Transportation Environmental Study Report

Highway 3 Twinning (GWP 3041-22-00)

February 2024

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SIGN OFF SHEET

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1.0 Overview of the Undertaking

1.1 Introduction

The Ministry of Transportation Ontario (MTO) retained Stantec Consulting Ltd. (Stantec) to complete the Preliminary Design, Detail Design, and Class Environmental Assessment (Class EA) Study to address the future needs of the Highway 3 corridor from Highway 4 near Talbotville in the Township of Southwold to Centennial Road in the City of St. Thomas.

The study has been divided into two Group Work Projects (GWPs):

- Highway 3 Twinning in the City of St. Thomas, Municipality of Central Elgin, and Township of Southwold (GWP 3041-22-00)
- Talbotville Bypass and Highway 4 Widening in the Township of Southwold (GWP 3042-22-00)

This *Transportation Environmental Study Report* (TESR) has been prepared to document the Preliminary Design and Class EA for the Highway 3 Twinning project (GWP 3041-22-00). A TESR has also been prepared to document the Preliminary Design and Class EA for the Talbotville Bypass and Highway 4 Widening project (GWP 3042-22-00) and is available under separate cover.

1.2 General Description of Project

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

This project is a Group 'B' project under the *Class Environmental Assessment for Provincial Transportation Facilities* (2000) and includes undertaking environmental and engineering field investigations and seeking input from stakeholders, external agencies, Indigenous communities, and the public.

1.2.1 Study Area

The study area for the Highway 3 Twinning project (GWP 3041-22-00) includes Highway 3 and areas adjacent to the highway from Centennial Avenue in the City of St. Thomas to west of Wellington Road in the Township of Southwold, Elgin County, as shown in **Figure 1**.

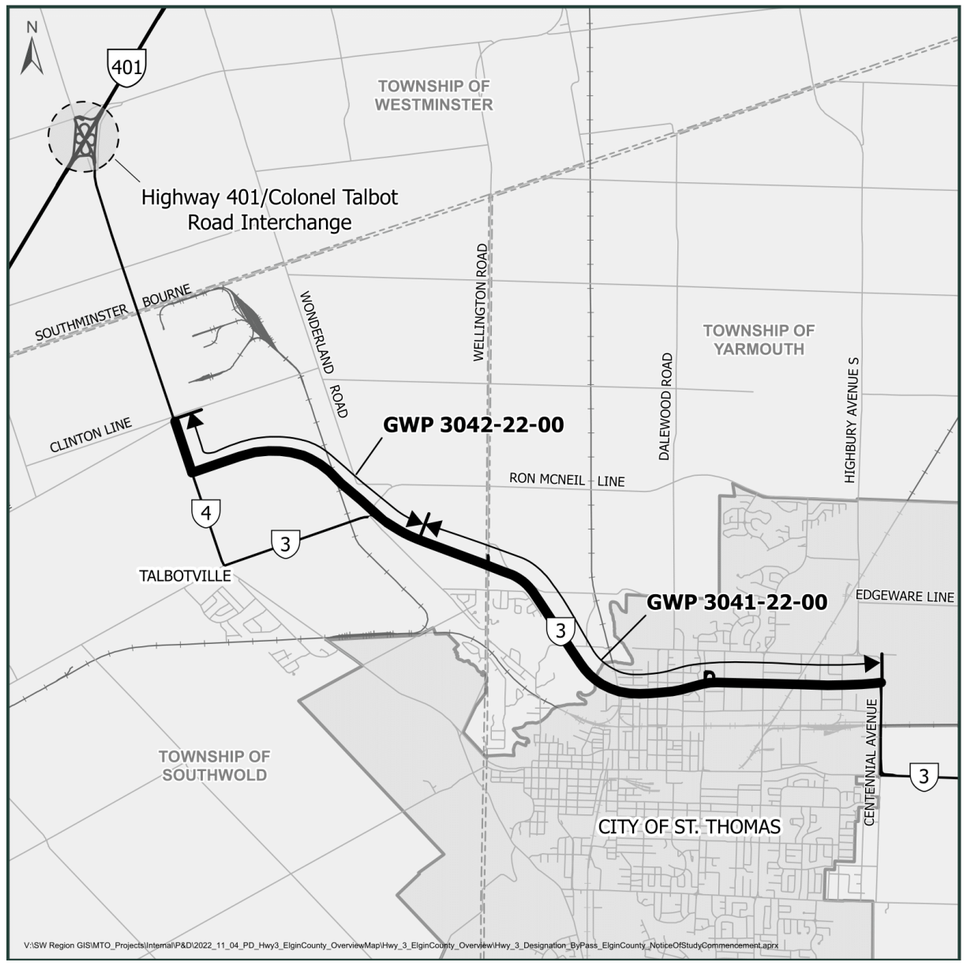

Figure 1: Study Area

1.3 Project Background

1.3.1 Function of Highway 3

Highway 3 is a King's Highway that provides a strategic connection to the City of St. Thomas and Highway 401 using Highway 4. Highway 3 allows for efficient movement of people and goods, with accommodation of heavy truck traffic along the highway. Access to Highway 3 is provided via existing intersections at Highway 4, Ron McNeil Line/Ford Road, Wellington Road, the existing First Avenue interchange, and Centennial Avenue. The intersection at Highway 3 and Highway 4 is signalized within Talbotville. Highway 3 provides a critical transportation link between Highway 401 and the growing industrial area within the City of St. Thomas.

The existing Highway 3 in the study area is an undivided two-lane highway that was constructed between 1974 and 1981. Generally, Highway 3 is at-grade west of Kettle Creek and in a cut east of Kettle Creek. There are underpass structures at Balaclava Street, Burwell Road, and at two railway lines in the study area. There is also one grade-separated interchange located at First Avenue. West of St. Thomas, there are at-grade intersections with Wellington Road and Ron McNeil Line, the former of which is signalized.

Prior to construction of Highway 3, it was anticipated that the highway would be expanded from two to four lanes in the future. As such, the Highway 3 right-of-way and underpasses in the study area were designed to accommodate a divided four-lane highway.

1.3.2 Previous and Adjacent Studies

In 1971, the Technical Advisory Committee for the City of St. Thomas and the Ontario Department of Highways completed a functional planning study for the St. Thomas Expressway from Highway 401 easterly to Highway 3 at New Sarum. This study recommended that the construction of both the St. Thomas Expressway and a new Highway 126 extension that should consist of four lanes of divided, controlled access highway, with the western extremity of the expressway interchanging at Highway 401 (approximately 4.5 km west of the existing Highway 4 interchange). In consideration of operating deficiencies that were estimated to occur over a 20-year planning period, four construction stages were recommended. The first stage would include the construction of a 10 km long, four-lane wide expressway between Highway 4 (north of Talbotville) and Centennial Avenue. This would complete the 'in-City' portion of the project and connect the expressway to the major existing highways. The recommended alignment was designated on January 20, 1976, and is the alignment followed for the current study. The second stage consisted of continuing the four lanes of expressway easterly for 6.0 km from Centennial Avenue to New Saum, to provide a direct connection to Highway 3. The third stage would provide a 5.0 km long connection from Highway 401 to Highway 4 with only two lanes of vehicular traffic. The fourth and final stage would consist of widening these two lanes to an eventual four lanes, once required. The Highway 126 extension was not implemented.

In 2021, MTO retained WSP to undertake a feasibility study to confirm the need for a future conversion of Highway 3 designations to a controlled access highway, and to identify alternative connection locations and types for the future Highway 3 bypass extensions between Highway 4 and Elgin County Road 35. Following the Evaluation of Alternatives and a Traffic Analysis of the Preferred Alternatives, Recommended Designs for the Highway 3 Talbotville Bypass and Highway 3 East Bypass extensions were confirmed. The recommended alignment for the Talbotville Bypass followed the designation from the 1970s and included an extension northwest from the existing Highway 3/Ron McNeil Line intersection, with a connection to Highway 4, south of Clinton Line. The recommended design of the Talbotville Bypass did not include a connection from Ford Road to Highway 3/Talbot Line, but rather converted the existing Ford Road into a cul-de-sac to maintain access to private properties and limited access to Ford Road and the surrounding residential development to Wellington Road and McBain Line. The Recommended Design for the East Bypass consisted of a 6.0 km long extension with a continuous connection to Highway 3 at the existing curve west of Belmont Road, 5.0 km east of the Highway 3/Centennial Avenue intersection. In addition, the existing Highway 3 was recommended to be realigned to meet the future bypass at a T-intersection west of the connection location. The existing cross-section for Highway 3 was recommended to be maintained for both the Talbotville Bypass and East Bypass, consisting of a two-lane undivided highway, with one 3.75 m wide vehicular lane in either direction and 2.5 m wide uncurbed shoulders. However, a right-of-way (ROW) width of 50 m was assumed for the East Bypass extension to accommodate future widening and the possible conversion to a divided freeway, if required.

MTO retained Stantec in 2022 to prepare a Conceptual Design of the Highway 3 Talbotville Bypass. The purpose of the assignment was to generate conceptual cross-section and intersection design alternatives to provide guidance to the subsequent Preliminary Design and Class EA Study. Design alternatives related to the twinning of Highway 3 through the City of St. Thomas were beyond the scope of the assignment.

Presently, the City of St. Thomas is undertaking a Municipal Class EA Study for improvements to Highbury Avenue from Edgeware Road to Ron McNeil Line, and South Edgeware Road from Burwell Road to Highbury Avenue. The study includes improvements to the Highway 3 and Highbury Avenue intersection to improve connectivity with Highway 3. The Recommended Design includes the construction of a multi-lane roundabout (i.e., two approach lanes per direction) to the southwest of the existing intersection. An *Environmental Study Report* (ESR) was prepared documenting the Municipal Class EA planning and decision-making process. The 30-day public review period ended December 7, 2023. Detail Design and Construction are to follow, subject to funding and approvals.

The City of St. Thomas is also undertaking a Municipal Class EA Study for the construction of a Major Arterial Roadway Connection from the existing Highway 3 and Centennial Avenue intersection, easterly to Yarmouth Centre Road. The new roadway is being proposed to support the construction of a new industrial park located within the north-eastern city limits. The Recommended Design includes the construction of a new semi-rural road (with a 15 m median) between Centennial Avenue and Yarmouth Centre with associated infrastructure and intersection

improvements. The Recommended Design was presented as part of the study's second Public Information Centre, which was available on the City's website from October 18 to November 8, 2023. It is anticipated that the City's Municipal Class EA Study will be completed in 2024, with Detail Design and Construction to follow, subject to funding and approvals.

In July 2020, MTO and the County of Elgin initiated a Municipal Class EA Study to determine the need for road network improvements in the vicinity of Wonderland Road, Ron McNeil Line, Ford Road, and Highway 3 in the Township of Southwold. One Public Information Centre took place in April 2021. The Municipal Class EA Study was replaced in 2022 with the Highway 3 Twinning, and Talbotville Bypass and Highway 4 Widening studies.

2.0 Class Environmental Assessment Process

The purpose of Ontario's *Environmental Assessment Act* (EA Act) (Government of Ontario) is to help protect and conserve Ontario's environment by requiring that projects subject to the EA Act follow a planning process leading to environmentally sound decision-making. For projects subject to the EA Act, an environmental assessment involves identifying and planning for environmental issues and effects prior to implementing a project. The process allows reasonable opportunities for public involvement in the decision-making process of the project.

The Class Environmental Assessment (EA) process is a planning process approved under the EA Act that provides a streamlined process that must be followed for projects or activities within a defined "class". When the Class EA planning process is adhered to for a project, the requirements of the EA Act are also fulfilled and formal approval under the EA Act is not required. The Class EA requirements must be met before a project can be implemented. Projects and activities that are defined within a "class" are generally one that are recurring, carried out routinely and have predictable environmental effects that can usually be mitigated. On December 15, 2023, the Ministry of Environment, Conservation and Parks (MECP) granted approval for amendments to the MTO Class EA for Provincial Transportation Facilities, encompassing significant and minor revisions endorsed by both MTO and MECP. During the transitional phase of the 2023 Class EA, the Preliminary Design of this project will advance under the framework of the 2000 Class EA. Subsequent design phases will consider a transition to the 2023 Class EA, if eligible.

The word "environment" within the EA Act is broadly defined and can include aspects of the natural, social, economic, and cultural environments depending on the project in question. The *Class EA for Provincial Transportation Facilities* (2000) outlines the EA process to be followed for specific groups of provincial transportation projects. The groups of projects are as follows:

- Group "A" – Projects involving new facilities.
- Group "B" – Projects involving major improvements to existing provincial transportation facilities.
- Group "C" – Projects involving minor improvements to existing provincial transportation facilities.
- Group "D" – Activities that involve operation, routine maintenance, administration, and miscellaneous work for provincial transportation facilities. These activities are approved under the EA Act subject to compliance with applicable environmental legislation other than the EA Act.

This project is following the Class EA process for a Group 'B' project under the MTO Class EA, which is required for major improvements to existing provincial transportation facilities, such as improvements to interchanges where there may be major footprint modifications, and highway improvements where significant modification to the "footprint" beyond the roadbed of an existing highway is proposed. Group 'B' projects are considered approved under Ontario's EA Act subject to compliance with the Class EA.

The Class EA study process is based on an assessment of alternatives, starting with a broad perspective, and narrowing to a more focused perspective as the study progresses. The process of collecting additional environmental data as the project becomes more focused ensures that current information is sought and used throughout the study process. The public, stakeholders and Indigenous communities were consulted/engaged during the assessment and evaluation of alternatives, and to refine issues/concerns in an attempt to develop measures for resolving them.

2.1 Purpose of the Transportation Environmental Study Report

This TESR documents the decision-making process and includes:

- A description of the project purpose.
- The existing technical, natural, socio-economic, and cultural environmental factors.
- The identification and evaluation of alternatives that were considered.
- Consultation activities, including a record of the comments received and how they were considered.
- The Recommended Plan.
- Anticipated environmental effects and proposed mitigation measures.
- Commitments to future work and monitoring.

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

Kevin Welker, P.Eng.
Project Manager
Stantec Consulting Ltd.
400-1305 Riverbend Road
London, ON N6K 0J5
Phone: 519-675-6652
Email: comments@highway3elgin.ca

Deanna Pizycki, P.Eng.
Senior Project Engineer
Ministry of Transportation
659 Exeter Road, 3rd Floor
London, ON N6E 1L3
Phone: 519-859-7492
Email: comments@highway3elgin.ca

Interested persons may provide written comments to the study team by Tuesday, March 5, 2024.

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

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

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

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

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

Upon reviewing comments received from the public, the Minister of the Environment, Conservation and Parks may make a Section 16 Order on their own initiative within 30 days from the end of the public review period set out in the Notice of Completion. If no concerns or issues are outstanding within 60 days from the end of the comment period set out in the Notice of Completion, the project is considered to have met the requirements of the Class EA, and MTO may proceed to the design stage, subject to the commitments documented in the TESR, and obtain any outstanding environmental approvals.

The potential exists for final design plans completed during the next stage of planning and design to identify design modifications or refinements that may result in environmental benefits or impacts that were not anticipated or identified in this TESR. Under the 2000 Class EA, any changes that result in design modifications is to be discussed with affected external agencies, interested stakeholders, and property owners during the next study phase, and is to be documented in a *Design and Construction Report* (DCR). If significant changes are made to the project following completion of the TESR and eligibility for Environmental Clearance, a TESR Addendum may be required to document the project changes.

2.2 Environmental Clearance

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

- Negotiate temporary and permanent property acquisitions consistent with the project needs (including right-of-way designation).
- Relocate utilities.
- Initiate subsequent study stages (i.e., design and contract preparation) for the Recommended Plan.

The implementation of the identified improvements is dependent on funding and approvals.

3.0 Consultation

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

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

- Study notifications (Notice of Study Commencement, Public Information Centre (PIC) 1 and *Study Design Report* Public Review, PIC 2, and Study Completion).
- Communication with external agencies in order to obtain pertinent technical information and identify the requirement for legislative or regulatory approvals related to the undertaking.
- Meetings with municipal staff (City of St. Thomas, Municipality of Central Elgin, County of Elgin, Township of Southwold).
- Communication with local residents, businesses, and local highway users.
- Two PICs (August 17, 2023, and November 22, 2023).
- 30-day comment period for the *Study Design Report* (August 17 to September 15, 2023).
- Notice of Study Completion/*Transportation Environmental Study Report* 30-Day Comment Period (February 5, 2024).

Copies of the study notifications are provided in **Appendix A.** Copies of all public consultation materials are provided in **Appendix B** and are available on the project website (www.highway3elgin.ca under “Documentation”).

The input received from the public was incorporated into the project findings and recommendations, as appropriate, and responses were provided to all input received, a summary of which is provided in **Table 1**.

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

3.1 Public Consultation

As noted, four study notifications have been prepared and issued as part of this study, including Ontario Government Notifications (OGNs), to notify the public, federal, provincial, and municipal agencies, Indigenous communities, local community members, and other interested persons of the study at key points in the Class EA process. Notices were published in the *Dorchester Signpost*, *Aylmer Express*, *The Londoner*, and the *St. Thomas Times Journal* newspapers. The OGNs were also posted on municipal websites, specifically the City of St. Thomas, Municipality of Central Elgin, County of Elgin, and Township of Southwold. The OGNs were provided to agencies, key stakeholders, and Indigenous communities, as described in the subsequent sections. Copies of the OGNs are provided in **Appendix A**.

3.1.1 Project Website

A project website (www.highway3elgin.ca) was developed at the onset of the study to provide the public with easy access to project information, which was maintained throughout the study process, including background information, project team member contact information, PIC materials, links to project-specific documentation (i.e., study notifications, MTO Class EA Document, MTO Property Brochure) and supplementary information.

3.1.2 Project Email Address

A project email address was established for this study (comments@highway3elgin.ca) and was provided on all public consultation materials (i.e., notifications, PIC displays, and the project website). In addition, the project website allowed interested parties to contact the project team directly through the dedicated project email address, or by using the online comment form (secured with certified encryption).

3.1.3 Notice of Study Commencement

The purpose of the Notice of Study Commencement was to introduce the study to the public, agencies, stakeholders, and Indigenous communities to gather initial feedback.

The notice provided the purpose of the study, a brief overview of the Class EA process, a map of the study area, and offered project team contact information for members of the public to provide comments and/or questions about the study. The OGNs were emailed and mailed (as required) to the public, agencies, and stakeholders on June 1, 2023. The Notice of Study Commencement was communicated via newspaper advertisements in *The Londoner* and the *St. Thomas Times Journal* on Thursday, June 1, 2023. It was also posted on the project website.

A Canada Post marketing mailing (AdMail) was used to deliver a hard copy of the notice in flyer format to approximately 8,030 properties within Canada Post's delivery routes in the vicinity of the study area during the week of May 29, 2023.

A total of 44 comments were received by comment form, letters, emails, and phone calls following the Notice of Study Commencement up to, and beyond the requested submission date of July 7, 2023. A copy of the comments received from agencies and public and associated responses are provided in **Appendix B**.

3.1.4 Public Information Centre 1

The first PIC was held in person on August 17, 2023, at the Talbotville United Church located at 10734 Sunset Drive in the City of St. Thomas, Ontario. The PIC was held from 5:00 PM to 8:00 PM and was open to the public. External agencies, utility providers, and councillors were invited to attend a drop-in meeting at the same location from 2:00 PM to 3:00 PM, prior to the public meeting. PIC materials were provided on the study website (www.highway3elgin.ca) beginning on August 17, 2023, and comments were requested by September 15, 2023. Hardcopies of the PIC 1 materials were available on request. The purpose of PIC 1 was to provide the public and stakeholders with an opportunity to review the Transportation Needs Assessment, Existing Conditions, and Alternatives to the Undertaking, and to comment on the project activities to date. The purpose of the PIC was to also present and gather input on the existing study area conditions.

The PIC was advertised in *The Londoner* and the *St. Thomas Times Journal* on July 27, 2023. The notice was also posted on the study website (www.highway3elgin.ca). In addition, the OGN was emailed and mailed (as required) to external agencies, businesses, stakeholders, property owners, and the general public on July 24, 2023. A Canada Post AdMail was used to deliver a hard copy of the notice in flyer format to approximately 8,015 properties within Canada Post's delivery routes in the vicinity of the study area during the week of July 24, 2023.

A total of 14 representatives from four external agencies attended the drop-in session from 2:00 PM to 3:00 PM, and 121 people attended the public drop-in session from 5:00 PM to 8:00 PM. In total, 33 comments were received by the September 15, 2023, submission deadline.

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

3.1.4.1 Study Design Report Review Period

A *Study Design Report* (SDR) is a requirement for Group 'A' projects following the Class EA process. The purpose of the SDR is to summarize the study process followed, document the planning decision made with respect to the assessment, and select the Preferred Alternative to the Undertaking. The report provides the basis for moving the study forward with confidence. The SDR included the Highway 3 Twinning (GWP 3041-22-00) project, despite it being a Group 'B' Class EA. Due to the proximity and interconnectedness of the Highway 3 Twinning and Talbotville Bypass and Highway 4 Widening projects, the project team documented both Class EAs in the SDR.

A SDR was prepared and made available for 30-day public review and comment from August 17 to September 15, 2023, on the study website (www.highway3elgin.ca). Comments on the SDR were requested by September 15, 2023. A hardcopy of the SDR was available in person at PIC 1.

The Notice of SDR Review Period was a combined OGN with the Notice of PIC 1. The distribution of the OGN is detailed in Section 3.1.4. No specific comments were received related to the SDR.

3.1.5 Public Information Centre 2

The second PIC was held on November 22, 2023, at the St. Anne's Centre located at 20 Morrison Drive in the City of St. Thomas, Ontario. The PIC was held from 5:00 PM to 8:00 PM and was open to the public. External agencies, utility providers, and councillors were invited to attend a drop-in meeting at the same location from 2:00 PM to 3:00 PM, prior to the public meeting. PIC materials were provided on the study website (www.highway3elgin.ca) beginning on November 22, 2023, and comments were requested from the public by December 7, 2023, and from agencies by December 22, 2023. Hardcopies of the PIC 2 materials were available on request. The purpose of PIC 2 was to present the Evaluation of Alternatives, the Preferred Plan, and next steps in the Class EA process.

The PIC was advertised in in the *Dorchester Signpost* and *Aylmer Express* on November 8, 2023, and *The Londoner* and the *St. Thomas Times Journal* on November 9, 2023. The notice was also posted on the study website (www.highway3elgin.ca). In addition, the OGN was emailed and mailed (as required) to external agencies, businesses, stakeholders, property owners, and the general public on November 6, 2023. A Canada Post AdMail was used to deliver a hard copy of the notice in flyer format to approximately 8,014 properties within Canada Post's delivery routes in the vicinity of the study area during the week of November 6, 2023.

A total of five representatives from three external agencies attended the drop-in session from 2:00PM to 3:00 PM, and 135 people attended the public drop-in session from 5:00 PM to 8:00 PM.

In total, 28 comments were received by the December 8, 2023, submission deadline.

A copy of the information presented at PIC 2, as well as the feedback received at, and following PIC 2 is provided in **Appendix B**.

3.1.6 Summary of Public Comments

Over the duration of the study, many comments were received from the public, some of which could be categorized into common themes, including highway/interchange improvements, safety, agricultural equipment, noise, property impacts, active transportation, and the Preferred Plan. **Table 1** provides a summary of the main comments and themes and the associated response provided by the project team.

Table 1: Summary of Public Comments and Responses

Comment	Response Provided and/or Action Taken
Highway/Interchange Improvements	
Why is Highway 3 being widened to the north of the existing lanes, rather than the south?	The new Highway 3 lanes are proposed to be constructed to the north of the existing lanes to minimize impacts to private property and the natural environment.
Is Wonderland Road being widening as part of this study?	The widening of Wonderland Road is beyond the scope of this assignment; however, a new Parclo A interchange is recommended at Ron McNeil Line/Wonderland Road.
Is Highway 3 extending east of Centennial Avenue?	The Ministry is undertaking a Preliminary Design and Environmental Assessment Study for the existing Highway 3 from Highway 4 easterly to just west of Centennial Avenue. Our project will tie into the planned roundabout at Highbury Avenue which is being completed as part of a separate study being undertaken by the City of St. Thomas (link: Highbury Widening Class EA – City of St. Thomas (stthomas.ca)). St. Thomas is also undertaking a study for a major arterial roadway connection east of Highway 3/Centennial (Major Arterial Roadway Connection MCEA). The Ministry is looking to undertake a Planning, Preliminary Design and Environmental Assessment Study for Highway 3 east of St. Thomas. The timing of this study will be subject to funding and approvals. No information on the timing or extent of the study is available at this time.
Why weren't roundabouts at ramp terminals considered?	Based on existing and future traffic projections, it was determined that interchanges in the locations selected support the anticipated traffic volumes, connections to the existing sideroads, the proposed twinned portion of Highway 3, and the proposed Talbotville bypass. Some of the ramp terminals at the interchanges are recommended to have signalized intersections but were assessed for potential roundabouts. While roundabouts provide safety, the approach grades to the bridge over Highway 3 make the installation of roundabouts less desirable. In addition, roundabouts at the ramp terminals would present challenges for large agricultural equipment/vehicles and would require a larger footprint to accommodate the equipment. The signalized intersections reduce the overall footprint when compared to roundabouts, which also reduces impacts to private properties.
Traffic increases will make turning movements from Clinton Line, and Southminster Bourne onto Highway 4 more difficult. Are improvements to these intersections being considered?	Based on current and project travel demands, traffic signals at the intersection of Clinton Line/Longhurst Line and Highway 4 are not warranted, but a Gap Analysis will be completed in order to assess the movements of farm and commercial vehicles crossing/accessing Highway 4 from Clinton Line and Southminster Bourne.
Safety	
There are a lot of accidents at the Ron McNeil/Wonderland Road intersection. The detours will divert more traffic to this area. Has this been considered?	Please note that Public Information Centre (PIC) 2 presented a Preliminary Construction Staging Sequence to provide the anticipated construction timeline for each section of the corridor. It is anticipated that the Ron McNeil Line Interchange will be constructed in advance of the Wellington Road Interchange. We will review the need for temporary traffic signals for use during construction during the Detail Design phase. This will allow the new Ron McNeil Line/Wonderland Road Interchange to be available for vehicular traffic during the construction staging and potential detours of the Wellington Road Interchange.

Comment	Response Provided and/or Action Taken
Agricultural Equipment	
Will we be able to drive our large farming equipment on the interchanges?	The Preferred Plan at Ron McNeil Line/Wonderland Road and Wellington Road include bridges that will allow traffic (including farm vehicles) to cross over Highway 3. The current bridge design, as an example, will consist of a single through lane as well as a speed change lane and wide shoulders in each direction. Generally, the minimum dimensions from the centreline of the bridge include a 3.75 m through lane, 3.5 m speed change lane and a 1.75 m shoulder. This will accommodate agricultural equipment 22 ft (6.7 m) wide to cross the bridge in either direction and not occupy lanes in the opposing direction. Please note that farm equipment is not permitted to use Highway 3.
Will farm vehicles be able to use the roundabout at Highway 4?	Traffic speeds within the proposed roundabout at Highway 4 and the Talbotville Bypass will be significantly lower than mainline speeds, and sightlines will be designed to allow for road users to identify slower-moving farm equipment and adjust their speed accordingly.
Noise	
Are there noise mitigation measures being considered?	Please note, a Noise Assessment is being undertaken as part of the study. This work is ongoing, and findings will be presented as the study progresses, including the need for noise barrier walls along the highway corridor. The Noise Assessment will use current and future traffic data to model the sound levels caused by road traffic with and without the proposed improvements. The Noise Assessment work is being undertaken in accordance with the Ministry of the Environment, Conservation and Parks' (MECP) draft document titled NPC-306, Methods to Determine Sound Levels Due to Road and Rail Traffic, published in December 2021. If a noise barrier is required in the area of your property, it will be constructed within the Ministry's right-of-way.
Property Impacts	
How will our household and business be affected?	If an impact is confirmed, you will be contacted by the Ministry of Transportation Ontario at a later date with more information specific to your property. You can find more property information available online on the project website under "Documentation – Property Brochure" www.highway3elgin.ca. The property representative listed in the brochure would be able to answer general questions related to acquisition/costs/legal counsel, in advance of knowing exact impacts (Susan McKay, Property Supervisor, Tel: 519-319-0527 Email: Susan.McKay2@ontario.ca). Please note that future design phases could result in refinements to the preferred plan and/or adjust property requirements.
Active Transportation	
Will the improvements include bike lanes, walking paths, or pedestrian bridges?	New bridges constructed over Highway 3 will provide shoulder widths for future bike lanes.
Is there a way to accommodate a cyclist crossing at the Ford Road cul-de-sac?	The project team is considering opportunities for a safe active transportation connection within this area. Cycling will not be permitted on Highway 3.
Preferred Plan	
What are the estimated project start and completion dates?	Construction will follow the Environmental Assessment and Design phase. It is anticipated that the project will be completed in phases. Construction could start as early as 2025, subject to funding and approvals. Details on the schedule will be provided as the study progresses.

3.2 Property Owners

Property owner dialogue has been ongoing throughout the project. Letters were mailed or hand delivered on September 29, 2023, October 24, 2023, and October 25, 2023, to the residents that are expected to be impacted by construction of the Recommended Plan and where the project team requires permission to enter property prior to completing field work.

In addition, MTO Property has been in direct contact with potentially impacted property owners to discuss the project and potential impacts.

3.3 Agency Consultation

As part of the study, the following external agencies were engaged:

Federal Agencies

- Transport Canada

Provincial Agencies

- Infrastructure Ontario
- Ministry of Natural Resources and Forestry (MNRF)
- Ministry of Citizenship and Multiculturalism (MCM)
- Ministry of Agriculture, Food and Rural Affairs (OMAFRA)
- Ministry of the Environment, Conservation and Parks (MECP)

Municipalities

- Township of Southwold
- Municipality of Central Elgin
- City of St. Thomas
- County of Elgin

Local Elected Representatives

- MPP – Elgin-Middlesex-London
- City of St. Thomas – Mayor
- Township of Southwold – Mayor, Deputy Mayor
- Municipality of Central Elgin–- Mayor

Emergency Services

- Ontario Provincial Police – West Region Headquarters
- Ontario Provincial Police – London OPP Satellite Detachment
- St. Thomas Police
- St. Thomas Fire Department
- Medavie EMS – Elgin (MEMSEO)
- Municipality of Central Elgin Fire Department
- Township of Southwold Fire Department

School Boards / Bus Service

- Southwestern Ontario Student Transportation Services
- London District Catholic School Board
- Conseil scolaire catholique providence
- Thames Valley District School Board
- Conseil scolaire Viamonde
- Service de transport Francobus

Other Stakeholders

- Kettle Creek Conservation Authority
- Railway City Cycling Club
- Elgin / St. Thomas Small Business Centre
- Elgin County Tourism
- Ontario Federation of Snowmobile Clubs
- Southwestern Ontario Snowmobile Region
- Ontario Trucking Association
- Elgin Federation of Agriculture
- Elgin Business Resource Centre
- St. Thomas Chamber of Commerce
- CN Rail

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

3.3.1 Agency Meetings

To date, two meetings were held with municipalities. The first meeting was held on October 5, 2023, to provide an update on the study progress, and to discuss construction staging and detours, active transportation, and traffic signals. The meeting was held via videoconference (i.e., Microsoft Teams).

The second meeting was held on December 13, 2023, to discuss the Recommended Plan, the closure of Ford Road, and the intersections of Clinton Line and Highway 4, and Southminster Borne and Highway 4. The meeting was held via videoconference (i.e., Microsoft Teams).

Monthly meetings will be established with municipalities as the project moves forward into Detail Design and implementation.

3.3.2 Agency Correspondence

Agencies provided comments throughout the duration of the study. A copy of all agency correspondence is provided in **Appendix B**.

3.4 Indigenous Community and First Nation Engagement

Indigenous communities and First Nations contacted with respect to this study were identified during the initial stages of the planning process. Through this review, the following Indigenous communities were identified as having interests within the study area, and were provided formal letter notification about this study in coordination with a Notice of Upcoming Study to gauge interest, the Notice of Study Commencement, PIC 1, SDR, PIC 2, and Notice of Completion:

- Aamjiwnaang First Nation
- Caldwell First Nation
- Chippewas of Kettle and Stony Point First Nation
- Chippewas of the Thames First Nation
- Delaware Nation at Moraviantown
- Munsee-Delaware Nation
- Oneida of the Thames
- Walpole Island First Nation
- Six Nations of the Grand River
- Haudenosaunee Confederacy Chiefs Council

A copy of all correspondence with Indigenous communities is provided in **Appendix B**.

3.4.1 Notice of Study Commencement

The Notice of Study Commencement and Request to Consult was sent via mail and email to the communities noted above on May 24, 2023. The purpose of this correspondence was to provide information related to the purpose, the Class EA process, and to invite each Indigenous community to participate in the consultation process.

3.4.2 Field Work Monitors

In May 2023, Stantec and MTO extended invitations to the Indigenous communities to join the archaeological crew during the Archaeological Assessment field work. Aamjiwnaang First Nation, Caldwell First Nation, Chippewas of the Thames First Nation, and Haudenosaunee Confederacy Chiefs Council signed participation agreements to participate in Stage 2 and Stage 3 Archaeological Assessments.

3.4.3 Public Information Centre 1

The letter for Notice of PIC 1 and Notice of SDR Review Period was sent via mail and email to the communities noted above on July 20, 2023. The purpose of the letter was to provide an update regarding the study, including PIC 1 and the SDR, which would present the Study Background, Existing Study Area Conditions, Alternatives to the Undertaking, and next steps in the Class EA process. The letter offered an opportunity to meet with ministry staff to discuss the study in more detail.

3.4.4 Public Information Centre 2

The Notice of PIC 2 and cover letter was sent via mail and email to the communities noted above on November 6, 2023. The purpose of the letter was to notify them of PIC 2, which would present and gather feedback on the Evaluation of Alternatives, the Preferred Plan, and next steps in the Class EA process. The letter offered an opportunity to meet with ministry staff to discuss the study in more detail.

3.4.5 Indigenous Community and First Nation Meetings

The Haudenosaunee Confederacy Chiefs Council and Haudenosaunee Development Institute (HDI) requested to meet with MTO to discuss the study. A virtual meeting was held on November 27, 2023. At the meeting, it was acknowledged that not all required personnel from HDI were in attendance. The meeting is planned to be rescheduled to accommodate HDI's availability and consultation with HDI will be ongoing as the design progresses.

4.0 Transportation Needs Assessment

The Transportation Needs Assessment was presented in Section 3 of the SDR and is available under separate cover. In summary, the assignment has been initiated to address the following problems and opportunities:

Problems

- Traffic on Highway 3 and Highway 4 through Talbotville will continue to increase as recent and future industrial, commercial, and residential growth occurs, which will impact safety in the community.
- Highway 3 is a two-lane undivided highway with at-grade intersections, which is not suitable for the anticipated increase in traffic generated by the recent and future industrial, commercial, and residential growth.

Opportunities

- Highway 3 improvements and the Talbotville Bypass are being planned as a provincial project to support future industrial, commercial, and residential growth in the County of Elgin and City of St. Thomas areas. The project aims to address projected travel demand and aid in network connectivity in the area.
- Widen Highway 4 to a four-lane undivided facility from the Talbotville Bypass to the existing four-lane section south of Clinton Line.
- Provide a four-lane divided Highway 3 between Centennial Avenue and Highway 4 to enhance safety and operations.
- Replace existing at-grade intersections with interchanges to promote free-flow movement along Highway 3 through the majority of the study area.

4.1 Alternatives to the Undertaking

The Class EA requires that ‘reasonable alternatives’ be considered in addressing identified problems and/or opportunities. This involves two levels of analysis. The Alternatives to the Undertaking considers a broad range of alternatives that could address the project needs. Once the best alternative is selected, the Alternative Methods of Carrying out the Undertaking are studied in greater detail. The Alternatives to the Undertaking considered as part of this assignment (i.e., for both the Talbotville Bypass and Highway 4 Widening project, GWP 3042-22-00, and the Highway 3 Twinning project, GWP 3041-22-00) consisted of the following.

4.1.1 Do Nothing

The “Do Nothing” alternative is used as the baseline for comparative evaluation of alternatives and is considered the status quo, where the area transportation system would be limited to maintenance of current transportation infrastructure and the implementation of approved provincial and municipal initiatives.

4.1.2 Optimize the Existing Area Transportation System

Considerations for the optimization of the existing area transportation system include Travel Demand Management (TDM) and Transportation Systems Management (TSM). The objective of TDM strategies is to improve the operation of the current area transportation system by managing travel demand independent of expanding or constructing new infrastructure. The objective of TSM is to improve the efficiency and safety of the current area transportation system and to optimize the use of existing and planned infrastructure through a wide range of strategies and technology policies and initiatives on existing municipal roads and existing provincial highways.

4.1.3 Expanded/New Non-Road Infrastructure

Expanded/new non-road initiatives include:

- New or improved transit service to potentially divert use of private cars and relieve congestion on existing municipal roadways.
- Increased freight rail services for goods movement within existing rail corridors and/or along new rail corridors could encourage the diversion of freight from trucks. The ability to expand rail service and divert longer haul goods to rail may provide some relief to network congestion both on regional arterial roads and the provincial highway network.
- Providing interregional transit and passenger rail and/or provincial transitways through new/increased services within the existing area transportation system and/or through new services in new corridors could relieve congestion and increase the performance of the area transportation system.

4.1.4 Widen/Enhance Existing Road Network

This alternative includes the widening/enhancing municipal arterial roads to improve capacity and operations and to provide congestion relief on existing facilities through additional lanes, thereby increasing the performance of the area transportation system.

4.1.5 Improve Highway 3 and Highway 4

This alternative includes the twinning and extension of Highway 3 (via the proposed Talbotville Bypass) and widening of Highway 4 to provide improved capacity and operations and to increase the performance of the area transportation system.

4.1.6 Preliminary Assessment of Alternatives to the Undertaking

A process has been developed to evaluate the Alternatives to the Undertaking and to select only the most reasonable alternative(s) for more detailed study. This process allows unreasonable alternatives or alternatives that do not meet provincial policy requirements to be eliminated from consideration in advance of further developing the alternatives and undertaking the detailed evaluation stage.

The *Preliminary Assessment of the Alternatives to the Undertaking* uses the following screening criteria:

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

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

The *Preliminary Assessment of the Alternatives to the Undertaking* is summarized in **Table 2**.

Table 2: Preliminary Assessment of Alternatives to the Undertaking

Alternatives to the Undertaking	Advantages/Disadvantages of the Alternative	Carried Forward?
Do Nothing The area transportation system would be limited to maintenance of current transportation infrastructure and the implementation of approved provincial and municipal initiatives.	× Increased costs for the delivery of goods and services. × Negative economic impact on industry and community quality of life. × Negative environmental impacts through increased fuel consumption and emissions. × Increased driver delay and stress. × Constrained employment and economic growth in the study area. × Loss of opportunity to improve highway safety, provide adequate future highway capacity, and address operational needs.	No. The alternative does not address the needs and opportunities for the study area, so it is not recommended to be carried forward.
Optimize the Existing Area Transportation System Optimize the existing area transportation system via TDM and TSM.	× TDM and TSM are more applicable to commuter traffic than the predominant local, recreational, and commercial traffic on Highway 3. × Loss of opportunity to improve highway safety, provide adequate future highway capacity, and address operational needs.	No. The alternative does not address the needs and opportunities for the study area, so it is not recommended to be carried forward.
Expanded/New Non-Road Infrastructure New or improved local transit service, increased freight rail services for goods movement, and/or providing interregional transit and passenger rail and/or provincial transitways through new/increased services.	× The scattered origin/destination patterns of travel within and beyond the study area are not conducive to supporting the use of non-road alternatives. × Loss of opportunity to improve highway safety, provide adequate future highway capacity, and address operational needs.	No. The alternative does not address the needs and opportunities for the study area, so it is not recommended to be carried forward.
Widen/Enhance Existing Road Network Widening/enhancing municipal arterial roads to improve capacity and operations and to provide congestion relief on existing facilities through additional lanes.	✓ Provides congestion relief on existing facilities through additional lanes. × Municipal roads are not generally designed and maintained to the standards required for higher speed, long distance, and interregional travel that is required through this study area. × Mixing long-distance and local traffic creates other transportation network concerns. × Constrained employment and economic growth in the study area. × Increased costs for the delivery of goods and services. × Loss of opportunity to improve highway safety, provide adequate future highway capacity, and address operational needs.	No. The alternative does not address the needs and opportunities for the study area, so it is not recommended to be carried forward.
Improve Highway 3 and Highway 4 Twinning and extension of Highway 3 (via the proposed Talbotville Bypass) and widening of Highway 4 to provide improved capacity and operations.	✓ Provides an opportunity to improve highway safety. ✓ Provides future highway capacity and addresses operational needs. ✓ Maximizes the use of the existing highway corridor. ✓ Improves the existing highway to meet current MTO design standards. ✓ Bypasses areas of the existing highway constrained by adjacent development/facilities and protects the village of Talbotville from commercial/truck traffic.	**Yes. The alternative addresses the needs and opportunities for the study area, and it is recommended to be carried forward.**

5.0 Overview of Existing Conditions

Background studies and site-specific field investigations were carried out to support the examination of a reasonable range of alternatives and to assess existing environmental conditions in the study area. All significant features were identified to determine their sensitivity and potential for impacts associated with the project. All work was carried out in accordance with the requirements of the *Environmental Reference for Highway Design* (2006), which provides standards for the scope of work, evaluation of potential impacts, and proposed mitigation measures for MTO undertakings.

The background reviews to identify existing conditions were carried out between spring, summer and fall 2023. Significant environmental features and/or constraints identified as a result of the background studies were documented and considered during the development and evaluation of alternatives.

5.1 Natural Environment

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

5.1.1 Physiography, Geology, and Soils

Background information pertaining to physiography, geology, and soils was reviewed as part of the overall assignment and is documented in a *Groundwater Review Report*. As the review was undertaken for the overall assignment (i.e., both GWP 3041-22-00 and GWP 3042-22-00), the study area referenced in this section includes the study area for both GWPs.

The study area traverses three physiographic regions. The western portion of the study area is situated within the Ekfrid Clay Plain, the eastern portion of the study area is generally situated within the Mount Elgin Ridges, and the eastern limits of the study area crosses the St. Thomas Moraine. A review of the surficial geological mapping by the Ontario Geological Survey (2010) indicated that overburden in the study area is predominantly composed of silty to clayey till of glaciolacustrine origin, interpreted as Port Stanley Till, with extensive pockets of fine textured, massive to well laminated glaciolacustrine deposits of silt and clay with minor sand and gravel lying within the eastern portion of the study area. The study area also crosses minor occurrences of coarse textured glaciolacustrine deposits to the east of First Avenue and modern alluvial deposits of silt, sand, and gravel associated with watercourses. The overburden is underlain by limestone and shale, mapped by Armstrong and Dodge (2007) as the Dundee Formation. Overall, the study area is relatively flat, apart from the Kettle Creek valley.

Based on a review of Ministry of the Environment, Conservation and Parks (MECP) water well records (WWRs), limestone bedrock occurs at depths of about 62 m to 80 m below ground surface in the study area. WWRs indicated that overburden predominantly consists of clay and clay with stones/gravel in minor layers of sand and/or gravel that range in thickness from less than 1 m to 9 m.

5.1.2 Drainage, Surface Water, Groundwater, and Source Water

The study area is located within the Kettle Creek Watershed and crosses Kettle Creek and several tributaries. Kettle Creek is predominantly a surface water driven system and has a warm water thermal regime. Kettle Creek flows southwesterly to southerly before discharging into Lake Erie at the Town of Port Stanley, located approximately 15 km south of the study area.

The Lake Erie Region Source Protection Committee (LERSPC 2014) indicated that groundwater levels within the Shallow Overburden Aquifer typically follow the contour of the surficial topography, with groundwater flow predominantly flowing south towards Lake Erie. Groundwater flow is influenced by Kettle Creek, with local shallow flow directed to the main branch of the creek. Groundwater flow within the Deeper Overburden Aquifer follows a similar southerly flow towards Lake Erie. Groundwater flow within the Bedrock Aquifer is from the northeast towards Lake Erie and surface water features do not appear to have a significant impact on the bedrock groundwater flow direction.

The study area is located in the Kettle Creek Source Protection Area and Catfish Creek Source Protection Area. Most communities in the study area, including St. Thomas and smaller communities, obtain their municipal water supply from surface water sourced from Lake Erie. The water supply for nearby rural residences and businesses could not be confirmed.

Based on a review of the MECP WWRs, there are 102 WWRs within 250 m of the study area, with 14 water supply wells reported for domestic/livestock use, one for irrigation, one for industrial use, and two for cooling/air conditioning use. The remaining WWRs were reported as monitoring, observation, or test wells, abandoned, or provided no information on use. Additionally, local private water wells were installed between 1955 and 2012, with four wells completed within shallow overburden, 10 wells completed within intermediate/deep overburden, and three wells completed within bedrock.

Results of a door-to-door survey conducted in May 2015 by Golder (2015) within 250 m of Highway 3 from Highway 4 to Centennial Avenue, indicated a piped municipal water supply is generally available to properties within the area, apart from properties along Wellington Road, Water Tower Road, and Beck Line, which rely on private groundwater wells as the primary water supply. Golder identified 12 inactive and 10 active private water supply wells within the area surveyed. Of the 10 active wells identified, five were reported as shallow overburden installations

and the remaining five were reported as deep installations. The active shallow private wells are situated outside of the study area and 250 m buffer. The active deep private wells are reported to be associated with properties near the Wellington Road/Highway 3 intersection, on Beck Line, and Water Tower Line within the study area and/or 250 m buffer. There are also properties along Highway 4, Longhurst Line, Clinton Road, Wonderland Road, Ron McNeil Line, Wellington Road, and Water Tower Line that may be supplied by private groundwater wells that are not associated with mapped WWRs. The use of private groundwater wells at these properties was not confirmed.

The study area does not cross/intercept any Wellhead Protection Areas, Highly Vulnerable Aquifers, Significant Groundwater Recharge Areas, Intake Protection Zones, or Issue Contributing Areas.

5.1.3 Designated Areas

Designated areas have special or unique value and are defined by government authorities and/or the public, and through legislation, policies, or approved management plans. These areas may have a variety of ecological, recreational, or aesthetic features and functions that are highly valued. Designated Areas include but are not limited to Provincially Significant Wetlands (PSWs), Areas of Natural and Scientific Interest (ANSIs), heritage rivers, and national and provincial parks. There are no Designated Areas in the study area.

Significant woodlands are present in the study area and occur within the jurisdictions of the Municipality of Central Elgin and the City of St. Thomas. The significant woodlands are also part of the municipalities' broader Natural Heritage System (Schedule A2 and C in Municipality of Central Elgin Official Plan 2013, and Schedule A in the Official Plan of the City of St. Thomas 2021). There are no other designated natural heritage features, such as wetlands, ANSIs, or significant valleylands present within the study area.

5.1.4 Terrestrial Ecosystems

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

The study area is situated in Ecoregion 7E (Carolinian Forest Ecoregion), and more specifically, the Ecodistrict of 7E-2 (St. Thomas). This Ecodistrict consists of sand plains and kame moraines. The land use is predominantly agricultural, with the remaining areas devoted to settlement. Approximately 17% of this Ecodistrict remains as natural cover and is predominantly forest (Henson and Brodribb 2005).

The study area was comprised mainly of agricultural areas, residential areas, and meadows along the right-of-way. Occasional forest and thicket communities were also present.

Field investigations were completed from May 10 to September 1, 2023. Surveys included documenting vegetation communities and vegetation species, wildlife habitat assessments, species at risk habitat assessments, incidental wildlife observations, and migratory bird nest surveys.

5.1.4.1 Species of Conservation Concern (SOCC)

Significant species are considered at a number of levels, including globally, nationally, and provincially. In Ontario, significant species include species that are provincially rare (with a Provincial S rank of S1 to S3) or listed as Endangered, Threatened, or Special Concern on the Species at Risk in Ontario List (SARO) and/or Schedule 1 of the federal *Species at Risk Act* (2002).

The Ontario *Endangered Species Act* (2007) prohibits harm or harassment to Threatened or Endangered species, and damage or disturbance to their habitat. The *Endangered Species Act* applies on all private and Crown owned lands in Ontario. Habitat protection under the *Endangered Species Act* typically includes all habitats that directly or indirectly support species at risk.

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

Provincial ranks (S-ranks) are used by the Natural Heritage Information Centre (NHIC) to set protection priorities for rare species and vegetation communities. They are based on the number of occurrences in Ontario and are not legal designations. By comparing the global and provincial ranks, the status, rarity, and the urgency of conservation needs can be determined. Species with provincial ranks of S1 to S3, and those tracked by the MNRF, are considered species of conservation concern (SOCC). Provincial S-ranks are defined as follows:

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

The potential for species at risk and SOCC to be present in the study area was evaluated based on the review of background information and field investigations. There were 11 species at risk and 19 SOCC identified in the background review that have been previously documented or have the potential to occur within the study area. The detailed findings of the background review and

field investigations are documented within the *Terrestrial Ecosystems Existing Conditions and Impact Assessment Report*. A copy of the report is on file with MTO.

5.1.4.2 Vegetation Communities

The study area was comprised mainly of agricultural areas, residential areas, and meadows along the right-of-way. Occasional forest and thicket communities were also present.

Two provincially rare (i.e., S1 to S3) vegetation communities were present within the study area; Fresh-Moist Black Walnut Lowland Deciduous Forest Type, and Fresh-Moist Shagbark Hickory Deciduous Forest Type. All other vegetation communities observed are common and widespread throughout Ontario.

Highly invasive European common reed, also known as Phragmites, was observed several roadside locations throughout the study area.

5.1.4.3 Rare Vegetation

Botanical assessments were carried out in May, June, August, and September 2023. A total of 155 species of vascular plants were recorded, including:

- 94 species native to Ontario, and 61 exotic species not native to Ontario.
- 81 native species that have a provincial rank of S5, which indicates that they are common with a secure population in Ontario.
- 11 native species that have a provincial rank of S4, which indicates that they are uncommon to common, but not rare in the province and populations are apparently secure.
- Two native species that are provincially rare (i.e., S1 to S3): swamp rose-mallow (*Hibiscus moscheutos;* S3; Special Concern) and shrubby St. John's-wort (*Hypericum prolificum;* S2).
- One regionally rare species in Elgin County – Seneca Snakeroot (Polygala senega).
- Two highly sensitive native plant species with a high coefficient of conservatism value of 8, 9, or 10 that were observed: creeping juniper (*Juniperus horizontalis*; CC 10) and swamp rose-mallow (CC 9).

5.1.4.4 Significant Wildlife Habitat

Significant Wildlife Habitat (SWH) is defined as habitat that is ecologically important in terms of features, functions, representation, or amount of contribution to the quality and diversity of an identifiable geographic area or Natural Heritage System and is protected under the *Provincial Policy Statement* (2020).

SWH includes species at risk habitat, seasonal concentration areas, rare vegetation communities or specialized habitat for wildlife, habitat for SOCC, and wildlife movement corridors.

Habitat for Species at Risk

A list of species at risk with the potential to occur in the study area was created using the results of the review of available background information. Habitat Assessments undertaken for the project determined that four Endangered or Threatened species at risk have the potential to occur in the study area, including Spoon-leaved Moss and four bat species at risk (Little Brown Myotis, Northern Myotis, and Eastern Small-footed Myotis, Tri-colored Bat). Spoon-leaved Moss is unlikely to be present within the right-of-way. Bat species at risk, however, have the potential to be present in the right-of-way and may interact with the proposed works, particularly in areas of tree clearing.

Seasonal Concentration Areas

Seasonal concentration areas are those sites where large numbers of a species gather at one time of the year, or where several species congregate. The following candidate habitat for seasonal concentration areas were identified within the study area through the background review and during field investigations:

- Bat Maternity Colonies: Present in forested communities in the study area that contain suitable bat maternity trees and bats (including species at risk), which were recorded using automatic recording units.
- Reptile Hibernaculum: Potential habitat within the study area where rock piles, crevices, foundations, or animal burrows are present that provide access below the frost line.
- Turtle Wintering Areas: Present in watercourses within the study area may provide suitable turtle overwintering habitat.

Rare or Specialized Habitat

Rare or specialized habitats are two separate components of SWH. Rare habitats are habitats with vegetation communities that are considered rare in the province. It is assumed that these habitats are at risk and that they are also likely to support additional wildlife species that are considered significant.

Specialized habitats are microhabitats that are critical to some wildlife species. The following rare or specialized habitats were identified within the study area through the background review and during field investigations:

- Rare Vegetation Communities: Two provincially rare vegetation communities were present in the study area: Fresh-Moist Black Walnut Lowland Deciduous Forest, and Fresh-Moist Shagbark Hickory Deciduous Forest.
- Bald Eagle and Osprey Nesting, Foraging, and Perching Habitat: Suitable habitat is present adjacent to watercourses. One Osprey nest was documented close to the study area.

- Woodland Raptor Nesting Habitat: Suitable forested habitat in the study area that may support woodland raptor nests.
- Amphibian Breeding Habitat (woodland and wetland): Forest communities in the study area have the potential to support breeding amphibians.
- Woodland Area Sensitive Breeding Bird Habitat: Forest communities in the study area contain potentially suitable woodland areas sensitive breeding bird habitat.

Habitats for Species of Conservation Concern

Habitat for SOCC includes four types of species: those that are rare, those whose populations are significantly declining, those that have been identified as being at risk to certain common activities, and those with relatively large populations in Ontario compared to the remainder of the globe.

Potentially suitable habitat for the following Special Concern and provincially rare wildlife was identified within the study area: Barn Swallow, Midland Painted Turtle, Northern Map Turtle, Snapping Turtle, and Eastern Milksnake. No Terrestrial Crayfish were documented during field surveys, although habitat may be present in the wetlands beyond the right-of-way.

Confirmed habitat for the following Special Concern and provincially rare wildlife was identified within the study area: Monarch, Eastern Wood-pewee, swamp rose-mallow, shrubby St. John's-wort.

Animal Movement Corridors

Animal movement corridors are distinct passageways or defined natural features that are used by wildlife to move between habitats. Movement is usually in response to different seasonal habitat requirements. Amphibian movement corridors are the only type of animal movement corridor in Ecoregion 7E. These corridors are identified after amphibian breeding habitat (woodlands) is confirmed. Amphibian breeding habitat can be identified by conducting amphibian surveys to target potential breeding features.

Amphibian movement corridors are present within the study area. They are potentially present where candidate SWH for amphibian breeding habitat (woodland and wetland) was identified.

5.1.4.5 Avian Species and Migratory Bird Nest Surveys

A breeding bird survey was completed on May 29 and June 30, 2023, following guidelines outlined in the 3rd Ontario Breeding Bird Atlas (OBBA 2023). Structures in the study area were also searched for the presence of migratory bird nests.

A total of 30 species of birds were recorded during the breeding bird surveys. The majority of species observed are ranked as S5 (common and secure in the province) or S4 (apparently secure in the province; uncommon but not rare). One species listed as Special Concern under the provincial *Endangered Species Act* was observed within the study area: a single Eastern Wood-Pewee.

None of the structures examined in the study area provided suitable habitat for Barn Swallow or other species protected under the *Migratory Birds Convention Act*. Under the 2022 updates to the *Migratory Bird Regulations* within the *Migratory Birds Convention Act*, nests for 18 bird species receive year-round protection for a prescribed length of time ranging from 24 to 26 months. Pileated Woodpecker was the only one of those 18 species that was identified as being potentially present in the study area. Targeted surveys were completed in November 2023 to search for evidence of Pileated Woodpecker nests, roosts, or foraging cavities within the study area. Surveys were also limited to the right-of-way and adjacent lands visible due to property access restrictions. No Pileated Woodpecker nests or roost cavities were observed during field investigations.

All vegetated areas within the study area have the potential to provide nesting habitat for migratory birds.

5.1.4.6 Bat Species and Habitat

Trees within the MTO right-of-way and portions of the study area were assessed on May 10, 2023, to identify trees that meet the criteria to support potential maternal roosts of species at risk bats (i.e., cavities and peeling bark). Due to the size of the study area and restrictions on property access, it was not possible to assess all trees in the study area. As such, field investigations were focused on areas with trees that were likely to support the highest quality habitat and areas with the best candidate roost trees were identified.

An acoustic survey was also completed to identify the bat species, including bat species at risk, that were present in the study area. Three Wildlife Acoustics SM4 bat detectors were deployed within areas where suitable bat habitat was identified during the bat habitat assessment described above. These devices passively record the ultrasonic echolocation calls of passing bats. Detectors recorded for 23 or 33 nights and were retrieved between June 23 and June 30, 2023. Recordings were taken from 30 minutes prior to sunset until 30 minutes after sunrise.

One suitable bat maternity roost tree was identified within the MTO right-of-way on May 10, 2023, during the leaf-off period; however, the entire study area was not searched due to property access restrictions. Five bat species were recorded during the acoustic surveys, including at least one species at risk (i.e., Little Brown Myotis, Northern Myotis, Eastern Small-footed Myotis, or Tri-colored Bat), but the exact species could not be identified. Ten calls from bat species at risk were recorded at the edges of deciduous forests near Kettle Creek Bridge and First Avenue interchange. These calls confirm that bat species at risk are present within the study area. Four additional bat species were recorded in the study area, including Big Brown Bat, Hoary Bat, Silver-haired Bat, and Eastern Red Bat. None of these bat species are species at risk.

5.1.5 Fish and Fish Habitat

Lakes, rivers, streams, ponds, and wetlands provide fish habitat. Seasonally flooded areas and watercourses with intermittent flow can also provide important habitat for some fish species at certain times of year. In-water structures such as logs, stumps and other woody debris, pools and riffle areas, riparian and aquatic vegetation, and groundwater discharge areas provide habitat structure and diversity.

Fish communities and fish habitat were assessed as part of this study based on a review of existing/available information and field investigations. Background information was obtained from MNRF and published resources, and field investigations were carried out on May 30 and July 18, 2023. The findings of these investigations are documented within in the *Fish and Fish Habitat Existing Conditions Report*, a copy of which is on file with MTO. Field investigations were conducted according to MTO's *Environmental Reference for Highway Design* (MTO 2013) and *Interim Environmental Guide for Fisheries* (MTO 2020).

Within the study area, three watercourses support warmwater fish communities and provide direct fish habitat. The Unnamed Tributary to Kettle Creek (West) and Unnamed Tributary to Kettle Creek (Mid) support small-bodied fish species (cyprinids). Kettle Creek supports a diverse fish community that includes Largemouth Bass and Smallmouth Bass. The Unnamed Tributary to Kettle Creek (East) and the Unnamed Tributary to Kettle Creek provide indirect fish habitat within the Highway 3 right-of-way.

There are no records of provincially or federally regulated aquatic species at risk in watercourses within the study area.

5.1.6 Summary of Key Terrestrial Ecosystems and Fish and Fish Habitat Features

Detailed Terrestrial and Aquatic Studies have been conducted as part of this study to confirm information gathered from secondary sources. Key ecological characteristics of the region include:

- Several wetland communities are present within the study area and work zone. Wetlands within the work zone include open water, meadow marsh and deciduous thicket communities.
- Significant woodlands are present within the study area.
- The municipal Natural Heritage Systems designated areas are within the study area and work zone. The significant woodlands are within the Municipality of Central Elgin and/or City of St. Thomas and are part of the municipalities' broader Natural Heritage System.
- SWH within the study area includes the following: Bat Maternity Colonies, Reptile Hibernaculum, Turtle Wintering Area, Rare Vegetation Communities, Bald Eagle, and Osprey Nesting, Foraging and Perching Habitat, Woodland Raptor Nesting Habitat, Amphibian Breeding Habitat/Amphibian Movement Corridor, Woodland Area-Sensitive Breeding Bird Habitat, Terrestrial Crayfish.
- Migratory bird bests may be present in vegetation within the study area and work zone. No nests were observed during field investigations, but new nests could be established in subsequent years.
- At least one bat species at risk (i.e., Little Brown Myotis, Northern Myotis, Eastern Small-footed Myotis, and/or Tri-coloured Bat) is present in the study area and has the potential to be present within the MTO right-of-way.
- Potentially suitable habitat for the following Special Concern and provincially rare wildlife was identified within the study area: Barn Swallow, Midland Painted Turtle, Northern Map Turtle, Snapping Turtle, Eastern Milksnake, Broad-leaved Puccoon, Virginia Bluebells, Green Dragon, Crooked-stem Aster, Lowland Brittle Fern, and Goosefoot Cornsalad.
- Monarch, Eastern Wood-pewee, and Swamp Rose-mallow, all Special Concern species, were observed during field investigations. Special Concern species and their habitat are not afforded protection under the *Endangered Species Act.*
- Two provincially rare vegetation communities were present in the study area: Fresh-Moist Black Walnut Lowland Deciduous Forest, and Fresh-Moist Shagbark Hickory Deciduous Forest.
- Within the study area, Kettle Creek and two Unnamed Tributaries to Kettle Creek support warmwater fish communities and provide direct fish habitat Two Unnamed Tributaries to Kettle Creek in the study area provide indirect fish habitat.

5.2 Tree Inventory

A Tree Inventory was completed in 2023 to assess trees located within the study area. Trees 10 cm diameter at breast height (DBH) and greater located within the study area were tagged and recorded in a Detailed Tree Inventory (DTI), and large groupings or stands of trees were recorded in a General Tree Inventory (GTI). The data collected for each tree took into consideration the condition of the tree, and specific details about the species and health.

A total of 6587 trees were observed within the study area as part of the DTI, and 2341 stems were observed as part of the GTI.

Additional details regarding trees to be preserved and trees to be removed, along with construction mitigation and management, are provided in Section 8.0.

5.3 Socio-Economic Environment

5.3.1 Land Use

The study area is located in the City of St. Thomas, and the Municipality of Central Elgin and Township of Southwold in Elgin County. The *City of St. Thomas Official Plan* (2021), *Municipality of Central Elgin Official Plan* (2022), and *Township of Southwold Official Plan* (2021) provide guidance for land use and development in the study area. Land uses adjacent to Highway 3 east of Kettle Creek are designated as Residential, Employment Lands, Business Employment, Industrial, Natural Heritage, and Natural Hazard in the Official Plans. Areas adjacent to Highway 3 west of Kettle Creek are designated as Agricultural, Hamlet, Residential, Natural Heritage, and Natural Hazard land uses in the Official Plans. Lands beyond the eastern limit of the study area are slated for future industrial development.

Additionally, there are no records of petroleum wells in or adjacent to the study area. Likewise, there are no aggregate operations (i.e., pits or quarries) in proximity to the study area.

5.3.2 Potentially Contaminated Property

A Contamination Overview Study (COS) was completed to determine the potential for the presence of subsurface contamination in the study area associated with current or historical land uses in and adjacent to the study area. The COS included a review of available background information and datasets and completion of a site reconnaissance in the study area.

The COS identified several potential sources of contaminating activities, including records of historical spills, waste management and disposal, railway operations, industrial operations, manufacturing operations, vehicle maintenance and fueling, chemical and fuel storage, and importation of fill material of unknown quality. In total, 17 Areas of Potential Environmental Concern were identified within and/or adjacent to the GWP 3041-22-00 study area. More detailed information is documented within the *Contamination Overview Study Report*, a copy of which is on file with MTO.

5.3.3 Student Transportation Services

Southwestern Ontario Student Transportation Services and Service de transport Francobus provide students with transportation services to and from schools in the City of St. Thomas. These companies will continue to be consulted during future phases of the project and will be advised of potential impacts to their operations.

5.3.4 Navigable Waters

Navigable waters include bodies of water that are used by vessels for any part of the year as a means of transport or travel for commercial or recreational purposes, or as a means of transport or travel for Indigenous peoples of Canada exercising rights recognized and affirmed by section 35 of the *Constitution Act* (1982).

Highway 3 crosses Kettle Creek, which may be considered a navigable body of water under the *Canadian Navigable Waters Act* (CNWA, 1985, amended 2019). Transport Canada's Navigation Protection Program administers the CNWA, which helps keep Canada's navigable waters open for transport and recreation. Any major works that may interfere with navigation must apply for approval to proceed with the works from the Minister of Transport.

5.3.5 Recreational Trails

The City of St. Thomas' *2020 Cycling and Trails Master Plan* identifies the following existing trails and cycling routes in the study area:

- Cycling lanes on Burwell Road which utilize the existing underpass at Highway 3.
- Signed route on Balaclava Street which utilizes the existing underpass at Highway 3.
- Multi-use trail on the east side of Kettle Creek which follows the geography of the watercourse and passes under the Highway 3 Kettle Creek Bridge.

The City of St. Thomas' *2020 Cycling and Trails Master Plan* does not identify any future trails or cycling routes that cross or utilize portions of the Highway 3 right-of-way. The Municipality of Central Elgin *10 Year Trails Master Plan & Implementation Strategy* (2017), however, identifies a proposed Tertiary Trail Route passing under the Highway 3 Kettle Creek Bridge. Discussions with MTO and the City of St. Thomas are ongoing regarding the City's active transportation improvement plans within the study area.

5.3.6 Emergency Services

Emergency services include police, fire, and medical service providers. The following is a summary of the emergency service providers in the study area:

- The Ontario Provincial Police, Elgin County Detachment and West Region Headquarters, as well as the St. Thomas Police Service provide policing to the area.
- St. Thomas Fire Department, Central Elgin Fire Department, and Southwold Fire Department provide fire and emergency response to the area.
- Medavie EMS Elgin Ontario provides ambulance services to the area.

5.3.7 Agriculture

There is active agricultural land use in the study area, west of the City of St. Thomas. Agricultural lands in these areas are predominantly used to grow row crops (i.e., corn, soybeans, etc.), and there are no designated specialty crop areas in the study area. The Elgin Federation of Agriculture is the affiliate of the Ontario Federation of Agriculture that represents farmers in and adjacent to the study area.

5.4 Cultural Environment

5.4.1 Archaeological Resources

A Stage 1 Archaeological Assessment (Project Information Form number P422-0029-2022) of the overall assignment's study area (i.e., the study areas for GWP 3041-22-00 and 3042-22-00) was carried out in accordance with the Ministry of Citizenship and Multiculturalism's (MCM) *Standards and Guidelines for Consultant Archaeologists* (2011) and the Office of History and Archaeology (OHA) to determine the potential for the presence of known and/or potential archaeological resources in the study area based on a review of relevant background information and a site visit conducted on February 21, 2023, and May 30, 2023. As the assessment was undertaken for the overall assignment, the study area referred to in this subsection includes the study areas for both GWP 3041-22-00 and GWP 3042-22-00.

Archaeological potential is established by determining the likelihood that archaeological resources may be present within the study area. Criteria to determine archaeological potential includes the proximity to registered archaeological sites, distance to various types of water sources, soil texture and drainage, glacial geomorphology, elevated topography, and the general topographic variability of the area; however, extensive land disturbance can eradicate archaeological potential. Distance to modern or ancient water sources is generally accepted as the most important determinant of past human settlement patterns and considered alone, may result in a determination of archaeological potential; however, any combination of two or more other criteria, such as well-drained soils or topographic variability, may also indicate archaeological potential.

Kettle Creek and several of its tributaries, as well as tributaries of Dodd Creek, cross through the study area. Ancient and/or relic tributaries of other water sources may have existed but are not identifiable today and are not indicated on historical mapping. Soil texture can also be an important determinant of past settlement, usually in combination with other factors, such as topography. A review of soils in the study area indicates that soils would have been suitable for Indigenous agricultural purposes. A review of MCM's *Ontario Archaeological Sites Database* has shown that there are 18 registered Indigenous archaeological sites within 1.0 km of the study area. Historical background information from Jesuit missionary accounts also suggests the presence of Indigenous villages and camps within the general vicinity of the study area.

Archaeological potential can be extended to areas of early Euro-Canadian settlement, including places of military or pioneer settlements, early transportation routes, and properties listed on the municipal register or designated under the OHA or property that local histories or informants have identified with possible historical events, activities, or occupations. Historical mapping demonstrates that the study area was occupied by Euro-Canadians as early as the mid-to-late 19th century. Much of the established road and rail networks and agricultural settlement from the 19th century is still visible today. Historical mapping illustrates many 19th century structures and homesteads within, or in proximity to, the study area. Adding to these observations is the presence of two registered Euro-Canadian archaeological sites within 1.0 km of the study area.

The Stage 1 Archaeological Assessment determined approximately 76.93% of the study area retains archaeological potential. The remaining portions of the study area (approximately 23.07%), retain low to no archaeological potential due to low and wet areas, areas of steep slope, areas subject to previous archaeological assessment, and areas subject to deep and extensive modern disturbances, such as existing gravel and asphalt laneways, driveways, draining ditching, sidewalks and parking lots, residential and commercial buildings, and buried utilities or other municipal infrastructure. A Stage 2 Archaeological Assessment will be undertaken for portions of the study area where construction activities are anticipated to impact areas of archaeological potential. Stage 2 Archaeological Assessment work is ongoing and will continue in 2024 when weather permits. A Stage 2 Archaeological Assessment is not required for areas determined to have low to no archaeological potential.

A *Stage 1 Archaeological Assessment Report* has been prepared to document the findings of the assessment and its recommendations. The report has been entered into the Ontario Public Register of Reports and is on file with MTO.

5.4.2 Built Heritage Resources and Cultural Heritage Landscapes

A *Cultural Heritage Report* (CHR) was undertaken in 2023 to identify any heritage resources, including built heritage and cultural heritage landscapes, present within, and adjacent to the study area. A land use history was completed to provide a cultural context for the study area, and to inform the evaluation of each property. In addition, the MCM, the Ontario Heritage Trust, and local municipalities were consulted.

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

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

Based on the findings of the evaluation, 11 built heritage properties and two cultural heritage landscapes were identified within a 50 m buffer of the study area. The CHR is on file with MTO.

5.5 Indigenous Communities

The following Indigenous communities/organizations have interest in the study area:

- Aamjiwnaang First Nation
- Caldwell First Nation
- Chippewas of Kettle and Stony Point First Nation
- Chippewas of the Thames First Nation
- Delaware Nation at Moraviantown
- Munsee-Delaware Nation
- Oneida of the Thames
- Walpole Island First Nation
- Six Nations of the Grand River
- Haudenosaunee Confederacy Chiefs Council

5.5.1 Historical Occupation

It has been demonstrated that Indigenous people began occupying southern Ontario as the Laurentide glacier receded, as early as 11,000 years ago. Contact between Indigenous and European cultures in what is now the province of Ontario broadly occurred in the 16th century. The precise moment of contact is unknown.

The post-contact Indigenous occupation of southern Ontario was heavily influenced by the dispersal of various Iroquoian-speaking communities by the New York State Iroquois and the subsequent arrival of Algonkian-speaking groups from northern Ontario at the end of the 17th century and beginning of the 18th century.

In the winter of 1626-1627, Recollet Father Daillion travelled through the region of the study area along the north shore of Lake Erie and encountered numerous villages occupied by the Neutral, also called Attikadaron, Atiouandaronk, and Attiwondaronk, who cultivated fields of maize, tobacco, and squash, in addition to hunting and fishing. In 1641-1642, the Jesuit missionaries Brebeuf and Chaumonot passed through 28 Neutral villages and gave some of them Christian names, which appear on Sanson's 1656 map of New France. The village of St. Alexis appears to be located near what may be Kettle Creek, but the rivers and creeks are not named on the map and their depicted locations are not entirely accurate; therefore, the exact location of the village cannot be determined. Population estimates of the Neutral, compiled by the Jesuits, range from 12,000 to 30,000 people. In 1650, the Iroquois Confederacy declared war on the Neutral, and they were expelled from their villages and lands. Once the Iroquois moved further into southern Ontario, the Ojibway moved into the Bruce Peninsula and the surrounding area.

By the 1680s, Mississauga people had begun to re-enter the lower Great Lakes basin. In southern Ontario, members of the Three Fires Confederacy (Chippewa, Ottawa, and Potawatomi) were immigrating from Ohio and Michigan in the late 1700s.

5.5.2 Historic Treaties

Since European contact and later, with the establishment of provincial and federal governments (i.e., the Crown), the lands within Ontario have been included in various treaties, land claims, and land cessions. Based on Morris (1943), the study area is part of Treaty Number 2, also known as the McKee Purchase, a parcel of land given to the Odawa, Chippewa, Pottawatomi, and Huron by the Crown on May 19, 1790.

5.6 Transportation Conditions

This section of the report documents the existing transportation conditions along Highway 3 within the study area.

5.6.1 Highway Classification

Highway 3 within the project limits runs east-west and is classified as a two-lane rural arterial undivided Controlled-Access-Highway.

5.6.2 Posted and Design Speed

The existing posted speed limit on Highway 3 is 80 km/h and the design speed is 100 km/h.

5.6.3 Cross-Section

The cross-section characteristics of Highway 3 within the study limits are summarized in **Table 3**.

Table 3: Summary of Existing Cross-Section Elements

Cross-Section Element	Width
Lane Width	2 lanes x 3.66 m
Shoulder Width	2.44 m (Left) 3.05 m (Right)
Shoulder Rounding	0.6 m – 0.9 m

5.6.4 Interchanges and Intersections

There is one interchange on Highway 3 and one at-grade intersection with Highway 3 in the study area that provide access to the local road network and existing communities. The interchange is at First Avenue and the at-grade intersection is at Wellington Road as described herein.

The City of St. Thomas is undertaking a separate study for improvements at the intersection of Highway 3 and Centennial Avenue and as such, this intersection is not included as part of this study.

5.6.4.1 First Avenue Interchange

The existing interchange at First Avenue is a diamond configuration on the south side and a Parclo A configuration on the north side. The intersection of First Avenue and Highway 3 W-N/S ramp (south ramp terminal) is signalized.

5.6.4.2 Wellington Road Intersection

The existing at-grade intersection at Wellington Road is signalized. There is a channelized right-turn lane for the Highway 3 westbound to Wellington Road northbound movement. There is a channelized right-turn lane for the Wellington Road southbound to Highway 3 westbound movement.

5.6.5 Crossing Roads

There are four municipal roadways that cross Highway 3 within the study area, including three underpasses (crossing road over the highway).

5.6.5.1 Posted and Design Speed

The posted speed limit and design speed on each crossing road are listed in **Table 4**. It has been assumed that the design speed is 20 km/h above the posted speed limit.

Table 4: Crossing Road Posted and Design Speed

Crossing Road	Structure Type	Posted Speed (km/h)	Design speed (km/h)
Wellington Road	N/A (at-grade intersection)	80 (see Note 1)	100
Balaclava Street	Underpass	50	70
First Avenue	Underpass (interchange)	60	80
Burwell Road	Underpass	50	70

*Note 1: The posted speed limit of 80 km/h transitions to 50 km/h south of the intersection with Highway 3.

5.6.5.2 Cross-Section

The cross-section characteristics of each crossing road within the study limits are summarized in **Table 5**.

Table 5: Summary of Existing Crossing Road Cross-Section Elements

Crossing Road	Approx. Lane Width	Approx. Shoulder Width
Wellington Road	2 x 3.66 m	2.4 m
Balaclava Street	2 x 4.88 m	N/A
First Avenue	4 x 3.66 m	N/A
Burwell Road	2 x 3.66 m	2.0 m

5.6.6 Existing Structures

There are six bridges within the study area: three at crossing roads (Balaclava Street, Burwell Road, First Avenue), one at Kettle Creek, and two at railway lines. There are two structural culverts within the study limits. **Table 6** summarizes the existing bridge and culvert structures within the study limits.

Table 6: Summary of Existing Structures

Structure ID	Name	Year Constructed
Bridges		
05X-0216/B0	Kettle Creek Bridge (EBL)	1979
05X-0217/B0	CNR Subway	1979
05X-0218/B0	Balaclava Street Underpass	1975
05X-0219/B0	First Avenue Underpass	1974
05X-0220/B0	Burwell Road Underpass	1974
05X-0221/B0	CPR Subway	1980
Culverts		
05X-0266/C0	Underhill Drain Culvert	1978
05X-0268/C0	Unnamed Tributary to Kettle Creek Culvert	1978

5.6.7 Traffic

A *Traffic Analysis Report* and *Safety Review of Existing Conditions Report* have been prepared as part of this study and are on file with MTO. The reports detail the existing traffic operations and collision statistics within the study area. The following sections have been extracted from those reports.

5.6.7.1 Traffic Operations

The operational efficiency of the Highway 3 corridor within the study area is determined by the signalized intersections, unsignalized intersections, and highway ramps. For the sideroads operating under stop control, the availability of gaps on Highway 3 traffic has a major influence on their operational performance.

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

The intersection of Highway 3 and Wellington Road operates at an overall LOS C in both the AM and PM periods. The intersection of Highway 3 and First Avenue W-N/S ramp (south ramp terminal) operates at an overall LOS A in both the AM and PM periods. The intersection of Highway 3 and First Avenue E-N/S ramp/N/S-W ramp (north ramp terminal) operates at an overall LOS A in the AM period and at an overall LOS B in the PM period.

A Traffic Signal Warrant Analysis was completed for the existing unsignalized intersections in the study area. A traffic signal is not warranted at the intersection of Highway 3 and First Avenue E-N/S ramp/N/S-W ramp (north ramp terminal).

5.6.7.2 Road Safety

Based on a review of collision history from the last seven years within the study area, along the Highway 3 corridor between First Avenue and Wellington Road, 17 of the total 36 collisions (i.e., 47%) were single motor vehicle collisions related to wild animal, and 14 of these 17 collisions (i.e., 82%) occurred during non-daylight conditions. Also, 11 of the total 36 collisions (i.e., 31%) occurred on a curve portion of the road.

There were five collisions at the intersection of Highway 3 and Wellington Road, and of the five, three were angle collisions where visibility may have been limited due to snow or fog environment conditions.

5.6.7.3 Traffic Field Investigation

In addition to the collision review, field investigations were conducted in June and July 2023 to collect additional data, observe traffic behaviours, and further analyze road safety. General deficiencies such as missing advisory signage, deficient acceleration lane length requirements, deficient guiderail systems and sources of traffic conflicts were identified.

5.6.8 Drainage

A *Drainage Report* has been completed as part of this study to assess existing drainage conditions and to develop a strategy for the Recommended Plan based on a desktop review of relevant information and field visit conducted during this study, as described herein.

5.6.8.1 Centreline Culverts

Within the study area limits, there are four centreline culverts on Highway 3 all west of Kettle Creek Bridge. Three of the culverts are concrete box culverts and the other culvert is a corrugated steel pipe (CSP) with a plastic liner inside of it. The culverts are all in good condition but there is evidence of erosion and scour at inlets and outlets and adjacent watercourse embankments.

5.6.8.2 Ditch Drainage

Drainage along Highway 3 west of Kettle Creek is conveyed overland through open ditches and swales. East of Kettle Creek the highway drainage is achieved through open ditches and swales, as well as an underground storm sewer network described below. These ditches are generally in fair condition. Some areas of ditching are very flat and were found to have an excess build-up of sediment and vegetation.

5.6.8.3 Storm Sewers

There is an existing underground storm sewer network east of the Kettle Creek Bridge along Highway 3. It primarily accepts drainage from the Highway 3 ditch inlet catch basins, as well as the adjacent residential and industrial lands along this section of the corridor and outlet to Kettle Creek. There is also an existing underground storm sewer network west of the Kettle Creek Bridge along Highway 3 that primarily accepts drainage from the Highway 3 ditch inlet catch basins and outlet to Kettle Creek. These sewer networks are to be inspected by closed circuit television cameras (CCTV) for condition as part of this study to determine the need for replacement or rehabilitation with pipe lining.

5.6.8.4 Other Drainage Infrastructure and Concerns

There are two notable watercourses within the study limits, Kettle Creek, and a Municipal Drain network at Wellington Road. Kettle Creek is the most prominent watercourse on this project, which includes a large multi-span bridge crossing over it. Kettle Creek is also the primary outlet location for most of the surface water conveyed along the Highway right-of-way. The Andrews Municipal Drain crosses Highway 3 just west of Wellington Road and runs south along the west side of Wellington Road. The Underhill Municipal Drain crosses Highway 3 east of Wellington Road and drains south-west to a concrete culvert under Wellington Road just north of McBain Line.

5.6.9 Utilities

Information on the location and types of existing utility plants was requested from utility companies with infrastructure in the study area. Enbridge Gas, Hydro One, Bell, Rogers, Entegrus, municipal watermain, storm sewer, sanitary sewer, and MTO storm sewer are present within the study limits.

6.0 Generation and Evaluation of Design Alternative

6.1 Generation of Design Alternatives

The purpose of the study was to identify a Recommended Plan for a free-flow, four-lane Highway 3 within the study limits with access restricted to interchange locations. Given the number of possible alternatives that could be reasonably considered, a staged evaluation approach was carried out. As a first step, a list of Design Alternatives was identified, which included the initial development of three Highway 3 cross-section alternatives, five Wellington Road interchange alternatives, and two First Avenue interchange alternatives for GWP 3041-22-00, as described and illustrated in the following subsections.

6.1.1 Highway 3 Cross-Section Alternatives

Three Highway 3 cross-section alternatives were considered, one with an 8.0 m median between lanes (see **Figure** 2), one with a 15.0 m median between lanes (see **Figure 3**), and one with a 22.5 m median between lanes (see **Figure 4**). Only the cross-section with a 15.0 m median is consistent with the historical intent for twinning Highway 3, as this alternative would centre the eastbound and westbound lanes within the highway right-of-way and would be accommodated by existing infrastructure.

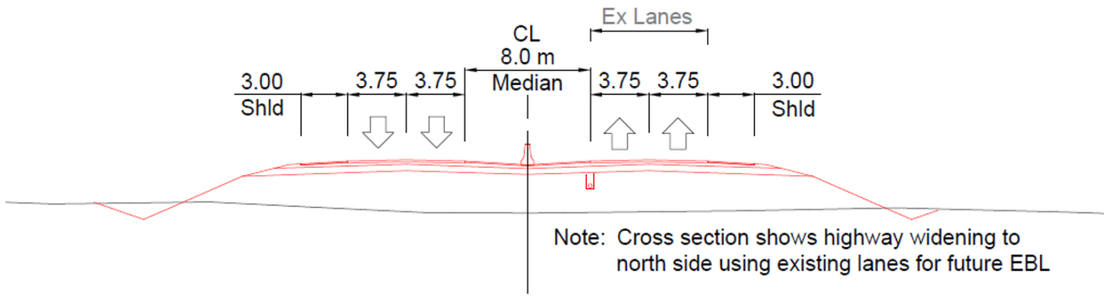

Figure 2: Highway 3 Cross Section Alternative 1: 8.0 m Median

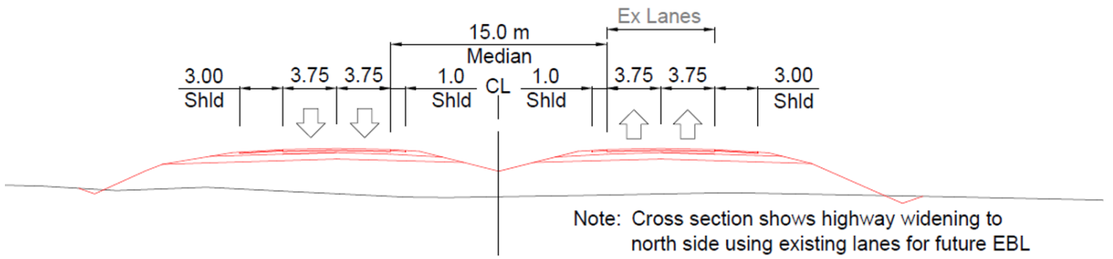

Figure 3: Highway 3 Cross Section Alternative 2: 15.0 m Median

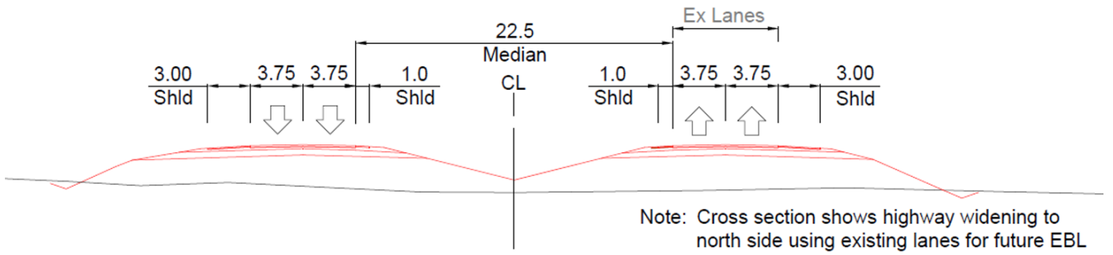

Figure 4: Highway 3 Cross Section Alternative 3: 22.5 m Median

6.1.2 Wellington Road Interchange Alternatives

Five interchange alternatives were considered at the intersection of Highway 3 and Wellington Road, including three Parclo A4 interchange alternatives with different alignments (see **Figure 5**, **Figure 6**, and **Figure 7**), a Parclo AB interchange alternative (see **Figure 8**), and a Diamond interchange alternative (see **Figure 9**).

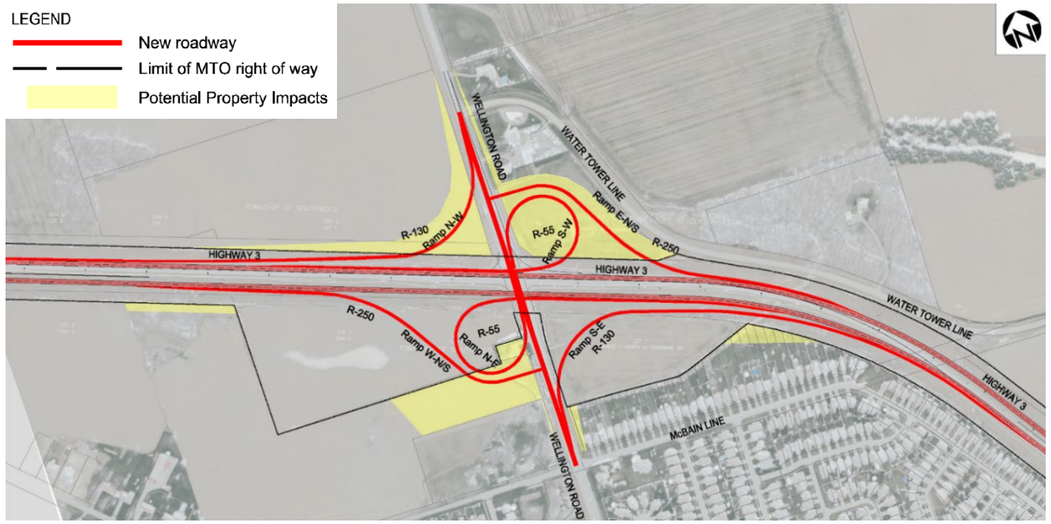

Figure 5: Wellington Road Interchange Alternative 1: Parclo A4 (On Existing Alignment)

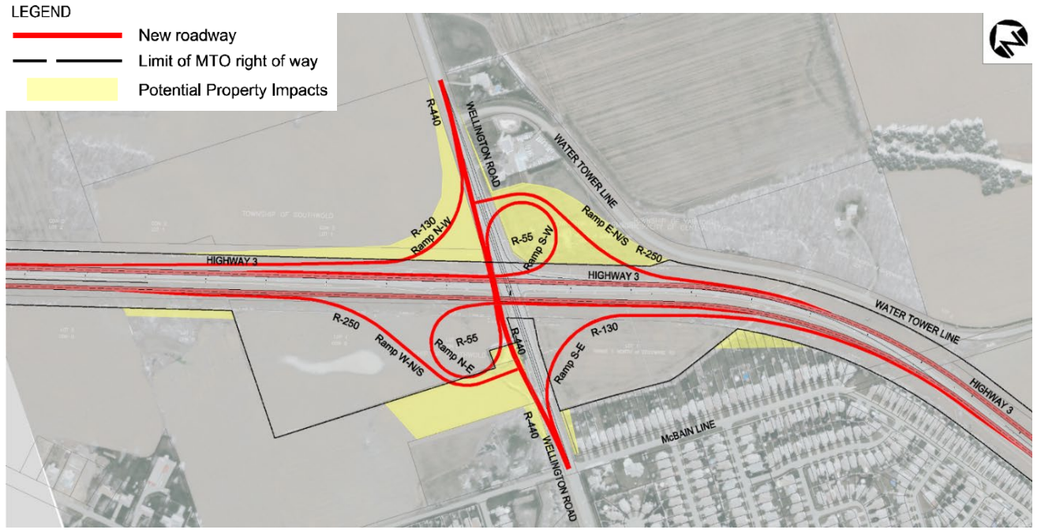

Figure 6: Wellington Road Interchange Alternative 2: Parclo A4 (Alignment Shifted to West)

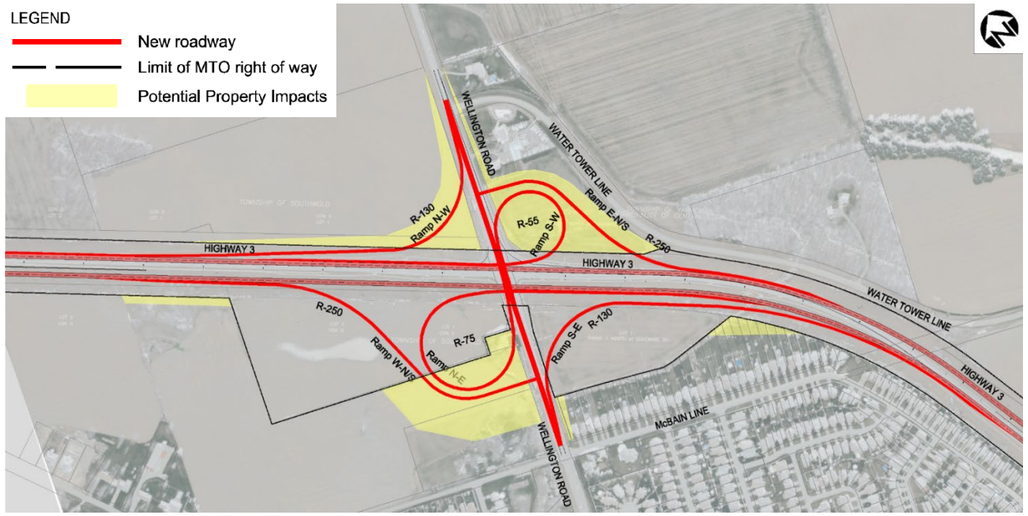

Figure 7: Wellington Road Interchange Alternative 3: Parclo A4 (Larger Inner Loop on South Side)

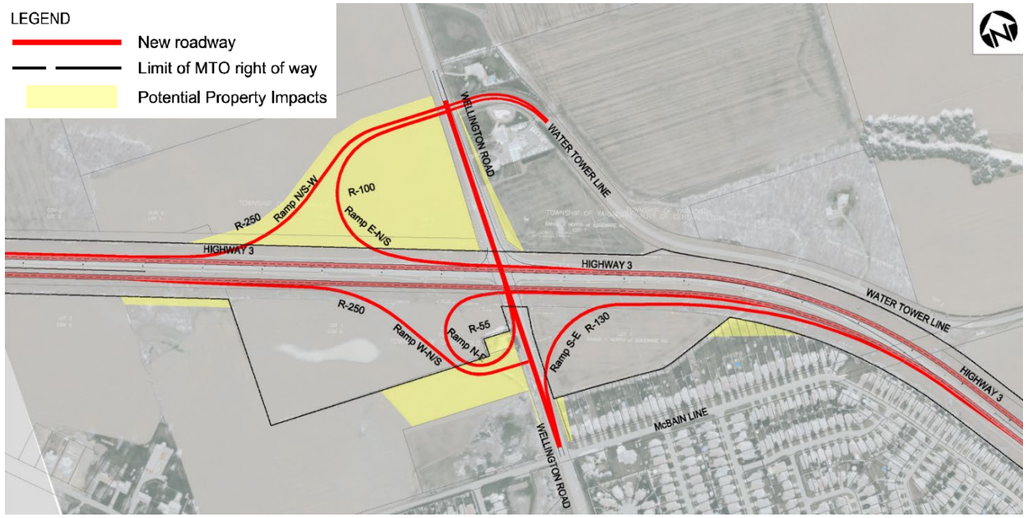

Figure 8: Wellington Road Interchange Alternative 4: Parclo AB

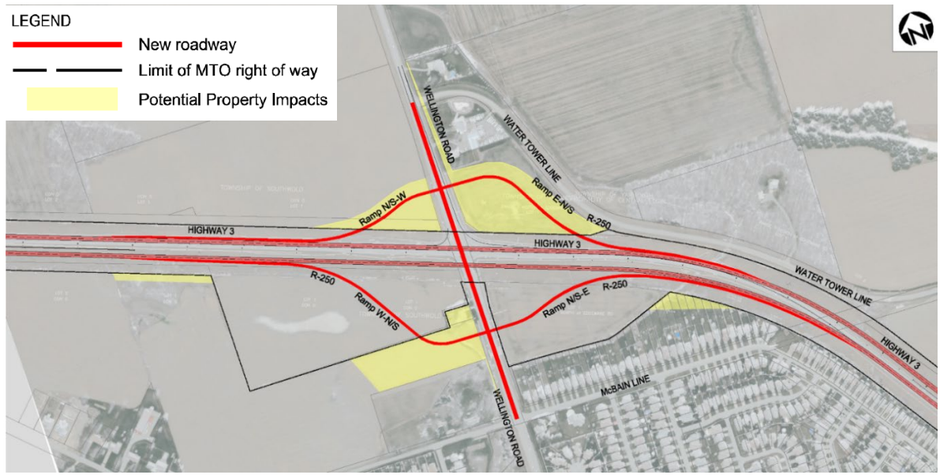

Figure 9: Wellington Road Interchange Alternative 5: Diamond

6.1.3 First Avenue Interchange Alternatives

Two interchange alternatives were considered for the Highway 3 and First Avenue Interchange. One alternative included minor improvements to the existing interchange (see **Figure 10**), and the other included a Parclo A2 interchange to the north, while maintaining the existing ramps to the south of the interchange (see **Figure 11**).

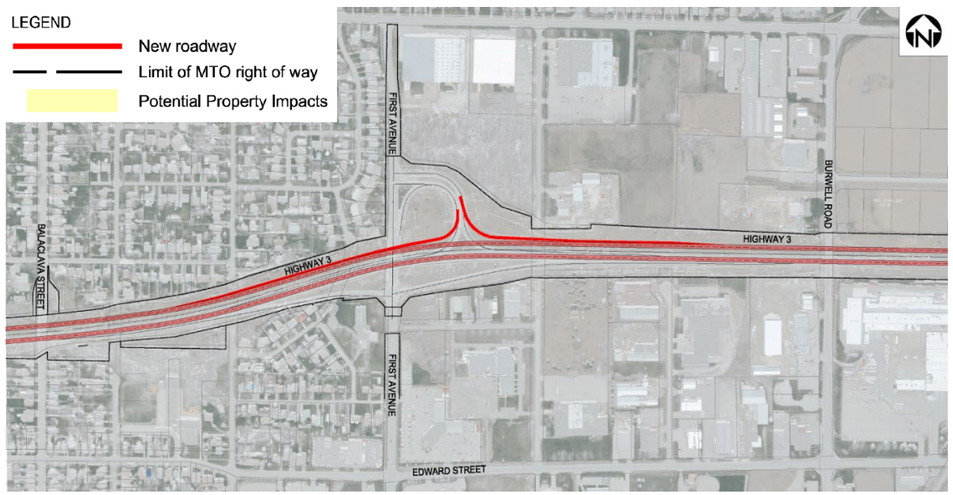

Figure 10: First Avenue Interchange Alternative 1: Minor Improvements

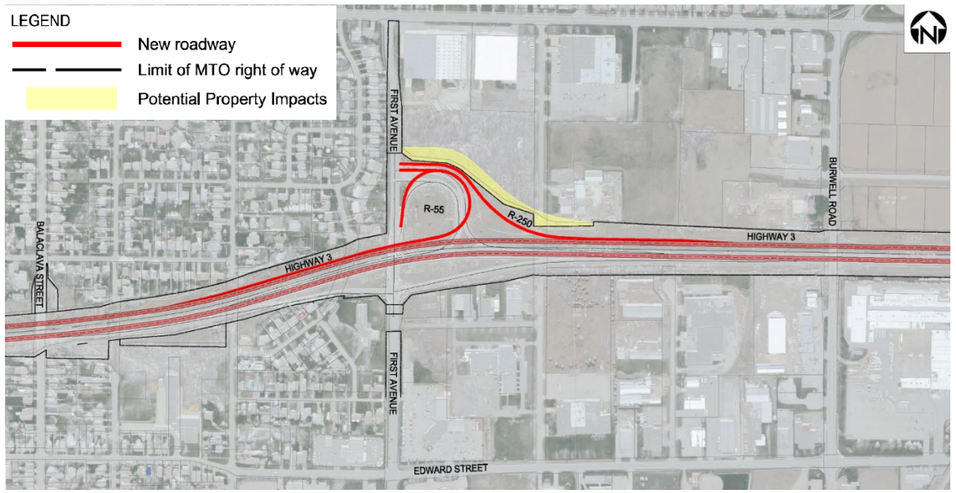

Figure 11: First Avenue Interchange Alternative 2: Parclo A2 North, Existing Ramps South

6.2 Initial Screening of Long List of Design Alternatives

An initial screening of the design alternatives was completed to assess their feasibility. Those alternatives that were deficient from an engineering, environmental, or community perspective were screened out from further consideration. The remaining design alternatives (i.e., the short list of design alternatives) were carried forward for further detailed evaluation, as described in Section 6.3.

6.2.1 Highway 3 Cross-Section Alternatives

Alternative 1: 8.0 m Median

Alternative 1 was screened out because:

- Twinning would not be centered within the right-of-way.
- Does not align well with existing bridge piers in the future median.
- Would require concrete median tall wall and median storm sewer.

Alternative 2: 15.0 m Median

Alternative 2 was carried forward because:

- It is consistent with the historical intent for the twinning of this highway, as the eastbound and westbound lanes will be centered within the right-of-way.

Alternative 3: 22.5 m Median

Alternative 3 was carried forward because:

- No median protection is required.
- It provides the standard median width for a divided highway.

During the initial screening process, it was determined that the 15.0 m median cross-section will be carried forward for areas where the highway footprint has constraints (i.e., property impacts, existing structures), and the 22.5 m median cross-section will be carried forward for other areas of Highway 3, where feasible.

6.2.2 Wellington Road Interchange Alternatives

Alternative 1: Parclo A4 (On Existing Alignment)

Alternative 1 was carried forward because it:

- Maintains tangent horizontal alignment of Wellington Road.
- Provides higher traffic capacity compared to a Diamond interchange.

Alternative 2: Parclo A4 (Alignment Shifted to West)

Alternative 2 was carried forward because it:

- Allows the existing intersection to be maintained with minor detour during bridge construction.
- Provides higher traffic capacity compared to a Diamond interchange.

Alternative 3: Parclo A4 (Larger Inner Loop on South Side)

Alternative 3 was carried forward because it:

- Maintains tangent horizontal alignment of Wellington Road.
- Provides higher traffic capacity compared to a Diamond interchange.

Alternative 4: Parclo AB

Alternative 4 was carried forward because it:

- Maintains tangent horizontal alignment of Wellington Road.
- Provides higher traffic capacity compared to a Diamond interchange.

Alternative 5: Diamond

Alternative 5 was carried forward because it:

- Maintains tangent horizontal alignment of Wellington Road.
- Has a smaller footprint than a Parclo A interchange.
- Has a lower cost than a Parclo A interchange.

6.2.3 First Avenue Interchange Alternatives

Alternative 1: Minor Improvements

Alternative 1 was screened out because it:

- Has substandard ramp alignments.

Alternative 2: Parclo A2 North, Existing Ramps South

Alternative 2 was carried forward because:

- R-55 loop ramp radius meets minimum standard for 80 km/h design speed.
- The new ramp alignments are consistent with new westbound lanes.

6.3 Evaluation of Short List of Design Alternatives

6.3.1 Evaluation Process

A detailed evaluation of the short list of Design Alternatives was carried out to identify an improvement plan that is cost-effective, addresses structural needs, provides safe operations, and provides reasonable local access, while minimizing the effects on the natural, social, and cultural environments. This is accomplished by identifying evaluation criteria along with their relative importance, and then ranking the overall scores of the design alternatives.

This process includes identifying evaluation criteria through the input received through the consultation process, the project team's experience on similar projects, provincial guidelines, and existing study area conditions. Preliminary evaluation criteria were presented for public review and comment at Public Information Centre (PIC) 1, following which the evaluation criteria were reviewed and confirmed. Engineering criteria included considerations for traffic operations, geometrics and safety, constructability, utility impacts, and total cost. Community-based criteria included considerations for property, business operations/viability, noise, air quality, contamination, stormwater management, cultural heritage resources, and archaeological resources. Natural environment criteria included considerations for terrestrial ecosystems, SOCC, species at risk, and fish and fish habitat.

The next step in the process included evaluating the Design Alternatives that were carried forward. The evaluation process considered a range of engineering and environmental factors in the study area. Alternatives were evaluated using a comparative analysis based on the evaluation criteria and consideration of the advantages and disadvantages of each alternative.

A Preliminary Preferred Plan is selected as the aggregate of Design Alternatives that achieve the best overall balance of transportation engineering, individual environmental factor impacts, and overall environmental impact, taking into consideration the net environmental effects by applying conceptual mitigation measures.

In the final step of the evaluation process, each alternative is ranked to provide an overall recommendation (i.e., Most Preferred, Moderately Preferred, Least Preferred). This is the basis for identifying the Preferred Plan.

6.3.2 Evaluation Criteria

In accordance with the MTO *Class EA for Provincial Transportation Facilities* (2000), a wide range of potential impacts to the natural, social, and cultural environments in the study area are to be considered in the development and evaluation of design alternatives.

As noted in Section 6.3.1, the preliminary evaluation criteria were provided for public review and feedback as part of PIC 1, following which the evaluation criteria were reviewed and confirmed. The criteria are independent variables, each of which may contribute a positive or negative influence on the overall suitability of an alternative. To evaluate and determine the Preferred Alternative, each alternative was rated based on whether it was more or less preferred for each evaluation criterion. Ratings were based on engineering judgement, environmental significance, input received from external agencies, and input received from the public.

Table 7 identifies the evaluation criteria for this study, including the factors considered for each criterion, and the measurement for the rating of each factor. The short list of Design Alternatives that were subjected to the detailed evaluation process is provided in **Table 8**.

Table 7: Evaluation Criteria

Category	Criteria	Measures
Highway Engineering	**Traffic Operations**	Level of Service (LOS) – Highway 3.
		Level of Service (LOS) – Municipal Intersections.
	Geometrics and Safety	Collisions.
		Accommodates large agricultural vehicles.
		Accommodates active transportation.
		Intersection spacing.
		Ramp radii.
		Crossing road alignment.
		Crossing road grade at ramp terminal.
		CNR compatibility.
	Constructability	Complexity of staging and detours.
	Utilities	Length of impacts to utilities.
	Total Cost	Construction cost.
Socio-Economic Environment	**Property**	Approximate area of impact to existing and future land uses.
		Approximate number of private properties potentially impacted by construction activities.
	Business Operations/Viability	Number of businesses directly impacted (i.e., access to/from commercial property or landscaped areas) or displaced.
	Noise	Relative potential change in traffic noise levels on surrounding residential dwellings.
	Air Quality	Relative potential to affect air quality.
	Contamination	Potential to encounter contaminated soils/groundwater.
	Stormwater	Total additional impervious area requiring stormwater management strategies/facilities.
Cultural Environmental	**Cultural Heritage Resources**	Conserves built heritage resources and cultural heritage landscapes. Minimize potential impact on known (i.e., previously recognized) and potential built heritage resources and cultural heritage landscape
	Archaeological Resources	Conserves archaeological resources. Minimize potential impact to archaeology sites and areas of archaeological potential.
Natural Environment	**Terrestrial Ecosystem**	Area of impact to wildlife habitat.
		Area of impacts to vegetated areas due to construction.
	Species of Conservation Concern, Species at Risk	Area impacts to potential species at risk habitat.
	Fish and Fish Habitat	Number of watercourse crossings. Impacts to fish habitat.

Table 8: Short List of Design Alternatives

Highway 3 Cross-Section Alternatives
Alternative 2: 15.0 m median
Alternative 3: 22.5 m median
Wellington Road Interchange Alternatives
Alternative 1: Parclo A4 (On Existing Alignment)
Alternative 2: Parclo A4 (Alignment Shifted to West)
Alternative 3: Parclo A4 (Larger Inner Loop on South Side)
Alternative 4: Parclo AB
Alternative 5: Diamond
First Avenue Interchange Alternative
Alternative 2: Parclo A2 North, Existing Ramps South

6.3.3 Evaluation

The evaluation of alternatives was completed based on the methodology outlined in **Section 6.3.2**. A detailed evaluation of the Wellington Road Interchange Alternatives was undertaken. Based on the evaluation, Alternative 1 (Parclo A4 interchange on existing alignment) was carried forward as the Preferred Plan because it:

- Has the least number of conflict points between traffic movements and provides free-flow operations for most of the movements.
- Free-flow on-ramps eliminate left-turn movements, which improves traffic operations and safety.
- Has the smallest footprint in the southwest quadrant, and a similar footprint to the other Parclo A4 alternatives in other quadrants.
- Provides straight alignment approaching intersection with McBain Line and Water Tower Line.
- Construction staging is similar for all Parclo A4 alternatives.
- The Parclo A4 is most preferred for the highway engineering factors, which outweigh the benefits of the Diamond interchange.

The detailed evaluation of the Wellington Road interchange alternatives is provided in **Table 9**.

As noted in Section 6.2.1, the 15.0 m median cross-section for Highway 3 was carried forward for areas where the highway footprint has constraints (i.e., property impacts). Due to constraints through the GWP 3041-22-00 study area, the 15.0 m median cross-section was the only alternative carried forward, it did not require evaluation, and it is considered to be the Preferred Alternative. A transition to the 22.5 m median cross-section, which will be implemented through the GWP 3042-22-00 study area, is proposed at the western end of the GWP 3041-22-00 study area. Additional information is provided in Section 7.0.

Additionally, only one alternative for the proposed First Avenue Interchange (Alternative 2) was carried forward from the screening process, as outlined in Section 6.2.3. As such, an evaluation of this alternative was not required, and this is considered to be the Preferred Alternative for this interchange.

Table 9: Evaluation of Wellington Road Interchange Alternatives

Criteria	Measures	Alternatives				
		1 – Parclo A4 (On Existing Alignment)	**2 – Parclo A4 (Alignment Shifted to West)**	**3 – Parclo A4 (Larger Inner Loop on South Side)**	**4 – Parclo AB**	**5 – Diamond**
Highway Engineering						
Traffic Operations	Level of Service (LOS) for Highway 3	• Higher traffic capacity compared to Diamond configuration.	• Higher traffic capacity compared to Diamond configuration.	• Higher traffic capacity compared to Diamond configuration.	• Higher traffic capacity compared to Diamond configuration but less than Parclo A4 alternatives. • N/S-W ramp overlaps with Ron McNeil/ Wonderland ramps.	• Lower traffic capacity compared to all other alternatives. • N/S-W ramp overlaps with Ron McNeil/ Wonderland ramps.
						
	Level of Service (LOS) for Wellington Road	• Higher traffic capacity compared to Diamond configuration.	• Higher traffic capacity compared to Diamond configuration.	• Higher traffic capacity compared to Diamond configuration.	• Higher traffic capacity compared to Diamond configuration but less than Parclo A4 alternatives.	• Lower traffic capacity compared to all other alternatives. • Back-to-back left turn lanes to on-ramps.
						
Geometrics and Safety	Collisions	• Interchange design has the least number of conflict points between traffic movements and provides free-flow operations for most of the movements.	• Interchange design has the least number of conflict points between traffic movements and provides free-flow operations for most of the movements.	• Interchange design has the least number of conflict points between traffic movements and provides free-flow operations for most of the movements.	• Interchange design has a fewer number of conflict points between traffic movements than Alternative 5, but does not provide as much free-flow operation as Alternatives 1, 2, and 3. • High-speed exit from Highway 3 is to a substandard inner loop.	• Interchange design has the highest number of conflict points between traffic movements. • Potential for wrong-way movements onto Highway 3.
						

Criteria	Measures	Alternatives				
		1 – Parclo A4 (On Existing Alignment)	**2 – Parclo A4 (Alignment Shifted to West)**	**3 – Parclo A4 (Larger Inner Loop on South Side)**	**4 – Parclo AB**	**5 – Diamond**
	Accommodates Long Combination Vehicles (LCVs), Large Agricultural Vehicles	• Greater ability to accommodate LCVs with modifications. • Ability to accommodate large agricultural vehicles.	• Greater ability to accommodate LCVs with modifications. • Ability to accommodate large agricultural vehicles.	• Greater ability to accommodate LCVs with modifications. • Ability to accommodate large agricultural vehicles.	• Greater ability to accommodate LCVs with modifications. • Ability to accommodate large agricultural vehicles.	• Lower ability to accommodate LCVs with modifications. • Ability to accommodate large agricultural vehicles.
						
	Accommodates Active Transportation	• Wellington Road is not part of the Province Wide Cycling Network. • Less suited to accommodate active transportation on Wellington Road due to the greatest number of direct ramps.	• Wellington Road is not part of the Province Wide Cycling Network. • Less suited to accommodate active transportation on Wellington Road due to the greatest number of direct ramps.	• Wellington Road is not part of the Province Wide Cycling Network. • Less suited to accommodate active transportation on Wellington Road due to the greatest number of direct ramps.	• Wellington Road is not part of the Province Wide Cycling Network. • Moderately suited to accommodate active transportation on Wellington Road due to the number of direct ramps.	• Wellington Road is not part of the Province Wide Cycling Network. • Better suited to accommodate active transportation on Wellington Road as there are no direct ramps.
						
	Intersection Spacing	• S-E ramp in close proximity to McBain Line intersection. • Moderate distance between ramp terminal intersections, same as Alternatives 2 and 5	• S-E ramp in close proximity to McBain Line intersection. • Moderate distance between ramp terminal intersections, same as Alternatives 1 and 5.	• W-N/S ramp terminal is closest to McBain Line compared to other alternatives. • S-E ramp in close proximity to McBain Line intersection. • Large distance between ramp terminal intersections.	• S-E ramp in close proximity to McBain Line intersection. • Maintains connection to Water Tower Line. • Large distance between ramp terminal intersections.	• Moderate distance between ramp terminal intersections, same as Alternatives 1 and 2.
						

Criteria	Measures	Alternatives				
		1 – Parclo A4 (On Existing Alignment)	**2 – Parclo A4 (Alignment Shifted to West)**	**3 – Parclo A4 (Larger Inner Loop on South Side)**	**4 – Parclo AB**	**5 – Diamond**
	Ramp Radii	• Loop ramp radii (R-55) meet minimum standard for 70 km/h design speed.	• Loop ramp radii (R-55) meet minimum standard for 70 km/h design speed.	• Loop ramp radii (R-55 & R-75) meet minimum standard for 70 km/h design speed.	• Loop ramp exits on freeways are less desirable than direct exit ramps. • Loop ramp radius (R-55) meets minimum standard for 70 km/h design speed. • Loop ramp radii (R-100) does not meet minimum standard for 120 km/h design speed of Highway 3. • N/S-W ramp speed change lane would overlap with E-N/S off-ramp at Ron McNeil Line interchange.	• All ramps meet standard.
						
	Crossing Road Alignment	• Maintains tangent horizontal alignment of Wellington Road.	• Shifted horizontal alignment on Wellington Road introduces less than desirable back-to-back curves.	• Maintains tangent horizontal alignment of Wellington Road.	• Maintains tangent horizontal alignment of Wellington Road.	• Maintains tangent horizontal alignment of Wellington Road.
						
	Crossing Road Grade at Ramp Terminal	• No significant difference between interchange alternatives.	• No significant difference between interchange alternatives.	• No significant difference between interchange alternatives.	• No significant difference between interchange alternatives.	• No significant difference between interchange alternatives.
						
	CNR Compatibility	• N/A	• N/A	• N/A	• N/A	• N/A

Criteria	Measures	Alternatives				
		1 – Parclo A4 (On Existing Alignment)	**2 – Parclo A4 (Alignment Shifted to West)**	**3 – Parclo A4 (Larger Inner Loop on South Side)**	**4 – Parclo AB**	**5 – Diamond**
Constructability	Complexity of Staging and Detours	• Requires temporary detour and intersection during bridge construction. • High complexity of traffic staging due to the number of ramps.	• Existing intersection to be maintained with minor detour during bridge construction. • High complexity of traffic staging due to the number of ramps.	• Requires temporary detour and intersection during bridge construction. • High complexity of traffic staging due to the number of ramps.	• Requires temporary detour and intersection during bridge construction. • Moderate complexity of traffic staging due to the number of ramps.	• Requires temporary detour and intersection during bridge construction. • Moderate complexity of traffic staging due to the number of ramps.
						
Utilities	Number of Impacts to Utilities	• Bell: Five potential conflict locations; crossing on Wellington south of Highway 3, and four on the east side of Wellington. • Hydro: Eight potential conflict locations; south on south side of Highway 3, and four on the east side of Wellington. • Less potential conflicts than Alternative 4 but more than Alternative 5.	• Bell: Five potential conflict locations on the east side of Wellington. • Hydro: Six potential conflict locations; two on the west side of Wellington, crossing on Wellington north of Highway 3, and three on the south side of Highway 3, two west of the interchange, two at the interchange and one on the south side of Ford Road. • Gas: Two potential conflict locations; at the house and on the west side of Wellington south of Highway 3. • Less potential conflicts than Alternative 4 but more than Alternative 5.	• Bell: Four potential conflict locations; crossing on Wellington south of Highway 3, and three on the east side of Wellington. • Hydro: Six potential conflict locations; three on the west side of Wellington, and three on the south side of Highway 3. • Gas: Two potential conflict locations; on the west side of Wellington south of Highway 3, and at the house south of Highway 3. • Less potential conflicts than Alternative 4 but more than Alternative 5.	• Bell: Six potential conflict locations; crossing on Wellington south of Highway 3, on the west side of Water Tower Line, and four on the east side of Wellington. • Hydro: Seven potential conflict locations; three on the west side of Wellington, crossing on Wellington north of Highway 3, and four on the south side of Highway 4. • Gas: Two potential conflict locations; on the west side of Wellington south of Highway 3, and on the east side of Wellington north of Highway 3. • Most number of potential conflicts.	• Bell: Three potential conflict locations; one crossing on Wellington south of Highway 3, and two on the east side of Wellington. • Hydro: Five potential conflict locations; two on the west side of Wellington, and three on the south side of Highway 3. • Gas: One potential conflict location; on the west side of Wellington south of Highway 3. • Least number of potential conflicts.
						

Criteria	Measures	Alternatives				
		1 – Parclo A4 (On Existing Alignment)	**2 – Parclo A4 (Alignment Shifted to West)**	**3 – Parclo A4 (Larger Inner Loop on South Side)**	**4 – Parclo AB**	**5 – Diamond**
Total Cost	Construction Cost	• Higher anticipated cost than Alternative 5, but lower than Alternative 2.	• Highest anticipated cost due to the new alignment and removing the existing embankment.	• Higher anticipated cost than Alternative 5, but lower than Alternative 2.	• Higher anticipated cost than Alternative 5, but lower than Alternative 2.	• Lower anticipated cost.
						
Socio-Economic Environment						
Property	Approximate Area of Impact to Designated Land Uses	• No significant difference between interchange alternatives. • Similar footprint of potential impacts to S-W and S-E quadrants as other alternatives.	• No significant difference between interchange alternatives. • Similar footprint of potential impacts to S-W and S-E quadrants as other alternatives.	• No significant difference between interchange alternatives. • Similar footprint of potential impacts to S-W and S-E quadrants as other alternatives.	• No significant difference between interchange alternatives. • Similar footprint of potential impacts to S-W and S-E quadrants as other alternatives.	• No significant difference between interchange alternatives. • Similar footprint of potential impacts to S-W and S-E quadrants as other alternatives.
						
	Approximate Number of Private Properties Potentially Impacted by Construction Activities	• One private residential property anticipated to be impacted in the S-W quadrant. • One private residential property anticipated to be impacted in the N-E quadrant. • Potential impacts to private residential properties in the S-E quadrant, along the S-E ramp • One private farm property anticipated to be impacted in the N-W quadrant.	• One private residential property anticipated to be impacted in the S-W quadrant. • One private residential property anticipated to be impacted in the N-E quadrant. • Potential impacts to private residential properties in the S-E quadrant, along the S-E ramp. • One private farm property anticipated to be impacted in the N-W quadrant.	• Two private residential properties anticipated to be impacted in the S-W quadrant. • One private residential property anticipated to be impacted in the N-E quadrant. • Potential impacts to private residential properties in the S-E quadrant, along the S-E ramp. • One private farm property anticipated to be impacted in the N-W quadrant.	• One private residential property anticipated to be impacted in the S-W quadrant. • Potential impacts to private residential properties in the S-E quadrant, along the S-E ramp. • One private farm property anticipated to be impacted in the N-W quadrant, largest area than other alternatives. • One private farm property anticipated to be impacted in the S-W quadrant.	• One private residential property anticipated to be impacted in the S-W quadrant. • One private residential property anticipated to be impacted in the N-E quadrant. • One private farm property anticipated to be impacted in the N-W quadrant. • One private farm property anticipated to be impacted in the S-W quadrant.

Criteria	Measures	Alternatives				
		1 – Parclo A4 (On Existing Alignment)	**2 – Parclo A4 (Alignment Shifted to West)**	**3 – Parclo A4 (Larger Inner Loop on South Side)**	**4 – Parclo AB**	**5 – Diamond**
		• One private farm property anticipated to be impacted in the S-W quadrant.	• One private farm property anticipated to be impacted in the S-W quadrant.	• One private farm property anticipated to be impacted in the S-W quadrant, largest area than other alternatives.		
		●	●	●	●	●
Business Operations/ Viability	Number of Businesses Directly Impacted (i.e., access to/from commercial property or landscaped areas) or Displaced.	• No significant changes between alternatives. • No businesses anticipated to be directly impacted.	• No significant changes between alternatives. • No businesses anticipated to be directly impacted.	• No significant changes between alternatives. • No businesses anticipated to be directly impacted.	• No significant changes between alternatives. • No businesses anticipated to be directly impacted.	• No significant changes between alternatives. • No businesses anticipated to be directly impacted.
		●	●	●	●	●
Cultural Environment						
Noise	Relative Potential Change in Traffic Noise Levels on Surrounding Residential Dwellings.	• Similar distance to nearby sensitive receptors as other alternatives. • High speeds along ramps due to configuration. • High number (4) of free-flowing ramps (S-W, N-E, N-W, and S-E) that can produce greater traffic noise level. • Some impacts may be mitigated by noise barrier design, if warranted and feasible.	• Similar distance to nearby sensitive receptors as other alternatives. • High number (4) of free-flowing ramps (S-W, N-E, N-W, and S-E) that can produce greater traffic noise level. • Some impacts may be mitigated by noise barrier design, if warranted and feasible.	• Similar distance to nearby sensitive receptors as other alternatives. • High number (4) of free-flowing ramps (S-W, N-E, N-W, and S-E) that can produce greater traffic noise level. • Some impacts may be mitigated by noise barrier design, if warranted and feasible.	• Similar distance to nearby sensitive receptors as other alternatives. • Lower number (2) of free-flowing ramps (N-E and S-E) that can produce greater traffic noise level. • Some impacts may be mitigated by noise barrier design, if warranted and feasible.	• Similar distance to nearby sensitive receptors as other alternatives. • No free-flowing ramps that can produce greater traffic noise level. • Some impacts may be mitigated by noise barrier design, if warranted and feasible.
		●	●	●	●	●
Air Quality	Relative Potential to affect Air Quality.	• Lowest potential to impact local air quality due to idling vehicles at	• Lowest potential to impact local air quality due to idling vehicles at	• Lowest potential to impact local air quality due to idling vehicles at	• Moderate potential to impact local air quality due to idling vehicles at	• Highest potential to impact local air quality due to idling vehicles at

Criteria	Measures	Alternatives				
		1 – Parclo A4 (On Existing Alignment)	**2 – Parclo A4 (Alignment Shifted to West)**	**3 – Parclo A4 (Larger Inner Loop on South Side)**	**4 – Parclo AB**	**5 – Diamond**
		interchange when compared to the other alternatives. • Impacts may be mitigated by landscape design (additional tree plantings at interchange).	interchange when compared to the other alternatives. • Impacts may be mitigated by landscape design (additional tree plantings at interchange).	interchange when compared to the other alternatives. • Impacts may be mitigated by landscape design (additional tree plantings at interchange).	interchange when compared to the other alternatives. • Impacts may be mitigated by landscape design (additional tree plantings at interchange).	interchange when compared to the other alternatives. • Impacts may be mitigated by landscape design (additional tree plantings at interchange).
						
Contamination	Potential to Encounter Contaminated Soils/Groundwater.	• Same footprint of potential impacts in the N-W, N-E and S-E quadrants as Alternatives 2 and 3. • Smaller footprint of potential impacts in the S-W quadrant than Alternative 2. • Additional environmental site assessment activities required to confirm presences of subsurface contamination, if any. • All excess materials generated during construction will be managed in accordance with MECP regulations.	• Same footprint of potential impacts in the N-W, N-E and S-E quadrants as Alternatives 1 and 3. • Larger footprint of potential impacts in the S-W quadrant than Alternative 1. • Additional environmental site assessment activities required to confirm presences of subsurface contamination, if any. • All excess materials generated during construction will be managed in accordance with MECP regulations.	• Same footprint of potential impacts in the N-W, N-E and S-E quadrants as Alternatives 1 and 2. • Largest footprint of potential impacts in the S-W quadrant. • Additional environmental site assessment activities required to confirm presences of subsurface contamination, if any. • All excess materials generated during construction will be managed in accordance with MECP regulations.	• Smallest footprint of potential impacts in the N-E quadrant. • Largest footprint of potential impacts in the N-W quadrant. • Same footprint of potential impacts in the S-W and S-E quadrants as Alternative 1. • Additional environmental site assessment activities required to confirm presences of subsurface contamination, if any. • All excess materials generated during construction will be managed in accordance with MECP regulations.	• Smallest footprint of potential impacts overall. • Additional environmental site assessment activities required to confirm presences of subsurface contamination, if any. • All excess materials generated during construction will be managed in accordance with MECP regulations.
						
Stormwater	Total Additional Impervious Area requiring Stormwater	• Large additional impervious area requiring stormwater management strategies/facilities.	• Large additional impervious area requiring stormwater management strategies/facilities.	• Largest additional impervious area requiring stormwater management strategies/facilities.	• Large additional impervious area requiring stormwater management strategies/facilities.	• Smallest additional impervious area requiring stormwater management strategies/facilities.

Criteria	Measures	Alternatives				
		1 – Parclo A4 (On Existing Alignment)	**2 – Parclo A4 (Alignment Shifted to West)**	**3 – Parclo A4 (Larger Inner Loop on South Side)**	**4 – Parclo AB**	**5 – Diamond**
	Management Strategies/Facilities.					
Cultural Heritage Resources	Conserves Built Heritage Resources and Cultural Heritage Landscapes. Minimize potential impact on known (i.e., previously recognized) and potential built heritage resources and cultural heritage landscape.	• Same footprint of potential impacts in the N-W, N-E and S-E quadrants as Alternatives 2 and 3. • Smaller footprint of potential impacts in the S-W quadrant than Alternative 2. • Additional cultural heritage assessment activities required to confirm cultural heritage value/interest, as well as impacts, if any.	• Same footprint of potential impacts in the N-W, N-E and S-E quadrants as Alternatives 1 and 3. • Larger footprint of potential impacts in the S-W quadrant than Alternative 1. • Additional cultural heritage assessment activities required to confirm cultural heritage value/interest, as well as impacts, if any.	• Same footprint of potential impacts in the N-W, N-E and S-E quadrants as Alternatives 1 and 2. • Largest footprint of potential impacts in the S-W quadrant. • Additional cultural heritage assessment activities required to confirm cultural heritage value/interest, as well as impacts, if any.	• Smallest footprint of potential impacts in the N-E quadrant. • Largest footprint of potential impacts in the N-W quadrant. • Same footprint of potential impacts in the S-W and S-E quadrants as Alternative 1. • Additional cultural heritage assessment activities required to confirm cultural heritage value/interest, as well as impacts, if any.	• Smallest footprint of potential impacts overall. • Additional cultural heritage assessment activities required to confirm cultural heritage value/interest, as well as impacts, if any.
						
Archaeological Resources	Conserves Archaeological Resources. Minimize potential impact to archaeology sites and areas of archaeological potential.	• Same footprint of potential impacts in the N-W, N-E and S-E quadrants as Alternatives 2 and 3. • Smaller footprint of potential impacts in the S-W quadrant than Alternative 2.	• Same footprint of potential impacts in the N-W, N-E and S-E quadrants as Alternatives 1 and 3. • Larger footprint of potential impacts in the S-W quadrant than Alternative 1.	• Same footprint of potential impacts in the N-W, N-E and S-E quadrants as Alternatives 1 and 2. • Largest footprint of potential impacts in the S-W quadrant.	• Smallest footprint of potential impacts in the N-E quadrant. • Largest footprint of potential impacts in the N-W quadrant. • Same footprint of potential impacts in the S-W and S-E quadrants as Alternative 1.	• Smallest footprint of potential impacts overall • Additional archaeological assessment activities required to confirm impacts, if any.

Criteria	Measures	Alternatives				
		1 – Parclo A4 (On Existing Alignment)	**2 – Parclo A4 (Alignment Shifted to West)**	**3 – Parclo A4 (Larger Inner Loop on South Side)**	**4 – Parclo AB**	**5 – Diamond**
		• Additional Archaeological Assessment activities required to confirm impacts, if any	• Additional Archaeological Assessment activities required to confirm impacts, if any	• Additional archaeological assessment activities required to confirm impacts, if any.	• Additional Archaeological Assessment activities required to confirm impacts, if any	
						
Natural Environment						
Terrestrial Ecosystem	Area of Impact to Wildlife Habitat	• Same footprint of potential impacts in the N-W, N-E and S-E quadrants as Alternatives 2 and 3. • Smaller footprint of potential impacts in the S-W quadrant than Alternative 2.	• Same footprint of potential impacts in the N-W, N-E and S-E quadrants as Alternatives 1 and 3. • Larger footprint of potential impacts in the S-W quadrant than Alternative 1.	• Same footprint of potential impacts in the N-W, N-E and S-E quadrants as Alternatives 1 and 2. • Largest footprint of potential impacts in the S-W quadrant.	• Smallest footprint of potential impacts in the N-E quadrant. • Largest footprint of potential impacts in the N-W quadrant. • Same footprint of potential impacts in the S-W and S-E quadrants as Alternative 1.	• Smallest footprint of potential impacts overall.
						
	Area of Impacts to Vegetated Areas due to Construction	• Same footprint of potential impacts in the N-W, N-E and S-E quadrants as Alternatives 2 and 3. • Smaller footprint of potential impacts in the S-W quadrant than Alternative 2.	• Same footprint of potential impacts in the N-W, N-E and S-E quadrants as Alternatives 1 and 3. • Larger footprint of potential impacts in the S-W quadrant than Alternative 1.	• Same footprint of potential impacts in the N-W, N-E and S-E quadrants as Alternatives 1 and 2. • Largest footprint of potential impacts in the S-W quadrant.	• Smallest footprint of potential impacts in the N-E quadrant. • Largest footprint of potential impacts in the N-W quadrant. • Same footprint of potential impacts in the S-W and S-E quadrants as Alternative 1.	• Smallest footprint of potential impacts overall.
						

Criteria	Measures	Alternatives				
		1 – Parclo A4 (On Existing Alignment)	**2 – Parclo A4 (Alignment Shifted to West)**	**3 – Parclo A4 (Larger Inner Loop on South Side)**	**4 – Parclo AB**	**5 – Diamond**
Species of Conservation Concern, Species at Risk	Area Impacts to potential species at risk Habitat.	• Same footprint of potential impacts in the N-W, N-E and S-E quadrants as Alternatives 2 and 3. • Smaller footprint of potential impacts in the S-W quadrant than Alternative 2.	• Same footprint of potential impacts in the N-W, N-E and S-E quadrants as Alternatives 1 and 3. • Larger footprint of potential impacts in the S-W quadrant than Alternative 1.	• Same footprint of potential impacts in the N-W, N-E and S-E quadrants as Alternatives 1 and 2. • Largest footprint of potential impacts in the S-W quadrant.	• Smallest footprint of potential impacts in the N-E quadrant. • Largest footprint of potential impacts in the N-W quadrant. • Same footprint of potential impacts in the S-W and S-E quadrants as Alternative 1.	• Smallest footprint of potential impacts overall.
		●	●	•	•	⬤
Fish and Fish Habitat	Number of Watercourse Crossings, Impacts to Fish Habitat.	• No significant difference between alternatives. • Same anticipated number of watercourse crossings as other alternatives. • Similar potential impacts to fish habitat between alternatives.	• No significant difference between alternatives. • Same anticipated number of watercourse crossings as other alternatives. • Similar potential impacts to fish habitat between alternatives.	• No significant difference between alternatives. • Same anticipated number of watercourse crossings as other alternatives. • Similar potential impacts to fish habitat between alternatives.	• No significant difference between alternatives. • Same anticipated number of watercourse crossings as other alternatives. • Similar potential impacts to fish habitat between alternatives.	• No significant difference between alternatives. • Same anticipated number of watercourse crossings as other alternatives. • Similar potential impacts to fish habitat between alternatives.
		●	●	●	●	●
Overall Assessment		⬤	●	•	•	●

Legend		
•	●	⬤
Least preferred	→	**Most preferred**

7.0 Recommended Plan

The Recommended Plan in the GWP 3041-22-00 study area, as shown in **Figure 12**, **Figure 13**, and **Figure 14** includes the following:

- A 15.0 m median Highway 3 cross-section from just west of Wellington Road to Centennial Road with a transition to the 22.5 m median cross-section at the western end of the study area.
- A Parclo A4 interchange (on existing alignment) at Wellington Road.
- A Parclo A2 interchange on the north side of Highway 3 at First Avenue, with maintenance of the existing ramps to the south of Highway 3 at First Avenue.
- Twinning of Kettle Creek Bridge.
- Alignment of Highway 3 to accommodate construction of a roundabout at Centennial Avenue, the design of which is being undertaken as part of a separate study by the City of St. Thomas.

An 11x17 copy of the Recommended Plan is provided in **Appendix C.**

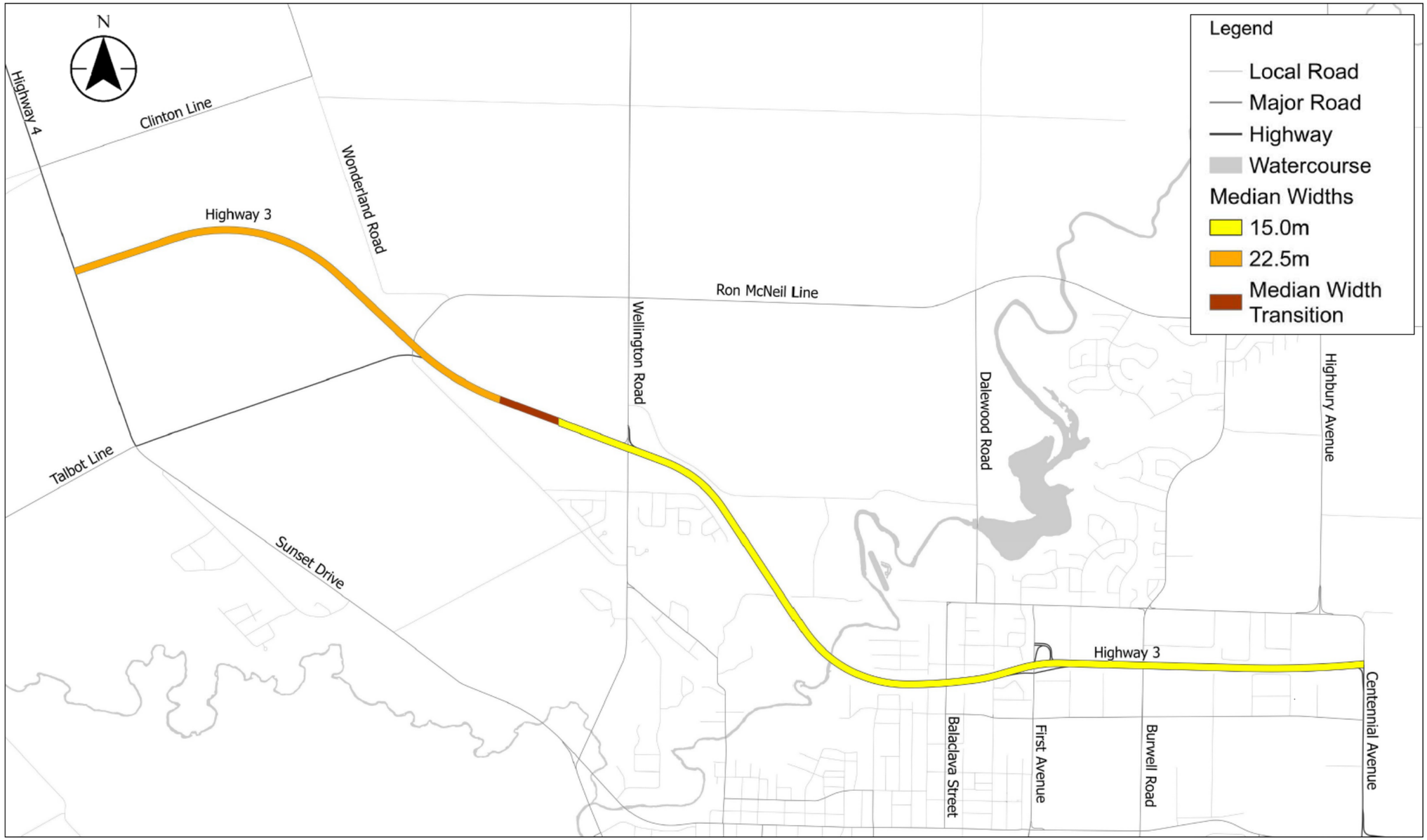

Figure 12: Recommended Plan for Highway 3 Cross-Section

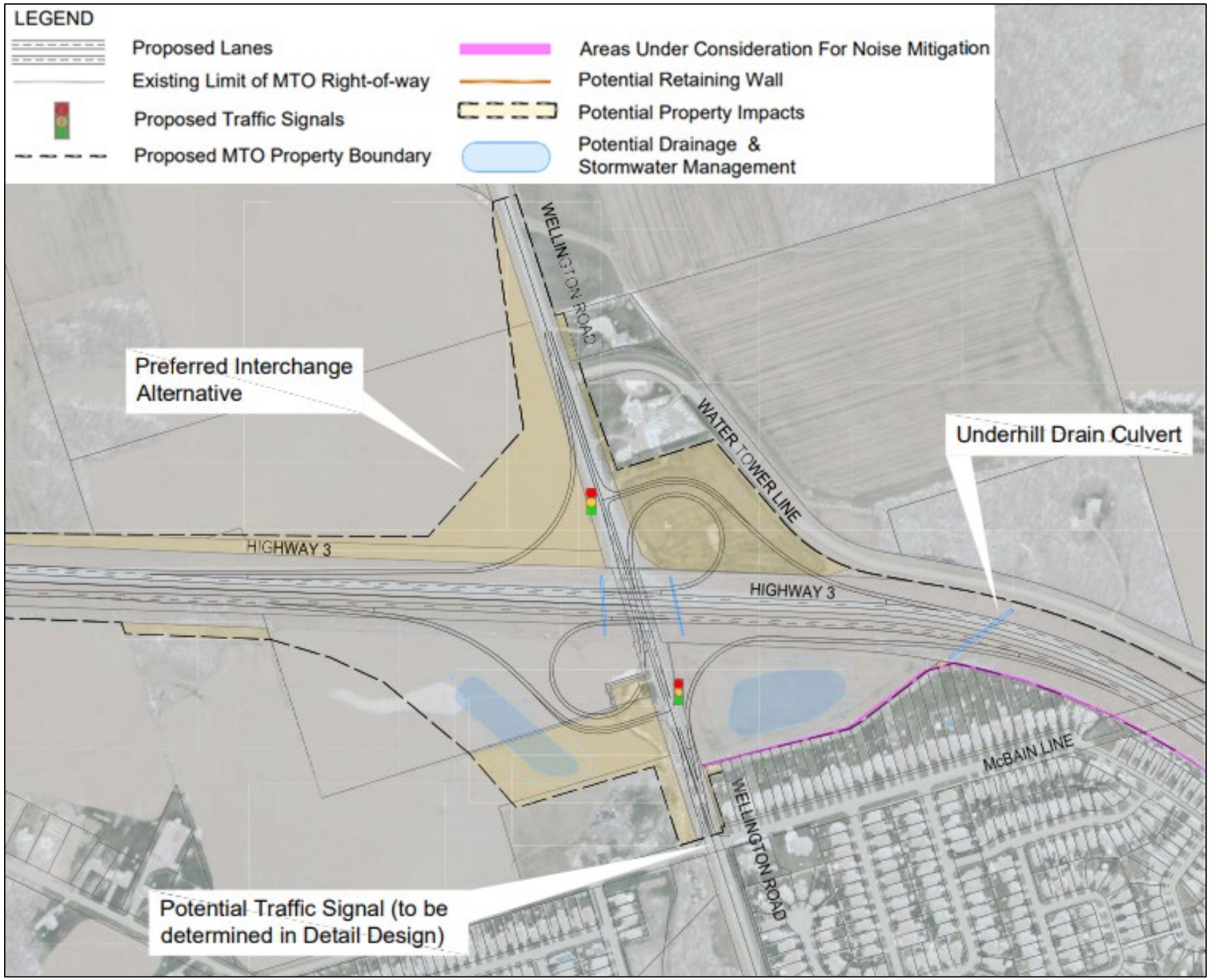

Figure 13: Recommended Plan at Wellington Road Interchange

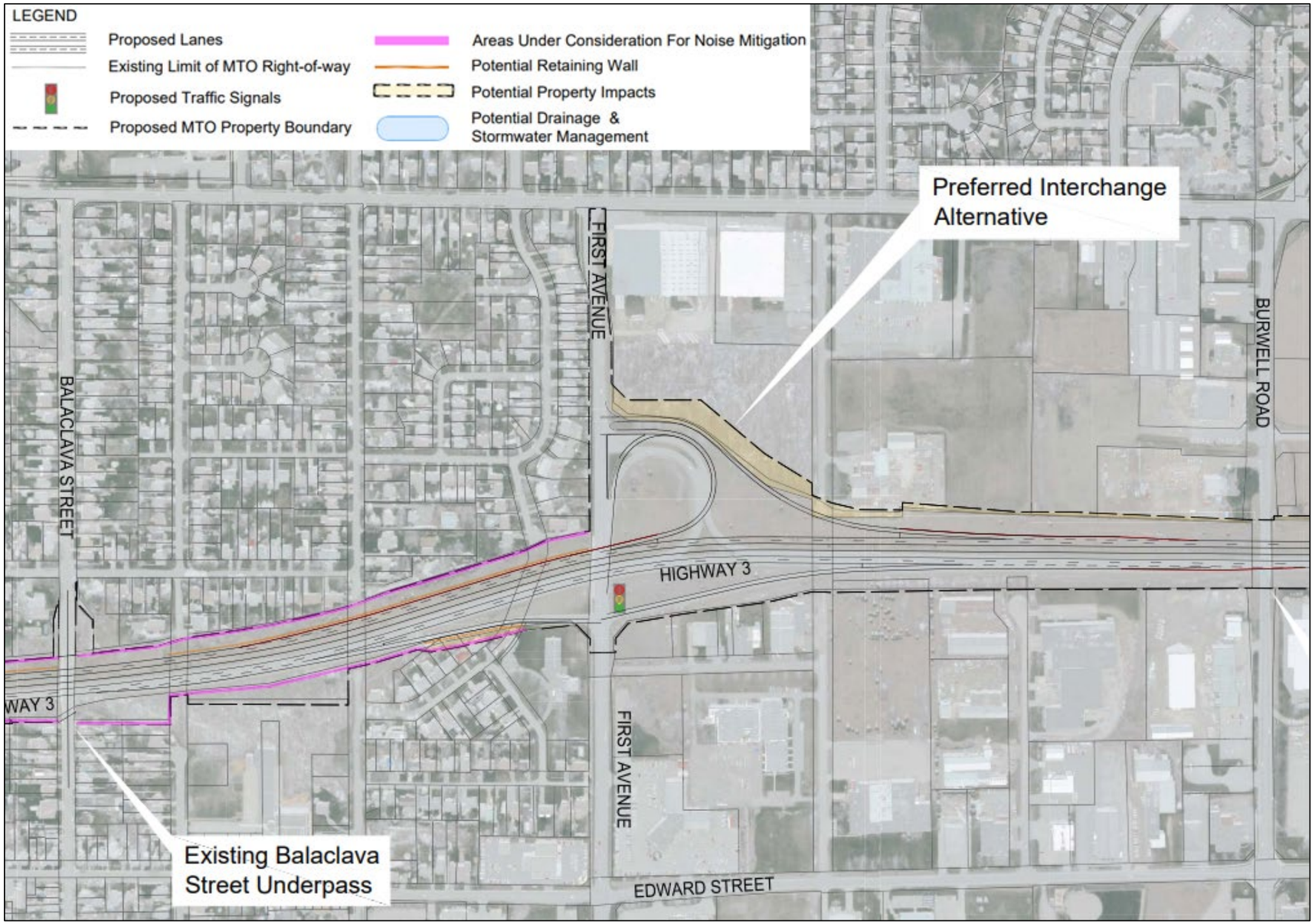

Figure 14: Recommended Plan at First Avenue Interchange

7.1 Design Criteria

Highway 3 within the study area is classified as a four-lane Rural Freeway Divided (RFD) highway. The new posted speed limit on Highway 3 is 100 km/h and the design speed is 120 km/h.

There are four roads that cross Highway 3 within the project limits. The functional classification of each crossing road along with its posted speed and design speed is outlined in **Table 10**.

Table 10: Crossing Road Posted and Design Speed

Crossing Road	Structure Type	Functional Highway Classification	Posted Speed (km/h)	Design Speed (km/h)
Wellington Road	Underpass (interchange)	RAU70	50 (see Note 1)	70
Balaclava Street	Underpass	UCU70	50	70
First Avenue	Underpass (interchange)	UAU80	60	80
Burwell Road	Underpass	RCU70	50	70

*Note 1: The posted speed limit of 50 km/h will now transition to 80 km/h north of the interchange with Highway 3.

7.2 Highway 3

7.2.1 Cross Section

The Highway 3 improvements within the study limits includes widening the existing two-lane cross section to a four-lane cross-section with an open median. The highway will be widened to the north side and the existing lanes will be used for the proposed eastbound lanes. A 22.5 m median width is the standard for divided highways and will be implemented along Highway 3 where feasible. A 15.0 m median width will be implemented where the road footprint has constraints (i.e., property impacts).

The cross-section elements of Highway 3 within the project limits are summarized in **Table 11**.

Table 11: Summary of Recommended Cross-Section Elements on Highway 3

Cross-Section Element	Width (m)
Pavement Width	4 lanes x 3.75 (2 EBL, 2 WBL)
Shoulder Width	3.0 outside shoulder 1.0 inside shoulder
Shoulder Rounding	1.5
Median Width	15.0 to 22.5 (see Note 1)

*Note 1: The 22.5 m median width will be implemented at the west limits of the project and will transition to the 15.0 m median width just west of Wellington Road. The 15.0 m median width is used in the constrained/developed section east of Kettle Creek.

7.3 Interchanges

To accommodate the footprint of Highway 3 and the projected future traffic volumes, a new interchange at Highway 3 and Wellington Road has been identified as part of the Recommended Plan. Improvements to the Highway 3 and First Avenue Interchange have been identified as part of the Recommended Plan. This section of the report provides a description of the interchange improvements.

7.3.1 Wellington Road Interchange

A Parclo A4 configuration interchange on the existing Wellington Road alignment is recommended for the new interchange at Highway 3 and Wellington Road. The new Wellington Road structure will be an underpass; Wellington Road will cross over Highway 3. The Highway 3 profile will be lowered to accommodate the underpass. The new interchange ramps include W-N/S, and E-N/S ramps, as well as direct N-W, S-E, S-W, and N-E ramps. The interchange includes R-55 m loop ramps for the S-W, and N-E ramps.

The intersection of Wellington Road and Highway 3 E-N/S off-ramp (north ramp terminal) and the intersection of Wellington Road and Highway 3 W-N/S off-ramp (south ramp terminal) will be signalized.

The cross-section of Wellington Road includes two 3.75 m lanes and 2.5 m shoulders with 1.0 m rounding. A 3.5 m lane is provided across the bridge to the S-W ramp and a 3.5 m lane is provided across the bridge to the N-E ramp.

As the existing horizontal alignment of Wellington Road will be retained, this will provide a straight alignment approaching the intersections with McBain Line and Water Tower Line.

All new interchange ramps are single lane ramps with a 4.75 m wide lane, a 1.0 m wide fully paved left shoulder, a 2.5 m wide fully paved right shoulders and a 1.0 m shoulder rounding.

A retaining wall is proposed along a section of the east side of the S-E Ramp to minimize impacts to the adjacent property.

7.3.1.1 Traffic Operations

Based on the Traffic Analysis conducted as part of this study, and as documented in the *Traffic Analysis Report* and *Safety Review of Existing Conditions Report* that are on file with MTO, the following conclusions are noted:

- The intersection of Wellington Road and Highway 3 E-N/S off-ramp (north ramp terminal) will operate at an overall LOS B in both the AM and PM periods in the 2032 future horizon year.
- The intersection of Wellington Road and Highway 3 W-N/S off-ramp (south ramp terminal) will operate at an overall LOS A in the AM period and at an overall LOS B in the PM period in the 2032 future horizon year.
- The intersection of Wellington Road and Highway 3 E-N/S off-ramp (north ramp terminal) will operate at an overall LOS B in both the AM and PM periods in the 2047 future horizon year.
- The intersection of Wellington Road and Highway 3 W-N/S off-ramp (south ramp terminal) will operate at an overall LOS A in both the AM and PM periods in the 2047 future horizon year.

7.3.2 First Avenue Interchange

A Parclo A2 configuration is recommended on the north side of First Avenue. The existing diamond configuration on the south side of First Avenue is recommended to be retained.

The E-N/S and N/S-W ramps will be reconstructed and realigned, and the Recommended Plan will tie into the existing cross-section on First Avenue at these locations.

The interchange includes a standard R-55 m loop ramp for the N/S-W ramp. The new alignments for both the E-N/S and N/S-W ramps will tie into the new westbound lane alignment.

The new E-N/S and N/S-W interchange ramps are single lane ramps with a 4.75 m wide lane, a 1.0 m wide fully paved left shoulder, a 2.5 m wide fully paved right shoulders and a 1.0 m shoulder rounding.

The intersection of Highway 3 and First Avenue W-N/S ramp (south ramp terminal) is signalized. The intersection of Highway 3 and First Avenue E-N/S ramp/N/S-E ramp (north ramp terminal) will remain unsignalized, as a traffic signal is not warranted.

To improve sight lines, shoulder widening is recommended along the south shoulder of the W-N/S ramp. A retaining wall is proposed along a section of the south side of the W-N/S ramp to minimize impacts to the adjacent properties.

7.3.2.1 Traffic Operations

Based on the traffic analysis conducted as part of this study, and as documented in the *Traffic Analysis Report* and *Safety Review of Existing Conditions Report* that are on file with MTO, the following conclusions are noted:

- The intersection of First Avenue and Highway 3 W-N/S off-ramp (south ramp terminal) will operate at an overall LOS A in the 2032 future horizon year.
- The intersection of First Avenue and Highway 3 E-N/S off-ramp (north ramp terminal) will operate at an overall LOS B in the 2032 future horizon year.
- The intersection of First Avenue and Highway 3 W-N/S off-ramp (south ramp terminal) will operate at an overall LOS A in the 2047 future horizon year.
- The intersection of First Avenue and Highway 3 E-N/S off-ramp (north ramp terminal) will operate at an overall LOS C in the 2047 future horizon year.

7.4 Crossing Roads

With the exception of Wellington Road and First Avenue, Balaclava Street and Burwell Road are the only municipal roads that cross Highway 3 within the study area. Changes to the existing roadway cross-section and alignments are not proposed as part of the Recommended Plan.

7.5 Intersections

7.5.1 Wellington Road and McBain Line

The Recommended Plan will impact the existing at-grade intersection of Wellington Road and McBain Line. The north approach of the intersection on Wellington Road will be impacted by the recommended Highway 3 and Wellington Road S-E ramp. The existing southbound right-turn lane and southbound left-turn lane will be reinstated. The remaining approaches of the intersection are anticipated to be maintained.

The need for traffic signals at the intersection will be reviewed and determined during Detail Design.

7.5.2 Wellington Road and Water Tower Line

Water Tower Line will be evaluated for potential realignment or closure during the Detail Design phase of the Highway 3 project. Key considerations include assessing traffic flow, environmental impact, and road user safety requirements.

7.6 Structures

The Recommended Plan includes one new roadway structure, one new structure at Kettle Creek, minor improvements to five existing bridges, and replacement/rehabilitation of two existing structural culverts, as described herein.

7.6.1 Wellington Road Underpass

The Wellington Road Underpass will carry a single lane of Wellington Road traffic and a ramp lane in each direction over Highway 3. The bridge will provide 2.0 m shoulders adjacent to the ramp lanes. The proposed bridge will consist of a two-span integral abutment bridge. The span lengths and superstructure type will be confirmed during Detail Design; however, it is expected that the bridge will consist of a slab-on-girder superstructure and that each span will be about 38 m long.

7.6.2 Kettle Creek Bridges

The existing Kettle Creek Bridge, constructed circa 1979, is a curved three-span slab-on-girder bridge. The bridge carries Highway 3 traffic, has spans of 31 m – 32 m – 28 m, and a skew of approximately 22.5°. The 11.2 m wide superstructure consists of six precast concrete girders with a 191 mm thick cast-in-place concrete deck.

The existing bridge will carry the eastbound lane (EBL) of Highway 3 and a new westbound lane (WBL) bridge is required to accommodate the twinning of Highway 3.

A three-span configuration for the new bridge, similar to the existing one, is preferred. The location of the abutments matches the existing bridge abutment locations and the pier locations for the new bridge have been selected to optimize the spans. Therefore, a span configuration of 28 m – 36 m – 28 m provides a symmetric structure with a slightly larger span over the watercourse while matching the overall length of the existing bridge.

The new bridge will have integral abutments founded on steel H-piles and the piers will be similar to the existing piers. They will consist of cast-in-place concrete shafts with a hammer head, will be made integral with the deck, and will be supported on steel H-piles. The superstructure will consist of a slab-on-girder system with four NU 1800 girders made composite with a cast-in-place concrete deck with an overall width of approximately 13 m.

7.6.3 CNR Subway, Balaclava Street Underpass, First Avenue Underpass, Burwell Road Underpass and CPR Subway

The five existing bridges that cross over Highway 3 will not be significantly altered by the Highway 3 improvements. The main modification will be to the embankments in front of the abutments, which will require re-grading. The addition of slope paving or short retaining walls in front of the abutments will also be reviewed during Detail Design.

7.6.4 Underhill Drain Culvert

The existing concrete, rigid frame, open footing culvert under Highway 3 will be rehabilitated and extended as part of the Highway 3 improvements. The extent of the repairs and the length of extension will be determined during Detail Design.

7.6.5 Unnamed Tributary to Kettle Creek Culvert

The existing CSP culvert under Highway 3 will be replaced or rehabilitated and extended as part of the Highway 3 improvements. The details of the replacement or the extent of the repairs and the length of extension will be determined during Detail Design.

7.6.6 Retaining Walls

Retaining walls are anticipated in certain locations along the north side of Highway 3 between Kettle Creek and First Avenue, to minimize impacts to the adjacent properties.

A retaining wall is proposed along a section of the east side of the Highway 3 and Wellington Road S-E Ramp to minimize impacts to the adjacent property, as noted in Section 7.3.1.

A retaining wall is proposed along a section of the south side of the Highway 3 and First Avenue W-N/S ramp to minimize impacts to the adjacent properties, as noted in Section 7.3.2.

The locations of the retaining walls will be confirmed during Detail Design.

7.6.7 Overhead Sign Support Structures

Overhead Sign Support Structures (OHSS) are required at the Highway 3 and Wellington Road interchange and at the Highway 3 and First Avenue interchange. The design of the OHSS will be completed during Detail Design.

7.7 Drainage

7.7.1 Culvert Recommendations

The centreline culvert on Highway 3 west of Wellington Road (Andrews Municipal Drain) will need to be replaced due to the profile lowering on Highway 3 required to construct the Highway 3 and

Wellington Road interchange. The other culverts under Highway 3 can be retained but will require extensions due to the twinning of Highway 3. At the Highway 3 and Wellington Road interchange, an additional culvert crossing Highway 3 and at least two other culverts under the interchange ramps will be installed. The new culverts proposed for this project will consist of pre-cast concrete box culverts as well as CSPs.

7.7.2 Stormwater Management Strategy

Two new stormwater management ponds are proposed at the new Highway 3 and Wellington Road interchange. One is proposed in the south-west quadrant of the interchange and the other is proposed in the southeast quadrant of the interchange.

7.7.3 Storm Sewer Recommendations

The recommendations for changes to the existing storm sewer will be determined once the CCTV inspection of the existing sewer network is completed and assessed.

7.8 Foundations

Foundations Investigations and testing are currently underway. At the time of the preparation of this TESR, the field investigations for the potential noise wall locations east and west of Kettle Creek, the Underhill Drain Culvert, the Unnamed Tributary to Kettle Creek Culvert, the Kettle Creek Bridge approaches and abutments, and at locations of deep cuts have been undertaken.

Additional field investigations and testing will be completed for the Kettle Creek Bridge piers, the Wellington Road Underpass, the OHSS and the stormwater management ponds during Detail Design.

7.9 Pavement

A Pavement Design and Analysis will be completed for the Highway 3 mainline, crossing roads, and interchange ramps during Detail Design.

7.10 Illumination

Illumination requirements will be reviewed and confirmed during Detail Design.

7.11 Utilities

Utility relocations will be required to accommodate the Recommended Plan. Potential utility conflicts have been identified and a Utility Conflict Plan is being completed. Relocation plans for utilities will be confirmed during Detail Design.

7.12 Construction Considerations and Staging

Construction of the Recommended Plan in the GWP 3041-22-00 study area is anticipated to take five years, and there is the potential for temporary road closures and detour routes to be implemented to facilitate construction. There are three main areas where temporary road closures are anticipated to be required during construction:

- Ron McNeil Line/Wonderland Road Interchange (including the permanent closure of Ford Road).
- Wellington Road Bridge.
- Wellington Road Interchange.

Detour routes will be implemented during the temporary closures. Additional information regarding the anticipated temporary closures and proposed detour routes is provided below. Additional temporary closures may be required for construction and will be confirmed during Detail Design.

It is anticipated that Highway 3 will have multiple overnight or weekend closures between Ron McNeil Line and Centennial Avenue to undertake erection of the girders for the new Wellington Road Underpass. Highway 3 traffic is proposed to be detoured via Ron McNeil Line, Highbury Avenue South, and Centennial Avenue during this time. **Figure 15** details the proposed temporary closure and detour route.

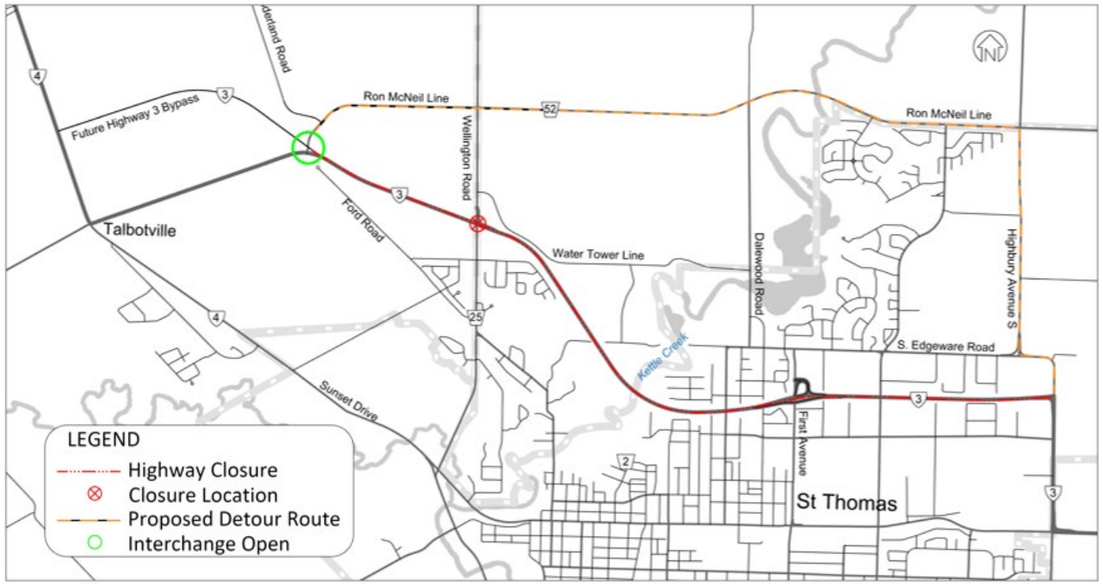

Figure 15: Proposed Temporary Closure of Highway 3 and Associated Detour Route

Additionally, it is anticipated that Wellington Road will be temporarily closed during construction of the Wellington Road interchange at Highway 3. Wellington Road traffic north of Highway 3 is proposed to be detoured via Ron McNeil Line, Highbury Avenue South, and Centennial Avenue. Wellington Road traffic south of Highway 3 is proposed to be detoured via Sunset Drive and Highway 4. **Figure 16** details the proposed closure and detour routes.

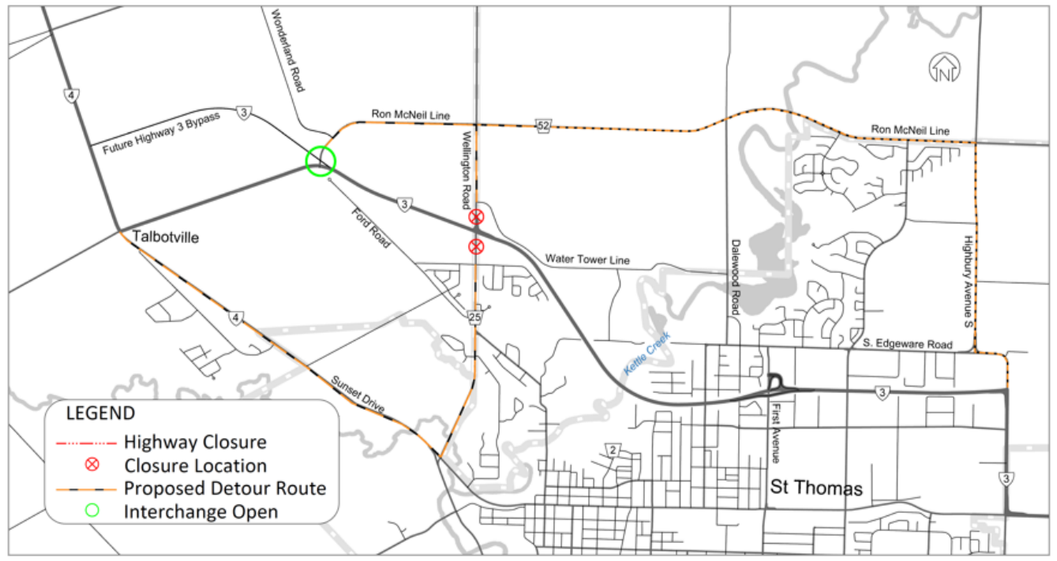

Figure 16: Proposed Temporary Closure of Wellington Road and Associated Detour Route

Lastly, it is anticipated that Ron McNeil Line will be temporarily closed to facilitate construction of the Ron McNeil Line/Wonderland Road Interchange. The design of the Ron McNeil Line/Wonderland Road Interchange is being undertaken as part of GWP 3042-22-00, however, the proposed detour route will extend into the GWP 3041-22-00 study area. It is proposed that Ron McNeil Line and Wonderland Road traffic accessing Highway 3 be detoured via Wellington Road. The Recommended Plan also includes the permanent closure of Ford Road near Highway 3 with construction of a cul-de-sac. **Figure 17** details the proposed closures and detour route.

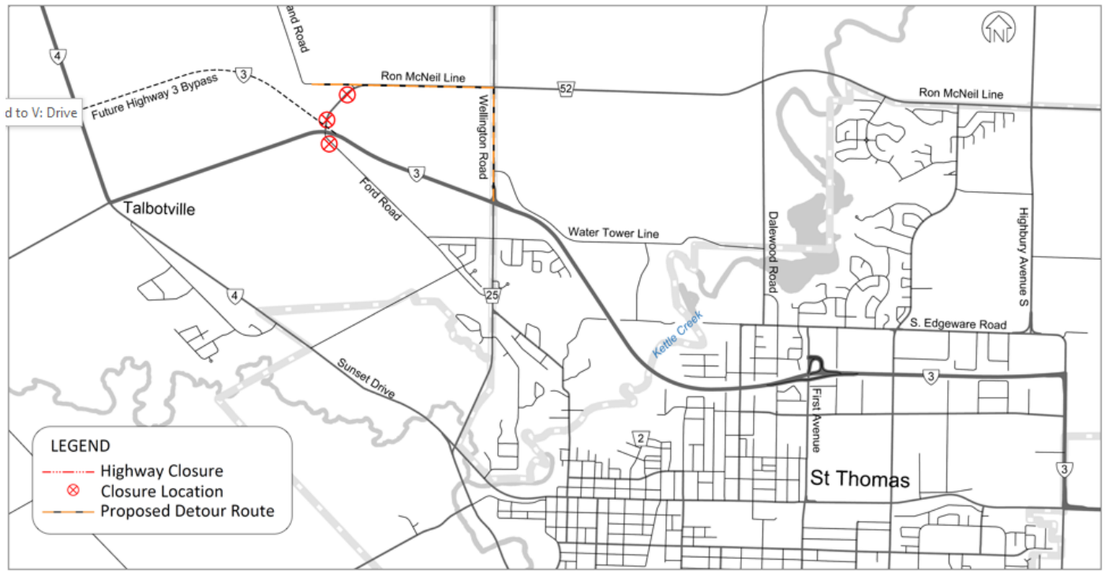

Figure 17: Proposed Temporary Closure of Ron McNeil Line and Associated Detour Route

8.0 Environmental Impacts and Mitigation

In accordance with the *Class EA for Provincial Transportation Facilities* (2000) and the *Environmental Reference for Highway Design* (2006), a description of the anticipated impacts associated with the Recommended Plan, and appropriate mitigation at a Preliminary Design level of detail is described herein. The details of the Recommended Plan will be refined and finalized during the next stage of the planning design process.

8.1 Natural Environment

Potential impacts to the natural environment were considered during the selection of the Recommended Plan. Alternatives that minimize potential impacts to the natural environment were more preferred during the Evaluation of Alternatives (see **Section 6.3**) than those with greater impacts. As the study progresses, the project team will minimize impacts through the design of the improvements and where impacts cannot be avoided, mitigation, or compensation measures will be developed in consultation with applicable regulatory authorities.

8.1.1 Physiography, Geology, and Soils

An Erosion and Sediment Overview Risk Assessment (ESORA) was completed for the study area to evaluate the potential of erosion and sediment migration off-site during construction of the proposed improvements and to identify associated risks. To complete the assessment, the study area was divided into polygons based on the underlying soil type per Ontario Soil Survey Complex mapping (2023). The polygons were each assigned a Soil Erodibility Rating based on soil type, and an Erosion Potential Rating, which considered soil type as well as the proposed slope gradient and proposed slope length. An Environmental Consequence Rating was also assigned to each polygon based on the likelihood that sensitive environmental features in the polygon would be impacted during construction. The three ratings were all considered to assign the cumulative Erosion and Sediment Risk Rating to each polygon. The results of the assessment are provided in **Table 12**.

The study area had an overall low to high Erosion and Sediment Risk Rating based on the erodibility of soils and sensitive environmental features. An Erosion and Sediment Control Plan (ESCP) will be developed in future design phases for all construction zones to mitigate erosion and sediment risk and limit impacts downstream. A memorandum was prepared to document the findings of the ESORA. A copy of the memorandum is on file with MTO.

Table 12: Erosion and Sediment Overview Risk Assessment Summary

Polygon Number	Soil Description (Texture)	Soil Erodibility Rating	Proposed Soil Gradient	Proposed Slope Length	Erosion Potential	Rational for Erosion Potential	Environmental Consequence Rating	Rational for Environmental Consequence Rating	Erosion and Sediment Risk Rating
1	Loam/Clay Loam	High	Less than 10%	Greater than 100 m	Medium	High Soil Erodibility. Gently undulating topography. Imperfectly drained soils.	Low	Indirect connectivity to Andrews Drain.	Medium
2	Clay Loam	Medium	Less than 10%	Less than 100 m	Medium	Medium Soil Erodibility. Gently undulating topography. Poorly drained soils.	Medium	Direct connectivity to Andrews Drain.	Medium
3	Loam/Silt Loam	High	Less than 10% (Channel side slopes are greater than 20%)	Greater than 100 m	High	High Soil Erodibility. Gently undulating topography, mainly short, irregular 1-5% slopes. Imperfectly drained soils.	High	Direct connectivity to Underhill Drain and partial overlap with significant woodlot.	High
4	Clayey Silt with traces of Gravel	Medium	Greater than 10% (Channel side slopes are 10-20%)	Less than 100 m	High	High variable Soil Erodibility. Channel side slopes greater than 10%. Rapid to poorly drained soils.	High	Direct connectivity to Unnamed tributary to Kettle Creek and partial overlap with significant woodlot.	High
5	Silty Clay Loam	Medium	Less than 10%	Greater than 100 m	Medium	Medium Soil Erodibility. Uniform slope to the southeast direction. Imperfectly drained soils.	High	Direct connectivity to Turner Drain and partial overlap with significant woodlot.	High
6	Sandy Silt to Silty Sand	High	Greater than 10%	Less than 100 m	High	High variable Soil Erodibility. Channel Flood plain of valley associated with creek greater than 10%. Rapid to poorly drained soils.	High	Direct connectivity to Kettle Creek and partial overlap with significant woodlot.	High
7	Silty Clay	Medium	Less than 10%	Greater than 100 m	Medium	Adjacent land use is built-up with residential/industrial/commercial infrastructure. Gently undulating topography. Rapid to poorly drained soils.	High	Direct connectivity to unnamed drain discharging into Kettle Creek and overlap with significant woodlot.	High
8	Silty Clay	Medium	Less than 10%	Greater than 100 m	Low	Adjacent land use is built-up with residential/industrial/commercial infrastructure. Gently undulating topography. Rapid to poorly drained soils.	Low	No connectivity to watercourse within 300 m.	Low

8.1.2 Drainage, Surface Water, Groundwater, and Source Water

There is the potential for impacts to surface water and groundwater as a result of construction, and mitigation measures will be confirmed during the subsequent phase of the project. Preliminary recommendations and proposed mitigation measures include:

- Refueling of equipment should be completed away from surface water features whenever possible to minimize potential impacts to surface water and groundwater quality in the event of a spill.
- To minimize the impact of potential contaminant spills, the Contractor should implement best management practices, such as containment of any temporary fuel storage, preparation of a spill response plan, and proper facility management during operation and maintenance.
- Materials for spill response, such as drip pans and spill contingency kits, must be maintained on site during construction.
- It is recommended that the locations of excavations and potential areas requiring groundwater dewatering be reviewed with respect to active groundwater supply wells to determine the need for and extent of private well monitoring. Based on the overburden clay and silt material across the study area, the extent of municipal water service, and the anticipated construction activities, minimal private well monitoring is anticipated to be required.

8.1.3 Designated Areas

Significant woodlands are present throughout the study area. There is one significant woodland located to the northeast of the First Avenue Interchange, which is anticipated to be directly impacted by the Recommended Plan. At this time, approximately 0.78 ha of the woodland is anticipated to be directly impacted. Minor changes in the amount of impacted woodland may occur during the subsequent phase of the project. Measures to mitigate impacts to vegetation and wildlife and wildlife habitat will be implemented. Proposed mitigation measures are included in Section 8.1.4, which will be reviewed and confirmed during the subsequent phase of the project.

8.1.4 Terrestrial Ecosystems

8.1.4.1 Potential Impacts

Vegetation and Vegetation Communities

The Recommended Plan will require earth clearing and grading, including encroachment of meadow, thicket, woodland, and wetland communities. Potential impacts to vegetation communities include the following and will be reviewed and confirmed during the subsequent phase of the project:

- Direct loss of approximately 51.4 ha of vegetation, as summarized in **Table 13**.
- Removal of approximately 1726 trees and 1814 stems in the study area.
- Soil compaction, which can affect existing trees and growing conditions if replanting is proposed in those areas following construction.
- Injury to trees outside of the construction limits if the proposed works occur within the root zones.
- Edge tree effects within woodlands where tree removal occurs, which may cause stress or injury to trees that were otherwise sheltered but now form the new woodland edge.
- Mechanical damage to trees caused by construction equipment or felled trees striking trees to be retained.
- Root damage to trees caused by excavating soil within 1.0 m of a tree’s dripline.
- Damage to vegetation due to dust suppression, salt spray effects, sedimentation, and accidental spills (i.e., fuel, oil, other hazardous materials).
- Changes to community structure due to the introduction and spread of invasive species, such as European common reed (i.e., Phragmites), which was documented in the study area.
- Exposure of soils from vegetation clearing, grubbing, and grading can result in sediment runoff discharging into nearby terrestrial habitats.

Table 13: Anticipated Impacts to Vegetation Communities

Vegetation Community Code	Description	Provincially Rare Community?	Approximate Area of Direct Loss (ha)
Agricultural Communities			
OAGM1	Annual Row Crops	No	10.12
Meadow Communities			
MEMM3	Dry - Fresh Mixed Meadow Ecosite	No	24.45
Thicket/Hedgerow Communities			
THDM2-6	Buckthorn Deciduous Shrub Thicket	No	0.12
THDM2-6/THDM5-1	Buckthorn Deciduous Shrub Thicket Type/Gray Dogwood Deciduous Thicket Type	No	0.06
THDM3-1	Buckthorn Deciduous Hedgerow Thicket	No	0.08
THDM4-1	Native Deciduous Regeneration Thicket	No	1.2
Woodland Communities			
FODM7-4	Fresh - Moist Black Walnut Lowland Deciduous Forest	Yes	0.78
FODM9-4	Fresh - Moist Shagbark Hickory Deciduous Forest	Yes	0.23
WODM4-4	Dry - Fresh Black Walnut Deciduous Woodland	No	0.63
Mixed Community Complexes			
MEMM3/FOD/THD	Dry - Fresh Mixed Meadow Ecosite/Deciduous Forest/Deciduous Thicket	No	5.23
MEMM3/THDM2	Dry - Fresh Mixed Meadow Ecosite/Dry – Fresh Deciduous Shrub Thicket Ecosite	No	5.65
MEMM3/THDM2-1/FODM11	Dry - Fresh Mixed Meadow Ecosite/Sumac Deciduous Shrub Thicket Type/Naturalized Deciduous Hedgerow Ecosite	No	2.35
Wetland Communities			
OA	Open Water	No	0.16
MAMM1	Graminoid Mineral Meadow Marsh Ecosite	No	0.05
MAMM1-3	Reed-canary Grass Graminoid Mineral Meadow Marsh	No	0.12
MAMM1-12	Common Reed Graminoid Mineral Meadow Marsh	No	0.06
SWTM3-3	Slender Willow Mineral Deciduous Thicket Swamp	No	0.11

Wildlife and Wildlife Habitat

Encroachment into natural features may result in direct and indirect impacts to wildlife and wildlife habitat. This includes the permanent and temporary loss of generalized wildlife habitat and candidate and confirmed SWH. Permanent habitat loss includes areas where permanent infrastructure will be constructed, and temporary habitat loss includes areas that can be restored following construction.

A summary of confirmed and candidate SWH in the study area and work zone is provided below:

- Confirmed SWH: Bat Maternity Colonies, Rare Vegetation Communities and Habitat for Species of Conservation Concern (SOCC) (Monarch, Eastern Wood Pewee, swamp rose-mallow, and shrubby St. Johns-wort).
- Candidate SWH: Reptile Hibernacula, Turtle Wintering Area, Amphibian Breeding Habitat/Amphibian Movement Corridors, and SOCC (Midland Painted Turtle, Northern Map Turtle, Snapping Turtle, Eastern Milksnake and vascular plants Broad-leaved Puccoon, Virginia Bluebells, Green Dragon, Crooked-stem Aster, Lowland Brittle Fern, Goosefoot Cornsalad), Bald Eagle and Osprey Nesting, Foraging and Perching Habitat, Woodland Raptor Nesting Habitat, and Woodland Area-Sensitive Breeding Bird Habitat.

Potential impacts to wildlife and wildlife habitat are provided below and will be reviewed and confirmed during the subsequent phase of the project:

- Temporary loss of or access to existing wildlife corridors and passages during construction works. This may result in increased wildlife/vehicle collisions if wildlife is unable to safely cross the highway through existing crossing structures.
- Collisions with vehicles, machinery, or physical barriers may occur if wildlife are able to access the construction limits (i.e., improper design or installation of exclusionary measures).
- Light pollution, including temporary and permanent lighting, may cause disorientation or attract birds and bats to the area due to increased foraging potential, which may result in injury or incidental take of individuals through collisions with vehicles or physical barriers.
- Migratory birds' nests and eggs are susceptible to incidental take during construction activities, especially during vegetation removal and culvert works.
- Increased noise or the proximity of workers could cause nesting birds to temporarily vacate or completely abandon a nest in progress.
- Wildlife that uses road surfaces and shoulders as part of their habitat (i.e., snakes basking on warm asphalt surfaces) or that cross the highway to access habitats may be particularly susceptible to harm associated with road construction projects.
- Hibernacula may be discovered during construction, particularly in areas where there are rock piles, bedrock outcrops, housing foundations, waterbodies, and wetlands, and require mitigation.

Migratory Birds

No Pileated Woodpecker nests were documented during the targeted surveys completed in November 2023. Therefore, a "Nest Notification" under the Environment and Climate Change Canada's (ECCC) Abandoned Nest Registry is not required. However, vegetation within the Work Zone has the potential to support nesting for other migratory birds. Work near active bird nests has the potential to disturb nesting behaviour or damage/destroy the nests, particularly if vegetation clearing occurs during the active breeding bird window (i.e., April 1 to August 31).

Species at Risk

Bats (non-species at risk and species at risk)

Species at risk bats were confirmed within the study area in two woodlands. There is the potential to harm bat species at risk (see the preliminary potential impacts listed below). Consultation with MECP is underway to determine species at risk permitting and compensation requirements and will be carried forward as the project progresses.

The following potential impacts have been identified and will be reviewed and confirmed during the subsequent phase of the project:

- Permanent and temporary loss of approximately 0.8 ha of habitat is anticipated in the woodlot east of Kettle Creek.
- Permanent and temporary loss of approximately 0.8 ha of habitat is anticipated in the woodlot northeast of First Avenue Interchange.
- Habitat alteration, disruption, and avoidance may occur as a result of edge effects to habitats where vegetation that was previously sheltered is now exposed (i.e., trees in a woodland that are part of the new edge may be susceptible to windthrow). Construction lighting, noise, vibration, and increased human presence may also result in disruption and avoidance of habitat.
- Injury and incidental take may occur as a result of collisions with vehicles, machinery, or physical barriers. Species at risk bats may be susceptible to injury and/or incidental take, particularly if habitat is removed while being occupied.

8.1.4.2 Preliminary Mitigation Measures

The standard measures described herein are recommended for the protection and reduction of impacts the natural features, general wildlife, and wildlife habitat, and to reduce the risk of potential impacts to species at risk and SOCC.

Site-specific mitigation recommendations for natural features, SWH or habitat of species at risk/SOCC confirmed in the study area or assumed to be present, are discussed below.

Ontario Provincial Standard Specifications

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

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

The OPSSs are applicable to the following general activities:

- Management of Excess Materials – Excess material shall be managed in accordance with OPSS 180 and O.Reg 406/19.
- Equipment Use – Use of equipment shall be in accordance with OPSS 182.
- Erosion and Sediment Control – The installation, monitoring, maintenance, and removal of temporary erosion and sediment control measures shall be according to OPSS 182, OPSS 801, OPSS 804, OPSS 805.
- Vegetation Removal and Restoration of Disturbed Areas – Vegetation protection and rehabilitation shall be in accordance with OPSS 182, OPSS 801, OPSS 803 and OPSS 804. West Region Seed Mix will be used to reseed disturbed areas.

Protection of Vegetation and Vegetation Communities

To address the potential impacts, the following preliminary mitigation measures and recommendations have been proposed and will be reviewed and confirmed during the subsequent phase of the project:

- Time vegetation removal to occur outside of following periods for wildlife, where feasible and unless otherwise specified: birds (April 1 to August 31), bats (March 15 to September 30), reptiles/amphibians (April 1 to October 31), and monarch (May 1 to September 30). In addition, vegetation removal in wetland, watercourse, or pond vegetation communities should occur outside of the reptile/amphibian overwintering season (November 1 to March 31). Additional mitigation measures to facilitate vegetation removal activities should timing windows not be able to be avoided (i.e., nest and/or hibernacula surveys) will be identified during the subsequent phase of the project, if necessary.
- Demarcate work zones to ensure work remains within the construction limits.
- Staging areas are recommended to be sited in developed and disturbed areas to minimize impacts to natural features.
- Appropriate vegetation clearing techniques should be implemented and clearing, grubbing, and grading should be minimized to only include areas necessary to complete the proposed works.
- Install surface protection measures to minimize soil compaction, particularly in areas where post-construction plantings are proposed.
- Install tree protection fencing along the dripline to protect the root zone of trees adjacent to work zones in accordance with Ontario Provincial Standard Specification (OPSS.PROV) 801.
- Temporarily disturbed areas will be restored and vegetated to pre-construction conditions or better. Vegetation plantings will include seed mixes that are appropriate for the area, and include a mix of native species, including salt-tolerant varieties (as needed) that are appropriate to the site and conditions. Seed mixes will include fast-growing, short-lived perennial cover crop to stabilize soil and reduce competition from weedy exotics.
- Install tree protection fencing to protect trees identified for preservation and have the project Arborist review and approve the fencing and its location prior to commencing construction activities in the area.
- Avoid storage of any materials, soils, equipment, etc. within tree protection zones.
- Remove felled trees, lumber, and brush from the site and complete any chipping, cutting, or brush cleanup outside of the migratory bird active season (i.e., April 1 to August 31). The works may be completed during this time only if the requirements of the *Migratory Birds Convention Act* (MBCA) (2022) are met and if the activities are monitored by a Qualified Biologist.
- Implement dust control measures for the suppression of dust.
- Include invasive species management and mitigation measures in the contract documents.

Protection of Rare Plants and Vegetation Communities

Loss of rare plants (swamp-rose mallow and shrubby St. John's-wort) and rare vegetation communities (FODM7-4 and FODM9-4) is anticipated. To reduce the extent of impacts, the following mitigation measures are recommended:

- Rare vegetation species be salvaged and transplanted within the study area, where possible.

- Rare plant species be included in seed mixes, where feasible.
- The edge of disturbance to rare vegetation communities be demarcated to minimize the extent of encroachment.

Invasive Phragmites Management

European common reed (Phragmites) is a 'restricted' plant species regulated by the *Ontario Invasive Species Act* (2015). Phragmites was identified throughout the study area and is expected to be impacted during construction. A Phragmites Management Plan is on file with MTO, and includes the following mitigation measures:

- Develop a site-specific Invasive Species Management Plan that will outline procedures for the management, removal, and disposal of Invasive Phragmites.
- The Contractor will adhere to the requirements of special provision number ENVR0011 – Requirements for Herbicide Spraying and Mechanical Cutting of Invasive and Noxious Vegetation Species (MTO 2019).
- Herbicide spraying will not occur in areas with standing water. All locations will be inspected for standing water prior to spraying in accordance with section 7.02 of special provision number ENVR0011. Spraying will only commence when water is no longer present.
- Locations to be treated by cutting will be cut to a height of 30 cm or less unless otherwise specified or directed by the Contract Administrator per section 7.04 of special provision number ENVR0011.
- The Contractor will implement the Clean Equipment Protocol for Industry (Halloran et al. 2013) to minimize the introduction and spread of invasive species.
- Designated areas for equipment cleaning and invasive species stockpiles may be temporarily required during construction. If designated areas are required, they will be identified and demarcated in the field. The designated areas will not be located in or near watercourses, environmentally sensitive features, or areas where invasive species are not currently present.
- Soil contaminated with invasive species will not be re-used for restoration activities.

Protection of Wildlife and Wildlife Habitat

To address the potential impacts, the following preliminary mitigation measures and recommendations have been proposed and will be reviewed and confirmed during the subsequent phase of the project:

- The design shall minimize encroachment of natural areas, including siting staging areas and other temporary construction activities appropriately so as to minimize disturbance of natural areas to the extent possible.
- The design shall consider areas where vegetated buffers can be maintained to allow for cover and protection of wildlife, where appropriate and feasible.
- Time vegetation removal to occur outside of following periods for wildlife, where feasible: birds (April 1 to August 31), bats (March 15 to September 30), reptiles/amphibians (April 1 to October 31), and monarch (May 1 to September 30). In addition, vegetation removal in wetland, watercourse, or pond vegetation communities should occur outside of the reptile/amphibian overwintering season (November 1 to March 31). Additional mitigation measures to facilitate vegetation removal activities should timing windows not be able to be avoided (i.e., nest and/or hibernacula surveys) will be identified during the subsequent phase of the project, if necessary.
- Restrict construction activities to work areas and demarcate sensitive features to prevent off-site encroachment.
- Stockpiles shall be covered, protected, and/or stored in a way to prevent/discourage wildlife from accessing the materials for nesting, burrowing, or refuge, and exclusionary measures should be installed around the perimeter to prevent wildlife access.
- Direct artificial light away from natural areas to minimize disturbance to wildlife habitat.
- Avoid idling and ensure construction vehicles and machinery are kept in good repair.
- Minimize the extent and duration of construction noise and lighting to daylight hours during the active wildlife season (i.e., April to October), where feasible.
- Wildlife protocols should be developed to educate workers of measures to take in the event of wildlife encounters, including species at risk.
- Environmental monitoring is recommended to ensure mitigation and contingency measures are implemented and performance objectives are being met.

Protection of Monarch

The following mitigation measures are recommended to reduce impacts to Monarch:

- Avoid vegetation clearing in Monarch habitat to outside of the larval period which is approximately May 1 to September 30 (Mission Monarch 2020).
- If vegetation clearing will proceed when Monarch larvae may be present (May 1 to September 30), identification and inspection of milkweed plants will be completed to locate Monarch larvae.
- If larvae are identified, a trained Environmental Monitor may relocate the species to a suitable and safe location under the direction of a Qualified Biologist. Monarch caterpillars may be moved to other milkweed plants; for other larval stages (i.e., eggs and chrysalis), entire milkweed plants should be transplanted.

- Milkweed and nectar producing plants are recommended to be included in seed mixes for areas restored to meadow to provide habitat for Monarch.

Protection of Migratory Birds

The MBCA protects nests of migratory birds from damage while they are active, including nests in vegetation and on structures. Vegetation clearing during nesting periods in migratory bird breeding habitat can destroy active nests and contravene the MBCA. The following mitigation measures will be followed for migratory birds (including SOCC, such as Eastern Wood-Pewee):

- Time vegetation removal to occur outside of the migratory bird nesting period which extends from April 1 to August 31, where feasible.
- If work must take place during the core nesting period and the area is small enough to be effectively searched for nesting birds, then a breeding bird survey will be completed by a Qualified Biologist. The area where vegetation is to be removed must be searched within five days prior to the work commencing.
- If an active nest is observed during construction, a designated buffer will be delineated within which no activity will be allowed to occur while the nest is active (i.e., with eggs or young). The radius of the buffer will be determined by a Qualified Biologist. Once the nest is determined to be inactive (i.e., the young have fledged the nest), clearing and other activities in the area may proceed.

Protection of Species at Risk

Bats (non-species at risk and species at risk)

The following mitigation measures are recommended to minimize impacts to bats (both species at risk and non-species at risk) and will be reviewed and updated following consultation with MECP on any permitting and compensation requirements for species at risk:

- Time tree removals to occur outside of the active bat period, which extends from March 15 to September 30.
- If potential roost trees are removed during the active bat period (i.e., March 15 to September 30), a Qualified Biologist shall complete a bat exit survey of each tree prior to removal. Trees occupied by bats shall not be removed until they have vacated the roost.
- Avoid installing light fixtures (permanent or temporary) near bat habitat to minimize the effects of light pollution. If not feasible, efforts to reduce illumination and light spill shall be considered, including light height, light shields, lighting intensity, light direction, and spectral composition.
- Installation of artificial bat boxes (i.e., Rocket Boxes and BrandenBark roosts) will be considered in areas with species at risk bats and adjacent to edges within retained vegetation.
- Creation of compensation habitat (i.e., tree plantings) will be considered with locations determined through consultation with MECP and Kettle Creek Conservation Authority.

Wildlife Encounters, Safe Handling and Relocation

- If wildlife is encountered during construction, personnel will move away from the animal and wait for the animal to move off the construction site. If slow-moving wildlife (i.e., turtles, snakes) are observed on the road and are in danger, and if safe to do so, they will be moved off the road by gently guiding the individual in the direction it was traveling.
- Wildlife shall not be harmed or harassed.
- Construction equipment and vehicles will yield to wildlife.
- Injured wildlife (species at risk or non-species at risk) will be transported to an authorized wildlife rehabilitator by an Environmental Monitor or Qualified Biologist. Euthanasia of injured wildlife is not permitted unless conducted by an authorized wildlife rehabilitator.
- If a hibernacula site is discovered, all work must cease, and a Qualified Biologist shall be contacted to discuss mitigation options.
- If overwintering turtles or snakes are disturbed by construction activities, work will cease, and a Qualified Biologist will be contacted to discuss mitigation measures. Overwintering turtles and snakes will not be relocated. Where species at risk are encountered, MECP will be contacted.
- Immediately upon observation of an actively nesting female turtle, personnel and vehicles will clear the area within the turtle's line of sight as much as possible to allow the female to finish laying. Startling a nesting female could lead to abandonment of the partially laid nest before the eggs are concealed.
- If potential turtle nest sites (i.e., areas of fresh digging in loose gravel or sandy materials) are found within the work areas, work in that area will cease. The nests will be left undisturbed, flagged and a setback applied to protect against construction activities. If avoidance is not possible, egg salvage may be completed by a Qualified Biologist which will be detailed in a Salvage and Relocation Plan.

Environmental Training and Monitoring

- Wildlife protocols will be developed to educate workers of potential wildlife occurrences, including species at risk, and measures to implement in the event of potential encounters. Preventative measures to reduce encounters, injury, and incidental take will also be provided.
- Monitoring will occur so that mitigation and contingency measures are implemented, and performance objectives are being met. A construction monitoring log will be maintained so that deficiencies and corrective actions are documented.

- Environmental monitoring during construction will include, but not be limited to:
    - Conduct daily visual inspections for wildlife prior to the start of construction during the active season (i.e., April to October). This shall include a thorough walk-through of the work area and searching vegetation, brush piles, logs or rock piles, and equipment. If wildlife is observed, work will be suspended until the individual(s) is out of harm's way.
    - Regular inspections of sensitive features so that setbacks are adhered to and that damage/alternation to the demarcations of these features is addressed.
    - Required monitoring activities so that spills and sediment releases are prevented or addressed quickly and effectively.
    - Visual inspections and wildlife monitoring will be required where exclusionary measures have been installed and where wildlife activity has been noted.
    - Monitoring during construction of environmental features to confirm works are carried out in accordance with the design and specifications.
- Specialized environmental monitoring programs shall be developed and implemented as it relates to:
    - Establishment of restoration and landscaping.
- Permit and approval requirements, which will be confirmed as part of the permitting processes (i.e., may include effectiveness monitoring of compensation habitat).

Erosion and Sedimentation Control

- Develop and implement an Erosion and Sediment Control (ESC) Plan prior to construction to protect sensitive natural heritage features.
- ESC will be in accordance with OPSS 804 (Construction Specification for Temporary Erosion Control) and OPSS 805 (Construction Specification for Temporary Sediment Control).
- The Erosion and Sediment Control Plan will capture measures related to vegetation communities, natural areas, and wildlife habitat.
- Maintain vegetative buffers and retain natural vegetation to the extent feasible, to help control erosion.
- Timing of vegetation removal shall consider rainfall and other weather conditions that could increase the likelihood of erosion and sedimentation.
- Reduce the extent and duration of exposed soil and cover areas to suppress dust and prevent sedimentation due to wind and rainfall erosion.
- Re-vegetate disturbed areas as soon as possible to help re-stabilize soils following OPSS 803 (Construction Specification for Vegetative Cover). Vegetation plantings will include a seed mix that is appropriate to the area and similar to or better than pre-construction conditions.
- Selection of ESC measures will be appropriate for the site and extent of disturbance, and potential impacts to wildlife, such as entanglement. For example, measures that contain plastic or wire mesh or netting will not be used, and fully biodegradable options shall be implemented wherever feasible (i.e., erosion control blankets made from coconut fiber, fiber rolls and etc.). Placement of silt fencing will not create a barrier to movement and wildlife should be redirected to areas where there is safe passage and access to habitat. Sediment control materials will follow specifications outlined in OPSS 805.
- ESC measures will be installed prior to vegetation removal and remain in place until vegetation has become established and soils re-stabilized.
- Remove non-biodegradable ESC materials, where approved once site is stabilized.
- ESC measures will be inspected to confirm they are installed in accordance with manufacturer's instructions and maintained to so that controls are working effectively and per design. A monitoring log shall be maintained and include corrective actions taken and additional recommendations for compliance.

Excess Material and Deleterious Substances

- Surplus materials will be managed in accordance with OPSS 180 (Management of Excess Materials).
- Excess soils will be managed in accordance with O. Reg 406/19: On-Site and Excess Soil Management.
- Management and placement of earth, excess soil, and stockpiles will be planned so it does not result in the discharge of contaminants into the natural environment or promote use by wildlife (i.e., bird nesting).
- Fuels, oils, and other hazardous materials will likely be present on site through the operation of vehicles and on-site equipment. Accidental spills of these materials could result in potential negative impacts to the natural environment. The following mitigation measures have been identified to lessen the likelihood the potential for accidental spills:
    - On-site hazardous materials will be properly stored and located at least 30 m away from watercourses/wetlands and other sensitive natural features.
    - On-site materials will be self-contained, maintained according to manufacturer's instructions and disposed of appropriately.

- Develop and implement an emergency response management and monitoring plan that includes measures for preventing and addressing potential spills and monitoring activities.
- Spill kits will be kept on-site and accessible.
- Waste resulting from construction will be removed from the site and disposed of at an appropriate facility. This includes packaging (bags, wraps, boxes, ties, etc.), waste materials (excess fill, cement, grout, asphalt, or other substances), and ESC structures (silt fencing, flow checks, etc.) once permanent vegetation has established and ESC measures are no longer required.

8.1.5 Fisheries and Fish Habitat

It was determined that watercourses in the study area do not provide significant habitat for fish; however, there are potential impacts to fish and fish habitat as a result of the Recommended Plan. The following potential impacts to fish and fish habitat have been identified based on the preliminary design information available at the time of publishing this TESR:

- Changes to direct fish habitat at two tributaries to Kettle Creek due to the need for longer culverts.
- Changes to direct fish habitat at Kettle Creek if changes within the bankfull channel are proposed.

During the subsequent design phase of the project, a Fisheries Assessment (i.e., Impact Assessment) will be undertaken to determine the potential for the death of fish or harmful alteration, disruption, or destruction (HADD) of fish habitat based on the final design of the project.

8.1.5.1 Potential Enhancement Measures and Design Recommendations

Opportunities for habitat enhancement were identified at the Unnamed Tributary to Kettle Creek (Mid) and include increasing stream shading by increasing vegetation in the riparian zone. Additionally, the culvert outlet is perched above the stream bed and may be barrier to fish passage under some flow scenarios. It was recommended that the design of the culvert replacement/extension at this location provide fish passage. It was also recommended that Kettle Creek Bridge avoid the need for in-water structures (i.e., piers, abutments, etc.) to reduce flow alterations and the loss of fish habitat. These recommendations and opportunities will be reviewed during the subsequent design phase to determine how these measures may be incorporated into the final design of the project.

8.1.5.2 Preliminary Mitigation Measures

The following mitigation measures have been identified and will be reviewed and confirmed during the subsequent design phase of the project. Additional mitigation measures will also be identified following the completion of the fisheries assessment, which will be undertaken during the subsequent design phase of the project.

Timing Windows

The in-water construction window for watercourses in the study area is July 16 to March 14, inclusive (i.e., in-water work is not permitted from March 15 to July 15). The timing window does not apply to work above the high-water level.

Ontario Provincial Standard Specifications

The following OPSS.PROVs may be applicable to the project:

- OPSS.PROV 180 – General Specification for the Management of Excess Materials
- OPSS.PROV 182 – General Specification for Environmental Protection for Construction in and Around Waterbodies and on Waterbody Banks
- OPSS.PROV 517 – Construction Specification for Dewatering
- OPSS.PROV 803 – Construction Specification for Vegetative Cover
- OPSS.PROV 804 – Construction Specification for Temporary Erosion Control
- OPSS.PROV 805 – Construction Specification for Temporary Sediment Control
- OPSS.PROV 825 – Construction Specification for Placement of Aggregates in Waterbodies
- OPSS.PROV 1005 – Material Specification for Aggregates - Waterbody
- The OPSS.PROVs are applicable to the following general activities:
- Equipment Use – Use of equipment shall be in accordance with OPSS.PROV 182.
- Dewatering and Temporary Flow Passage – Dewatering and/or temporary flow passage shall be implemented according to OPSS.PROV 517 and OPSS.PROV 182.
- Fish Salvage – Fish salvage operations shall be conducted in accordance with OPSS.PROV 182.
- Preservation of Riparian Vegetation – Removal of riparian vegetation shall be in accordance with OPSS.PROV 182.

- Erosion and Sediment Control – The installation, monitoring, maintenance, and removal of temporary erosion and sediment control measures shall be according to OPSS.PROV 182, OPSS.PROV 804 and OPSS.PROV 805.
- Placement of Aggregates in Waterbodies – The use of aggregate in waterbodies shall be according to OPSS.PROV 825 and OPSS.PROV 1005.
- Restoration of Disturbed Areas – Vegetation protection and rehabilitation shall be in accordance with OPSS.PROV 182, OPSS.PROV 803 (Vegetative Cover, Non-Standard Special Provision - Amendment to OPSS.PROV 803) and OPSS.PROV 804.
- Management of Excess Materials – Excess material shall be managed in accordance with OPSS.PROV 180.

8.2 Socio-Economic Environment

8.2.1 Land Use

8.2.1.1 Property

It is anticipated that the Recommended Plan will require the acquisition of property to facilitate construction. Property impacts and/or acquisitions will be confirmed during the subsequent phase of the project.

8.2.1.2 Communities

Direct impacts to community facilities in the study area are not anticipated as a result of the Recommended Plan.

8.2.1.3 Agriculture

It is anticipated that the Recommended Plan will result in impacts to portions of agricultural land in the study area. These impacts will be confirmed during the subsequent phase of the project.

8.2.2 Potentially Contaminated Property

In total, 17 Areas of Potential Environmental Concern were identified within and/or adjacent to the study area. The Recommended Plan may result in impacts to these areas and will be confirmed during the subsequent phase of the project. The following recommendations were provided in the COS Report, and will be reviewed during the subsequent phase of the project:

- O.Reg 406/19 (On-Site and Excess Soil Management) and the associated document, Rules for Soil Management and Excess Soil Quality Standards, as referenced by O.Reg 406/19, should be followed for soil that is excavated and managed on-site or off-site during construction. This includes sampling soil that will be disturbed during construction, if required, according to a sampling and analysis plan and analyzing for the specific contaminants of concern, as described in the APEC summary table. Sampling programs should be developed and undertaken under the supervision of a qualified person, as defined in O.Reg 406/19, and sample selection should take into consideration the presence of anthropogenic substances, such as debris/waste, and unusual odours or staining.
- Stockpiling and transport of excavated soil during construction should be done in accordance with the requirements specified in O.Reg 406/19.
- Should suspected contaminated soil be encountered during future construction activities (i.e., staining, odours, debris/waste, petroleum hydrocarbon sheen), a qualified person should be retained to identify and collect representative soil samples for chemical analysis to determine management options and appropriate handling in accordance with O.Reg 406/19.

8.2.3 Excess Materials Management

As noted in Section 8.2.2, O.Reg 406/19 (On-Site and Excess Soil Management) and the associated document, *Rules for Soil Management and Excess Soil Quality Standards*, as referenced by O.Reg 406/19, should be followed for soil that is excavated and managed on-site or off-site during construction.

8.2.4 Student Transportation Services

Permanent impacts to student transportation routes are not anticipated as a result of the Recommended Plan. Students/school transportation services may experience minor delays while traveling through the study area and along detour routes during construction. Student transportation services will be consulted during the subsequent design stage and will be notified prior to construction commencing.

8.2.5 Navigable Waters

Highway 3 crosses Kettle Creek, which may be considered a navigable body of water under the *Canadian Navigable Waters Act* (CNWA, 1985, amended 2019). During the subsequent design phase of the project, it will be determined whether Kettle Creek is considered a navigable body of water, and consultation will be undertaken with Transport Canada and any approvals will be obtained, if required. Mitigation measures to be implemented during construction will also be recommended, if required.

8.2.6 Active Transportation

There are no impacts to active transportation routes anticipated as a result of the Recommended Plan. Consideration for active transportation improvements will be further assessed during Detail Design.

8.2.7 Recreational Features

It is anticipated that the multi-use trail on the east side of Kettle Creek will be closed during the construction of the new Kettle Creek Bridge. Impacts to the trail will be confirmed during the subsequent design phase.

8.2.8 Emergency Services

There are no permanent impacts to emergency service providers anticipated as a result of the Recommended Plan. Emergency service providers may, however, experience temporary delays during construction activities. All emergency service providers that service the study area will be consulted during the subsequent design phase and will be notified prior to construction commencing.

8.2.9 Municipal Services

Municipal services are expected to be impacted by the Recommended Plan and will be confirmed during Detail Design. As a result, temporary disruptions (i.e., water service) may be experienced by residents. All disruptions will be communicated to those affected prior to commencement of the activities impacting the service.

8.2.10 Air Quality

An Air Quality Assessment was completed to characterize baseline (2023) air pollutant emissions and predict air quality effects within the study area after implementation of the project in the Future Build (2032 and 2047) scenarios for the project alone and cumulatively with background air quality levels. The Future Build years of 2032 and 2047 represent five years and 20 years after completion of project construction. Predicted future emissions and potential effects with project implementation (Future Build) are compared to baseline emissions and effects (Baseline), and to predict future emissions and effects without implementation of the project (Future No Build) for a total of five assessment scenarios:

- 2023 – Baseline (existing conditions; two lanes).
- 2032 – Future No Build (future conditions without the project; two lanes).
- 2032 – Future Build (future conditions with the project; four lanes, bridge/interchange improvements, Talbotville Bypass).
- 2047 – Future No Build (future conditions without the project; two lanes).
- 2047 – Future Build (future conditions with the project; four lanes, bridge/interchange improvements, Talbotville Bypass).

This study was conducted following guidance from the MTO's *Environmental Guide for Assessing and Mitigating the Air Quality Impacts and Greenhouse Gas Emissions of Provincial Transportation Projects* (MTO Guide) (MTO 2020). Changes in greenhouse gas (GHG) emissions are assessed in this study. Additionally, potential air quality impacts during project construction are assessed qualitatively.

The air contaminants of potential concern (CoPC) selected for this study are based on the most relevant transportation-related contaminants listed in the MTO Guide and include nitrogen dioxide (NO_2), carbon monoxide (CO), particulate matter with diameter less than 10 micrometres (PM_{10}), particulate matter with diameter less than 2.5 micrometres ($PM_{2.5}$), acrolein, benzene, 1,3-butadiene, benzo(a)pyrene (B(a)P), acetaldehyde and formaldehyde. Greenhouse gas (GHG) emissions in the form of carbon dioxide equivalent (CO_2e) were also quantified.

Baseline ambient air quality conditions were characterized from historical data obtained from ECCC's National Air Pollution Surveillance (NAPS) Network and MECP for stations located near the study area. The United States Environmental Protection Agency's (US EPA's) Motor Vehicle Emission Simulator (MOVES) model version 3 (MOVES3) was used to estimate baseline and future emission rates from motor vehicles. The US EPA dispersion model, CAL3QHCR was used to predict the maximum 1-hour, 8-hour, 24-hour, and annual average ground level concentrations (GLCs) at special receptors for the five assessment scenarios.

The predicted ambient air quality results for each scenario were compared against relevant provincial Ambient Air Quality Criteria (AAQC) and Canadian Ambient Air Quality Standards (CAAQS) while GHG emissions were compared to National and Provincial totals for 2021 and 2030 emissions targets.

Based on the results of the assessment, the following was noted:

- While the project contributions to exceedances are expected to be small, it is expected that with ongoing advancements of on-road vehicles to newer, lower emission or electric vehicles, the quantities of air contaminants released to the atmosphere from transportation sources will be lower in the future.
- Implementation of the project will improve the future traffic flow and reduce congestion in the local road network, which is beneficial to local air quality. Other measures to minimize impacts of particulate and NOx emissions that could be considered include incorporating vegetative barriers in the landscaping design. The effectiveness of trees and plants as physical barriers for particulate or gaseous contaminant control depends on the density and height of the vegetation. In general, a vegetation barrier should be thick (approximately 6.0 m or more) and have full leaf and branch coverage from the ground to the top of the canopy with no gaps in-between or underneath the vegetation.
- Releases of GHGs from the project are expected to be insignificant (less than 0.1%) in comparison to the 2021 Canada and Ontario totals and the 2030 emissions targets.

8.2.10.1 Air Quality During Construction

During construction of the project, dust will be the primary CoPC. Other CoPC such as NO_2 and VOCs will also be emitted from equipment used during construction. As the construction activities will be short-term and intermittent, no significant adverse effects on local air quality are expected provided adequate mitigation measures are implemented. The ECCC guideline *Best Practices for the Reduction of Air Emissions from Construction and Demolition Activities* (ECCC 2005) provides recommendations for mitigation measures to reduce construction emissions. These measures include material wetting or use of chemical suppressants to reduce dust, use of wind barriers, covering or stabilizing exposed areas which may be a source of dust, and equipment washing. It is recommended that appropriate best management practices be followed during project construction.

8.2.11 Noise

8.2.11.1 Operational Noise

A Noise Impact Assessment was carried out in accordance with MTO's *Environmental Guide for Noise* (MTO 2008) to measure the anticipated change in traffic noise levels associated with the operation of the improved highway and to investigate the need for noise mitigation measures.

Road traffic noise impact is assessed with the applicable criteria published in MTO *Environmental Guide for Noise*. Future noise levels with (Future Build) and without the Project (Future No-build) are predicted for the assessment. Where predicted Future Build noise levels increase by 5.0 dB or more over Future No-build, or the predicted Future Build noise levels equal or greater than 65 dBA, mitigation measures are investigated.

According to the MTO Guide requirements, mitigation measures should be restricted to within the MTO right-of-way. For the mitigation to be implemented, it must be technically, economically, and administratively feasible. For the noise mitigation measure(s) to be considered technically feasible, it (they) must provide a minimum 5.0 dB noise reduction averaged over the first row of receptors. Once a mitigation option is deemed technically feasible, it must then be evaluated for economic feasibility. For the noise mitigation measure(s) to be considered economically feasible, its cost-benefit ratio should be within the range of what the MTO typically spends per benefitted receptor (i.e., receptor with a minimum 5.0 dB noise reduction from the investigated mitigation). The current MTO cost-benefit ratio limit is $125,000 per residence for the noise mitigation measure to be economically feasible. The cost-benefit ratio is calculated as the estimated cost of the noise mitigation divided by the number of benefitted receptors. Administrative feasibility is assessed by determining the ability to locate the noise mitigation on lands within public ownership (i.e., provincial or municipal right-of-way).

Project road traffic noise impact was assessed at 55 representative receptors from eight noise sensitive areas (NSAs) within the study area (see attached figure for receptor locations), and the assessment was completed based on the criteria published in applicable MTO *Environmental Guide for Noise*. The assessment considered future traffic for horizon year 2047, as provided by the traffic team (CIMA+).

The increase in future sound levels with the project (Future Build) over without project (Future No-build) at all modelled receptors were below the MTO limit of 5.0 dB, except at receptor R45. However, the predicted Future Build sound levels at 16 receptors were equal or greater than 65 dBA limit (R03 within NSA01; R14 within NSA02; R17 thru R19 within NSA03; and R31, R33, R36, R38, R41, R42, R43, R45 thru R48 within NSA07) and noise mitigation was investigated for all receptors, except for the future developments. Mitigation for the proposed future developments (R14 and R43) was not investigated as the noise mitigation for the future developments is expected to be incorporated in the design and would fall under the responsibility of the developers.

Six noise barriers on MTO right-of-way were investigated and assessed for technical and economic feasibility. One of the barriers (NB1 – along Highway 4, just north of Talbotville roundabout) was ruled out for technical feasibility, as it did not provide the required 5 dB reduction with the investigated noise barrier. Other five noise barriers (NB2 thru NB6) were assessed for economic feasibility, and they all passed feasibility and recommended for the project. Noise barrier dimensions are provided in the feasibility assessment table below.

The location of noise barriers is displayed in the Recommended Plan, provided in **Appendix C.**

8.2.11.2 Construction Noise

To minimize construction noise during construction, it is recommended that the following mitigation measures be carried forward for consideration during the subsequent phase of the project:

- All construction equipment should properly be maintained to limit noise emissions. As such, all construction equipment should be operated with effective muffling devices that are in good working order.
- There should be explicit indication that Contractors are expected to comply with all applicable requirements of the contract and any applicable local by-laws.
- The Contract documents should contain a provision that any initial noise complaint will trigger verification of construction noise and typical noise control measures.
- In the presence of persistent noise complaints, all construction equipment should be verified to comply with MECP NPC-115 and NPC-118 limits.

- In the presence of persistent complaints and subject to the results of a field investigation, alternative noise control measures may be required, where reasonably available. In selecting appropriate noise control and mitigation measures, consideration should be given to the technical, administrative, and economic feasibility of the various alternatives.

8.3 Cultural Heritage Environment

8.3.1 Archaeological Resources

Stage 2 and Stage 3 assessment work is ongoing as of the end of 2023 and will continue when weather permits in 2024.

Should previously undocumented archaeological resources be discovered, they may be a new archaeological site and be subject to Section 48(1) of the *Ontario Heritage Act* (Government of Ontario 1990). The proponent or person discovering the archaeological resources must cease alteration of the site immediately and engage a Licensed Consultant Archaeologist to carry out archaeological fieldwork, in compliance with Section 48(1) of the *Ontario Heritage Act.*

The *Funeral, Burial and Cremation Services Act*, 2002, S.O. 2002, c.33 (Government of Ontario, 2002) requires any person discovering human remains notify the police or coroner and the Registrar of Cemeteries at the Ministry of Public and Business Service Delivery.

8.3.2 Built Heritage Resources and Cultural Heritage Landscapes

A Preliminary Impact Assessment was undertaken as part of the CHRA and is documented in the CHRA Report on file with MTO. It was determined that two built heritage resources located within the study area have the potential to be directly impacted through disruption, displacement, isolation, encroachment, and/or the introduction of non-sympathetic elements. In addition, nine built heritage resources within 50 m of the study area have the potential to be indirectly impacted through vibration during construction activities. Impacts to heritage resources will be confirmed during the subsequent design of the project.

Mitigation measures may be required once impacts are determined. Depending on the final design, property-specific Cultural Heritage Evaluation Report(s) may be needed prior to the completion of a Heritage Impact Assessment. In general, the preferred approach to mitigate direct impacts is to avoid potential built heritage resources. In addition, the preferred approach to mitigate indirect impacts is to establish a buffer zone around built heritage resources to avoid construction activity within 50 m and to have staging and laydown areas be non-invasive and avoid built heritage resources. Where avoidance is not feasible, it is recommended that a Qualified Building Condition Specialist or Engineer develop a strategy to carry out condition surveys and vibration monitoring, where required. The pre-condition survey may include screening activities to identify critical properties and determine appropriate vibration levels based on building type, age, and condition. Vibration monitoring may consist of random confirmatory vibration monitoring during construction. A post-condition survey should be carried out on an as-needed basis to be determined by a Qualified Building Condition Specialist or Engineer. Mitigation measures and vibration monitoring, if required, will be confirmed during the subsequent phase of the project.

9.0 Summary of Environmental Effects, Proposed Mitigation and Commitments

A summary of environmental effects, proposed mitigation, and commitments to future work, as identified during the course of this study, is provided in **Table 14**. This summary forms a comprehensive ‘checklist’ of outstanding issues identified at the end of the Class EA and Preliminary Design phase of the project and will serve as a starting point for the subsequent design phase of the project.

Table 14: Summary of Environmental Effects, Proposed Mitigation, and Commitments for Future Work

I.D. #	Environmental Issues/Concerns and Potential Effects	Mitigation/Protection/Monitoring/Commitments to Further Work
Natural Environment		
1.0	**Physiography, Geology, and Soils (See Section 8.1.1 for further details)**	
	Potential for erosion and sedimentation during construction activities, which may impact watercourses and drainage ditches within the study area.	• An Erosion and Sediment Control Plan will be prepared during the subsequent design phase.
2.0	**Drainage, Surface Water, Groundwater, and Source Water (See Section 8.1.2 for further details)**	
	Potential impacts to surface water and groundwater from contaminant spills and soils, leaks, accidental spills, and dewatering activities.	• Refueling of equipment should be completed away from surface water features whenever possible to minimize potential impacts to surface water and groundwater quality in the event of a spill. • To minimize the impact of potential contaminant spills, the Contractor should implement best management practices, such as containment of any temporary fuel storage, preparation of a spill response plan, and proper facility management during operation and maintenance. • Materials for spill response, such as drip pans and spill contingency kits, must be maintained on site during construction. • To minimize the impact of potential contaminant spills, the Contractor should implement best management practices, such as containment of any temporary fuel storage, preparation of a spill response plan, and proper facility management during operation and maintenance. • Obtain a draft Permit to Take Water (PTTW), if required. • It is recommended that the locations of excavations and potential areas requiring groundwater dewatering be reviewed with respect to active groundwater supply wells to determine the need for and extent of private well monitoring. Based on the overburden clay and silt material across the study area, the extent of municipal water service, and the anticipated construction activities, minimal private well monitoring is anticipated to be required.
3.0	**Designated Areas (See Section 8.1.3 for further details)**	
	Potential for impacts to designated areas (i.e., significant woodland) within the study area.	• Measures to mitigate impacts to vegetation, wildlife and wildlife habitat, as outlined in the rows below, will be implemented.
4.0	**Vegetation and Vegetation Communities (See Section 8.1.4 for further details)**	
	Potential for localized impacts to vegetation due to disturbance of existing common and rare species.	• Time vegetation removal to occur outside of following periods for wildlife, where feasible: – Birds (April 1 to August 31) – Bats (March 15 to September 30) – Reptiles/amphibians (April 1 to October 31) – Monarch (May 1 to September 30) • Vegetation removal in wetland, watercourse, or pond vegetation communities should occur outside of the reptile/amphibian overwintering season (November 1 to March 31). • Demarcate work zones to ensure work remains within the construction limits. • Staging areas are recommended to be sited in developed and disturbed areas to minimize impacts to natural features.

I.D. #	Environmental Issues/Concerns and Potential Effects	Mitigation/Protection/Monitoring/Commitments to Further Work
		• Install surface protection measures to minimize soil compaction, particularly in areas where post-construction plantings are proposed. • Install tree protection fencing along the dripline to protect the root zone of trees adjacent to work zones in accordance with Ontario Provincial Standard Specification (OPSS.PROV) 801. The project Arborist shall review and approve fencing and its location prior to commencing construction activities in the area. • Temporarily disturbed areas should be restored and vegetated to pre-construction conditions or better. Vegetation plantings will include seed mixes that are appropriate for the area, and include a mix of native species, including salt-tolerant varieties (as needed) that are appropriate to the site and conditions. Seed mixes will include fast-growing, short-lived perennial cover crop to stabilize soil and reduce competition from weedy exotics. Rare plant species should be included in seed mixes, where feasible. • Avoid storage of any materials, soils, equipment, etc. within tree protection zones. • Remove felled trees, lumber, and brush from the site and complete any chipping, cutting, or brush cleanup outside of the migratory bird active season (i.e., April 1 to August 31). The works may be completed during this time only if the requirements of the *Migratory Birds Convention Act* are met and if the activities are monitored by a Qualified Biologist. • Implement dust control measures for the suppression of dust. • Rare vegetation species be salvaged and transplanted within the study area, where possible. • The edge of disturbance to rare vegetation communities be demarcated to minimize the extent of encroachment. • If vegetation clearing will proceed when Monarch larvae may be present (May 1 to September 30), identification and inspection of milkweed plants will be completed to locate Monarch larvae. • If larvae are identified, a trained Environmental Monitor may relocate the species to a suitable and safe location under the direction of a Qualified Biologist. Monarch caterpillars may be moved to other milkweed plants; for other larval stages (i.e., eggs and chrysalis), entire milkweed plants should be transplanted. • Milkweed and nectar producing plants are recommended to be included in seed mixes for areas restored to meadow to provide habitat for Monarch. • If potential roost trees are removed during the active bat period (i.e., March 15 to September 30), a Qualified Biologist shall complete a bat exit survey of each tree prior to removal. Trees occupied by bats shall not be removed until they have vacated the roost.
5.0	**Wildlife and Wildlife Habitat (See Section 8.1.4 for further details)**	
	Potential for species at risk habitat within or adjacent to the study area, and potential interactions with wildlife during construction.	• Restrict construction activities to work areas and demarcate sensitive features to prevent off-site encroachment. • Stockpiles shall be covered, protected, and/or stored in a way to prevent/discourage wildlife from accessing the materials for nesting, burrowing, or refuge, and exclusionary measures should be installed around the perimeter to prevent wildlife access. • Direct artificial light away from natural areas to minimize disturbance to wildlife habitat. • Avoid idling and ensure construction vehicles and machinery are kept in good repair. • Minimize the extent and duration of construction noise and lighting to daylight hours during the active wildlife season (i.e., April to October), where feasible. • Construction equipment and vehicles are to yield to wildlife and wildlife shall not be harmed or harassed. • If wildlife is encountered during construction, personnel are required to move away from the animal and wait for the animal to move off the construction site. If slow-moving wildlife are observed and are in danger, and if safe to do so, they should be moved off the road by gently guiding the individual in the direction it was traveling.

I.D. #	Environmental Issues/Concerns and Potential Effects	Mitigation/Protection/Monitoring/Commitments to Further Work
		• All injured wildlife shall be transported to an authorized wildlife rehabilitator by an Environmental Monitor or Qualified Biologist. Euthanasia of injured wildlife is not permitted. • If a hibernacula is discovered, all work must cease and a Qualified Biologist shall be contacted to discuss mitigation options. • If overwintering turtles or snakes are disturbed by construction activities, work shall cease, and a Qualified Biologist shall be contacted to discuss mitigation measures. Overwintering turtles and snakes shall not be relocated. Where species at risk are encountered, MECP shall be contacted. • If an actively nesting female turtle is observed, personnel and vehicles shall immediately clear the area within the turtle's line of sight, as much as possible, to allow the female to finish laying. Startling a nesting female could lead to abandonment of a partially laid nest before the eggs are concealed. • If potential turtle nest sites (i.e., areas of fresh digging in loose gravel or sandy materials) are found within the work areas, work in that area will cease. The nests will be left undisturbed, flagged and a setback applied to protect against construction activities. If avoidance is not possible, egg salvage may be completed by a Qualified Biologist which will be detailed in a Salvage and Relocation Plan. • Wildlife protocols should be developed to educate workers of measures to take in the event of wildlife encounters, including species at risk. • If potential roost trees are removed during the active bat period (i.e., March 15 to September 30), a Qualified Biologist shall complete a bat exit survey of each tree prior to removal. Trees occupied by bats shall not be removed until they have vacated the roost. • Avoid installing light fixtures (permanent or temporary) near bat habitat to minimize the effects of light pollution. If not feasible, efforts to reduce illumination and light spill shall be considered, including light height, light shields, lighting intensity, light direction, and spectral composition. • Installation of artificial bat boxes (i.e., Rocket Boxes and BrandenBark roosts) will be considered in areas with species at risk bats and adjacent to edges within retained vegetation. • Creation of compensation habitat (i.e., tree plantings) will be considered with locations determined through consultation with MECP and Kettle Creek Conservation Authority. • Monitoring will occur so that mitigation and contingency measures are implemented and performance objectives are being met. A construction monitoring log will be maintained so that deficiencies and corrective actions are documented. • Environmental monitoring during construction will include, but not be limited to: – Conduct daily visual inspections for wildlife prior to the start of construction during the active season (i.e., April to October). This shall include a thorough walk-through of the work area and searching vegetation, brush piles, logs or rock piles, and equipment. If wildlife is observed, work will be suspended until the individual(s) is out of harm's way. – Regular inspections of sensitive features so that setbacks are adhered to and that damage/alternation to the demarcations of these features is addressed. – Required monitoring activities so that spills and sediment releases are prevented or addressed quickly and effectively. – Visual inspections and wildlife monitoring will be required where exclusionary measures have been installed and where wildlife activity has been noted. – Monitoring during construction of environmental features to confirm works are carried out in accordance with the design and specifications.

I.D. #	Environmental Issues/Concerns and Potential Effects	Mitigation/Protection/Monitoring/Commitments to Further Work
		• Specialized environmental monitoring programs shall be developed and implemented as it relates to: – Establishment of restoration and landscaping.
6.0	**Migratory Birds (See Section 8.1.4 for further details)**	
	Potential for protected birds to establish nests on existing structures.	• Time vegetation removal to occur outside of the migratory bird nesting period which extends from April 1 to August 31, where feasible. • If work must take place during the core nesting period and the area is small enough to be effectively searched for nesting birds, then a breeding bird survey will be completed by a Qualified Biologist. The area where vegetation is to be removed must be searched within five days prior to the work commencing. • If an active nest is observed during construction, a designated buffer will be delineated within which no activity will be allowed to occur while the nest is active (i.e., with eggs or young). The radius of the buffer will be determined by a Qualified Biologist. Once the nest is determined to be inactive (i.e., the young have fledged the nest), clearing and other activities in the area may proceed.
7.0	**Fish and Fish Habitat (See Section 8.1.5 for further details)**	
	Potential for changes to direct fish habitat in the study area and works adjacent to waterbodies have the potential to impact fish and fish habitat.	• The in-water construction window for watercourses in the study area is July 16 to March 14, inclusive (i.e., in-water work is not permitted from March 15 to July 15) (MNRF 20232db). The timing window does not apply to work above the high-water level. • Applicable Ontario Provincial Standard Specifications will be identified and incorporated into the Contract Documents during the subsequent phase of the project.
Socio-Economic Environment		
8.0	**Land Use/Property (See Section 8.2.1 for further details)**	
	It is anticipated that the Recommended Plan will require the acquisition of property to facilitate construction.	• Confirm property impacts and/or acquisitions during the subsequent phase of the project. • Engage with impacted property owners to review, discuss, and confirm impacts to property and associated mitigation measures.
9.0	**Potentially Contaminated Property (See Section 8.2.2 for further details)**	
	17 Areas of Potential Environmental Concern were identified within/adjacent to the study area. Contaminated materials may be encountered during construction activities.	• The Recommended Plan may result in impacts to the Areas of Potential Environmental Concern and will be confirmed during the subsequent phase of the project. • O.Reg 406/19 (On-Site and Excess Soil Management) and the associated document, *Rules for Soil Management and Excess Soil Quality Standards*, as referenced by O.Reg 406/19, should be followed for soil that is excavated and managed on-site or off-site during construction. This includes sampling soil that will be disturbed during construction, if required, according to a sampling and analysis plan and analyzing for the specific contaminants of concern, as identified in the Contamination Overview Study Report prepared for this project. • Sampling programs should be developed and undertaken under the supervision of a qualified person, as defined in O.Reg 406/19, and sample selection should take into consideration the presence of anthropogenic substances, such as debris/waste, and unusual odours or staining.

I.D. #	Environmental Issues/Concerns and Potential Effects	Mitigation/Protection/Monitoring/Commitments to Further Work
10.0	**Excess Materials Management (See Section 8.2.3 for further details)**	
	Excess materials may be generated/encountered during construction and require proper management/disposal.	• O.Reg 406/19 (On-Site and Excess Soil Management) and the associated document, *Rules for Soil Management and Excess Soil Quality Standards*, as referenced by O.Reg 406/19, should be followed for soil that is excavated and managed on-site or off-site during construction.
11.0	**Noise (See Section 8.2.11 for further details)**	
	Potential increase in noise during construction associated with construction equipment.	• Contract documents will include measures to mitigate potential noise impacts during construction. It is recommended that the following mitigation measures be carried forward for consideration during the subsequent phase of the project. • All construction equipment should properly be maintained to limit noise emissions. As such, all construction equipment should be operated with effective muffling devices that are in good working order. • There should be explicit indication that Contractors are expected to comply with all applicable requirements of the contract and any applicable local by-laws. • The Contract documents should contain a provision that any initial noise complaint will trigger verification of construction noise and typical noise control measures. • In the presence of persistent noise complaints, all construction equipment should be verified to comply with MECP NPC-115 and NPC-118 limits.
12.0	**Air Quality (See Section 8.2.10 for further details)**	
	Potential for dust and air quality impacts on adjacent land uses during construction.	• Potential impacts will be reviewed and potential mitigation measures will be identified during the subsequent design phase.
13.0	**Utilities**	
	Potential for impacts to municipal services by the Recommended Plan.	• All disruptions to water service will be communicated to those to be affected prior to commencement of the activities impacting the service.
14.0	**Transportation**	
	Temporary full closures and delays are anticipated to be required to facilitate construction.	• Continue consultation with agencies and the public during the subsequent phases of the project to provide and receive input on construction staging, laydown areas, traffic impacts, etc. • Establish and confirm construction staging and laydown areas. • Prepare a detailed Traffic Management Plan. • Maintain access to private entrances and sideroads during construction.

I.D. #	Environmental Issues/Concerns and Potential Effects	Mitigation/Protection/Monitoring/Commitments to Further Work
Cultural Heritage Environment		
15.0	**Archaeological Resources (See Section 8.3.1 for further details)**	
	Previously unknown/deeply buried artifacts/human remains could be discovered during construction.	• Should previously undocumented archaeological resources be discovered, they may be a new archaeological site and be subject to Section 48(1) of the *Ontario Heritage Act*. The proponent or person discovering the archaeological resources must cease alteration of the site immediately and engage a licensed consultant archaeologist to carry out archaeological fieldwork, in compliance with Section 48(1) of the Ontario Heritage Act. • The *Funeral, Burial and Cremation Services Act* (2002, S.O. 2002, c.33), requires any person discovering human remains notify the police or coroner and the Registrar of Cemeteries at the Ministry of Public and Business Service Delivery.
16.0	**Built Heritage and Cultural Heritage Landscapes (See Section 8.3.2 for further details)**	
	Two built heritage resources are located in the study area and have the potential to be impacted through disruption, displacement, encroachment, and/or the introduction of non-sympathetic elements due to the Recommended Plan.	• Impacts to the two built heritage resources will be confirmed during the subsequent phase of the project. • The need for property-specific Cultural Heritage Evaluation Report(s) (CHERs) will be determined during the subsequent phase of the project. CHERs may be required prior to the completion of a Heritage Impact Assessment. • Mitigation measures may be required once impacts are determined. In general, the preferred approach to mitigate direct impacts is to avoid potential built heritage resources. Additionally, the preferred approach to mitigate indirect impacts is to establish a buffer zone around built heritage resources to avoid construction activity within 50 m and to have staging and laydown areas be non-invasive and avoid built heritage resources. • Where avoidance is not feasible, it is recommended that a Qualified Building Condition Specialist or Engineer develop a strategy to carry out condition surveys and vibration monitoring, where required. The pre-condition survey may include screening activities to identify critical properties and determine appropriate vibration levels based on building type, age, and condition. Vibration monitoring may consist of random confirmatory vibration monitoring during construction. A post-condition survey should be carried out on an as-needed basis to be determined by a Qualified Building Condition Specialist or Engineer. • Mitigation measures and vibration monitoring, if required, will be confirmed during the subsequent phase of the project.

10.0 Future Consultation

During the subsequent design stage of this undertaking, relevant agencies, authorities, Indigenous Communities, and property owners will continue to be engaged with respect to Detail Design and commitments to future work as outlined in this document, as appropriate.

10.1 Future Commitments

Consultation will be ongoing during the next phase of planning and design to address all outstanding issues, including permits and approvals and more detailed environmental and engineering investigations to confirm the Final Design. A summary of the proposed future consultation activities is provided in **Table 15**.

Table 15: Future Consultation Commitments

External Agency	Subject of Consultation
Emergency service agencies (i.e., OPP, Fire, Ambulance, Police Services, etc.)	• Traffic Management Plan • Construction timing • Final Detour Plans
Fisheries and Oceans Canada	• Request for Review Form for project review under the *Fisheries Act*
Canadian National Rail	• Work Permit Application
Transport Canada	• Notice of Railway Works, if required
Ministry of Natural Resources and Forestry	• Terrestrial species and habitat • Construction timing windows/restrictions
Ministry of Citizenship and Multiculturalism	• Stage 2 and Stage 3 Archaeological Assessment • Stage 4 Archaeological Assessment, if required
Ministry of Environment, Conservation and Parks	• Terrestrial and/or aquatic species at risk and/or habitat • *Endangered Species Act* authorization/permit
Indigenous Communities	• Stage 2 and Stage 3 Archaeological Assessment • Stage 4 Archaeological Assessment, if required
Municipalities (City of St. Thomas, Township of Southwold, Municipality of Central Elgin, Elgin County)	• Traffic Management Plan • Construction timing • Utility relocations • Public concerns, as required. • Cost sharing agreements
	• Detour routes • Operational improvements (i.e., signalizing intersections, etc.)
Kettle Creek Conservation Authority	• Source Water Protection
Utility Companies	• Utility relocations • Construction timing

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

- Property concerns and negotiations with individual property owners.
- Additional details of the Recommended Plan such as tree clearing.

11.0 Monitoring

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

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

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

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

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