Comments and Suggestions

The Ministry of Transportation welcomes comments and suggestions on ways to improve the document with the objective of providing a practical and pragmatic approach to environmental management in the Province of Ontario. MTO anticipates that changes will be warranted to clarify, improve and incorporate new information. The format of the document is designed to accommodate such changes. Such revisions and amendments will be incorporated in later editions of this document. MTO will not formally respond to unsolicited comments submitted in response to the document.

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## VERSION HISTORY

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Glossary of Terms/ Acronyms

AGR - Agriculture
ANSI - Areas of Natural and Scientific Interest
ANSI - Provincially Significant Areas of Natural and Scientific Interest
AQ – Air Quality
BHCHL - built heritage resources and cultural heritage landscapes
BMP – Best Management Practices
CA - Conservation Authority
CAPHC - Canadian Association of Professional Heritage Consultants
CC – Climate Change
CEA - Class Environmental Assessments
CEAA - Canadian Environmental Assessment Act (CEA)
CISEA - Certified Inspector Sediment and Erosion Control
CPS - Contract Preparation System
DCR - Design and Construction Report
DFO - Department of Fisheries and Oceans Canada
E.G – Example Given
EA - Environmental Assessments
EPR - Environmental Protection Requirements
ERCP - Environmental Reference for Contract Preparation
ERD - Environmental Reference for Highway Design
ESA - Environmentally Sensitive Areas
ESC - Erosion and Sediment Control
ESCP - Erosion and Sediment Control Plan
ESPA - Environmentally Sensitive Policy Areas
1. Preface

The Environmental Reference for Highway Design (ERD) addresses the environmental assessment issues relating to preliminary design and detail design transportation projects. This document has been developed in co-operation with the various Ministry of Transportation (MTO) Regional Environmental Offices and Environmental Regulatory Agencies including:

- Fisheries and Oceans Canada
- Environment Canada
- Canadian Environmental Assessment Agency
- Health Canada
- Ministry of Agriculture, Food and Rural Affairs
- Ministry of Culture
- Ministry of Environment
- Ministry of Natural Resources
- Ministry of Municipal Affairs and Housing

Where discrepancies occur between this document and legislative requirements, legislation shall take precedence over this document. However, many aspects of the ERD are in excess of the requirements of factor specific protocols. Where such inconsistencies exist, the requirements of this document shall apply. Similarly, where inconsistencies exist between the ERD and the project specific Terms of Reference, the Terms of Reference takes precedence.

1.2 About this Document

The ERD has been revised from the document first developed by MTO’s Central Region staff. The section revisers wish to acknowledge the outstanding work of Darleen Proudfoot, Cindy Mitton-Wilkie and the other MTO staff in developing the first ERD.
1.2.1 Purpose and Goals

This document provides guidance to managing environmental impacts of transportation projects in transportation project design.

The ERD outlines staff qualifications and the scope of work, as well as specific timing and documentation requirements to be conducted for each environmental specialty area. Consultants may use the ERD to enhance the quality and accuracy of their proposals by ensuring that they are aware of and fully understand the legislative obligations, technical quality, and program delivery expectations of MTO.

1.2.2 The Role of Other MTO Documents in this Document

The ERD is one of MTO’s many environmental, design and construction documents. Below are documents that relate to or are referenced within the ERD.

1.2.2.1 Environmental Documents

Environmental Protection Requirements for Transportation Planning and Highway Design, Construction, Operation and Maintenance

Environmental Protection Requirements (EPRs) are a list of statements, organized by environmental factors. The EPRs are a synthesis of the requirements in over sixty statutes, supporting regulations and formal government policies applicable to environmental aspects of transportation projects. Each statement is an interpretation of these requirements as they apply to transportation planning and highway design, construction, operation and maintenance activities.

Class Environmental Assessment for Provincial Transportation Facilities (Class EA)

The Environmental Assessment Act provides for the preparation at Class Environmental Assessments (Class EA). MTO’s Class EA document is an approved planning document that defines groups of projects and activities and the environmental assessment (EA) processes which MTO commits to following for each of these undertakings. The Class EA document defines the groups of projects and details the processes to be followed.

Environmental Standards and Practices User Guide

The Environmental Standards and Practices User Guide (User Guide) contains a brief overview of typical potentially significant environmental impacts associated with transportation projects for each environmental factor, provides design considerations in managing those impacts and lists applicable technical, environmental and engineering policies, guides and references (like the ERD).
Environmental Guides

MTO has various environmental guides to provide environmental assessment and mitigation process and technical details on individual environmental factors as may be needed on a project-specific basis. MTO’s environmental guides include:

- Environmental Guide for Fish and Fish Habitat
- Environmental Guide for Wildlife in the Oak Ridges Moraine
- Environmental Guide for Noise
- Environmental Guide for Built Heritage and Cultural Heritage Landscapes
- Environmental Guide for Patrol Yard Design
- Environmental Guide for Contaminated Property Identification and Management
- Environmental Guide for Erosion and Sediment Control During Construction of Highway Projects

Environmental Reference for Contract Preparation

The Environmental Reference for Contract Preparation (ERCP) contains a brief overview of potential environmental impacts associated with highway construction and all relevant Ontario Provincial Standard Specification (OPSS) and MTO Standards Special Provisions (SSP) that are used as part of Construction contract to mitigate those impacts.

Environmental Glossary

Keywords or terms for all environmental documents are defined in MTO’s central Environmental Glossary.

1.2.2.2 Engineering Standards and Manuals

The engineering design of transportation projects within the jurisdiction of the Ministry of Transportation of Ontario (MTO) is based on and reflects the principles and procedures identified in the MTO engineering standards and manuals. The development of environmental management options must be consistent with the approach outlined in these documents.
Section 2: Generic Requirements and Optimal Timelines for Obtaining Provincial and Federal Environmental Assessment Clearances

2.1 Introduction

Clearance for Provincial Environmental Assessment (EA) can be obtained in either the Preliminary or Detail Design stage of a highway design project as per the MTO Class Environmental Assessment process. However, Federal EA clearance requires specific information that may only be available during Detail Design. As such there are 4 approaches (or options) for obtaining Provincial and Federal EA Clearances for highway design projects as shown in the following Options Table.

**Options Table: Four Options for Obtaining Provincial and Federal Environmental Assessment (EA) Clearances for Highway Design Projects**

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Ministry of Transportation
Environmental Reference for Highway Design

The Overview Table on page 7 is the key to identifying the generic environmental assessment requirements and steps, and the optimal timelines and key milestones that apply to the four options listed above.

The Document Summary Table on page 8 provides a summary of the general documentation requirements for the four options.

This section is further organized into sub-sections that are intended to stand independently. The user can begin with the Overview Table to find the option they are interested in, based on when they would like to obtain their EA clearances, and then go to the applicable sub-section for further details. These details are organized into 7 sets of tables that define the generic factor-specific environmental assessment requirements, the design steps and optimal timelines, and the key milestones during design that relate to each option. This section of the ERD is not intended to be read from beginning to end, as the sub-sections are not meant to be consecutive.

As previously stated, this section includes optimal timelines for environmental activities. There are many reasons (engineering, environmental, etc.) why a project may not meet the optimal timelines shown. For example, for field investigations:

- specific timing requirements (such as multi-season data collection, timing windows) may be required (as set out in Section 3 of the ERD); and

- the design may need to be advanced to a certain point to allow an understanding of potential impacts, thus, either additional field investigations would need to be done later in the design process or the design and mitigation will be based on the data in-hand.

The solution is flexibility. The reality is that the field season requirements generally do not coincide with the design completion schedule (i.e., % completion milestones). Therefore, in some projects, for some environmental factors, background data may need to be used for consultation until field data can be obtained. As an example, background information can be obtained early (by 30% completion of Preliminary Design) to gain an overall appreciation of environmental constraints. This information would then be supplemented by the field investigations that could be done once there is a better understanding of impacts (i.e., the design is sufficiently advanced).
Overview Table: Generic Requirements and Timing for Obtaining Federal and Provincial Environmental Assessment Clearances for Transportation Projects

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### Document Summary Table: Document Submissions for Provincial and Federal Environmental Assessment Clearances for Transportation Projects

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1. Draft factor-specific technical reports (revised as per MTO comment) must include: existing environmental conditions; environmental constraints to design and construction; details/scope of conceptual environmental design; details/scope of conceptual construction environmental mitigation; and any outstanding environmental issues.

2. Draft TESR submitted for MTO review must include information from final factor-specific environmental technical reports and the same level of information for applicable environmental factors for which factor-specific reports are not required.
### Summary of Environmental Concerns & Commitments

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Ministry of Transportation
Environmental Reference for Highway Design

Option 1- Provincial EA Clearance Obtained in Preliminary Design and Federal EA Clearance Obtained in Detail Design

Option 1 - Preliminary Design

Table 1.1: Generic Requirements for Factor-Specific Environmental Assessments in Preliminary Design for Option 1

Table 1.2: Preliminary Design Steps and Optimal Timeline for Option 1

Figure 1.1: Timeline of Preliminary Design Key Milestones for Option 1
Table 1.1: Generic Requirements for Factor-Specific Environmental Assessments in Preliminary Design for Option 1

(Provincial EA Clearance Obtained in Preliminary Design and Federal EA Clearance Obtained in Detail Design)³

<table>
<thead>
<tr>
<th>Section No. and Sub-Factor Title</th>
<th>Study Area</th>
<th>Background Data</th>
<th>Field Investigations</th>
<th>Determination of Significance</th>
<th>Assessment of Impacts</th>
<th>Env. Protection, Mitigation &amp;/or Compensation</th>
<th>Documentation</th>
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<tbody>
<tr>
<td>3.1 Fish and Fish Habitat</td>
<td>Determine</td>
<td>Collect</td>
<td>Undertake all steps except for fluvial geomorphic assessment</td>
<td>Undertake all steps</td>
<td>Determine the potential permanent and temporary impacts of the various highway design alternatives</td>
<td>Undertake environmental protection and mitigation for highway design alternatives</td>
<td>Prepare: Field forms, photos, maps, Constraints and Opportunities map, Fish and Fish Habitat Existing Conditions Report and the Fish and Fish Habitat Impact Assessment Report, Project Notification Form and Compensation Strategy</td>
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³ The appropriate sections and activities to be followed are determined on a project-specific basis and identified in the Terms of Reference.
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<th>Documentation</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.2 Terrestrial Ecosystems</td>
<td>Determine</td>
<td>Collect</td>
<td>Undertake all steps</td>
<td>Undertake all steps</td>
<td>Determine the potential permanent and temporary impacts of the various highway design alternatives</td>
<td>Undertake for highway design alternatives</td>
<td>Prepare Terrestrial Ecosystem Report</td>
</tr>
<tr>
<td>3.3 Groundwater</td>
<td>Determine</td>
<td>Collect</td>
<td>Undertake all steps</td>
<td>Undertake all steps</td>
<td>Determine the potential permanent and temporary impacts of the various highway design alternatives</td>
<td>Undertake for highway design alternatives</td>
<td>Prepare Groundwater Report</td>
</tr>
<tr>
<td>Section No. and Sub-Factor Title</td>
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<tr>
<td>3.4 Noise</td>
<td>Determine</td>
<td>Collect</td>
<td>Undertake all steps</td>
<td>Undertake all steps</td>
<td>Determine the potential permanent and temporary impacts of the various highway design alternatives</td>
<td>Develop acoustical recommendations</td>
<td>Prepare Noise Report</td>
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<td>3.5 Land Use</td>
<td>Determine</td>
<td>Collect</td>
<td>Undertake all steps</td>
<td>Undertake all steps</td>
<td>Determine the potential permanent and temporary impacts of the various highway design alternatives</td>
<td>Undertake for the various highway design alternatives</td>
<td>Prepare Land Use Factors Report</td>
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<td>3.6 Contaminated Property</td>
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A 6-step process is undertaken to identify past and present site activities and evaluate the existing environmental liabilities, and environmental risk of a property and manage the contamination.

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<th>Documentation</th>
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<td>Implement</td>
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<td>3.7 Built Heritage and Cultural Heritage Landscapes</td>
<td>Determine</td>
<td>Collect</td>
<td>Undertake Field Survey</td>
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<td>Determine the potential permanent and temporary impacts of the various highway design alternatives</td>
<td>Undertake for the various highway design alternatives</td>
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<td>3.8 Archaeology</td>
<td>Determine</td>
<td>Collect for Stage 1</td>
<td>Undertake Stage 2 and Stage 3</td>
<td>Undertake all steps</td>
<td>Determine the potential permanent and temporary impacts of the various highway design alternatives</td>
<td>Undertake for the various highway design alternatives</td>
<td>Prepare report for Stage 1 - 3</td>
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<td>3.9 Landscape Composition</td>
<td>Determine</td>
<td>Collect</td>
<td>Undertake all steps</td>
<td>Undertake all steps</td>
<td>Undertake all steps</td>
<td>Integrate mitigation of other factor areas plus landscape mitigation into conceptual landscape plan</td>
<td>Prepare Landscape Composition Report</td>
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<td>3.10 Air</td>
<td>Determine</td>
<td>Collect</td>
<td>Undertake all steps</td>
<td>Undertake all steps</td>
<td>Undertake all steps based on EA Group</td>
<td>Undertake for local and regional impacts as required</td>
<td>Prepare AQ and GHG Emissions Assessment and Mitigation Report</td>
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A 4-step assessment / management process is undertaken to identify, evaluate and manage sites.
### 3.11 Surface Water

- **Determine** Collect Undertake all steps
- **Undertake all steps**
- **Determine the potential permanent and temporary impacts of the various highway design alternatives**
- **Undertake** for the various highway design alternatives
- **Prepare** the Existing Conditions Drainage Mosaic and an Existing Conditions Brief

### 3.12 Designated Areas

- **Augment as required**

### 3.13 Erosion and Sediment

A 2-step process: initial overview risk assessment, and erosion and sediment control.

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<th>Collect</th>
<th>As required</th>
<th>Undertake</th>
<th>Determine</th>
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<th>Prepare the Erosion and Sediment Overview Risk Assessment Report</th>
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Table 1.2 Preliminary Design Steps and Optimal Timeline for Option 1

(Provincial EA Clearance Obtained in Preliminary Design and Federal EA Clearance Obtained in Detail Design)

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<th>Steps</th>
<th>Optimal Timeline</th>
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<td><strong>Step 1</strong></td>
<td>By 30% preliminary design (PD) completion, and before the first Public Information Centre (PIC)</td>
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<tr>
<td>a) complete background data collection and environmental field investigations¹;</td>
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<tr>
<td>b) provide draft existing environmental conditions report, including field data records;</td>
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<tr>
<td>c) provide details/scope of environmental constraints to design; and,</td>
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<tr>
<td>d) contact environmental agencies.</td>
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<tr>
<td><strong>Step 2</strong></td>
<td>Between 30% and 60% preliminary design completion</td>
</tr>
<tr>
<td>a) hold first PIC (presentation of preliminary design alternatives);</td>
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<tr>
<td>b) prior to last PIC:</td>
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<tr>
<td>c) provide draft factor-specific technical reports;</td>
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<tr>
<td>d) provide written details/scope of project design and construction elements that are likely to require formal federal / provincial technical environmental approvals during the detail design process, or confirm that such approvals will not be required;</td>
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<tr>
<td>e) co-ordinate/attend meetings between environmental agencies and MTO as necessary to get project endorsement.</td>
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<tr>
<td><strong>Step 3</strong></td>
<td>By 60% preliminary design completion</td>
</tr>
<tr>
<td>a) hold last PIC (presentation of preferred preliminary design);</td>
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<tr>
<td>b) submit draft Transportation Environmental Study Report (TESR) for MTO review, which meets Class Environmental Assessment (EA) requirements;</td>
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<tr>
<td>c) develop outline of approach for federal / provincial environmental approvals and municipal bylaw exemptions during detail design.</td>
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<td>Step 4</td>
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</tr>
<tr>
<td>a) obtain agreement-in-principle from regulatory agencies that the conditions that will require formal environmental approvals will be acceptable;</td>
<td>Between 60% and 90% preliminary design completion</td>
</tr>
<tr>
<td>b) finalize factor-specific environmental technical reports;</td>
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<tr>
<td>c) file MTO-accepted TESR on the public record; and,</td>
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<tr>
<td>d) TESR clearance.</td>
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<th>Step 5</th>
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<tr>
<td>Provide completed &quot;Class EA Monitoring Questionnaire for Design Consultant Staff&quot; (See Appendix 1 of ERD Section 8).</td>
<td>By 90% preliminary design completion</td>
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</table>
Field Investigations may need to collect field information in more than one season and/or in timing windows, and this reality should be considered in the project schedule.
Option 1 - Detail Design

Table 1.3: Generic Requirements for Factor-Specific Environmental Assessments in Detail Design for Option 1

Table 1.4: Detail Design Steps and Optimal Timeline for Option 1

Figure 1.2: Timeline of Detail Design Key Milestones for Option 1
<table>
<thead>
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<th>Documentation</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.1 Fish and Fish Habitat</td>
<td>Refine</td>
<td>N/A</td>
<td>Undertake fluvial geomorphic assessment, as required</td>
<td>N/A</td>
<td>Update impacts from preferred highway design alternative&lt;br&gt;<strong>Determine</strong> potential impacts from alternative methods of construction and operation and maintenance&lt;br&gt;<strong>Undertake</strong> cumulative impact assessment, if applicable&lt;br&gt;<strong>Update/confirm</strong> likelihood of HADD</td>
<td>Update for preferred design alternative and other potential impacts identified&lt;br&gt;<strong>Develop</strong> Compensation Plan</td>
<td>Compile project file for fish and fish habitat</td>
</tr>
<tr>
<td>Section No. and Sub-Factor Title</td>
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<td>Assessment of Impacts</td>
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</tr>
<tr>
<td>3.2 Terrestrial Ecosystems</td>
<td>Refine</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>Update impacts from preferred highway design alternative</td>
<td>Update for preferred design alternative and other potential impacts identified</td>
<td>Update Terrestrial Ecosystems Report</td>
</tr>
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</table>

- **Update** impacts from preferred highway design alternative
- **Determine** potential impacts from alternative methods of construction and operation and maintenance
- **Undertake** cumulative impact assessment, if applicable
<table>
<thead>
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</table>
| 3.3 Groundwater                | Refine     | N/A            | N/A                 | N/A                         | Update impacts from preferred highway design alternative  
Determine potential impacts from alternative methods of construction and operation and maintenance  
Undertake cumulative impact assessment, if applicable  | Update for preferred design alternative and other potential impacts identified | Update Groundwater Report |
<table>
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<tr>
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<tbody>
<tr>
<td>3.4 Noise</td>
<td>Refine</td>
<td>N/A</td>
<td>Update</td>
<td>N/A</td>
<td>Update acoustical analysis for preferred highway design &lt;br&gt;Undertake cumulative impact assessment, if applicable</td>
<td>Update acoustical recommendations &lt;br&gt;Develop noise barrier design recommendations as required</td>
<td>Update Noise Report</td>
</tr>
<tr>
<td>3.5 Land Use</td>
<td>Refine</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>Update impacts from preferred highway design alternative on various land uses &lt;br&gt;Undertake cumulative impact assessment, if applicable</td>
<td>Update for preferred design alternative &lt;br&gt;Undertake for other potential impacts identified</td>
<td>Update Land Use Factors Report</td>
</tr>
<tr>
<td>3.6 Contaminated Property</td>
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</table>
A 6-step process is undertaken to identify past and present site activities and evaluate the existing environmental liabilities, and environmental risk of a property and manage the contamination.

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<td>Determine</td>
<td>Collect</td>
<td>Undertake</td>
<td>Undertake</td>
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<td>Phase One ESA Report</td>
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<td>Assessment of Impacts</td>
<td>Env. Protection, Mitigation &amp;/or Compensation</td>
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<tr>
<td>As required Step 4 Phase Two ESA /Step 5 Screening Level Risk Evaluation</td>
<td>Determine</td>
<td>-</td>
<td>Undertake</td>
<td>Undertake</td>
<td>Undertake</td>
<td>-</td>
<td>Prepare Phase Two ESA Report / Screening Level Risk Evaluation Report</td>
</tr>
<tr>
<td>As required Step 6 Site Management</td>
<td>-</td>
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<td>-</td>
<td>-</td>
<td>Implement Prepare Remedial Work Plan and Site Remediation Report</td>
</tr>
<tr>
<td>3.7 Built Heritage and Cultural Heritage Landscapes</td>
<td>Refine</td>
<td>Update</td>
<td>Update Field Survey Undertake Detailed Inventory</td>
<td>Update</td>
<td>Update potential impacts from preferred highway design alternative Determine potential impacts from alternative methods of construction Undertake cumulative impact assessment, if applicable</td>
<td>Update for preferred design alternative and other potential impacts identified</td>
<td>Update Cultural Heritage Assessment Report</td>
</tr>
</tbody>
</table>
### A 4-stage assessment (Stages 1 to 3), and mitigation, protection and monitoring (Stage 4) process is undertaken to identify, evaluate and manage sites.

<table>
<thead>
<tr>
<th>Section No. and Sub-Factor Title</th>
<th>Study Area</th>
<th>Background Data</th>
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<th>Assessment of Impacts</th>
<th>Env. Protection, Mitigation &amp;/or Compensation</th>
<th>Documentation</th>
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<tbody>
<tr>
<td>3.8 Archaeology</td>
<td>Refine</td>
<td>Update</td>
<td>Undertake Stage 4</td>
<td>Update</td>
<td>Update potential impacts from preferred highway design alternative as per point</td>
<td>Update for preferred design alternative and other potential impacts identified which may include undertaking Stage 4</td>
<td>Update report for Stage 1-3 Assessments</td>
</tr>
<tr>
<td>3.9 Landscape Composition</td>
<td>Refine</td>
<td>Update</td>
<td>N/A</td>
<td>N/A</td>
<td>Update</td>
<td>Update conceptual plan</td>
<td>Update Landscape Composition Report</td>
</tr>
<tr>
<td>3.10 Air</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Update</td>
<td>Prepare landscape components of the contract package</td>
<td>Update</td>
</tr>
</tbody>
</table>

June 2013
<table>
<thead>
<tr>
<th>Section No. and Sub-Factor Title</th>
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<th>Field Investigations</th>
<th>Determination of Significance</th>
<th>Assessment of Impacts</th>
<th>Env. Protection, Mitigation &amp;/or Compensation</th>
<th>Documentation</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.11 Surface Water</td>
<td>Refine</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>Update impacts from preferred highway design alternative</td>
<td>Update for preferred design alternative and other potential impacts identified</td>
<td>Update Drainage and Storm Water Management Report</td>
</tr>
<tr>
<td>3.12 Designated Areas</td>
<td>-</td>
<td>Augment as required</td>
<td>Augment as required</td>
<td>Augment as required</td>
<td>Augment as required</td>
<td>Augment as required</td>
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</tr>
<tr>
<td>3.13 Erosion and Sediment</td>
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</table>

A 2-step process: initial overview risk assessment, and erosion and sediment control.
<table>
<thead>
<tr>
<th>Section No. and Sub-Factor Title</th>
<th>Study Area</th>
<th>Background Data</th>
<th>Field Investigations</th>
<th>Determination of Significance</th>
<th>Assessment of Impacts</th>
<th>Env. Protection, Mitigation &amp;/or Compensation</th>
<th>Documentation</th>
</tr>
</thead>
<tbody>
<tr>
<td>As required Step 1 Erosion and Sediment Overview Risk Assessment</td>
<td>-</td>
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<td>-</td>
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</tr>
<tr>
<td>Step 2 Erosion and Sediment Control</td>
<td>Update</td>
<td>Update</td>
<td>Undertake</td>
<td>Update</td>
<td>Update</td>
<td>Determine</td>
<td>Prepare Erosion and Sediment Control Plan (if required) and/or contract documents</td>
</tr>
</tbody>
</table>
Table 1.4 Detail Design Steps and Optimal Timeline for Option 1
(Provincial EA Clearance Obtained in Preliminary Design and Federal EA Clearance Obtained in Detail Design)

<table>
<thead>
<tr>
<th>Steps</th>
<th>Optimal Timeline</th>
</tr>
</thead>
</table>
| **Step 1** | a) confirm content of factor-specific reports and/or complete any necessary collection of background data and environmental field investigations, and provide documentation to MTO; and  
    b) contact environmental agencies. | By 30% detail design completion, and before the Public Information Centre (PIC) |
| **Step 2** | a) hold PIC (presentation of preferred design);  
    b) provide written confirmation of the details/scope of project design and construction elements that are likely to require formal federal / provincial technical environmental approvals prior to tendering, or confirm that such approvals will not be required; and  
    c) co-ordinate/attend meetings between environmental agencies and MTO as necessary to get project endorsement. | Between 30% and 60% detail design completion |
| **Step 3** | a) submit draft TESR addendum or Design and Construction Report (DCR) (as applicable) for MTO review, which meets Class EA and Canadian Environmental Assessment Act (CEAA) requirements; and  
    b) submit draft federal / provincial applications for formal federal / provincial environmental approvals and municipal bylaw exemptions for MTO review. | By 60% detail design completion |
<table>
<thead>
<tr>
<th>Steps</th>
<th>Optimal Timeline</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Step 4</strong></td>
<td><strong>Between 60% and 90% detail design completion</strong></td>
</tr>
<tr>
<td>a) co-ordinate/attend meetings between environmental agencies and MTO as necessary to present project details;</td>
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</tr>
<tr>
<td>b) file MTO-accepted TESR addendum or DCR on the public record;</td>
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<tr>
<td>c) TESR addendum or DCR clearance; and</td>
<td></td>
</tr>
<tr>
<td>d) after TESR addendum or DCR clearance, submit MTO-accepted applications for formal federal / provincial environmental approvals and municipal bylaw exemptions.</td>
<td></td>
</tr>
<tr>
<td><strong>Step 5</strong></td>
<td><strong>By 90% detail design completion</strong></td>
</tr>
<tr>
<td>a) provide MTO with formal federal / provincial technical environmental approvals; and</td>
<td></td>
</tr>
<tr>
<td>b) provide environmental component of contract package prior to contract package review meeting.</td>
<td></td>
</tr>
<tr>
<td><strong>Step 6</strong></td>
<td><strong>By Executive Review</strong></td>
</tr>
<tr>
<td>a) provide Environmental Clearance Memorandum;</td>
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<tr>
<td>b) provide Environmental Synopsis; and</td>
<td></td>
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<tr>
<td>c) provide completed “Class EA Monitoring Questionnaire for Design Consultant Staff” (See Appendix 1 of ERD Section 8).</td>
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</tbody>
</table>
Field Investigations may need to collect field information in more than one season and/or in timing windows, and this reality should be considered in the project schedule.
Option 2 - Provincial and Federal EA Clearances Obtained in Detail Design

Option 2 - Preliminary Design

Table 2.1: Generic Requirements for Factor-Specific Environmental Assessments in Preliminary Design for Option 2

Table 2.2: Preliminary Design Steps and Optimal Timeline for Option 2

Figure 2.1: Timeline of Preliminary Design Key Milestones for Option 2
Table 2.1: Generic Requirements for Factor-Specific Environmental Assessments in Preliminary Design for Option 2

(Provincial and Federal EA Clearances Obtained in Detail Design)

<table>
<thead>
<tr>
<th>Section No. and Sub-Factor Title</th>
<th>Study Area</th>
<th>Background Data</th>
<th>Field Investigations</th>
<th>Determination of Significance</th>
<th>Assessment of Impacts</th>
<th>Env. Protection, Mitigation &amp;/or Compensation</th>
<th>Documentation</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.1 Fish and Fish Habitat</td>
<td>Determine</td>
<td>Collect</td>
<td>Undertake all steps except for fluvial geomorphic assessment</td>
<td>Undertake all steps</td>
<td>Determine the potential permanent and temporary impacts of the various highway design alternatives</td>
<td>Undertake environmental protection and mitigation for highway design alternatives</td>
<td>Prepare Field forms, photos, maps, Constraints and Opportunities map, the Existing Conditions and Impact Assessment Report, project notification form, and Compensation Strategy</td>
</tr>
<tr>
<td>3.2 Terrestrial Ecosystems</td>
<td>Determine</td>
<td>Collect</td>
<td>Undertake all steps</td>
<td>Undertake all steps</td>
<td>Determine the potential permanent and temporary impacts of the various highway design alternatives</td>
<td>Undertake for highway design alternatives</td>
<td>Prepare Terrestrial Ecosystems Report</td>
</tr>
<tr>
<td>Section No. and Sub-Factor Title</td>
<td>Study Area</td>
<td>Background Data</td>
<td>Field Investigations</td>
<td>Determination of Significance</td>
<td>Assessment of Impacts</td>
<td>Env. Protection, Mitigation &amp;/or Compensation</td>
<td>Documentation</td>
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</tr>
<tr>
<td>3.3 Groundwater</td>
<td>Determine</td>
<td>Collect</td>
<td>Undertake all steps</td>
<td>Undertake all steps</td>
<td>Determine the potential permanent and temporary impacts of the various highway design alternatives</td>
<td>Undertake for highway design alternatives</td>
<td>Prepare Groundwater Report</td>
</tr>
<tr>
<td>3.4 Noise</td>
<td>Determine</td>
<td>Collect</td>
<td>Undertake all steps</td>
<td>Undertake all steps</td>
<td>Determine the potential permanent and temporary impacts of the various highway design alternatives</td>
<td>Develop acoustical recommendations</td>
<td>Prepare Noise Report</td>
</tr>
<tr>
<td>3.5 Land Use</td>
<td>Determine</td>
<td>Collect</td>
<td>Undertake all steps</td>
<td>Undertake all steps</td>
<td>Determine the potential permanent and temporary impacts of the various highway design alternatives</td>
<td>Undertake for the various highway design alternatives</td>
<td>Prepare Land Use Factors Report</td>
</tr>
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</table>
### 3.6 Contaminated Property

A 6-step process is undertaken to identify past and present site activities and evaluate the existing environmental liabilities, and environmental risk of a property and manage the contamination.

<table>
<thead>
<tr>
<th>Step 1 Contamination Overview Study</th>
<th>Determine</th>
<th>Collect</th>
<th>Undertake</th>
<th>Undertake</th>
<th>-</th>
<th>-</th>
<th>Prepare Contamination Overview Study Report</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 2 Preliminary Site Screening</td>
<td>Determine</td>
<td>Collect</td>
<td>Undertake</td>
<td>Undertake</td>
<td>-</td>
<td>-</td>
<td>Prepare MTO Preliminary Site Screening form</td>
</tr>
<tr>
<td>Section No. and Sub-Factor Title</td>
<td>Study Area</td>
<td>Background Data</td>
<td>Field Investigations</td>
<td>Determination of Significance</td>
<td>Assessment of Impacts</td>
<td>Env. Protection, Mitigation &amp;/or Compensation</td>
<td>Documentation</td>
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<tr>
<td>As required Step 3 Phase One Environmental Site Assessment (ESA)</td>
<td>Determine</td>
<td>Collect</td>
<td>Undertake</td>
<td>Undertake</td>
<td>-</td>
<td>-</td>
<td>Prepare Phase One ESA Report</td>
</tr>
<tr>
<td>As required Step 4 Phase Two ESA / Step 5 Screening Level Risk Evaluation</td>
<td>Determine</td>
<td>-</td>
<td>Undertake</td>
<td>Undertake</td>
<td>Undertake</td>
<td>-</td>
<td>Prepare Phase Two ESA Report / Screening Level Risk Evaluation Report</td>
</tr>
<tr>
<td>As required Step 6 Site Management</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>Implement</td>
<td>Prepare Remedial Work Plan and Site Remediation Report</td>
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</table>
### Section No. and Sub-Factor Title

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<th>Assessment of Impacts</th>
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<th>Documentation</th>
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<tbody>
<tr>
<td><strong>3.7</strong></td>
<td>Determine</td>
<td>Collect</td>
<td>Undertake Field Survey</td>
<td>Undertake all steps</td>
<td>Determine the potential permanent and temporary impacts of the various highway design alternatives</td>
<td>Undertake for the various highway design alternatives</td>
</tr>
</tbody>
</table>

**3.8 Archaeology**

A 4-stage assessment (Stages 1 to 3), and mitigation, protection and monitoring (Stage 4) process is undertaken to identify, evaluate and manage sites.

<table>
<thead>
<tr>
<th>Determine</th>
<th>Collect for Stage 1</th>
<th>Undertake Stage 2 and Stage 3</th>
<th>Undertake all steps</th>
<th>Determine the potential permanent and temporary impacts of the various highway design alternatives</th>
<th>Undertake for the various highway design alternatives</th>
<th>Prepare report for Stages 1 to 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Section No. and Sub-Factor Title</td>
<td>Study Area</td>
<td>Background Data</td>
<td>Field Investigations</td>
<td>Determination of Significance</td>
<td>Assessment of Impacts</td>
<td>Env. Protection, Mitigation &amp;/or Compensation</td>
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</tr>
<tr>
<td>3.9 Landscape Composition</td>
<td>Determine</td>
<td>Collect</td>
<td>Undertake all steps</td>
<td>Undertake all steps</td>
<td>Undertake all steps</td>
<td>Integrate mitigation of other factor areas plus landscape mitigation into conceptual landscape plan</td>
</tr>
<tr>
<td>3.10 Air</td>
<td>Determine</td>
<td>Collect</td>
<td>Undertake all steps</td>
<td>Undertake all steps</td>
<td>Undertake all steps</td>
<td>Undertake for local and regional impacts</td>
</tr>
<tr>
<td>3.11 Surface Water</td>
<td>Determine</td>
<td>Collect</td>
<td>Undertake all steps</td>
<td>Undertake all steps</td>
<td>Determine the potential permanent and temporary impacts of the various highway design alternatives</td>
<td>Undertake for the various highway design alternatives</td>
</tr>
<tr>
<td>3.12 Designated Areas</td>
<td>-</td>
<td>Augment as required</td>
<td>Augment as required</td>
<td>Augment as required</td>
<td>Augment as required</td>
<td>Augment as required</td>
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<td>Section No. and Sub-Factor Title</td>
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<td>Field Investigations</td>
<td>Determination of Significance</td>
<td>Assessment of Impacts</td>
<td>Env. Protection, Mitigation &amp;/or Compensation</td>
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<tr>
<td>3.13 Erosion and Sediment</td>
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</table>

A 2-step process: initial overview risk assessment, and erosion and sediment control.

<table>
<thead>
<tr>
<th>As required Step 1 Erosion and Sediment Overview Risk Assessment</th>
<th>Determine</th>
<th>Collect</th>
<th>As required</th>
<th>Undertake</th>
<th>Determine</th>
<th>-</th>
<th>Prepare Erosion and Sediment Overview Risk Assessment</th>
</tr>
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<tbody>
<tr>
<td>Step 2 Erosion and Sediment Control</td>
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</table>


Table 2.2 Preliminary Design Steps and Optimal Timeline for Option 2
(Provincial and Federal EA Clearances Obtained in Detail Design)

<table>
<thead>
<tr>
<th>Steps</th>
<th>Optimal Timeline</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Step 1</strong> Same as Option 1 Step 1</td>
<td>a) complete background data collection and environmental field investigations;</td>
</tr>
<tr>
<td></td>
<td>b) provide draft existing environmental conditions report, including field data records;</td>
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<tr>
<td></td>
<td>c) provide details/scope of environmental constraints to design; and</td>
</tr>
<tr>
<td></td>
<td>d) contact environmental agencies.</td>
</tr>
<tr>
<td></td>
<td>By 30% preliminary design completion, and before the first Public Information Centre (PIC)</td>
</tr>
<tr>
<td><strong>Step 2</strong> Same as Option 1 Step 2 with additional sub-step (c)</td>
<td>I. hold first PIC (presentation of preliminary design alternatives);</td>
</tr>
<tr>
<td></td>
<td>a) prior to last PIC:</td>
</tr>
<tr>
<td></td>
<td>II. provide draft factor-specific technical reports;</td>
</tr>
<tr>
<td></td>
<td>III. provide written details/scope of project design and construction elements that are likely to require formal federal / provincial technical environmental approvals during the detail design process, or confirm that such approvals will not be required;</td>
</tr>
<tr>
<td></td>
<td>IV. co-ordinate/attend meetings between environmental agencies and MTO as necessary to get project endorsement;</td>
</tr>
<tr>
<td></td>
<td>V. submit draft environmental component of Preliminary Design Report (PDR) for MTO review, which includes information from final factor-specific environmental technical reports; and</td>
</tr>
<tr>
<td></td>
<td>b) submit the same information for applicable environmental factors for which factor-specific reports are not required.</td>
</tr>
<tr>
<td>Steps</td>
<td>Optimal Timeline</td>
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</tr>
<tr>
<td><strong>Step 3</strong></td>
<td>Between 60% and 90% preliminary design completion</td>
</tr>
<tr>
<td>a) hold last PIC (presentation of preferred preliminary design);</td>
<td></td>
</tr>
<tr>
<td>b) finalize factor-specific environmental technical reports; and</td>
<td></td>
</tr>
<tr>
<td>c) develop outline of approach for federal / provincial environmental approvals and municipal bylaw exemptions during detail design.</td>
<td></td>
</tr>
<tr>
<td><strong>Step 4</strong></td>
<td>By 90% preliminary design completion</td>
</tr>
<tr>
<td>a) submit MTO-accepted Preliminary Design Report (PDR); and</td>
<td></td>
</tr>
<tr>
<td>b) obtain agreement-in-principle from regulatory agencies that the conditions that will require formal environmental approvals will be acceptable.</td>
<td></td>
</tr>
</tbody>
</table>
Field Investigations may need to collect field information in more than one season and/or in timing windows, and this reality should be considered in the project schedule.
Option 2 - Detail Design

Table 2.3: Generic Requirements for Factor-Specific Environmental Assessments in Detail Design for Option 2

Table 2.4: Detail Design Steps and Optimal Timeline for Option 2

Figure 2.2: Timeline of Detail Design Key Milestones for Option 2
Table 2.3 Generic Requirements for Factor-Specific Environmental Assessments in Detail Design for Option 2

(Provincial and Federal EA Clearances Obtained in Detail Design)

<table>
<thead>
<tr>
<th>Section No. and Sub-Factor Title</th>
<th>Study Area</th>
<th>Background Data</th>
<th>Field Investigations</th>
<th>Determination of Significance</th>
<th>Assessment of Impacts</th>
<th>Env. Protection, Mitigation &amp;/or Compensation</th>
<th>Documentation</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.1 Fish and Fish Habitat</td>
<td>Refine</td>
<td>N/A</td>
<td>Undertake fluvial geomorphic assessment as required</td>
<td>N/A</td>
<td><strong>Update</strong> impacts from preferred highway design alternative</td>
<td><em>Update</em> environmental protection and mitigation for preferred design alternative and other potential impacts identified</td>
<td><em>Update</em> the Existing Conditions and Impact Assessment Report</td>
</tr>
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<td></td>
<td><strong>Determine</strong> potential impacts from alternative methods of construction and operation and maintenance</td>
<td><strong>Develop</strong> compensation plan</td>
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<td></td>
<td><strong>Undertake</strong> cumulative impact assessment, if applicable</td>
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<td><strong>Update/confirm</strong> HADD determination</td>
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</table>

*Refine the Existing Conditions and Impact Assessment Report and Letter of Intent.*

*Develop the Fisheries Compensation Plan and Application Package.*

*Compile project file for fish and fish habitat.*
<table>
<thead>
<tr>
<th>Section No. and Sub-Factor Title</th>
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<th>Env. Protection, Mitigation &amp;/or Compensation</th>
<th>Documentation</th>
</tr>
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<tbody>
<tr>
<td>3.2 Terrestrial Ecosystems</td>
<td>Refine</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>Update impacts from preferred highway design alternative</td>
<td>Update for preferred design alternative and other potential impacts identified</td>
<td>Update Terrestrial Ecosystems Report</td>
</tr>
<tr>
<td>Section No. and Sub-Factor Title</td>
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</tr>
<tr>
<td>3.3 Groundwater</td>
<td>Refine</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>Update impacts from preferred highway design alternative</td>
<td>Update for preferred design alternative and other potential impacts identified</td>
<td>Update Groundwater Report</td>
</tr>
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</table>

**Study Area:**
- Refine

**Background Data:**
- N/A

**Field Investigations:**
- N/A

**Determination of Significance:**
- N/A

**Assessment of Impacts:**
- Update impacts from preferred highway design alternative
- Determine potential impacts from alternative methods of construction and operation and maintenance
- Undertake cumulative impact assessment, if applicable

**Env. Protection, Mitigation &/or Compensation:**
- Update for preferred design alternative and other potential impacts identified

**Documentation:**
- Update Groundwater Report
<table>
<thead>
<tr>
<th>Section No. and Sub-Factor Title</th>
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</thead>
<tbody>
<tr>
<td>3.4 Noise</td>
<td>Refine</td>
<td>N/A</td>
<td>Update</td>
<td>N/A</td>
<td>Update acoustical analysis for preferred highway design</td>
<td>Update acoustical recommendations</td>
<td>Update Noise Report</td>
</tr>
<tr>
<td></td>
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<td></td>
<td>Undertake cumulative impact assessment, if applicable</td>
<td>Develop noise barrier design recommendations as required</td>
<td></td>
</tr>
<tr>
<td>3.5 Land Use</td>
<td>Refine</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>Update impacts from preferred highway design alternative on various land-uses; and</td>
<td>Update for preferred design alternative; and</td>
<td>Update Land Use Factors Report</td>
</tr>
<tr>
<td></td>
<td></td>
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<td></td>
<td></td>
<td>Undertake cumulative impact assessment, if applicable</td>
<td>Undertake for other potential impacts identified</td>
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</table>
A 6-step process is undertaken to identify past and present site activities and evaluate the existing environmental liabilities, and environmental risk of a property and manage the contamination.

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<th>Study Area</th>
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<tr>
<td>Contamination Overview Study</td>
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<td>Step 1</td>
<td>Determine</td>
<td>Collect</td>
<td>Undertake</td>
</tr>
<tr>
<td>Preliminary Site Screening</td>
<td>Step 2</td>
<td></td>
<td>Determine</td>
<td>Collect</td>
<td>Undertake</td>
</tr>
<tr>
<td>Section No. and Sub-Factor Title</td>
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<tr>
<td>As required Step 3 Phase One Environmental Site Assessment (ESA)</td>
<td>Determine</td>
<td>Collect</td>
<td>Undertake</td>
<td>Undertake</td>
<td>-</td>
</tr>
<tr>
<td>As required Step 4 Phase Two ESA / Step 5 Screening Level Risk Evaluation</td>
<td>Determine</td>
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<td>Undertake</td>
<td>Undertake</td>
<td>Undertake</td>
</tr>
<tr>
<td>As required Step 6 Site Management</td>
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</tr>
<tr>
<td>3.7 Built Heritage and Cultural Heritage Landscapes</td>
<td>Refine</td>
<td>Update</td>
<td>Update Field Survey Undertake Detailed Inventory</td>
<td>Update</td>
<td>Update potential impacts from preferred highway design alternative</td>
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</table>

A 4-stage assessment (Stages 1 to 3), and mitigation, protection and monitoring (Stage 4) process is undertaken to identify, evaluate and manage sites.
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<th>Env. Protection, Mitigation &amp;/or Compensation</th>
<th>Documentation</th>
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<tbody>
<tr>
<td>Refine</td>
<td>Update</td>
<td>Undertake Stage 4</td>
<td>Update</td>
<td>Update</td>
<td>Update potential impacts from preferred highway design alternative as per point</td>
<td>Update for preferred design alternative and other potential impacts identified</td>
<td>Update report for Stage 1-3</td>
</tr>
<tr>
<td>3.9 Landscape Composition</td>
<td>Refine</td>
<td>Update</td>
<td>N/A</td>
<td>N/A</td>
<td>Update</td>
<td>Update conceptual plan</td>
<td>Update Landscape Composition Report</td>
</tr>
<tr>
<td>To be developed</td>
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June 2013
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<th>Documentation</th>
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<tbody>
<tr>
<td>3.11 Surface Water</td>
<td>Refine</td>
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<td>N/A</td>
<td>N/A</td>
<td><strong>Update</strong> impacts from preferred highway design alternative</td>
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<td></td>
<td><strong>Determine</strong> potential impacts from: alternative methods of construction; and operation and maintenance</td>
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<td></td>
<td><strong>Undertake</strong> cumulative impact assessment, if applicable.</td>
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</tr>
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</table>

**Update** for preferred design alternative and other potential impacts identified

**Update** Drainage and Storm Water Management Report

| 3.12 Designated Areas           | -          | Augment as required | Augment as required | Augment as required | Augment as required | Augment as required | - |

|                               |            |                 |                      |                              |                      |                              |          |
### Section No. and Sub-Factor Title

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<th>Documentation</th>
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<tbody>
<tr>
<td><strong>3.13 Erosion and Sediment</strong></td>
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A 2-step process: initial overview risk assessment, and erosion and sediment control.

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<tr>
<th>As required</th>
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<tr>
<td><strong>Step 1</strong></td>
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</tr>
<tr>
<td>Erosion and Sediment Overview Risk Assessment</td>
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<table>
<thead>
<tr>
<th>Step 2</th>
<th>Update</th>
<th>Update</th>
<th>Undertake</th>
<th>Update</th>
<th>Update</th>
<th>Determine</th>
<th>Prepare</th>
</tr>
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<tbody>
<tr>
<td>Erosion and Sediment Control</td>
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<td></td>
<td>Erosion and Sediment Control Plan (if required) and/or contract documents</td>
</tr>
</tbody>
</table>
Table 2.4: Detail Design Steps and Optimal Timeline for Option 2

(Provincial and Federal EA Clearances Obtained in Detail Design)

<table>
<thead>
<tr>
<th>Steps</th>
<th>Optimal Timeline</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Step 1</strong>&lt;br&gt;Same Option 1&lt;br&gt;Step 1</td>
<td>By 30% detail design completion, and before the Public Information Centre (PIC)</td>
</tr>
<tr>
<td>a) confirm content of factor specific reports and/or complete any necessary collection of background data and environmental field investigations, and provide documentation to MTO; and&lt;br&gt;b) contact environmental agencies.</td>
<td></td>
</tr>
<tr>
<td><strong>Step 2</strong>&lt;br&gt;same as Option 1&lt;br&gt;Step 2 but with the PIC done in Step 3</td>
<td>Between 30% and 60% detail design completion</td>
</tr>
<tr>
<td>c) provide written confirmation of the details/scope of project design and construction elements that are likely to require formal federal / provincial technical environmental approvals prior to tendering, or confirm that such approvals will not be required; and&lt;br&gt;d) co-ordinate/attend meetings between environmental agencies and MTO as necessary to get project endorsement.</td>
<td></td>
</tr>
<tr>
<td><strong>Step 3</strong></td>
<td>By 60% detail design completion</td>
</tr>
<tr>
<td>a) hold PIC (presentation of preferred design);&lt;br&gt;b) submit draft TESR for MTO review, which meets Class EA and CEAA requirements (as applicable) and includes:&lt;br&gt;c) information from final factor-specific environmental technical reports; and&lt;br&gt;d) the same information for applicable environmental factors for which factor-specific reports are not required; and&lt;br&gt;e) submit draft federal / provincial applications for formal federal / provincial environmental approvals and municipal bylaw exemptions for MTO review.</td>
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</tbody>
</table>
## Steps

<table>
<thead>
<tr>
<th>Steps</th>
<th>Optimal Timeline</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Step 4</strong></td>
<td></td>
</tr>
<tr>
<td>a) file MTO-accepted TESR on the public record;</td>
<td>Between 60% and 90% detail design completion</td>
</tr>
<tr>
<td>b) TESR clearance;</td>
<td></td>
</tr>
<tr>
<td>c) after TESR clearance, submit MTO-accepted applications for formal federal / provincial environmental approvals and municipal bylaw exemptions; and</td>
<td></td>
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<tr>
<td>d) co-ordinate/attend meetings between environmental agencies and MTO as necessary to present project details.</td>
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<tr>
<td><strong>Step 5</strong></td>
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<tr>
<td>Same as Option 1 Step 5</td>
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</tr>
<tr>
<td>a) provide MTO with formal federal / provincial technical environmental approvals; and</td>
<td>By 90% detail design completion</td>
</tr>
<tr>
<td>b) provide environmental component of contract package prior to contract package review meeting.</td>
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<tr>
<td><strong>Step 6</strong></td>
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<tr>
<td>Same as Option 1 Step 6</td>
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<tr>
<td>a) provide Environmental Clearance Memorandum;</td>
<td>By Executive Review</td>
</tr>
<tr>
<td>b) provide Environmental Synopsis; and</td>
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<tr>
<td>c) provide completed &quot;Class EA Monitoring Questionnaire for Design Consultant Staff&quot; (See Appendix 1 in ERD Section 8).</td>
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</table>
Figure 2.2 Timeline of Detail Design Key Milestones for Option 2

NOTE: Indicates a different milestone from Option 1
Option 3 - Provincial and Federal EA's Undertaken and Clearances Obtained in Detail Design

Similar to Option 2 with Provincial and Federal EA clearances obtained in Detail Design; however, the majority of environmental assessments are undertaken in Detail Design.

Option 3 - Detail Design

Table 3.1: Generic Requirements for Factor-Specific Environmental Assessments in Detail Design for Option 3

Table 3.2: Detail Design Steps and Optimal Timeline for Option 3

Figure 3.1: Timeline of Detail Design Key Milestones for Option 3
Table 3.1: Generic Requirements for Factor-Specific Environmental Assessments in Detail Design for Option 3

(Provincial and Federal EA’s Undertaken and Clearances Obtained in Detail Design)

<table>
<thead>
<tr>
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<th>Documentation</th>
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</thead>
<tbody>
<tr>
<td>3.1 Fish and Fish Habitat</td>
<td>Determine</td>
<td>Collect</td>
<td>Undertake all steps including fluvial geomorphic assessment, as required</td>
<td>Undertake all steps</td>
<td>Determine the potential permanent and temporary impacts of the various highway design alternatives</td>
<td>Undertake environmental protection and mitigation for highway design alternatives and other potential impacts identified</td>
<td>Prepare field forms, photos, maps, Constraints and Opportunities map, the Existing Conditions and Impact Assessment Report, project notification forms</td>
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<td></td>
<td>Develop Compensation Plan</td>
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Field investigations include:
- Undertake all steps including fluvial geomorphic assessment, as required.
- Undertake all steps.
- Determine the potential permanent and temporary impacts of the various highway design alternatives.
- Determine the potential impacts from alternative methods of construction and operation and maintenance.
- Undertake cumulative impact assessment, if applicable.
- Determine likelihood of HADD.

Documentation includes:
- Prepare field forms, photos, maps, Constraints and Opportunities map, the Existing Conditions and Impact Assessment Report, project notification forms.
- Develop the Fisheries Compensation Plan and Application Package and Letter of Intent.
- Compile project file for fish and fish habitat.
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<th>Documentation</th>
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<tbody>
<tr>
<td>3.2 Terrestrial Ecosystems</td>
<td>Determine</td>
<td>Collect</td>
<td>Undertake all steps</td>
<td>Undertake all steps</td>
<td>Update impacts from preferred highway design alternative</td>
<td>Undertake for highway design alternatives and other potential impacts identified</td>
<td>Prepare Terrestrial Ecosystems Report</td>
</tr>
<tr>
<td>3.3 Groundwater</td>
<td>Determine</td>
<td>Collect</td>
<td>Undertake all steps</td>
<td>Undertake all steps</td>
<td>Update impacts from preferred highway design alternative</td>
<td>Undertake for highway design alternatives and other potential impacts identified</td>
<td>Prepare Groundwater Report</td>
</tr>
<tr>
<td>Section No. and Sub-Factor Title</td>
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<tr>
<td>3.4 Noise</td>
<td>Determine</td>
<td>Collect</td>
<td>Undertake all steps</td>
<td>Undertake</td>
<td>Determine the potential permanent and temporary impacts of the various highway design alternatives</td>
<td>Develop acoustical recommendations</td>
<td>Prepare Noise Report</td>
</tr>
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<td></td>
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<td></td>
<td></td>
<td>Undertake cumulative impact assessment, if applicable</td>
<td>Develop noise barrier design recommendations as required</td>
<td></td>
</tr>
</tbody>
</table>
### 3.5 Land Use

**Study Area:** Determine  
**Background Data:** Collect  
**Field Investigations:** Undertake all steps  
**Determination of Significance:** Undertake all steps  
**Assessment of Impacts:** Determine the potential permanent and temporary impacts of the various highway design alternatives  
**Env. Protection, Mitigation &/or Compensation:** Undertake for the various highway design alternatives  
**Documentation:** Prepare Land Use Factors Report

### 3.6 Contaminated Property

A 6-step process is undertaken to identify past and present site activities and evaluate the existing environmental liabilities, and environmental risk of a property and manage the contamination.

<p>| Step 1 Contamination Overview Study | - | - | - | - | - | - | - | - |</p>
<table>
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<th>Assessment of Impacts</th>
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<th>Documentation</th>
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<tr>
<td>Step 2 Preliminary Site Screening</td>
<td>Determine</td>
<td>Collect</td>
<td>Undertake</td>
<td>Undertake</td>
<td>-</td>
<td>-</td>
<td>Prepare MTO Preliminary Site Screening form</td>
</tr>
<tr>
<td>As required Step 3 Phase One Environmental Site Assessment (ESA)</td>
<td>Determine</td>
<td>Collect</td>
<td>Undertake</td>
<td>Undertake</td>
<td>-</td>
<td>-</td>
<td>Prepare Phase One ESA Report</td>
</tr>
<tr>
<td>As required Step 4 Phase Two ESA / Step 5 Screening Level Risk Evaluation</td>
<td>Determine</td>
<td>-</td>
<td>Undertake</td>
<td>Undertake</td>
<td>Undertake</td>
<td>-</td>
<td>Prepare Phase Two ESA report / Screening Level Risk Evaluation Report</td>
</tr>
<tr>
<td>Section No. and Sub-Factor Title</td>
<td>Study Area</td>
<td>Background Data</td>
<td>Field Investigations</td>
<td>Determination of Significance</td>
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<td>Documentation</td>
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<tr>
<td>As required Step 6 Site Management</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>Implement</td>
<td>Prepare Remedial Work Plan and Site Remediation Report</td>
</tr>
<tr>
<td>3.7 Built Heritage and Cultural Heritage Landscapes</td>
<td>Determine</td>
<td>Collect</td>
<td>Undertake Field Survey Detailed Inventory</td>
<td>Undertake all steps</td>
<td>Determine the potential permanent and temporary impacts of the various highway design alternatives</td>
<td>Undertake for the various highway design alternatives and other potential impacts identified</td>
<td>Prepare Cultural Heritage Assessment Report</td>
</tr>
<tr>
<td>3.8 Archaeology</td>
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A 4-stage assessment (Stages 1 to 3), and mitigation, protection and monitoring (Stage 4) process is undertaken to identify, evaluate and manage sites.
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<th>Documentation</th>
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<tbody>
<tr>
<td>Determine</td>
<td>Collect for Stage 1</td>
<td>Undertake Stage 2 and 3 Undertake Stage 4</td>
<td>Undertake all steps</td>
<td>Determine the potential permanent and temporary impacts of the various highway design alternatives Determine potential impacts from alternative methods of construction and operation and maintenance</td>
<td>Undertake for the various highway design alternatives and other potential impacts identified</td>
<td>Prepare report for Stage 1-3 Prepare Stage 4 Report</td>
<td></td>
</tr>
<tr>
<td>Section No. and Sub-Factor Title</td>
<td>Study Area</td>
<td>Background Data</td>
<td>Field Investigations</td>
<td>Determination of Significance</td>
<td>Assessment of Impacts</td>
<td>Env. Protection, Mitigation &amp;/or Compensation</td>
<td>Documentation</td>
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</tr>
<tr>
<td>3.9 Landscape Composition</td>
<td>Determine</td>
<td>Collect</td>
<td>Undertake all steps</td>
<td>Undertake all steps</td>
<td>Undertake all steps</td>
<td>Integrate mitigation of other factor areas plus landscape mitigation into conceptual</td>
<td>N/A</td>
</tr>
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<td></td>
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<td></td>
<td>Prepare landscape components of the contract package landscape plan</td>
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</tr>
<tr>
<td>3.10 Air</td>
<td>To be developed</td>
<td>To be developed</td>
<td>To be developed</td>
<td>To be developed</td>
<td>To be developed</td>
<td>To be developed</td>
<td>To be developed</td>
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<tr>
<td>Section No. and Sub-Factor Title</td>
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<td>Field Investigations</td>
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<td>Assessment of Impacts</td>
<td>Env. Protection, Mitigation &amp;/or Compensation</td>
<td>Documentation</td>
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</tr>
<tr>
<td><strong>3.11 Surface Water</strong></td>
<td>Determine</td>
<td>Collect</td>
<td>Undertake all steps</td>
<td>Undertake all steps</td>
<td>Determine the potential permanent and temporary impacts of the various highway design alternatives</td>
<td>Undertake for the various highway design alternatives and other potential impacts identified</td>
<td>Prepare the Existing Conditions Drainage Mosaic and an Existing Conditions Brief</td>
</tr>
<tr>
<td><strong>3.12 Designated Areas</strong></td>
<td>-</td>
<td>Augment as required</td>
<td>Augment as required</td>
<td>Augment as required</td>
<td>Augment as required</td>
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### 3.13 Erosion and Sediment

A 2-step process: initial overview risk assessment, and erosion and sediment control.

<table>
<thead>
<tr>
<th>Step 1</th>
<th>Erosion and Sediment Overview Risk Assessment</th>
<th>Study Area</th>
<th>Background Data</th>
<th>Field Investigations</th>
<th>Determination of Significance</th>
<th>Assessment of Impacts</th>
<th>Env. Protection, Mitigation &amp;/or Compensation</th>
<th>Documentation</th>
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</table>

<table>
<thead>
<tr>
<th>Step 2</th>
<th>Erosion and Sediment Control</th>
<th>Determine</th>
<th>Collect</th>
<th>Undertake</th>
<th>Undertake</th>
<th>Determine</th>
<th>Determine</th>
<th>Prepare Erosion and Sediment Control Plan (if required) and/or contract documents</th>
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<tbody>
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</table>
Table 3.2: Detail Design Steps and Optimal Timeline for Option 3
(Provincial and Federal EA’s Undertaken and Clearances Obtained in Detail Design)

<table>
<thead>
<tr>
<th>Steps</th>
<th>Optimal Timeline</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Step 1</strong>&lt;br&gt;Same as Option 1 Step 1 in Preliminary Design</td>
<td><strong>By 30% detail design completion, and before the Public Information Centre (PIC)</strong></td>
</tr>
<tr>
<td>a) complete background data collection and environmental field investigations;</td>
<td></td>
</tr>
<tr>
<td>b) provide draft existing environmental conditions report, including field data records;</td>
<td></td>
</tr>
<tr>
<td>c) provide details$scope of environmental constraints to design; and</td>
<td></td>
</tr>
<tr>
<td>d) contact environmental agencies.</td>
<td></td>
</tr>
<tr>
<td><strong>Step 2</strong>&lt;br&gt;Same as Option 1 Step 2 in Preliminary Design</td>
<td><strong>Between 30% and 60% detail design completion</strong></td>
</tr>
<tr>
<td>a) hold first PIC (presentation of design alternatives);</td>
<td></td>
</tr>
<tr>
<td>b) prior to last PIC:</td>
<td></td>
</tr>
<tr>
<td>c) provide draft factor-specific technical reports;</td>
<td></td>
</tr>
<tr>
<td>d) provide written details scope of project design and construction elements that are likely to require formal federal/provincial technical environmental approvals during the detail design process, or confirm that such approvals will not be required; and</td>
<td></td>
</tr>
<tr>
<td>e) co-ordinate/attend meetings between environmental agencies and MTO as necessary to get project endorsement.</td>
<td></td>
</tr>
<tr>
<td>Step 3</td>
<td>Same as Option 1 Step 3 Preliminary Design with a different sub-step (c)</td>
</tr>
<tr>
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<td>-----------------------------------------------------------------------</td>
</tr>
<tr>
<td></td>
<td>a) hold last PIC (presentation of preferred design);</td>
</tr>
<tr>
<td></td>
<td>b) submit draft TESR for MTO review, which meets Class EA requirements and includes:</td>
</tr>
<tr>
<td></td>
<td>c) information from final factor-specific environmental technical reports; and,</td>
</tr>
<tr>
<td></td>
<td>d) the same level of information for applicable environmental factors for which factor-specific reports are not required; and</td>
</tr>
<tr>
<td></td>
<td>e) submit draft federal / provincial applications for formal federal / provincial environmental approvals and municipal bylaw exemptions for MTO review.</td>
</tr>
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<td></td>
<td>By 60% detail design completion</td>
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<thead>
<tr>
<th>Step 4</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>a) co-ordinate/attend meetings between environmental agencies and MTO as necessary to present project details;</td>
</tr>
<tr>
<td></td>
<td>b) finalize factor-specific environmental technical reports;</td>
</tr>
<tr>
<td></td>
<td>c) file MTO-accepted TESR on the public record;</td>
</tr>
<tr>
<td></td>
<td>d) TESR clearance; and</td>
</tr>
<tr>
<td></td>
<td>e) after TESR clearance, submit MTO-accepted applications for formal federal / provincial environmental approvals and municipal bylaw exemptions.</td>
</tr>
<tr>
<td></td>
<td>Between 60% and 90% detail design completion</td>
</tr>
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</table>

<table>
<thead>
<tr>
<th>Step 5</th>
<th>Same as Option 1 Step 5 in Detail Design</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>a) provide MTO with formal federal / provincial technical environmental approvals; and</td>
</tr>
<tr>
<td></td>
<td>b) provide environmental component of contract package prior to contract package review meeting.</td>
</tr>
<tr>
<td></td>
<td>By 90% detail design completion</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Step 6</th>
<th>Same as Option 1 Step 6 in Detail Design</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>a) provide Environmental Clearance Memorandum;</td>
</tr>
<tr>
<td></td>
<td>b) provide Environmental Synopsis; and</td>
</tr>
<tr>
<td></td>
<td>c) provide completed &quot;Class EA Monitoring Questionnaire for Design Consultant Staff&quot; (See Appendix 1 in ERD Section 8).</td>
</tr>
<tr>
<td></td>
<td>By Executive Review</td>
</tr>
</tbody>
</table>
Field Investigations may need to collect field information in more than one season and/or in timing windows, and this reality should be considered in the project schedule.
Option 4 - Provincial EA Clearance Obtained and Federal Agreement-in-Principle Reached in Preliminary Design

Similar to Option 1, but an Agreement-in-Principle is reached for Federal EA in Preliminary Design. While the Agreement-in-Principle does not replace or guarantee clearance in Detail Design, it provides a level of certainty in Preliminary Design.

Option 4 - Preliminary Design

Table 4.1: Generic Requirements for Factor-Specific Environmental Assessments in Preliminary Design for Option 4

Table 4.2: Preliminary Design Steps and Optimal Timeline for Option 4

Figure 4.1: Timeline of Preliminary Design Key Milestones for Option 4
Table 4.1 Generic Requirements for Factor-Specific Environmental Assessments in Preliminary Design for Option 4

(Provincial EA Clearance Obtained and Federal Agreement-in-Principle Reached in Preliminary Design)

<table>
<thead>
<tr>
<th>Section No. and Sub-Factor Title</th>
<th>Study Area</th>
<th>Background Data</th>
<th>Field Investigations</th>
<th>Determination of Significance</th>
<th>Assessment of Impacts</th>
<th>Env. Protection, Mitigation &amp;/or Compensation</th>
<th>Documentation</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.1 Fish and Fish Habitat</td>
<td>Determine</td>
<td>Collect</td>
<td>Undertake all steps except for fluvial geomorphic assessment</td>
<td>Undertake all steps</td>
<td>Determine the potential permanent and temporary impacts of the various highway design alternatives&lt;br&gt;<strong>Determine</strong> potential impacts from alternative methods of construction and operation and maintenance&lt;br&gt;<strong>Undertake</strong> cumulative impact assessment, if applicable <strong>Determine</strong> likelihood of HADD</td>
<td>Undertake environmental protection and mitigation for highway design alternatives&lt;br&gt;<strong>Develop</strong> compensation strategy</td>
<td>Prepare field forms, photos and maps, Constraints and Opportunities map, the Existing Conditions and Impact Assessment Report, Project Notification Form and Compensation strategy</td>
</tr>
<tr>
<td>Section No. and Sub-Factor Title</td>
<td>Study Area</td>
<td>Background Data</td>
<td>Field Investigations</td>
<td>Determination of Significance</td>
<td>Assessment of Impacts</td>
<td>Env. Protection, Mitigation &amp;/or Compensation</td>
<td>Documentation</td>
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</tr>
<tr>
<td>3.2 Terrestrial Ecosystems</td>
<td>Determine</td>
<td>Collect</td>
<td>Undertake all steps</td>
<td>Undertake all steps</td>
<td>Update impacts from preferred highway design alternative</td>
<td>Undertake for highway design alternatives</td>
<td>Prepare Terrestrial Ecosystems Report</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Determine potential impacts from alternative methods of construction and operation and maintenance</td>
<td>Undertake cumulative impact assessment, if applicable</td>
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<tr>
<td>3.3 Groundwater</td>
<td>Determine</td>
<td>Collect</td>
<td>Undertake all steps</td>
<td>Undertake all steps</td>
<td>Update impacts from preferred highway design alternative</td>
<td>Undertake for highway design alternatives</td>
<td>Prepare Groundwater Report</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Determine potential impacts from alternative methods of construction and operation and maintenance</td>
<td>Undertake cumulative impact assessment, if applicable</td>
<td></td>
</tr>
<tr>
<td>Section No. and Sub-Factor Title</td>
<td>Study Area</td>
<td>Background Data</td>
<td>Field Investigations</td>
<td>Determination of Significance</td>
<td>Assessment of Impacts</td>
<td>Env. Protection, Mitigation &amp;/or Compensation</td>
<td>Documentation</td>
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<tr>
<td>3.4 Noise</td>
<td>Determine</td>
<td>Collect</td>
<td>Undertake all steps</td>
<td>Undertake all steps</td>
<td>Determine the potential permanent and temporary impacts of the various highway design alternatives</td>
<td>Undertake cumulative impact assessment, if applicable</td>
<td>Prepare Noise Report</td>
</tr>
<tr>
<td>3.5 Land Use</td>
<td>Determine</td>
<td>Collect</td>
<td>Undertake all steps</td>
<td>Undertake all steps</td>
<td>Determine the potential permanent and temporary impacts of the various highway design alternatives</td>
<td>Undertake cumulative impact assessment, if applicable</td>
<td>Prepare Land Use Factors Report</td>
</tr>
<tr>
<td>3.6 Contaminated Property</td>
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</table>
A 6-step process is undertaken to identify past and present site activities and evaluate the existing environmental liabilities, and environmental risk of a property and manage the contamination.

<table>
<thead>
<tr>
<th>Study Area</th>
<th>Background Data</th>
<th>Field Investigations</th>
<th>Determination of Significance</th>
<th>Assessment of Impacts</th>
<th>Env. Protection, Mitigation &amp;/or Compensation</th>
<th>Documentation</th>
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<tbody>
<tr>
<td>As required</td>
<td>Determine</td>
<td>Collect</td>
<td>Undertake</td>
<td>Undertake</td>
<td></td>
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<tr>
<td>Step 1</td>
<td></td>
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<td></td>
<td></td>
<td>Prepare</td>
</tr>
<tr>
<td>Contamination Overview Study</td>
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<td>Contamination Overview Study Report</td>
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<tr>
<td>As required</td>
<td>Determine</td>
<td>Collect</td>
<td>Undertake</td>
<td>Undertake</td>
<td></td>
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</tr>
<tr>
<td>Step 2</td>
<td></td>
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<td>Prepare</td>
</tr>
<tr>
<td>Preliminary Site Screening</td>
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<td>Preliminary Site Screening form</td>
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<td>Determine</td>
<td>Collect</td>
<td>Undertake</td>
<td>Undertake</td>
<td></td>
<td></td>
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<tr>
<td>Step 3</td>
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<td></td>
<td>Prepare</td>
</tr>
<tr>
<td>Phase One Environmental Site Assessment</td>
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<td>Phase One ESA Report</td>
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### Section No. and Sub-Factor Title

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<th>Assessment of Impacts</th>
<th>Env. Protection, Mitigation &amp;/or Compensation</th>
<th>Documentation</th>
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</thead>
<tbody>
<tr>
<td><strong>As required Step 4 Phase Two ESA / Step 5 Screening Level Risk Evaluation</strong></td>
<td>Determine</td>
<td>-</td>
<td>Undertake</td>
<td>Undertake</td>
<td>Undertake</td>
<td>-</td>
</tr>
<tr>
<td><strong>As required Step 6 Site Management</strong></td>
<td>-</td>
<td>-</td>
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<td>-</td>
<td>-</td>
<td>Implement</td>
</tr>
<tr>
<td><strong>3.7 Built Heritage and Cultural Heritage Landscapes</strong></td>
<td>Determine</td>
<td>Collect</td>
<td>Undertake Field Survey</td>
<td>Undertake all steps</td>
<td>Determine the potential permanent and temporary impacts of the various highway design alternatives</td>
<td>Undertake for the various highway design alternatives</td>
</tr>
<tr>
<td><strong>3.8 Archaeology</strong></td>
<td>-</td>
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A 4-stage assessment (Stages 1 to 3), and mitigation, protection and monitoring (Stage 4) process is undertaken to identify, evaluate and manage sites.
<table>
<thead>
<tr>
<th>Section No. and Sub-Factor Title</th>
<th>Study Area</th>
<th>Background Data</th>
<th>Field Investigations</th>
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<th>Assessment of Impacts</th>
<th>Env. Protection, Mitigation &amp;/or Compensation</th>
<th>Documentation</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.9 Landscape Composition</td>
<td>Determine</td>
<td>Collect for Stage 1</td>
<td>Undertake Stage 2 and 3</td>
<td>Undertake all steps</td>
<td>Determine the potential permanent and temporary impacts of the various highway design alternatives</td>
<td>Undertake for the various highway design alternatives</td>
<td>Prepare report for Stages 1-3</td>
</tr>
<tr>
<td>3.10 Air</td>
<td>To be developed</td>
<td>To be developed</td>
<td>To be developed</td>
<td>To be developed</td>
<td>To be developed</td>
<td>To be developed</td>
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<table>
<thead>
<tr>
<th>Section No. and Sub-Factor Title</th>
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<th>Background Data</th>
<th>Field Investigations</th>
<th>Determination of Significance</th>
<th>Assessment of Impacts</th>
<th>Env. Protection, Mitigation &amp;/or Compensation</th>
<th>Documentation</th>
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<tbody>
<tr>
<td><strong>3.11 Surface Water</strong></td>
<td>Determine</td>
<td>Collect</td>
<td>Undertake all steps</td>
<td>Undertake all steps</td>
<td>Determine the potential permanent and temporary impacts of the various highway design alternatives</td>
<td>Undertake for the various highway design alternatives</td>
<td>Prepare the Existing Conditions Drainage Mosaic and an Existing Conditions Brief</td>
</tr>
<tr>
<td><strong>3.12 Designated Areas</strong></td>
<td>-</td>
<td>Augment as required</td>
<td>Augment as required</td>
<td>Augment as required</td>
<td>Augment as required</td>
<td>Augment as required</td>
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</tr>
<tr>
<td><strong>3.13 Erosion and Sediment</strong></td>
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A 2-step process: initial overview risk assessment, and erosion and sediment control.
### Study Area Background Data Field Investigations Determination of Significance Assessment of Impacts Env. Protection, Mitigation &/or Compensation Documentation

<table>
<thead>
<tr>
<th>Section No. and Sub-Factor Title</th>
<th>Study Area</th>
<th>Background Data</th>
<th>Field Investigations</th>
<th>Determination of Significance</th>
<th>Assessment of Impacts</th>
<th>Env. Protection, Mitigation &amp;/or Compensation</th>
<th>Documentation</th>
</tr>
</thead>
<tbody>
<tr>
<td>As required</td>
<td>Determine</td>
<td>Collect</td>
<td>As required</td>
<td>Undertake</td>
<td>Determine</td>
<td>-</td>
<td>Prepare Erosion and Sediment Overview Risk Assessment</td>
</tr>
<tr>
<td>Step 1 Erosion and Sediment Overview Risk Assessment</td>
<td></td>
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<tr>
<td>As required</td>
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</tr>
<tr>
<td>Step 2 Erosion and Sediment Control</td>
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</table>
### Table 4.2: Preliminary Design Steps and Optimal Timeline for Option 4

*(Provincial EA Clearance Obtained and Federal Agreement-in-Principle Reached in Preliminary Design)*

<table>
<thead>
<tr>
<th>Steps</th>
<th>Optimal Timeline</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Step 1</strong>&lt;br&gt;Same as Option 1&lt;br&gt;Step 1</td>
<td>By 30% preliminary design completion, and before the first Public Information Centre (PIC)</td>
</tr>
<tr>
<td>a) complete background data collection and environmental field investigations;</td>
<td></td>
</tr>
<tr>
<td>• provide draft existing environmental conditions report, including field data records;</td>
<td></td>
</tr>
<tr>
<td>• provide details/scope of environmental constraints to design; and</td>
<td></td>
</tr>
<tr>
<td>• contact environmental agencies.</td>
<td></td>
</tr>
<tr>
<td><strong>Step 2</strong>&lt;br&gt;Same as Option 1&lt;br&gt;Step 2</td>
<td>Between 30% and 60% preliminary design completion</td>
</tr>
<tr>
<td>b) hold first PIC (presentation of preliminary design alternatives);</td>
<td></td>
</tr>
<tr>
<td>• prior to last PIC:</td>
<td></td>
</tr>
<tr>
<td>• provide draft factor-specific technical reports, provide written details/scope of project design and construction elements that are likely to require formal federal / provincial technical environmental approvals during the detail design process, or confirm that such approvals will not be required; and</td>
<td></td>
</tr>
<tr>
<td>• co-ordinate/attend meetings between environmental agencies and MTO as necessary to get project endorsement.</td>
<td></td>
</tr>
<tr>
<td>Step 3</td>
<td>Same as Option 1 Step 3 except the TESR must meet both the Class EA and CEAA requirements</td>
</tr>
<tr>
<td>--------</td>
<td>------------------------------------------------------------------</td>
</tr>
<tr>
<td></td>
<td>c) hold last PIC (presentation of preferred preliminary design);</td>
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<tr>
<td></td>
<td>- submit draft Transportation Environmental Study Report (TESR) for MTO review, which meets Class Environmental Assessment (EA) and Canadian Environmental Assessment Act (CEAA) requirements and includes:</td>
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<tr>
<td></td>
<td>- information from final factor-specific environmental technical reports; and,</td>
</tr>
<tr>
<td></td>
<td>- the same level of information for applicable environmental factors for which factor-specific reports are not required;</td>
</tr>
<tr>
<td></td>
<td>By 60% preliminary design completion</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Step 4</th>
<th>d) finalize factor-specific environmental technical reports;</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>- file MTO-accepted TESR on the public record;</td>
</tr>
<tr>
<td></td>
<td>- obtain agreement-in-principle from regulatory agencies that the conditions that will require formal environmental approvals will be acceptable; and</td>
</tr>
<tr>
<td></td>
<td>- TESR clearance.</td>
</tr>
<tr>
<td></td>
<td>Between 60% and 90% preliminary design completion</td>
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</tbody>
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<table>
<thead>
<tr>
<th>Step 5</th>
<th>Same as Option 1 Step 5</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>e) provide completed &quot;Monitoring Questionnaire for Design Consultant Staff&quot; (See Appendix 1 of ERD Section 8).</td>
</tr>
<tr>
<td></td>
<td>By 90% preliminary design completion</td>
</tr>
</tbody>
</table>
Field Investigations may need to collect field information in more than one season and/or in timing windows, and this reality should be considered in the project schedule.
Option 4 - Detail Design

Note: Federal EA clearance is obtained in Detail Design

Table 4.3: Generic Requirements for Factor-Specific Environmental Assessments in Detail Design for Option 4

Table 4.4: Detail Design Steps and Optimal Timeline for Option 4

Figure 4.2: Timeline of Detail Design Key Milestones for Option 4
Table 4.3: Generic Requirements for Factor-Specific Environmental Assessments in Detail Design for Option 4
(Provincial EA Clearance Obtained and Federal Agreement-in-Principle Reached in Preliminary Design)

<table>
<thead>
<tr>
<th>Section No. and Sub-Factor Title</th>
<th>Study Area</th>
<th>Background Data</th>
<th>Field Investigations</th>
<th>Determination of Significance</th>
<th>Assessment of Impacts</th>
<th>Env. Protection, Mitigation &amp;/or Compensation</th>
<th>Documentation</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.1 Fish and Fish Habitat</td>
<td>Refine</td>
<td>N/A</td>
<td>Undertake fluvial geomorphic assessment, as required</td>
<td>N/A</td>
<td>Update</td>
<td>Update for preferred design alternative and other potential impacts identified</td>
<td>Update the Existing Conditions and Impact Assessment Report</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Develop the Fisheries Compensation Plan and Application Package and Letter of Intent</td>
<td>Develop the Fisheries Compensation Plan and Application Package and Letter of Intent</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Compile project file for fish and fish habitat</td>
<td>Compile project file for fish and fish habitat</td>
</tr>
<tr>
<td>3.2 Terrestrial Ecosystems</td>
<td>Refine</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>Update</td>
<td>Update for preferred design alternative and other potential impacts identified</td>
<td>Update Terrestrial Ecosystems Report</td>
</tr>
<tr>
<td>Section No. and Sub-Factor Title</td>
<td>Study Area</td>
<td>Background Data</td>
<td>Field Investigations</td>
<td>Determination of Significance</td>
<td>Assessment of Impacts</td>
<td>Env. Protection, Mitigation &amp;/or Compensation</td>
<td>Documentation</td>
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<td>---------------------------------------------</td>
<td>--------------</td>
</tr>
<tr>
<td>3.3 Groundwater</td>
<td>Refine</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>Update</td>
<td>Update for preferred design alternative and other potential impacts identified</td>
<td>Update Groundwater Report</td>
</tr>
<tr>
<td>3.4 Noise</td>
<td>Refine</td>
<td>N/A</td>
<td>Update</td>
<td>N/A</td>
<td>Update</td>
<td>Update acoustical recommendations</td>
<td>Update Noise Report</td>
</tr>
<tr>
<td>3.5 Land Use</td>
<td>Refine</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>Update</td>
<td>Update for preferred design alternative</td>
<td>Update Land Use Factors Report</td>
</tr>
<tr>
<td>3.6 Contaminated Property</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>
A 6-step process is undertaken to identify past and present site activities and evaluate the existing environmental liabilities, and environmental risk of a property and manage the contamination.

<table>
<thead>
<tr>
<th>Step 1</th>
<th>Contamination Overview Study</th>
</tr>
</thead>
<tbody>
<tr>
<td>Study Area</td>
<td>-</td>
</tr>
<tr>
<td>Background Data</td>
<td>-</td>
</tr>
<tr>
<td>Field Investigations</td>
<td>-</td>
</tr>
<tr>
<td>Determination of Significance</td>
<td>-</td>
</tr>
<tr>
<td>Assessment of Impacts</td>
<td>-</td>
</tr>
<tr>
<td>Environ. Protection, Mitigation &amp;/or Compensation</td>
<td>-</td>
</tr>
<tr>
<td>Documentation</td>
<td>-</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Step 2</th>
<th>Preliminary Site Screening</th>
</tr>
</thead>
<tbody>
<tr>
<td>As required</td>
<td>Determine, Collect, Undertake, Undertake</td>
</tr>
<tr>
<td>Study Area</td>
<td>-</td>
</tr>
<tr>
<td>Field Investigations</td>
<td>-</td>
</tr>
<tr>
<td>Determination of Significance</td>
<td>-</td>
</tr>
<tr>
<td>Assessment of Impacts</td>
<td>-</td>
</tr>
<tr>
<td>Environ. Protection, Mitigation &amp;/or Compensation</td>
<td>-</td>
</tr>
<tr>
<td>Documentation</td>
<td>Prepare MTO Preliminary Site Screening form</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Step 3</th>
<th>Phase One Environmental Site Assessment (ESA)</th>
</tr>
</thead>
<tbody>
<tr>
<td>As required</td>
<td>Determine, Collect, Undertake, Undertake</td>
</tr>
<tr>
<td>Study Area</td>
<td>-</td>
</tr>
<tr>
<td>Field Investigations</td>
<td>-</td>
</tr>
<tr>
<td>Determination of Significance</td>
<td>-</td>
</tr>
<tr>
<td>Assessment of Impacts</td>
<td>-</td>
</tr>
<tr>
<td>Environ. Protection, Mitigation &amp;/or Compensation</td>
<td>-</td>
</tr>
<tr>
<td>Documentation</td>
<td>Prepare Phase One ESA Report</td>
</tr>
<tr>
<td>Section No. and Sub-Factor Title</td>
<td>Study Area</td>
</tr>
<tr>
<td>--------------------------------</td>
<td>------------</td>
</tr>
<tr>
<td>As required Step 4 Phase Two ESA / Step 5 Screening Level Risk Evaluation</td>
<td>Determine</td>
</tr>
<tr>
<td>As required Step 6 Site Management</td>
<td>-</td>
</tr>
<tr>
<td>3.7 Built Heritage and Cultural Heritage Landscapes</td>
<td>Refine</td>
</tr>
<tr>
<td>3.8 Archaeology</td>
<td></td>
</tr>
</tbody>
</table>
A 4-stage assessment (Stages 1 to 3), and mitigation, protection and monitoring (Stage 4) process is undertaken to identify, evaluate and manage sites.

<table>
<thead>
<tr>
<th>Section No. and Sub-Factor Title</th>
<th>Study Area</th>
<th>Background Data</th>
<th>Field Investigations</th>
<th>Determination of Significance</th>
<th>Assessment of Impacts</th>
<th>Env. Protection, Mitigation &amp;/or Compensation</th>
<th>Documentation</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.9 Landscape Composition</td>
<td>Refine</td>
<td>Update</td>
<td>Undertake Stage 4</td>
<td>Update</td>
<td>Update</td>
<td>Update for preferred design alternative and other potential impacts identified</td>
<td>Update report for Stage 1-3</td>
</tr>
<tr>
<td>3.10 Air</td>
<td>To be developed</td>
<td>To be developed</td>
<td>To be developed</td>
<td>To be developed</td>
<td>To be developed</td>
<td>To be developed</td>
<td>To be developed</td>
</tr>
<tr>
<td>Section No. and Sub-Factor Title</td>
<td>Study Area</td>
<td>Background Data</td>
<td>Field Investigations</td>
<td>Determination of Significance</td>
<td>Assessment of Impacts</td>
<td>Env. Protection, Mitigation &amp;/or Compensation</td>
<td>Documentation</td>
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<td>--------------</td>
</tr>
<tr>
<td>3.11 Surface Water</td>
<td>Refine</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>Update</td>
<td>Update for preferred design alternative and other potential impacts identified</td>
<td>Update Drainage and Storm Water Management Report</td>
</tr>
<tr>
<td>3.12 Designated Areas</td>
<td>-</td>
<td>Augment as required</td>
<td>Augment as required</td>
<td>Augment as required</td>
<td>Augment as required</td>
<td>Augment as required</td>
<td>-</td>
</tr>
<tr>
<td>3.13 Erosion and Sediment</td>
<td>-</td>
<td>-</td>
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</tbody>
</table>

A 2-step process: initial overview risk assessment, and erosion and sediment control.

**Step 1 Erosion and Sediment Overview Risk Assessment**
- - - - - - - - -
### Section No. and Sub-Factor Title

<table>
<thead>
<tr>
<th>Study Area</th>
<th>Background Data</th>
<th>Field Investigations</th>
<th>Determination of Significance</th>
<th>Assessment of Impacts</th>
<th>Env. Protection, Mitigation &amp;/or Compensation</th>
<th>Documentation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Step 2</strong></td>
<td><strong>Erosion and Sediment Control</strong></td>
<td>Determine</td>
<td>Collect</td>
<td>Undertake</td>
<td>Undertake</td>
<td>Determine</td>
</tr>
</tbody>
</table>

**Prepare the Erosion and Sediment Control Plan (if required) and/or contract documents**
### Table 4.4: Detail Design Steps and Optimal Timeline for Option 4

**(Provincial EA Clearance Obtained and Federal Agreement-in-Principle Reached in Preliminary Design)**

<table>
<thead>
<tr>
<th>Steps</th>
<th>Optimal Timeline</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Step 1</strong></td>
<td></td>
</tr>
<tr>
<td>Same as Option 1 Step 1</td>
<td></td>
</tr>
<tr>
<td>a) confirm content of factor-specific reports and/or complete any necessary collection of background data and environmental field investigations, and provide documentation to MTO; and</td>
<td>By 30% detail design completion, and before the Public Information Centre (PIC)</td>
</tr>
<tr>
<td>b) contact environmental agencies.</td>
<td></td>
</tr>
<tr>
<td><strong>Step 2</strong></td>
<td></td>
</tr>
<tr>
<td>Same as Option 1 Step 2</td>
<td></td>
</tr>
<tr>
<td>a) hold PIC (presentation of preferred design);</td>
<td>Between 30% and 60% detail design completion</td>
</tr>
<tr>
<td>b) provide written confirmation of the details/scope of project design and construction elements that are likely to require formal federal / provincial technical environmental approvals prior to tendering, or confirm that such approvals will not be required; and</td>
<td></td>
</tr>
<tr>
<td>c) co-ordinate/attend meetings between environmental agencies and MTO as necessary to get project endorsement.</td>
<td></td>
</tr>
<tr>
<td><strong>Step 3</strong></td>
<td></td>
</tr>
<tr>
<td>Same as Option 1 Step 3</td>
<td></td>
</tr>
<tr>
<td>except draft TESR addendum or DCR (as applicable) needs to meet Class EA only</td>
<td>By 60% detail design completion</td>
</tr>
<tr>
<td>a) submit draft TESR addendum or Design and Construction Report (DCR) (as applicable) for MTO review, which meets Class EA requirements; and</td>
<td></td>
</tr>
<tr>
<td>b) submit draft federal / provincial applications for formal federal / provincial environmental approvals and municipal bylaw exemptions for MTO review.</td>
<td></td>
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</table>
### Step 4

| a) | file MTO-accepted TESR addendum or DCR on the public record; |
| b) | TESR addendum or DCR clearance; |
| c) | after TESR addendum or DCR clearance, submit MTO-accepted applications for formal federal / provincial environmental approvals and municipal bylaw exemptions; and, |
| d) | co-ordinate/attend meetings between environmental agencies and MTO as necessary to present project details. |

- **Between 60% and 90% detail design completion**

### Step 5

**Same as Option 1 Step 5**

| a) | provide MTO with formal federal / provincial technical environmental approvals; and |
| b) | provide environmental component of contract package prior to contract package review meeting. |

- **By 90% detail design completion**

### Step 6

**Same as Option 1 Step 6**

| a) | provide Environmental Clearance Memorandum; |
| b) | provide Environmental Synopsis; and |
| c) | provide completed "Class EA Monitoring Questionnaire for Design Consultant Staff" (See Appendix 1 of ERD Section 8). |

- **By Executive Review**
Field Investigations may need to collect field information in more than one season and/or in timing windows, and this reality should be considered in the project schedule.
Section 3.1: Fish and Fish Habitat

This section of the *Environmental Reference for Highway Design* (ERD) provides direction on the process and procedures for the assessment, mitigation and/or compensation of fish and fish habitat during preliminary and detail design transportation projects, and retainer assignments.

All work shall be conducted in compliance with the process and procedures outlined in the *MTO/DFO/OMNR Protocol for Protecting Fish and Fish Habitat on Provincial Transportation Undertakings – Version 2, 2013* and the most recent version of the *Environmental Guide for Fish and Fish Habitat*. The *Environmental Guide for Fish and Fish Habitat* (the Fish Guide) provides a broader review of fish and fish habitat considerations in relation to highway projects and addresses policy, background data collection, field investigations, sensitivity of fish and fish habitat, impact assessment and mitigation, compensation, monitoring, documentation and qualifications in more detail. In particular, the Guide provides detailed direction regarding specific environmental protection/mitigation and compensation measures and related review processes.

Definitions of environmental terms and acronyms are provided in MTO’s *Environmental Glossary*.

### 3.1.1 Study Area

For the purposes of investigating the potential impacts of a transportation project on fish and fish habitat, the study area must encompass all waterbodies (e.g. streams, ponds, lakes) that may directly, or indirectly support fish and fish habitat that could potentially be affected by the project; including those within the project limits and interconnected waterbodies and adjacent portions or reaches of waterbodies as detailed in Section 3 of the Fish Guide.

### 3.1.2 Background and Data Collection

Relevant existing background fish and fish habitat information for each waterbody shall be obtained from all relevant sources as detailed in Section 3 of the Fish Guide.

### 3.1.3 Field Investigations

#### 3.1.3.1 Area of Investigation

For the purpose of field investigations, the area of investigation is divided into the following two (2) zones.

a) the Zone of Detailed Assessment,

b) the Zone of General Assessment.
Detailed description of these zones is provided in Section 4 of the Fish Guide.

3.1.3.2 Timing Considerations for Field Investigations

The Fisheries Assessment Specialist shall conduct field investigations of fish and fish habitat in the spring and summer. Field investigations shall also be conducted in the fall where there is a potential for fall spawning fish, as detailed in Section 4 of the Fish Guide.

3.1.3.3 Fish Habitat Assessment

The Fisheries Assessment Specialist shall document the characteristics of the fish habitat to ensure that the potential impacts of a project can be comprehensively identified and addressed. This information will be required to determine the level of risk a project poses fish and fish habitat. Section 4 of the Fish Guide provides details for the Fish Habitat Assessment requirements for:

a) the zone of detailed assessment,
b) the zone of general assessment and
c) areas outside of the area of investigation

3.1.3.4 Fish Community Inventory

The Fisheries Assessment Specialist shall conduct fish community inventories where fish community data are incomplete, dated (i.e. more than five years old) or non-existent for a project that could potentially impact the fish community. In general, most investigations include fish community inventories unless the fish community is well documented. Section 4 of the Fish Guide provides details for the Fish Community Inventory requirements for:

a) the zone of detailed assessment,
b) the zone of general assessment and
c) areas outside of the area of investigation

3.1.4 Impact Assessment and Mitigation

3.1.4.1 Assessing Potential Impacts

The Fisheries Assessment Specialist shall use the Pathways of Effects (PoE) diagrams for assessing potential impacts of a project. The PoE’s are the primary reference tool for determining and communicating potential impacts of a project. The PoE diagrams enable Fisheries Assessment Specialists to have a common tool to use in the Aquatic Effects Assessment, as detailed in Section 5 of the Fish Guide.
3.1.4.2 Mitigation

In developing mitigation, the Fisheries Assessment Specialist must consider the full range of potential impacts on fish, fish movement, and fish habitat as a result of the project. The Fisheries Assessment Specialist shall use DFO’s Risk Management Framework (RMF) for the mitigation approach, using re-location and re-design type measures for avoiding and minimizing impacts of a project. The process of developing mitigation measures is detailed in Section 5 of the Fish Guide.

3.1.4.3 Determining the Scale of Negative Residual Effects

Often, mitigation will not completely alleviate all impacts. The severity of the remaining impacts or the negative residual effects must then be considered using the Attributes and Scale for the Assessment of Negative Residual Effects and considered in the overall Risk Assessment as described in Section 5 of the Fish Guide.

As well, the severity of negative residual effects is an important consideration in developing the appropriate level of compensation, where required.

3.1.5 Analysis of Fish and Fish Habitat Sensitivity

OMNR has a significant role in providing MTO their interpretation of fish and fish habitat sensitivity. The Fisheries Assessment Specialist shall compile OMNR’s information as well as background information and the results of the current field inventories in order to provide a comprehensive description of existing fish and fish habitat conditions. The Fisheries Assessment Specialist shall use all information available in the analysis of fish and fish habitat sensitivity in an iterative manner in consultation with OMNR, as detailed in Section 6 of the Fish Guide.

3.1.6 Categorization of Project Risk

The potential for, or risk that a project will result in a HADD of fish habitat is determined after the application of all possible mitigation measures is considered and based on negative residual effects. Ultimately, the scale of negative residual effects is combined with sensitivity of fish and fish habitat in a risk assessment process to determine the rationale of risk of a project as detailed in Section 7 of the Fish Guide.

Again using DFO’s RMF, the Fisheries Assessment Specialist shall determine the risk a highway project poses to fish and fish habitat by undertaking:

- an Aquatic Effects Assessment; and

- where there are negative residual effects (i.e. impact(s) that cannot be mitigated) a Risk Assessment.
3.1.7 Compensation

The development of a compensation plan is generally a staged process developed cooperatively with DFO as described in Section 8 of the Fish Guide.

3.1.8 Monitoring

MTO and DFO have specific expectations regarding monitoring of construction projects. This includes monitoring for projects with or without Fisheries Act Authorizations and the duty to report spills during construction. In the case of projects with Fisheries Act Authorizations, monitoring must be performed by a qualified Fisheries Contracts Specialist as per MTO Standard Special Provision 199F58, FISHERIES ACT AUTHORIZATION COMPLIANCE - OVERSIGHT, MONITORING, AND DOCUMENTATION. For projects without a Fisheries Act Authorization, but where there is in-water work or potential for impacts to fish and fish habitat, it may be deemed appropriate by MTO that monitoring be carried out as per MTO Non-standard Special Provision ENVR0002. Details of monitoring requirements are outlined in Section 9 of the Fish Guide.

3.1.9 Documentation

MTO projects have specific reporting and documentation requirements. Information regarding MTO’s expectations concerning documentation in support of the Environmental Assessment process and the Protocol process are detailed in Section 10 of the Fish Guide.

3.1.10 Qualifications

The MTO/DFO/MNR Fisheries Protocol requires at a minimum:

- Protocol Steps 1 – 4:
  - The initial steps may be conducted by any person with sufficient knowledge of the issues to be reviewed and an understanding of the intent of the criteria. This person need not be a Fisheries Assessment Specialist registered on MTO’s Consultant Registry, unless otherwise specified by MTO.

- Protocol Steps 5 – 10:
  - Where a Fisheries Assessment is required the consultant shall be a qualified Fisheries Assessment Specialist registered on MTO’s Consultant Registry
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Environmental Reference for Highway Design

Fisheries Assessment Specialist

The Fisheries Assessment Specialist shall be hired by MTO to complete the required field investigations and assessments in order to meet the requirements of Steps 5 through 10 in Annex 2 of the Protocol.

As a minimum the Fisheries Assessment Specialist shall possess the following;

Education:

- Graduation with a degree or diploma from a recognized university or college in a natural or physical science with specialization in fisheries biology, aquatic biology, ecology, or another related discipline, and
- Completion of MTO Fisheries Protocol Training.

Experience:

- Demonstrated related work experience,
- Demonstrated experience in conducting fisheries inventories and habitat assessments,
- Demonstrated experience in evaluating the effects of development and/or other land use activities on fish habitat,
- Demonstrated experience in planning and designing fish and fish habitat mitigation measures,
- Demonstrated experience and/or knowledge of the application of DFO’s Risk Management Framework and the Fisheries Act Authorization process, gained through project experience and/or successful completion of a supplementary case study exercise administered by MTO,
- Demonstrated knowledge of federal and provincial legislation, policies and procedures for fish and fish habitat in Ontario.

The MTO Fisheries Protocol Implementation Team (PIT) will consider upon request, on a case by case basis, those individuals who do not meet the full criteria for qualification.

- Protocol Step 11 Project Implementation and Monitoring

Where construction monitoring is required, a qualified Fisheries Contracts Specialist registered on MTO’s Consultant Registry and shall carry out the construction oversight, monitoring and documentation requirements.
Note: Where fish rescues are required as part of the construction, a licence to collect fish issued by the OMNR according to Ontario Regulation 664/98 shall be obtained under the *Fish and Wildlife Conservation Act*.

**Fisheries Contracts Specialist**

The Fisheries Contracts Specialist shall be used on projects for which a *Fisheries Act* Authorization has been issued to ensure the proper implementation of its terms and conditions including the Compensation Plan, as included in the construction contract, to meet the requirements of Step 11 in Annex 2 of the Protocol. The Fisheries Contracts Specialist may work for either the consultant Contract Administrator, the Contractor or for MTO directly.

As a minimum the Fisheries Contracts Specialist shall possess the following;

**Education:**

- Graduation with a degree or diploma from a recognized university or college in a natural or physical science with specialization in fisheries biology, aquatic biology, ecology or another related discipline,
- Completion of MTO Fisheries Protocol Training,
- Valid Electrofishing Crew Leader Certification
- Completion of Erosion and Sediment Control Monitoring training*

* Proven completion of a training course on ESC monitoring (e.g. Certified Inspector Sediment and Erosion Control (CISEC), International Erosion Control Association (IECA), or equivalent.

**Experience:**

- Demonstrated related work experience,
- Demonstrated experience in monitoring construction activities in and around fish habitat, (e.g. identifying risk situations, recommending corrective actions/solutions),
- Demonstrated experience in the application of erosion and sediment control measures,
- Demonstrated experience in the application of fish and fish habitat mitigation measures,
- Demonstrated experience in monitoring the construction/installation of fisheries compensation measures,
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- Demonstrated experience and/or knowledge of the Fisheries Act Authorization amendment process gained through project experience or MTO Protocol Training, and the ability to identify when an amendment to an Authorization is required,

- Demonstrated knowledge of federal and provincial legislation, policies and procedures for fish and fish habitat in Ontario.

The MTO Fisheries Protocol Implementation Team (PIT) will consider upon request, on a case by case basis, those individuals who do not meet the full criteria for qualification.

Field Staff

A minimum of a 2-person crew is required for all field work. When conducting a fish community inventory or fish rescue by electrofishing, at least one member of the field crew shall possess a valid Ontario Electrofishing Certification.

Field staff that are not registered under RAQS and need to gain experience may do so by conducting the duties of either a Fisheries Assessment Specialist or a Fisheries Contracts Specialist provided that a RAQS qualified individual for the appropriate speciality is present on site to supervise or oversee their work.

However, all field staff that conduct fish community inventories or fish rescues must have experience in fish collection methods and be able to identify Ontario fish and mussel species using any tool(s) available (e.g. personal experience, field guides, identification keys etc.).
Section 3.2: Terrestrial Ecosystems

This section of the *Environmental Reference for Highway Design* (ERD) provides guidance on the process and procedures for the assessment of terrestrial ecosystems during highway design. Terrestrial ecosystems are defined as the interaction of land, air, water, and biotic components (e.g., wildlife, vegetation), functioning as an ecological unit over space and time.

This section provides the requirements for:

- the assessment of terrestrial ecosystems;
- the determination and mitigation of impacts;
- the development of the Terrestrial Ecosystems Report; and
- key staff qualifications.

It provides comprehensive guidance for Preliminary Design and Detail Design. The guidance is flexible so as to allow for various options in obtaining environmental assessment clearances (See Section 2 - *Generic Requirements and Optimal Timelines for Obtaining Provincial and Federal Environmental Assessment Clearances*).

Definitions of environmental terms and acronyms are provided in MTO's *Environmental Glossary*.

3.2.1 Study Area

For the purposes of investigating the potential impacts of the project on all terrestrial ecosystems, the study area will be defined as within the existing and proposed ROW and adjacent lands for 120 m unless a sensitive receptor greater than a distance of 120m is likely to be adversely affected.

3.2.2 Background Data

Existing data/reports on terrestrial ecosystems shall be obtained for features within and adjacent to the study area. This information shall include, but not be restricted to:

- environmental policies, plans and/or strategies;
- wildlife habitat including significant wildlife habitat (see Appendix 3.2.A);
- wildlife use of the area (all life stages and times of year) to the extent possible;
- wetland resources (see Appendix 3.2.B);
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- vegetation/forest information (see Appendix 3.2.C);

- Designated Areas (see sub-section 3.12 Designated Areas of the ERD);

- soils information; and

- groundwater recharge and discharge areas.

Sources of information should include but not be restricted to:

- Natural Heritage Information Centre data bases\(^\text{10}\);

- Environment Canada Species at Risk database;

- traditional and local community ecological knowledge;

- documents such as watershed reports, management studies, consultant reports, municipal official plans and supporting documentation, agency resource files, naturalist information;

- previous/proposed habitat restoration works;

- aerial photographs; and

- surficial geology and topographic maps.

3.2.3 Field Investigations

Field inventories shall be conducted during appropriate season(s) and periods to include migratory, over-wintering and nesting species. The nature and extent of field inventories will be determined based on extent and currency of existing information and the nature of the undertaking. Field inventories shall include, but not be restricted to:

- vegetation community mapping, including dominant species associations, using the Ecological Land Classification System (ELC) to ecosite level in areas where applicable, or other classification systems acceptable to agencies having jurisdiction\(^\text{11}\);

\(^{10}\) Land Information Ontario data are available to members of the Ontario Geospatial Data Exchange and include data uploaded from MNR’s NRVIS [Natural Heritage Information Centre data bases]

\(^{11}\) The use of ELC methodology and survey forms will depend on the characteristics of vegetation associations encountered within or near the Right-of-way (ROW). Many culturally derived vegetation units (such as hedgerows,

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• verification of evaluated wetland boundaries where applicable to the highway undertaking;
  • list of plant species observed through the growing season (spring to fall) including any significant species observed;
  • list of wildlife species observed (or evidence of presence – such as scat, trails, spoor, browse) within each vegetation community or as appropriate within identified habitat areas and on man-made structures (such as bird nesting on bridges, culverts, light standards, signs) including direct observation and incidental evidence;
  • inventory of the number, location and species of any bird nests on, under or in any structure or individual trees likely to be affected by construction. For larger areas of brush or forest identified for clearing, a representative sampling of nesting activity may be adequate to assess the probability of nesting interference and develop an appropriate mitigation strategy, in consultation with the Canadian Wildlife Service;
  • assess habitat use and potential based on wildlife observations and site conditions;
  • confirmation of presence/absence and location of any species of conservation concern (such as MNR, COSEWIC, SARA listings);
  • description and mapping of significant wildlife habitat (see Appendix 3.2.A);
  • evidence of groundwater upwelling and high groundwater table; and
  • description of surficial soils.

small planted tree clusters, etc.) and units <0.5 ha in size will not meet ELC criteria. Soils probing in the vicinity of the ROW as part of the ELC review may not be appropriate due to typical disturbance in such areas. In other areas, a modified (less rigorous) ELC review may be suitable (for example depending on the level of available information). Application of the full ELC survey methodology may be warranted (for example in higher quality wetland/forest areas and/or areas with identified special features/characteristics). Some discretion is allowed for the investigator in this regard provided that a rationale for the survey approach is documented.
Mapping and species lists shall be provided to MTO using the ELC forms (See Appendix 3.2.D), unless mutually agreed to in writing by both MTO and the agencies having jurisdiction – and shall include identification of the boundaries and significant components/functions of Designated Areas.

Changes in site conditions, application of other approvals (such as development activities) and other works in the area should be noted and the information used in refining (either scoping or expanding) the nature of required fieldwork.

A photo record shall be maintained and provided to MTO. This shall include but not be restricted to:

- Species At Risk;
- critical habitat (significant portions of the habitat of threatened or endangered species – see the Provincial Policy Statement); and
- representative vegetation communities.

### 3.2.4 Determination of Significance

The background research and field studies coupled with agency consultation shall be used in the determination of habitat function and significance, including:

- vegetation communities (including wetland communities and adjacent lands);
- wildlife and natural corridors;
- significant wildlife habitat;
- ecological functions;
- aquatic resources and hydrology; and
- groundwater recharge, discharge and high groundwater table areas.

Opportunity and constraint mapping should be developed summarizing the information as detailed in Appendices 3.2.A to 3.2.D.

The determination of significance will also assist in identifying what, if any, resource features would meet the criteria for Valued Ecosystem Components as defined in the CEAA Reference Guide to Completing an Environmental Assessment, in the event that the undertaking triggers a CEAA screening. Identified VECs would then be subject to an impact review (discussed in the next section). It is important that the information and analysis contained in the provincial EA documentation is sufficient to identify potential VECs and impacts if a future CEAA screening is triggered.
3.2.5 Assessment of Impacts

The potential permanent and temporary impacts of (a) highway design alternatives, (b) alternative methods of construction, and (c) highway operation/maintenance on terrestrial ecosystems shall be identified, including:

- quality and quantity of areas altered by physical intrusion;
- sensitivity of habitat and species to disturbance;
- importance of identified ecological functions and implications of altering them;
- severance and isolation of habitats;
- impacts on surface water level regime in wetlands and ponds:
  - altered adjacent habitats (e.g. forest edge effects); and
  - obstruction to movement and/or migration of wildlife;
- impacts on species of conservation concern;
- impacts on critical life stage processes (such as staging of migratory bird species, nesting of breeding species);
- excavation or fill in areas of highly erodible and/or unstable soils;
- excavation or fill in areas of groundwater discharge and high groundwater table:
  - compaction or decreased permeability in groundwater recharge areas;
  - changes to groundwater or surface water movement patterns that may affect resources such as wetlands;
  - construction access and staging impacts;
  - release of sediment and/or other deleterious substances, and
  - conflict with management plans, designated planning areas or Designated Areas.

The potential impacts of the highway operation and maintenance on terrestrial ecosystems shall be identified, including release of deleterious and potentially harmful substances.
In the event that the undertaking triggers the requirements of CEAA, the information collected must be adequate to enable the identification of resources/issues that clearly meet VEC criteria. In that case, the significance of the residual environmental effects of the project after applying the proposed mitigation measures should be predicted and described, considering the following factors:

- direction (of effects);
- timing;
- duration;
- frequency;
- magnitude;
- reversibility;
- geographic extent;
- probability of occurrence; and
- cumulative impacts.

Under CEAA, residual environmental effects should be compared against existing (or proposed) standards, criteria and thresholds (where such information is available), and their ecological context and importance described and documented. Guidance documents to assist in this work include:

- Environmental Assessment Guideline for Forest Habitat of Migratory Birds (Milko, DOE, 1998);
- Migratory Birds Environmental Assessment Guideline (Milko, DOE, 1998);

### 3.2.6 Environmental Protection/Mitigation

Mitigation measures shall be provided as required. Mitigation strategies are prepared for highway design alternatives in Preliminary Design with mitigation details prepared for the preferred design alternative in Detail Design; see Section 2 - *Generic Requirements and Optimal Timelines for Obtaining Provincial and Federal Environmental Assessment Clearances.*
Mitigation includes but is not restricted to:

- highway design alternatives / preferred design alternative;
- strategy, location and details of landscape plantings;
- strategy, location and details of ecological restoration plantings, habitat rehabilitation and/or habitat creation including:
- provisions for transplanting of existing vegetation;
- location of salvage and transplant zones\textsuperscript{12};
- location and management of salvaged substrate stockpiles (minimize height, and duration of storage); and
- staging of work to ensure salvaged material is quickly spread with limited storage requirements (otherwise viability of substrate and seed material will be limited);
- strategy, location and details of constraints to construction methods and highway operation and maintenance including:
  - construction timing windows for activities such as vegetation clearing to minimize wildlife effects (with agency input) including avoiding migratory bird nesting periods; and
  - vegetation management timing constraints that may be required for the protection of rare/sensitive flora species;
- strategy, location and details of wildlife deterrence measures including installation of barriers to prevent nesting in areas subject to probable disturbance;
- strategy, location and details of mitigation to facilitate wildlife movement across the highway where warranted and feasible, based on available background and field-collected information; and
- strategy and details of spills control, containment and contingency plans.

\textsuperscript{12} Opportunities to salvage and transplant may be very limited on some projects as lands availed for salvage and transplant may not be identified until after property acquisition.
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The draft mitigation strategies shall be reviewed and, pending revision(s), accepted by MTO. The strategies shall be distributed to and discussed with the appropriate regulatory agencies to determine if the proposed mitigation plan is acceptable. MTO shall be invited to attend all agency meetings and discussions. The information provided shall be of sufficient detail to allow the regulatory agencies to provide acceptance / agreement.

During the appropriate stage of design, it is necessary to identify:

- specific locations where special protection measures are warranted;
- identification of drainage management requirements for maintenance of wetland features and functions;
- wetland limit survey areas for accurate delineation of protection zones prior to construction; and
- need for implementation of any vegetation management or wildlife mitigation measures that would benefit the wetland area.

3.2.7 Documentation

The Terrestrial Ecosystems Report is intended to provide background information and technical information to support the final project recommendations set out in the appropriate Class EA documentation. Section 6 – Environmental Assessment Documentation details the requirements for EA documentation; and Section 2 - Generic Requirements and Optimal Timelines for Obtaining Provincial and Federal Environmental Assessment Clearances outlines documentation requirements for various options in obtaining EA clearances.

The Terrestrial Ecosystems Report shall include but is not restricted to the following:

a) An Existing Conditions section that includes:
   - an introduction;
   - site map;
   - sources of existing baseline information;
   - data collection methodology;
   - a description of the relevant Environmental Protection Requirements;
   - a description and assessment of the existing terrestrial habitat, species and Designated Areas;
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- references;
- photographs;
- habitat maps; and
- species lists, including status.

b) An Impact Assessment section that includes:

- assessment methodology;
- an assessment of potential impacts; and
- mitigation strategy and locations for:
  - vegetation protection including:
    - high constraint areas;
    - additional botanical work; and
    - timing restrictions for vegetation removals;
  - habitat creation;
  - wetland / vegetation salvage / transplant;
  - timber salvage;
  - Right-of-Way maintenance;
  - edge management and ecological restoration adjacent to significant resource areas;
  - protected nesting birds (including migratory birds and other protected species) including, timing restrictions;
  - wildlife deterrence measures including but not limited to barriers for nest prevention;
  - maintenance of wildlife movement opportunities including but not limited to measures to facilitate wildlife passage and reduce mortality, where appropriate;
  - wildlife encounters including but not limited to wildlife rescue (such as stranded turtles); and
beaver dam removal.

c) Follow-up including compliance monitoring.

d) An assessment of residual effects.

e) Conclusions.

f) Correspondence with regulatory agencies.

Mitigation details (developed from the strategies above) shall be documented as required in Section 2 - *Generic Requirements and Optimal Timelines for Obtaining Provincial and Federal Environmental Assessment Clearances* and detailed in Section 6 – *Environmental Assessment Documentation*.

Note: The establishment of new vegetation plans including warranty requirements can be identified in a Landscape Plan – See sub-section 3.9 Landscape Composition of the ERD.

### 3.2.8 Qualifications

As a minimum, field investigations and analysis must be undertaken using qualified individuals with technical or university degrees specializing in ecology/biology, wildlife, and botany resources. Biologist(s) should have demonstrated knowledge of pertinent Ontario and federal policies and procedures as well as professional experience in conducting wetland evaluations, wildlife (including birds) inventories, vegetation assessments, impact assessments, and in developing mitigation measures for design, construction and operations and maintenance stages. It is preferable if the biologists have also completed the Ontario Wetland Evaluation and Ecological Land Classification Courses. The biologist shall also demonstrate professional experience in the assessment and development of erosion protection and sediment control measures. At the sole discretion of the ministry, a qualified specialist with demonstrated relevant experience may be substituted for the biologist.
APPENDIX 3.2.A: Background Information for Wildlife

Background Research and Studies:

- Identify and map areas of significant wildlife habitat as defined in the Provincial Policy Statement (PPS), the MNR Significant Wildlife Habitat Technical Guide (SWHTG 2000) and/or identified by agency staff, knowledgeable resource individuals, traditional and local community ecological knowledge, and field work. These areas may include, but are not necessarily limited to, oak savannahs, prairie, interior forest habitat, old growth forest, etc.

- Identify known areas supporting Vulnerable, Threatened, Endangered or Species at Risk in Ontario (Special Concern), and/or other species of conservation concern as defined by agencies/status documents and the SWHTG (Mapping confidentiality may be required – subject to agency input). Supporting areas include breeding, staging, migratory and over wintering habitat.

- Critical habitat areas are to be defined through input from agency staff or other resource experts (such as through Recovery Teams and their reports), as well as via guidance from applicable documents (such as the PPS) that are most current at the time of the work.

- Identify other wildlife habitat areas through background review and field work, including Important Bird Areas (IBAs), important feeding, migratory stop-over/staging and identified over wintering habitat.

- Municipal Official Plans provide specific policies and direct guidance on local or regional environmental matters that may be affected by development applications. Highway undertakings need to consider such policies/guidelines in the context of the EA process and subsequent design/construction. The policies and guidelines may identify wildlife resources and habitats (and Conservation Priority bird species) that require consideration in an undertaking.

- Identify key wildlife corridors (known and documented) utilizing knowledgeable agency and other sources and guidelines in the SWHTG.

- Identify other functional linkages providing wildlife movement opportunities (map where appropriate) utilizing knowledgeable agency and other sources and guidelines in the SWHTG.

- Undertake wildlife field surveys during appropriate seasons or periods and following recognized survey protocols appropriate to the objectives of the field survey. Examples of survey protocols are provided in SWHTG (2000), as well as Canadian Wildlife Service Forest Breeding Bird Survey Protocol (1997),

- Identify, map and document any additional wildlife information requirements discussed in the SWHTG.
- Identify habitat areas for migratory birds as declared in the Migratory Birds Convention Act, 1994 and supporting regulations.
- Indicate areas of interior forest breeding bird habitat, as appropriate.
APPENDIX 3.2.B: Background Information for Wetlands

Background Research and Studies:

- Identify and map all wetlands evaluated by MNR (provincially significant and locally significant) requesting most up-to-date information.

- Identify and map unevaluated wetlands based on input from agency staff, knowledgeable resource individuals, and confirmed by field work (where feasible).

- Identify and map wetlands with special sensitivities/features/functions including, but not necessarily limited to, bogs, fens, alvars, Great Lakes shoreline marsh (see MNR Significant Wildlife Habitat Technical Guide (SWHTG 2000).

- Categorize wetland types using accepted vegetation classification system identified by agencies with jurisdiction in the study area, and identify wetland functions.

- Identify wetland management, research and/or other wetland conservation programs/areas through consultation with MNR, Conservation Authority (CA), municipal staff and other knowledgeable resource individuals.

- Identify, map and document any additional wetland information requirements discussed in the SWHTG (2000), watershed and sub-watershed studies, Remedial Action Plans, Management Plans, municipal Official Plans etc.

- Municipal Official Plans and supporting documents must be reviewed to ensure that relevant information on wetland resources (including evaluated and unevaluated wetlands) is integrated through all stages of highway planning, route location, construction and operations/maintenance.

- Prepare opportunity and constraint mapping highlighting wetland resources in the study area. Integrate wetland resource information as a key component during route evaluation and selection.
APPENDIX 3.2.C: Background Information for Vegetation

Background Research and Studies:

- Identify and map significant woodlands/valleylands as defined in the PPS, and/or the MNR *Significant Wildlife Habitat Technical Guide* (SWHTG 2000), agency staff, knowledgeable resource individuals, and field work.

- Identify areas supporting known populations of significant flora (Vulnerable, Threatened, Endangered or other status) as identified by agency staff, knowledgeable experts, and/or field work (Mapping confidentiality may be required – subject to agency input).

- Identify and map rare or specialized vegetation associations ranked either nationally, provincially or locally through recognized agency sources (including NHIC and SWHTG). These associations may include, but are not necessarily limited to, Great Lakes Shoreline marsh, bogs, fens, alvars prairies and savannahs (Mapping confidentiality may be required – subject to agency input). Identify ecological functions of these vegetation associations.

- Identify and map documented areas of old growth forest as defined in *Old Growth Forest Definitions for Ontario*, Version 1.0, (MNR, 2003) or areas containing mature forest with an identified component of old growth trees, as well as any rare forest types (SWHTG).

- Identify Honour Roll or other municipally designated/recognized tree or vegetation resources through background review and field work.

- Prepare opportunity and constraint mapping highlighting vegetation resource quality and sensitivity.

- Integrate vegetation resource information as a key component during route evaluation and selection. Identify and avoid significant high constraint vegetation resources, or demonstrate why avoidance has not been possible. Identify locally important vegetation resources and how they have been addressed in the study process.

- Identify locally important vegetation resources and how they have been addressed in the study process. Municipal Official Plans provide specific policies and direct guidance on local or regional environmental matters that may be affected by development applications. Highway undertakings need to consider such policies/guidelines in the context of the EA process and subsequent design/construction. The policies and guidelines may identify vegetation communities or species of local or regional importance that require consideration in an undertaking.
APPENDIX 3.2.D: Field Collection Record Forms for Terrestrial Ecosystems

The Field Collection Record Forms for Terrestrial Ecosystems can be found on MTO's website.
Section 3.3: Groundwater

This section of the Environmental Reference for Highway Design (ERD) provides guidance on the process and procedures for the assessment of groundwater during highway design.

This section provides the requirements for:

- the assessment of groundwater resources;
- the determination and mitigation of impacts;
- the development of the Groundwater Report; and
- qualifications.

It provides comprehensive guidance for Preliminary Design and Detail Design. The guidance is flexible so as to allow for various options in obtaining environmental assessment clearances (See Section 2 - Generic Requirements and Optimal Timelines for Obtaining Provincial and Federal Environmental Assessment Clearances).

Definitions of environmental terms and acronyms are provided in MTO’s Environmental Glossary.

3.3.1 Study Area

For the purposes of investigating the potential impacts of the project on groundwater, the factor-specific study area must be determined but at a minimum is defined as all lands to be impacted/disturbed by proposed highway construction within the proposed highway Right-of-Way plus access roads, detours, staging and storage areas, and areas of other works and activities associated with the construction of the highway and, to a reasonable distance, adjacent lands where activities may effect or influence groundwater conditions.

3.3.2 Background Data

Background data (information) shall include, but not be restricted to:

- existing groundwater information including recharge and discharge areas (as available);
- topographic information;
- soils/geological information;
- borehole and geophysical data; and
- changes in site conditions, application of other approvals (such as development activities) and other works in the area.
Existing data/reports shall be obtained and shall include, but not be restricted to:

- topographic and other maps;
- soils/geological maps and information;
- local precipitation and other climatic data;
- Ministry of the Environment (MOE) well water records;
- borehole and geophysical data from:
  - Ontario Geological Survey and Geological Survey of Canada, and
  - geotechnical and foundation investigations;
- published hydrogeological and water resources reports;
- watershed studies\(^\text{13}\);
- municipal Groundwater Studies\(^\text{14}\);
- bulletins and local consultants reports that can be obtained from area municipalities and conservation authorities; and
- aerial photography.

### 3.3.3 Field Investigation

The investigation of hydrogeological conditions should be co-ordinated with geotechnical investigations and assessment of contaminated property in order to supplement and verify information from other sources. An inventory of water wells and collection of direct hydrogeological data should be performed in areas where it is anticipated that loss of water or the impairment of well water or baseflow quantity or quality may result due to the project.

Changes in site conditions, application of other approvals (such as development activities) and other works in the area should be noted and the information used in refining (either scoping or expanding) the nature of required field work.

The field investigation should include, but not be restricted to:

- geological mapping;

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\(^{13}\) There are required studies for specified Municipalities in the ORMCP O. Reg. 140/02, s. 24 (1). Other Watershed Plans (also Subwatershed Plans) have been prepared under other initiatives and should be reviewed as available.

\(^{14}\) *Groundwater Studies 2001/2002 Technical Terms of Reference* (Ministry of the Environment, 2001)
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- confirmation of well location and type;
- subsurface investigations by drilling and monitoring well installation at key sensitive locations such as water crossings and stormwater management facilities;
- determination of groundwater/surface water interactions;
- evidence of groundwater up-welling and high groundwater table; and
- well water quality and quantity testing, which includes appropriate notification to residents as described in Guidelines for Drinking Well Water Sampling and Testing in Ministry of Transportation Activities.

A photographic record shall be maintained and provided to MTO, including but not restricted to:

- evidence of existing problems that could contribute to groundwater contamination/quantity problems; and
- areas of groundwater upwelling.

3.3.4 Determination of Significance

Based on the background data (Section 3.3.2) and the Field Investigation (Section 3.3.3), a hydrogeological assessment shall be conducted that includes but is not limited to the following:

- shallow, intermediate, and deep aquifers;
- distribution of overburden and bedrock permeability;
- groundwater intrinsic susceptibility and groundwater vulnerability ranking\textsuperscript{15};
- locations and usage of large water takings;
- groundwater source and wellhead protection areas;
- wells that have existing quality/quantity problems;

• groundwater sensitive ecosystems;
• groundwater dependant commercial enterprises; and
• location and type of private wells.

This activity is an important prerequisite in route location and subsequent design because identifying important resource areas and ecological functions and then avoiding these areas to the extent possible will serve to reduce or minimize residual effects on these features and functions.

The determination of significance will also assist in identifying what, if any resource features would meet the criteria for Valued Ecosystem Components (VECs) as defined in the CEAA Reference Guide to Completing an Environmental Assessment, in the event that the undertaking triggers a CEAA screening. Identified VECs would then be subject to an impact review as highlighted in the next section. It is important that the information and analysis contained in the provincial EA documentation is sufficient to identify potential VECs and impacts if a future CEAA screening is triggered.

3.3.5 Assessment of Impacts

The potential permanent and temporary impacts of: highway design alternatives (e.g., alignment and profile of highway, drainage, etc.); alternative methods of construction; and highway operations / maintenance on groundwater shall be identified including:

• pre-development and post-development water budget assessment and mitigation including:
  • likelihood and significance of interception, draw-down, compaction, impoundment, and obstruction to recharge and discharge of groundwater;
  • likelihood and significance of interference with private/municipal wells (including the quantity/quality of well water);
  • impacts of areas of high groundwater table on the project;
  • impacts to surface water due to groundwater interference;
  • temporary and permanent construction impacts;
  • changes to groundwater movement patterns; and
  • consideration of other development within a subwatershed;
• areas altered by physical intrusion;
• construction access impacts;
need for application for MOE permit(s)-to-take-water;

potential for contamination using appropriate and applicable criteria from Ontario Provincial Water Quality Objectives, Ontario Drinking Water Standards and CCME Canadian Environmental Quality Guidelines;

conflict with management plans including for example fisheries management plans;

conflict with commercial uses; and

the potential long term impacts of highway operations and maintenance on groundwater quality and quantity with respect to baseflow maintenance, private wells and wellhead protection areas.

Consideration of impacts to groundwater shall be incorporated into the assessment of highway design as early as possible, typically by the 30% design stage.

The potential impacts of highway construction, operations and maintenance on groundwater should be identified during all stages of highway design, as the level of detail permits, including release of deleterious and potentially harmful substances. The impact review must include a review of residual effects after the application of mitigation measures.

In the event that the undertaking triggers the requirements of CEAA, the information collected must be adequate to enable the identification of resources / issues that clearly meet Valued Ecosystem Component criteria. In that case, the significance of the residual environmental effects of the project after applying the proposed mitigation measures should be predicted and described, considering the following factors:

- direction (of effects);
- timing;
- duration;
- frequency;
- magnitude;
- reversibility;
- geographic extent;
- probability of occurrence; and
- cumulative impacts.
Under CEAA, residual environmental effects should be compared against existing (or proposed) standards, criteria and thresholds (where such information is available), and their ecological context and importance described and documented.

3.3.6 Environmental Protection / Mitigation

Mitigation measures shall be provided to meet all applicable Environmental Protection Requirements, permits, approvals and authorizations.

A comprehensive list of measures to mitigate the potential for groundwater impacts of the project should be identified for each specific point or area of impact along the highway alignment.

In general, mitigation measures may include, but are not restricted to:

- design alternatives (e.g., alignment and profile of highway, drainage treatments);
- stormwater management designs to protect groundwater quality and quantity;
- construction methods to protect groundwater quality and quantity;
- consideration in the above of drainage alignment alternatives, liners, runoff separation, enhanced infiltration and grading;
- proper decommissioning of abandoned wells;
- operational methods (including salt management to deal with the storage, handling and use of de-icing chemicals, and snow disposal); and
- monitoring plans, trigger values and contingency measures such as provision of temporary and/or permanent water supply in the event of well interference.

The above listing of mitigation measures will not necessarily apply to every highway project. In some cases only a subset of the listed issues will be applicable, depending on the type of highway project, the study setting and site conditions.
3.3.7 Documentation

The work identified in the above sections shall be documented in a Groundwater Report that includes but is not restricted to the following:

- information sources and references;
- description of methodologies employed;
- well water records and borehole logs;
- all required data, forms and lab results;
- description and mapping of the area under investigation, including areas of groundwater recharge and discharge and well locations;
- impact assessment findings and conclusions;
- trigger mechanisms and recommended mitigation measures; and
- Copies of all correspondence sent to landowners.

3.3.8 Qualifications

The specialist should be qualified to practice geoscience in Ontario (P.Geo.) with specific training or experience as a hydrogeologist and have, as a minimum, demonstrated knowledge of pertinent Ontario policies and procedures as well as professional experience in conducting impact assessments of highway design, construction and maintenance on groundwater resources.
Section 3.4: Noise

This section of the Environmental Reference for Highway Design (ERD) provides guidance on the process and procedures for the assessment of noise during highway design.

This section provides the requirements for:

- the assessment of noise;
- its mitigation (as required);
- technical reports; and
- qualifications of the Acoustic Specialist.

It is expected that a full noise analysis will be required where there is new road infrastructure or significant improvements to existing road infrastructure (greater than three metres widening of the pavement surface).

If noise investigations are required, they shall be in compliance with:

- the MTO Quality and Standards (QST) Directive A-1;
- the MTO/MOE Noise Protocol (Protocol); and

Definitions of environmental terms and acronyms are provided in MTO’s Environmental Glossary.

3.4.1 Study Area

The Study Area is the smallest area of investigation identified using one of the methods included in Section 7.1 of the Guide.

3.4.2 Background Information - Identification of Noise Sensitive Areas (NSAs)

Noise Sensitive Areas (NSAs) are defined in the Guide. All noise sensitive land uses including any approved residential subdivisions, regardless of size or location (urban or rural), must be assessed for application of noise control measures. NSAs must be identified using current air photo/mapping, documented on a plan and confirmed through field investigations.

3.4.3 Field Investigation

A field inventory shall be carried out to identify NSAs including any approved residential subdivisions. The consultant shall provide any field services necessary to produce the topographic contours necessary to operate highway noise prediction models.
3.4.4 Assessment of Impacts

An acoustical analysis shall be done in accordance with the Guide and include but not be limited to determining:

a) the noise levels for the proposed facility and (for each alternative, if there is more than one);

b) the noise impacts from road traffic assuming a detailed examination of the existing ground conditions, including rows of homes; and

c) construction noise impacts.

The Guide includes a requirement new to this version of the ERD: the “most exposed side” of the dwelling unit of a NSA is to be assessed as part of an initial screening. The determination of the provision of mitigation, however, is based on the analysis of the predicted noise level at the Outdoor Living Area (OLA). The Guide describes the process for the assessment of noise mitigation based on the most exposed side vs. OLA for NSAs.

If the Canadian Environmental Assessment Act (CEAA) is triggered, then the noise impact assessment must satisfy the requirements of the CEAA review process. If CEAA is triggered, the proponent should contact the CEA Agency and Responsible Authority, who will provide specific guidance on CEAA noise requirements in consultation with other federal agencies including Health Canada, Environmental Health Services.

3.4.5 Determination of Significance

The term significance is meant to be the level at which MTO begins determining whether or not the provision of noise mitigation requires investigation. The significance of highway noise will be predicted for NSA's expected to experience increases in sound levels, and the NSA's shall be grouped as per the Guide. The study shall include the comparison of alternatives and assessment of impacts as per the Guide. This shall include grouping effected NSA's by sound level increases and reductions.
3.4.6 Environmental Protection/Mitigation

If existing noise barriers need to be removed, or new noise barriers need to be designed, acoustical recommendations for new noise barrier design alternatives shall be done including recommendations for noise barrier heights and lengths, and the adequacy of the existing noise barriers. A minimum of one receiver per three homes shall be used to determine the best noise barrier design. A number of noise barrier designs shall be evaluated and included in the Noise Report. Recommendations to MTO will be made regarding noise barrier colours and textures. MTO will make the final determination on noise barrier height, length, materials, texture and colour.

From the analysis of construction noise impacts, determination of the requirements for Special Provisions and any hardships to MTO caused by municipal noise control bylaws shall be undertaken (see the Guide).

3.4.7 Documentation

The above work shall:

- be documented in developmental draft, MTO accepted draft and final Noise Reports; and
- be presented to MTO for review at the following intervals:
  - at approximately 30% design completion, the construction noise evaluation study design shall be presented to MTO; and
  - at approximately 80% design completion, the Noise Report shall be presented to MTO. MTO will examine this report to see if it meets all of MTO Policy requirements as well as complying with the Protocol.

The Noise Report shall be prepared in accordance with the Guide and shall include as a minimum the following:

- a description of the NSAs (usually identifying discrete receiver locations) including maps as appropriate;
- the name of the noise prediction model used (if one was used);
- results of existing ambient and future noise level predictions at NSAs for each alternative (if more than one);
- a table identifying project impacts;
- where mitigation is necessary, the report shall include a discussion of mitigation measures including needs, cost/effectiveness, and applicability to the project and construction timing, as well the practicability of each measure will be evaluated by such factors as the effectiveness of the mitigation (i.e.
predicted noise level decrease), and technical, economic and administrative technical feasibility; and

- an analysis of construction noise impacts and the requirements for Special Provisions (see the Guide) including the following:
  - location and number of NSAs;
  - identification of municipal noise control by-laws;
  - need to obtain noise bylaw exemptions;
  - an explanation of any hardships to MTO caused by municipal noise control bylaws; and

- construction noise complaint process.

3.4.8 Qualifications

The Acoustic Specialist shall have demonstrated knowledge of pertinent Ontario policies and procedures as well as expertise/experience in highway noise analysis and mitigation including construction noise from having completed at least three projects of similar scale and complexity.
Section 3.5: Land Use Factors

This section of the Environmental Reference for Highway Design (ERD) provides the requirements during highway design for:

- the assessment of land use;
- the determination and mitigation of impacts;
- the development of the Land Use Factor Report; and
- qualifications.

Definitions of environmental terms and acronyms are provided in MTO's Environmental Glossary.

3.5.1 Study Area

For the purposes of investigating the potential impacts of this project on land uses, the factor-specific study area is defined as all lands to be impacted/disturbed by proposed highway construction within the existing and proposed highway Right-of-Way plus any specified access roads, detours, staging and storage areas, and areas of other works and activities associated with the construction of the highway and all other affected land uses as identified below:

- Agriculture;
- Residential (urban & rural);
- Commercial, Industrial & Tourism;
- Community Facilities;
- Recreation;
- Natural Features / Natural Systems;
- Aggregates/Mines;
- Municipal Services; and
- Aboriginals (requirements are at the federal level).
3.5.2 Background Data

As such, existing land use information shall be obtained from sources including, but not restricted to:

- any relevant factor-specific technical reports for the project (land use information may overlap with the information gathered and augmented for other environmental factor studies, e.g., groundwater; built heritage and cultural heritage landscapes; or contaminated property identification and management);
- applicable local and regional Official Plans and local zoning by-laws;
- special Federal and Provincial land use plans, policies, strategies and guidelines;
- special policy areas in municipal plans;
- other resources from local and regional municipalities, federal and provincial agencies, conservation authorities (e.g., public transit, school bus routes, emergency response routes, utilities);
- community-based associations (e.g., Business groups, Municipal Heritage Committees, Community Associations, Snowmobile Clubs, etc.);
- appropriate land use mapping including soils, topographic, demographic, flood plain limits;
- locations and usage of wells and septic systems;
- recreational and navigable river systems; and
- primary and secondary mineral/aggregate deposit and resource extraction areas and associated haul routes.

For Agriculture, additional appropriate sources may include, but are not restricted to:

- Ontario Ministry of Agriculture, Food and Rural Affairs background information including farm crop studies;
- applicable Local and Regional/County Official Plans and local zoning by-laws;
- special Federal and Provincial land use plans, policies, strategies and guidelines;
- special policy areas in municipal plans;
- land use mapping including soils, topographic, demographic, flood plain limits; and
property maps/assessment data.

For Agriculture, information gathered from the appropriate sources should include, but are not restricted to:

- locations and usage of drainage, wells and septic systems;
- soil and soil capability—the capacity for agriculture based on potential and limitations of the mineral soils for agricultural use;
- location of Specialty Crop Areas and Tender Fruit Areas;
- location of farm communities and farm community infrastructure;
- location of prime agricultural lands and prime agricultural areas;
- water quality and quantity studies;
- wellhead protection studies; and
- microclimate data.

3.5.3 Field Investigation

The background data collected from appropriate secondary sources shall be augmented through field investigations in the land use categories noted below.

a) Agriculture:

- verification of background data pertaining to agricultural land uses;
- active farm locations, and the type of operation at each location;
- farm buildings and other key permanent facilities at each location;
- directly linked operations at different locations;
- active farm communities (1000 + acres);
- heritage buildings and features;
- contaminated property; and
- verification of soil capability, crop patterns, farm operations and Specialty Crop status of lands in the study area.

Note: Access to farmlands to complete the required assessment studies must be negotiated with the landowner. Where environmental impacts from field investigations are not avoided, their mitigation shall be part of the negotiation with the landowner.
b) Residential (urban & rural):

- verification of background data pertaining to residential land uses;
- residential neighbourhoods;
- rural communities;
- vehicular and pedestrian access;
- heritage buildings and features; and,
- aesthetics.

c) Commercial, Industrial & Tourism:

- verification of background data pertaining to commercial, industrial and tourism land uses;
- commercial, industrial and tourism areas;
- vehicular and pedestrian access;
- heritage buildings and features; and
- contaminated property.

d) Community Facilities

- verification of background data pertaining to community facilities;
- community facilities/institutions;
- vehicular and pedestrian access;
- heritage buildings and features; and
- contaminated property.

e) Recreation

- verification of background data pertaining to recreational land uses;
- passive and active parks;
- vehicular and pedestrian access to parks;
- aesthetics;
- contaminated property;
• public recreational corridors (multi-modal trails); and
• recreational and navigable river systems.

f) Natural Features
• verification of background data pertaining to natural features.

g) Aggregates/Minse:
• verification of background data pertaining to aggregates and mines; and
• contaminated property.

h) Municipal Services:
• verification of background data pertaining to municipal services

3.5.4 Determination of Significance
A land use assessment shall be conducted using secondary source information, the results of the field investigation, and input from various agencies and the public, to determine the significance of following land uses:
• Agriculture;
• Residential (urban & rural);
• Commercial, Industrial & Tourism;
• Community Facilities;
• Recreation;
• Natural Features / Natural Systems;
• Aggregates/Mines; and
• Municipal Services.

3.5.5 Assessment of Impacts
Based on the results of Section 3.5.4, the review of the background data as confirmed through the field investigation, and agency and public consultation, land use impacts shall be assessed in relation to the alternatives being considered, including but not limited to:
• compatibility/incompatibility with Municipal Official Plans and development proposals;
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- compatibility/incompatibility with identified Federal, Provincial, and Municipal policies, plans or strategies relating to land use and environmental features; and

- jurisdictional overlap with any Federal/Provincial agencies relating to land use.

a) Agriculture:

- encroachment, severance, displacement, disruption, alteration of farm operations;

- loss of Speciality Crop Areas (including Tender Fruit) and Class 1, 2, 3, 4, 5, 6 agricultural land (in that order);

- loss of capital investment in agricultural operations;

- overall effect on locations and usage of wells / effects on farm water supplies;

- impacts to farm communities and farm community infrastructure;

- impacts to access to farm communities and for existing farm operations;

- effects of changes to the movement of cold air – cold air drainage and microclimate on specialty crop operations;

- effects of de-icing chemicals, noise, vibration, dust and light;

- effects of landscape plans on operations (e.g., introduction of invasive plants); and

- effects on the ability of farm operations to meet nutrient management and minimum distance separation requirements.

The potential impacts of highway operations and maintenance on agricultural ecosystems should be identified, including release of deleterious and potentially harmful substances.

b) Residential (urban & rural):

- encroachment, severance, displacement, disruption, alteration of rural communities and residential neighbourhoods;

- displacement or extraordinary isolation of homes;

- overall effect on locations and usage of wells and residential sewage and water systems;
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- overall effects on access or travel time to various land uses;
- alteration, severance/extension and overall effect on bus routes (local municipal transit and school buses); and
- disruption and overall effect on emergency response routes.

c) Commercial, Industrial & Tourism:

- encroachment, severance, displacement, disruption, alteration of commercial, industrial, and tourism areas;
- effect on highway exposure for commercial, industrial, and tourism areas;
- effect on overall travel time and distance for local manufacturers and shippers;
- effects on regional distribution of manufacturing;
- overall effects on regional and local economy;
- overall effects on access or travel time to various land uses;
- disruption and overall effect of emergency response routes;
- alteration, severance/extension and overall effect (including staging detours) on bus routes (local municipal transit and school buses); and
- overall effect on locations and usage of wells and residential sewage and water systems.

d) Community Facilities:

- encroachment, severance, displacement, disruption, alteration of community facilities/institutions;
- alteration, severance/extension and overall effect on bus routes (local municipal transit and school buses);
- overall effects on access or travel time to various land uses;
- disruption and overall effect on emergency response routes; and
- overall effect on locations and usage of wells.

e) Recreation:

- encroachment, severance, displacement, disruption, alteration of parks, multi-modal trails, greenways and open space linkages; and
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- overall effect on locations and usage of wells.

f) Natural Features / Natural Systems:

- encroachment, severance, displacement, disruption, alteration of natural features.

g) Aggregates / Mines:

- encroachment, severance, displacement, disruption, alteration of mineral/aggregate operations;

- sterilization of primary and secondary mineral/aggregate deposit areas;

- loss of opportunities for sequential land use;

- loss of capital investment in mineral/aggregate operations;

- overall effects on access or travel time to various land uses; and

- overall effect on locations and usage of wells.

h) Municipal Services:

- encroachment, severance, displacement, disruption, alteration of municipal services;

- disruption and overall effect on emergency response routes;

- alteration, severance/extension and overall effect on bus routes (local municipal transit and school buses);

- overall effect on locations and usage of wells;

- disruption and overall effect on utilities; and

- overall effect on municipal services.

If CEAA is triggered and the project results in significant environmental effects to the factor-specific area, then a cumulative impact assessment shall be conducted in accordance to the "Cumulative Effects Practitioners Guide (1999)".
3.5.6 Environmental Protection / Mitigation

Mitigation measures shall be incorporated into the project to avoid, prevent, control, mitigate, enhance, or compensate detrimental environmental effects resulting from the preferred alternative. These shall be developed in response to the environmental impacts identified and shall include, but not be limited to:

a) Agriculture:

- installation and/or reconnection of agricultural field tiles;
- use of construction timing and methods;
- replacement of fences;
- maintenance of water quality and quantity;
- reconditioning of fields where construction impacts have occurred;
- maintenance of access for farm related travel to ensure equally efficient operation of the individual farm operation and the farm community;
- maintenance of the contour and efficiency of farm drainage (Municipal Drains);
- control of dust, noise and light during construction;
- following of farm property lines where possible;
- minimization of inconvenience to the landowner or tenant and his farm operation during construction;
- installation and maintenance of fences marking the limits of the Right-of-Way, particularly where livestock may be present (Note: Specialty fencing may be needed in some situations);
- control of the effects of blasting;
- use of non-invasive plant species for landscaping; and
- use of best salt management practices near salt vulnerable agricultural operations.

Note: All landowners affected shall be approached to discuss and ensure suitable arrangements for livestock, access and farm operations are in place.

b) Residential (urban & rural):

- use of landscaping;
- use of construction timing and methods;
- use of noise barriers;
- protection of well water quality and quantity; and
- restoration of / improvement to access.

c) Commercial, Industrial & Tourism:
- restoration of / improvement to access;
- use of construction timing and methods;
- restoration of / improvement to visibility;
- protection of well water quality and quantity; and
- restoration of / improvement to signage.

d) Community Facilities:
- restoration of / improvement to access;
- use of construction timing and methods;
- restoration of / improvement to visibility;
- protection of well water quality and quantity; and
- restoration of / improvement to signage.

e) Recreation:
- use of landscaping;
- use of construction timing and methods;
- restoration of / improvement to access;
- protection of well water quality and quantity; and
- restoration of / improvement to signage.

f) Natural Features / Natural Systems:
- use of erosion protection and sediment control;
- use of landscaping;
- use of construction timing and methods
preservation of species through transplanting.

g) Aggregates/Mines:
- restoration of / improvement to access;
- use of construction timing and methods;
- reduction of visibility; and
- restoration of / improvement to signage.

h) Municipal Services:
- use of construction timing and methods;
- minimization to the disruption of service; and
- relocation of services.

3.5.7 Documentation

The work in the above sections shall be documented in developmental draft, MTO accepted draft and a final report entitled Land Use Factors Report. The report shall include:

- a summary of all background data;
- the results of the field investigation;
- a land use constraints map (scale and size appropriate to the project);
- the determination of significance;
- the assessment of impacts;
- the proposed environmental protection/mitigation; and
- copies of all field investigation notes, photographs (digital and film-based), reference documentation, etc., created or used.

3.5.8 Qualifications

As a minimum, the consultant shall have demonstrated knowledge of pertinent Ontario policies and procedures as well as proven professional experience in the identification, impact assessment, evaluation, construction mitigation and enhancement of land use factors associated with highway projects and/or projects of similar scale, scope and complexity.
Section 3.6: Contaminated Property Identification and Management

This section of the Environmental Reference for Highway Design (ERD) provides the requirements for:

- the identification and assessment of contaminated properties;
- the management of contaminated properties;
- the development of technical reports; and
- qualifications.

Section 2 - Generic Requirements and Optimal Timelines for Obtaining Provincial and Federal Environmental Assessment Clearances of the ERD provides guidance on the timing (i.e., Preliminary Design or Detail Design) of requirements and documentation.

MTO’s Contaminated Property Process is divided into six (6) steps as follows:

1. Contamination Overview Study
2. Preliminary Site Screening
3. Phase I [one] Environmental Site Assessment (ESA)
4. Phase II [two] Environmental Site Assessment (ESA)
5. Screening Level Risk Evaluation (SLRE)
6. Site Management

The consultant will be required to complete one or more of the above steps as detailed in MTO’s Environmental Guide for Contaminated Property Identification and Management to:

- identify past and present site activities;
- evaluate the existing environmental liabilities, current environmental performance, and environmental risk of a property; and
- determine and undertake contamination management.

Definitions of environmental terms and acronyms are provided in MTO’s Environmental Glossary.
3.6.1 Contamination Overview Study

3.6.1.1 Reference

Requirements for this step are detailed in Section 2 of the Guide.

3.6.1.2 Description

A Contamination Overview Study is a general overview of the study area to identify properties/areas with the potential for site contamination. It is generally completed at the route selection stage of the highway planning and design process.

3.6.1.3 Study Area

For the purposes of investigating the potential impacts of a project on potentially contaminated property and certified waste deposition areas, the factor-specific study area is defined as all lands to be impacted/disturbed by proposed highway construction within the proposed Right-of-Way, plus access roads, detours, staging and storage areas, and areas of other works and activities associated with the construction of the highway. It will also include adjacent property that has the potential for contaminant migration onto MTO lands.

3.6.1.4 Background Data

Overview information for all properties in the study area is required.

3.6.1.5 Field Investigation

A “windshield-level” survey is required.

3.6.1.6 Assessment of Contamination

Properties and/or areas that have a potential for site contamination are to be identified. The potential for soil and groundwater contamination for the properties within the study area shall be qualitatively ranked and recommendations shall be made for properties that require further assessment.

3.6.1.7 Documentation

A Contamination Overview Study Report is required. A developmental draft, an MTO accepted draft and final reports shall be prepared.

3.6.2 Preliminary Site Screening

3.6.2.1 Reference

Requirements for this step are detailed in Section 3 of the Guide.
3.6.2.2 Description

Preliminary Site Screening is a broad review of a single property to determine the potential for contamination. It is generally completed for property that is likely to be impacted by highway construction and some or all of the property must be acquired by MTO, and for adjacent property that has the potential for contaminant migration onto MTO lands (e.g., gas station, industrial facility).

3.6.2.3 Study Area

The Study Area is comprised of the property(s) identified by MTO.

3.6.2.4 Background Data

A review of site records for the property is required.

3.6.2.5 Field Investigation

A site walk through is required.

3.6.2.6 Assessment of Contamination

Individual properties are to be assessed for potential contamination, and the potential contamination described.

3.6.2.7 Documentation

MTO’s Preliminary Site Screening form is to be completed.

3.6.3 Phase I Environmental Site Assessment (ESA)

3.6.3.1 Reference

Requirements for this step are detailed in Section 4 of the Guide.

3.6.3.2 Description

A Phase I ESA is a detailed review and non-intrusive investigation to identify actual, or potential contamination on, in, or adjacent to, a property. It is typically completed for property that has characteristics or activities of concern identified during the Contamination Overview Study; and/or the Preliminary Site Screening. Most commercial and industrial property will require a Phase I ESA. To decrease time and cost, this step can be combined with the Phase II ESA.

3.6.3.3 Study Area

The Study Area is comprised of the property(s) identified by MTO.

3.6.3.4 Background Data

A detailed review of site records for the property is required.
3.6.3.5 Field Investigation

Detailed non-intrusive investigations are required.

3.6.3.6 Assessment of Contamination

Actual or potential contamination on, in, or adjacent to, a property shall be determined.

3.6.3.7 Documentation

A developmental draft, an MTO accepted draft and final Phase I ESA Reports shall be prepared.

3.6.4 Phase II Environmental Site Assessment (ESA)

3.6.4.1 Reference

Requirements for this step are detailed in Section 5 of the Guide.

3.6.4.2 Description

A Phase II ESA is an intrusive site investigation to confirm the extent of suspected environmental liabilities and property contamination issues that have been identified in previous steps (the Phase I ESA, or the Phase I ESA in combination with the Contamination Overview Study and/or the Preliminary Site Screening). The Phase II ESA may be a continuing process, or may need to be repeated when it is found by the initial study that further delineation is required.

3.6.4.3 Study Area

The Study Area is comprised of the property(s) identified by MTO.

3.6.4.4 Background Data

The background data is the results of the Phase I ESA for the property(s).

3.6.4.5 Field Investigation

Intrusive investigations (e.g. electromagnetic surveys, boreholes) are required to confirm the extent of suspected environmental liabilities and property contamination issues.

3.6.4.6 Assessment of Contamination

The extent of contamination is to be quantified.
3.6.4.7 Determination of Significance\textsuperscript{16}

The Phase II ESA shall determine the significance of the contamination using the appropriate standards.

3.6.4.8 Documentation

A developmental draft, an MTO accepted draft and final Phase II ESA Reports shall be prepared.

3.6.5 Screening Level Risk Evaluation

3.6.5.1 Reference

Requirements for this step are detailed in Section 6 of the Guide.

3.6.5.2 Description

Screening Level Risk Evaluation\textsuperscript{17} (SLRE) is a qualitative assessment of the site contamination to evaluate the potential short-term and long-term risk of the contamination to the human and natural environment. It is undertaken to facilitate decision-making regarding site management options.

3.6.5.3 Study Area

The Study Area is comprised of the property(s) identified by MTO.

3.6.5.4 Background Data

The background data is the results of the Phase I and II ESA for the property(s).

3.6.5.5 Determination of Significance\textsuperscript{18}

The consultant shall undertake a qualitative assessment of the short and long-term risk of the site contamination to both human and natural environment receptors. Based on this risk assessment, the consultant shall evaluate and recommend remediation options.

\textsuperscript{16} Determination of significance, in this context means the potential short-term and long-term impacts of the contamination.

\textsuperscript{17} The SLRE does not constitute a formal Risk Assessment (as per EPA O.Reg. 153/04).

\textsuperscript{18} Determination of significance, in this context means the potential short-term and long-term impacts of the contamination.
3.6.5.6 Documentation

A developmental draft, an MTO accepted draft and final SLRE Reports shall be prepared. At the sole discretion of MTO, the SLRE Report may be combined with the Phase II ESA report.

3.6.6 Site Management

3.6.6.1 Reference

Requirements for this step are detailed in Section 7 of the Guide.

3.6.6.2 Description

Site management is the design and implementation of an effective and practical strategy to mitigate site contamination. There are three approaches to site management:

- site monitoring;
- site remediation; and
- formal Risk Assessment (as per EPA O.Reg. 153/04).

3.6.6.3 Study Area

The Study Area is comprised of the property(s) identified by MTO.

3.6.6.4 Documentation

The work in the above will be documented in developmental draft, a MTO accepted draft and final documents. Depending on the approach to site management, one or more of the following documents shall be prepared:

- for site monitoring:
  - Site Monitoring Reports
- for site remediation
  - Remedial Work Plan (RWP)
  - Site Remediation Report
  - Record of Site Condition
- for risk assessment
  - Risk Assessment Pre-submission Form
  - Risk Assessment Report
3.6.7 Qualifications

Each step in the contaminated property process has its own qualification requirements as detailed in the Guide. As a minimum, the consulting firm is to hold (or be eligible to hold) a valid Certificate of Authorization from either the Association of Professional Geoscientists of Ontario or Professional Engineers of Ontario and must be able to provide products signed / sealed by either a licensed Professional Geoscientist or Professional Engineer. Also the consultant shall have proven knowledge and experience of the Province of Ontario's waste management and related legislation, regulations, guidelines and policies.

Experience and expertise shall include:

- waste management planning and implementation for construction projects;
- identifying and resolving associated health and safety issues and concerns;
- conducting Phase I and Phase II Environmental Site Assessments and remediation;
- soil assessments;
- environmental impact assessments;
- geotechnical investigations;
- hydrogeological sampling, and/or construction mitigation; and
- experience on MTO projects, and/or projects of similar scale and scope related to contaminated property assessment and management.
Section 3.7: Built Heritage and Cultural Heritage Landscapes (BHCHL)

This section of the Environmental Reference for Highway Design (ERD) provides guidance on the process and procedures for the assessment of built heritage resources and cultural heritage landscapes (BHCHL) during highway design.

This section provides the requirements for:

- the identification and assessment of built heritage resources and cultural heritage landscapes;
- their mitigation (as required);
- technical reports; and
- qualifications of the Cultural Heritage Specialist.

If BHCHL investigations are required, they shall be in compliance with the following (until superseded19):

- Guideline for Preparing the Cultural Heritage Resource Component of Environmental Assessments (Ministry of Culture [MCL], October 1992);
- Guidelines on the Man-Made Heritage Component of Environmental Assessments (MCL, 1980);1
- Mandatory Standards and Guidelines for Provincial Heritage Properties, under Part III, 1 of the OHA (MCL, 2005);
- Ontario Heritage Bridge Guideline (MCL, 1983; Revised 1991);
- Ontario Heritage Bridge Guideline for Provincially-Owned Bridges (MTO and MCL, 2007);20 and

19 The Ministry of Culture (MCL) is developing new Standards and Guidelines that will supersede these guidelines and will provide direction to the provincial ministries and agencies, including MTO, on how to manage and conserve their heritage resources.

20 When released by MTO, the 2007 version will supersede the 1991 version of the Ontario Heritage Bridge Guide. Until that time, the 1991 version by MCL/MTO should be followed.
This document shall be read in conjunction with the Environmental Guide for Built Heritage and Cultural Landscapes (the BHCHL Guide).

Definitions of environmental terms and acronyms are provided in MTO’s Environmental Glossary.

3.7.1 Study Area

For the purposes of investigating the potential impacts of a project on BHCHL, the factor-specific study area is defined as all lands to be negatively affected either through displacement and/or disruption by the proposed highway design and construction within the existing and proposed highway ROW plus off-route zones adjacent or abutting the existing ROW, any specified access roads, detours, staging and storage areas, and areas of other works and activities associated with the construction, operation and maintenance of the highway (see Section 4.1 of the BHCHL Guide).

3.7.2 Background Data

The Cultural Heritage Specialist is to collect and review existing heritage background information as per Section 4.2 of the BHCHL Guide for the study area.

3.7.3 Field Investigation

A Field Investigation shall be conducted to identify built heritage resources and cultural heritage landscape resources of 40 years of age or older within or abutting the Study Area. The field survey shall comprise the following steps undertaken as per the BHCHL Guide:

a) Field Survey - identify and map built heritage resources and cultural heritage landscape units through a “roadside” survey. The Cultural Resource Record Forms (Appendix A of the BHCHL Guide) or an MTO Heritage Bridge Survey Form (see MTO’s Ontario Heritage Bridge Guideline for Provincially-Owned Bridges) shall be completed for each resource as applicable.

b) Updated Field Survey – a further field investigations may be needed to examine any built heritage resources and cultural heritage landscapes newly affected by the design alternatives being considered and to develop preservation/mitigation details.

3.7.4 Determination of Significance

The Cultural Heritage Specialist shall determine whether or not the built heritage resources and cultural heritage landscapes are of character defining or character-contributing significance as per Section 5 of the BHCHL Guide. The determination shall be based on, but not limited to, the following:

- a review of background data as confirmed through field investigations; and
consultation with stakeholders, including but not limited to:

- municipal heritage committees;
- local municipality; and
- applicable provincial (MCL) and federal ministries and agencies.

Character defining resources shall be evaluated for jurisdictional level of significance, i.e., federal, provincial, regional, local or other community of interest.

### 3.7.5 Assessment of Impacts

The potential impacts of (a) highway design alternatives and (b) alternative methods of construction to cultural heritage landscapes and built heritage resources shall be assessed as per Section 5 of the BHCHL Guide including, but not limited to:

- Significance of direct and indirect impacts, and overall affect on any built heritage resources and/or cultural heritage landscapes protected, listed, or identified.

- Overall effect on:
  - buildings or "standing" sites assessed as being of architectural and/or historical significance;
  - buildings or "standing" sites of recognized federal, provincial or local significance;
  - Ontario Heritage Trust easement properties;
  - Heritage bridges and those included on the Ontario Heritage Bridge List;
  - areas of historical 19th and 20th century settlement; and
  - historical cultural heritage landscapes.
3.7.6 Preservation / Mitigation

The Cultural Heritage Specialist shall recommend strategies (Section 5 of the BHCHL Guide) for preservation of / mitigation of impacts to cultural heritage landscapes and built heritage resources. If adverse impacts to a built heritage resource or cultural heritage landscape are to occur, mitigation strategies and details shall be developed (Section 5 and 6 of the BHCHL Guide).

As per Section 6, a Cultural Heritage Resource Documentation Report will be prepared as a stand-alone document prior to:

- the relocation, demolition and salvage of a significant built heritage feature; and/or
- disruption, displacement, isolation or encroachment of a significant cultural heritage landscape.

3.7.7 Documentation

Forms

For each resource, historical information collected and digital photographs from the field survey shall be included on the appropriate form:

- Cultural Heritage Resource Form for Built Heritage Resources (see Appendix A of the BHCHL Guide)
- Cultural Heritage Resource Form for Cultural Heritage Landscapes (see Appendix A of the BHCHL Guide)
- Heritage Bridge Survey Form from MTO’s *Ontario Heritage Bridge Guideline for Provincially-Owned Bridges*.

**Cultural Heritage Resource Assessment Report: Cultural Heritage Landscapes and Built Heritage**

The work in the above sections will be prepared as a Cultural Heritage Resource Assessment Report in conformance with the BHCHL Guide and include the above forms. A developmental draft, MTO accepted draft and final reports / documents will be prepared. Upon MTO approval, reports will be provided to MTO, MCL and the municipality.

**Cultural Heritage Resource Evaluation Report**

A stand-alone Cultural Heritage Evaluation report will be prepared for individual resources as required by and in conformance with the BHCHL Guide.

Also, a stand-alone Cultural Heritage Evaluation Report will be prepared as per Appendix A of the *Ontario Heritage Bridge Guideline for Provincially-Owned Bridges* for a highway bridge or culvert not previously assessed under the aforementioned guideline.
A developmental draft, MTO accepted draft and final reports / documents will be prepared. Upon MTO approval, reports will be provided to MTO, MCL and the municipality.

**Cultural Heritage Resource Documentation Report**

If a built heritage resource or a cultural heritage landscape is determined to be of heritage significance in the Cultural Heritage Resource Assessment Report or the Cultural Heritage Resource Evaluation Report, a Cultural Heritage Resource Documentation Report shall be developed for each resource relocated, salvaged, demolished, or displaced in accordance with the BHCHL Guide and MCL guidance documents. Documents shall be developed in developmental draft, MTO accepted draft and final reports / documents. Upon MTO approval, reports will be provided to MTO, MCL and the municipality.

**3.7.8 Qualifications**

As a minimum, the Cultural Heritage Specialist shall be a member in good standing with the Canadian Association of Professional Heritage Consultants (CAPHC) and have demonstrated knowledge of pertinent Ontario policies and procedures for cultural heritage, of the *Standards and Guidelines for the Conservation of Historic Places in Canada*, and demonstrated experience in fulfilling the requirements of an environmental assessment for built heritage and cultural heritage landscapes. This shall include undertaking the documentation of cultural heritage resources and experience with linear corridor infrastructure projects.
Section 3.8: Cultural Heritage - Archaeology

This section of the Environmental Reference for Highway Design (ERD) provides the requirements and guidance for identifying, assessing, mitigating, and/or protecting any archaeological resources that may be impacted by a highway project. It also provides the requirements for technical reports and qualifications. The guidance provided is consistent with the Ministry of Culture’s four (4)-step process that includes:

- Stage 1 Assessment - Evaluation of Archaeological Potential
- Stage 2 Assessment - Property Assessment
- Stage 3 Assessment - Site Specific Assessment
- Stage 4 - Mitigation, Protection and Monitoring

Potential permanent and temporary impacts to archaeological resources are possible due to the nature of highway design alternatives, alternative methods of construction, and highway operations and maintenance activities. This means that procedures must be put in place that will map, assess and mitigate/protect these resources as early as possible in the study design and planning process to avoid unnecessary loss of or disturbance to these valuable and significant resources.

Definitions of environmental terms and acronyms are provided in MTO’s Environmental Glossary.

3.8.1 Study Area

For the purposes of investigating the potential impacts of the project on archaeological resources, the factor-specific study area is defined as all lands to be impacted/disturbed by proposed highway construction within the existing and proposed highway Right-of-Way, plus any planned and designed access roads, detours, staging and storage areas, and areas of other works and activities associated with the construction, operation and maintenance of the highway.

3.8.2 Background Data

The Archaeologist (see Sub-section 3.8.10 Qualifications) shall become familiar with the project by reviewing the commitments and conditions of approval of the Environmental Assessment, or by consulting the completed Environmental Assessment documentation and approvals, as well as by reviewing any relevant reports on previous archaeological investigations of the study area.
Stage 1 Assessment: Background Research

Information needed for the Stage 1 Assessment includes:

- a review of available project mapping (for example, from previously completed stages of the project);
- a review of the Ontario Archaeological Sites Database (OASD) at the Ministry of Culture;
- a review of land use history and present conditions of the study area;
- the determination of the archaeological potential of the study area;
- the preparation of the Stage 1 Archaeological Assessment report; and
- as necessary, discussions with informants with information regarding archaeological resources in the study area.

Typically, project mapping is to include:

- detailed mapping at a scale of 1:10,000 or lesser showing the study area limits for the project;
- plans that show existing conditions such as watercourses, water bodies, treed areas, contour lines, and structures; and
- mapping that shows the proposed alternatives, the preferred alternative, and preliminary and detail design maps.

3.8.3 Field Investigation

The appropriate field investigation for terrestrial and underwater archaeology is as follows:

Stage 2 Assessment: Property Assessment

The Archaeologist is required to conduct a Stage 2 Assessment in accordance with accepted Ministry of Culture guidelines and precedents.

The locations of identified archaeological sites are to be plotted on the project plans relative to permanent landmarks shown on the plans. Identified archaeological sites include:

- sites previously registered or to be registered as a result of assessment; and
- any other archaeological find-spots (locations of identified archaeological material that may not be registered due to lack of significance and extremely low artifact yield).
The locations of identified archaeological sites are to be determined using standard archaeological procedures, for example with a transit and staid rod or with a Geographic Positioning System (GPS) unit.

Any materials recovered during the course of the field assessment will be analyzed.

The Stage 2 Assessment report will incorporate the results of Stage 2 Assessment field work, and will contain all necessary cartographic and photographic documentation (see Sub-section 3.8.8).

Registered site forms (see Appendix 3.8.A for an example) for an identified archaeological site are to be submitted to the Ministry of Culture within a reasonable timeframe after Ministry of Culture concurrence with the recommendations regarding the site presented in the Stage 2 assessment report.

**Stage 3 Assessment: Site Specific Assessment**

The Stage 3 Assessment is to be carried out in accordance with accepted Ministry of Culture guidelines and precedents.

It will begin with the establishment or re-establishment of a site datum staked in the field and mapped with reference to permanent landmarks shown on MTO plans. Prior to test excavation, an intensified survey of the site is to be made by means of pedestrian survey, test pitting, or underwater (systematic free swim and/or test pit) survey as appropriate.

As warranted, sites are to be test excavated using one-metre square units spaced at intervals across the entire site area as determined by the intensified survey. The Archaeologist is to backfill and stabilizes all excavations. In underwater context, efforts must be made to minimize silt dispersal beyond the site area.

**Stage 4: Mitigation, Protection and Monitoring**

Stage 4 of terrestrial sites will begin with the establishment or re-establishment of a site datum staked in the field and mapped with reference to permanent landmarks shown on MTO plans.

Salvage excavation will include the systematic hand excavation of topsoil in areas of topsoil middens or significantly rich topsoil concentrations of archaeological materials, if necessary.

In areas where systematic hand excavation is not required, topsoil will be removed by using a smooth-bucket Gradall machine (under the supervision of an Archaeologist). Care must be taken to ensure that the subsoil is not disturbed. After topsoil removal, shovels and trowels should be used to identify and excavate archaeological features and foundations.

Features (and stratigraphic levels if applicable) should form the basis of artifact provenience, with the potential exception of artifacts identified during systematic
topsoil excavation. The locations of systematic topsoil excavation areas, artifacts identified in such areas, and features identified following topsoil removal should be plotted with reference to the established site datum. A field excavation plan should be updated daily. The Archaeologist must ensure that all excavations are backfilled and stabilized.

On submerged or underwater sites, Stage 4 will begin with the establishment or re-establishment of a site datum staked in the field and mapped with reference to permanent landmarks shown on MTO plans. Salvage excavation will involve the systematic excavation of remains or significantly rich sediment concentrations of archaeological materials, if necessary. The locations of sediment excavation areas, artifacts identified in such areas, and features identified following sediment removal should be plotted with reference to the established datum. The field excavation plan will be updated daily.

3.8.3.1 Environmental Effect of Archaeological Excavations

Archaeological excavations shall adhere to all Environmental Protection Requirements. Environmental protection measures should include, but are not limited to:

- Erosion and sediment control for exposed soils (e.g., from topsoil stripping of sites). See MTO’s *Environmental Guide for Erosion and Sediment Control During Construction of Highway Projects*.

- The water from dewatering of excavation sites must be controlled (see MTO’s *Environmental Reference for Contract Preparation*, Section 3: Water Resources and Fish and Fish Habitat for available/applicable contract provisions).

- Any vegetation removal shall consider nesting birds and other protected species (see ERD Section 3.2 Terrestrial Ecosystems and MTO’s *Environmental Reference for Contract Preparation*, Section 4: Wildlife and Wildlife Management for available/applicable contract provisions).

- Animals and pedestrians must be protected from the excavation site by installing and maintaining fencing as necessary.

- In underwater context, the potential for the excavation to affect fish and/or fish habitat shall be assessed as per the *Environmental Guide for Fish and Fish Habitat* prior to commencement of in-water work.

3.8.3.2 Appropriate Field Conditions

The Ministry of Culture’s technical guidelines require that all active or formerly worked agricultural lands be freshly ploughed prior to surface survey.

Prior to a walking survey, the agricultural land must be freshly ploughed (within three to four weeks is optimal) and allowed to weather through at least one substantial rainfall. Once the land has sufficiently weathered, a systematic
walking survey will be conducted to identify, collect, and record artifactual remains.

Areas that cannot be ploughed must be assessed by test pitting. Test pitting may also be conducted in narrow corridors of field land (less than approximately 10 metres in width) directly adjacent to existing roadways. Test pits are approximately 30 centimetres square and are excavated to subsoil in order to facilitate the identification of any subsurface cultural deposits. The soil fills of all test pits in high potential areas are screened through 6-millimetre mesh (where soil types allow), to facilitate the recovery of artifactual remains. All test pits will be back-filled. Their location will be recorded on field maps. Any factors that preclude test pits (e.g. slope, drainage, previous disturbance) will be mapped and photographed.

These survey techniques rely considerably on the field expertise and experience of the personnel involved; not only to recognize areas of high archaeological potential, but also to determine where testing is not required.

Archaeological testing should not be carried out under certain adverse weather conditions. Stage 2 Assessments should not be conducted under conditions of steady snow or rainfall that may impair visibility. Stage 2 Assessments and Stage 3 and 4 excavations should not be conducted in frozen soil (i.e., where frost has penetrated to a depth greater than one inch). There are very rare circumstances where excavations proceed through the winter in covered, heated areas. However, such strategies should be reserved strictly for emergency circumstances where there is no opportunity to wait for the frost to leave the ground.

3.8.4 Determination of Significance

Based on the review of the background data and as confirmed through the field investigation, the Archaeologist will determine significance and/or sensitivity of any identified archaeological material to be impacted by land disturbance by conducting a Stage 3 Assessment. At the discretion of the Ministry of Culture and the Archaeologist, a recommendation for Stage 4 Mitigation, Protection and Monitoring of historic Euro-Canadian archaeological sites may be made directly following the Stage 2 Assessment, provided that the recommendation in the assessment report stipulates that the procedures of the Stage 3 Assessment will be completed as the initial phase of Stage 4. Note: The absence of the Stage 3 Assessment may substantially reduce the accuracy of the information that is available for planning the Stage 4 approach. It should also be noted that sites that are to be avoided / protected must always undergo the Stage 3 Assessment in order to accurately establish their boundaries. It should further be noted that no Stage 4 work may proceed without approval from the Ministry of Culture in the form of a Project Information Form returned to the consulting Archaeologist. Submission of the form alone is not sufficient for Stage 4; the form must also be returned to the Archaeologist. It is a violation of archaeological licence terms and conditions to proceed without approval.
3.8.5 Assessment of Impacts

The potential permanent and temporary impacts of:

a) highway design alternatives;

b) alternative methods of construction; and

c) highway operations/maintenance on registered and potential archaeological resources should be identified.

This should include:

- field assessment of undisturbed lands to be impacted by highway design alternatives;
- mapping of registered archaeological sites; and
- areas of archaeological potential to be impacted by alternative methods of construction.

3.8.6 Environmental Protection/Mitigation

Upon completion of the Stage 2 Assessment and, if necessary, the Stage 3 Assessment, the Archaeologist shall provide recommendations to ensure all known or newly discovered archaeological sites are properly mitigated.

Mitigation for sites of potential archaeological resources should include but not be restricted to the following:

a) Accurately determine the boundaries of the site and the degree of significance through Stage 3 assessment.

b) If determined to be significant, recommend avoidance along with protection provisions for the short and long term.

c) If avoidance will not be possible for part of or the entire site, make recommendations for the most appropriate means of mitigation through excavation.

While avoidance is the desired mitigative option, some archaeological sites will remain within the highway corridor. While short term practices such as fencing, monitoring by the Archaeologist, and contractor instruction can protect the site in the short term, there also needs to be long-term protection provisions. Awareness of the presence of the archaeological site and the need to avoid any soil disturbances within the area of that archaeological site need to be incorporated into highway management or highway operations plans. The need to contact the Ministry of Culture for approval of any soil disturbances in that area is imperative and also needs to be incorporated into long-term protection provisions.
3.8.7 Contingency Plan

It is occasionally necessary to put into practice emergency measures to mitigate unexpected impacts on archaeological sites. Although the project limits may have been cleared of documented resources, there is the potential to unearth deeply buried archaeological resources and human remains during construction. If not properly handled these valuable resources could be inadvertently destroyed or not treated with the respect that they deserve.

Where a find is thought to represent an archaeological resource or human remains, work shall be stopped immediately and notification shall be as per MTO contract provisions (see MTO’s Environmental Reference for Contract Preparation, Section 2: General Environmental and Incident Management for available/applicable contract provisions.

The Environmental Planner and Regional Archaeologist shall consult with the Project Archaeologist and if necessary, contact the Ministry of Culture. An investigation shall be carried out to determine an appropriate approach to dealing with the find.

In the event that human remains are found, work shall be stopped immediately and notification shall be as per MTO contract provisions. If it is determined to be of no forensic interest by the Police and Coroner, the Police and/or Project Archaeologist shall contact the Cemeteries Branch of the Ministry of Business and Consumer Services. If the finds are determined to be Aboriginal upon further investigation, the Ministry’s Project Manager, Environmental Planner and/or Project Archaeologist will contact the local Aboriginal group(s) and the Aboriginal group(s)’s designate Archaeologist to assist in the preparation of a report for the Cemeteries Branch. Disposition of the remains shall be based on the report.

An appropriate mitigation strategy shall be developed and implemented in consultation with the Ministry of Culture for all non-burial situations.

For burial situations, a mitigation strategy shall be developed and implemented in consultation with the Cemeteries Branch, Ministry of Business and Consumer Services, Ministry of Culture, and the local Aboriginal group(s).

Work in the vicinity of the find can only be resumed when authorized by the Contract Administrator, in consultation with the Environmental Planner and the Project Archaeologist, and after clearance has been received from the Ministry of Culture.

3.8.8 Documentation

The investigation, assessment and mitigation work will be documented in one or more draft technical and licence reports entitled: Archaeology Technical Report. Developmental draft, MTO accepted draft, and final reports will be developed.
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The draft technical and licence reports shall be in accordance with the Ontario Heritage Act and Ministry of Culture’s Standards and Guidelines for Consultant Archaeologists and include the following:

a) For Stage 1-3 assessment, the identification and description of archaeological remains will be documented and summarized in appropriate sections of the reports.

b) For Stage 4 excavations, mapping and analysis of settlement pattern data, and identification and analysis of artifacts, zooarchaeological remains, and archaeobotanical remains will be documented and summarized in appropriate sections of the reports. The Stage 4 salvage excavation report should include:

- executive summary;
- introduction (background and history of investigations);
- site setting; excavation methods (grid system, test excavations, salvage excavations, special sampling and investigative procedures); and
- results of field work (identification and description of settlement pattern data, artifacts, and zooarchaeological and archaeobotanical assemblages).

3.8.9 Archival Record

The archival record for the project consists of all recovered materials, catalogue, fieldnotes, drawings, maps, photographs, and report. Archaeological material recovered should be packaged appropriately for long-term storage. Storage cartons should be standard-sized (cardboard boxes of approximately two cubic feet and capable of holding a weight of 65 pounds), and each should be clearly labelled with highway, W.P. number, year, site(s), (Borden designation and name), and a full listing of the carton’s contents (copy of artifact catalogue) will be included inside the carton.

All original field notes (consultant to keep copies), sketch and draft plans, photographs (consultant to keep copies), and final license report are to be stored in a separate, clearly labelled carton with the cartons of recovered material.

The archival record for the assessment and excavation including original field notes, photographs, catalogue, drawings, maps and report is to be deposited

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21 The Ministry of Culture’s Standards and Guidelines for Consultant Archaeologists is anticipated to come into effect on March 1, 2007. Until it comes into effect, the Ministry of Culture’s Archaeological Assessment Technical Guidelines (1993) shall be followed.
with Central Region, MTO, Downsview. The consultant is to be responsible for long-term curation of the recovered material from the assessment and excavation.

3.8.10 Qualifications

The Archaeologist shall possess a valid Ontario professional archaeological consulting licence. As a minimum, the Archaeologist shall have demonstrated knowledge of pertinent Ontario policies and procedures as well as experience in conducting Stage 1-3 Assessments and Stage 4 – Mitigation, Protection and Monitoring for corridor projects.

3.8.11 Aboriginal Group(s) Involvement

Unit 6 of the MCL Standards and Guidelines for Consultant Archaeologists, requires archaeological licence holders to engage with interested Aboriginal communities when conducting archaeological field work. However, MTO will be leading such engagement as part of its broader aboriginal consultation within the EA process. Consultants should be prepared to make available all relevant reports and work plans to accommodate this process. In addition, MTO and its consultants will accommodate requests for monitoring archaeological investigations.

3.8.12 References


APPENDIX 3.8.A: Archaeological Site Record

To access the Archaeological Site Record form visit MTO’s website.
Section 3.9: Landscape Composition

This section of the Environmental Reference for Highway Design (ERD) provides guidance on the requirements for landscape composition during highway design. Landscape composition refers generally to the aggregate of elements in a region or area, which include but are not limited to culturally significant vegetation, views and viewsheds, topography, landform, and land use.

This section provides the requirements for:

• the assessment of landscape composition - establish base line conditions for the character of the existing landscape;

• the determination and mitigation of impacts;

• the development of the Landscape Composition Technical Report; and

• key staff qualifications.

It provides comprehensive guidance for Preliminary Design and Detail Design. The guidance is flexible so as to allow for various options in obtaining environmental assessment clearances (See Section 2 - Generic Requirements and Optimal Timelines for Obtaining Provincial and Federal Environmental Assessment Clearances).

Definitions of environmental terms and acronyms are provided in MTO’s Environmental Glossary.

3.9.1 Study Area

The factor-specific study area is defined as all landscaping conditions within the existing and proposed highway Right-of-Way (ROW) plus the surrounding viewshed.

3.9.2 Background Data

As an integral part of landscape investigation, the Landscape Architect is required to review all pertinent information on fish and fish habitat, terrestrial ecosystems, noise, land use, waste management, heritage, and air issues relative to the project. Such background information shall be available from other factor-specific environmental services under the design. Various landscape treatments may have been identified under the Environmental Protection/Mitigation section for those factors.
3.9.3 Field Investigation

The Landscape Architect (See Sub-section 3.9.8 Qualifications) is required to conduct an inventory and analysis (species, condition, etc.) of all specimen trees located within and immediately adjacent to the existing and proposed highway ROW. The Landscape Architect is also required to carry out field investigation of existing visual and ROW landscape features such as:

- natural geomorphologic landforms, waterscapes, or vistas within the viewshed of the highway;
- aesthetic and non-aesthetic man-made features within the viewshed of the highway;
- scenic composition, arrangement, and sequence of visual landscape features; and
- density and proximity of surrounding dwellers with views of the highway.

3.9.4 Determination of Significance

The Landscape Architect is required to collect information on the significance and sensitivity of all identified landscape features as determined by other factor-specific environmental services. Such information may include but not restricted to:

- vulnerability of specimen trees to design and construction-related damage;
- provincially significant landscape features (e.g. Niagara Escarpment, designated heritage sites);
- regionally rare tree species and landscape types, vegetation associated with ANSI's, ESA's; and
- locations and types of environmentally sensitive land use.

The Landscape Architect shall determine the significance of the view from the highway, and the sensitivity of the views of the highway.

3.9.5 Assessment of Impacts

In addition to the assessment of visual impacts on ROW vegetation and sensitive view groups, the Landscape Architect shall gather information on landscape impacts determined by other factor-specific environmental services. By compiling this information, the Landscape Architect can determine the overall impacts such as:

- impacts on landscape vegetation relative to long term soil erosion protection;
- impacts on landscape vegetation relative to fisheries potential;
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- impacts on rare vegetative species;
- visual impacts of noise attenuation treatments;
- vegetative buffer requirements relative to traffic generated contaminants such as dust, fumes, grime, glare and heat radiation on surrounding areas;
- socio-economic impacts of view of the highway, based upon the sensitivity of the surrounding dwellers;
- tourism-related socio-economic impacts;
- impact on heritage features; and
- impact on vegetative cover relative to air quality concerns.

3.9.6 Mitigation

The Landscape Architect shall summarize the environmental impacts that are to be mitigated via Landscape Architecture means by combining the background data provided by other pertinent factor-specific environmental services, and the field inventory and analysis of the existing ROW landscape conditions. The areas requiring landscape mitigation may include specific or combined treatment relative to:

- fish and fish habitat protection/mitigation/compensation;
- terrestrial ecosystem protection/mitigation;
- noise barrier aesthetics;
- effects on land use;
- heritage landscape features; and
- air quality.

The Landscape Architect shall also provide design influence on civil engineering components. The Landscape Architect is required to review removal and grading proposals in a timely and integrated manner, and make recommendations towards preservation of landscape features, and contour grading by effective placement of surplus fill material for environmental mitigation purposes where applicable.

The design concept shall reflect the appropriate level of treatment to mitigate environmental impacts relative to all identifiable environmental issues, including landscape concerns raised during the course of the design, and those resulting from the external agencies and public consultation process.
The Landscape Architect is required to prepare a conceptual landscape plan for discussion and review at the intermediate stage of the design process. It shall be in 1:1000 scale and include all environmental mitigation needs identified by other factor-specific environmental services. (Colour rendering and foamboard-mounting shall be performed for presentation purposes in Public Information Centres, as warranted).

The Landscape Architect is required to prepare detailed contract drawings to be incorporated into the overall tender package of the construction contract. Landscape planting components of the contract package include landscape planting plans, planting details, Planned Quantity Payment quantities, Non-Standard Special Provisions (NSSP’s) and other pertinent Contract Preparation System (CPS) documentation in conformity to MTO standards. The capital cost of landscape development shall not exceed that specified in Ministry Directive B-154, Landscape Development - Capital Funding Guidelines.

3.9.7 Documentation

The work carried out as per the above sections will be documented in developmental draft, MTO accepted draft and final documents entitled Landscape Composition Technical Report. The number of copies of the developmental draft, MTO accepted draft and final reports (MTO and regulatory agency accepted) will be determined in consultation with MTO.

The documents will include:

- title page;
- table of contents;
- introduction;
- site map;
- methodology; and
- full listing of the secondary source information and reference materials.

Reports will be prepared and signed by the appropriate qualified staff. Technical summaries that include the following shall be provided for inclusion in environmental assessment documentation;

- the inventory and analysis of the existing landscape features on 1:1000 scale base plans;
- landscape vegetation including the species, size and health condition of individual specimens or groups plus additional descriptions where applicable;
- notable views from the highway;
views of the highway from sensitive viewer groups;

- the conceptual plan; and

- contract drawings and documents per CPS.

### 3.9.8 Qualifications

Landscape Architect shall, as a minimum, have demonstrated knowledge of pertinent Ontario policies, procedures and MTO Design Guidelines as well as proven professional experience in highway landscape design through the successful completion of projects of similar scale and complexity. The Landscape Architect shall be in good standing with the Ontario Association of Landscape Architect.
Section 3.10: Air

This section of the *Environmental Reference for Highway Design* (ERD) provides guidance on the overall Air Quality and Greenhouse Gas (AQ/GHG) scope of assessment and mitigation, as well as the assessment components specifically for Group ‘A’ and Group ‘B’ project projects.

It provides the requirements for:

a) the assessment of AQ/GHG assessment;

b) the assessment of need for mitigation and evaluation of options;

c) reporting; and

d) qualifications of AQ/GHG specialist consultants.

For direction regarding how to conduct the assessments, refer to the most recent version of MTO’s Environmental Guide for Assessing and Mitigating the Air Quality Impacts and Greenhouse Gas Emissions of Provincial Transportation Projects (the Guide).

The Guide stipulates that the above noted assessments will be carried out in all MTO Individual and Group A and B Class Environmental Assessment projects, except in those specific cases where such assessments may not be necessary due to the “insignificance” of expected impacts. In these specific cases, MTO will need to present its rationale to MOE and seek a waiver.

3.10.1 Study Area

For major roads, the Study Area is limited to the area within approximately 500 m of the road.

3.10.2 Background Information

Sensitive and critical receptors are defined in the Guide, as well as the terms ‘local’ and ‘regional’ air quality assessments.

3.10.3 Field Investigation

A field investigation shall be carried out to identify sensitive and critical receptors including any approved developments.
3.10.4 Impact Assessment Objectives

The AQ and CC/GHG impact assessment will serve the following specific objectives:

1. Provide comparative pollutant emission estimates that can be used in the selection of the “preferred” transportation and route alternative(s). This information can become part of the set of traditional project planning and design criteria and enhance the societal value of the selection process.

2. For the preferred alternative and the planning timeframe (typically, 20 years):
   - Assess local air quality impacts and, specifically, the likelihood, extent and duration of exceeding provincial ambient air quality criteria and national air quality standards. The results of this assessment are of direct interest to the agencies and to local residents, institutions and businesses.
   - Assess regional air quality impacts. The results of this analysis are of particular interest to local, provincial and federal governments and can assist in the project approval process. The impacts can be either positive or negative relative to a do-nothing scenario.
   - Assess the incremental increase or decrease in expected greenhouse gas emissions. This information is of particular interest to the provincial government with respect to the Climate Change Action Plan and the federal agencies responsible for Canada’s international efforts on Climate Change (CC).

3. Assess the need for and practicality of mitigation measures and predict their utility. This information can be useful to MTO, regulatory agencies, stakeholders, and the public. Refer to Figure 1 and 2 for methodology overview flowcharts.

Tasks

A comprehensive AQ and CC/GHG assessment can pursue the above objectives by performing the six tasks listed below.

a) Assessment of transportation planning alternatives;

b) Assessment of route alternatives;

c) Detailed assessment of the preferred alternative (selected transportation planning and route option);

d) Assessment of need for mitigation;

e) Evaluation of mitigation options; and
f) Reporting.

### 3.10.5 Scope of Assessment

In this reference document, it is assumed that a typical AQ/GHG assessment will include all components of a complete assessment - even though some components may not be deemed essential in certain projects. Hence, MTO calls for the technical expertise necessary to complete all components of a complete assessment.

#### For Group ‘A’ Projects

1. If the starting point is **area planning**, then the assessment will usually include:
   - burden analysis (for each alternative);
   - local and regional AQ and GHG emission impact assessments (for each route alternative); and
   - comprehensive local and regional AQ and GHG emission impact assessments (for the preferred route).

2. If the starting point is **route planning**, then the assessment will usually include:
   - local and regional AQ and GHG emission impact assessments (for each route alternative); and
   - comprehensive local and regional AQ and GHG emission impact assessments (for the preferred route).

3. If the starting point is **preliminary design**, then the assessment types will usually include:
   - comprehensive local and regional AQ and GHG emission impact assessments (for the preferred route).

#### For Group ‘B’ Projects

1. If the starting point is preliminary design, then the assessment types will usually include:
   - local and regional AQ and GHG emission impact assessments (for each design alternative); and
   - comprehensive local and regional AQ and GHG emission impact assessments (for the preferred design).

2. If the starting point is **detail design**, then the assessment types will usually include:
3.10.6 Limitations/Determination of Significance

The approach to AQ and CC/GHG impact assessment is limited to prediction of emissions and ambient pollutant concentration levels. It does not extend to an explicit prediction of health and welfare effects.

3.10.7 Environmental Protection/Mitigation

MTO has jurisdiction over a very limited set of mitigation options. The mitigation options for local and regional impacts are discussed in Appendix 5.

3.10.8 Documentation

The AQ and GHG emissions assessment and mitigation work will be documented in a stand-alone report, which provides the full context of the project and a detailed presentation and interpretation of the results. This project specific report will not need to justify the methodology employed. This will be accomplished by referencing the appropriate sections of the AQ Guide.

3.10.9 Qualifications

An individual with a university degree in one of the relevant disciplines: environmental, chemical or civil engineering, chemistry, physics, meteorology, or environmental sciences.

**Good understanding of:**

- transportation engineering and transportation planning principles and practices;
- provincial, national and international environmental legislation, standards, best practices, and current developments; and
- the science and practice of meteorology.

**Thorough knowledge of:**

- the environmental assessment process, as it applies to MTO transportation projects; and
- MTO’s Air Quality & Greenhouse Gases Guide.

**Up-to-date knowledge of:**

- vehicle and fuel technologies and related standards;
- vehicle emission prediction models and demonstrated experience using them; and
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- air pollutant dispersion models relevant to transportation projects and demonstrated experience using them.

**Demonstrated ability to:**

- effectively present air quality and GHG emissions impact assessment reports; and
- respond to relevant technical questions in front of large public audiences.
- write professional transportation air quality and GHG emission impact reports.
Figure 1: Methodology Flowchart: Selection of Preferred Alternative

**Number of Transportation Planning Alternatives >1?**

- **NO**
  - **NO**
    - NO, or PM$_{2.5}$ or GHG emissions > 0.1% of provincial total?
      - **NO**
        - Number of credible route alternatives > 1 (i.e., highway & transitway)
          - **YES**
            - Input to Selection Process
          - **NO**
            - Difference of Route Lengths > 10% or 1 km?
              - **YES**
                - Conduct Emission Burden Analysis for each Transportation Planning Alternative (TASK 1)
              - **NO**
                - Input to Selection Process
      - **YES**
        - Conduct Emission Burden Analysis for each Route Alternative (TASK 2)
        - Conduct Credible Worst-Case Air Quality Analysis of each Route Alternative (TASK 2)

**Selection of Preferred Alternative**
Figure 2: Methodology Flowchart: Assessment of Preferred Alternative

ASSESSMENT OF PREFERRED ALTERNATIVE

Preferred Alternative

Credible Worst-Case Analysis of Preferred Alternative (From Task 2)

Any AAQC/CWS Exceedances?

YES

Comprehensive Analysis of Preferred Alternative (TASK 3)

NO

Regional AQ & GHG Emission Analysis of Preferred Alternative (TASK 3)

Is Mitigation Needed? (TASK 4)

NO

YES

Evaluation of Mitigation Options (TASK 5)

AQ & CC Report (TASK 6)
Section 3.11: Surface Water

This section of the Environmental Reference for Highway Design (ERD) provides the requirements during highway design for:

- the assessment of surface water resources;
- the determination and mitigation of impacts;
- the development of the technical reports; and
- qualifications.

Definitions of environmental terms and acronyms are provided in MTO’s Environmental Glossary.

This document provides comprehensive guidance for Preliminary Design and Detail Design. The guidance is flexible so as to allow for various options in obtaining environmental assessment clearances. See Section 2 - Generic Requirements and Optimal Timelines for Obtaining Provincial and Federal Environmental Assessment Clearances the timing (i.e., Preliminary Design or Detail Design) of elements.

Note: This section is intended to be in addition to drainage and other design work requirements. This section does not, in any way, supersede or otherwise relieve a consultant from undertaking drainage and other design work as per MTO documents including but no limited to:

- Drainage Design Standards; and

3.11.1 Study Area

For the purposes of assessing the potential surface water related impacts of the proposed highway, the Study Area is defined as all waterbodies (including upstream and downstream areas, and associated features such as flood plains etc.) to be impacted / disturbed by the proposed highway construction within the proposed transportation corridor, plus access roads, detours, staging and storage areas, and areas of other works and activities associated with the construction of the highway.

3.11.2 Background Data

Background data should be obtained from credible sources including: Fisheries and Oceans Canada, Environment Canada, Ontario Ministry of Natural Resources, Ontario Ministry of the Environment, Conservation Authorities, local municipalities, etc. Preliminary work completed by other members of the Study Team for other environmental factor areas should also be collected and reviewed.
Information sources should include, but not be restricted to:

- topographic and other mapping;
- aerial photography;
- geotechnical and hydrogeologic investigations;
- subwatershed management plans, drainage reports, and/or storm water management plans;
- contract drawings;
- soils maps;
- municipal land use plans; and
- maps of vulnerability to low flow conditions.

Data should include but not be restricted to:

- water quality and quantity data (including temperature and baseflows);
- local precipitation and other climatic data;
- fish and terrestrial habitat data;
- lake and harbour water levels;
- downstream surface water uses; and
- data related to wetland hydrology.

### 3.11.3 Field Investigations

To facilitate the surface water evaluation and subsequent design of drainage and storm water management measures, field reconnaissance should be conducted for areas within and adjacent to the transportation corridor. The purpose of the field investigation(s) should be to:

- familiarize the designer with site conditions;
- collect raw and supplemental data relating to surface water drainage;
- verify background data;
- identify and investigate areas of concern as identified by the review of background data;
- identify the need for additional data from Study Team members completing work for other factor areas; and
• identify the need for a detailed or special purpose survey.

The field investigation requirements outlined in this section are presented under the assumption that an engineer or engineering technologist will complete the fieldwork. Accordingly, the field data collected will need to be supplemented with the field data collected by other members of the Study Team for their respective environmental factor areas.

a) Information collected during field reconnaissance should include, but not be restricted to:

• characteristics of existing culverts and bridges, such as dimensions, construction material, sediment accumulation, high water marks, structural integrity, etc.;

• existing upstream and downstream channel characteristics, such as geometry, flow rate, depth of flow, substrate, vegetative cover both in the channel and on the surrounding floodplain, bank stability, general gradients, erosion sites, etc.;

• general observations regarding the quality of surface water in natural features along the transportation corridor;

• outfall locations for existing highway sewer systems;

• locations where surface water is released into the highway Right-of-Way (ROW) from external lands, as well as locations where surface water will be released from the highway ROW to external lands;

• water levels and extents of ponding in existing natural and man-made features that receive/will receive surface water from the lands in the transportation corridor, including wetlands, watercourses, lakes, roadside ditches, storm water, agricultural ponds, etc.;

• relief flow routes;

• evidence of historical flooding, erosion and/or sedimentation;

• dams and other stream controls, including beaver dams; and

• evidence of past beaver activity.

b) A photographic inventory should be compiled to document, at a minimum:

• evidence of existing flooding, erosion and sedimentation;

• characteristics of existing culverts and structures;

• condition of existing roadside drainage works;
characteristics of existing features of the natural environment that receive/will receive surface water from the lands in the transportation corridor, including wetlands, watercourses, lakes, roadside ditches, storm water, agricultural ponds, etc.; and

changes in site conditions, application of other approvals (such as development activities) and other works in the area should be noted and the information used in refining (either scoping or expanding) the nature of required fieldwork.

3.11.4 Determination of Significance

Compiled background data and the observations made during the surface water field investigation should be used to characterize and assess the performance of the existing surface drainage network in the Study Area. The assessment should include, but not be limited to:

an overview of the watershed/subwatershed surface drainage patterns and characteristics including base flows;

identification of significant groundwater recharge and discharge areas;

a description of surface water quality and quantity, within a watershed context;

an overview of the significance and sensitivities of fish and terrestrial habitat in features of the natural environment that receive/will receive surface water drainage from lands in the transportation corridor, based on input from other Study Team members;

an overview of the sensitivities of water uses defined for receiving surface water conveyance networks; and

a hydraulic performance evaluation of existing drainage works, with reference to criteria defined by the current policy framework and surface water Environmental Protection Requirements.

The preliminary surface water assessment should be provided to and reviewed with other members of the Study Team. Similarly, the assessments completed for their respective factor areas should be reviewed prior to finalizing the surface water drainage assessment. This will be done to ensure that the measures recommended for surface water conveyance and management comprehensively address the needs of the natural environment in all relevant aspects of the design.

This integrated review process is necessary to guide the specification of crossing characteristics (i.e., locations, types, alignments, dimensions, etc.), incorporation of design enhancements that address fish and terrestrial needs, and formulation of an effective drainage and storm water management strategy.
This activity is an important prerequisite in route location and subsequent design planning because identifying important resource areas and ecological functions and then avoiding these areas to the extent possible will serve to reduce or minimize residual effects on these features and functions.

The determination of significance will also assist in identifying what, if any, resource features would meet the criteria for Valued Ecosystem Components (VEC) as defined in the CEAA Reference Guide to Completing an Environmental Assessment, in the event that the undertaking triggers a CEAA screening. Identified VECs would then be subject to an impact review as highlighted in Subsection 3.11.5. It is important that the information and analysis contained in the Provincial EA documentation is sufficient to identify potential VECs and impacts if a future CEAA screening is triggered w/o.

3.11.5 Assessment of Impacts

An assessment should be completed to identify the potential short-term and long-term surface water related impacts associated with each of the following:

a) the various highway design alternatives;

b) alternative methods of construction; and

c) operations and maintenance.

At a minimum, the assessment shall consider:

- interim and ultimate configurations of the highway;

- the quality and quantity of surface water runoff discharged from the transportation corridor;

- changes to surface water flow patterns, quantities or quality;

- the capacities of existing highway drainage works, features of the natural environment and agricultural and urban drainage systems that receive/will receive surface water from lands in the transportation corridor or could potentially have their hydrologic performance characteristics altered by the proposed highway works;

- water levels in features of the natural environment that receive/will receive surface water from lands in the transportation corridor, at locations both upstream and downstream of the highway;

- surface water flow patterns, including locations where surface water from external areas will be intercepted by the highway drainage system, and locations where surface water will be released from the transportation corridor;
• erosion potential in features of the natural environment, as well as urban and agricultural drainage systems, that receive/will receive surface water from lands in the transportation corridor;

• the effects on hydrologic functions of surface water features and on the hydrologic integrity of the watershed;

• upstream and downstream water uses;

• conflicts with existing site-specific management practices and/or plans;

• the effects on the hydrologic functions of features and the hydrologic integrity of the watershed;

• requirements for temporary construction access as well as potential permanent access;

• erosion and sedimentation during construction; and

• highway operations and maintenance activities that could introduce deleterious and potentially harmful substances to surface water.

The preliminary surface water impact assessment should be provided to and reviewed with other Study Team members. Similarly, the assessments completed for their respective factor areas should be reviewed prior to finalizing the surface water impact assessment. The identified impacts will facilitate the formulation and assessment of design and construction alternatives, as well the selection of mitigation measures.

The above listing of impact issues will not necessarily apply to every highway project. In some cases only a subset of the listed issues will be applicable, depending on the study setting and site conditions. Following the selection of mitigation measures, as presented in Sub-section 3.11.6, the impact assessment must be expanded to include an assessment of the residual effects after the application of mitigation measures.

In the event that the undertaking triggers the requirements of CEAA, the information collected must be adequate to enable the identification of resources/issues that clearly meet VEC criteria. In that case, the significance of the residual environmental effects of the project after applying the proposed mitigation measures should be predicted and described, considering the following factors:

• direction (of effects);

• timing;

• duration;

• frequency;
• magnitude;
• reversibility;
• geographic extent;
• probability of occurrence; and
• cumulative impacts.

Under CEAA, residual environmental effects should be compared against existing (or proposed) standards, criteria and thresholds (where such information is available), and their ecological context and importance described and documented.

3.11.6 Environmental Protection/Mitigation

A variety of structural, vegetative and/or procedural measures should be integrated, as required, to mitigate potential short-term and long-term impacts of the proposed highway works on the quality and quantity of surface water. Mitigation measures could include, but not be restricted to:

• design alternatives/elements;
• surface water conveyance and management measures;
• strategic plantings to enhance the performance of proposed drainage and storm water management measures;
• erosion and sediment control measures that will be implemented during construction;
• construction methods and operational constraints, such as complying with timing restrictions for all in-stream works;
• measures for spill control/containment/contingency plans; and
• a construction inspection and monitoring plan, including use of qualified personnel, reporting and response procedures.

The selection and subsequent design of mitigation measures should be completed in consultation with the other members of the Study Team to ensure that the selected measures comprehensively address the concerns of all environmental factor areas.
3.11.7 Documentation

As part of the highway planning and design, all work completed to characterize the existing surface water conveyance system, to assess surface water related impacts of the proposed highway project, and to select and design mitigation measures should be documented as follows:

a) Hydrology Reports for Water Crossings: the guide for preparing this report is found at: http://www.mto.gov.on.ca/english/engineering/drainage/hydrology/index.html

b) An Existing Conditions Drainage Mosaic should be prepared identifying, at a minimum:

- the project limits and the extent of the proposed transportation corridor;
- the significant natural environmental features, and agricultural and urban surface water conveyance works that receive/will receive surface water from lands in the transportation corridor and/or could potentially have their existing hydrologic performance characteristics impacted by the proposed highway works;
- the existing surface water conveyance and management measures provided within the transportation corridor, such as culverts, bridges, storm water management ponds, roadside ditches, sewer systems, etc.;
- the catchment boundaries for areas contributing drainage through the transportation corridor;
- the overland flow patterns both within and upstream of the proposed transportation corridor;
- the relief flow paths over an existing highway; and
- the locations where surface water is released from an existing transportation corridor.

c) An Existing Conditions Brief shall be prepared including, at a minimum:

- the Existing Conditions Drainage Mosaic;
- a summary of compiled background information;
- field notes and a summary of significant observations made during field investigations(s);
- an overview of information compiled for other factor areas that could potentially impact the design and evaluation of surface water conveyance and management measures;
• an overview of the current policy framework, including the identification of relevant Environmental Quality Standards;

• documentation of the characteristics of existing highway surface water conveyance and management works;

• technical analyses completed to quantify the surface water released through the transportation corridor under existing conditions, and to evaluate the hydraulic performance of existing surface water conveyance and management works and/or features of the natural environment;

• identification of existing erosion and flood-prone sites;

• a review of opportunities for mitigating surface water related impacts of an existing highway alignment on features of the natural environment, and surrounding agricultural and urban drainage works; and

• initial recommendations for mitigating any deficiencies identified in existing highway surface water conveyance and management works.

d) A Drainage and Storm Water Management Report should be prepared including, at a minimum:

• information from the Existing Conditions Brief as it relates to the selection and design of surface water conveyance and storm water management works for the project;

• an overview of the current policy framework;

• specification of design objectives and criteria based on requirements of the current policy framework, the surface water Environmental Protection Requirements, existing characteristics through and in the vicinity of the proposed transportation corridor, potential surface water related impacts associated with the proposed highway works, and ecological requirements identified by members of the Study Team for other environmental factor areas;

• an Updated Drainage Mosaic illustrating characteristics of the post-construction surface water conveyance and management system along the proposed transportation corridor, including flow patterns, new culvert and bridge crossing locations, components of the roadside and median drainage systems, alterations to features of the natural environment that provide a surface water conveyance function (i.e., watercourses, wetlands, lakes, etc.), permanent flow diversions and locations of surface water management measures required to meet the design objectives and criteria;

• technical analyses completed to:
quantify changes in surface water quantity through the transportation corridor;

evaluate the hydraulic performance of proposed surface water conveyance works; and

assess the effectiveness of proposed surface water management measures.

design recommendations for:

modifications to components of the existing surface water conveyance and management system;

new surface water conveyance and management works;

enhancements to surface water conveyance works that will be required to mitigate surface water related impacts on features of the natural environment, and to maintain or enhance existing aquatic and terrestrial habitat and linkages;

temporary erosion and sediment control measures that will be required during construction;

temporary surface water conveyance and diversion measures that will be required to maintain a hydraulic connection between the upstream and downstream sides of the proposed highway during construction; and

contract plates showing plans, profiles and cross-sections for surface water conveyance and storm water management works.

confirmation that the design of the proposed surface water conveyance and management system complies with all applicable Environmental Protection Requirements.

e) Input to documentation being prepared by members of the Study Team for other environmental factor areas, as required.
The above reports are intended to provide background information and technical information to support the final project recommendations set out in the appropriate Class EA documentation. Section 6: *Environmental Assessment Documentation* details the requirements for Environmental Assessment documentation; and Section 2 - *Generic Requirements and Optimal Timelines for Obtaining Provincial and Federal Environmental Assessment Clearances* outlines documentation requirements for various options in obtaining Environmental Assessment clearances.
3.11.8 Qualifications

Work shall be completed by a qualified water resources engineer in consultation with qualified practitioners representing the other environmental factor areas, including environmental planners, ecologists, hydrogeologists, fluvial geomorphologists, etc. The water resources engineer should have demonstrated professional experience in completing surface water assessments in a highway setting, including the characterization of existing surface water conveyance networks, completion of impact assessments, and the selection and design of an integrated surface water conveyance and management system that incorporates design enhancements to address the needs of other environmental factor areas.
Section 3.12: Designated Areas

3.12.1 Definition of Designated Areas

Designated Areas are defined by resource agencies, municipalities, the government and/or the public, through legislation, policies, or approved management plans, to have special or unique value. Such areas may have a variety of ecological, recreational, and/or aesthetic features and functions that are highly valued.

Designated Areas include but are not limited to:

- Provincial Land Use and Environmental Plans areas:
  - Oak Ridges Moraine;
  - Niagara Escarpment; and
  - Greenbelt.
- Other area’s:
  - Bruce Trail;
  - Trans Canada Trail;
  - National and Provincial Parks;
  - Designated federal wildlife/marine areas;
  - RAMSAR wetlands;
  - Remedial Action Plan areas (RAP);
  - International Biological Program areas;
  - World Biosphere Reserves;
  - Designated heritage rivers;
  - Environmentally Sensitive Areas (ESA);
  - Environmentally Sensitive Policy Areas (ESPA);
  - Provincially Significant Areas of Natural and Scientific Interest (ANSI);
  - Conservation Authority parks/Open Space lands;
  - Stewardship lands; and
  - Land trust areas (such as Nature Conservancy of Canada and others).
3.12.2 Determining Designated Areas

The boundary(s) of Designated Areas are to be identified and mapped using information from appropriate sources including:

- federal government agencies (e.g., Park Canada);
- provincial government agencies (Ministry of Municipal Affairs and Housing; Ministry of Natural Resources, etc.);
- local Conservation Authority(s);
- municipal land use plans; and
- management plans (e.g., Niagara Escarpment Plan, Oak Ridges Moraine Conservation Plan).

Municipal Official Plans provide specific policies and direct guidance on local or regional environmental matters that may be affected by development (including transportation projects). Transportation projects need to consider such policies/guidelines in the context of the Environmental Assessment process and subsequent design / construction. The policy and guidelines may identify Designated Areas that require consideration in an undertaking.

3.12.3 Approach to Designated Areas

For most other Designated Areas, the main difference in approach between Designated Areas and elsewhere in the province is the “environmental significance” and “level of effort”. Simply put, there is an expectation that the inherent significance of these areas and their special environmental protection status be recognized, and therefore that extra effort go into data gathering, understanding the environment, understanding the potential impacts of the project, avoidance of impacts, and actions to mitigate residual impacts.

In addition to the requirements of other factor-specific sections (e.g., Section 3.2 Terrestrial Ecosystems), the consultant is required to undertake any additional work needed to address the specific requirements for Designated Areas as highlighted in the Environmental Protection Requirements including but not limited to:

- expanding the Study Area;
- gathering additional background information;
- conducting additional field inventories during appropriate season(s) and periods as needed; and
- developing appropriate environmental protection and/or mitigation.
Additional details on how to meet these requirements for Provincial Land Use and Environmental Planning Areas are provided below.

3.12.4 Provincial Land Use and Environmental Planning Areas

In recognition of their unique and highly sensitive environmental features, the government of Ontario has designated special environmental planning areas and approved plans to protect the Niagara Escarpment, the Oak Ridges Moraine and the Greenbelt. In doing so the government has set a higher standard for environmental protection for these areas than elsewhere in the Province. The Niagara Escarpment has further been designated as a World Biosphere site; a very special status dictating even greater care.

The MTO is committed to protecting all designated areas, however special attention must be given to achieving the objectives of the relevant plans when planning, designing, constructing and maintaining highways within the areas covered by the Niagara Escarpment Plan, the Oak Ridges Moraine Conservation Plan (ORMCP) and the Greenbelt Plan. The Environmental Protection Requirements provides an interpretation of these requirements as they apply to MTO.

While transportation projects are permitted through the Plan areas, the Environmental Assessment must demonstrate that the highway project is needed and that there is no reasonable alternative to that being proposed. Project design and construction activities will be expected to be put through a higher environmental test to demonstrate that the potential impacts are fully understood, that mitigation can minimize or avoid the impacts, and the net effects are acceptable.

3.12.4.1 Oak Ridges Moraine

When undertaking environmental impact studies and protection / mitigation design for provincial highways, the consultant shall address the requirements of the Oak Ridges Moraine Plan as detailed in the Environmental Protection Requirements with special attention paid to maintaining the ecological integrity of these areas. Appendix 3.12.A provides a list of considerations and

MTO’s Environmental Protection Requirements are a synthesis of the over 60 environmental statutes and the supporting regulations and formal government policies interpreted as to how each is applied to transportation planning and highway design, construction, operation and maintenance activities. The EPR’s can be found in the document entitled Environmental Protection Requirements for Transportation Planning and Highway Design, Construction, Operation and Maintenance.
Ministry of Transportation
Environmental Reference for Highway Design

requirements for an environmental impact study and environmental protection / mitigation in the Oak Ridges Moraine.

3.12.4.2 Niagara Escarpment

When undertaking environmental impact studies and protection / mitigation for provincial highways, the consultant shall address the requirements of the Niagara Escarpment Plan as detailed in the Environmental Protection Requirements with special attention paid to provide for the maintenance of the Niagara Escarpment and land in its vicinity substantially as a continuous natural environment. 

Appendix 3.12.B provides a list of considerations and requirements for environmental impact studies and environmental protection / mitigation on the Niagara Escarpment.

3.12.4.3 Greenbelt

When undertaking environmental impact studies and protection / mitigation design for provincial highways, the consultant shall address the requirements of the Greenbelt Plan as detailed in the Environmental Protection Requirements with special attention paid to protecting against the loss and fragmentation of the agricultural land base; protecting the natural heritage and water resource systems; and providing for a diverse range of economic and social activities associated with rural communities, agriculture, tourism, recreation and resource uses. Appendix 3.12.C provides a list of considerations and requirements for environmental impact studies and environmental protection / mitigation in the Greenbelt.
APPENDIX 3.12.A: Oak Ridges Moraine

Considerations and Requirements for Environmental Impact Assessments and Protection / Mitigation

Tables:

3.12.A.1 Environmental Impact Study Considerations for the Oak Ridges Moraine

3.12.A.2 Requirements for Protection and /or Mitigation in Design and Construction for Design Activities and Environmental Factors for the Oak Ridges Moraine
**Table 3.12.A.1 Environmental Impact Study Considerations for the Oak Ridges Moraine (ORM)**

The following are in addition to the requirements in the Environmental Reference for Highway Design Section 3 - Technical Requirements for Factor Specific Areas

<table>
<thead>
<tr>
<th>Environmental Factor</th>
<th>Considerations for the Oak Ridges Moraine</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>GENERAL PRINCIPLES</strong></td>
<td></td>
</tr>
<tr>
<td>Natural Core Areas</td>
<td>• Maintain and, where possible, improve or restore the ecological integrity</td>
</tr>
<tr>
<td>Natural Linkage Areas</td>
<td>• Maintain and, where possible, improve or restore the ecological integrity and maintain, and where possible, improve or restore, regional-scale open space linkages between Natural Core Areas and along river valleys and stream corridors</td>
</tr>
<tr>
<td>Countryside Areas</td>
<td>• Encourage agricultural and other rural uses that support the Plan’s objectives, and encourage ecological integrity in the Countryside Areas</td>
</tr>
<tr>
<td>Section 3.1 Fish and Fish Habitat</td>
<td></td>
</tr>
<tr>
<td>Habitat</td>
<td>• Maintain and, where possible, improve or restore the health, diversity, size and connectivity for the feature and the related ecological functions (ORM-1, 2,3)</td>
</tr>
<tr>
<td></td>
<td>• Maintain natural stream form and flow characteristics (ORM-1, 2,3)</td>
</tr>
<tr>
<td>Section 3.2 Terrestrial Ecosystems</td>
<td></td>
</tr>
</tbody>
</table>
### Environmental Factor

<table>
<thead>
<tr>
<th>Environmental Factor</th>
<th>Considerations for the Oak Ridges Moraine</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Determine Key Natural Heritage Features</strong></td>
<td>• Maintain and, where possible, improve or restore the health, diversity, size and connectivity for the feature and the related ecological functions (ORM-1, 2,3)</td>
</tr>
<tr>
<td>Wetlands</td>
<td>• See MTO’s Environmental Guide for Wildlife in the Oak Ridges Moraine</td>
</tr>
<tr>
<td>Significant portions of the habitat of endangered, rare and threatened species</td>
<td>• The following Technical Papers from the Ministry of Municipal Affairs and Housing (MMAH) will be considered when determining key heritage features:</td>
</tr>
<tr>
<td>Significant valleylands</td>
<td>• Technical Paper 1 - Identification of Key Natural Heritage Features on the Oak Ridges Moraine</td>
</tr>
<tr>
<td>Significant woodlands</td>
<td>• Technical Paper 2 - Significant Wildlife Habitat Technical Paper for the Oak Ridges Moraine</td>
</tr>
<tr>
<td>Significant wildlife habitat</td>
<td>• Technical Paper 5- Identification and Protection of Vegetation Protection Zones for Areas of Natural and Scientific Interest (ANSI) – Life Science</td>
</tr>
<tr>
<td>Areas of natural and scientific interest (life science).</td>
<td>• Technical Paper 6- Identification and Protection of Significant Portions of Habitat for Rare, Threatened and Endangered Species on the Oak Ridges Moraine</td>
</tr>
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</table>

### Vegetation and Wildlife Habitat

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<tr>
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<tr>
<td><strong>In Natural Core Areas:</strong></td>
<td>• In Natural Core Areas:</td>
</tr>
<tr>
<td></td>
<td>• maintain or restore natural self-sustaining vegetation and wildlife habitat (ORM-1); and</td>
</tr>
<tr>
<td></td>
<td>• consider lighting intrusion impacts (ORM-12)</td>
</tr>
<tr>
<td></td>
<td>• see MTO’s Environmental Guide for Wildlife in the Oak Ridges Moraine</td>
</tr>
<tr>
<td><strong>In Natural Linkage Areas:</strong></td>
<td>• In Natural Linkage Areas:</td>
</tr>
<tr>
<td></td>
<td>• maintain, and where possible improve or restore natural self-sustaining vegetation over large parts of the area to facilitate movement of plants and animals;</td>
</tr>
<tr>
<td></td>
<td>• maintain a natural continuous east-west connection and additional connections to river valleys and streams north and south of the Plan</td>
</tr>
</tbody>
</table>
Ministry of Transportation  
Environmental Reference for Highway Design

<table>
<thead>
<tr>
<th>Environmental Factor</th>
<th>Considerations for the Oak Ridges Moraine</th>
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<tbody>
<tr>
<td></td>
<td>Area (ORM-2); and</td>
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<tr>
<td></td>
<td>• Technical Paper 3 - Supporting Connectivity within the Oak Ridges Moraine from the MMAH will be considered when determining key heritage features</td>
</tr>
<tr>
<td></td>
<td>• See MTO’s Environmental Guide for Wildlife in the Oak Ridges Moraine</td>
</tr>
<tr>
<td></td>
<td>• In Countryside Areas, maintain or restore natural self-sustaining vegetation and wildlife habitat (ORM-3)</td>
</tr>
</tbody>
</table>

**Section 3.3 Groundwater**

**General**

- In Natural Core Areas and Natural Linkage Areas:
  - maintain the quantity and quality of groundwater; and
  - maintain recharge (ORM-1, 2)

**Study Area**

The minimum area of influence from seepage areas and springs is all land within 120 metres of any part of feature (O. Reg. 140/02, Oak Ridges Moraine Conservation Plan)

**Hydrogeological assessment**

Groundwater intrinsic susceptibility and groundwater vulnerability ranking are as per Ontario Oak Ridges Moraine Aquifer Vulnerability Mapping (March, 2004)

**Hydrologically sensitive features:**

- Permanent and intermittent streams
- Wetlands
- Kettle lakes
- Seepage areas and springs

- Maintain and, where possible, improve or restore the health, diversity, size and connectivity for the feature and the related ecological functions (ORM-1, 2,3)

**Section 3.4 Noise**

None
### Section 3.5 Land Use Factors

#### Agricultural
- In Countryside Areas:
  - protect prime agricultural areas;
  - provide for the continuation of agricultural and other rural land uses and normal farm practices; and
  - maintain the rural character of the Rural Settlements (ORM-3)

#### Recreation
- In Countryside Areas, accommodate a trail system through the Plan Area and trail connections to it (ORM-3)

#### Commercial, Industrial & Tourism
- In Countryside Areas, provide for compatible economic development (ORM-3)

### Section 3.6 Contaminated Property Identification and Management
None

### Section 3.7 Built Heritage and Cultural Landscapes
- In Countryside Areas, maintain the rural character of the Rural Settlements (ORM-3)

### Section 3.8 Archaeology
None

### Section 3.9 Landscape Composition

#### Landform Features
- Protect landform features (ORM-3)
- Technical Paper 4 - Landform Conservation on the Oak Ridges Moraine from MMAH will be considered
### Environmental Factor

<table>
<thead>
<tr>
<th>Environmental Factor</th>
<th>Considerations for the Oak Ridges Moraine</th>
</tr>
</thead>
<tbody>
<tr>
<td>Section 3.10 Air</td>
<td>None</td>
</tr>
<tr>
<td>Section 3.11 Surface Water</td>
<td>None</td>
</tr>
<tr>
<td>Quality and Quantity</td>
<td>- Maintain the quantity and quality of surface water (ORM-1, 2,3)</td>
</tr>
<tr>
<td>Stream Channel</td>
<td>- Maintain natural stream form and flow characteristics (ORM-1, 2,3)</td>
</tr>
<tr>
<td>Section 3.12 Designated Areas</td>
<td>Not Applicable</td>
</tr>
<tr>
<td>Section 3.13 Erosion and Sediment</td>
<td>None</td>
</tr>
</tbody>
</table>
The following are in addition to the requirements in the Environmental Reference for Highway Design Section 3 - Technical Requirements for Factor Specific Areas.

### GENERAL PRINCIPLES

- Avoid Natural Core Areas and Natural Linkage Areas
- Where avoidance is not possible, and has been permitted through the Environmental Assessment process, highway planning, design, and construction practices that are adopted shall minimize adverse effects on the ecological integrity of the Plan Area. The highway will be designed, constructed, and operated/maintained to minimize effects on Natural Core Areas and Natural Linkage Areas (ORM-13)
- To the extent that is technically, physically, and economically practical, highway planning, design and construction practices that protect water resources shall be used such that:
  - the removal of vegetation, grading and soil compaction is kept to a minimum;
  - soil migration from the construction area is prevented;
  - exposed soils are stabilized as soon as is possible;
  - chemical applications to suppress dust and control pests are kept to a minimum; and
  - areas of impervious land use are minimized, while areas retained in a natural, undisturbed state are maximized (ORM-20)

### DESIGN ACTIVITIES

<table>
<thead>
<tr>
<th>Design Activity or Factor</th>
<th>Requirements for Environmental Protection and / or Mitigation within the Oak Ridges Moraine</th>
</tr>
</thead>
<tbody>
<tr>
<td>General</td>
<td>• Avoid Natural Core Areas and Natural Linkage Areas</td>
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<td>• Where avoidance is not possible, and has been permitted through the Environmental</td>
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<td>Assessment process, highway planning, design, and construction practices that are</td>
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<td>adopted shall minimize adverse effects on the ecological integrity of the Plan Area.</td>
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<td>The highway will be designed, constructed, and operated/maintained to minimize effects</td>
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<td>on Natural Core Areas and Natural Linkage Areas (ORM-13)</td>
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<td>• To the extent that is technically, physically, and economically practical, highway</td>
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<td>planning, design and construction practices that protect water resources shall be used</td>
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<td>and</td>
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<td>• areas of impervious land use are minimized, while areas retained in a natural,</td>
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<td>undisturbed state are maximized (ORM-20)</td>
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### Cross Section and Horizontal / Vertical Alignments

- In Natural Core Areas and Natural Linkage Areas the Right-of-Way widths and associated construction disturbance is kept to the minimum (ORM-9)
- Highways shall coincide to the extent possible with existing transportation, infrastructure or utility corridors (ORM-10)
- Highways shall facilitate wildlife movement (ORM-11) – see Terrestrial Ecosystems row below
- Locate the project as close to the edge of the Natural Core Area as possible (ORM-15)

### Illumination

- Lighting shall be designed to minimize light intrusion into Natural Core Areas (ORM-12)
| Drainage / 3.11 Surface Water | • Drainage design shall be consistent with Municipal watershed plans (ORM-4)  
• All stormwater management plans shall have the objective of maintaining:  
  • groundwater quantity and flow and stream baseflow;  
  • protecting water quality;  
  • protecting aquatic species and their habitat;  
  • preventing increases in stream channel erosion; and  
  • preventing any increase in flood risk (ORM-7)  
• Highway surface water conveyance and management works shall be planned and designed, constructed, and operated and maintained to:  
  • keep any adverse effects on ecological integrity to a minimum;  
  • maintain the ecological integrity of hydrological features, key natural heritage features and related vegetation protection zones;  
  • maintain the quantity and quality of groundwater and surface water;  
  • maintain stream baseflows;  
  • protect aquatic species and their habitat;  
  • prevent increases in stream channel erosion;  
  • prevent any increase in flood risk; and  
  • be consistent with the applicable watershed plan, water budget and conservation plan (ORM-4, 19)  
• Surface water conveyance and management systems should integrate a variety of measures to form a “treatment train” that provides a total, long-term suspended solids removal efficiency of at least 80 percent (ORM-21)  
• Prohibitions:  
  • the disposal of stormwater into kettle lakes is strictly prohibited (ORM-22)  
  • stormwater management ponds shall not be located in key natural heritage features and hydrologically sensitive features or related vegetation protection zones (ORM-23)  
  • rapid infiltration basins and/or columns are strictly prohibited (ORM-24) |
<table>
<thead>
<tr>
<th>Section 3.2 Terrestrial Ecosystems</th>
</tr>
</thead>
<tbody>
<tr>
<td>In Natural Core Areas and Natural Linkage Areas, highways shall facilitate wildlife movement (ORM-11), see MTO’s Environmental Guide for Wildlife in the Oak Ridges Moraine as well as Technical Paper 3 - Supporting Connectivity within the Oak Ridges Moraine from MMAH will be considered for guidance on not impeding the movement of native plant and animal species and maintaining or restoring native self-sustaining vegetation cover (ORM-17, 18)</td>
</tr>
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<td></td>
</tr>
</tbody>
</table>
### Section 3.3 Groundwater

- The following uses are prohibited in wellhead protection areas:
  - storage of petroleum fuels, solvents and chlorinated solvents, pesticides, herbicides, fungicides, construction equipment, inorganic fertilizers, road salt and contaminants listed in Schedule 3 (Severely Toxic Contaminants) to Regulation 347 (RRO 1990);
  - generation and storage of hazardous waste or liquid industrial waste; and
  - snow storage and disposal facilities (ORM-25)

- The following uses are prohibited in areas of high aquifer vulnerability as shown on the map entitled Reference Map for Ontario Regulation 140/02:
  - generation and storage of hazardous waste or liquid industrial waste;
  - snow storage and disposal facilities; and
  - underground and above ground storage tanks that are not equipped with an approved secondary containment device (ORM-26)

- Highways that will be used to transport chemicals or volatile materials should be planned and designed to avoid wellhead protection areas and areas of high aquifer vulnerability (ORM-27)

- Highway design and construction shall provide for groundwater source protection in terms of both quality and quantity and recognize vulnerable or sensitive (highly vulnerable) aquifer zones and wellhead protection zones as defined by MOE (designated Director) and in Municipal Official Plans

### Section 3.4 Noise

None

### Section 3.5 Land Use

- Maintain, and where possible improve or restore, key ecological and recreational linkages, including the ORM recreational trail system that will be established as described in Section 39 of the ORMCP (ORM-16)

### Section 3.6 Contaminated Property Identification and Management

None
<table>
<thead>
<tr>
<th>Section 3.7</th>
<th>None</th>
</tr>
</thead>
<tbody>
<tr>
<td>Built Heritage and Cultural Heritage Landscapes</td>
<td>None</td>
</tr>
<tr>
<td>Section 3.8</td>
<td>None</td>
</tr>
<tr>
<td>Archaeology</td>
<td>None</td>
</tr>
</tbody>
</table>
| Section 3.9   | • Highway design shall implement a landscape design that is compatible with adjacent natural areas and site conditions and that utilizes native plant species as much as possible, especially along Rights-of-Way (ORM-17)  
  • Highway long-term landscape management approaches that are adopted shall maintain, and where possible improve or restore the health, diversity, size and connectivity of the key natural heritage feature or hydrologically sensitive feature (ORM-18) |
| Section 3.10  | None                        |
| Air           | None                        |
| Section 3.11  | See Drainage / Surface Water under Design Activities above |
| Surface Water | None                        |
| Section 3.12  | None                        |
| Designated Areas | None                        |
### Section 3.13
#### Erosion and Sediment

- To the extent that is technically, physically, and economically practical, highway planning, design and construction practices that protect water resources should be used such that:
  - the removal of vegetation, grading and soil compaction is kept to a minimum;
  - soil migration from the construction area is prevented;
  - exposed soils are stabilized as soon as is possible;
  - chemical applications to suppress dust and control pests are kept to a minimum; and
  - areas of impervious land use are minimized, while areas retained in a natural, undisturbed state are maximized (ORM-20)
APPENDIX 3.12.B: Niagara Escarpment

Considerations and Requirements for Environmental Impact Assessments and Protection / Mitigation

Tables:

3.12.B.1 Environmental Impact Study Considerations for the Niagara Escarpment

3.12.B.2 Protection and/or Mitigation in Design and Construction for Design Activities and Environmental Factors for the Niagara Escarpment
### Table 3.12.B.1 Environmental Impact Study Considerations for the Niagara Escarpment

The following are in addition to the requirements in the Environmental Reference for Highway Design Section 3 - Technical Requirements for Factor Specific Areas.

<table>
<thead>
<tr>
<th>Environmental Factor</th>
<th>Considerations for the Niagara Escarpment</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>GENERAL PRINCIPLES</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• All new and expanded transportation facilities must be located and designed to minimize impact on the Niagara Escarpment environment (NE-2)</td>
</tr>
<tr>
<td><strong>Niagara Escarpment Area</strong></td>
<td>• Determine the location and significance of and assess the impacts to:</td>
</tr>
<tr>
<td></td>
<td>• the unique ecologic and historic areas of the NE; and</td>
</tr>
<tr>
<td></td>
<td>• the quality and character of natural streams and water supplies</td>
</tr>
<tr>
<td><strong>Parks, Open Space, and the Bruce Trail</strong></td>
<td>• Determine the location of (NE-10):</td>
</tr>
<tr>
<td></td>
<td>• parks</td>
</tr>
<tr>
<td></td>
<td>• open spaces; and</td>
</tr>
<tr>
<td></td>
<td>• the Bruce Trail</td>
</tr>
<tr>
<td><strong>Section 3.1 Fish and Fish Habitat</strong></td>
<td>None</td>
</tr>
<tr>
<td><strong>Section 3.2 Terrestrial Ecosystems</strong></td>
<td></td>
</tr>
</tbody>
</table>
### Environmental Factor: Key Natural Heritage Features
- Determine the location and significance of and assess the impacts to Key Natural Heritage Features:
  - wetlands
  - significant portions of the habitat of endangered, rare and threatened species;
  - significant valleylands;
  - significant woodlands;
  - significant wildlife habitat;
  - areas of natural and scientific interest (life science);

### Environmental Factor: Vegetation and wildlife habitat
- Identify and determine the significance of and assess the impacts to vegetation and wildlife that represents unique ecologic areas (NE-28)

### Environmental Factor: Wildlife movement
- Identify and determine wildlife movement opportunities in the NE and its vicinity so that it remains substantially as a continuous natural environment

### Environmental Factor: Section 3.3 Groundwater
- Identify and determine the significance of groundwater to and assess the impacts to hydrologically sensitive features:
  - permanent and intermittent streams;
  - seepage areas and springs;
  - wetlands taking into account that wetland limits are to be determined by the Ministry of Natural Resources (NE-17); and
  - for fish habitat, baseflow to watercourses.
- Identify potential ground pollution problems and provide appropriate detailed studies on the detrimental effects (NE-13)
<table>
<thead>
<tr>
<th>Environmental Factor</th>
<th>Considerations for the Niagara Escarpment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Section 3.4 Noise</td>
<td>None</td>
</tr>
<tr>
<td>Section 3.5 Land Use Factors</td>
<td></td>
</tr>
</tbody>
</table>
| Recreation / Natural Features                | • Identify and determine the significance of and assess the impacts to (NE-10):  
<p>|                                             |   • parks;                                |
|                                             |   • open spaces; and                      |
|                                             |   • the Bruce Trail                       |
|                                             | • Identify and determine the significance of and assess the impacts to public access to fish areas (NE-20) |
| Geological Formations                       | • Determine the location and significance of and assess the impacts to geological formations |
| Section 3.6 Contaminated Property Identification and Management | None                                     |
| Section 3.7 Built Heritage and Cultural Landscapes |                                   |
| General                                      | • Identify and determine the significance of and assess the impacts to unique historic areas (NE-1) |
| Section 3.8 Archaeology                     | None                                     |
| Section 3.9 Landscape Composition            | None                                     |
| Section 3.10 Air                             | None                                     |</p>
<table>
<thead>
<tr>
<th>Environmental Factor</th>
<th>Considerations for the Niagara Escarpment</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Section 3.11 Surface Water</strong></td>
<td></td>
</tr>
</tbody>
</table>
| Quality and Quantity         | • Identify and determine the significance of and assess the impacts to the natural drainage features including permanent and intermittent streams. The assessment of impacts shall include the affects to water supplies, downstream water quality, quantity, adjacent lands and riparian rights (NE-1, NE-24)  
|                              | • Identify potential surface water pollution problems and provide appropriate detailed studies on the detrimental effects (NE-13)  
|                               | **Water Taking/Stream Diversions**  
|                              | • Identify and justify the potential need and amount of water taking and/or stream diversions during construction, and determine the significance of and assess the impacts to water quality, quantity and the Niagara Escarpment environment. (NE-15)  
|                               | • Identify and determine the water resource management policies/activities and permit requirements of the Ministry of the Environment, Ministry of Natural Resources and Conservation Authority (NE-22)  
| Natural Channel              | • Identify and determine the significance of and assess the impacts to the character of natural streams (NE-1)  
| **Section 3.12 Designated Areas** | Not Applicable  
| **Section 3.13 Erosion and Sediment** | • Identify tree cover or other stabilizing vegetation on slopes in excess of 25 per cent (1 in 4 slope) (NE-28)  

Table 3.12.B.2 Requirements for Protection and /or Mitigation in Design and Construction for Design Activities and Environmental Factors for the Niagara Escarpment (NE)

The following are in addition to the requirements in the Environmental Reference for Highway Design Section 3 - Technical Requirements for Factor Specific Areas

<table>
<thead>
<tr>
<th>Design Activity or Factor</th>
<th>Requirements for Environmental Protection and / or Mitigation on the Niagara Escarpment</th>
</tr>
</thead>
<tbody>
<tr>
<td>GENERAL PRINCIPLES</td>
<td>Applicable to all design activities and environmental factors</td>
</tr>
<tr>
<td></td>
<td>• The NEP recognizes that transportation facilities have other constraints and that avoidance, minimization, mitigation and/or enhancement is not feasible in every situation. The following have been developed to meet the objectives of the NEP, the Development Criteria for Transportation and Utilities and other applicable Development Criteria</td>
</tr>
<tr>
<td></td>
<td>• Transportation facilities will only be permitted in Escarpment Natural Areas when deemed necessary to the public interest after all alternatives have been considered (NE-3)</td>
</tr>
<tr>
<td></td>
<td>• In addition to the other Environmental Protection Requirements, MTO shall, comply with the following:</td>
</tr>
<tr>
<td></td>
<td>(a) Protect the unique ecologic and historic areas;</td>
</tr>
<tr>
<td></td>
<td>(b) Maintain and enhance the quality and character of natural streams and water supplies; and</td>
</tr>
<tr>
<td></td>
<td>(c) Maintain and enhance the open landscape of the Niagara Escarpment by preserving the natural scenery (NE-1)</td>
</tr>
<tr>
<td>DESIGN ACTIVITIES</td>
<td></td>
</tr>
<tr>
<td>Bridges, structures, walls, and other elements</td>
<td>• The visual impact of highways including structures and facilities should be minimized by measures such as structural design, coloration and landscape planting (NE-9)</td>
</tr>
</tbody>
</table>
## Design Activity or Factor

<table>
<thead>
<tr>
<th>Requirements for Environmental Protection and / or Mitigation on the Niagara Escarpment</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Alignment and Grading</strong></td>
</tr>
<tr>
<td>• Maintain existing tree cover or other stabilizing vegetation on slopes in excess of 25 per cent (1 in 4 slope) (NE-28)</td>
</tr>
<tr>
<td>• Finished slopes should be graded to a slope of 2:1 or less and re-vegetated (NE-5)</td>
</tr>
<tr>
<td>• Large cuts or steeper slopes should be avoided. If not avoidable, then terracing should be considered (NE-6)</td>
</tr>
<tr>
<td>• Blasting, and grading should be minimized preferably through realignment (NE-4)</td>
</tr>
</tbody>
</table>
### Design Activity or Factor

#### Drainage / Section 3.11 Surface Water

- Maintain and enhance where feasible, the character of natural streams and water supplies (NE-1)
- During development of drainage design:
  - consider the water resource management policies/activities and permit requirements of the Ministry of the Environment, Ministry of Natural Resources and Conservation Authority (NE-23);
  - avoid, minimize and/or mitigate adverse affects to downstream water quality, quantity, and riparian rights (NE-24);
  - avoid any changes to the natural drainage (NE-12; and
  - provide appropriate detailed studies on the potential detrimental effects to surface water quality and how they will be minimized (NE-13)

### Water Taking/Stream Diversions

- Justify the need and amount of water taking and/or stream diversions during construction and ensure that the scale and intensity of water taking or stream diversions will not adversely impact water quality, quantity and the Escarpment environment

### Fish Habitat

- Treat surface runoff to maintain water quality and hydrological characteristics in receiving watercourses with significant fishery resources to the standards established by the Ministries of the Environment and Natural Resources (NE-19)

### Stormwater Management Ponds

- Stormwater management pond(s):
  - shall be designed and located to avoid streams, wetlands, Areas of Natural and Scientific Interest (Life Science), source areas, Escarpment slopes and significant watercourses (NE-21); and
  - should be designed to be off-stream with bottom draw-off control structures (NE-22)
### Section 3.1 Fish and Fish Habitat

#### Requirements for Environmental Protection and / or Mitigation on the Niagara Escarpment

- Ensure:
  - Net gain/no net loss of productive capacity of fish habitat;
  - Maintenance of minimum baseflow of watercourses;
  - Maintenance of existing watercourses in a healthy, natural state;
  - Maintenance of vegetative buffers in accordance with the sensitivity of the fishery resource and development criteria; and
  - Best available construction and management practices are used to protect water quality and quantity, both during and after construction (NE-19)

- Construction in or across a watercourse should be appropriately timed to minimize impacts on fish and fish habitat (NE-14)
<table>
<thead>
<tr>
<th>Design Activity or Factor</th>
<th>Requirements for Environmental Protection and / or Mitigation on the Niagara Escarpment</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Section 3.2 Terrestrial Ecosystems</strong></td>
<td><strong>Wetlands</strong></td>
</tr>
<tr>
<td></td>
<td>• Wetlands including a set back set by the Niagara Escarpment Commission should be avoided (NE-17)</td>
</tr>
<tr>
<td></td>
<td>• The set-back should be a natural vegetated buffer (NE-18)</td>
</tr>
<tr>
<td></td>
<td>• Wetland limits are to be determined by the Ministry of Natural Resources (NE-17)</td>
</tr>
<tr>
<td></td>
<td>• Ensure (NE-19):</td>
</tr>
<tr>
<td></td>
<td>• No loss of water quality;</td>
</tr>
<tr>
<td></td>
<td>• No loss of wetland functions;</td>
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<tr>
<td></td>
<td>• No Conflict with existing site-specific wetland management practices; and</td>
</tr>
<tr>
<td></td>
<td>• Loss of contiguous wetland area (NE Plan 2.6, New Development Affecting Water Resources) (NE-18)</td>
</tr>
<tr>
<td></td>
<td>• Maintain or establish natural vegetative buffers (NE-23)</td>
</tr>
<tr>
<td></td>
<td>• Construction in or across a wetland should be appropriately timed to minimize impacts on wildlife habitat (NE-14)</td>
</tr>
<tr>
<td></td>
<td><strong>Vegetation</strong></td>
</tr>
<tr>
<td></td>
<td>• New highways are not permitted in identified habitat of endangered (regulated) plant species (NE-29)</td>
</tr>
<tr>
<td></td>
<td>• Minimize the disturbance of wooded areas (NE-26)</td>
</tr>
<tr>
<td></td>
<td>• Protect trees that are to be retained by means of snow fencing, wrapping, tree wells or other acceptable means during construction (NE-27)</td>
</tr>
<tr>
<td></td>
<td>• Maintain existing tree cover or other stabilizing vegetation on slopes in excess of 25 per cent (1 in 4 slope), as feasible (NE-28)</td>
</tr>
<tr>
<td></td>
<td>• Maintain or establish natural vegetative buffers (NE-23)</td>
</tr>
<tr>
<td></td>
<td><strong>Wildlife</strong></td>
</tr>
<tr>
<td></td>
<td>• New highways are not permitted in identified habitat of endangered (regulated) animal species (NE-29)</td>
</tr>
<tr>
<td></td>
<td>• Minimize the impacts upon wildlife habitat, in particular, habitats of endangered (not regulated), rare, special concern, and threatened plant or animal species, as identified by on-site evaluation (NE-30)</td>
</tr>
<tr>
<td>Design Activity or Factor</td>
<td>Requirements for Environmental Protection and / or Mitigation on the Niagara Escarpment</td>
</tr>
<tr>
<td>--------------------------</td>
<td>----------------------------------------------------------------------------------</td>
</tr>
</tbody>
</table>
| **Section 3.3 Groundwater** | • Maintain and enhance where feasible, the character of natural streams and water supplies (NE-1)  
• Avoid, minimize and/or mitigate:  
  • potential groundwater pollution problems (NE-13);  
  • impacts to hydrologically sensitive features including:  
    • permanent and intermittent streams;  
    • seepage areas and springs;  
    • wetlands;  
    • baseflow to watercourses with significant fish habitat |
| **Section 3.4 Noise** | None |
| **Section 3.5 Land Use** | **Agriculture**  
• EPR AGR-1 for prime agricultural lands and prime agricultural areas shall be applicable to Agricultural Areas (as defined in the NEP)  
**Recreation**  
• Site and design transportation facilities to avoid or minimize the impacts on parks, open space and the Bruce Trail. Where impacts to the Bruce Trail cannot be avoided, an acceptable, safe alternative must be provided (NE-10)  
• Maintain or, wherever practicable, improve public access to fishery resource areas (NE-20) |
| **Section 3.6 Contaminated Property Identification and Management** | None |
### Section 3.7: Built Heritage and Cultural Heritage Landscapes
- The visual impact of highways including structures and facilities should be minimized by measures such as landscape planting (NE-9)

### Section 3.8: Archaeology
None

### Section 3.9: Landscape Composition
- Natural features such as tree groves, grades and waterways should be preserved
- Final landscaping and vegetation should be installed as soon as practical following completion of construction
- Topsoil should not be removed from the site, but rather, should be stored and redistributed as a suitable base for seeding and planting (NE-14)
- Native species of vegetation should be used for the protection of earth surfaces, and blended into the surrounding landscape (NE-7)
- Vegetation screens should be used (NE-8)
- The visual impact of highways including structures and facilities should be minimized by measures such as structural design, colouration and landscape planting (NE-9)

### Section 3.10: Air
None

### Section 3.11: Surface Water
See Drainage / Surface Water under Design Activities above
### Section 3.12 Designated Areas

**ANSI's**
- **Avoid** Significant and Regionally Significant Life Science - Areas of Natural and Scientific Interest (ANSIs) (NE-31) and if the ANSIs are not avoidable, ensure that (NE-32):
  - development does not significantly alter the natural topography or geological features of the Earth Science ANSI; and
  - methods are employed to minimize the impact of the use on the values for which the site has been identified; and
  - A natural vegetative buffer is maintained or established (NE-32)

### Section 3.13 Erosion and Sediment
- During construction, the following erosion and sediment control practices should be carried out (NE-14):
  - only the smallest practical area of land should be exposed at any time;
  - when land is exposed, the exposure should be kept to the shortest practical period of time;
  - temporary vegetation and/or mulching should be used to protect critical areas exposed;
  - final landscaping and vegetation should be installed as soon as practical following completion of construction;
  - topsoil should not be removed from the site, but rather, should be stored and redistributed as a suitable base for seeding and planting; and
  - sediment control devices should be installed to remove sediment from runoff due to changed soil surface conditions during and after construction
APPENDIX 3.12.C: Greenbelt

Considerations and Requirements for Environmental Impact Assessment and Protection / Mitigation

Tables:

3.12.C.1 Environmental Impact Study Considerations for the Greenbelt

3.12.C.2 Protection and /or Mitigation in Design and Construction for the Greenbelt
Table 3.12.C.1 Environmental Impact Study Considerations for the Greenbelt

The following are in addition to the requirements in the Environmental Reference for Highway Design Section 3 - Technical Requirements for Factor Specific Areas

<table>
<thead>
<tr>
<th>Environmental Factor</th>
<th>Considerations for the Greenbelt</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Section 3.1 Fish and Fish Habitat</strong></td>
<td>None</td>
</tr>
<tr>
<td><strong>Section 3.2 Terrestrial Ecosystems</strong></td>
<td>In the Protected Countryside Areas, identify, determine significance, and assess impacts to key natural heritage and key hydrologic features including:</td>
</tr>
<tr>
<td></td>
<td>• Key natural heritage features including:</td>
</tr>
<tr>
<td></td>
<td>• significant habitat of endangered species, threatened species and special concern species;</td>
</tr>
<tr>
<td></td>
<td>• fish habitat;</td>
</tr>
<tr>
<td></td>
<td>• wetlands;</td>
</tr>
<tr>
<td></td>
<td>• life Science Areas of Natural and Scientific Interest (ANSIs);</td>
</tr>
<tr>
<td></td>
<td>• significant valleylands;</td>
</tr>
<tr>
<td></td>
<td>• significant woodlands;</td>
</tr>
<tr>
<td></td>
<td>• significant wildlife habitat;</td>
</tr>
<tr>
<td></td>
<td>• sand barrens, savannahs and tallgrass prairies; and</td>
</tr>
<tr>
<td></td>
<td>• Alvars</td>
</tr>
<tr>
<td></td>
<td>• Key hydrologic features including:</td>
</tr>
<tr>
<td></td>
<td>• permanent and intermittent streams;</td>
</tr>
<tr>
<td></td>
<td>• lakes (and their littoral zones);</td>
</tr>
</tbody>
</table>
### Environmental Factor: Considerations for the Greenbelt

- seepage areas and springs; and
- wetlands
- The assessment of impacts should include but is not limited to illumination and road salt (GB-5 to 8)

#### Section 3.3 Groundwater

- In the Protected Countryside Areas, identify, determine significance, and assess impacts to Key Hydrologic Features including:
  - the network of countryside and open space areas that supports the Oak Ridges Moraine and the Niagara Escarpment (See Appendix A and B for details on Oak Ridges Moraine and Niagara Escarpment, respectively) (GB-2);
  - the connections between lakes and the Oak Ridges Moraine and Niagara Escarpment (GB-2); and
  - the linkages between ecosystems and provincial parks or public lands (GB-2)

#### Section 3.4 Noise

None

#### Section 3.5 Land Use

**Agricultural**
- Identify, determine significance, and assess impacts to:
Environmental Factor | Considerations for the Greenbelt
--- | ---
 | • the countryside, rural and small towns with respect to their contribution to the economic viability of farming communities (GB-2); and  
 | • Prime Agricultural Areas (GB-3)  
 | • The assessment of impacts should include but is not limited to impacts caused by light intrusion, noise and road salt (GB-5)

Recreation | • Identify, determine significance, and assess impacts to recreational linkages network of countryside and open space areas which supports the Oak Ridges Moraine and the Niagara Escarpment (GB-2)  
 | • The assessment of impacts should include but is not limited to impacts caused by light intrusion, noise and road salt (GB-5)

Commercial, Industrial & Tourism | • In the Protected Countryside, including Prime Agricultural Areas (GB-3), identify, determine significance, and how the transportation facility supports (GB-4):  
 | • Tourism;  
 | • Resource Use;  
 | • Rural Economic Activity that exists and is permitted within the Greenbelt; or  
 | • growth and economic development expected in southern Ontario beyond the Greenbelt through infrastructure connections among urban growth centres and between these centres and Ontario’s borders(GB-4)  
 | • The assessment of impacts should include but is not limited to impacts caused by light intrusion, noise and road salt (GB-5)

Section 3.6 Contaminated Property Identification and Management | None

Section 3.7 Built Heritage and Cultural Landscapes | None
Environmental Factor | Considerations for the Greenbelt
--- | ---
Section 3.8 Archaeology | None

Section 3.10 Air Quality | • In the Protected Countryside Areas, identify, determine significance, and assess impacts from dust to the existing landscape

Section 3.11 Surface Water | • Identify, determine significance, and assess impacts to Key Hydrologic Features including:
  • permanent and intermittent streams; and
  • lakes (and their littoral zones)
• The assessment of impacts should include but is not limited to impacts caused by road salt (GB-5)

Section 3.12 Designated Areas | Not Applicable

Section 3.13 Erosion and Sediment | None
### Table 3.12.C.2 Requirements for Protection and/or Mitigation in Design and Construction for Design Activities and Environmental Factors for the Greenbelt

The following are in addition to the requirements in the Environmental Reference for Highway Design Section 3 - Technical Requirements for Factor Specific Areas

<table>
<thead>
<tr>
<th>Design Activity or Factor</th>
<th>Requirements for Environmental Protection and/or Mitigation within the Greenbelt</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Principles</td>
<td>Applicable to all design activities and environmental factors</td>
</tr>
</tbody>
</table>

- The Greenbelt recognizes that transportation facilities have other constraints and that some criteria may not be feasible in every situation. The following protection and mitigation requirements recognize the flexibility of the Greenbelt and should be met if feasible.

- Elements of a highway or transit corridor or facility may be established within a key natural heritage feature or key hydrologic feature or its associated vegetation protection zone in the Protected Countryside (GB-6), including Prime Agricultural Areas (GB-3), if the highway or transit corridor or facility:
  - serves the Agricultural sector;
  - makes all reasonable efforts to keep infrastructure out of key natural heritage features or key hydrologic features or the vegetation protection zones\(^{23}\) (GB-5,6); and
  - minimizes negative impacts and disturbance on the features or their related functions, and where reasonable, maintains or improves connectivity for instances where infrastructure does cross the Natural Heritage System or intrude into or result in the loss of a key natural heritage feature or key hydrologic feature, including related landform features (GB-5).

- Elements of a highway or transit corridor or facility may be established within the Agricultural System.

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\(^{23}\) Vegetation protection zone: A vegetated buffer area surrounding a key natural heritage feature or key hydrologic feature that is to protect the feature and its functions from the impacts of the proposed change and associated activities that will occur before, during, and after, construction, and where possible, restore or enhance the feature and/or its function.
<table>
<thead>
<tr>
<th>Design Activity or Factor</th>
<th>Requirements for Environmental Protection and / or Mitigation within the Greenbelt</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• MTO shall:</td>
</tr>
<tr>
<td></td>
<td>• maintain the network of countryside and open space areas which supports the Oak Ridges Moraine and the Niagara Escarpment;</td>
</tr>
<tr>
<td></td>
<td>• sustain the countryside, rural and small towns and contribute to the economic viability of farming communities;</td>
</tr>
<tr>
<td></td>
<td>• preserve agricultural land;</td>
</tr>
<tr>
<td></td>
<td>• maintain connections between lakes and the Oak Ridges Moraine and Niagara Escarpment;</td>
</tr>
<tr>
<td></td>
<td>• maintain or restore and improve as practical, linkages between ecosystems and provincial parks or public lands; and</td>
</tr>
<tr>
<td></td>
<td>• ensure that the development of transportation infrastructure proceeds in an environmentally sensitive manner (GB-2)</td>
</tr>
<tr>
<td></td>
<td>• In the Protected Countryside, MTO shall during the design, construction, and operation of transportation facilities:</td>
</tr>
<tr>
<td></td>
<td>• minimize the amount of the Greenbelt, and in particular the Natural Heritage System, that is traversed and/or occupied;</td>
</tr>
<tr>
<td></td>
<td>• minimize the negative impacts and disturbance of the existing landscape; and</td>
</tr>
<tr>
<td></td>
<td>• optimize existing capacity and coordination with different infrastructure services so that the rural and existing character of the Protected Countryside and the overall urban structure for southern Ontario established by the Greenbelt and any provincial growth management initiatives are supported and reinforced</td>
</tr>
</tbody>
</table>

**DESIGN ACTIVITIES**
Design Activity or Factor | Requirements for Environmental Protection and / or Mitigation within the Greenbelt
--- | ---
**Illumination** | • In the Protected Countryside, including Prime Agricultural Areas (GB-3), minimize negative impacts and disturbance of the existing landscape (GB-5) caused by light intrusion

**Maintenance** | • Whenever in the Protected Countryside, including Prime Agricultural Areas (GB-3), minimize negative impacts and disturbance of the existing landscape (GB-5) caused by road salt
### Design Activity or Factor

Drainage / Section 3.11 Surface Water

<table>
<thead>
<tr>
<th>Requirements for Environmental Protection and / or Mitigation within the Greenbelt</th>
</tr>
</thead>
<tbody>
<tr>
<td>• For permanent and intermittent streams, and lakes in the Protected Countryside Area, the minimum vegetation protection zone shall be 30 metres wide measured from the outside boundary of the feature</td>
</tr>
<tr>
<td>• If new transportation infrastructure is within 120 m of permanent and intermittent streams, and lakes in the Protected Countryside Area, a vegetation protection zone shall be established which:</td>
</tr>
<tr>
<td>• is of sufficient width to protect the key hydrologic feature and its functions from the impacts of the proposed change and associated activities that may occur before, during, and after, construction, and where possible, restore or enhance the feature and/or its function; and</td>
</tr>
<tr>
<td>• is established to achieve, and be maintained as natural self-sustaining vegetation</td>
</tr>
</tbody>
</table>

### Prohibitions:

- Storm water management ponds are prohibited in key natural heritage features or key hydrologic features or their vegetation protected zones in the Protected Countryside (GB-7), including the Prime Agricultural Areas (GB-3), except for the major river valleys that connect the Niagara Escarpment and Oak Ridges Moraine to Lake Ontario. In these areas, naturalized stormwater management ponds are permitted at a minimum of 30 metres away from the edge of the river/stream and in the vegetation protection zones of any abutting key natural heritage features or key hydrologic features (GB-7)

- In the Protected Countryside Areas, stormwater management plans shall avoid, minimize and/or mitigate stormwater volume, contaminant loads and impacts to receiving water courses in order to (GB-8):
  - maintain groundwater quality and flow and stream baseflow;
  - protect water quality;
  - minimize the disruption of pre-existing (natural) drainage patterns wherever possible;
  - prevent increases in stream channel erosion;
  - prevent any increase in flood risk; and
  - protect aquatic species and their habitat (GB-8)
<table>
<thead>
<tr>
<th>Design Activity or Factor</th>
<th>Requirements for Environmental Protection and / or Mitigation within the Greenbelt</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ENVIRONMENTAL FACTORS</strong></td>
<td></td>
</tr>
</tbody>
</table>
| **Section 3.1 Fish and Fish Habitat** | • For fish habitat, the minimum vegetation protection zone shall be a minimum of 30 metres wide measured from the outside boundary of the feature  

• If new transportation infrastructure is within 120 m of fish habitat in the Natural Heritage System of the Protected Countryside Area, a vegetation protection zone shall be established which:  

  • is of sufficient width to protect the fish habitat and its functions from the impacts of the proposed change and associated activities that may occur before, during, and after, construction, and where possible, restore or enhance the feature and/or its function; and  

  • is established to achieve, and be maintained as natural self-sustaining vegetation |
| **Section 3.2 Terrestrial Ecosystems** | • Within the Natural Heritage System the minimum vegetation protection zone for wetlands and significant woodlands shall be a minimum of 30 metres wide measured from the outside boundary of the feature  

• For new transportation infrastructure within the Natural Heritage System of the Protected Countryside and within 120 m of a key natural heritage feature, a vegetation protection zone will be provided that:  

  • is of sufficient width to protect the feature and its functions from the impacts of the proposed change and associated activities that may occur before, during, and after, construction, and where possible, restore or enhance the feature and/or its function; and  

  • is established to achieve, and be maintained as natural self-sustaining vegetation |
## Design Activity or Factor

### Requirements for Environmental Protection and / or Mitigation within the Greenbelt

#### Section 3.3 Groundwater
- For seepage areas and springs, the minimum vegetation protection zone shall be a minimum of 30 metres wide measured from the outside boundary of the feature.
- For new transportation infrastructure within the Protected Countryside within 120 m of a key hydrologic feature, a vegetation protection zone will be provided that:
  - is of sufficient width to protect the key hydrologic feature and its functions from the impacts of the proposed change and associated activities that may occur before, during, and after, construction, and where possible, restore or enhance the feature and/or its function; and
  - is established to achieve, and be maintained as natural self-sustaining vegetation

#### Section 3.4 Noise
- In the Protected Countryside, including Prime Agricultural Areas (GB-3), minimize negative impacts and disturbance of the existing landscape (GB-5) caused by noise

#### Section 3.5 Land Use
- None

#### Section 3.6 Contaminated Property Identification and Management
- None

#### Section 3.7 Built Heritage and Cultural Heritage Landscapes
- None

#### Section 3.8 Archaeology
- None
### Requirements for Environmental Protection and / or Mitigation within the Greenbelt

<table>
<thead>
<tr>
<th>Design Activity or Factor</th>
<th>Requirements for Environmental Protection and / or Mitigation within the Greenbelt</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Section 3.10 Air</strong></td>
<td>• In the Protected Countryside, including Prime Agricultural Areas (GB-3), minimize negative impacts and disturbance of the existing landscape (GB-5) caused by dust</td>
</tr>
<tr>
<td><strong>Section 3.11 Surface Water</strong></td>
<td>See Drainage / Surface Water under Design Activities above</td>
</tr>
<tr>
<td><strong>Section 3.12 Designated Areas</strong></td>
<td>Not Applicable</td>
</tr>
<tr>
<td><strong>Section 3.13 Erosion and Sediment</strong></td>
<td>None</td>
</tr>
</tbody>
</table>
Section 3.13: Erosion and Sediment

This section of the Environmental Reference for Highway Design (ERD) provides the requirements during highway design for:

- the assessment of erosion and sediment;
- the determination and mitigation of impacts;
- the development of documentation including:
  - Erosion and Sediment Overview Risk Map and Erosion and Sediment Overview Risk Assessment Report;
  - contract documentation for erosion and sediment control;
  - Technical Memo; and
- qualifications for those persons undertaking the above work.

Definitions of environmental terms and acronyms are provided in MTO’s Environmental Glossary.

This document references the MTO’s Environmental Guide for Erosion and Sediment Control During Construction of Highway Projects hereafter referred to as the ESC Guide.

3.13.1 Minimum Requirements

Note: the minimum requirement is to develop erosion and sediment control following Approach 1: Best Management Practices as described in Section 3 of the ESC Guide. The following are not required on a project unless specifically required in the Request-For-Proposals or otherwise directed by MTO:

- An Erosion and Sediment Overview Risk Assessment
- Approach 2: Erosion and Sediment Control Plan (ESCP)
- Approach 3: Two-Part ESCP – Main & Supplemental

3.13.2 Erosion and Sediment Overview Risk Assessment

3.13.2.1 Study Area

For the purposes of the Erosion and Sediment Overview Risk Assessment, the Study Area is defined as all lands that may be disturbed by proposed highway construction.
3.13.2.2 Background Data

Information for erosion and sediment assessment may overlap with the information gathered and augmented for other studies (e.g., for geotechnical design, drainage design, groundwater; surface water, and fish and fish habitat) for assessing erosion potential or determining potential impacts from sediment-laden water. As such, existing information will be obtained from any relevant technical reports for the undertaking.

Background data should be obtained from credible sources, including the Department of Fisheries and Oceans, Environment Canada, the Ministry of Natural Resources, the Ministry of the Environment, Conservation Authorities, local municipalities, etc. and should include, but not be restricted to:

- soils, surficial geology and topographic mapping;
- geotechnical reports;
- recent aerial photographs (at 1:5,000 where available); and
- climate and hydrology information.

For the Erosion and Sedimentation Overview Risk Assessment, data should include but not be restricted to:

- thicknesses and classification of unconsolidated material that may be exposed at various stages of construction;
- top soil characteristics and quantities;
- general local precipitation and other climatic data;
- location of watercourses (ephemeral draws, etc.) and receiving waterbodies; and
- information on fish and fish habitat, terrestrial habitats and surface water uses (as determined from preliminary work completed by other members of the Study Team for other environmental factor areas).

3.13.2.3 Field Investigations

At a minimum, an overview “walking” examination of the site should be conducted.

3.13.2.4 Overview Risk Assessment

The assessment of risk shall be as per the ESC Guide and include but not be limited to:

- an assessment of:
Ministry of Transportation  
Environmental Reference for Highway Design  

- the soil and sub-surface conditions;  
- drainage;  
- off-site environmentally sensitive areas;  
- the division of the Study Area into polygons of like erosion potential;  
- for each polygon, the determination of:  
  - erosion potential (expressed as a rating);  
  - consequence (expressed as a rating); and  
  - erosion and sediment risk (expressed as a rating).  

3.12.2.5 Documentation

All of the above work shall be documented in the Erosion and Sediment Overview Risk Assessment Report as per the ESC Guide and shall include but not be limited to:

- an Erosion and Sediment Overview Risk Map:
  - the base map shall be prepared from a detailed topographic map or aerial photograph mosaic;  
  - the study area divided into numbered polygons based on erosion potential with sizes appropriate to the scale of the project;  
  - the qualitative high, medium, low risk for each polygon colour coded on the map;  
- project overview;  
- description of the study area;  
- scope of work (type of transportation project);  
- existing conditions including but not limited to soils or surface conditions, drainage, off-site water, sensitive areas, existing water quality (if known);  
- description of the approach used to determine and rate erosion potential and consequence;  
- a table that includes, for each polygon on the Erosion and Sediment Overview Risk Map, the rational for the erosion potential, the consequence rating, and the risk. The following are example column headings for the table:
  - Polygon No.
Ministry of Transportation
Environmental Reference for Highway Design

- Soil Type
- Soil Erodibility Rating
- Slope Gradient
- Slope Length
- Erosion Potential
- Rationale for Erosion Potential
- Consequence Rating
- Rationale for Consequence Rating (Receiving Environment Sensitivity)
- Erosion and Sedimentation Risk

- considerations for ESC development (e.g., areas that may need detention ponds); and

- a recommendation for ESC Approach(es) as per ESC Guide, Section 3.

3.13.3 Approach 1: Best Management Practices (BMPs)

See Section 3 of the ESC Guide for a description of Approach 1.

3.13.3.1 Study Area

For erosion and sediment control, the Study Area is defined as all lands to be disturbed by proposed highway construction including access roads, detours, staging and storage (stockpile) areas, and areas of other works and activities associated with the construction of the highway.

3.13.3.2 Background Data

Background data should be obtained from sources as detailed in Section 7 of the ESC Guide.

Information required for erosion and sediment assessment and mitigation will overlap with the information gathered for other studies (e.g., for geotechnical design, drainage design, groundwater; surface water, and fish and fish habitat). As such, existing information will be obtained from any relevant technical reports for the transportation project.
3.13.3.3 Field Investigations

At a minimum, an overview “walking” examination of the site should be conducted. If post-construction vegetative cover is required to meet or exceed original conditions, the state of the vegetation cover prior to construction shall be documented using photographs during the site inspection and the location and direction of the photographs noted on plans. For more information about the above requirements, see Section 7 of the ESC Guide.

3.13.3.4 Assessment

Assessment will be undertaken as detailed in Section 5 and 7 of the ESC Guide.

3.13.3.5 Mitigation

Control of erosion and sediment will be developed as detailed in Section 8 and 9 of the ESC Guide.

3.13.3.6 Documentation

A draft, MTO approved draft and final is required for all documents.

BMPs as per Section 8 of the ESC Guide shall be provided on contract drawings (as appropriate) and contract documentation as required (e.g., OPS 577).

3.13.4 Approach 2: Erosion and Sediment Control Plan (ESCP)

See Section 3 of the ESC Guide for a description of Approach 3

3.13.4.1 Study Area

For erosion and sediment control, the Study Area is defined as all lands to be disturbed by proposed highway construction including access roads, detours, staging and storage (stockpile) areas, and areas of other works and activities associated with the construction of the highway.

3.13.4.2 Background Data

Background data should be obtained from sources as detailed in Section 7 of the ESC Guide.

Information required for erosion and sediment assessment and mitigation will overlap with the information gathered for other studies (e.g., for geotechnical design, drainage design, groundwater; surface water, and fish and fish habitat.). As such, existing information will be obtained from any relevant technical reports for the transportation project.
3.13.4.3 Field Investigations

At a minimum, an overview “walking” examination of the site should be conducted. If post-construction vegetative cover is required to meet or exceed original conditions, the state of the vegetation cover prior to construction shall be documented using photographs during the site inspection and the location and direction of the photographs noted on plans. For more information about the above requirements, see Section 7 of the ESC Guide.

3.13.4.4 Assessment

Assessment will be undertaken as detailed in Section 5 and 7 of the ESC Guide.

3.13.4.5 Mitigation

Control of erosion and sediment will be developed as detailed in Section 6, 8 and 9 of the ESC Guide.

3.13.4.6 Documentation

A draft, MTO approved draft and final is required for all documents that comprise the ESCP including but not limited to:

- one or more drawings;
- non-standard Special Provision (NSP); and
- ESC Technical Memo.

The NSP shall be in standard MTO format and include all relevant information to enable the Contractor to implement the ESCP. As per Section 6 of the ESC Guide, the NSP shall include, but not be limited to:

- a clear and concise list of all objectives of the ESC strategy;
- a clear and concise list all assumptions about construction methods;
- a clear and concise list of all measures that are part of Fisheries Act Authorizations, permits approvals etc.;
- installation requirements (process for installing water management first, then perimeter ESC control, etc.);
- BMP specification and details such as maintenance requirements and performance measures (if not specified in other contract documentation, e.g., OPS 577);
- the Contractor’s responsibility for inspection (e.g., regular, before / after storm events);
- contingency requirements for failure of BMPs or other events; and
standard wording that includes making the Contractor responsible for the erosion and sedimentation caused by their operations. (See Appendix F of the ESC Guide for example NSP wording.

The ESC Technical Memo shall include all relevant information from the ESCP as detailed in Section 6 of the ESC Guide so as to document the ESC strategy and allow review of the ESCP. As such the Technical Memo will include, but not be limited to:

- a description of the project;
- a description of re-development site conditions;
- a description of critical Areas of Concern; and
- the design criteria used in developing the ESC.

3.13.5 Approach 3: Two-Part ESCP – Main & Supplemental

See Section 3 of the ESC Guide for a description of Approach 3.

3.15.5.1 Study Area

For erosion and sediment control, the Study Area is defined as all lands to be disturbed by proposed highway construction including access roads, detours, staging and storage areas, and areas of other works and activities associated with the construction of the highway.

3.15.5.2 Background Data

Background data should be obtained from sources as detailed in Section 7 of the ESC Guide.

Information required for erosion and sediment assessment and mitigation will overlap with the information gathered for other studies (e.g., for geotechnical design, drainage design, groundwater; surface water, and fish and fish habitat.). As such, existing information will be obtained from any relevant technical reports for the transportation project.

3.15.5.3 Field Investigations

At a minimum, an overview “walking” examination of the site should be conducted. If post-construction vegetative cover is required to meet or exceed original conditions, the state of the vegetation cover prior to construction shall be documented using photographs during the site inspection and the location and direction of the photographs noted on plans. For more information about the above requirements, see Section 7 of the ESC Guide.

3.15.5.4 Assessment

Assessment will be undertaken as detailed in Section 5 and 7 of the ESC Guide.
3.15.5.5 Mitigation

Control of erosion and sediment will be developed as detailed in Section 6, 8 and 9 of the ESC Guide.

3.15.5.6 Documentation

A draft, MTO approved draft and final is required for all documents that comprise the Main ESCP including but not limited to:

- one or more drawings;
- Non-Standard Special Provision (NSP); and
- ESC Technical Memo.

The NSP shall be in standard MTO format and include all relevant information to enable the Contractor to implement the Main ESCP. As per Section 6 of the ESC Guide, the NSP shall include, but not be limited to:

a) a clear and concise list of all objectives of the ESC strategy;

b) a clear and concise list all assumptions about construction methods, if any;

c) a clear and concise list of all measures that are part of Fisheries Act Authorizations, permits approvals etc.;

d) installation requirements (process for installing water management first, then perimeter ESC control, etc.);

e) BMP specification and details such as maintenance requirements and performance measures (if not specified in other contract documentation, e.g., OPS 577);

f) the Contractor’s responsibility for inspection (e.g., regular, before / after storm events); (What about the CA’s responsibility for monitoring – approach 2 also)

g) contingency requirements for failure of BMPs or other events;

h) standard wording that includes making the Contractor responsible for the erosion and sedimentation caused by their operations. (See Appendix F of the ESC Guide for example NSP wording); and

i) a requirement for the Contractor to develop a Supplemental ESCP.

The ESC Technical Memo shall include all relevant information from the ESCP as detailed in Section 6 of the ESC Guide so as to document the ESC strategy and allow review of the ESCP. As such the Technical Memo will include, but not be limited to:
3.13.6 Qualifications

Work shall be completed by a qualified erosion and sediment control professional. The erosion and sediment control professional shall either be a Professional Engineer or Professional Geoscientist licensed to practice in Ontario with professional experience in completing erosion and sediment control plans in a highway setting, including the characterization of existing site conditions, completion of impact assessments, and the selection and design of integrated erosion and sediment control best management practices.

3.13.7 Value Engineering

A qualified erosion and sediment control professional should be part of any Value Engineering design review to ensure that the ESC measures developed in the design process are adequate for any subsequent design revisions. The erosion and sediment control professional must be fully aware of the erosion and sediment control requirements for the project, as well as with the rationale behind the mitigation measures selected in the original design.
Section 3.14: Species at Risk

This is a future section of the MTO Environmental Reference for Highway Design.

NOTE TO USER

The technical requirements for environmental impact study and environmental protection/mitigation during highway design for the species at risk factor are currently under internal development at MTO. When complete, they will be documented in this section.

In the interim, requirements for the assessment and mitigation of species at risk impacts shall be as specified under subsections 3.1 Fish and Fish Habitat and 3.2 Terrestrial Ecosystems or as otherwise specified on a project-by-project basis.
Section 4: Consultation Program

4.1 Consultation Program

Consultation is an integral component of various pieces of provincial and federal environmental legislation and is a key component of MTO’s *Class Environmental Assessment for Provincial Transportation Facilities, 2000* (Class EA). Consultation occurs throughout the planning of the project and is carried out in conjunction with the transportation engineering and environmental protection principles, as well as the documentation and bump-up principles set out in the Class EA.

Consultation involving external agencies (provincial, federal, municipal) and the public is an essential component of this Class EA process. MTO’s consultation processes attempt to meet the growing expectation on the part of the public that they will be consulted regarding decisions by public authorities.

Technical definitions and acronyms are provided in MTO’s *Environmental Glossary*.

4.1.1 Consultation Plan

A Consultation Plan shall be provided within one month of project start-up. The Consultation Plan shall contain, but not be limited to, the elements outlined in Section 4.2 and 4.3. The Consultation Plan shall constitute a project deliverable.

4.2 External Consultation

A public/agency consultation program for the full course of the study will be designed and conducted to include, but should not be restricted to, the following:

- public notices;
- external communications with stakeholders, including departments, ministries, agencies, Aboriginal Groups, municipalities and members of the public;
- inquiries from the public and general consultation;
- public information centre(s); and
- group / neighbourhood meetings as may be necessary.

Drafts of public notices, external correspondence, presentation material, brochures, and display material will be subject to review and acceptance by the MTO Environmental Planner. Draft material will be provided for review a minimum of (ten) 10 working days prior to it being required for consultation.

All components of the consultation program are to comply with the applicable requirements of the *French Language Services Act*. The French Language
Services Policy outlines the principles and objectives to be followed for MTO projects.

The Act and the Policy list designated areas in which translation is specifically required see the Office of Francophone Affairs website (http://www.ofa.gov.on.ca/).

All French Language Services as outlined in Exhibit 4.1 below are required.

4.2.1 Public Notices

The following MTO accepted public notices shall be published:

- "Notice of Study Commencement" announcing the study start-up;
- "Notice of Public Information Centre(s)" announcing the time and location of the PIC; and,
- "Notice of Submission" announcing the placement of the TESR and/or DCR on the public record.
**Figure 4.1: French Language Services Requirements in Designated Areas**

<table>
<thead>
<tr>
<th>Consultation Program(^{24})</th>
<th>Components</th>
<th>Requirements (according to the French Language Services Act)</th>
</tr>
</thead>
</table>
| Study Commencement            | • Newspaper notices  
                               • Letters to agencies | • Advertisements should appear in English and in the local French newspapers. The advertising agency will do a French translation, if given 24 hours, and will arrange to place the advertisement in the local French newspaper. If a French newspaper is not available, the French notice can be published in the English newspaper; or, as an alternative, a notation written in French can be put in the English notice as to a contact where assistance in French is available. (For example, “Pour des renseignements en français veuillez communiquer avec _____ au ____.”)  
                               • Considered technical. No translation required. |

\(^{24}\)If any information on the project is on the TPM consultant website and available to the public, there is a requirement under the French Language Services Act for the information to be available in both English and French. For consistency, all logos (i.e. MTO, etc.) should be displayed in a bilingual format. A disclaimer should be displayed on the website such as “…The information contained in this site may not be available in French. For information in French, please contact _____ at ____.” The TPM consultant would provide a contact name and telephone number. Any documents that are not exempted from translation (i.e. those provided at the PICs) should be available in both English and French on the website.
<table>
<thead>
<tr>
<th>PIC</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Newspaper notices</td>
</tr>
<tr>
<td>• Notices hand delivered to affected land owners</td>
</tr>
<tr>
<td>• Hand-outs at PIC (such as brochures, fact sheets, etc.)</td>
</tr>
<tr>
<td>• Display Pabels for public viewing on masse</td>
</tr>
<tr>
<td>• Translator</td>
</tr>
</tbody>
</table>

<p>| |</p>
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</thead>
<tbody>
<tr>
<td>• As above for Newspaper Notices.</td>
</tr>
<tr>
<td>• Because this is a direct communication to a specific community, notices are to be available in English and French</td>
</tr>
<tr>
<td>• To be available in English and French</td>
</tr>
<tr>
<td>• To be available in English and French. If more convenient or if space is at a premium, text boards translated in French can be available as handouts only. Drawings/plans/profiles/technical panels (evaluation and analysis text boards) do not have to be translated, given that a translator is present at the PIC.</td>
</tr>
<tr>
<td>• A translator is to be at the PIC. A translator must be fluent in French at an advanced level, as a minimum. Fluency requirements are outlined in the French Language Services Policy.</td>
</tr>
<tr>
<td>Documentation</td>
</tr>
<tr>
<td>--------------------------------</td>
</tr>
<tr>
<td>• TESR, DCR, EA</td>
</tr>
<tr>
<td>• Other reports referenced in the TESR, DCR, EA</td>
</tr>
</tbody>
</table>

The standard disclaimer is to be placed on the Public Record page: “Document hautement spécialisé n’est disponible qu’en anglais en vertu du règlement 411/97, qui en exemple l’application de la Loi sur les services en français. Pour de l’aide en français, veuillez communiquer avec le ministère des Transports, Bureau des services en français au: 905-704-2045 ou 905-704-2046.”

**Please Note: The standard disclaimer is to appear in all public documents, regardless of where the project is located.**
4.2.2 External Consultation and Negotiations

External consultation and negotiations shall include:

- Preparation and maintenance of a list of contacts with external departments, ministries, agencies, First Nations and municipalities over the course of the study, and identify property owners and/or tenants who may be affected directly or indirectly by the project;

- Preparation and sending contact letters to these parties early in the environmental assessment process so that concerns or comments may be discussed during the design of the project. Initial contact letters will be forwarded to government ministries, agencies and First Nations prior to the initial public notice. The contact letters are to:
  - explain in detail the environmental assessment particulars of the project;
  - provide a brief description of the extent of any potential impacts to the environment as it relates to that agency's mandate or property owner/tenant; and,
  - describe preliminary avoidance/protection/mitigation measures to be employed.

A map outlining the Study Area is to be included with the initial contact letter to the agencies.

Key agencies that have not responded by the deadline shall be contacted, and provided with a follow-up letter to the agency to confirm any verbal discussions and commitments within five (5) working days.

All letters, comments and inquiries of an environmental nature received from the public, federal departments, provincial ministries, agencies, First Nations and local government, including those received during the public review period of the TESR, shall be answered promptly.

Subsequent external communications will be made as required to resolve identified environmental issues. This may require discussions, meetings, correspondence and presentations with/to external government departments, ministries and agencies, First Nations, provincial and municipal politicians, interest groups and members of the public.

The proposed avoidance/protection/mitigation measures shall be developed and negotiated as required. External negotiations to resolve environmental issues will be subject to MTO participation and approval prior to any negotiations or discussions being held with external parties.
Consultants will not set up or attend any meeting with external stakeholders without Ministry presence, unless the Ministry has provided prior approval in writing. In addition, any discussions on the phone with external stakeholders will only be held within the context of approved issues by the Ministry. If a consultant makes contact, holds meetings/discussions without Ministry approval or makes commitments without prior Ministry approval, then the Ministry will take any action, as it may deem appropriate to rectify the situation.

4.2.3 Brochures

The Consultation Plan will be included in the overall Project Management Schedule and Environmental Plan Schedule. For a PIC, as a minimum, the consultant should provide a fact sheet or brochure unless otherwise specified.

PIC brochures or fact sheets shall be prepared, printed and distributed to households, businesses and others located along the study section of the highway.

4.2.4 Public Information Centre

The precise timing of the PIC(s) will be determined during the development of the study schedule and the submission of the Consultation Plan. The schedule and plan will be subject to review and accepted by MTO.

Accessibility issues as per the Ontario with Disabilities Act must be taken into account when developing the Consultation Plan and the selection of facilities. The document *Planning for Accessible Meetings. April 2002 Ministry of Citizenship, Accessibility Directorate of Ontario, Accessibility Ontario (www.culture.gov.on.ca)* is a resource to assist in the planning of meetings and reflects an optimal level of accessibility.

The consultant will be responsible for all arrangements and associated costs for the PIC including, but not limited to:

- newspaper notification and mailing letters and accompanying information to landowners/tenants located adjacent to the project;
- booking a suitable, universally accessible facility;
- all required displays, comment sheets and sign-in sheets, refreshments, etc. Freedom of Information (FOI) and Protection of Privacy Act compliance shall appear on all comment sheets and sign-in sheets (e.g. Information will be collected in accordance with the Freedom of Information and Protection of Privacy Act. This information will be kept on file and may be included in study documentation, which will be made available for public review. Names and addresses will be kept confidential);
- attendance and participation at the PIC;
• organization of, preparation for, and participation in project team meetings,
  senior management presentations, regional and municipal presentations prior
  to the PIC, and a debriefing session after the PIC; and,

• analysis and evaluation of comments received at the PIC; co-ordination and
  preparation of draft and final follow-up responses to comments and concerns
  received at the PIC; and preparation of a summary report for the PIC. The
  consultant will be required to submit draft correspondence to MTO for review
  and approval prior to finalization. Copies will be distributed to the appropriate
  parties.

A summary report of the PIC will be provided to MTO’s Environmental Planner
ten (10) working days after the deadline of written submissions. The summary
will include an analysis and evaluation of comments received at the PIC, and
follow-up responses to comments and concerns received at the PIC. The
consultant is required to consider the comments received at the PIC in
developing and evaluating design alternatives. This information will be included
in the TESR, DCR or environmental screening document, as applicable.

4.3 Internal Consultation

The consultant Environmental Planner shall be expected to attend all project
meetings and all meetings relating to environmental deliverables (unless
otherwise agreed to by the MTO Environmental Planner). The consultant
Environmental Planner shall also participate in all team discussions involving the
evaluation of planning and design options to ensure environmental factors are
properly considered.
Section 5: Environmental Requirements

All MTO projects are subject to a variety of federal and/or provincial legislation, policies, and procedures. Prior to scoping the work, it is necessary to be familiar with the requirements and prohibitions of each of these that will apply to the project, as well as any approvals that may be required for the work.

Applicable federal and provincial statutes were identified related to the environmental aspects of transportation planning, and highway design, construction, and operation and maintenance activities. Each of these has various requirements and many have supporting regulations, and/or formal government policies. Some of these statutes have overlapping or complementary requirements.

To clarify its environmental requirements, the ministry reviewed and synthesized the statutes and the supporting regulations and formal government policies, interpreted how each is applied to transportation planning and highway design, construction, operation and maintenance activities and developed “Environmental Protection Requirements”.

The “Environmental Protection Requirements” (EPRs) have been developed in co-operation with Environmental Regulatory Agencies. The ministry has consulted with the various agencies mandated with enforcement of the statutes to ensure a common interpretation and has also solicited public input through the Ontario Environmental Bill of Rights Registry.

The “Environmental Protection Requirements” are available in the MTO document entitled “Environmental Protection Requirements for Transportation Planning and Highway Design, Construction, Operation and Maintenance”.

The “Environmental Protection Requirements” are supported by a Legislative Database that is intermittently updated by MTO.

The information in both the Environmental Protection Requirements and the Legislative Database is provided as a convenience only and should not be relied upon as authoritative. The ministry makes no warranty, express or implied, with respect to the accuracy or completeness of information contained herein, and in no event shall the ministry be liable for any losses arising out of the use of, or inability to use either the document or the database. Each user is ultimately responsible for identifying the most relevant and current statutory materials for the purpose intended. With respect to non-OPS employees, access to the database does not relieve the user from carrying out his/her services in accordance with the terms of his/her employment. In addition, access to the database is restricted to undertakings for or on behalf of the Province of Ontario and any other use shall be considered unauthorized and subject to the legal rights of the Province.
Section 6: Environmental Assessment Documentation

Section 2: Generic Requirements and Optimal Timelines for Obtaining Provincial and Federal Environmental Assessment Clearances, details the timing of (i.e., Preliminary Design or Detail Design) and requirements for various environmental factor-specific and environmental assessment documents.

The various environmental factor-specific technical reports and supporting documentation required are identified in Section 3.

These reports are intended to provide background information and technical information to support the final project recommendations set out in the appropriate Class EA process documentation.

Technical definitions and acronyms are provided in MTO's Environmental Glossary.

6.1.1 Summary of Environmental Concerns and Commitments

The 'Summary of Environmental Concerns and Commitments' outlines the environmental issues and concerns identified for a specific project and the measures and approaches that were developed to address these issues and concerns. A description of the contents of the summary report is provided in Table 6.2. The blank 'Summary of Environmental Concerns and Commitments' Table is shown in Table 6.2. The first five columns of the summary are to be included in the Transportation Environmental Study Report - TESR (Sub-section 6.3.1), Design & Construction Report - DCR (Sub-section 6.3.2) or Environmental Screening Document (Sub-section 6.3.3). The entire summary will be appended to the Environmental Synopsis (Sub-section 6.5), which will subsequently be used to report on the contractor's compliance with, and the effectiveness of, the identified measures. If an Addendum is required, the first eight columns of the Summary shall be attached to the document.

The summary should provide a detailed breakdown of the identified environmental features within the project limits and the committed measures/approaches for protecting the environment or for addressing other project-related (including specific public/agency) concerns.

6.1.2 Environmental Component in the Preliminary Design Report

Where Preliminary Design does not include a TESR (See Section 2 of the ERD), the environmental component of the Preliminary Design Report (PDR) shall include:

- a complete discussion and documentation of the generation, assessment, evaluation, selection and development of the design alternative;
Ministry of Transportation  
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- the transportation engineering and environmental issues and how they were incorporated into the environmental assessment program;

- if an individual EA has been conducted, a summary of the EA report shall be provided;

- a full description of the identified potential environmental condition changes, effects and commitments to mitigation measures, and if CEAA applies, all cumulative effects and environmental issues of federal concern;

- completion of the first five columns of the Summary of Environmental Concerns and Commitments Table.

- commitments to further work, including any environmental effects monitoring, that is required;

- a full description of the study's consultation program; and

- identification of all project approvals licences and permits which have or must be obtained.

6.1.3 Environmental Assessment Process Documentation

6.1.3.1 Transportation Environmental Study Report

Transportation Environmental Study Reports (TESR’s) are required as stipulated in Table 6.1 of MTO’s Class Environmental Assessment for Provincial Transportation Facilities, 2000, as amended. All components of the Environmental Assessment Program will be documented in the TESR. The content requirements are set out in the Class EA. The TESR should include, but not be restricted to, the following:

- a complete discussion and documentation of the generation, assessment, evaluation, selection and development of the design alternative;

- the transportation engineering and environmental issues and how they were incorporated into the environmental assessment program;

- if an individual EA has been conducted, a summary of the EA report shall be provided;

- a full description of the identified potential environmental condition changes, effects and commitments to mitigation measures, and if CEAA applies, all cumulative effects and environmental issues of federal concern;

- completion of the first five columns of the Summary of Environmental Concerns and Commitments Table.
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- commitments to further work, including any environmental effects monitoring, that is required;

- a full description of the study’s consultation program;

- identification of all project approvals, licences and permits which have or must be obtained; and

- elements of construction documentation.

Drafts of the TESR will be prepared, and revised as directed, for review and approval by the project team, and MTO internal review processes. The TESR will be supplied to appropriate external ministries/agencies to follow up on concerns identified during the consultation process. This will include:

- the printing, binding and distribution of the necessary number of copies to all public review locations and ministries/agencies that are involved in the design aspects of the project or require a copy for approval purposes;

- final notification in the local media (newspapers) and provision for the public review period; and

- provision of two electronic copies (one in Microsoft Word and one in Adobe Acrobat PDF format) and fifteen (15) bound copies of the final TESR to the MTO Environmental Planner.

6.1.3.2 Design & Construction Report

A Design and Construction Report (DCR) will be prepared as stipulated in Table 6.1e of MTO’s Class Environmental Assessment for Provincial Transportation Facilities, 2000, as amended. In addition, a DCR is required when cumulative effects and environmental issues of federal concern were not documented in the TESR and CEAA applies.

All components of the Environmental Assessment Program will be documented in the DCR, as they relate to Detail Design. The DCR should include, but not be restricted to, the following:

- the transportation engineering and environmental issues and how they were incorporated into the environmental assessment program;

- if an individual EA has been conducted, a summary of the EA report shall be provided;

- a full description of the identified potential environmental condition changes, effects and commitments to mitigation measures that will be incorporated into
the construction documents, and if CEAA applies, all cumulative effects and environmental issues of federal concern;

- completion of the first five columns of the Summary of Environmental Concerns and Commitments Table)

- a full description of the study’s detail design consultation program;

- identification of all project approvals, licences and permits which have or must be obtained;

- implementation of the commitments to further work contained in the TESR, including any environmental effects monitoring that is required; and

- construction documentation where relevant.

Drafts of the DCR will be prepared and revised as directed by MTO, for review and approval by the project team and MTO internal review processes. The DCR will be supplied to appropriate external ministries/agencies to follow up on concerns identified during the consultation process. This will include:

- the printing, binding and distribution of the necessary number of copies to all public review locations and ministries/agencies that are involved in the design aspects of the project;

- notification in the local media (newspapers) and provision for the public review period; and

- provision of two electronic copies (one in Microsoft Word and one in Adobe Acrobat PDF format) and fifteen (15) bound copies of the DCR to the MTO Environmental Planner.

6.1.3.3 Environmental Screening Document

An Environmental Screening Document shall be prepared to a standard acceptable to the ministry to ensure adequate background documentation regarding the EA process and the mitigation requirements for the project. An Environmental Screening Document should include documentation of the environmental conditions inventory, external agency and public consultation process, assessment of environmental impacts, and any proposed mitigation measures and construction monitoring requirements. The first five columns of the Summary of Environmental Concerns and Commitments Table are also required.

The Environmental Screening Document shall be prepared in draft form, and is subject to review by MTO for conformance with environmental policies and procedures. It shall be revised as required. The final Environmental Screening
Document should be supplied to appropriate external ministries/agencies as requested or required to follow up on concerns identified during the consultation process. Five (5) printed copies, and two electronic copies (one in Microsoft Word and one in Adobe Acrobat PDF format) of the final Environmental Screening Document should be supplied to MTO.

6.1.3.4 Addenda

If it is necessary to make significant changes to the commitments outlined in the TESR/DCR or changes to the concept of portions of the project, an Addendum may be required. The information provided in Section 6.1 of MTO's Class EA applies in such cases.

Only the changes documented in the Addendum are eligible for bump-up. In the event that a bump-up request is granted, the proponent has the option of withdrawing the Addendum and implementing the project as documented in the original TESR.

The first eight columns of the Summary of Environmental Concerns and Commitments Table shall be included in the Addendum.

6.1.4 Environmental Synopsis

The Environmental Synopsis is generally prepared at or near the completion of the detail design stage as a means of summarizing the environmental protection plan that has been developed for the implementation of the project. The purpose of the Environmental Synopsis is to ensure continuity in commitments and approaches to environmental protection between design and construction stages.

The Environmental Synopsis:

- clarifies assumptions that have been built into environmental protection approaches;
- spells out the planner's/designer's understanding of the basis/rationale for any environmental approvals and the associated conditions; and
- helps to ensure effective implementation of committed environmental protection measures/approaches.

The Environmental Synopsis should provide a clear outline of the requirements that the Contract Administrator must be mindful of in supervising work that has identified potential for environmental impacts.

Typical items to be included in the Environmental Synopsis include:

- a description of the approaches developed for environmental protection including such matters as erosion and sediment control and
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fisheries/watercourse protection. This should include any assumptions that are built into the protection approaches such as where timing constraints for grading operations have been used in lieu of extensive erosion and sediment control measures or where there are several conceivable options which might be used for flow management during in-water works;

• specific end result requirements for the protective approaches/measures and possible consequences/requirements in the event of non-compliance;

• proposals required from the contractor to address environmental protection requirements/approvals, what the proposals are to address (specific data requirements included), and the process to be followed in obtaining necessary approvals;

• contingency requirements that are to be addressed by the contractor (i.e., plans for dealing with spills, unanticipated conditions such as during flow diversions, and delays in meeting early grading completion dates);

• monitoring requirements including the need for any environmental specialists to assist in specific aspects of the monitoring or in the routine co-ordination of environmental requirements during construction;

• the entire Summary of Environmental Concerns and Commitments Table; and

• any anticipated requirements for internal/external meetings/communication during construction to address environmental components of the construction contract
### Table 6.1: Description of the Contents of the Summary of Environmental Concerns and Commitments Table

<table>
<thead>
<tr>
<th>I.D. #</th>
<th>Issues/Concerns</th>
<th>Concerned Agencies</th>
<th>I.D. #</th>
<th>Mitigation/Protection/Monitoring</th>
<th>Changes to Mitigation/Protection/Monitoring</th>
<th>Agencies Responses &amp; Date</th>
<th>New Mitigation / Protection/ Monitoring</th>
<th>Date of Approvals/Permits/Authorizations Environmental Clearance</th>
<th>Mitigation/Protection/Monitoring in Contract Documents (yes/no - describe)</th>
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<tbody>
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<td>(yes/no - describe)</td>
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| Use item #s to reference specific req'ts | - Outline potential environmental affects associated with particular aspects of the work  
- Describe the nature of issue/concern and associated potential effects for individual items  
- Reference other associated investigations and reports | Agency raising issues/concern | Use item #s to reference specific req'ts for sub-issues | - Describe mitigation/protection req'ts applicable to each item.  
- Describe any req'ts for further external mtgs to address particular items  
- Outline clear end result expectations for each item to be used as gauge for monitoring.  
- Outline consequences of non-compliance  
- Describe contingency req'ts that must be addressed  
- Describe commitments to monitoring/reporting | - If there are no changes to the mitigation/protection/monitoring commitments, then this column is not applicable  
- If change is unavoidable, for each sub-issue, summarize agencies responses to modifications.  
- State date of response. | - If there are no changes to the mitigation/protection/monitoring commitments, then this column is not applicable  
- If change is unavoidable, for each sub-issue, summarize agencies responses to modifications.  
- State date of response. | - List all environmental approvals/permits/authorizations obtained that are applicable to each item.  
- State date that each approval/permit/authorization was obtained  
- State date of environmental clearance. | - Ensure mitigation/protection monitoring commitments are incorporated into the contract. | |

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**Portion of Table Applicable to PDR/TESR/DCR/Environmental Screening Document**

**Portion of Table Applicable to TESR/DCR Addenda (if required)**

**Copied from above**

**Portion of Table Applicable to Environmental Synopsis**

**Copied from above**
Table 6.2: Summary of Environmental Concerns and Commitments Table - Blank

<table>
<thead>
<tr>
<th>I.D. #</th>
<th>Issues/Concerns Potential Effects</th>
<th>Concerned Agencies</th>
<th>I.D. #</th>
<th>Mitigation/Protection/ Monitoring</th>
<th>Changes to Mitigation/Protection/ Monitoring (yes/no - describe)</th>
<th>Agencies Responses &amp; Date</th>
<th>New Mitigation / Protection / Monitoring</th>
<th>Date of Approvals / Permits / Authorizations Environmental Clearance</th>
<th>Mitigation/Protection/Monitoring in Contract Documents (yes/no - describe)</th>
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Section 7: Environmental Component of Contract Documents

MTO’s *Environmental Reference for Contract Preparation (ERCP)* contains a brief overview of potential environmental impacts associated with highway construction and all relevant Ontario Provincial Standard Specification (OPSS) and MTO Standards Special Provisions (SSP) that may be used as part of a construction contract to mitigate those impacts.
Section 8: MTO Class EA Process Monitoring

8.1 MTO Class EA Process Monitoring

As a Condition of approval, MTO is required to develop and implement an environmental monitoring program to assess and report on the effectiveness of, and compliance with, the parent Class EA process as outlined in the document, *Environmental Assessment for Provincial Transportation Facilities* (2000, as amended).

Upon the submission of the Transportation Environmental Study Report (TESR) and/or Design Construction Report (DCR), the person responsible for ensuring compliance with MTO's parent Class EA document shall complete the MTO Class EA Process Monitoring Questionnaire for Design Consultant Staff. It requests administrative data as well as project specific views regarding compliance with and the effectiveness of MTO's Class EA process.

The completed questionnaire should be forwarded to the MTO Regional Environmental Planner and to:

- Ontario Ministry of Transportation
- Provincial and Environmental Planning Office
- 301 St. Paul Street
- St. Catharines, ON
- L2R 7R4
- (905) 704-2104 Phone
- (905) 704-2007 Fax

Technical definitions and acronyms are provided in MTO’s Environmental Glossary
Appendix 8.2

MTO CLASS EA PROCESS MONITORING QUESTIONNAIRE

FOR DESIGN CONSULTANT STAFF

The MTO Class EA Process Monitoring Questionnaire for Design Consultant Staff has been converted into a PDF form and can be filled out electronically.
Table 7 Summary of MTO's Class EA principles

<table>
<thead>
<tr>
<th>PRINCIPLES</th>
<th>SECTION/ PAGE#</th>
<th>SUMMARY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environmental Protection Principles</td>
<td>Section 4.2.1</td>
<td>- Conduct studies with an inherent approach of avoiding or minimizing overall environmental impacts through consideration of alternatives.</td>
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<tr>
<td></td>
<td>Page 4-3</td>
<td>- Identify existing environmental conditions and potential impacts relevant to the study.</td>
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<td>- Meet the requirements of federal and provincial environmental legislation.</td>
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<td>- Meet the intent of government-approved policy and Inter-ministerial protocols.</td>
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<td>- Address the Ministry of Transportation's Statement of Environmental Values.</td>
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<td>- Balance environmental protection considerations with transportation engineering considerations during each stage of the study process, recognizing that safety and effectiveness of the transportation system is fundamental to such decisions.</td>
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<td>- Recognize that it is seldom possible to satisfy all interests when making the trade-offs necessary in the EA process, and that no single environmental factor is always &quot;paramount&quot;.</td>
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<td>- Recognize that environmental mitigation measures themselves may have environmental impacts which offset their benefit.</td>
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<td>- Provide mitigation effort in proportion to environmental significance and ability to reasonably mitigate.</td>
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<td>- Monitor the implementation of environmental protection and mitigation measures during construction.</td>
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<tr>
<td>PRINCIPLES</td>
<td>SECTION/ PAGE#</td>
<td>SUMMARY</td>
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<tr>
<td>Evaluation</td>
<td>Section 4.3.1 Page 4-6</td>
<td>• The evaluation process must be <em>traceable, replicable,</em> and must be <em>understandable</em> by those who may be affected by the decisions.</td>
</tr>
<tr>
<td>Evaluation</td>
<td>Section 4.3.1 Page 4-6</td>
<td>• All relevant factors, including transportation engineering and environmental protection, will be given <em>due consideration.</em></td>
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<tr>
<td>Evaluation</td>
<td>Section 4.3.1 Page 4-6</td>
<td>• The evaluation may be <em>subjective</em> (based on reasoned argument) or <em>objective</em> (using quantifiable data).</td>
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<tr>
<td>Evaluation</td>
<td>Section 4.3.1 Page 4-6</td>
<td>• For Group A projects, the proposed evaluation process in planning will be established through <em>consultation</em> with external stakeholders.</td>
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<tr>
<td>Evaluation</td>
<td>Section 4.3.1 Page 4-6</td>
<td>• Factors may be refined from one stage of a project to the next.</td>
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<tr>
<td>Environmental Protection in Construction</td>
<td>Section 4.8.3 Page 4-40</td>
<td>• Ensure conformance to the environmental requirements of the construction documents.</td>
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<tr>
<td>Environmental Protection in Construction</td>
<td>Section 4.8.3 Page 4-40</td>
<td>• Provide all additional environmental elements necessary to address the Construction, including but not restricted to the following:</td>
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<tr>
<td>Environmental Protection in Construction</td>
<td>Section 4.8.3 Page 4-40</td>
<td>• control and mitigation of access, removal, and direct damage impacts;</td>
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<tr>
<td>Environmental Protection in Construction</td>
<td>Section 4.8.3 Page 4-40</td>
<td>• control and mitigation of disturbance and interference impacts;</td>
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<tr>
<td>Environmental Protection in Construction</td>
<td>Section 4.8.3 Page 4-40</td>
<td>• control and mitigation of emissions and escapes to air, water and soil;</td>
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<tr>
<td>Environmental Protection in Construction</td>
<td>Section 4.8.3 Page 4-40</td>
<td>• control and mitigation of traffic access modification impacts;</td>
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<td>Environmental Protection in Construction</td>
<td>Section 4.8.3 Page 4-40</td>
<td>• procurement of any formal environmental approvals, permits, exemptions, agreements and clearances required for construction; and</td>
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<td>PRINCIPLES</td>
<td>SECTION/ PAGE#</td>
<td>SUMMARY</td>
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<tr>
<td>Environmental Monitoring of</td>
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<td>• environmental contingency plans relative to the above.</td>
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<td>• Make any formal environmental reporting to environmental agencies and others as required by statute (e.g. for spills).</td>
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<td>• Address any construction-related commitments and conditions of EA process and environmental approvals, permits and exemptions.</td>
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<td>• Observe good construction environmental practice, including compliance with environmental legislation</td>
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<td>• Anticipate and address environmental problems during construction.</td>
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<td>• Monitor the implementation of environmental protection and mitigation measures during construction.</td>
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<td>• Provide any formal construction and post-construction monitoring and reports that were committed to.</td>
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<td>• During construction, the proponent ensures that implementation of mitigating measures and key design features are consistent with the contract and external commitments (see on-site section below). In addition, the proponent assesses the effectiveness of project environmental protection measures to ensure that:</td>
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<td>• Environmental protection measures are what is needed; in place when they are needed; positioned where they are needed; and are working as required;</td>
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<td>• Operations, equipment and materials are only where they are permitted; occurring/operated/placed when they are permitted; and doing what is permitted; and</td>
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<td>• Deficiencies are corrected when they are needed; by using what is needed; and doing it where it is needed.</td>
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| Construction | Section 4.8.4  
Page 4-41 | - External stakeholders, including external agencies and the public will be notified of the proponent's intention to carry out a study at the beginning of the study, before the proponent becomes committed to a particular solution.  
- In all cases, the construction plan will be developed to place emphasis on consultation with the stakeholders most directly affected.  
- The consultation plan will provide timely, user-friendly opportunities for input by the public and the agencies whose mandates are most directly affected.  
- The proponent will constructively address input received during the consultation process.  
- During later planning and design phases, the proponent will show how the input received in earlier stages affected the project.  
- The amount, extent and timing of consultation will vary according to the complexity of a specific project, the nature of the specific environmental issues, and the concerns expressed by the public and external agencies.  
- For each study, appropriate methods of notification will be selected based on the nature of the study area, the external parties to be contacted, the stage of the study, and the issues to be addressed.  
- The proponent will make reasonable efforts to resolve concerns.  
- Mediation will be considered for major issues, at key decision points. |
| Consultation  | Section 5.2/  
Page 5-2 | |
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| Documentation (For Group A and B Projects) | Section 6.1 Page 6-1 | • The document content requirements will be fulfilled.  
• Documentation will deal with project-specific details and issues. Information presented in this Class EA will not be repeated.  
• Documentation will cover the results of the study to date.  
• A TESR and DCR must cover full phases.  
• Where a Study Design Report, TESR or DCR is required, an opportunity to review the documentation and provide comments will be provided.  
• The review period for Study Design Reports, TESR and DCRs will be at least 30 days. |
| Bump-Up                          | Section 6.2 Page 6-5 | • Notice of bump-up opportunity will be provided upon formal submission of the TESR in all cases, and if applicable, upon submission of the DCR.  
• The review period following the notice of bump-up opportunity will be at least 30 days in all cases.  
• Environmental Clearance - Construction Start will not be issued, and the construction of physical works will not begin, until the 30 day review period is over and any bump-up requests have been dealt with. |
Section 9: Environmental Clearance

Following the successful completion of a Class EA project, consultant staff will be required to prepare, and submit to MTO, a statement indicating that the project is now eligible for construction. This notification takes the form of an environmental clearance letter.

MTO must provide Environmental Clearance for all projects in Group A and Group B, and for those Group C projects for which an Environmental Screening Document is prepared. A memorandum shall be prepared indicating that all environmental issues have been addressed and that the project is eligible for Environmental Clearance. The memorandum does not substitute for any other deliverables, and shall be no more than two pages in length.
Section 10: Key Staff Qualifications

This section identifies the minimum qualifications that key staff must possess if they are to be considered eligible to bid on environmental work for MTO projects.

Environmental Factor Specific Staff

Section 3 of the ERD is organized into sub-sections by environmental factor. Each sub-section contains the minimum qualifications that key environmental staff must possess for that factor.

In some cases, membership in accredited associations and/or applicable licences may be required. Consultants are advised to clearly document that their staff have such qualifications when preparing their proposals.

Environmental Planner

The Environmental Planner shall have a demonstrated broad based knowledge of a wide variety of environmental disciplines and the technical aspects of these and current environmental issues, a working knowledge of federal and provincial planning and environmental policy/legislation in general, and a specific knowledge of MTO policy and legislation including the requirements of the MTO Class Environmental Assessment for Provincial Transportation Facilities (2000, as amended).

The Environmental Planner shall demonstrate, as a minimum, that they have proven professional experience in the:

- management of the environmental component of multi-disciplinary projects;
- preparation, submission and successful clearance of Environmental Study Reports, Transportation Environmental Study Reports, Environmental Screening Documents, Individual Environmental Assessments and/or Design and Construction Reports;
- preparation and co-ordination of three public consultation programs including open houses, at least one of which was for MTO;
- good understanding of the interests and mandates of environmental ministries and agencies;
- development of mitigation measures and contract documentation to address mitigation needs;
- co-ordination of erosion and sediment control measures; and
- ability to deliver products within tight timelines.
The consultant Environmental Planner shall have proven experience on highway projects and/or infrastructure projects of similar scale and scope. Contact names and phone numbers are to be provided for all projects listed as applicable experience. Both MTO and other references may be checked.