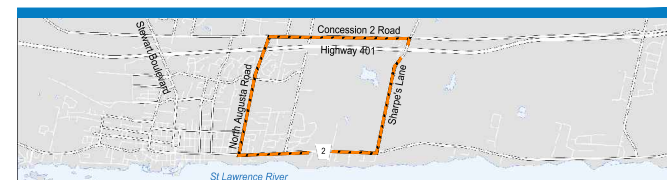
2

Standard Median (7.5 m) Widen to the Inside and the Outside





Bridge closed with detour



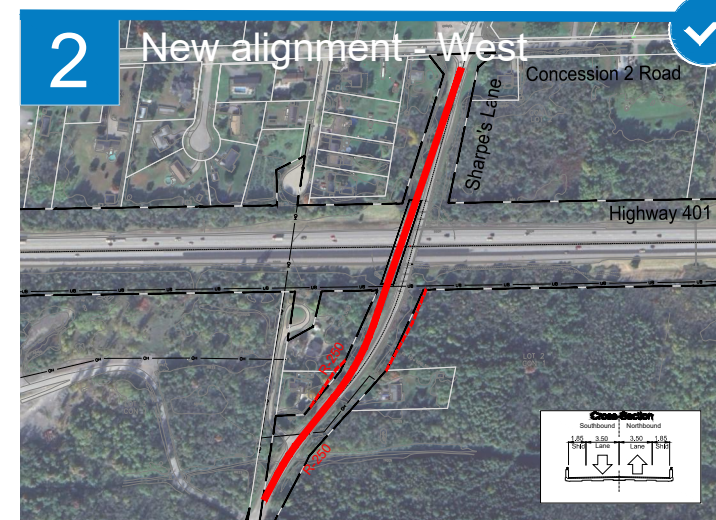
Advantages

- Retains existing alignment of Sharpe's Lane
- Less property required compared to Alternatives 2 and 3
- Faster method of construction compared to staged construction with single lane
- Lower construction staging cost compared to keeping bridge open during construction

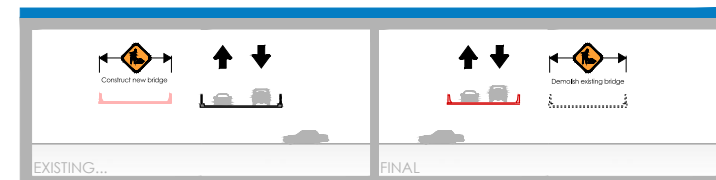
Disadvantages

- Impacts 2 hydro poles
- Introduces up to 8 km of travel for traffic to cross Highway 401 via detour route

Note: The final detour route will be confirmed in consultation with the affected municipalities.



Bridge open with two lanes



Advantages

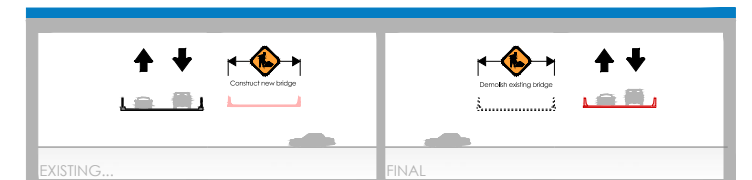
- Maintains access across Highway 401 during construction with minimal impacts to traffic
- Similar construction duration as closing the bridge
- Similar construction staging cost as closing the bridge
- No hydro pole impacts

Disadvantages

- Requires alignment shift on Sharpe's Lane
- Requires more property compared to Alternatives 1 and 3
- Significantly higher cost compared to replacing on existing alignment



Bridge open with two lanes



Advantages

- Maintains access across Highway 401 during construction with minimal impacts to traffic
- Similar construction duration as closing the bridge
- Similar construction staging cost as closing the bridge

Disadvantages

- Requires alignment shift on Sharpe's Lane
- Results in undesirable horizontal curve on bridge
- Requires more property compared to Alternative 1
- Impacts 3 hydro poles
- Significantly higher cost compared to replacing on existing alignment

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7.3 Evaluation Process

An evaluation of the design alternatives was carried out to identify a cost-effective improvement plan that addresses structural needs, provides safe operations, and provides reasonable local access, while minimizing the effects on the natural, social, and cultural environments.

This process includes identifying evaluation criteria through input received through the consultation process, the Project team’s experience on similar projects, provincial guidelines, and existing study area conditions. Draft evaluation criteria were presented for public review and comment at Online Public Information Centre (PIC) 1, following which the evaluation criteria were reviewed and confirmed.

The evaluation criteria are then utilized to develop advantages and disadvantages for each alternative and to undertake a qualitative evaluation of alternatives to identify the recommended plan. A reasoned argument approach was also applied to the evaluation, which considered the net environmental effects of each alternative.

In the final step of the evaluation process, the design alternatives are ranked and, along with a reasoned argument assessment approach, help to identify the overall Recommended Plan for the project.

7.4 Evaluation Criteria

In accordance with the MTO Environmental Assessment for Provincial Transportation Facilities and Municipal Expressways (2024), a wide range of potential impacts to the natural, social, and cultural environments in the study area are to be considered in the development and evaluation of design alternatives.

As noted, the preliminary evaluation criteria were provided for public review and feedback as part of PIC 1. The evaluation criteria are utilized to develop advantages and disadvantages for each alternative and to undertake a qualitative evaluation of alternatives to identify the recommended plan. The evaluation criteria were grouped into highway engineering, social and cultural environment, natural environment, and total cost. The criteria are independent variables, each of which may contribute a positive or negative influence on the overall suitability of an alternative.

Table 10 displays the evaluation criteria for this project and the measures that are considered for scoring each criterion.

Table 10: Evaluation Criteria

Category	Criteria	Measures
Highway Engineering	Geometrics & Safety	• Design standards for provincial highways • Potential for collisions • Crossing road alignment • Pedestrian and cyclist accommodations
	Constructability	• Construction techniques • Complexity of staging and detours • Traffic flow operations, including local access and out-of-way travel
	Utilities	• Impacts to utilities
Social & Cultural Environment	Property	• Impacts to private property
	Noise & Air Quality	• Proximity to residences
	Archaeology	• Impacts to potential archaeological resources
	Contamination	• Potential to encounter contaminated soils/ groundwater
	Groundwater	• Potential to impact groundwater recharge areas and highly vulnerable aquifers
Natural Environment	Terrestrial Ecosystem	• Impacts to wildlife habitat • Impacts on significant trees and vegetations
	Fish & Fish Habitat	• Impacts to watercourses, fish and fish habitat
	Species of Conservation Concern	• Impacts to species at risk and habitat associated with species at risk
	Designated Areas	• Impacts to significant ecological areas
Total Cost		• Consider total cost, including utility relocations and property acquisition

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7.5 Evaluation of Highway 401 Alternatives

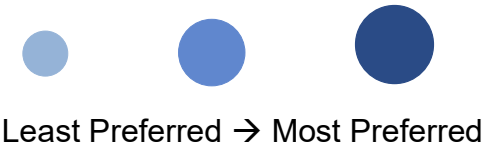
A qualitative assessment of the Highway 401 Cross-Section Alternatives was completed by tabulating the advantages and disadvantages of each alternative based upon the evaluation criteria developed and the scale of potential impacts for each criterion.

The evaluation of Highway 401 cross-section alternatives is summarized in **Table 11**.



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Table 11: Evaluation of Highway 401 Cross-Section Alternatives



Category	Highway 401 Cross-Section Alternatives	
	1 – Maintain Existing Median Widen to the Outside	2 – Standard Median (7.5 m) Widen to the Inside and the Outside
Highway Engineering	<u>Advantages</u> - Minimizes impacts to traffic during construction - Retains the existing median with concrete barrier <u>Disadvantages</u> - Requires grading outside of the existing highway footprint	<u>Advantages</u> - Provides standard median width concrete barrier (7.5 m) <u>Disadvantages</u> - Requires more complicated traffic staging compared to Alternative 1 - Requires reconstruction of the median, including concrete barrier - Requires grading outside of the existing highway footprint
Social & Cultural Environment	<u>Disadvantages</u> - More property impacts compared to Alternative 2 - May result in greater potential noise impacts compared to Alternative 2 - Greater potential impacts to areas of archaeological potential compared to Alternative 2 - Greater potential impacts to areas of potential contamination compared to Alternative 2	<u>Advantages</u> - Fewer property impacts compared to Alternative 1 - Fewer potential noise impacts compared to Alternative 1 - Fewer potential impacts to areas of archaeological potential compared to Alternative 1 - Fewer potential impacts to areas of potential contamination compared to Alternative 1
Natural Environment	<u>Disadvantages</u> - Greater potential impacts to forested and wetland areas compared to Alternative 2 - Greater potential impact to potential wildlife habitat and significant ecological areas compared to Alternative 2 - Greater potential impacts to fish and fish habitat and watercourses that cross Highway 401 compared to Alternative 2	<u>Advantages</u> - Fewer potential impacts to forested and wetland areas compared to Alternative 1 - Fewer potential impacts to potential wildlife habitat and significant ecological areas compared to Alternative 1 - Fewer potential impacts to fish and fish habitat and watercourses that cross Highway 401 compared to Alternative 1
Overall Assessment	Preferred	Not Preferred

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Based on the evaluation, the preferred alternative is **Alternative 1 – Maintain Existing Median and Widen to the Outside** because:

- Lower cost compared to Alternative 2¹
- Minimizes impacts to traffic during construction
- Retains the existing median with concrete barrier
- Matches the cross-sections of the previously completed Highway 401 studies adjacent to this study

7.6 Evaluation of Sharpe’s Lane Alternatives

A qualitative assessment of the Sharpe’s Lane Bridge Alternatives was completed by tabulating the advantages and disadvantages of each alternative based upon the evaluation criteria developed and the scale of potential impacts for each criterion.

The evaluation of the Sharpe’s Lane bridge alternatives is summarized in **Table 12**.

¹ Project cost was considered at a high level during the development of alternatives to confirm overall technical and financial feasibility. However, cost was not included as a weighted criterion in the comparative evaluation of alternatives. Cost was reviewed separately to ensure that the recommended alternative represents a feasible and implementable solution.

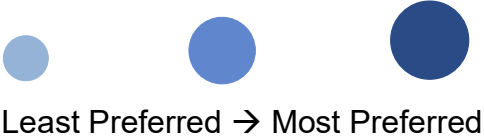


Table 12: Evaluation of Sharpe's Lane Bridge Alternatives

Category	Sharpe's Lane Bridge Alternatives			
	1 – Replace on Existing Alignment		2 – New Alignment – West	3 – New Alignment – East
	1a - Bridge Closed with Detour	1b - Bridge Open with Single Lane		
Highway Engineering	<u>Advantages</u> - Retains existing alignment of Sharpe's Lane - Faster method of construction compared to staged construction with single lane - Lower construction staging cost compared to keeping bridge open during construction - New bridge is constructed in one phase, which increases its durability and reduces future maintenance of the bridge <u>Disadvantages</u> - Impacts 2 hydro poles - Introduces up to 8 km of travel for traffic to cross Highway 401 via detour route	<u>Advantages</u> - Retains existing alignment of Sharpe's Lane - Maintains a single lane of traffic across Highway 401 during construction <u>Disadvantages</u> - Impacts 2 hydro poles - Minor traffic delays due to single lane of traffic across the bridge during construction - Longer construction duration compared to closing the bridge - Higher construction staging cost compared to closing bridge - New bridge is constructed in two phases, which decreases its durability and increases future maintenance of the bridge	<u>Advantages</u> - Maintains access across Highway 401 during construction with minimal impacts to traffic - Similar construction duration as closing the bridge - Similar construction staging cost as closing the bridge - New bridge is constructed in one phase, which increases its durability and reduces future maintenance of the bridge - No hydro pole impacts <u>Disadvantages</u> - Requires alignment shift on Sharpe's Lane - Significantly higher cost compared to replacing on existing alignment	<u>Advantages</u> - Maintains access across Highway 401 during construction with minimal impacts to traffic - Similar construction duration as closing the bridge - Similar construction staging cost as closing the bridge - New bridge is constructed in one phase, which increases its durability and reduces future maintenance of the bridge <u>Disadvantages</u> - Requires alignment shift on Sharpe's Lane - Significantly higher cost compared to replacing on existing alignment - Results in undesirable horizontal curve on bridge - Impacts 3 hydro poles
				
Social & Cultural Environment	<u>Advantages</u> - Less property required compared to Alternatives 2 and 3 - Fewer potential impacts to areas of archaeological potential and potential contamination compared to Alternatives 2 and 3 <u>Disadvantages</u>	<u>Advantages</u> - Less property required compared to Alternatives 2 and 3 - Fewer potential temporary impacts to local businesses located on Sharpe's Lane, Kelly Road and Concession Road 2 compared to Alternative 1a as it does not require a detour - Fewer potential impacts to areas of archaeological potential and	<u>Advantages</u> - No temporary impacts to local businesses located on Sharpe's Lane, Kelly Road and Concession Road 2 compared to Alternative 1 <u>Disadvantages</u> - Requires more property compared to Alternatives 1 and 3	<u>Advantages</u> - No temporary impacts to local businesses located on Sharpe's Lane, Kelly Road and Concession Road 2 compared to Alternative 1 <u>Disadvantages</u> - Requires more property compared to Alternative 1 - Greater potential for noise impacts to residential properties compared to Alternative 1



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Category	Sharpe's Lane Bridge Alternatives			
	1 – Replace on Existing Alignment		2 – New Alignment – West	3 – New Alignment – East
	1a - Bridge Closed with Detour	1b - Bridge Open with Single Lane		
	Greater potential temporary impacts to local businesses located on Sharpe's Lane, Kelly Road and Concession Road 2 compared to Alternative 1b due to detour	potential contamination compared to Alternatives 2 and 3	- Greater potential for noise impacts to residential properties compared to Alternative 1 - Greater potential impacts to areas of archaeological potential and potential contamination compared to Alternative 1	Greater potential impacts to areas of archaeological potential and potential contamination compared to Alternative 1
				
Natural Environment	<u>Advantages</u> Fewer potential impacts to forested areas and natural environment compared to Alternatives 2 and 3	<u>Advantages</u> Fewer potential impacts to forested areas and natural environment compared to Alternatives 2 and 3	<u>Disadvantages</u> Greater potential impacts to forested areas and natural environment compared to Alternative 1	<u>Disadvantages</u> Greater potential impacts to forested areas and natural environment compared to Alternative 1
				
Overall Assessment ²	Not Preferred	Preferred	Not Preferred	Not Preferred

Based on the evaluation, the preferred alternative is **Alternative 1b – Replace on Existing Alignment – Bridge Open with Single Lane** because:

- Retains existing alignment of Sharpe's Lane, which minimizes environmental, property and utility impacts
- Maintains access across Highway 401 during construction
- Staged construction has fewer potential temporary impacts to local businesses compared to a full closure with detour

² Project cost was considered at a high level during the development of alternatives to confirm overall technical and financial feasibility. However, cost was not included as a weighted criterion in the comparative evaluation of alternatives. In accordance with the MTO Class Environmental Assessment process, the evaluation focused on the relative potential effects on the natural, social, cultural, and economic environments, as well as constructability and operational considerations. Cost was reviewed separately to ensure that the recommended alternative represents a feasible and implementable solution.



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7.7 Butler Creek Culvert Alternatives

One (1) larger (greater than 3 m wide) structural culvert, the Butler Creek Culvert, is present within the study area and is approaching the end of its service life and will require rehabilitation or replacement. The existing structure is approximately 66 years old and is currently in relatively fair condition. In addition, the culvert must accommodate the future Highway 401 cross-section associated with the interim six (6) lane and ultimate eight (8) lane widening.

As part of the evaluation process, high-level drainage strategies were first reviewed to determine whether the existing culvert should be rehabilitated or replaced. Culvert rehabilitation with extension was considered as a potential short-term solution that could accommodate the interim six (6) lane widening. However, this approach would not accommodate the ultimate eight (8) lane widening and would require eventual replacement of the original culvert, which would introduce additional construction complexity and long-term maintenance considerations.

Replacement of the culvert with a new structure was therefore identified as the preferred drainage strategy. A full replacement provides a long-term infrastructure solution capable of accommodating both the interim and ultimate highway widening configurations and avoids the need for future replacement of a partially rehabilitated structure.

The alternatives developed as part of this study, the associated advantages and disadvantages of each alternative, and the evaluation are summarized in **Table 13**.

Table 13: Evaluation of Butler Creek Culvert Alternatives

Alternative	Key Considerations	Overall Assessment
Alternative 1: Rehabilitate and Line Existing Culvert and Jack and Bore (trenchless installation method) Twin Culverts	• Complex construction methodology required to install new twin culverts while retaining the existing structure • Reduced hydraulic reliability compared to full replacement • Increased long-term maintenance risk associated with multiple culvert structures	Not Preferred Constructability challenges and long-term performance concerns reduce overall suitability
Alternative 2: Replace with New Culvert at Existing Location	• Direct replacement approach • Significant traffic staging constraints during construction • Potential impacts to highway operations during replacement • More complicated drainage requirements during construction	Not Preferred Greater staging impacts and construction risks compared to other options
Alternative 3: Replace with New Culvert East of Existing Location	• Strong hydraulic performance • Improved constructability when compared to Alternative 2 • Reduced traffic staging complexity when compared to Alternative 2 • Reliable long-term service solution	Preferred Alternative Best overall balance of hydraulic performance, constructability, cost, and long-term service life

The most suitable alternative is **Alternative 3, replacement with a new culvert to the east of the existing culvert location**, as it provides best overall balance of hydraulic performance, constructability, cost, and long-term service.

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7.7.1 Other Considerations

Several additional alternatives and considerations were reviewed during the evaluation process but were not carried forward for detailed evaluation.

One (1) concept involved rehabilitating the existing culvert while incorporating retaining wall structures to accommodate the interim highway widening footprint. While this option could have provided a temporary solution for the interim six (6) lane configuration, it would not accommodate the ultimate eight (8) lane widening and would ultimately require full replacement of the original culvert. Given the additional structural complexity and lack of long-term viability, this approach was not considered a suitable long-term solution.

Several construction flow management approaches were also considered to maintain drainage through Butler Creek during culvert replacement.

One (1) option involved using the existing culvert as a temporary flow passage during construction while the new culvert structure is constructed adjacent to it. This approach would allow creek flows to be maintained without requiring significant temporary diversion infrastructure. However, this introduces additional staging complexity and requires careful coordination between construction phases.

Another option considered the installation of a temporary pipe through the existing culvert to convey flows during construction. While this approach could provide additional flow management flexibility, it would require temporary infrastructure and additional installation and removal activities, increasing construction complexity and cost.

The proposed solution, **Alternative 3, replacement with a new culvert to the east of the existing culvert location** utilizes the drainage provided by the existing culvert temporarily while the new culvert to the east is constructed.



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8.0 Recommended Plan

This section of the report describes the Recommended Plan for the replacement and rehabilitation of one (1) bridge and one (1) culvert and identifies the future Highway 401 footprint for an interim six (6) lanes and ultimate eight (8) lanes.

The Recommended Plan is presented in **Figure 6** and includes the following:

- Replacement of the Sharpe’s Lane underpass structure (bridge open with a single lane)
- Replacement of the Butler Creek structural culvert to the east of the existing location
- Future expansion of Highway 401 to an interim six (6) lane and ultimate eight (8) lane cross-section
- Implementation of Noise Barrier along the north side of Highway 401 during the interim six (6) lane Highway 401 widening
- Drainage improvements

Plans that illustrate details of the Recommended Plan are provided in **Appendix A**.

8.1 Design Criteria

Highway 401 within the project limits is classified as a four (4)-lane Rural Freeway Divided (RFD) highway. The current posted speed limit on this section of the highway is 100 km/h, and the design speed is 130 km/h. The posted speed limit within the study area is expected to increase to 110 km/h in the coming years and potentially in advance of the implementation of the Recommended Plan.

There is one (1) road that crosses Highway 401 within the study area. The functional classification of Sharpe’s Lane, along with its posted speed and design speed, is shown in **Table 14**.

Table 14: Sharpe’s Lane Posted and Design Speed

Structure Type	Functional Highway Classification	Posted Speed (km/h)	Design Speed (km/h)
Underpass	RCU80	60	80

8.2 Highway 401

8.2.1 Horizontal Alignment

The existing horizontal alignment for Highway 401 will be maintained throughout the study area.

There is one (1) existing horizontal curve on Highway 401 within the study limits, and it exceeds the minimum design standard radius for a design speed of 130 km/h (R=950 m), and it exceeds the desirable design radius of R=2300 m.

8.2.2 Vertical Alignment

The minimum K values for vertical curves with a design speed of 130 km/h are: Crest K-150 and Sag K-80. There are three (3) existing crest curves and three (3) existing sag curves on Highway 401 within the study area. Of the six (6) vertical curves, four (4) do not meet the minimum K-value for the design speed of the highway (130 km/h). The substandard vertical curves will have their geometry improved. The recommended Highway 401 profile will satisfy the requirements for a design speed of 130 km/h.

8.2.3 Cross-Section

The Highway 401 cross-section within the study limits includes expanding the highway to six (6) lanes initially (Interim), and eight (8) lanes ultimately (Ultimate). The existing median width will be maintained throughout the study area by adding additional lanes to the outside of the existing platform. A typical cross-section is provided **Figure 7**.

The cross-section elements of Highway 401 within the project limits are summarized in **Table 15**.

Table 15: Summary of Recommended Cross-Section Elements on Highway 401

Cross-Section Element	Width (m)
Pavement Width	6 x 3.75 m (3 EBL, 3 WBL) [Interim] 8 x 3.75 m (4 EBL, 4 WBL) [Ultimate]
Shoulder Width	3.45 – 3.65 m (lt) 3.0 m (rt)
Shoulder Rounding	1.5 m



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Cross-Section Element	Width (m)
Median Width	7.7 – 8.1 m (varies)
ROW Width	91.5-108 m (varies)

8.2.4 Noise Barrier Wall

An existing noise barrier, located at the west end of the study area on the south side of Highway 401 and approximately 310 m long, will be maintained. One noise barrier (NB1) was evaluated as a potential mitigation measure for the Project. The barrier was modelled within the Project right-of-way at a maximum height of 5 m, in accordance with MTO requirements. In accordance with the MTO Environmental Noise Guideline, the noise barrier was found to be technically feasible. While the cost-effectiveness analysis indicates that the estimated cost marginally exceeds the \$125,000 per receptor threshold, the exceedance is minor and the mitigation measure achieves meaningful noise reduction at impacted receptors. Therefore, noise barrier NB1 is recommended as part of the Project.

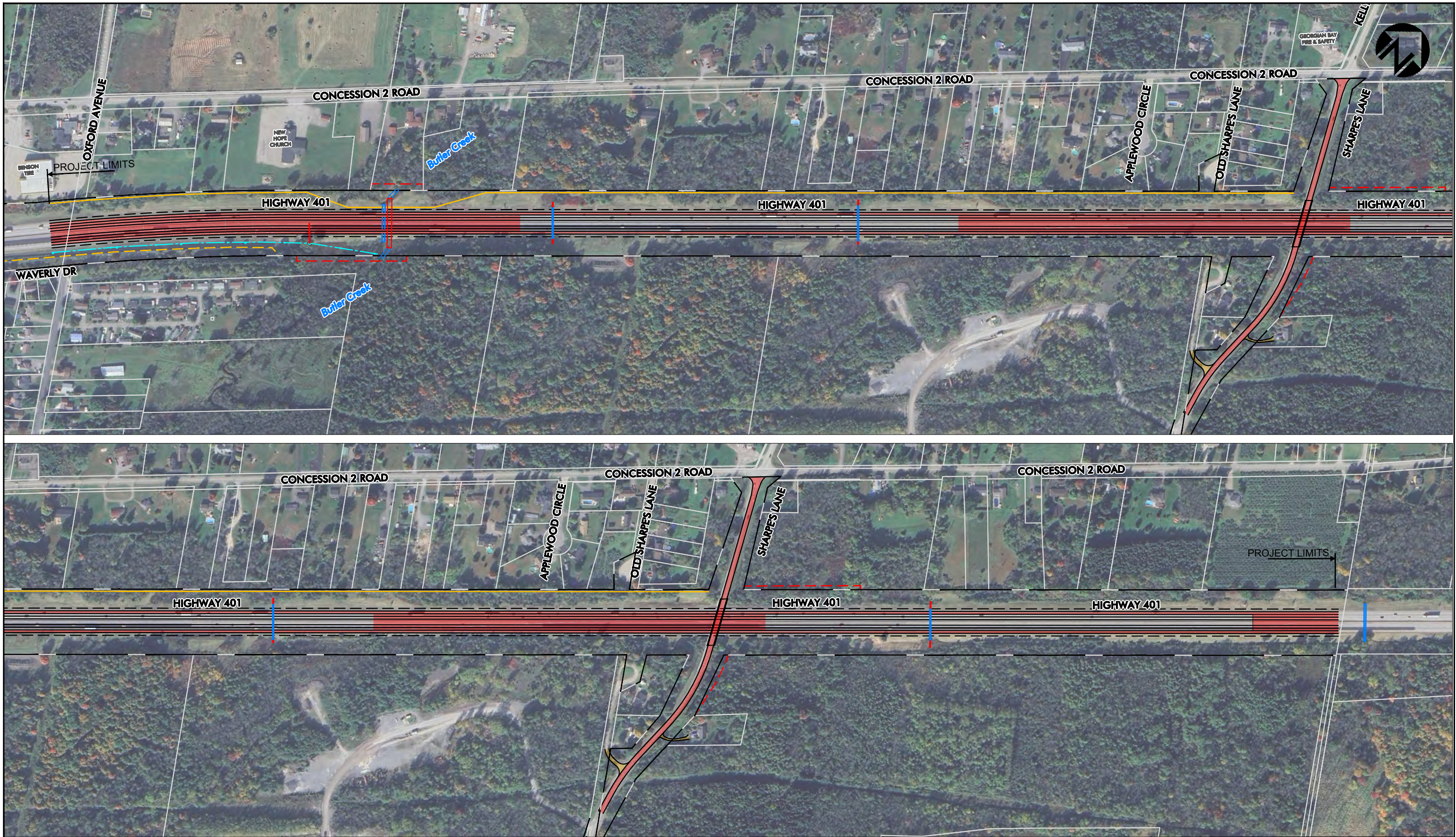
8.2.5 Traffic Operations

The Level of Service (LOS) is a way to measure the free flow of traffic on a roadway and is used to determine how well a transportation facility is operating from a traveller’s perspective. LOS is expressed in terms of traffic delays and is represented by letters A through F. Level of Service ‘A’ represents free-flow traffic conditions, while Level of Service ‘F’ represents breakdown flow with stop-and-go traffic conditions.

Based on a traffic analysis conducted as part of this study, the following conclusions are noted:

- Based on the existing four (4) lane cross-section, Highway 401 between North Augusta Road Interchange and Maitland Road Interchange is expected to operate at LOS D or better until 2044
- Highway 401, with a six (6) lane cross-section between North Augusta Road Interchange and Maitland Road Interchange, is expected to operate at LOS C or better until 2044
- Highway 401, with an eight (8) lane cross-section between North Augusta Road Interchange and Maitland Road Interchange, is expected to operate at LOS B or better until 2044

All traffic reports prepared for this study are on file with the MTO and can be made available upon request.



HIGHWAY 401 PLANNING STUDY, EAST OF BROCKVILLE
 from 0.75 km east of North Augusta Rd Interchange
 to 3.3 km west of Maitland Rd Interchange
 Preliminary Design & Class Environmental Assessment
 GWP 4111-22-00

- Limit of existing MTO right of way
- New Roadway - Initial (6-Lane Highway 401)
- New Roadway - Ultimate (8-Lane Highway 401)
- - - Property Required - Ultimate (8-Lane Highway 401)
- - - Driveway Modification

- Existing Culvert
- New Culvert / Extension
- - - Existing Noise Barrier
- New Noise Barrier
- - - New Storm Sewer

Recommended Plan
 Highway 401
 Elizabethtown-Kitley Township
 SCALE 1:5000

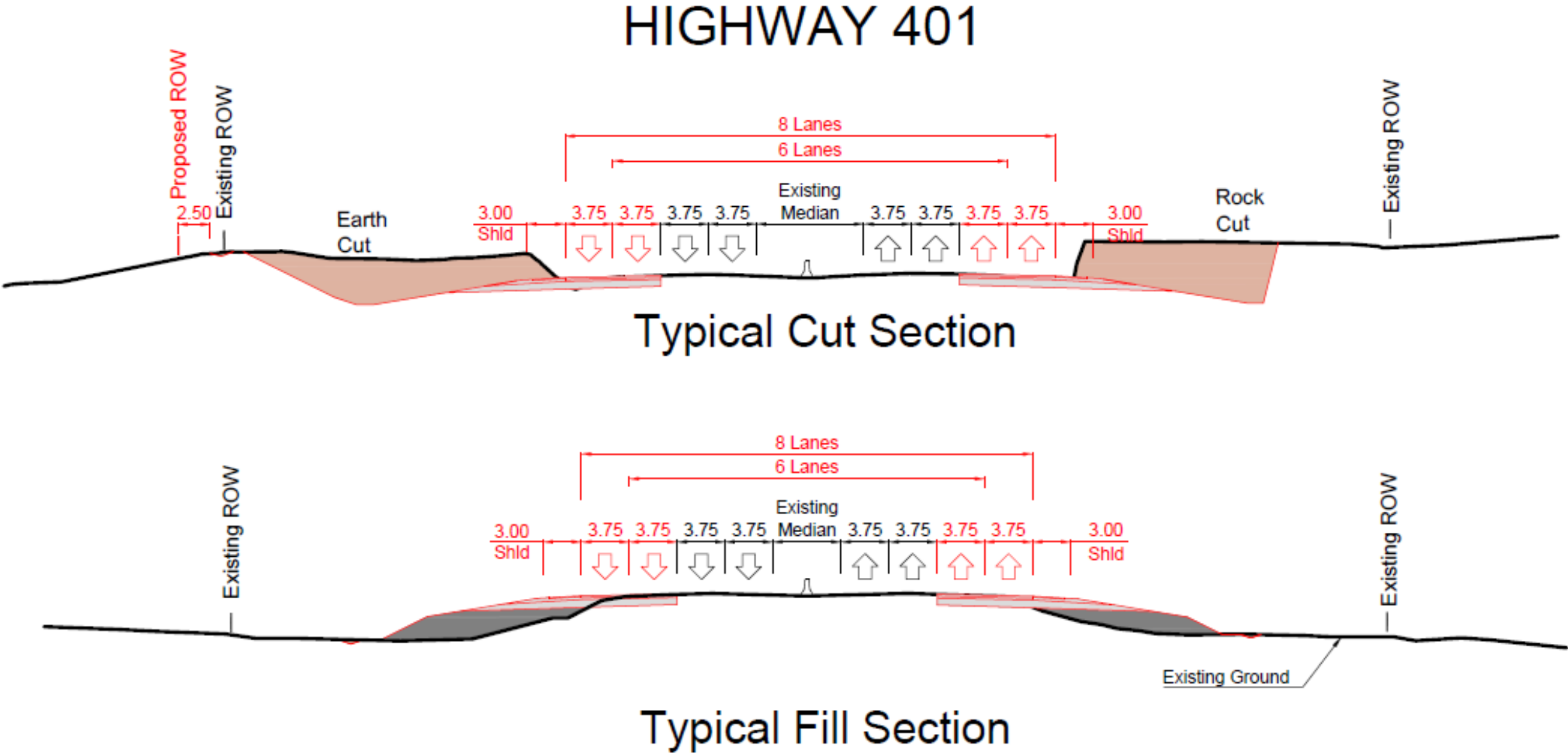


Figure 7: Typical Highway 401 Cross-Section

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8.3 Sharpe’s Lane

8.3.1 Horizontal Alignment

The recommended horizontal alignment of Sharpe’s Lane is realigned slightly to the east of the existing alignment. The new horizontal alignment was developed to permit staged construction of the new bridge with minimal alignment shift. Two (2) horizontal curves will be used to tie into the existing roadway. All horizontal curves meet the minimum requirements for a design speed of 80 km/h.

8.3.2 Vertical Alignment

The new underpass structure at Sharpe’s Lane (to span the ultimate eight (8) lane Highway 401), will require the road profile to be raised to provide the minimum vertical clearance of 5.0 m from the underside of the new structure to the recommended profile elevation of Highway 401.

8.3.3 Cross-Section

The recommended cross-section elements for Sharpe’s Lane are summarized in **Table 16**.

Table 16: Summary of Recommended Cross-Section Elements

Number of Lanes & Lane Width (m)	Shoulder Width (m)	Shoulder Rounding (m)	Right-of-way Width (m)
2 x 3.25	1.0	0.5	33.0-48.0 (varies)

8.4 Bridge Engineering

The Recommended Plan includes the replacement of the existing Sharpe’s Lane underpass and the replacement of the existing Butler Creek culvert, as described in the following sections. It is anticipated that the structures will be replaced in advance of, or in conjunction with, the interim six (6) lane highway widening.

8.4.1 Sharpe’s Lane Underpass

The existing Sharpe’s Lane Underpass will be replaced with a new structure. The preferred strategy for Sharpe’s Lane Underpass is to replace the existing bridge and construct a two (2) span (34 m – 34 m), slab-on-girder, integral abutment structure with NU-girders on a slightly shifted new alignment to the east. The proposed width of the new bridge is 11.4 m. The new bridge is designed to accommodate the ultimate eight (8) lane Highway 401 cross-section.

8.4.2 Butler Creek Culvert

The preferred strategy for the Butler Creek Culvert is to replace the existing culvert with a new 6.0 m span by 2.7 m rise precast concrete box culvert. The preferred strategy is to orient the culvert perpendicular to the highway and shift it about 3.0 m to the east from the existing culvert. The culvert will be replaced in conjunction with the interim six (6) lane widening of Highway 401. The culvert will be built in two (2) stages via the open-cut method while diverting flows through a bypass pipe positioned parallel to the work area. This offers clean separation between live flow and excavation, allowing for the full removal of the existing culvert.

8.5 Drainage Engineering

The proposed drainage conditions are summarized in the sections below.

8.5.1 Culvert Recommendations

In general, specific maintenance work is recommended for the existing centreline culverts to ensure proper design service life of the infrastructure. Specific recommendations for culvert replacement have been made in the instance of MTO standard exceedance. In instances where the culvert was in fair – good material condition, and MTO Design Criteria were met, the culvert is recommended to be retained.

There are three (3) non-structural centreline culverts within the study area. As part of the Recommended Plan, the culverts are recommended to be retained and extended to accommodate the ultimate eight (8) lane Highway 401 footprint. Based on the condition of the culverts at the time of the interim six (6) lane widening of Highway 401, replacement of the culverts may be recommended.

8.5.2 Butler Creek Culvert

The current Butler Creek culvert does not meet all MTO drainage design standards, and the overall culvert is in fair condition, replacement was considered for the site. This will allow for greater flow capacity, reduced maintenance needs, and an improved aquatic environment. The existing culvert is proposed to be replaced with a larger structural culvert.

8.5.3 Storm Sewer

To mitigate impacts to the existing noise barrier wall, it is recommended to implement a new closed drainage system on the south side of Highway 401 from the west limit of the study area to the Butler Creek Culvert. Maintaining an open drainage system, such as ditches, would result in a larger footprint, particularly when combined with the highway widening, and would impact the existing noise barrier wall. A new 300 mm storm sewer with ditch inlets to the outlet to the Butler Creek Culvert is recommended.



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8.5.4 Stormwater Management Strategy

The proposed stormwater management (SWM) strategy was designed to meet SWM design guidelines and policies as outlined in the *MTO Drainage Management Manual* (1997), the *Ministry of the Environment Stormwater Management Planning and Design Manual* (2003), and the *MTO Highway Drainage Design Standards* (HDSS) (2024).

Ideally, SWM quantity controls would be provided whenever peak flows are shown to increase. Drainage analysis that clearly shows zero impact on adjacent landowners (no negative impact on upstream or downstream properties) can be used as a defense in cases where a landowner claims a negative impact on their land. Any outlet not located directly on a permanent watercourse has potential drainage risk, such as downstream flooding, erosion, or scour, which could be attributed to MTO.

The proposed road improvements are generally located at the downstream end of very large catchments with increased paved area, allowing water to run off more quickly. Quantity controls in these areas would delay peak flows from the highway, causing them to match up more closely with upstream areas, resulting in higher peak flows to the downstream watercourse, and they have not been included in the current design. The SWM strategy is summarized below:

- Water quality control is required at all outlets, and typically, vegetated ditches are sufficient in rural areas. The storm sewer system should be designed to outlet a minimum of 100 m from the nearest watercourse in order to provide sufficient length of water quality control in the ditch, where possible. Low Impact Development (LID) features can also be used to provide water quality control as required.
- Vegetated ditches and enhanced grass swales are recommended to provide water quality controls where possible for enhancing the storm drainage from the proposed highway. In addition to being consistent with design features typically implemented in highway drainage systems, these types of water quality features typically have lower maintenance costs than centralized stormwater management basins.
- Highway embankments can also be used to improve water quality. Highway embankments and roadside ditches should be planted with dense vegetation to prevent erosion and trap sediments. Rock check dams can be used along steep grades to reduce velocities and erosion.

8.6 Foundation Engineering

A foundation investigation was undertaken at both structure sites.

At Sharpe’s Lane, the site stratigraphy consists of asphalt and granular base overlying embankment fill (silty sand with pockets of sandy clayey silt), underlain by glacial till deposits

of silty sand to silt and sand with gravel, cobbles, and boulders. The preferred foundation option is to support the abutments on steel H-piles driven to refusal in very dense till and the center pier on shallow foundations bearing on very dense till.

At Butler Creek, the site’s subsurface stratigraphy consists of surficial topsoil underlain by fill materials (silty sand to clayey silt), followed by native deposits. Shallow foundations are recommended for the culvert replacement.

Additional field investigations and testing will be completed during detailed design to confirm the site-specific soil conditions.

8.7 Pavement Engineering

A preliminary pavement analysis was completed for the Highway 401 mainline and Sharpe’s Lane. The proposed pavement design will be confirmed during detailed design.

8.8 Utilities

Utility relocations will be required to accommodate the ultimate Highway 401 widening to eight (8) lanes and the associated structure replacements. Utility crossings and potential conflicts are summarized in **Table 17**. Relocation plans for utilities will be confirmed in the detailed design. It is recommended that all utility relocations occur as part of the Interim Phase.

Table 17: Potential Utility Impacts

Approximate Location	Approximate Length	Utility Type	Recommendation
Highway 401 (crossing) Station 23+940	100 m	Overhead Hydro	Poles and Hydro line do not require relocation
Highway 401 (crossing) Station 24+730	100 m	Overhead Hydro	Poles and Hydro line do not require relocation
Highway 401 (crossing) Station 25+520	100 m	Overhead Hydro	Poles and Hydro line do not require relocation
Sharpe’s Lane (east side) Station 10+140-10+225)	80 m	Overhead Hydro	Consult Hydro One for potential pole relocations due to grade raise of Sharpe’s Lane
Sharpe’s Lane (crossing) Station 10+225	75 m	Overhead Hydro	Poles and Hydro line do not require relocation

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8.9 Implementation Plan

A preliminary strategy to implement the Recommended Plan has been prepared as part of this study. However, depending on MTO funding priorities and future operations, there may be changes to the proposed construction strategy (implementation plan). MTO will continue to monitor study area operations and may implement certain components of the plan as needed to meet provincial transportation needs.

8.9.1 Interim Phase

The structures will be replaced in advance of, or in conjunction with, the widening of the Highway 401 mainline, as described herein.

8.9.1.1 Sharpe's Lane Underpass

The structure at Sharpe's Lane is to be replaced using a staged construction method. This approach will maintain one (1) lane of traffic to ensure continuous access for vehicles travelling across Highway 401 on Sharpe's Lane.

Two (2) possible construction staging alternatives have been developed for the Sharpe's Lane underpass:

- The first concept involves completing the structure replacement over two construction seasons, with one stage completed per season. In Stage 1, half of the existing structure will be removed, retaining two (2) girders and two columns to maintain stability during construction. The new bridge section constructed in this stage will also consist of two (2) girders and two columns. During the winter stage, one (1) lane will remain open in each direction, that is, one (1) on the new bridge and one (1) on the existing bridge. In Stage 2, the remaining portion of the existing bridge will be removed, and the second half of the underpass will be completed.
- The second concept is similar to the first but involves an accelerated construction method to complete the bridge replacement within a single construction season and avoid the winter stage.

The two (2) proposed concepts will be further assessed and confirmed during the detailed design phase.

8.9.1.2 Butler Creek Culvert

A two (2) stage construction approach will be required to install the new culvert while maintaining two (2) lanes of traffic in each direction. Temporary construction barriers and roadway protection systems will be used to separate traffic from the work zone. In Stage 1,

traffic will be shifted toward the median to allow replacement of the outside portions of the culvert. In Stage 2, traffic will be shifted to the newly constructed outside lanes, enabling the completion of the middle portion of the culvert.

8.9.1.3 Highway 401 Mainline

After the structures have been replaced, Highway 401 can be widened to six (6) lanes. Expansion will occur outside of the existing platform. The existing outside shoulder can be removed, and the new lane and shoulder can be constructed.

The existing Highway 401 substandard vertical curves are recommended to be improved to satisfy the requirements for a design speed of 130 km/h. It is assumed that two (2) lanes of traffic will need to be maintained and traffic will be shifted during construction to accommodate the highway reconstruction.

8.9.2 Ultimate Phase

All of the structures will be constructed to their ultimate design at the interim phase of construction. Therefore, no structure widening or lengthening is required when Highway 401 is expanded to eight lanes.

During the expansion of the highway to the eight (8) lane cross-section, it is assumed that three (3) lanes of traffic will need to be maintained, and traffic will be shifted to the median during construction. Once the traffic has been shifted, the shoulder removal can be completed, and the new lanes can be added to the outside of the pavement structure.

8.10 Construction Closures and Detours

To facilitate the construction of the Recommended Plan, no closures of municipal roads will be required, but a temporary closure of Highway 401 will be required. Highway 401 overnight closures are required for the removal of the existing Sharpe's Lane bridge over the highway and potential girder installation for the new bridge. The anticipated duration of the Highway 401 closures is 12 to 18 hours.

8.10.1 Overnight Closures and Detours

Overnight closures of Highway 401 will be required for the demolition of the underpass at Sharpe's Lane. An overnight closure may be required for girder placements for the new underpass structure, although this activity can typically be completed through the use of rolling closures. The anticipated overnight closures are summarized in **Table 18**.



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Table 18: Overnight Closures

Structure Replacement	Closure Requirement	Construction Activity
Sharpe’s Lane Underpass	Highway 401 EB between North Augusta Road and Maitland Road	Existing Sharpe’s Lane underpass demolition and potential girder placement for new bridge
	Highway 401 WB between Maitland Road and North Augusta Road	

Each overnight closure of Highway 01 will require a detour route along the existing municipal road network to maintain traffic along Highway 401. The anticipated detour routes are shown in **Figure 8**.

The overnight closure and detour traffic analysis shows some significant queueing and delay along the Highway 401 mainline. A no-flag-person scenario and a flag-person scenario were modelled for each closure along Highway 401. Based on the comparison made between the Highway 401 closure scenarios and the base-case scenarios, travel delays and traffic queuing are anticipated. Adding a flag person or Ontario Provincial Police Officer, and temporary signal timing adjustments at applicable intersections will significantly reduce the potential delay and queueing impact on Highway 401 mainline during the full closure.



Figure 8: Overnight Closure Detour Routes

9.0 Notice of Study Completion

The Notice of Study Completion was placed in local newspapers (Brockville Recorder and Times and Brockville This Week) when the Transportation Environmental Study Report (TESR) was made available for a 30-day comment period. The Notice was also made available on the project website and distributed to agencies, key stakeholders, Indigenous communities, and the public on the project mailing list.

9.1 Future Consultation

During the subsequent design stage of this undertaking, external agencies, municipalities, Indigenous and Métis communities, and property owners will continue to be contacted and consulted regarding design / construction details and commitments to future work as outlined in this document, where appropriate and/or necessary.

9.2 Future Commitments

Future consultation will be required during the next phase of planning and design to deal with all outstanding issues, including permits and approvals from external agencies, consultation with Indigenous communities, and detailed environmental investigations regarding impacts and mitigation, and engineering investigations to confirm the final design.

Future consultation is anticipated to include notification of the start of next phase of design and a PIC near the completion of design stage to display plans, and to answer questions about the final design and proposed mitigation measures. A summary of proposed future consultation is in Table 19.

Table 19: Future Consultation with External Agencies

External Agency	Subject of Consultation
Ministry of Citizenship and Multiculturalism	Stage 2 Archaeological Assessment
Ministry of Natural Resources	- Terrestrial Species and Habitat - Wetland Compensation - Construction timing windows/restrictions - Specific fisheries management objectives
Ministry of the Environment, Conservation and Parks	Terrestrial and/or aquatic Species at Risk species and/or habitat

External Agency	Subject of Consultation
	Species Conservation Act Registration and Conservation Plans (if required)
Indigenous Communities	- Participation in archaeological field surveys - Decisions or actions that may adversely impact asserted or established Aboriginal or treaty rights.
Emergency service agencies (i.e., OPP, Fire, ambulance)	Ongoing consultation during subsequent design phase of project to minimize impacts to emergency response times during and after construction
United Counties of Leeds and Grenville, Elizabethan-Kitley, and City of Brockville	- Ongoing consultation during subsequent design phase of project - Consultation for traffic management, construction timing, and detours, public concerns, etc.
Property Owners	Ongoing consultation during subsequent design phase of project with respect to property impacts, well and watermain impacts, and property acquisition
Utility companies	Ongoing consultation during subsequent planning and design phase of project

Other issues to be dealt with during the subsequent planning and design process include:

- Property concerns and entrance closures through negotiations with individual property owners
- Additional details of the Recommended Plan, such as tree clearing requirements

10.0 Environmental Impacts and Mitigation

In accordance with the *Class Environmental Assessment for Provincial Transportation Facilities and Municipal Expressways* (2024) and the *Environmental Reference for Highway Design* (2006), a description of the anticipated impacts associated with the Recommended Plan, and appropriate mitigation at a Preliminary Design level of detail, is described herein. The details of the Recommended Plan will be refined and finalized during the next stage of the planning design process, Detail Design.

10.1 Natural Environment

Impacts to the natural environment have been minimized in part by minimizing footprint impacts to undisturbed natural environments. This includes selecting a Recommended Plan that minimizes impacts to the rare and sensitive vegetation communities identified within the study area.

To the extent possible, project facilities and components will be sited to avoid and minimize interactions with wooded areas and potentially impacted properties; where avoidance is not possible, mitigation or compensation measures will be developed in consultation with the applicable regulatory authorities.

Although the Recommended Plan will have direct impacts on wildlife habitat and vegetation, impacts at the larger watershed and ecosystem scale are not expected to be significant.

10.1.1 Indigenous Rights and Interests

Indigenous rights and interests related to the natural environment have been addressed through consideration of potential effects on lands, waters, vegetation, wildlife habitat, and areas that may support traditional or cultural activities, and through Indigenous community consultation undertaken as part of the Class EA process. Consultation activities included:

- Issuance of the Notice of Study Commencement and Request to Consult on April 19, 2024;
- Notification of planned natural environment field investigations on April 19, 2024;
- Circulation of the Draft Stage 1 Archaeological Assessment Report for review on November 15, 2024;
- Invitations to participate in Public Information Centre (PIC) 1, October 2, 2025 and PIC 2 July 17, 2025, where information on existing conditions, alternatives, and potential environmental effects and mitigation measures was presented.

These activities provided opportunities for Indigenous communities to review and comment on potential interactions between the project and the natural environment.

Indigenous community consultation related to the project has been initiated and carried out to date in accordance with the Class EA process, as summarized in **Section 9.0** of this report.

During the next stage of design for this project, engagement with Indigenous communities will be carried out at the initiation of the design and construction planning process.

10.1.2 Erosion and Sediment Control

This study included a review of potential erosion and sediment control requirements for the Recommended Plan, based on the results of the geotechnical investigation and available background information, including soils and geological mapping.

Various mitigation techniques will be employed during construction to reduce the risk of impacts to natural environment features. Mitigation measures for sedimentation, erosion, and dust control will be implemented to prevent sediment and dust from entering sensitive natural features. An Erosion and Sediment Control Plan (ESCP) (Approach 2, ERD) is recommended to be developed during the next stage of the planning and design process to mitigate erosion potential by effective planning, procedures, and water management, apply erosion control measures to prevent mobilization of sediment, and apply sediment control measures to prevent off-site sediment release in the event of sediment mobilization.

The ESCP should identify how to manage water, control erosion, and control sedimentation, including where to install appropriate Best Management Practices (BMPs), how to install the BMPs, when to install, and maintain and remove BMPs. The following ESC procedures will be considered for the ESCP:

- Employ a multi-barrier approach
- Retain existing vegetation and stabilize exposed soils with cover
- Limit the duration of soil exposure and phase construction when possible
- Limit the size of disturbed areas by minimizing nonessential clearing and grading
- Reduce slope length and gradient of disturbed areas
- Maintain overland sheet flow and avoid concentrated flows
- Store / stockpile erodible materials away (i.e., greater than 15 m) from watercourses, drainage features, and the top of steep slopes
- Provide reasonable professional effort to involve contractors in ESC practices and determine if the contractors are trained in ESC Plan implementation, inspections, maintenance, and repairs

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- Adjust ESC Plan at construction site to adapt to site features
- Assess all ESC practices before and after significant rainfall (>10mm) and snowmelt events
- Selection of Best Management Practices will be completed during the detailed design

10.1.3 Potential Contaminated Property

The Recommended Plan is expected to impact eight areas of potential concern identified as having the potential to have contaminated subsurface soil and/or groundwater conditions. These properties include pesticides (including herbicides, fungicides, and anti-fouling agents), mining, smelting and refining, ore processing, tailings storage, importation of fill material of unknown quality, and gasoline and associated products storage in fixed tanks. Waste Disposal and Waste Management, including thermal treatment, landfilling, and transfer of waste, other than the use of bio-soils as soil conditioners. Further investigation would be required to confirm soil quality within the Areas of Potential Concern identified at the study area. In addition, the following recommendations are provided:

- A Preliminary Site Screening (PSS), Phase I ESA and Phase II ESA (if recommended as part of the PSS or Phase I ESA) should be completed for any property that will be acquired by MTO in accordance with the requirements of the MTO documents *Environmental Guide for Contaminated Property Identification and Management* (MTO, 2006) and *Environmental Reference for Highway Design* (MTO, 2013). If demolition activities are required, designated substance surveys should be completed for buildings or structures prior to demolition
- O.Reg. 406/19 and the associated document, Rules for Soil Management and Excess Soil Quality Standards referenced by O.Reg. 406/19, should be followed for soil that is excavated and managed on-site or off-site during construction. This includes sampling soil that is intended to be excavated prior to or during construction, which may require off-site management as excess soil. The soil sampling program will be undertaken according to a sampling and analysis plan, and analyses will be performed for the specific contaminants of potential concern
- Sampling programs should be developed and undertaken under the supervision of a qualified person as defined in O.Reg. 406/19, and sample selection should take into consideration the presence of anthropogenic substances such as debris/waste, and unusual odours or staining
- Stockpiling and transport of excavated soil and sediment during construction should be done in accordance with the requirements specified in O.Reg. 406/19

10.1.3.1 Excess Soil Management

Based on the findings of the Contamination Overview Study (COS) completed by Stantec in September 2024, several Areas of Potential Environmental Concern (APECs) were identified within and adjacent to the study area, associated with historical and current Potentially Contaminating Activities (PCAs) including furnace oil spills, waste disposal and management activities, garages and maintenance operations, pesticide use, manufacturing, ore processing, and tailings storage. In accordance with MTO’s *Environmental Guide for Contaminated Property Identification and Management* (2006) and *Environmental Reference for Highway Design* (2013), a Preliminary Site Screening (PSS), Phase I Environmental Site Assessment (ESA), and Phase II ESA, if warranted, will be completed for any property to be acquired. Where demolition is proposed, designated substance surveys will be undertaken prior to the removal of structures. Soil excavation and management during construction will be carried out in compliance with Ontario Regulation 406/19 and the associated *Rules for Soil Management and Excess Soil Quality Standards*, including development and implementation of a sampling and analysis plan under the supervision of a Qualified Person. The Soil Characterization Report will address contaminants of potential concern identified in the APEC summary table, with consideration given to anthropogenic indicators such as debris, staining, and unusual odours. Stockpiling, handling, tracking, reuse, and off-site transport of excess soil and sediment will be conducted in accordance with O.Reg. 406/19 requirements to ensure regulatory compliance and appropriate soil management documentation.

10.1.4 Fish and Fish Habitat

Species lists from background data sources and Stantec’s field investigations indicate that the warm / cool water fish communities in the study area are comprised primarily of baitfish species. There are no records of aquatic SAR in watercourses within the study area (MNR 2024b; DFO 2024).

At sites where fish habitat (direct or indirect) was identified, the in-water timing window that is applicable is July 1 to March 14 (no in-water work from March 15 to June 30).

Stantec determined that watercourses in the study area do not provide Significant Habitat for fish. Significant Habitat means habitat that meets one (1) or more of the following criteria (MTO 2020b):

- *Rare or uncommonly found habitat that may (but may not) be one of the limiting factors to the fish population*
- *Specialized habitat that fish populations are highly dependent on to support critical life functions*
- *Areas contributing to fisheries productivity that are exceptionally productive, likely to be limiting, and are rare or relatively uncommon*

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Opportunities for habitat enhancement are identified at both stations with direct fish habitat within the study area. Butler Creek (Site 16X-0238/C0), specifically on the Highway 401 westbound side, would benefit from enhancements to the riparian zone, such as planting shrub vegetation, in order to increase shading. The Unnamed Tributary to St. Lawrence River (AG_10+050 / C5) features a large beaver dam at the Highway 401 Eastbound right-of-way edge that has caused the impoundment of water on both sides of Highway 401. The Tributary would benefit from having this removed, allowing for better fish passage and less potential for erosion should the beaver dam fail. This feature is located within and outside of the study area.

As the specific nature of the proposed work within the study area is currently unknown, the following list identifies potential effects associated with common construction activities related to Highway 401 (GWP 4111-22-00) occurring at or within 30 m of fish-bearing watercourses. Construction activities include maintenance, rehabilitation, or replacement of bridges and culverts, repaving and widening, and drainage improvements.

At Butler Creek (Site 16X-039/C0), the existing culvert and watercourse within the study area support fish and fish habitat. The spatial extent of fish habitat directly affected by the project, through the removal and replacement of the culvert, minor realignment of the watercourse, and widening of the highway, will need to be determined and/or confirmed once the following information is confirmed:

- New culvert length (and confirmation of dimension and structure type)
- The need for rock protection in the creek bed (areal extent, aggregate size)
- The extent of the channel realignment and the channel realignment details
- Details of other activities that may affect fish and fish habitat

Rock protection (waterbody material) is often added to the bed and/or banks of watercourses at both ends of culverts where extensions and new culverts are proposed. The intent of the rock protection is to reduce the risk of scour and erosion of the bed and banks of watercourses. The area of rock protection should be determined using the Drainage Management Manual (MTO 1997). The extent (area) of rock protection to be added and the area that will directly affect fish habitat should be determined during Detail Design and documented in a fisheries impact assessment.

As a minor realignment is necessary with the installation of the new culvert, fish passage needs to be considered. A low-flow channel should be considered and constructed to facilitate fish passage. Details of a low-flow channel or how fish passage will be maintained should be determined during the detailed design and documented in the aquatic effects assessment.

As part of the fisheries assessments during detailed design, Pathways of Effects (POEs) for land-based and in-water activities will need to be applied to determine the likelihood of the death of fish and/or HADD of fish habitat. The project is subject to the Fisheries Act, which prohibits the death

of fish and the harmful alteration, disruption, or destruction (HADD) of fish habitat. Compliance is guided through the MTO Fisheries Protocol, which establishes a stepwise process to determine whether routine works, Best Management Practices (BMPs), or a detailed Fisheries Assessment and Department of Fisheries and Oceans (DFO) review are required, which will be determined at Detail Design. Where HADD is likely, or where federally listed aquatic Species at Risk are present, the project must proceed to DFO review under the Fisheries Act.

10.1.4.1 Preliminary Avoidance and Design Considerations

As indicated in the previous sections, there is potential for impacts to fish habitat within the study area. Avoidance of impacts was initially implemented through the alternatives analysis process. Further avoidance of potential impacts may be feasible during Detail Design through reducing the potential footprints below the high-water mark, where the culvert removal and replacement and realignment are proposed.

The following measures should be considered during the detailed design to further reduce the risk of impacts to fish and fish habitat:

- Design the channel relocation / realignment using natural channel design principles such that it continues to provide fish habitat and fish passage
- New box culvert should consider open foot design, or if not feasible be embedded to allow for fish passage
- Design drainage system to reduce changes in drainage to watercourses that provide fish habitat
- Design and plan activities and works to reduce loss of fish habitat and disturbance to fish habitat
- Design stormwater management measures to reduce effects on watercourses that provide fish habitat
- Design a rehabilitation/re-vegetation plan for long-term stability of the areas disturbed during construction
- For rock reinforcement below the normal high-water level, use appropriately sized material and install at a similar slope to the existing, maintain a uniform bank / shoreline, and maintain a natural bank/shoreline alignment such that it does not interfere with fish passage or alter the bankfull channel profile

Design considerations with respect to fish and fish habitat in the Study Area are provided in **Table 20**. This table is to be referred to and updated through Detail Design to describe how each factor was addressed. DFO review is anticipated, however this will be determined at detailed design.

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Table 20: Design Considerations

Factors to Consider	Design Considerations Provided by the Fisheries Assessment Specialist	Describe How Each Factor Was Addressed Through Design
In-Water Works Timing Window	At sites where fish habitat (direct or indirect) was identified, the following in-water timing windows are applicable: Schedule work to occur from July 1 to March 14 (no in-water work from March 15 to June 30)	To be determined as the project progresses through design
Fish Passage	Design new culvert crossings to allow for fish passage. Fish passage should be designed for Butler Creek (Site 16X-0238/C0). Design channel realignment to allow for fish passage	To be determined as the project progresses through design
Significant Fish Habitat	No Significant Fish Habitat present	To be determined as the project progresses through design
Constraints and Opportunities	Opportunities for habitat enhancement are identified at both sites: - Butler Creek (Site 16X-0238/C0), specifically on the Highway 401 Westbound side, would benefit from enhancements to the riparian zone, such as planting shrub vegetation, in order to increase shading - The Unnamed Tributary to St. Lawrence River (AG_10+050 / C5) features a large beaver dam at the Highway 401 Eastbound ROW edge that has caused the impoundment of water on both sides of Highway 401. During the July 11, 2024, survey, water levels exceeded the top of the culvert openings on both sides of Highway 401	To be determined as the project progresses through design

10.1.4.2 Mitigation Measures

The impact assessment identifies that replacement of the existing Butler Creek culvert, associated channel realignment, highway widening, and drainage improvements have the potential to result in permanent and temporary impacts to fish habitat. Removal of the existing culvert alone is anticipated to permanently affect approximately 270 m² of direct fish habitat, with additional alteration to be quantified once realignment and detailed design elements are confirmed. As a result, a Fisheries Assessment during detailed design may be required to complete an Aquatic Effects Assessment, calculate habitat loss and alteration, evaluate rock protection requirements, address fish passage, and determine whether HADD is likely. The report confirms that a DFO review will be required for the channel realignment and new culvert installation, dependent on review during the detailed design. Future design must incorporate natural channel design principles, maintain fish passage, adhere to timing restrictions, and implement applicable MTO BMPs and OPSS/SSP mitigation measures to minimize impacts. Species at Risk databases must also be reconfirmed during detailed design to ensure regulatory compliance. The final determination of regulatory pathway, including whether Fisheries Act authorization and habitat offsetting are required, will depend on the outcome of the detailed Fisheries Assessment and confirmation of the extent of permanent habitat alteration.

For most of the in-water works, protection of fish and fish habitat is expected to be achieved through implementation of the prescribed in-water timing window and the measures outlined within the Ontario Provincial Standard Specifications (OPSS) and MTO Standard Special Provisions (SSP).

New culvert installation at Butler Creek should adhere to MTO design standards as they relate to fish passage at culverts identified to support direct fish habitat.

Mitigation of impacts to fish habitat from sources such as erosion and sedimentation that can occur during construction activities, including, but not limited to, staging, vegetation clearing, dewatering, and stockpiling, can be achieved through implementation and adherence to standard measures outlined within OPSS. Additional measures outlined within MTO SSP are also anticipated to be applicable to the project during the detailed design in order to further mitigate potential impacts to fish and fish habitat.

10.1.4.3 Timing

The in-water construction window for watercourses in the study area where fish habitat was identified is July 1 to March 14 (no in-water work from March 15 to June 30) (MNR 2024d). This timing window does not apply to work above the high-water level.

Additional timing considerations are as follows:

- Reduce the duration of in-water work



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- Conduct in-water work during periods of low flow to allow work in water to be isolated from flows
- Schedule work to avoid wet, windy, and rainy periods that may increase erosion and sedimentation
- Allow time for re-stabilization and re-vegetation as appropriate prior to winter

10.1.4.4 General Mitigation Measures

The following general measures are applicable to the project and should be designed and implemented following the OPSSs listed below:

- Limit access to banks or areas adjacent to watercourses to the extent required for construction activities
- Manage and treat dewatering (or other) discharge water to reduce the risk of erosion and/or release of sediment-laden or contaminated water to surface water features
- Operate machinery on land above the high-water level
- Operate, store, and maintain (i.e., refuel) equipment, vehicles, and materials in a manner that reduces the risk of the entry of deleterious substances to surface water features
- Maintain equipment operating within 30 m of surface water features free of fluid leaks, invasive species, and noxious weeds
- Design and implement erosion and sediment controls (ESC) to contain / isolate the construction zone, manage site drainage / runoff, and reduce the risk of erosion of exposed soils and migration of sediment to surface water features during construction and site restoration
- Maintain ESC measures until disturbed ground has been stabilized. The ESC plan should include the following items:
- Install effective ESC measures before starting work to reduce the risk of sediment entering surface water features
- Regularly inspect, maintain, and repair ESC measures during construction
- Remove non-biodegradable ESC materials once the site is stable
- Develop a Spill Management Plan and have it on site for implementation in the event of an accidental spill
- Stabilize and re-vegetate areas of disturbed/exposed soil, as per the rehabilitation / re-vegetation plan

10.1.4.5 Ontario Provincial Standard Specifications

The following OPSSs are applicable to the project:

- OPSS.PROV 180 – General Specification for the Management of Excess Materials
- OPSS.PROV 182 – General Specification for Environmental Protection for Construction in and Around Waterbodies and on Waterbody Banks
- SSP 101F23 – Amendment to OPSS 182, April 2021 – Timing of In-water Works, Oversight Requirements, and Measures to Avoid Harm to Fish
- OPSS.PROV 517 – Construction Specification for Dewatering
- OPSS.PROV 803 – Construction Specification for Vegetative Cover (issued in November 2020 to replace former OPSS.PROV 804)
- OPSS.PROV 804 – Construction Specification for Temporary Erosion Control (issued in April 2021 to replace the erosion control components of former OPSS 805)
- OPSS.PROV 805 – Construction Specification for Temporary Sediment Control (issued in November 2020 to replace the sediment control components of former OPSS 805)
- OPSS.PROV 825 – Construction Specification for Placement of Aggregates in Waterbodies
- OPSS.PROV 1005 – Material Specification for Aggregates – Waterbody

The OPSSs are applicable to the following general activities:

- Equipment Use – Use of equipment shall be in accordance with OPSS.PROV 182.
- Dewatering and Temporary Flow Passage – Dewatering and/or temporary flow passage shall be according to OPSS.PROV 517 and OPSS.PROV 182
- Fish Salvage – Fish salvage operations shall be conducted in accordance with OPSS.PROV 182 (SSP 101F23)
- Preservation of Riparian Vegetation – Removal of riparian vegetation shall be in accordance with OPSS.PROV 182
- Erosion and Sediment Control – Installation, monitoring, maintenance, and removal of temporary erosion and sediment control measures shall be according to OPSS.PROV 182, OPSS.PROV 804 and OPSS.PROV 805
- Placement of Aggregates in Waterbodies – Use of aggregate in waterbodies shall be according to OPSS.PROV 825 and OPSS.PROV 1005



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- Restoration of Disturbed Areas – Vegetation protection and rehabilitation shall be in accordance with OPSS.PROV 182, OPSS.PROV 803 (Vegetative Cover, Non-Standard Special Provision - Amendment to OPSS.PROV 803) and OPSS.PROV 804.
- Management of Excess Materials – All excess material shall be managed in accordance with OPSS.PROV 180.

10.1.4.6 Potential Enhancement

The proposed widening of Highway 401 and associated culvert / drainage works under GWP 4111-22-00 are anticipated to result in minimal changes to the existing ecological footprint within confirmed fish habitat. Through field surveys, in conjunction with a review of potential impacts based on the Preferred Plan, the following enhancement opportunities for fish habitat should be considered:

- Natural channel design for the realigned section of Butler Creek
- New culvert on Butler Creek should be installed in a manner to enhance fish passage to upstream areas, including appropriate sizing and embedment, and low-flow channels
- Although outside the study area, the removal of the beaver dam at the Unnamed Tributary to the St. Lawrence River

10.1.4.7 Preliminary Determination of HADD

Mitigation measures applicable to the proposed work that have the potential to affect fish and fish habitat are provided in **Section 10.1.4** of this report.

An Aquatic Effects Assessment cannot be completed until the design details are available and finalized. The assessment should be conducted during the detailed design to assess the risk of the project resulting in the death of fish or HADD of fish habitat.

Although a final Detailed Impact Assessment and the Aquatic Effects Assessment are required during the detailed design, the preliminary review of potential impacts indicates:

- Proposed works at Butler Creek culvert (Site 16X-039/C0) will result in the loss / destruction, alteration, and creation of new fish habitat through the removal, new culvert, and realignment. The removal of the existing Butler Creek culvert (Site 16X-039/C0) will result in the permanent removal / infilling (destruction) of approximately 270 m² of direct fish habitat.
- Additional permanent removal of fish habitat will also need to be calculated once realignment details are designed.

- Alteration of fish habitat is also anticipated at the tie-in locations of the new aligned channel to the existing channel at the upstream and downstream extents. The area for alteration of fish habitat will need to be calculated once realignment details are designed. It is likely that the habitat alteration (where alignment overlaps with existing) will not be harmful alterations, as the areas should continue to provide habitat for use by fish.
- New habitat below the two (2) year high-water level will also need to be calculated based on realigned area and new culvert dimensions once details are determined. The intensity and spatial scale will need to be determined in the detailed design phase. The effects of the impact (i.e., habitat loss) are likely not mitigable and have the potential to result in a HADD of fish habitat and will likely require review under the *Fisheries Act* through the Request for Review process, which will be undertaken if required at detailed design.
- Works within 30 m of Butler Creek, but outside the high-water level related to the proposed widening, are not anticipated to result in residual effects through implementation and adherence to standard measures outlined within OPSS.PROV.180, OPSS.PROV 517, OPSS.PROV 804, and OPSS.PROV 805.

Design details, construction methods, and additional mitigation measures (if required) will be necessary to update this Preliminary Impact Assessment.

10.1.5 Terrestrial Habitat

The proposed improvements will require earth clearing and grading, including loss of meadow, forest, thicket, and marsh communities. These communities support a variety of wildlife habitats, which are discussed in the sections below.

In addition to direct loss, potential impacts associated with the proposed works could include soil compaction, siltation of nearby wetland communities, disturbance to wildlife species, spills of deleterious substances into natural communities, and noise disturbance. These impacts, except for terrestrial habitat loss, are expected to be short-term and localized to the work zone during construction activities and lessened through the application of appropriate construction techniques and mitigation measures. Some terrestrial habitats will be permanently lost due to vegetation clearing for the construction of Highway 401 widening, the replacement of the Butler Creek culvert, and the new Sharpe's Lane Bridge. Standard environmental protection and feature-specific mitigation measures are discussed in separate sections below.

10.1.5.1 Loss of Terrestrial Habitat

The proposed widening of Highway 401 and associated structural replacement will require vegetation removal, earth clearing, and grading, and will result in a direct loss of approximately 26.26 ha of terrestrial habitat within the study area, of which 9.84 ha is currently constructed land. Construction activities will require vegetation removal and earth grading, which will result in the

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loss of natural vegetation communities, including meadows, thickets, woodlands, forests, and wetland communities. There will also be a 4.03 ha loss of forested habitat, and the loss of a 0.50 ha Green Ash deciduous swamp identified as an unevaluated wetland.

10.1.5.2 Potential Disturbance to Wetlands

The Green Ash Mineral Deciduous Swamp (SWDM2-2) is present south of Highway 401 within the proposed area of impact. A portion of an unevaluated wetland within the Dry-Fresh Mixed Meadow / Fresh – Moist Mixed Meadow Ecosite south of Highway 401, adjacent to Butler Creek, will also be impacted. In addition to these wetlands, a marsh community interspersed with meadows along the right-of-way will also be impacted.

Standard sediment and erosion control methods are recommended along all wetland communities and near watercourse boundaries.

10.1.5.3 Potential Disturbance to Vegetation and Terrestrial Habitat

It is anticipated that the proposed works will disturb approximately 26.26 ha of vegetation cover and terrestrial habitat during construction. There will be temporary and permanent loss or disturbance to native vegetation communities because of the clearing required to accommodate construction activities (i.e., excavation, demolition, staging).

The following indirect impacts may also occur due to construction:

- Accidental damage or loss of trees and other vegetation features because of site alteration or construction activities
- Temporary disturbance of noise, vibration, and vegetation removal to terrestrial wildlife habitat
- Erosion and sedimentation into adjacent vegetation communities
- Permanent loss of native vegetation due to the spread of non-native and invasive species into disturbed areas after construction

10.1.5.4 Significant Wildlife Habitat (SWH)

Vegetation removal will result in permanent and temporary loss of candidate SWH. Permanent habitat loss includes areas where there is permanent infrastructure, and temporary habitat loss includes areas that can be restored following construction (e.g., staging areas, etc.).

The following candidate SWH features were present in the study area:

- Raptor Wintering Area
- Bat Maternity Colonies

- Reptile Hibernacula
- Turtle Wintering Area
- Old Growth Forest
- Bald Eagle and Osprey Nesting, Foraging, and Perching Habitat
- Woodland Raptor Nesting Habitat
- Amphibian Breeding Habitat (woodland)
- Woodland Area Sensitive Breeding Bird Habitat

Construction disturbance to candidate SWH can be mitigated through standard environmental protection measures for sediment and erosion control and vegetation protection.

10.1.5.5 Potential Interference with Nesting Birds

Vegetation within the work zone has the potential to support migratory bird nests. Any work near active bird nests has the potential to disturb nesting behaviour or damage / destroy the nests, particularly if vegetation clearing occurs during the active breeding window (i.e., April 1 – August 31).

Under the Migratory Bird Regulations of the MBCA, nests for 18 bird species (seven (7) of which occur in Ontario) receive year-round protection for a prescribed length of time ranging from 24-36 months. Pileated Woodpecker (*Dryocopus pileatus*) was the only species that was identified as potentially present in the study area. Pileated Woodpecker nests have a designated 36-month waiting period where they must be confirmed unoccupied prior to removal. However, there is an option to obtain a permit and waive the 36-month waiting period if the nest is in the Abandoned Nest Registry system. Following the guidance outlined by ECCC (2023), no Pileated Woodpecker nesting cavities were observed along the alignment. As such, advancing the permit application for Pileated Woodpecker is not recommended.

Suitable habitat for SAR and SOCC in the study area was primarily associated with deciduous forest, woodland, and wetland communities. Potential impacts to SAR and SOCC that may be encountered in Work Zones, including Blanding’s Turtle, Gray Ratsnake, Bat SAR, Butternut, Black Ash, Barn Swallow, Eastern Wood-Pewee, Tufted Titmouse, Wood Thrush, Eastern Milksnake, Eastern Ribbonsnake, Monarch Butterfly, Snapping Turtle, and Midland Painted Turtle, are discussed below.

Construction phase disturbance to the habitat of SAR and SOCC can be mitigated through standard environmental protection measures for sediment and erosion control and vegetation protection.

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10.1.5.6 Species at Risk

Potential habitat for Blanding’s Turtle, Gray Ratsnake, Bat SAR, Butternut, and Black Ash were identified in the study area and may be directly impacted by construction.

- Blanding’s Turtle – May be present in the unevaluated wetland pockets associated with Butler Creek and an unnamed tributary. Blanding’s turtle may enter the work area when seeking nesting sites (i.e., gravel shoulders) or when moving between habitats. It is not anticipated that Blanding’s Turtles or their habitat will be permanently impacted, and any potential interactions or impacts related to Blanding’s Turtles are expected to be incidental and temporary in nature.
- Gray Ratsnake – Potential habitat for Gray Ratsnake may be present in the forests, woodlands, meadows, and agricultural areas in the study area. Additionally, one (1) potential snake hibernacula was also observed within the work zone. In addition to direct loss of habitat, construction activities such as grading and excavation can result in direct mortality to Gray Ratsnakes.
- Bat SAR – Potential habitat is present for both migratory and resident Bat SAR in mature forests and woodlands adjacent to the Highway 401. Additionally, two (2) potential bat SAR cavity trees were observed within the study area. In addition to direct loss of habitat, tree removal can result in direct mortality to bat SAR.
- Butternut – Although suitable conditions are available for this species, no Butternuts were observed within the study area during the field investigations. Therefore, no impacts to this species are anticipated as a result of the proposed work.
- Black Ash – Although suitable conditions are available for this species, no Black Ash were observed within the study area during the field investigations. Therefore, no impacts to this species are anticipated as a result of the proposed work.

10.1.5.7 Species of Conservation Concern

The following SOCC have the potential to be directly impacted during construction activities due to their behaviour, habitat preferences, or movement patterns:

- Barn Swallow, Eastern Wood-Pewee, Tufted Titmouse, and Wood Thrush – Potential breeding habitat for these birds SOCC is present in the study area within contiguous deciduous forests, swamps, rural buildings, and box culverts that may be impacted by the proposed construction and will therefore experience local habitat loss. There is also potential for direct mortality due to interaction with equipment during vegetation removal.

- Eastern Milksnake and Eastern Ribbonsnake – Construction activities can result in direct mortality to snakes. Snakes may be vulnerable during emergence from a hibernaculum, re-entrance, and basking periods, and may seek out construction materials to bask under. Peak activity for Eastern Milksnake and Eastern Ribbonsnake is typically between April and late June (MNRF 2016). With the implementation of mitigation measures, no direct impacts are expected.
- Monarch Butterfly – Was observed in a meadow community within the Highway 401 ROW during field investigations but may also be present in areas that contain milkweed and wildflowers. The larvae occurs only where milkweed (monarch’s larval host plant) exists, whereas adults are more generalized, feeding on a variety of wildflower nectar. Monarch Butterfly and its habitat (i.e., milkweed patches) were observed in areas that will experience temporary and permanent disturbance during construction.
- Turtle SOCC (Snapping Turtle, Midland Painted Turtle) – Interaction with turtle SOCC during construction activities could result in direct mortality. The watercourses and wetlands in the study area may provide suitable habitat for turtles and individuals during peak activity periods (April 1 to October 31), including movement between wintering and nesting sites, nesting in the road shoulder, and basking or foraging in the ROW.

10.1.5.8 Environmental Protection Measures

Mitigation will be implemented to reduce the likelihood of impacts to the natural environment.

The following Ontario Provincial Standard Specifications (OPSS) are applicable to the project:

- OPSS 180 – General Specification for the Management of Excess Materials
- OPSS 182 – Environmental Protection for Construction in Waterbodies and on Waterbody Banks
- OPSS 801 – Construction Specification for the Protection of Trees
- OPSS 803 – Construction Specification for Vegetative Cover
- OPSS 804 - Construction Specification for Temporary Erosion Control
- OPSS 805 – Construction Specification for Temporary Sediment Control

The OPSSs are applicable to the following general activities:

- Management of Excess Materials – Excess material shall be managed in accordance with OPSS 180 and O.Reg. 406/19
- Equipment Use – Use of equipment shall be in accordance with OPSS 182



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- Erosion and Sediment Control – The installation, monitoring, maintenance, and removal of temporary erosion and sediment control measures shall be according to OPSS 182, OPSS 801, OPSS 804, and OPSS 805
- Vegetation Removal and Restoration of Disturbed Areas – Vegetation protection and rehabilitation shall be in accordance with OPSS 182, OPSS 801, OPSS 803, and OPSS 804. Seed Mix will be used to reseed disturbed areas

10.1.5.9 Standard Environmental Protection Measures

The following sections describe standard measures that will be applied to all work zones.

Erosion and Sedimentation Control

Mitigation measures for sedimentation, erosion, and dust control should be implemented to prevent sediment and dust from entering sensitive natural features. The primary principles associated with sedimentation and erosion protection measures are to:

- Reduce the duration of soil exposure
- Retain existing vegetation, where feasible
- Encourage re-vegetation
- Divert runoff away from exposed soils
- Keep runoff velocities low
- Trap sediment as close to the source as possible

To address these principles, the following mitigation measures are recommended:

- Silt fencing and/or barriers are recommended along Work Zones where there is potential for sedimentation of watercourses or wetlands, or inadvertent encroachment of construction vehicles into natural areas
- Avoid entering any natural areas beyond the barrier fencing with equipment and avoid excess vegetation removal
- Re-vegetate disturbed areas as soon as possible to help re-stabilize soils following OPSS 803 (Construction Specification for Vegetative Cover). Vegetation plantings shall include a seed mix that is appropriate to the area and similar to or better than pre-construction conditions
- Re-fuel equipment 30 m away from watercourses to reduce potential impacts if an accidental spill occurs

- In addition to any specified requirements, make additional silt fence available on site, prior to grading operations, to provide a contingency supply in the event of an emergency
- Monitor all sediment and erosion controls regularly and properly maintain, as required. Remove controls only after the soils of the construction area have been stabilized and adequately protected, or until cover is re-established
- Monitor limits of construction adjacent to natural features during construction (along with sediment and erosion control measures) to make sure that the limits are maintained with respect to vehicular traffic and soil or equipment stockpiling
- Avoid stockpiling excess materials on site
- Restore any disturbed natural areas to pre-construction conditions

10.1.5.10 Vegetation Removal

During construction adjacent to vegetated areas, heavy equipment could damage peripheral vegetation from contact, excavation, and/or soil compaction. In areas where trees are present adjacent to construction activities that are not required to be removed for grading, tree protection is recommended to avoid encroachment.

Post-construction seeding of the disturbed right-of-way should be done with a suitable native seed mix. Seed mixes should include fast-growing, short-lived perennial cover crops to stabilize soil and reduce competition from weedy exotics. It is recommended that new seeds be introduced to disturbed substrates as soon as feasible, following construction, and sediment fencing remains in place until vegetation cover is re-established.

Vegetation removal should be undertaken outside of the migratory bird nesting period (April 1 to August 31) and bat window (April 1 to November 30). If in-water works / vegetation removals are required within wetlands that may also support turtle wintering habitat, those activities should occur between April 15 and October 15 to avoid potential harm to overwintering turtles.

10.1.5.11 Protection of Migratory Birds

The MBCA protects nests of migratory birds from damage while they are active, including nests in vegetation and on structures. For all migratory birds, the core nesting period is identified as April 1 to August 31 (Government of Canada 2018). Vegetation clearing during nesting periods in migratory bird breeding habitats can destroy active nests and contravene the MBCA. Vegetation clearing is recommended to occur outside the core nesting period to eliminate the need for migratory bird nest searches. If work must take place during the core nesting period and the area is small enough to be effectively searched for nesting birds, then a breeding bird survey can be completed by a Qualified Biologist. The area where vegetation is to be removed must be searched within five days prior to the work commencing. If breeding pairs are located, then they will be protected with a buffer until the nest is no longer active.

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If an active nest is observed during construction, a designated buffer will be delineated within which no activity will be allowed to occur while the nest is active (i.e., with eggs or young). The radius of the buffer will be determined by a Qualified Professional. Once the nest is determined to be inactive (i.e., the young have fledged the nest), clearing and other activities in the area may proceed.

10.1.5.12 Wildlife Protection

The following environmental mitigation and protective measures for wildlife and wildlife habitat are recommended:

- Wildlife shall not be harmed or harassed
- Construction equipment and vehicles are to yield to wildlife
- Inform construction personnel not to threaten, harass, or injure wildlife
- If wildlife is encountered during construction, personnel are required to move away from the animal and wait for the animal to move off the construction site. If slow-moving wildlife (i.e., turtles, snakes) are observed on the road and are in danger, and if safe to do so, they should be moved off the road by gently guiding the individual in the direction it was traveling

10.1.5.13 Invasive Species Management

During the field investigations, no invasive species listed as ‘restricted’ were observed throughout the Study Area, although the following mitigation measures should be followed to prevent the introduction of invasive Phragmites or other regulated invasive species.

- The contractor shall implement the Clean Equipment Protocol for Industry to reduce the likelihood of the introduction and spread of invasive species
- Designated areas for equipment cleaning and invasive species stockpiles may be temporarily required during construction. If designated areas are required, they will be identified and demarcated in the field. The designated areas will not be located in or near watercourses, environmentally sensitive features, or areas where invasive species are not currently present
- Soil contaminated with invasive species will not be reused for restoration activities

10.1.5.14 Site-Specific Protection Measures

Site-specific protection measures are required for sensitive species or habitats that may be present within the study area and where standard mitigation measures alone do not provide sufficient protection.

10.1.5.15 Wetlands

Standard sediment and erosion control measures are recommended where work will occur within 30 m of wetland communities.

It is anticipated that with the preferred design, impacts to unevaluated wetlands located around the Butler Creek will take place during the culvert replacement works. Given that the footprint impacts associated with the proposed work are primarily at the edges of the unevaluated wetlands, it is anticipated that the functions of these designated areas within the work zone will not be impaired upon completion of the project.

10.1.5.16 Blanding’s Turtle & Turtle Species of Conservation Concern

There is potential for SAR Blanding’s Turtle, SOCC Snapping Turtle, and Midland Painted Turtle to be encountered within the Work Zone associated with the Butler Creek culvert replacement, as well as other project works.

Turtle nesting typically takes place in June, with eggs remaining in the nest until September. Turtles are likely to be encountered during the mating season, which generally occurs from late May to early July (MNRF 2013). Overwintering occurs in wetlands with standing water and soft substrates, generally between November and March.

The following mitigation measures are recommended to reduce the likelihood of impacts to turtles:

- If any Blanding’s Turtle or their nest is observed during the site inspection or at any other time, the Contractor shall immediately halt construction in the vicinity of the observation. SAR that are encountered within the work zone should be allowed a reasonable amount of time to leave the work area. A Qualified Biologist shall notify MTO’s Contract Administration once the SAR has left the work area prior to continuation of construction.
- The Qualified Biologist shall contact MTO’s Contract Administration immediately to notify them of SAR observations within the work area. Upon approval from MTO, the Qualified Biologist shall report the SAR observation to MECP within 24 hours of the observation, and if necessary, seek advice on how to proceed if the encountered SAR has remained within or adjacent to the work area. Confirmed sightings of SAR species within the work zone should be compiled and reported to the Natural Heritage Information Centre (NHIC) following construction, using a SAR encounter form. SAR should only be handled by qualified professionals who have knowledge of the species and the correct approvals to undertake SAR handling.
- If in-water works / vegetation removals are required within wetlands that may also support turtle wintering habitat, those activities should occur between April 15 and October 15 to avoid potential harm to overwintering turtles.



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- Erect exclusion fencing (i.e., light geotextile silt fence) around proposed construction areas prior to the start of work to reduce the likelihood of turtles entering the work area.
- Install exclusion fencing prior to the sensitive nesting season if activities are anticipated to occur throughout this period to prevent turtles from entering and/or nesting: Prior to May 15 if activities are occurring within or adjacent to nesting habitat (i.e., exposed soils adjacent to or along riverbanks). If construction activities commence after May 1, a Qualified Biologist must be present on site to oversee the installation
- If erecting exclusion fencing, use a type that will last the duration of the project. Check that stakes are securely driven into the ground on the inside of the working area. Place stakes 2 m apart and drive them to a depth of 30 cm, with the fabric pulled tight to reduce sagging, and the bottom of the fabric buried 10-20 cm down within an additional fabric lip extending 90 degrees outwards
- Backfill and compact the fabric lip (MNRF 2013)
- Inspect any fenced-off areas daily to identify compromises in the fence and to remove any turtles that may be trapped in the fence (MNRF 2016)
- Install fencing so that it prevents construction sediment from entering wetlands (MNRF 2016)
- Have a qualified person conduct a pre-construction sweep and monitor the work area for active turtle nests during the turtle nesting season (June – August)
- If turtle eggs are encountered or unearthed during the construction activities, all operations must immediately stop within 5 m of the active nest
- If a turtle is encountered that has already begun to nest (i.e., digging and/or sitting in a nest pit), construction activities should stop within 5 m of the turtle, and the turtle should be left alone to complete the egg-laying process and leave the area on its own accord
- Implement a worker awareness program for construction staff that includes Blanding's Turtle, Snapping Turtle, and Midland Painted Turtle identification and habitat characteristics
- Stockpiled topsoil, sand, and/or gravel must be completely encircled with silt fence or completely covered with geotextile to prevent turtles from accessing and nesting in the materials from May 15 to July 15 of any year

10.1.5.17 Gray Ratsnake

Based on the results of field investigations, one potential snake hibernaculum is present within the work zone. The following mitigation measures should be employed during construction to protect any species that may be present. These mitigations include:

- Having a Qualified Biologist with experience with snake and SAR on the contract to be onsite during construction activities to complete visual sweeps for SAR snakes (e.g., Gray Ratsnake) of the work zone throughout the day to reduce incidental interactions between construction activities and SAR snakes. This would minimize potential harm to any species that may be utilizing the hibernaculum or adjacent areas and would allow for a mechanism to quickly handle the situation should a species conflict arise. The active season for the Gray Ratsnake species is May 1 to September 30 (COSEWIC, 2018).

If Gray Ratsnake are observed within the Work Zone prior to, or during construction, the Qualified Biologist shall coordinate with the MTO Contract Administration to ensure the following mitigation measures are implemented to prevent adverse impacts to the SAR:

- Temporary Work Stoppage during SAR Encounter – If any SAR or their nest is observed during the site inspection or at any other time, the Contractor shall immediately halt construction in the vicinity of the observation. SAR that are encountered within the work zone should be allowed a reasonable amount of time to leave the work area. The Qualified Biologist shall notify MTO's Contract Administration once the SAR has left the work zone prior to continuation of construction.
- Report SAR Observations within the work zone to the MECP – The Qualified Biologist shall contact MTO's Contract Administration immediately to notify them of SAR observations within the work area. Upon approval from MTO, the Qualified Biologist shall report the SAR observation to MECP within 24 hours of the observation, and if necessary, seek advice on how to proceed if the encountered SAR has remained within or adjacent to the work zone. Confirmed sightings of SAR species within the work area should be compiled and reported to the Natural Heritage Information Centre (NHIC) following construction, using a SAR encounter form. SAR should only be handled by qualified professionals who have knowledge of the species and the correct approvals to undertake SAR handling.

10.1.5.18 Bats

Potential habitat is present for both migratory and resident Bat SAR in mature forests and woodlands adjacent to Highway 401. Additionally, two (2) potential Bat SAR cavity trees were observed within the study area. It is anticipated that monitoring in June of any given year will need to be completed to determine if SAR Bats are present within the work zone. This is typically followed by initiating consultation with MECP to determine requirements for registration and conservation plans under the Species Conservation Act (SCA).

However, in the absence of feedback from MECP, the following mitigation measures are recommended based on recent MECP guidance on other projects.



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- Bats are vulnerable to disturbance during their active season (April 1 through November 30). Activities that may disturb Bat SAR (i.e., removal of trees ≥ 10 cm DBH, or shrubs ≥ 1 m in height) should avoid their active season. The two (2) trees that were identified as potential Bat SAR maternity trees should be protected from harm during tree clearing, and the trees will be clearly marked with a suitable buffer zone using tree protection fencing (OPSD 200.010 Barrier for Tree Protection). The two (2) trees will not be removed until approval from MECP has been received

Other recommended mitigation measures to compensate for the loss of habitat may include:

- In consultation with MECP and a local Conservation Authority, consider actively managing (i.e., watering, tending, and replacing trees and shrubs) newly planted forested habitat within a nearby Conservation Authority's lands until a newly forested area is well established
- Install anthropogenic roosting structures (e.g., bat boxes) both off-site within Conservation Authority lands and within the study area

10.1.5.19 Eastern Milksnake and Eastern Ribbonsnake

There are records of Eastern Milksnake and Eastern Ribbonsnake in the study area, and potential habitat is present in agricultural fields, meadows, thickets, wetlands, and within the right-of-way. The following mitigation measures are recommended to address potential interaction with Eastern Milksnake and Eastern Ribbonsnake:

- A thorough visual search of the work zone by construction contractors is recommended before work commences each day. Visual searches should include inspection of the machine and equipment, prior to starting equipment, particularly during the peak reptile activity period from April 1 to November 1
- If snakes are encountered during construction, they will be permitted a reasonable time to leave the area. Individuals will not be handled, chased, or harassed. If reptiles do not leave the work zone on their own, contact should be made with the appropriate agency to obtain information about the species and directions on how to proceed. A qualified Biologist may need to be retained to relocate the individuals
- If a snake hibernaculum is discovered, all work must cease, and a Qualified Biologist shall be contacted to discuss mitigation options. Overwintering snakes shall not be relocated
- Disturbance to brush piles / logs will be avoided wherever possible. If a brush / log pile must be moved or disturbed, it will be inspected for reptiles and relocated within a few metres, to the extent possible, to retain the habitat feature

- Potential snake hibernation sites (rock outcroppings or stumps extending below-grade, or animal burrows) should not be disturbed during the hibernation period (November 1 to March 31). If removal of above-ground habitat features (rock slabs or piles, brush) is needed, these features will be retained outside of the active work zone during construction and returned post-construction to the same or a nearby location

10.1.5.20 Monarch Butterfly

The following mitigation measures are recommended to reduce impacts on the Monarch Butterfly:

- If possible, avoid construction activities that have the potential to harm Monarch Butterfly eggs, caterpillars, or pupae (i.e., vegetation clearing in meadow areas) during the larval period, which is approximately June 1 to September 30
- If vegetation clearing will proceed when Monarch Butterfly larvae may be present (June 1 to September 30), identification and inspection of milkweed plants shall be completed to locate Monarch Butterfly larvae. If larvae are identified, a trained Environmental Monitor may relocate the species to a suitable and safe location under the direction of a Qualified Biologist. Monarch Butterfly caterpillars may be moved to other milkweed plants; for other larval stages (i.e., eggs and chrysalis), entire milkweed plants should be transplanted
- Milkweed and nectar-producing plants are recommended to be included in seed mixes for areas restored to meadow to provide habitat for the Monarch Butterfly

10.1.5.21 Consideration of the Species Conservation Act, 2026

At the time of project initiation, the Endangered Species Act (ESA) of 2007 was in place. In March 2026, the Ontario Species Conservation Act (SCA), 2026, replaced the ESA. The purpose of the SCA is to identify species at risk based on the best available scientific information, including information obtained from community knowledge and Indigenous traditional knowledge, and to provide for the protection and conservation of species at risk while taking into account social and economic considerations, including the need for sustainable economic growth in Ontario. The SCA prohibits the killing, harming, capturing, or taking of a member of a species that is listed on the Protected Species in Ontario List, or damage to or destruction of the habitat of a species that is listed on the Protected Species in Ontario List. The SCA applies to all private and Crown-owned lands in Ontario. Habitat protection under the SCA for animal species typically includes a dwelling place, such as a den, nest, or other similar place, that is occupied or habitually occupied by one or more members of a species for the purposes of breeding, rearing, staging, wintering, or hibernating, and the area immediately around a dwelling place. Consultation with the MECP should be initiated during detailed design to determine permitting, registration, and conservation plan requirements under the new SCA.



10.2 Climate Change

Greenhouse gases are major contributors to warming temperatures on the planet and global climate change. As part of the Air Quality Assessment completed for this study, the air quality and greenhouse gas (GHG) emissions modelling showed a decrease in GHG emissions of 20% compared to the baseline scenario and is about the same as the Future Ultimate (2044) No Build scenario. Overall, the CO_{2e} emissions per vehicle mile travelled are lower in the future compared

to the Baseline scenario due to the expected improvements in engine technology and cleaner fuels. Stormwater management and drainage infrastructure for the Recommended Plan will be designed considering climate change impacts in the detailed design phase.

10.3 Socio-Economic Environment

10.3.1 Land Use

10.3.1.1 Property

The Recommended Plan is expected to result in the partial acquisition of approximately four (4) properties with an impacted area of 0.31 hectares

10.3.1.2 Communities

There are no direct impacts on community facilities. There may be minor temporary delays for traffic during the construction phase for the structure / bridge replacement and highway expansion. No other impacts / minor changes are anticipated to community facilities in the study area.

10.3.1.3 Student Transportation

No permanent impacts are anticipated to student transportation routes as a result of the Recommended Plan. There may be minor temporary delays for students and school transportation services that travel through the structural/bridge replacement and highway expansion; however, all student transportation services will be consulted during the next stage of design and will be notified of any delays prior to construction, if any.

During construction at Sharpe's Lane bridge, temporary single-lane traffic will be required at certain stages to accommodate bridge replacement activities. Traffic will be managed through flagging operations or temporary signals to ensure safe access for local and school vehicles. A detour will also be required for the removal of the existing bridge over Highway 401 and for potential girder installation for the new bridge. Highway 401 traffic will be redirected via adjacent interchanges at Maitland Road, North Augusta Road, and County Road 2. The duration and number of closures will be confirmed during detailed design, in consultation with the affected municipalities.

10.3.1.4 Emergency Services

No permanent impacts are anticipated for emergency service providers that service the study area and surrounding communities. There may be minor temporary delays for EMS services that travel through the structural / bridge replacement and highway expansion during construction. EMS providers will be consulted during detailed design, and will be notified of any delays prior to construction, if applicable.

10.3.2 Utilities

Potential impacts to utilities are discussed in **Section 8.8**.

10.3.3 Air Quality and Greenhouse Gas Assessment

10.3.3.1 Operational Air Quality

An Air Quality Impact Assessment was completed as part of this study to characterize existing Baseline (2020) air pollutant emissions and predict the potential effects on air quality within the Study Area after implementation of the Project in the Future Interim Build (2034) and Future Ultimate Build (2044) time horizons. Predicted future emissions and effects with project implementation (Future Build) were compared to both existing baseline and future conditions without the project, for a total of five (5) assessment scenarios. Changes in greenhouse gas (GHG) emissions were also assessed in this study. Additionally, potential air quality impacts during the construction phase were assessed qualitatively.

The air contaminants of potential concern (CoPCs) selected are based on the most relevant transportation-related air contaminants listed in the MTO Guide. These include nitrogen dioxide (NO₂), carbon monoxide (CO), particulate matter with particle diameters less than 10 micrometres (PM₁₀), particulate matter with particle diameters less than 2.5 micrometres (PM_{2.5}), acrolein, benzene, 1,3-butadiene, benzo(a)pyrene [B(a)P], acetaldehyde, and formaldehyde. In addition, greenhouse gas (GHG) emissions, including carbon dioxide (CO₂), methane (CH₄), and nitrous oxides (N₂O) in the form of carbon dioxide equivalent (CO_{2e}), were also quantified.

Baseline ambient air quality conditions were characterized using historical data from monitoring stations located near or representative of the study area. These data were obtained from Environment and Climate Change Canada's (ECCC) National Air Pollution Surveillance (NAPS) Network and the Ontario Ministry of the Environment, Conservation and Parks (MECP) monitoring stations.

The United States Environmental Protection Agency's (U.S. EPA's) Motor Vehicle Emission Simulator (MOVES) model version 5 (MOVES5) was used to estimate baseline and future emission rates from motor vehicles. The U.S. EPA's dispersion model, CAL3QHCR, was used to predict the maximum 1-hour, 8-hour, 24-hour, and annual average ground-level concentrations (GLCs) at 25 special receptors (locations of residences, a place of worship, and a school) for the following five assessment scenarios:



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- 2020 – Baseline (existing conditions), Highway 401 (four (4) lanes)
- 2034 – Future Interim No-Build, Highway 401 (four (4) lanes)
- 2034 – Future Interim Build, Highway 401 (six (6) lanes), replacement of Sharpe’s Lane bridge
- 2044 – Future Ultimate No-Build, Highway 401 (six (6) lanes), replacement of Sharpe’s Lane bridge
- 2044 – Future Ultimate Build, Highway 401 (eight (8) lanes), replacement of Sharpe’s Lane bridge

A five (5) year (2020-2024) site-specific meteorological dataset pre-processed by the MECP was used as an input to the dispersion model. Since CAL3QHCR can only process one year of meteorological data per run, each of the five years of meteorological data was processed separately. The highest predicted ambient concentrations from across the five (5) year period were then used in the assessment to ensure a conservative estimate of air quality impacts.

Predicted ambient air quality concentrations for each scenario were compared to applicable provincial Ambient Air Quality Criteria (AAQC) and Canadian Ambient Air Quality Standards (CAAQS). AAQCs are established by the Ministry of Environment, Conservation and Parks (MECP) and represent contaminant concentrations in the air that are intended to protect human health and the environment. The CAAQS are developed collaboratively by federal, provincial, and territorial governments through the Canadian Council of Ministers of the Environment (CCME) and are intended for regional air quality management rather than evaluating the local impacts of individual projects. The GHG emissions were assessed against national and provincial totals, including 2023 levels and 2030 emissions reduction targets.

The following conclusions were made from the air quality and greenhouse gas impact assessment.

Operation Phase – Project Alone (Without Background)

- The maximum predicted Project Alone GLCs (without background) for all CoPCs are below their respective AAQC and/or CAAQS other than NO₂ for all five scenarios and B(a)P in the Baseline (2020), Future Interim (2034) No Build and Future Interim (2034) Build scenarios
- The maximum predicted one (1) hour NO₂ GLC exceeds the CAAQS by 211% for the Baseline scenario, 62% for the Future Interim No Build, 64% for the Future Interim Build, 9% for the Future Ultimate No Build, and 11% for the Future Ultimate Build scenarios. The maximum exceedance occurs at receptor R009 (a residence on Old Sharpe’s Lane) for all five (5) scenarios

- NO₂ concentrations were predicted using the US EPA Ambient Ratio Method (ARM2) methodology, which provides conservative estimates of NO₂ formation in the atmosphere. Maximum predicted hourly average NO₂ concentrations were conservatively compared directly to the one (1) hour CAAQS rather than the 98th percentile metric, as the CAL3QHCR model does not provide outputs of the appropriate statistical measure required for direct comparison to the CAAQS
- Maximum predicted Project Alone hourly and 24-hour average NO₂ concentration were below the provincial NO₂ AAQCs for all scenarios.
- The maximum predicted annual average NO₂ GLCs are above the CAAQS by 141% at receptor R009 for the Baseline scenario, and by 5% at receptor R059* (residence on Waverly Drive) for the Future Interim Build Scenario
- The maximum predicted 24-hour and annual average B(a)P concentrations for the Baseline scenario are above the AAQCs by 309% at receptor R059* and 541% at receptor R009, respectively. The maximum predicted B(a)P concentrations decrease for the Future Interim and Future Ultimate scenarios relative to the Baseline scenario, with the maximum predicted 24-hour average concentrations being below their AAQCs for all four (4) future scenarios
- Exceedances of the annual B(a)P AAQC are predicted for the Future Interim No Build scenario by 48% and the Future Interim Build scenario by 52% for all five modelled years, with no exceedances predicted for the Future Ultimate scenarios.

Operation Phase – Cumulative (With Background)

- Maximum predicted cumulative GLCs (i.e., with background) of all CoPCs other than NO₂ and B(a)P are below their respective AAQC and/or CAAQS at all special receptors for all scenarios
- Predicted cumulative NO₂ concentrations exceed the 1-hour CAAQS for all scenarios, while cumulative annual average NO₂ concentration exceeds the CAAQS for the Baseline (2020) and Future Interim (2034) scenarios. However, the maximum predicted NO₂ concentrations are well below the provincial hourly and 24-hour average AAQC
- Maximum predicted cumulative B(a)P concentrations exceed the 24-hour and annual average AAQCs at all special receptor locations for all scenarios, with the background concentrations alone exceeding the 24-hour and annual average AAQCs. The maximum cumulative B(a)P concentrations are predicted to decrease in the Future Interim and Future Ultimate No Build / Build scenarios relative to the Baseline scenario due to expected future reductions in vehicle emissions

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- For all COPCs except PM10, the maximum predicted cumulative concentrations for the future scenarios are lower than the Baseline scenario due to expected advances in cleaner fuels and emissions control technology, which are anticipated to lower all vehicle contaminant tailpipe emissions in the future and are incorporated into the MOVES5 model. The modifications to Highway 401 from the Baseline Scenario to the Future Ultimate Build Scenario should promote smoother traffic flow, which could also help to improve air quality by reducing gridlock

Construction

- During Project construction, particulate matter (dust) will be the primary CoPC. NO₂, VOCs, and GHGs will also be emitted from equipment used during construction. As the construction activities will be short-term and intermittent, air contaminant and GHG emissions are expected to be minor, provided adequate mitigation measures are implemented

Mitigation

- During construction, industry best management practices should be implemented to minimize air contaminants and GHG emissions
- During operation, air quality levels are generally predicted to decrease relative to baseline levels, and mitigation measures such as vegetation barriers can be used to further decrease ambient concentrations of particulate matter and NO₂. The vegetation barrier should be thick (approximately 6 m or more) and have full leaf and branch coverage from the ground to the top of the canopy with no gaps in-between or underneath the vegetation, and the barrier should be located close to the emissions sources. Evergreen species are more effective than deciduous species for this objective

Greenhouse Gases

- Annual GHG emissions from the Project operation are expected to be insignificant (less than 0.1%) compared to Canada and Ontario's 2023 GHG emission totals and 2030 emissions reduction targets

10.3.4 Noise Impact Assessment

A Noise Impact Assessment was undertaken to evaluate the potential changes in traffic noise associated with the future highway footprint. The purpose of the assessment was to determine potential noise impacts at nearby noise-sensitive areas (NSAs) resulting from the Project and to assess the feasibility of noise mitigation measures, if required, in accordance with the MTO Environmental Guide for Noise (MTO, 2022).

The following two (2) scenarios were considered for the noise assessment:

- Interim Project Footprint – Highway 401 upgrades from four (4) lanes to six (6) lanes. Noise modelling for this scenario was based on projected traffic volumes for the horizon year 2044
- Ultimate Project Footprint – Highway 401 upgrades from six (6) lanes to eight (8) lanes, including the reconfiguration of Sharpe's Lane. Noise modelling for this scenario was based on projected traffic volumes for the horizon year 2054

The approximate horizon years 2044 (interim) and 2054 (ultimate) were selected for the purpose of the analysis and do not represent the actual timing of highway improvements.

To assess the noise impact, predicted future noise levels with the project (Future Build) were compared to those without the project (Future No-Build) for both the interim and ultimate footprint scenarios. Noise mitigation was investigated where the predicted Future Build noise levels increased by more than 5 dB over the Future No-Build scenario and/or where Future Build noise levels were equal to or exceeded 65 dBA. The feasibility of mitigation was assessed based on technical, economic, and administrative criteria.

Six (6) NSAs were identified based on a review of aerial imagery and the Air Quality Assessment Report. No proposed developments were identified within the study area. Thirty-three (33) representative receptors were selected from these NSAs for the noise assessment. Only receptors with outdoor living areas (OLAs) were included in the assessment. Receptors identified in the Air Quality Assessment that fell outside the noise study area or did not have an OLA were excluded. Additional receptors were added to represent second-and third-row residences. Consistent with the MTO Guide, OLA receptors were modelled at 1.5 m above existing ground and 3 m from the dwelling façade, typically within the backyard.

For the Road Traffic Noise Impact Assessment, the latest version of the Traffic Noise Model (TNM version 3.2), developed by the United States Federal Highway Administration (FHWA), was used, as recommended in the MTO guidelines.

Predicted future noise levels from the study area exceeded the MTO threshold of 65 dBA, the level above which mitigation feasibility is evaluated, at three receptors (R07, R08, and R09) for the future interim build scenario and at four (4) receptors (R07, R08, R09, and R19) for the future ultimate build scenario. Noise mitigation measures were therefore investigated for these receptors.

Given the nature of the project, alignment adjustments were not considered as a noise mitigation option. Similarly, changes to pavement type were not evaluated, as asphalt is the designated pavement. Therefore, only noise barriers were considered as a potential mitigation measure.

The existing noise barrier, ENB1, located at the west end of the study area between North Augusta Road and Oxford Avenue, will be retained.



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One (1) noise barrier (NB1) was evaluated as a potential mitigation measure. In accordance with the MTO Environmental Noise Guideline, the noise barrier was found to be technically feasible. While the cost-effectiveness analysis indicates that the estimated cost marginally exceeds the \$125,000 per receptor threshold, the exceedance is minor and the mitigation measure achieves meaningful noise reduction at impacted receptors. Therefore, noise barrier NB1 is recommended as part of the Project.

Construction noise impacts are temporary in nature and largely unavoidable. With adequate controls, impacts can be minimized. It should be noted that MTO is legally exempt from the requirements of municipal noise bylaws and does not apply for bylaw exemptions or get permits. However, MTO recognizes that construction noise can have impacts on communities and will ensure clear and frequent communication with the municipalities to work within the spirit of the municipal noise bylaws. Construction noise was assessed in accordance with the applicable Ministry of the Environment, Conservation and Parks (MECP) Publication NPC-115 (MECP 1977) and NPC-118 (MECP 1982) for construction and the City of Brockville Noise By-Law (No. 076-2-21), a By-Law to Control Noise in the City of Brockville (Brockville 2021). No noise by-law currently exists for the Township of Elizabethtown-Kitley.

The typical sound levels for most of the construction equipment are within the MECP noise limits. However, there is potential for higher sound levels than the permissible limits for some equipment (e.g., paving machine, hoe ram, and pile driver). Once equipment and construction schedules are finalized, the equipment noise data should be reviewed to confirm that noise emissions are within the applicable limits. If the sound levels are higher than the limits, noise control options may be required. Methods to minimize construction noise impacts should be included in the Construction Code of Practice.

To minimize the potential for construction noise impacts, it is recommended that the following be carried out:

- All equipment should be properly maintained to limit noise emissions. As such, all construction equipment should be operated with effective muffling devices that are in good working order
- The Contract Documents should contain a provision that any initial noise complaint will trigger verification that the general noise control measures agreed to are in effect
- In the presence of persistent noise complaints, all construction equipment should be verified to comply with the MECP NPC-115 guideline
- In the presence of persistent complaints and subject to the results of a field investigation, alternative noise control measures may be required, if reasonably available. In selecting appropriate noise control and mitigation measures, consideration should be given to the technical, administrative, and economic feasibility of the various alternatives

10.4 Cultural Heritage Environment

10.4.1 Archaeological Resources (Land)

The Stage 1 Archaeological Assessment included background research and a property inspection conducted on June 12, 2024, to evaluate the archaeological potential of the study area. The assessment identified portions of the study area as having archaeological potential.

Along Highway 401, no further archaeological assessment is required for areas evaluated as disturbed or determined to have no or low archaeological potential. However, 52.84 ha of the study area requires a Stage 2 Archaeological Assessment, and an additional 0.71 ha that were previously assessed also require a Stage 2 investigation.

Portions of the study area consisting of actively or recently cultivated agricultural fields will be subject to a pedestrian survey. If archaeological resources are identified during a pedestrian survey, transect spacing will be reduced to 1 m intervals within a minimum 20 m radius of the find to determine whether the material represents an isolated find or part of a larger scatter, in accordance with Section 2.1.1, Standard 7 of the *2011 Standards and Guidelines for Consultant Archaeologists*.

Portions of the study area consisting of scrubland that is not accessible for ploughing will be subject to a test pit survey, in accordance with Section 2.1.2 of the Ministry of Citizenship and Multiculturalism's *2011 Standards and Guidelines for Consultant Archaeologists* (Government of Ontario 2011). Test pits will be hand excavated using shovels and trowels, measuring a minimum of 30 cm in diameter and extending at least 5 cm into subsoil where possible. All excavated soil will be screened through 6 mm hardware mesh to facilitate the identification and recovery of archaeological resources. Test pits will be examined for stratigraphy, cultural features, and evidence of fill and will be backfilled upon completion.

If archaeological resources are identified, the test pit survey will continue on a grid to determine the number of additional positive test pits within the limits of the study area. If sufficient archaeological resources are identified to meet the criteria for recommending a Stage 3 Archaeological Assessment, no further Stage 2 survey intensification will be required. Should previously undocumented archaeological resources be discovered, they may be a new archaeological site and therefore subject to Section 48(1) of the Ontario Heritage Act (Government of Ontario 1990b). The proponent or person discovering archaeological resources must cease alteration of the site immediately and engage a Licensed Archaeologist to carry out archaeological fieldwork, in compliance with Section 48(1) of the Ontario Heritage Act.

The Funeral, Burial and Cremation Services Act, 2002, S.O. 2002, c.33 requires that any person discovering human remains must notify the police or coroner and the Registrar of Cemeteries at the Ministry of Government and Consumer Services.



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10.4.2 Cultural Heritage Resources Assessment (CHRAR)

The documentation of cultural heritage conditions and identifying built and landscape heritage resources, in addition to potential impacts and mitigations, was completed as part of the CHRAR and is documented in the CHRAR on file with the MTO. The assessment identified four (4) potential built heritage resources within the study area. Of these, one (1) property, 2801 Oxford Avenue (BHR-1), was determined to have potential for indirect impacts resulting from the proposed widening of Highway 401 to an interim six (6) lanes and ultimately eight (8) lanes.

Potential indirect impacts include disruption, displacement, isolation, encroachment, and the introduction of non-sympathetic elements. The assessment also concluded that none of the transportation structures within the study area exhibit Cultural Heritage Value or Interest (CHVI).

2801 Oxford Avenue is located within the study area, approximately 43 m north of the Highway 401 right-of-way, and is therefore at potential risk of vibration-related impacts. To address potential vibration effects, it is recommended that a qualified engineer undertake a pre-construction vibration monitoring assessment to determine the need for vibration monitoring during construction.

If potential impacts are confirmed, appropriate mitigation measures will be implemented. Depending on the final design, property-specific Cultural Heritage Evaluation Reports may be required prior to completion of a Heritage Impact Assessment.

In general, the preferred approach to mitigating indirect impacts is to establish a buffer zone of at least 50 m around built heritage resources to avoid construction activity within this area. Staging and laydown areas should be non-invasive and located to avoid built heritage resources. Where avoidance is not feasible, a Qualified Building Condition Specialist or Engineer should develop a strategy to conduct pre-condition surveys and vibration monitoring, as appropriate.

The pre-condition survey may include screening activities to identify sensitive properties and determine acceptable vibration thresholds based on building type, age, and condition. Vibration monitoring may include random confirmatory checks during construction, with post-condition surveys undertaken as required at the discretion of the Qualified Building Condition Specialist or Engineer.

11.0 Summary of Environmental Effects, Proposed Mitigation and Commitments to Future Work

A summary of environmental effects, proposed mitigation, and commitments to future work, as identified during the course of this study, is provided in **Table 21**, and forms a comprehensive ‘checklist’ of outstanding issues identified at the end of Class EA and Preliminary Design and will serve as a starting point for the subsequent planning and design phase of the project.

Table 21: Summary of Environmental Effects, Proposed Mitigation and Commitments for Future Work

Legend

MTO: Ministry of TransportationMUN: Local MunicipalitiesPUB: General PublicMCM: Ministry of Citizenship and MulticulturalismMNR: Ministry of Natural ResourcesEMS: Emergency Medical ServicesRES/BUS: Local Residents/Business OwnersSTS: Student Transportation ServicesMECP: Ministry of Environment, Conservation and Parks

I.D. #	Environmental Issues/Concerns and Potential Effects	Concerned Parties	I.D. #	Mitigation/Protection/Monitoring/Commitments to Further Work
Natural Environment				
1.0	Surface Water Potential impacts to surface water and groundwater from disturbance of contaminated soils, leaks, and accidental spills	MTO MECP	1.1	Complete drainage design to provide appropriate drainage capacity.
			1.2	Direct runoff and overland flow away from working areas and areas of exposed soils.
			1.3	Store all oils, lubricants, and other chemicals in suitable containers and handle them in accordance with applicable regulations.
			1.4	Do not permit refueling within 30 m of a watercourse.
			1.5	At minimum, best management practices will be applied for fuel management, including secondary containment of temporary fuel storage.
			1.6	Install debris platforms and/or collection systems to prevent dust, debris, effluent, and visible emissions from falling into watercourse.
			1.7	Prepare and follow spill response plan for construction. All spills will be cleaned up immediately, and contaminated materials will be disposed of in an approved manner. The MECP will be informed immediately of all reportable spills.
			1.8	Run-off from construction and stockpiles will be contained and discharged to prevent entry of sediment into the water.
2.0	Vegetation Potential for localized impacts to vegetation due to disturbance of common species	MTO MECP MNR	2.1	Right-of-way clearing will be minimized to the extent possible. Any additional property holdings or Excess Material Management Areas adjacent to forest or wetland areas will be rehabilitated to further reduce impacts.
			2.2	Vegetation removal should be undertaken outside of the migratory bird nesting period (April 1 to August 31) and bat window (April 1 to November 30), as discussed in Sections 8.2.3 and 8.3.3. If in-water works / vegetation removals are required within wetlands that may also support turtle wintering habitat, those activities should occur between April and October to avoid potential harm to overwintering turtles

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I.D. #	Environmental Issues/Concerns and Potential Effects	Concerned Parties	I.D. #	Mitigation/Protection/Monitoring/Commitments to Further Work
			2.3	Vegetation removal associated with construction-related activities will be minimized, and where required, Environmentally Sensitive Areas will be established to restrict access to sensitive areas during construction. Sediment controls to clearly mark and separate work areas from sensitive natural features (i.e., woodlands, wetlands, and watercourses) are recommended.
			2.4	Stockpiling of materials will be kept away from adjacent natural areas.
			2.5	Stormwater discharge during construction will be directed away from adjacent natural areas.
			2.6	A comprehensive Erosion and Sediment Control Plan will be completed during the next stage of planning and design. At minimum, the Best Management Practices set forth in the <i>Environmental Guide for Erosion and Sediment Control During Construction of Highway Project</i> will be followed.
			2.7	Topsoil, seed banks, and organic matter will be salvaged and reintroduced to any areas disturbed during construction. Post-construction seeding of the disturbed ROW should be done with a suitable native seed mix and in consideration of Monarch Butterfly habitat. Seed mixes will include fast-growing, short-lived perennial cover crops to stabilize soil and reduce competition from weedy exotics. Native cover crops are preferred. New seeds will be introduced to disturbed substrates as soon as feasible following construction (within 15 days for areas less than 200 m from a waterbody or watercourse, and 45 days for other areas), and sediment fencing or other barrier will remain in place until vegetation cover is re-established. Seeded areas shall receive water either through precipitation or irrigation after every seven successive days without rainfall for the first two (2) months during the growing season after seeding.
3.0	Wildlife and Species at Risk (SAR) Potential for species at risk (SAR) habitat within or adjacent to the study area, and potential interactions with wildlife during construction	MTO MNRF MECP	3.1	Interaction with SAR and other wildlife during construction may occur. The Contractor will ensure all SAR sighted or encountered are protected and avoided if under immediate threat from construction activities. If any SAR or their nest is observed during the site inspection or at any other time, the Contractor shall immediately halt construction in the vicinity of the observation. SAR that are encountered within the work zone should be allowed a reasonable amount of time to leave the work area. The Qualified Biologist shall notify MTO’s Contract Administration once the SAR has left the work area prior to continuation of construction. The Qualified Biologist shall contact MTO’s Contract Administration immediately to notify them of SAR observations within the work area. Upon approval from MTO, the Qualified Biologist shall report the SAR observation to MECP within 24 hours of the observation, and if necessary, seek advice on how to proceed if the encountered SAR has remained within or adjacent to the work area. Confirmed sightings of SAR species within the work area should be compiled and reported to the Natural Heritage Information Centre (NHIC) following construction, using a SAR encounter form. SAR should only be handled by qualified professionals who have knowledge of the species and the correct approvals to undertake SAR handling.
			3.2	Once design details are confirmed, additional surveys will be carried out in identified suitable habitat areas for SAR (Butternut, Black Ash, Blanding’s Turtle, Gray Ratsnake, Little Brown Myotis, Northern Myotis, Eastern Small-footed Myotis, and Tri-coloured Bat suitable habitat) to confirm potential impacts to SAR species identified. Proper mitigation and avoidance will be determined.
			3.3	Preconstruction surveys will be carried out to determine the presence of suitable maternity roost trees for Endangered bats. If species observed to be present, additional mitigation and registration requirements under the SCA will be determined.
			3.4	If impacts cannot be avoided through design, appropriate mitigation measures will be developed as required in accordance with the most up-to-date legislation at that time, including any requirements under the SCA.
			3.5	A thorough visual search of machinery and the work area for turtles, reptiles, or other wildlife, particularly between May 15 and September 1, when nesting turtles are most active, will occur before work commences each day by construction contractors to avoid interaction with wildlife. Construction equipment and vehicles are to yield to wildlife. If encountered, work will stop, and wildlife

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I.D. #	Environmental Issues/Concerns and Potential Effects	Concerned Parties	I.D. #	Mitigation/Protection/Monitoring/Commitments to Further Work
				will be permitted reasonable time to flee the area on their own. If slow-moving wildlife (i.e., turtles, snakes) are observed on the road and are in danger, and if safe to do so, they will be moved off the road by gently guiding the individual in the direction it was traveling. Handling of SAR is not permitted without an ESA authorization. If necessary, a qualified professional can move wildlife to a location that is both safe and suitable. Construction machinery/equipment must maintain a minimum operating distance of 20 m from the individual until it disperses from the Work Zone on its own accord. If on-site personnel are unable to allow a SAR to leave the active construction area on its own, MECP must be contacted immediately for additional guidance. If an injured or deceased SAR is found, the specimen must be placed in a non-airtight container that is maintained at an appropriate temperature, and MECP must be contacted immediately for additional guidance. Temporary alterations to SAR habitat must be limited to the duration and spatial extent possible and be remediated upon completion of the activity and monitored as necessary. Factsheets will be provided to assist contractors in the identification of potential SAR and SOCC (Blanding’s Turtle, Gray Ratsnake, Eastern Milksnake, Ribbonsnake). Observations of SAR will be reported to MECP within 48 hours. If the peak active season for reptiles, from approximately April 1 to November 1, cannot be avoided during construction, then installation of wildlife exclusion fencing must occur before May 15 or after September 15 (i.e., outside of the key breeding period) to define work zones and restrict the movement of reptiles into the working area. If a snake hibernaculum is discovered, all work must cease, and a Qualified Biologist shall be contacted to discuss mitigation options. Overwintering snakes shall not be relocated. Disturbance to brush piles / logs will be avoided wherever possible. If a brush/ log pile must be moved or disturbed, it will be inspected for reptiles and relocated within a few metres, to the extent possible, to retain the habitat feature. During ditching and grading activities undertaken between April 1 and November 1, disturbance will be limited to the greatest extent possible to protect reptiles that may be present.
			3.6	Erect exclusion fencing (i.e., light geotextile silt fence) around proposed construction areas prior to start of work to reduce the likelihood of turtles entering the work zone. Install exclusion fencing prior to the sensitive nesting season if activities are anticipated to occur throughout this period to prevent turtles from entering and/or nesting (MNRF 2013): Prior to June 1, if activities are occurring within or adjacent to nesting habitat (i.e., exposed soils adjacent to or along riverbanks). If construction activities commence after June 1, a Qualified Biologist must be present on site to oversee the installation. If erecting exclusion fencing, use a type that will last the duration of the project (MNRF 2016). Check that stakes are securely driven into the ground on the inside of the work zone. Place stakes 2 m apart and drive them to a depth of 30 cm, with the fabric pulled tight to reduce sagging, and the bottom of the fabric buried 10-20 cm down within an additional fabric lip extending 90 degrees outwards. Backfill and compact the fabric lip Inspect any fenced-off areas daily to identify compromises in the fence and to remove any turtles that may be trapped in the fence. Install fencing so that it prevents construction sediment from entering wetlands. Have a qualified person conduct a pre-construction sweep and monitor the work area for active turtle nests during the turtle nesting season (June-August). If turtle eggs are encountered or unearthed during the construction activities, all operations must immediately stop within 5 m of the active nest. If a turtle is encountered that has already begun to nest (i.e., digging and/or sitting in a nest pit), construction activities should stop within 5 m of the turtle, and the turtle should be left alone to complete the egg-laying process and leave the area on its own accord.

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I.D. #	Environmental Issues/Concerns and Potential Effects	Concerned Parties	I.D. #	Mitigation/Protection/Monitoring/Commitments to Further Work
				If any Blanding's Turtle or their nest is observed during the site inspection or at any other time, the Contractor shall immediately halt construction in the vicinity of the observation. SAR that are encountered within the Work Zone should be allowed a reasonable amount of time to leave the work zone. A Qualified Biologist shall notify MTO's Contract Administration once the SAR has left the work zone prior to continuation of construction. Stockpiled topsoil, sand, and/or gravel must be completely encircled with silt fence or completely covered with geotextile to prevent turtles from accessing and nesting in the materials from May 15 to July 15 of any year.
			3.7	Bats are vulnerable to disturbance during their active season (April 1 through November 30). Activities that may disturb Bat SAR (i.e., removal of trees ≥ 10 cm DBH, or shrubs ≥ 1 m in height) should avoid their active season. The two (2) trees that were identified as potential bat SAR maternity trees should be protected from harm during tree clearing, and the trees will be clearly marked with a suitable buffer zone using tree protection fencing (OPSD 200.010 Barrier for Tree Protection). The two (2) trees will not be removed until approval from MECP has been received.
			3.8	Vegetation clearing in meadow areas should not be undertaken during the larval period, which is approximately June 1 to September 30 (Mission-Monarch 2020). If vegetation clearing will proceed when Monarch larvae may be present (June 1 to September 30), inspection of milkweed plants is recommended to locate Monarch larvae. If larvae are present, they may be moved to a location that is suitable and safe under the direction of a qualified professional. Monarch caterpillars may be moved to other milkweed plants; for other larval stages (i.e., eggs and chrysalis), entire milkweed plants should be transplanted. Milkweed and nectar-producing plants are recommended to be included in seed mixes for areas restored to meadow to provide habitat for the Monarch Butterfly.
4.0	Migratory Birds and Protected Nests Potential for protected birds to establish nests on existing structures	MTO MNR	4.1	Active nests (nests with eggs or young birds) and birds will be protected under the Migratory Birds Convention Act (MBCA). Tree removal will occur outside the Primary Nesting Period (PNP) of April 1 to August 31.
			4.2	If a nest is located, a designated buffer shall be determined by a qualified professional and delineated. No activity shall be permitted within the buffer radius while the next is active.
			4.3	If construction activities may disturb nesting birds on bridges during the PNP, exclusionary measures such as pre-tarping structures before April 1 shall be employed to deter birds from nesting on the bridges, following the MNR Best Management Practices for Excluding Barn Swallows and Chimney Swifts from Buildings and Structures.
5.0	Fish and Fish Habitat - Design-related impacts - Potential for habitat loss or alteration, potential for changes to fish passage, potential changes to water quality - Construction-related impacts: - Potential for sedimentation due to erosion, potential changes to water quality, potential fish mortalities, and potential	MTO MNR DFO	5.1	Proposed works at Butlers Creek culvert (Site 16X-039/C0) will result in the loss / destruction, alteration, creation of new fish habitat through the removal, new culvert, and realignment. The effects of the impact (i.e., habitat loss) are likely not mitigable and have the potential to result in a HADD of fish habitat and will likely require review under the Fisheries Act through the Request for Review process. Aquatic effects assessments will be completed during detail design to assess risk of the project resulting in the death of fish or HADD of fish habitat.
			5.2	Determine if BMPs (MTO 2025b) are applicable at Step 3 of the Fisheries Protocol and/or to conduct a Fisheries Assessment at Step 4 of the Fisheries Protocol to determine / confirm if the project may result in the death of fish or HADD of fish habitat.
			5.3	In-water work restrictions will be applied. In-water construction activities are permitted from July 1 to March 14, inclusive (i.e., no work from March 15 to June 30).
			5.4	The maintenance of fish passage must be considered during detailed design.

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	reduction in access to habitats during critical life stages		5.5	Design new culvert crossings and channel realignment to allow for fish passage. Fish passage should be designed for Butler Creek (Site 16X-0238/C0).
			5.6	Groundwater upwelling areas shall be protected
			5.7	Stormwater runoff shall be directed to ditches or other treatment facilities, and not to centreline culverts identified as fish habitat
			5.8	A Request for Review Form shall be submitted to DFO (per Step 6 of the Protocol) for review under the Fisheries Act, with respect to whether the Butler Creek culvert replacement may be required, to be confirmed at Detail Design. A Project Notification Form shall be submitted for the Unnamed Tributary to St. Lawrence if required.
			5.9	Vehicle and equipment refueling shall be carried out at least 30 m away from any adjacent waterway.
			5.10	A spill containment plan shall be established prior to construction and remain on-site during construction.
			5.11	Opportunities to improve fish habitat shall be reviewed and confirmed during detailed design. Maintenance of fish passage shall be considered during detailed design. Where culverts are being replaced, perched conditions and/or other barriers to fish passage shall be removed.
			5.12	Drainage systems should be designed to reduce changes in drainage to watercourses that provide fish habitat. SWM measures should be designed to reduce effects on watercourses that provide fish habitat to the extent possible.
			5.13	A rehabilitation/re-vegetation plan for the long-term stability of areas disturbed during construction shall be prepared during detailed design.
			5.14	For rock reinforcement below the normal high-water level, use appropriately sized material and install at a similar slope to the existing, maintain a uniform bank / shoreline, and maintain a natural bank/shoreline alignment such that it does not interfere with fish passage or alter the bank full channel profile.
			5.15	The following OPSSs shall be implemented during detailed design: • Equipment Use – Use of equipment shall be in accordance with OPSS 182 • Fish Salvage – Fish salvage operations shall be conducted in accordance with OPSS.PROV 182. • Dewatering and the Use of Pumps – Dewatering activities and the use of pumps shall be conducted in accordance with OPSS.PROV 517 and OPSS.PROV 182 • Preservation of Riparian Vegetation – Removal of riparian vegetation shall be in accordance with OPSS.PROV 182 • Erosion and Sediment Control – The installation, monitoring, maintenance, and removal of temporary erosion and sediment control measures shall be according to OPSS.PROV 182, OPSS.PROV 804, and OPSS.PROV 805 • Management of Excess Materials – All excess material shall be managed in accordance with OPSS.PROV 180 • Placement of Aggregates in Waterbodies – Use of aggregate in waterbodies shall be according to OPSS.PROV 825 and OPSS.PROV 1005 Restoration of Disturbed Areas – Vegetation protection and rehabilitation shall be in accordance with OPSS.PROV 182, OPSS.PROV 803, and OPSS.PROV 804

I.D. #	Environmental Issues/Concerns and Potential Effects	Concerned Parties	I.D. #	Mitigation/Protection/Monitoring/Commitments to Further Work
6.0	Erosion and Sedimentation Erosion and sedimentation during activities associated with construction have the potential to impact drainage ditches within the study area	MTO MNR	6.1	A comprehensive Erosion and Sedimentation Control Plan (Approach 2, ERD) will be developed prior to construction. Erosion and sedimentation control measures will be implemented in accordance with the Contract Documents to avoid or mitigate impacts to adjacent habitats and property inside or outside of the right-of-way.
			6.2	At minimum, the Best Management Practices set forth in the Environmental Guide for Erosion and Sediment Control During Construction of Highway Project will be followed.
			6.3	The limits of construction (site boundaries) adjacent to all natural areas will be flagged and/or fenced prior to construction, and monitored during construction (along with erosion and sediment control measures).
			6.4	No equipment will be permitted to enter any natural areas beyond the sediment fencing (site boundaries) during construction. Equipment arriving on-site will be inspected inside and out prior to entering the site for debris such as mud or accumulation of dirt, plant material, or snow / ice. Silt fencing and/or barriers are recommended along the work zone where there is potential for sedimentation of watercourses or wetlands, or inadvertent encroachment of construction vehicles into natural areas of woodlands, wetlands, and watercourses.
			6.5	All materials requiring stockpiling (fill, topsoil, etc.) will be stabilized and kept a safe distance from any sensitive natural features.
			6.6	All exposed soil areas will be stabilized and re-vegetated. Native seeds and mulching, or seeds, and an erosion control blanket will be applied to disturbed sites promptly upon completion of construction activities. Introduce seed to disturbed substrates as soon as feasible following construction, and sediment fencing is recommended to remain in place until vegetation cover is re-established.
			6.7	Refueling of equipment will be carried out away from any sensitive natural features to avoid potential impacts, in the event that an accidental spill occurs.
			6.8	In addition to any specified requirements, an additional sediment fence will be available on site, prior to grading operations, to provide a contingency supply in the event of an emergency.
			6.9	All sediment and erosion controls will be monitored regularly and properly maintained, as required. Controls will be removed only after the soils of the construction area have been stabilized, and vegetation cover is re-established.
			6.10	Any natural areas that are temporarily disturbed for access or construction will be restored to natural self-sustaining conditions.
			6.11	Environmental controls will be monitored by an Environmental Inspector.
			6.12	In addition to any specified requirements, additional silt fence shall be available on site, prior to grading operations, to provide a contingency supply in the event of an emergency.
7.0	Management of Invasive Species	MTO MNR	7.1	The invasive common reed (Phragmites) is a ‘restricted’ plant species regulated by the Ontario Invasive Species Act (2015), and under the Act, it is illegal to import, deposit, release, grow, buy, sell, lease, or trade this species. Phragmites are not present throughout the existing right-of-way; a clean equipment protocol is recommended for machinery entering riparian areas to prevent the spread of invasive species into the feature.
Social and Economic Environment				
8.0	Land Use and Property Potential direct and indirect impacts to adjacent properties,	MTO MUN	8.1	Notify the public, Indigenous communities, and associated emergency service providers, OPP, fire department, and ambulance of start of the next stage of design, construction staging, start of construction, etc., to minimize delay in emergency response times during and after construction.
			8.2	Maintain liaison / coordinate construction with responding agencies (including school boards).

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	including disruption during construction Temporary delay or disruption to EMS providers during construction		8.3	Engage with impacted property owners to review, discuss, and\ confirm impacts to property
			8.4	Consult general public through newspaper notices and directly affected / adjacent property owners through correspondence at the start of the subsequent design process.
			8.5	Hold Public Information Centre during the next stage of design to display and seek input on the detailed plan and construction staging.
			8.6	Establish and confirm construction staging and laydown areas.
			8.7	Prepare a detailed Traffic Management Plan.
			8.8	Confirm proposed Conceptual Landscape Plan and obtain input on plan during detailed design.
	Subsurface Contamination Records of historical spills, importation of fill materials of unknown quality, and gasoline storage have the potential for environmental concern	MTO	8.9	Undertake Phase 1 and/or 2 Environmental Site Assessment (ESA) activities to confirm the presence or absence of on-site soil and/or groundwater contamination.
	Management of Excess Materials Excess materials may be encountered during construction at the sites and require proper management/disposal	MTO MECP	8.10	Excess materials generated during construction will be managed in accordance with O.Reg. 406/19. All materials and debris will be removed upon completion of the work, in accordance with O.Reg. 406/19. This includes sampling soil that is intended to be excavated prior to or during construction, which may require off-site management as excess soil. The soil sampling program will be undertaken according to a Sampling and Analysis Plan (SAP), and a Soil Characterization Report will also be required once the results of the SAP are known.
9.0	Noise Assessment - The existing noise barrier (ENB1) will be retained. - In accordance with the MTO Environmental Noise Guideline, the noise barrier was found to be technically feasible. While the cost-effectiveness analysis indicates that the estimated cost marginally exceeds the \$125,000 per receptor threshold, the exceedance is minor and the mitigation measure achieves meaningful noise reduction at impacted receptors. Therefore, noise barrier NB1 is	MTO MUN RES/BUS PUB	9.1	Once equipment and construction schedules are finalized, construction equipment sound levels will be reviewed to confirm that noise emissions are within the permissible limits. If higher than permissible limits, noise control options will be explored.
			9.2	All equipment will be properly maintained to limit noise emissions. As such, all construction equipment will be operated with effective muffling devices that are in good working order.
			9.3	The contractor will be required to adhere to standard noise restrictions (i.e., proper maintenance of equipment, no unnecessary idling).

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I.D. #	Environmental Issues/Concerns and Potential Effects	Concerned Parties	I.D. #	Mitigation/Protection/Monitoring/Commitments to Further Work
	recommended as part of the Project.			
	Construction Noise Potential noise increase during construction associated with some equipment (e.g., boom trucks, pile drivers, dump trucks, and paving machines)		9.4	The Contract Documents will contain a provision that any initial noise complaint will trigger verification that the general noise control measures agreed to are in effect.
			9.5	In the presence of persistent noise complaints, all construction equipment will be verified to comply with MECP NPC-115 guideline.
			9.6	In the presence of persistent complaints and subject to the results of a field investigation, alternative noise control measures may be required, where reasonably available. In selecting appropriate noise control and mitigation measures, consideration will be given to the technical, administrative, and economic feasibility of the various alternatives.
10.0	Archaeological Resources - Previously unknown/deeply buried artifacts/human remains could be uncovered during construction - Stage 2 Archaeological Assessment	MTO MCM	10.1	Should previously undocumented archaeological resources be discovered, they may be a new archaeological site and therefore subject to Section 48(1) of the Ontario Heritage Act (Government of Ontario 1990b). The proponent or person discovering the archaeological resources must cease alteration of the site immediately and engage a licensed consultant archaeologist to carry out archaeological fieldwork, in compliance with Section 48(1) of the Ontario Heritage Act (Government of Ontario 1990b). The Funeral, Burial and Cremation Services Act, 2002, S.O. 2002, c.33 (Government of Ontario 2002) requires that any person discovering human remains must notify the police or coroner and the Registrar of Cemeteries at the Ministry of Government and Consumer Services.
			10.2	Stage 2 Archaeological Assessment for parts of the study area evaluated to retain archaeological potential. Stage 2 Archaeological Assessment will involve both test pit survey and pedestrian survey, as per Sections 2.1.1 and 2.1.2 of the MCM’s Standards and Guidelines for Consultant Archaeologists (Government of Ontario 2011).
			10.3	Indigenous Communities with potential archaeological interests in the area will be notified of any subsequent archaeological assessment activities and invited to participate in archaeological field surveys, and to review any related reporting, prior to submission of the final reports to MCM.
11.0	Air Quality - Potential for dust from construction activities to adversely affect nearby land uses - Opportunities to decrease ambient concentrations of particulate matter and NO2	MTO MECP RES/BUS PUB	11.1	The Environment and Climate Change Canada’s Best Practices for the Reduction of Air Emissions from Construction and Demolition Activities will be followed. At minimum, best practices during construction will include material wetting or use of chemical suppressants to reduce dust, use of wind barriers, limiting exposed areas that may be a source of dust, and equipment washing. During construction, industry best management practices should be implemented to minimize air contaminants and GHG emissions. During operation, air quality levels are generally predicted to decrease relative to Baseline levels, and mitigation measures such as retaining existing or integrating additional vegetation barriers to the Project design can be used to further decrease ambient concentrations of particulate matter and NO2. The vegetation barrier should be thick (approximately 6 m or more) and have full leaf and branch coverage from the ground to the top of the canopy with no gaps in between or underneath the vegetation, and the barrier should be located close to the emissions sources. Evergreen species are more effective than deciduous species for this objective.
12.0	Cultural and Built Heritage A property identified with potential cultural/built heritage is located approximately 43 m north of the Highway 401 right-	MTO MCM	12.1	A qualified engineer should undertake a pre-construction vibration monitoring assessment to determine the need for vibration monitoring during construction. Vibration monitoring may include random confirmatory checks during construction, with post-condition surveys undertaken as required at the discretion of the Qualified Building Condition Specialist or Engineer.
			12.2	Property-specific Cultural Heritage Evaluation Reports may be required prior to completion of a Heritage Impact Assessment.

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	of-way, and is therefore at potential risk of vibration-related impacts		12.3	Establish a buffer zone of at least 50 m around built heritage resources to avoid construction activity within this area. Where avoidance is not feasible, a Qualified Building Condition Specialist or Engineer should develop a strategy to conduct pre-condition surveys and vibration monitoring, as appropriate.
13.0	Utilities Impacts to existing utilities during construction	MTO UTL	13.1	Utilities will be contacted during next stage of planning and design to confirm the location of existing utilities and potential conflicts.

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12.0 Monitoring

The planning and preliminary design phase of the project is now complete. Specific mitigation measures identified in this report will require confirmation during the next design phase and monitoring during construction.

Monitoring will be conducted by on-site construction supervisory staff to make sure that environmental protection measures, as outlined in this report and confirmed during subsequent design phases and included in the contract package, are implemented. This includes making sure that the implementation of mitigating measures and key design features is consistent with commitments made to external agencies prior to construction.

For certain activities, monitoring by a Qualified Environmental Specialist will be required.

In the event that protective measures do not address concerns identified or if major problems develop, the appropriate agency will be contacted to provide additional input.

In the event that the impacts of construction are different from anticipated, or that the method of construction is such that there are greater than anticipated impacts, the Contractor's method of operation will be modified to reduce those impacts.



