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Ministry of Transportation, Ontario

Design and Construction Report (Final)

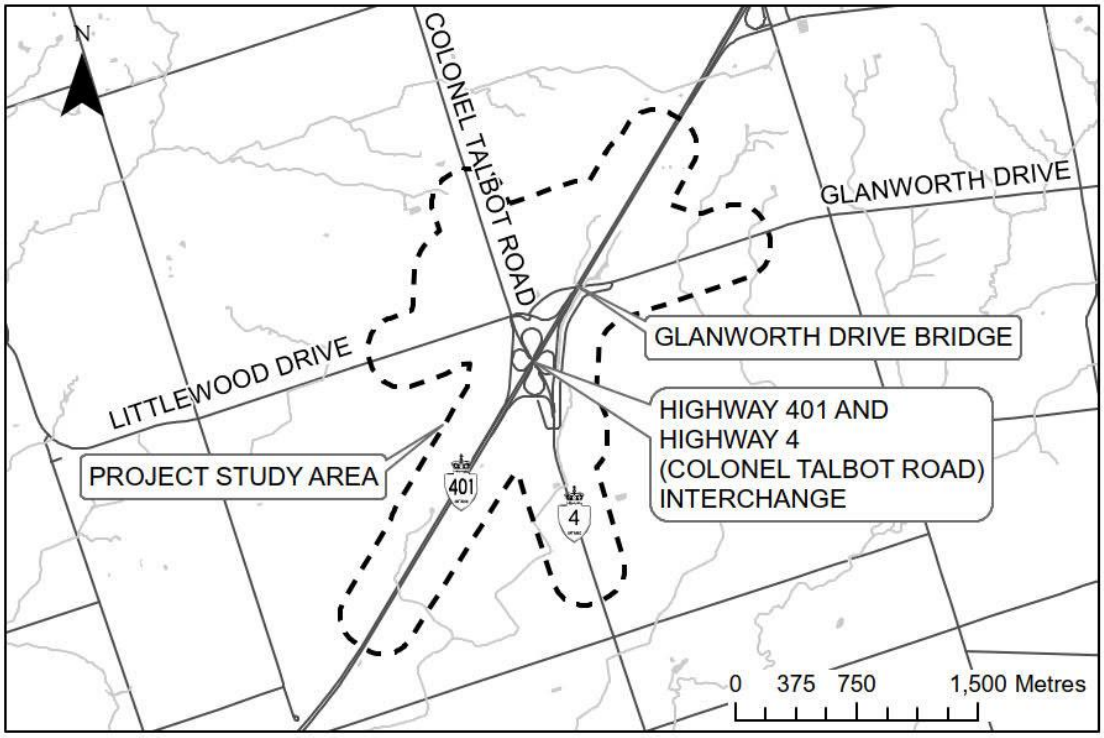
Highway 401 and Highway 4 (Colonel Talbot Road) Interchange Reconfiguration & Highway 4 (Colonel Talbot Road) and Glanworth Drive Bridge Replacements
Design-Build and Class Environmental Assessment (GWP 3030-11-00)

December 2023 – 22-4307

NOTICE OF COMPLETION

Highway 401 and Highway 4 (Colonel Talbot Road) Interchange Reconfiguration & Highway 4 (Colonel Talbot Road) and Glanworth Drive Bridge Replacements (GWP 3030-11-00)

The Ministry of Transportation, Ontario (MTO) retained Green Infrastructure Partners (GIP) Paving Inc. and Dillon Consulting Limited (Dillon) to complete the Design-Build Contract 2022 – 3008, which includes the Class Environmental Assessment (EA), Detailed Design and construction of the Highway 401 and Highway 4 (Colonel Talbot Road) Interchange Reconfiguration and Highway 4 (Colonel Talbot Road) and Glanworth Drive Bridge Replacements in the City of London, as shown on the figure below. Additional information is available on the project website: **www.Hwy401ColTalbot.com**.



This project has been completed in accordance with the MTO *Class Environmental Assessment (EA) for Provincial Transportation Facilities* (2000) as a Group 'B' undertaking. Group 'B' projects are considered major improvements to existing transportation facilities. This project builds upon the approved Preliminary Design as documented in the Transportation Environmental Study Report Addendum (2018). It is anticipated that construction will begin in 2024.

In accordance with the MTO Class EA, a Design and Construction Report (DCR) has been prepared to document the study including environmental impacts and mitigation measures required for construction. The DCR will be made available for a 30-day comment period from **December 13, 2023, to January 15, 2024,** on the project website **www.Hwy401ColTalbot.com.** The DCR is also available for public review at the following locations:

London Public Library
Lambeth Branch
7112 Beattie Street
London, Ontario
Tel: 519-652-2951

City of London
Clerk's Office
300 Dufferin Avenue
London, Ontario
Tel: 519-661-2500

London Public Library
Glanworth Branch
2950 Glanworth Drive
London, Ontario
Tel: 519-681-6797

Ministry of Transportation
West Region
659 Exeter Road, Lobby
London, Ontario
Tel: 519-873-4100

Ministry of the Environment, Conservation and Parks
London Regional Office
733 Exeter Road
London, Ontario
Tel: 519-873-5000

We encourage interested parties to review the DCR and provide any comments to the project team by **January 15, 2024,** by contacting one of the project team members listed below.

Jeff Matthews, P. Eng.
Project Manager
Dillon Consulting Limited
Tel: 519-438-1288 Ext. 1275
Email: Hwy401ColTalbot@dillon.ca

Eric Huey
Project Manager
Ministry of Transportation, Ontario
Tel: 548-388-3150
Email: Eric.Huey@ontario.ca

Section 16 Order (Aboriginal and Treaty Rights)

Outstanding concerns are to be directed to the team members listed above for a response, unless the outstanding concerns are regarding potential adverse impacts to constitutionally protected Aboriginal and treaty rights, in which case Section 16 Order requests on these matters should be addressed in writing or by email to the following contacts, and copied to the project team members listed above, no later than **January 15, 2024**.

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

Director, Environmental Assessment Branch
Ministry of the Environment, Conservation and Parks
135 St. Clair Ave W, 1st Floor
Toronto, Ontario, M4V 1P5
Email: EABDirector@ontario.ca

Further information on requests for orders under Section 16 of the Ontario *EA Act* is available on the MECP website at: https://www.ontario.ca/page/class-environmental-assessments-section-16-order

We are committed to ensuring that government information and services are accessible for all Ontarians. For communication supports or to request project information in an alternate format, please contact one of the preceding project team members.

Information collected will be used in accordance with the Freedom of Information and Protection of Privacy Act. With the exception of personal information, all comments will become part of the public record.

Des renseignements sont disponibles en français en composant Sydney Tasfi, 519-438-1288 Ext. 1004.

Ontario

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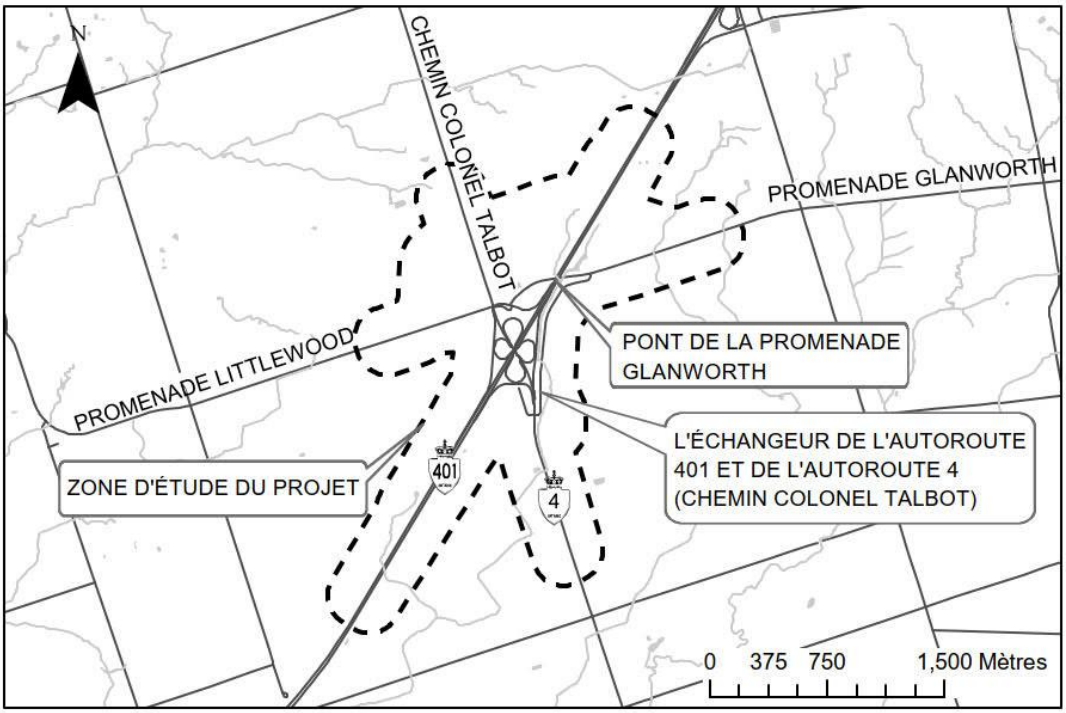
AVIS D'ACHÈVEMENT

Reconfiguration de l'échangeur de l'autoroute 401 et de l'autoroute 4 (chemin Colonel Talbot) et remplacement des ponts de l'autoroute 4 (chemin Colonel Talbot) et de la promenade Glanworth (GWP 3030-11-00)

Le ministère des Transports de l'Ontario (MTO) a retenu les services de Green Infrastructure Partners (GIP) Paving inc. et de Dillon Consulting ltée (Dillon) pour réaliser le contrat de conception-construction 2022 – 3008, qui comprend l'évaluation environnementale de portée générale, la conception détaillée et la construction de la reconfiguration de l'échangeur de l'autoroute 401 et de l'autoroute 4 (chemin Colonel Talbot) et du remplacement des ponts de l'autoroute 4 (chemin Colonel Talbot) et de la promenade Glanworth dans la ville de London, comme l'indique la figure ci-dessous. Des informations supplémentaires sont publiées sur le site Web du projet : **www.Hwy401ColTalbot.com**.



Ce projet a été réalisé conformément à l'évaluation environnementale (EA) de portée générale pour les routes provinciales (2000) en tant qu'entreprise du groupe « B ». Les projets du groupe « B » sont considérés comme des améliorations majeures des routes existantes. Ce projet s'appuie sur la conception préliminaire approuvée, dans sa version consignée dans l'addendum au rapport d'étude environnementale pour le transport (2018). Les travaux de construction devraient débuter en 2024.

Conformément à l'évaluation environnementale de portée générale du MTO, un rapport de conception et de construction (RCC) a été préparé pour consigner l'étude, y compris les conséquences environnementales et les mesures d'atténuation nécessaires pour la construction. Le RCC sera accessible pour une période de commentaires de 30 jours, soit du **13 décembre, 2023, au 15 janvier, 2024**, sur le site Web du projet, au **www.Hwy401ColTalbot.com**. Le RCC peut être consulté aussi aux endroits suivants :

Bibliothèque municipale de London
Succursale de Lambeth
7112, rue Beattie
London (Ontario)
Tél. : 519 652-2951

Cité de London
Bureau du greffier
300, avenue Dufferin
London (Ontario)
Tél. : 519 661-2500

Bibliothèque municipale de London
Succursale de Glanworth
2950, promenade Glanworth
London (Ontario)
Tél. : 519 681-6797

Ministère des Transports
Région Ouest
659, chemin Exeter, hall d'entrée
London (Ontario)
Tél. : 519 873-4100

Ministère de l'Environnement, de la Protection de la nature et des parcs
Bureau régional de London
733, chemin Exeter
London (Ontario)
Tél. : 519 873-5000

Nous encourageons les parties intéressées à examiner le RCC et à faire part de leurs commentaires à l'équipe de projet avant le **15 janvier, 2024,** en contactant l'un des membres de l'équipe de projet ci-dessous.

Jeff Matthews, ing.
Chef de projet
Dillon Consulting ltée
Tél. : 519 438-1288 poste 1275
Courriel : Hwy401ColTalbot@dillon.ca

Eric Huey
Chef de projet
Ministère des Transports de l'Ontario
Tél. : 548 388-3150
Courriel : Eric.Huey@ontario.ca

Arrêté pris en vertu de l'article 16 (droits ancestraux et issus de traités)

Les préoccupations en suspens doivent être adressées aux personnes susmentionnées pour obtenir une réponse, sauf si elles concernent des incidences négatives potentielles sur les droits ancestraux et issus de traités protégés par la Constitution, auquel cas les demandes d'arrêté pris en vertu de l'article 16 concernant ces préoccupations doivent être adressées par écrit ou par courriel aux personnes-ressources suivantes, avec copie aux membres de l'équipe de projet énumérés ci-dessus, au plus tard le **15 janvier, 2024**.

Ministre de l'Environnement, de la Protection de la nature et des Parcs
Ministère de l'Environnement, de la Protection de la nature et des Parcs
777, rue Bay, 5e étage
Toronto (Ontario) M7A 2J3
Courriel : Minister.MECP@ontario.ca

Directeur, Direction des évaluations environnementales
Ministère de l'Environnement, de la Protection de la nature et des Parcs
135, avenue St. Clair Ouest, 1er étage
Toronto (Ontario) M4V 1P5
Courriel : EABDirector@ontario.ca

De plus amples renseignements sur les arrêtés pris en vertu de l'article 16 de la *Loi sur les évaluations environnementales* sont accessibles sur le site Web du MEPNP à l'adresse suivante : https://www.ontario.ca/page/class-environmental-assessments-section-16-order

Nous nous engageons à veiller à ce que les informations et les services gouvernementaux soient accessibles à tous les Ontariens. Pour obtenir des aides à la communication ou des informations sur le projet dans un autre format, contactez l'un des membres de l'équipe de projet susmentionnés.

L'information recueillie sera utilisée conformément à la Loi sur l'accès à l'information et la protection de la vie privée. À l'exception des renseignements personnels, tous les commentaires feront partie du domaine public.

Des renseignements sont disponibles en français en appelant Sydney Tasfi, au 519 438-1288 poste 1004.

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Figures

Tables

Appendices (provided in separate document)

Acronyms and Abbreviations

AAF	Alternatives Assessment Form
ARA	Archaeological Assessment
BMP	best management practices
CHER	Cultural Heritage Evaluation Report
dBA	A-weighted decibel
DCR	Design and Construction Report
DCR	Design and Construction Report
DFO	Fisheries and Oceans Canada
EA	Environmental Assessment
EASR	Environmental Activity and Sector Registry
ECA	Environmental Compliance Approval
ECCC	Environment and Climate Change Canada
EDR	Emergency Detour Route
ESA	Environmental Site Assessments
ESC	Erosion and Sediment Control
FFHAR	Fish and Fish Habitat Assessment Report
FFHEC	Fish Habitat Existing Conditions
GDG	Geometric Design Guide
GIP	Green Infrastructure Partners
GWP	Global Warming Potential
ha	hectare
HADD	Stoneridge Inn had the potential to result in Harmful
HADD	Harmful Alteration Disruption and Destruction

HVA	Highly Vulnerable Aquifers
IGF	Information Gathering Form
KKCA	Kettle Creek Conservation Authority
km	kilometre
LCFSP	Licence to Collect Fish for Scientific Purposes
m	metre
MBCA	Migratory Birds Convention Act
MCM	Ministry of Citizenship and Multiculturalism
MECP	Ministry of the Environment, Conservation and Parks
MNRF	Ministry of Natural Resources and Forestry
MTO	Ministry of Transportation
NPC	nominal pipe size
OPSS	Ontario Provincial Standards Specifications
PIF	Project Information Form
PPS	Provincial Policy Statement
ROW	Right-of-Way
SAR	Species at Risk
SOR	Statutory Orders and Regulations
SWH	Significant Wildlife Habitat
TAC	Transportation Association of Canada
TESR	Transportation Environmental Study Report
URS	User Requirements Specification
WHPA	Well Head Protection Areas

Public Record

This Design-Build and Class Environmental Assessment Study is being carried out as a Group 'B' undertaking following the Ministry of Transportation (MTO) *Class Environmental Assessment (EA) for Provincial Transportation Facilities* (2000). This Design and Construction Report (DCR) documents the Detailed Design for the Highway 401 and Highway 4 (Colonel Talbot Road) Interchange Reconfiguration & Highway 4 (Colonel Talbot Road) and Glanworth Drive Bridge Replacements. A copy of this document will be made available for a 30-day comment period between **December 13, 2023,** and **January 15, 2024,** on the project website: **www.Hwy401ColTalbot.com**. Copies of the Design and Construction Report (DCR) are also available for review at the following locations:

<table>
<tr><td rowspan="2">London Public Library
Lambeth Branch
7112 Beattie Street
London, Ontario
Tel: 519-652-2951</td><td>City of London
Clerk's Office
300 Dufferin Avenue
London, Ontario
Tel: 519-661-2500</td><td>Ministry of Transportation
West Region
659 Exeter Road, Lobby
London, Ontario
Tel: 519-873-4100</td></tr>
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2950 Glanworth Drive
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Tel: 519-681-6797</td><td>Ministry of the Environment, Conservation and Parks
London Regional Office
733 Exeter Road
London, Ontario
Tel: 519-873-5000</td></tr>
</table>

Comments

Interested persons are encouraged to review this document and provide comments by **January 15, 2024,** to any of the project team members identified below. Information collected will be used in accordance with *the Freedom of Information and Protection of Privacy Act* and the *Access to Information Act* (1990). With the exception of personal information, all comments will become part of the public record.

If you have any accessibility requirements in order to participate in this study, please contact one of the individuals identified below.

Jeff Matthews, P. Eng. Project Manager Dillon Consulting Limited Tel: 519-438-1288 Ext. 1275 Hwy401ColTalbot@dillon.ca	**Eric Huey** Project Manager Ministry of Transportation, Ontario Tel: 548-388-3150 Eric.Huey@ontario.ca

Section 16 Order (Aboriginal and Treaty Rights)

Outstanding concerns are to be directed to the project team members listed above for a response, unless the outstanding concerns are regarding potential adverse impacts to constitutionally protected Aboriginal and treaty rights, in which case Section 16 Order requests on these matters should be addressed in writing or by email to the following contacts, and copied to the project team members listed above, no later than **January 15, 2024.**

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

Further information on requests for orders under Section 16 of the Ontario *EA Act* (1990) is available on the Ministry of Environment, Conservation and Parks (MECP) website at: https://www.ontario.ca/page/class-environmental-assessments-section-16-order.

All personal information included in your request – such as name, address, telephone number and property location – is collected under the authority of Section 30 of the Ontario *EA Act* (1990) and maintained for the purpose of creating a record that is available to the general public. As this information is collected for the purpose of a public record, the protection of personal information provided in the *Freedom of Information and Protection of Privacy Act* (1990) does not apply (Section 37). Personal information you submit will become part of a public record available to the general public unless you request that your personal information remain confidential.

Executive Summary

The Ministry of Transportation, Ontario (MTO) retained Green Infrastructure Partners (GIP) Paving Incorporated and Dillon Consulting Limited (Dillon) to complete the Design-Build and Class Environmental Assessment (EA) for the Detailed Design and construction of the Highway 401 and Highway 4 (Colonel Talbot Road) Interchange Reconfiguration and Highway 4 (Colonel Talbot Road) and Glanworth Drive Bridge Replacements in the City of London.

The Preliminary Design and Class EA Study for the 'Highway 401 Improvements from 1.0 kilometre (km) west of Highway 4 easterly to 1.0 km east of Highbury Avenue' (GWP 476-89-00) was previously completed and documented in a Transportation Environmental Study Report (TESR; URS, 2004). MTO retained Dillon to review and update the 2004 TESR for improvements to the 'Highway 401 and Highway 4 Interchange Improvements and Highway 4 and Glanworth Drive Underpass Replacements' (GWP 3030-11-00), which was documented in a TESR Addendum (Dillon, 2018). The TESR Addendum received Environmental Clearance for Right-of-Way (ROW) Designation and Property Expropriation on September 10, 2020, allowing the project to advance.

A Procurement Ready Report was completed by Dillon (2022) to prepare the project for Detailed Design. The purpose of the Detailed Design stage of the project is to develop the design to an implementation level of detail, and to prepare drawings and documents for construction. The Class EA study focused on traffic operations and safety, highway and bridge engineering requirements, natural environment, cultural environment, socio-economic environment, and cost. This Design and Construction Report (DCR) has been prepared to document the Detailed Design and Class EA for the project and is being issued for a 30-day public comment period.

Construction is anticipated to be completed over three construction seasons, and may include additional work in year 4. The anticipated construction schedule is as follows:

- Year 1 Anticipated Construction Activities:
    - Construct median piers for new Highway 4 (Colonel Talbot Road) bridge;

  - Construct median piers, abutments with approaches and install new girders for new Glanworth Drive bridge;
  - Construct high mast illumination footings along the Highway 401 median;
  - Reconstruct Highway 401 median storm sewer and sewer crossings; and,
  - Construct realignment of Glanworth Drive and Littlewood Drive.

- Year 2 Anticipated Construction Activities:
  - Construct new Highway 4 (Colonel Talbot Road) road and bridge offline;
  - Construct abutments with approaches and install new girders for new Highway 4 (Colonel Talbot Road) bridge;
  - Construct Tempo Road realignment;
  - Construct new Glanworth Drive bridge and deck structure;
  - Construct Littlewood Drive and Glanworth Drive realignments;
  - Widen Highway 4 (Colonel Talbot Road) to the west (southbound lanes) for temporary traffic in future stages; and,
  - Remove existing Glanworth Drive bridge.
- Year 3 Anticipated Construction Activities:
  - Construct new Highway 4 (Colonel Talbot Road) bridge deck and structure;
  - Construct northbound lanes of Highway 4 (Colonel Talbot Road);
  - Construct new E-N/S Ramp, S-W Ramp and S-E Ramp;
  - Remove existing Highway 4 (Colonel Talbot Road) bridge;
  - Construct southbound lanes of Colonel Talbot Road;
  - Construct new W-N/S Ramp, N-E Ramp and N-W Ramp;
  - Construct realignment of Burtwistle Lane; and,
  - Complete construction of Highway 4 (Colonel Talbot Road), except for surface course paving.
- If Required, Year 4 Minor Carry-Over Anticipated Construction Activities:
  - Complete surface course paving and construction of raised median on Highway 4 (Colonel Talbot Road).

Highway 401 will remain open for the majority of construction; however, nightly full closures of Highway 401 will be required to demolish the existing Highway 4 (Colonel Talbot Road) and Glanworth Drive bridges and erect the new bridge girders. During construction, one lane of traffic in each direction will be maintained on Highway 4

(Colonel Talbot Road) except for nightly full closures to facilitate final construction activities such as tie-ins. Glanworth Drive, Tempo Road, and Littlewood Drive are anticipated to remain open except for closures to facilitate final construction activities. No closures are anticipated on Burtwistle Lane. Detour routes, signage and signalling will be provided to indicate lane restrictions and closures.

A Terrestrial Ecosystems Impact Assessment Update Memo (Dillon, 2023) was prepared to update and confirm the existing terrestrial features, and associated impacts and mitigation measures. This analysis found that the Red-headed Woodpecker, Eastern Small-footed Myotis, Little Brown Myotis, Northern Myotis and Tri-colored Bat were not previously listed in the 2018 report and were identified as having potential habitat within the Study Area. In addition, the Barn Swallow was down-listed from Threatened to Special Concern under the *Endangered Species Act* (2007), although still protected under the *Migratory Birds Convention Act* (1994). It was determined that potential impacts to Red-headed Woodpecker and SAR bat species was possible as a result of the proposed improvements. Discussions are underway with the Ministry of the Environment, Conservation and Parks to determine if a permit under the *Endangered Species Act* is required.

A Fisheries and Fish Habitat Impact Assessment Update Memo (Dillon, 2023) was prepared to update and confirm existing aquatic conditions and potential impacts to fish and fish habitat. The memo included the results of investigations at the stormwater management pond at the Best Western Stoneridge Inn, the man-made pond north of the interchange, the Gold Seal Drain and the Fournie Drain. The analysis found that the stormwater management pond, man-made pond, and Gold Seal Drain are not considered fish habitat, while the Fournie Drain is considered to have fish habitat. It also determined that the realignment of the Fournie Drain has the potential to cause harmful alteration, disruption, or destruction (HADD) of fish habitat and as a result, it has been recommended that a Fisheries and Oceans Canada (DFO) Request for Review form be prepared and submitted to DFO for works proposed on the Fournie Drain.

Contamination Overview Studies were previously completed to identify areas where Phase 1 and/or Phase 2 Environmental Site Assessments (ESA) were required prior to construction. These Phase 1 and II ESA investigations are underway to determine recommendations for contaminated soils based on the design footprint. The results of

these investigations will be used to guide the management of soils for reuse and/or disposal, with the recommendations updated and carried forward into the construction contract.

A Stage 1 and Stage 2 Archaeological Assessment (ARA, 2023) determined that further Stage 2 and Stage 3 assessments were required for the project. The Stage 2 and Stage 3 Archaeological Assessments were completed in October 2023, and it was determined that Stage 4 assessments were not required. An Archaeological Assessment Report is being prepared and will be submitted for concurrence from the Ministry of Citizenship and Multiculturalism (MCM) prior to construction.

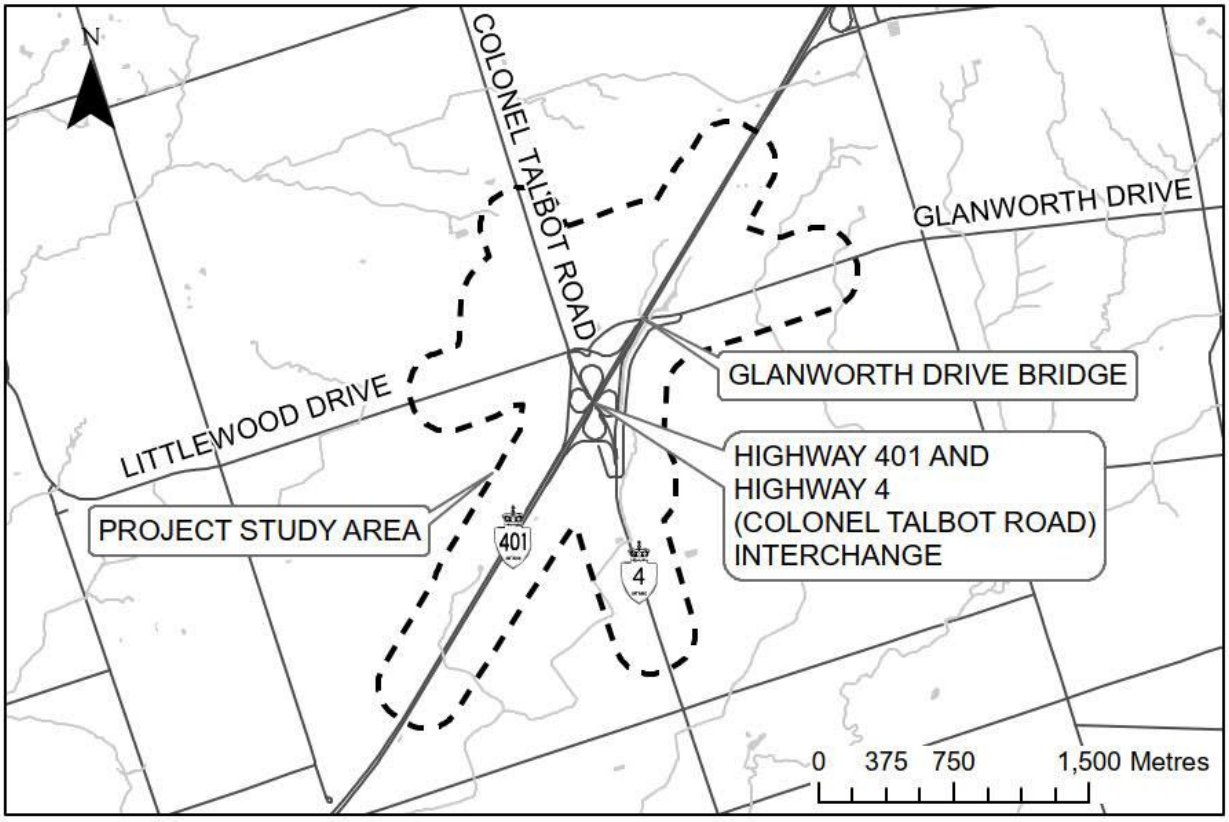
1.0 Overview

1.1 Summary of Description of the Undertaking

The Ministry of Transportation, Ontario (MTO) has retained Green Infrastructure Partners (GIP) Paving Incorporated and Dillon Consulting Limited (Dillon) to complete the Design-Build Contract 2022-3008, which includes meeting the requirements of the MTO Class Environmental Assessment (EA), Detailed Design, and construction of the Highway 401 and Highway 4 (Colonel Talbot Road) Interchange Reconfiguration and Highway 4 (Colonel Talbot Road) and Glanworth Drive Bridge Replacements in the City of London (**Figure 1**).

As shown in **Figure 1**, the general Study Area consists of the lands around the Highway 401 and Highway 4 (Colonel Talbot Road) interchange and Highway 4 (Colonel Talbot Road) and Glanworth Drive bridges within the City of London. The project limits extend along Highway 401 from 1.9 kilometre (km) west to 1.8 km east of the existing Colonel Talbot Road bridge as well as along Highway 4 (Colonel Talbot Road) from 1.4 km north to 1.3 km south of Highway 401. The project limits also extend along Littlewood Drive and Glanworth Drive from 0.8 km west to 1.7 km east of Highway 4 (Colonel Talbot Road).

Figure 1: Project Study Area



1.2 Project Description, Needs and Justification

The existing Colonel Talbot Road bridge was built in 1956 and the Glanworth Drive bridge was built in 1958. Both bridges are nearing the end of their service life. As a result, the existing structures require replacement. The improvements include the following:

- Replace the Highway 4 bridge on a slight alignment shift to the east of the existing bridge over Highway 401;
- Replace the existing Glanworth Drive bridge on a new alignment to the east over Highway 401;
- Realign the intersection of Burtwistle Lane and Tempo Road at Highway 4; and,
- Realign Glanworth Drive and Littlewood Drive to a new intersection at Colonel Talbot Road north of the existing connection.

To minimize future costs and traffic disruption, the new bridges and interchange have been designed to accommodate the future expansion of Highway 401 to eight lanes. Details for the Highway 401 expansion work are outlined in **Section 1.3**.

Construction activities are anticipated to begin in 2024, subject to approvals. All work is anticipated to be completed in 2027.

1.3 Highway 401 Expansion

During Detailed Design, MTO identified the opportunity to streamline work within the Study Area by incorporating additional work within the scope of this project. The Highway 401 Expansion project (GWP 3025-18-00) is being completed for MTO by Stantec Consulting Ltd (Stantec) in a separate study and includes the widening of Highway 401 and installation of concrete median barrier from 1.0 km west of Highway 4 (Colonel Talbot Road) to Wellington Road. MTO requested that Dillon incorporate details from the Highway 401 Expansion project into the design for this project, which includes, realigning the ditches adjacent to Highway 401 and providing additional granular to allow for the widening of Highway 401 during the expansion.

Stantec completed a TESR Review Memo (2020) to document their review of the 2004 TESR and changes that have taken place since its submission. The memo includes a review of existing environmental conditions (natural, socio-economic and cultural), relevant legislation, new engineering standards and new technologies for mitigation measure to document any changes since submission of the 2004 TESR. The memo concluded that a TESR Addendum is not required, and the project may proceed to Detailed Design.

In addition to the impact assessment studies, Dillon reviewed Stantec's TESR Review Memo to consider its findings regarding the Highway 401 expansion to be incorporated into the Detailed Design of the Highway 401 and Highway 4 (Colonel Talbot Road) project. The memo confirmed the requirements for the Detailed Design stage and appropriate mitigation measures including the need to assess the area for SAR and provincially rare species, identify areas of potential groundwater impact, undertake a well survey, complete post-construction landscaping, undertake additional consultation, and monitoring during construction. The memo also confirmed that the Stage 1 archaeological investigation of the lands within the Highway 401 mainline, have been

extensively disturbed and exhibit low archaeological potential. Based on the findings of the TESR Review Memo and Dillon's impact assessment, Dillon completed the Class EA and Detailed Design of the Highway 401 expansion within the study limits.

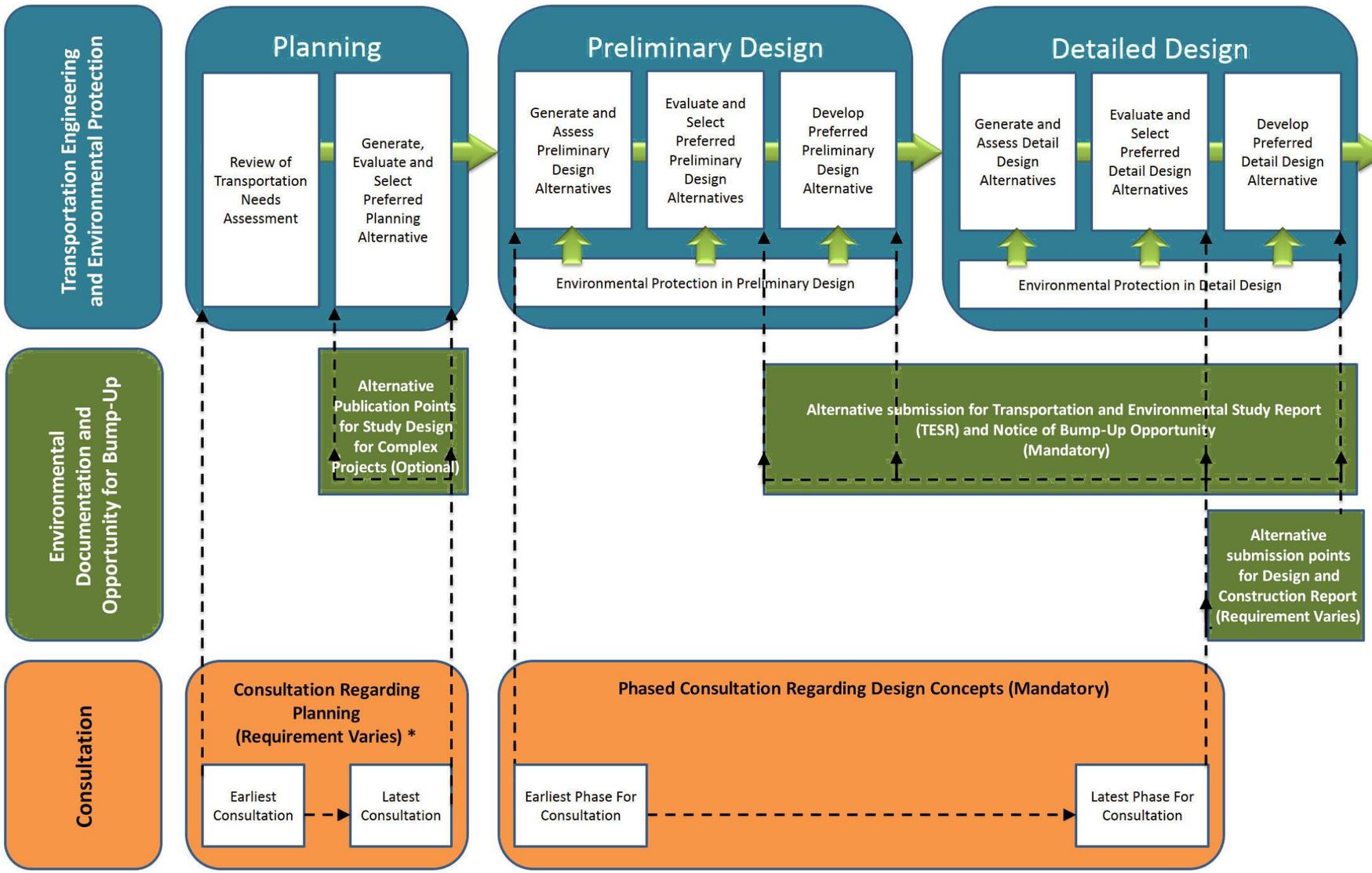
1.4 MTO Class EA Requirements

The MTO Class EA provides a streamlined planning approach (**Figure 2**) that allows individual projects or activities within a defined "class" to meet the requirements of the Ontario *EA Act* (1990), provided the Class EA is followed. The MTO Class EA document follows a principle-based approach, and includes the following principles that must be addressed during the course of a study:

- Transportation Engineering Principles to confirm that the project meets current engineering design standards for the safe and efficient movement of people and goods across Ontario;
- Environmental Protection Principles to protect or mitigate potential natural, socio-economic and cultural environmental impacts through the development of mitigation measures;
- Consultation Principles to encourage meaningful engagement with stakeholders such as the public, agencies and Indigenous communities;
- Evaluation Principles to provide an evaluation of alternatives that provides balance between engineering requirements and environmental protection that is open and transparent; and,
- Documentation Principles providing an opportunity for stakeholders to review the design, potential impacts and proposed mitigation measures.

MTO's Class EA identifies the interchange improvements and bridge replacements as a Group 'B' project. Group 'B' projects include major improvements to existing transportation facilities. This type of project is approved under the Ontario *EA Act*, as long as it is planned and designed according to the requirements of the Class EA. The Preliminary Design and Detailed Design studies for the interchange improvements and bridge replacements were carried out as a Group 'B' undertaking following MTO's *Class EA for Provincial Transportation Facilities* (2000).

Figure 2: MTO Class Environmental Assessment Process



1.5 Preliminary Design Stage

The Preliminary Design and Class EA Study for the 'Highway 401 Improvements and from 1.0 km west of Highway 4 easterly to 1.0 km east of Highbury Avenue' (GWP 476-89-00) was previously completed and documented in a Transportation Environmental Study Report (TESR; URS, 2004). MTO retained Dillon to review and update the 2004 TESR for improvements to the 'Highway 401 and Highway 4 Interchange Improvements and Highway 4 and Glanworth Drive Underpass Replacements' (GWP 3030-11-00), which was documented in a TESR Addendum (Dillon, 2018). The TESR Addendum received Environmental Clearance for Right-of-Way (ROW) Designation and Property Expropriation on September 10, 2020, allowing the project to advance.

A Procurement Ready Report was completed by Dillon (2022) to prepare the project for Detailed Design.

1.6 Detailed Design Stage

The purpose of the Detailed Design stage of the project is to develop the recommended design to an implementation level of detail and prepare drawings and documents for construction. This stage focused on the environmental impacts and environmental mitigation, monitoring measures and provisions to be incorporated into the construction contract. A Design and Construction Report (DCR) is prepared to document the final Detailed Design and Class EA for the project.

A Notice of Completion for the DCR will be published in English in The Londoner and in French in the London L'Action announcing the start of the 30-day public and agency comment period. Comments received will be reviewed by the project team, and changes to the design and/or mitigation measures will be made as appropriate. Following the 30-day public comment period, the 30-day Ministry of the Environment, Conservation and Parks (MECP) comment period and receipt of all design related approvals, the project will receive Environmental Clearance under the MTO Class EA to proceed to construction without further notice unless a Section 16 Order is received.

The Notice of Completion and further details related to Section 16 Orders (Aboriginal and Treaty Rights) are included at the beginning of this report.

1.7 Consistency with Provincial Policy Statement

The Provincial Policy Statement (PPS; 2020) is issued under Section 3 of the *Planning Act* (1990) and came into effect on May 1, 2020. Section 3 of the *Planning Act* states that decisions affecting planning matters "shall be consistent with" the PPS. The consistency of the proposed improvements (defined as "infrastructure" in the PPS) within the relevant Infrastructure and Public Service Facilities policies included in Section 1.6 of the PPS is summarized as follows:

- The planned bridge replacements and interchange improvements are consistent with the PPS goal of providing transportation systems which are safe, energy efficient and facilitate the movement of people and goods and are appropriate to address projected needs;
- Consistent with the PPS, the improvements make efficient use of existing and planned infrastructure;
- MTO has integrated transportation and land use considerations in all stages of the planning process, as required by the PPS; and,
- MTO is planning for and protecting the Highway 401 corridor, interchanges and the ROW for the future.

Section 1.6.8.6 of the PPS, requires that MTO, consider significant resources protected by the PPS, such as prime agricultural lands, significant natural features and lands with archaeological potential when planning for corridor and ROWs. Significant resources are not affected by the improvements, as described below:

- Impacts on agriculture including the fragmentation of farmland have been minimized;
- Impacts to fish and fish habitat through the alterations of the Fournie Drain have been minimized;
- Impacts to migratory and other protected birds have been minimized; and,
- Impacts on lands with archaeological potential will be avoided by completing the required archaeological assessments and obtaining archaeological concurrence from the Ministry of Citizenship and Multiculturalism (MCM) prior to construction.

2.0 Consultation Process

The following sections summarize the public, agency and Indigenous community consultation and engagement completed throughout the Detailed Design stage. Input was considered by the project team and, where applicable, incorporated into the design and construction documents.

Consultation materials are summarized below and are included in **Appendix A**.

2.1 Project Contact List

The project contact list builds upon the stakeholders identified during the Preliminary Design stage of the project. The list includes elected officials, Federal and Provincial ministries, local agencies, interest groups and community associations, emergency services, and members of the public. Landowners and businesses within approximately 1.0 km of the project were also included, as well as any additional parties that requested to be kept informed of the project. Potentially interested Indigenous communities were identified by MTO and included. The contact list was updated throughout the project based on feedback received.

2.2 Project Website and E-mail Address

A project website and a project-specific e-mail address were developed. The website featured an overview of the study, information on the Class EA process, a copy of the TESR Addendum, and copies of the Notice of Commencement and Public Information Centre and Notice of Completion. The website is **www.Hwy401ColTalbot.com** and the project e-mail address is Hwy401ColTalbot@dillon.ca.

2.3 Notice of Study Commencement and Public Information Centre

A Notice of Study Commencement and Public Information Centre (the Notice) was prepared to introduce the next stage of the project and provide information on the Detailed Design and Class EA process, project team contact details, and project website address. The Notice was published on September 6, 2023, on the project website and on September 7, 2023, in The Londoner and L'Action newspapers. Copies of the Notice were mailed and e-mailed to the project contact list as follows:

- A copy of the Notice was sent to the local MPP via e-mail on August 30, 2023;
- A copy of the Notice was mailed to stakeholder and agency contacts where e-mails were not available on September 5, 2023;
- A copy of the Notice was e-mailed to the remaining stakeholder and agency contacts on September 6, 2023; and,
- MTO e-mailed a copy of the Notice to Indigenous communities on September 6, 2023.

Seven comments were received from agencies and included acknowledgement of the Notice, updated contact information and an inquiry about the MECP Project Information Form (PIF). The MCM noted that the 2018 TESR Addendum indicated Stage 1 and 2 archaeological assessments were being undertaken as part of Detailed Design and requested PIF numbers for the assessments.

Nine comments were received from the public and stakeholders. The majority provided updated contact information. There was one request for a mailed copy of the approved preliminary design plan and one inquiry about how drivers would turn from Tempo Road onto Highway 4. Hydro One noted there were no transmission assets in the project area and asked to be kept updated should there be changes to the project plans or Study Area.

The project team responded to the comments and questions received as necessary. Responses included general acknowledgment of the information received, supplying PIF information to MECP and the MCM, direction to the project website to review the interactive map, and information on the Tempo Road and Highway 4 intersection. Detailed responses can be reviewed in **Appendix A**.

2.3.3 Indigenous Communities

Engagement with Indigenous communities has been ongoing throughout the Preliminary Design and Detailed Design stages of this project and included the following communities, as identified by MTO:

- Aamjiwnaang First Nation;
- Caldwell First Nation;
- Chippewas of Kettle and Stony Point First Nation;
- Chippewas of the Thames First Nation;
- Delaware Nation (Moravian of the Thames);
- Munsee-Delaware Nation;
- Oneida Nation of the Thames; and,
- Walpole Island First Nation.

No comments were received from Indigenous communities.

2.4 Public Information Centre

A Public Information Centre (PIC) was held at the Best Western Plus Stoneridge Inn and Conference Centre on September 20, 2023, from 4:00 pm to 8:00 pm. The purpose of the PIC was to obtain input on the Detailed Design including design refinements (**Section 3.10**) and traffic management during construction.

The PIC was a drop-in style, open house format meeting with display boards summarizing the Detailed Design and construction of the project. Members of the project team were in attendance to explain the displays, record comments, and answer questions. The PIC display boards covered the following:

- Project background;
- Preferred Design (2018);
- Refinements to the Preferred Design;
- Anticipated impacts and proposed mitigation measures;
- Anticipated permits, approvals, and exemptions;
- Construction staging and traffic management;
- Anticipated closures and durations; and,
- Next steps and how to submit comments.

A copy of the PIC display boards were uploaded to the project website on September 20, 2023.

2.4.1 Public Information Centre Comments and Responses

A total of 26 individuals attended the PIC and the majority of the attendees were landowners. City of London Councillor Anna Hopkins attended the PIC, as well as representatives from Green Lane Landfill, Gentek Building Products and Best Western Stoneridge Inn.

The PIC was well received and attendees were pleased to hear that the project is moving forward. General comments included questions about the construction schedule, concerns related to drainage on specific properties, utility relocations, access during construction and the operations of the interchange and realigned roads.

Three comment forms were received during the PIC. Feedback received included safety concerns related to transport trucks traveling north of the interchange on Colonel Talbot Road, drainage concerns specific to certain properties, and measurements of lanes, shoulders and median at a proposed entrance relocation for a specific property.

The project team e-mailed the respondents to thank the attendees for their comments and to provide responses to the specific inquiries. Responses included reference to a comprehensive drainage study, specific improvements included as part of the project, and the commitment to pass on the concerns received to the City of London. One response included the offer to meet with the project team to discuss the concerns related to a specific property. Detailed responses can be reviewed in **Appendix A**.

A member of the project team met with the previously mentioned property owner to review the design and construction drawings to ensure the potential impacts to the property were understood. The property owner noted they would review the information with their contractor and advise the project team member if further information was required.

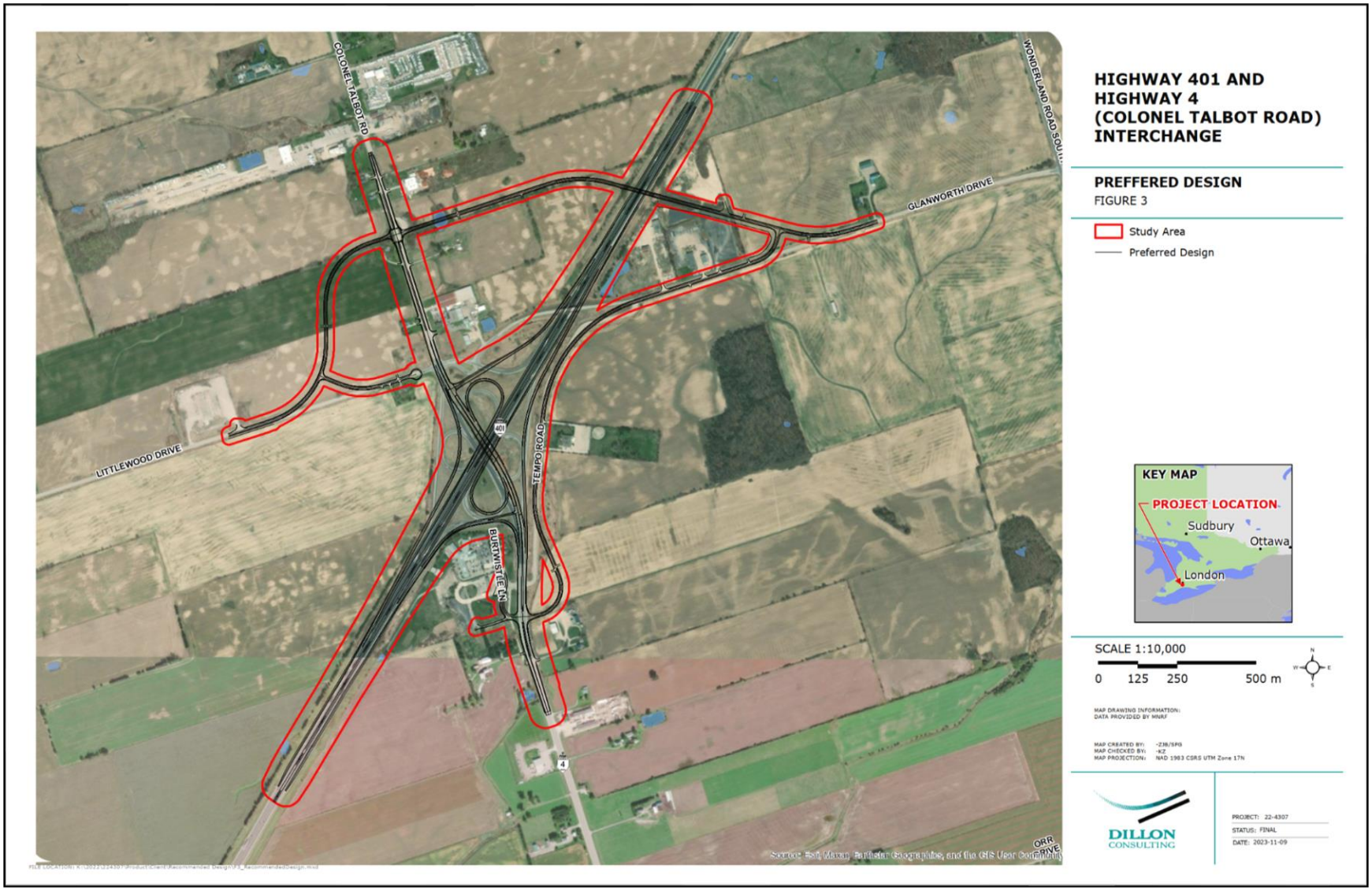
3.0 Description of the Preferred Design

The Preferred Design was documented in the Preliminary Design and Procurement Ready Report (**Section 1.5**). The project limits extend along Highway 401 from 1.9 km west to 1.8 km east of the existing Highway 4 (Colonel Talbot Road) bridge, along Highway 4 (Colonel Talbot Road), extend from 1.4 km north to 1.3 km south of Highway 401 and along Glanworth Drive, and extends from 0.8 km west to 1.7 km east of Highway 4 (Colonel Talbot Road).

The Preferred Design has been advanced through to the Detailed Design stage and the work includes the following improvements (**Figure 3**):

- Highway 4 (Colonel Talbot Road) bridge realignment east of existing bridge;
- New intersection of Glanworth Drive and Littlewood Drive north of Highway 401;
- Existing section of Littlewood Drive and Colonel Talbot Road intersection eliminated with new cul-de-sac on Littlewood Drive to the west;
- Reconfiguration of the Highway 401 and Highway 4 (Colonel Talbot Road) interchange to a Parclo A-4;
- Burtwistle Lane realigned and Tempo Road realigned with new intersection at Highway 4 (Colonel Talbot Road);
- New intersection at Glanworth Drive and Tempo Road;
- Traffic signals provided at Highway 4 (Colonel Talbot Road) intersection with E-N/S ramp;
- Traffic signals provided at Highway 4 (Colonel Talbot Road) intersection with W-N ramp;
- Traffic signals provided at Highway 4 (Colonel Talbot Road)/Glanworth Drive and Littlewood Drive intersection; and,
- Full interchange illumination, including high mast illumination along the Highway 401 median.

Figure 3: Preferred Design



The following activities were undertaken to help develop the Preferred Design, identify potential environmental impacts, and develop appropriate and effective mitigation measures:

- Reviewed the TESR Addendum and Procurement Ready Report;
- Completed a Terrestrial Ecosystem Impact Assessment Update Memo (Dillon, 2023) and Fish and Fish Habitat Impact Assessment Update Memo (Dillon, 2023);
- Completed a Phase 1 and/or Phase 2 Environmental Site Assessments (WSP, TBD);
- Completed Archaeology Assessments (ARA, TBD); and,
- Conducted additional consultation with the public, agencies, and Indigenous communities.

It is anticipated that construction will start in 2024 with completion in Summer 2027.

Additional details pertaining to key improvements are included below. The design has been completed in accordance with the Transportation Association of Canada Geometric Design Guide for Canadian Roads (TAC GDG) (2017), MTO Design Supplement to the TAC-GDG (2020) and the MTO Roadside Design Manual (2020).

3.1 Highway 401 and Highway 4 (Colonel Talbot Road) Interchange

The existing Highway 401 and Highway 4 (Colonel Talbot Road) modified cloverleaf interchange will be reconstructed to a Parclo A-4 interchange. The W-S, S-E, S-W, N-W and N-E ramps will be single lane, 4.75 metres (m) in width. The E-N/S Ramp will include dual 3.75 m left-turn lanes and a 3.75 m right turn lane at the signalized intersection. The W-N ramp will include a 3.75 m left-turn lane at the signalized intersection. All ramps include 2.5 m right paved shoulders and 1.0 m left shoulders.

The interchange ramp terminals are designed to accommodate long combination vehicles turning movements.

3.2 Highway 401

New speed change lanes will be constructed to accommodate interchange improvements for the Highway 401 and Highway 4 (Colonel Talbot Road) interchange including paved shoulders at ramp terminal intersections.

The new Highway 4 (Colonel Talbot Road) and Glanworth Drive bridges will be designed to accommodate an ultimate eight-lane cross-section of Highway 401. The future cross-section will include four through lanes in each direction and speed change lanes associated with the interchange improvements included in the TESR. Further details can be reviewed in **Section 1.3**.

3.3 Colonel Talbot Road

The Colonel Talbot Road cross-section includes four lanes, two southbound and two northbound lanes, left-turn lanes at each intersection and speed change lanes for each direct interchange ramp. There will be a raised concrete median from south of the Colonel Talbot Road and Tempo Road intersection to north of the north ramp terminal. There will be a two-way left-turn lane between the north ramp terminal and the new Littlewood Drive and Glanworth Drive intersection at Colonel Talbot Road.

3.4 Glanworth Drive

Glanworth Drive will have two 3.5 m lanes, one eastbound and one westbound, with 2.5 m shoulders 1.5 m partially paved to accommodate the City of London cycling network.

Glanworth Drive will be realigned and crossover Highway 401 approximately 440 m northeast of the existing alignment. The Glanworth Drive alignment will also be shifted northward to meet with Colonel Talbot Road at a new intersection approximately 440 m north of the existing Highway 4 (Colonel Talbot Road) and Glanworth Drive intersection.

3.5 Tempo Road

Tempo Road will have two 3.5 m lanes and 2.5 m shoulders. Tempo Road will be realigned from Highway 4 (Colonel Talbot Road) and extended eastward to meet with the realigned Glanworth Drive. The intersection of Tempo Road and Highway 4 (Colonel Talbot Road) will be shifted south approximately 100 m from the existing intersection.

3.6 Littlewood Drive

Littlewood Drive will have two 3.5 m lanes and 2.5 m shoulders. A northerly realignment of Littlewood Drive is included to align with Glanworth Drive to maintain a single intersection. Littlewood Drive will be shifted northward to meet with Colonel Talbot Road on a new alignment approximately 440 m north of the existing Littlewood Drive and Colonel Talbot Road intersection.

Littlewood Place, a new road to be built from Littlewood Drive, will extend eastward and end in a cul-de-sac at Colonel Talbot Road.

3.7 Burtwistle Lane

Burtwistle Lane will have two 4.0 m lanes, with paved shoulder widths varying from 1.5 to 3.0 m to provide acceptable turning radii for vehicles entering and exiting and will include and curb and gutter. A realignment of Burtwistle Lane is included to improve the geometry of the intersection with Highway 4. The realigned Burtwistle Lane maintains the same intersection location across from Tempo Road.

3.8 Overhead and Ground Mounted Signs

Existing ground mounted signs for the Highway 401 and Highway 4 (Colonel Talbot Road) interchange will be replaced in advance of the interchange and new overhead signs will be installed over the exit ramps.

3.9 Construction Staging

The work to be undertaken as part of this Contract is anticipated to be completed over three construction seasons generally following the sequence outlined below. Modifications to the staging may occur to further streamline construction, as needed.

- Year 1 Anticipated Construction Activities:
    - Construct median piers for new Highway 4 (Colonel Talbot Road) bridge;
    - Construct median piers, abutments with approaches and install new girders for new Glanworth Drive bridge;
    - Construct high mast illumination footings along the Highway 401 median;
    - Reconstruct Highway 401 median storm sewer and sewer crossings; and,
    - Construct realignment of Glanworth Drive and Littlewood Drive.

- Year 2 Anticipated Construction Activities
  - Construct new Highway 4 (Colonel Talbot Road) road and bridge offline;
  - Construct abutments with approaches and install new girders for new Highway 4 (Colonel Talbot Road) bridge;
  - Construct Tempo Road realignment;
  - Construct new Glanworth Drive bridge and deck structure;
  - Construct Littlewood Drive and Glanworth Drive realignments;
  - Widen Highway 4 (Colonel Talbot Road) to the west (southbound lanes) for temporary traffic in future stages; and,
  - Remove existing Glanworth Drive bridge.
- Year 3 Anticipated Construction Activities
  - Construct new Highway 4 (Colonel Talbot Road) bridge deck and structure;
  - Construct northbound lanes of Highway 4 (Colonel Talbot Road);
  - Construct new E-N/S Ramp, S-W Ramp and S-E Ramp;
  - Remove existing Highway 4 (Colonel Talbot Road) bridge;
  - Construct southbound lanes of Colonel Talbot Road;
  - Construct new W-N/S Ramp, N-E Ramp and N-W Ramp;
  - Construct realignment of Burtwistle Lane; and,
  - Complete construction of Highway 4 (Colonel Talbot Road), except for surface course paving.
- If Required, Year 4 Minor Carry-Over Anticipated Construction Activities:
  - Complete surface course paving and construction of raised median on Highway 4 (Colonel Talbot Road).

Highway 401 will remain open for the majority of construction; however, nightly full closures of Highway 401 will be required to demolish the existing Highway 4 (Colonel Talbot Road) and Glanworth Drive bridges and erect the new bridge girders. During construction, one lane of traffic in each direction will be maintained on Highway 4 (Colonel Talbot Road) except for nightly full closures to facilitate final construction activities such as tie-ins. Glanworth Drive, Tempo Road, and Littlewood Drive are anticipated to remain open except for closures to facilitate final construction activities. No closures are anticipated on Burtwistle Lane. Detour routes, signage and signalling will be provided within the Study Area to indicate lane restrictions and closures.

Construction staging, detour route maps and traffic management details are provided in the following sections.

3.10 Detour Routes

Detour routes for Highway 401, Highway 4 (Colonel Talbot Road), Glanworth Drive and Littlewood Drive were previously identified and presented during the Preliminary Design stage of this project, based on input from the City of London, the counties, and other affected local municipalities. The detour routes outlined below were reviewed during Detailed Design and are consistent with what was previously presented. Traffic volumes, signaling, and signage have been refined as part of the Detailed Design stage of this project.

3.10.1 Highway 401

During construction, nightly full closures of both eastbound and westbound lanes of Highway 401 are required to remove the existing Highway 4 (Colonel Talbot Road) and Glanworth Drive bridges and to erect new girders at both structures. Long duration ramp closures are required for construction of the new Highway 401 and Highway 4 (Colonel Talbot Road) interchange ramps and speed change lanes. Long duration lane closures will also be required for construction of the new median piers.

During the closures of Highway 401 to remove the existing Highway 4 (Colonel Talbot Road) and Glanworth Drive bridges, as well as during girder placement, detour signage will direct traffic as follows (**Figure 4**):

- Westbound lanes will exit Highway 401 at Highway 402, travel westbound along Highway 402 where they will exit at Colonel Talbot Road, head southbound and merge onto Highway 401 westbound; and,
- Eastbound traffic will be detoured along the Emergency Detour Route (EDR). Traffic will exit Highway 401 at Highway 4 (Colonel Talbot Road), travel southbound along Highway 4 to Highway 3, where they will travel eastbound on Highway 3 to Wellington Road, then travel northbound on Wellington Road and merge onto Highway 401 eastbound.

3.10.2 Highway 4 (Colonel Talbot Road)

Due to the easterly alignment shift of the interchange, construction of the new bridge will be completed offline and installed in a single stage.

Temporary nightly full closures of Highway 4 (Colonel Talbot Road) are required to facilitate traffic during removal of the existing Highway 4 (Colonel Talbot Road) bridges and to erect the new girders. One lane of traffic in each direction will be maintained except for closures to facilitate final construction activities such as tie-ins.

During the closure of Highway 4 (Colonel Talbot Road) detour signage will direct traffic around the interchange using the new alignment of Glanworth Drive and Tempo Road as follows (**Figure 5**):

- Northbound traffic will exit at Tempo Road, travel eastbound to Glanworth Drive, then follow Glanworth Drive to Colonel Talbot Road; and,
- Southbound traffic will exit at Glanworth Drive, travel westbound to Tempo Road, then follow Tempo Road to Highway 4 (Colonel Talbot Road).

3.10.3 Glanworth Drive and Littlewood Drive

Glanworth Drive is anticipated to remain open for the duration of construction except for closures to facilitate construction activities such as tie-ins. The closures of Glanworth Drive will not occur at the same time as the closure of Highway 4 (Colonel Talbot Road) and Colonel Talbot Road will remain open to northbound and southbound traffic north of Glanworth Drive.

Traffic will be maintained on Littlewood Drive except for short duration closures to complete tie-ins.

During the closure of Glanworth Drive and Littlewood Drive, detour signage will direct traffic as follows (**Figure 6**):

- Westbound traffic on Glanworth Drive will be detoured north at Wonderland Road to Westminster Drive, westbound along Westminster Drive and southbound at Westdel Bourne to Littlewood Drive;

- Eastbound traffic on Littlewood Drive will be detoured north at Westdel Bourne to Westminster Drive, eastbound along Westminster Drive and southbound at Wonderland Road: and,
- Signage will be placed at Colonel Talbot Road for motorists exiting Highway 401 and destined for Littlewood Drive and Glanworth Drive. The signage will direct traffic north to Westminster Drive to use the appropriate east or west detour to reach Littlewood Drive or Glanworth Drive.

Figure 4: Highway 401 Detour Route

Figure 5: Highway 4 (Colonel Talbot Road) Detour Route

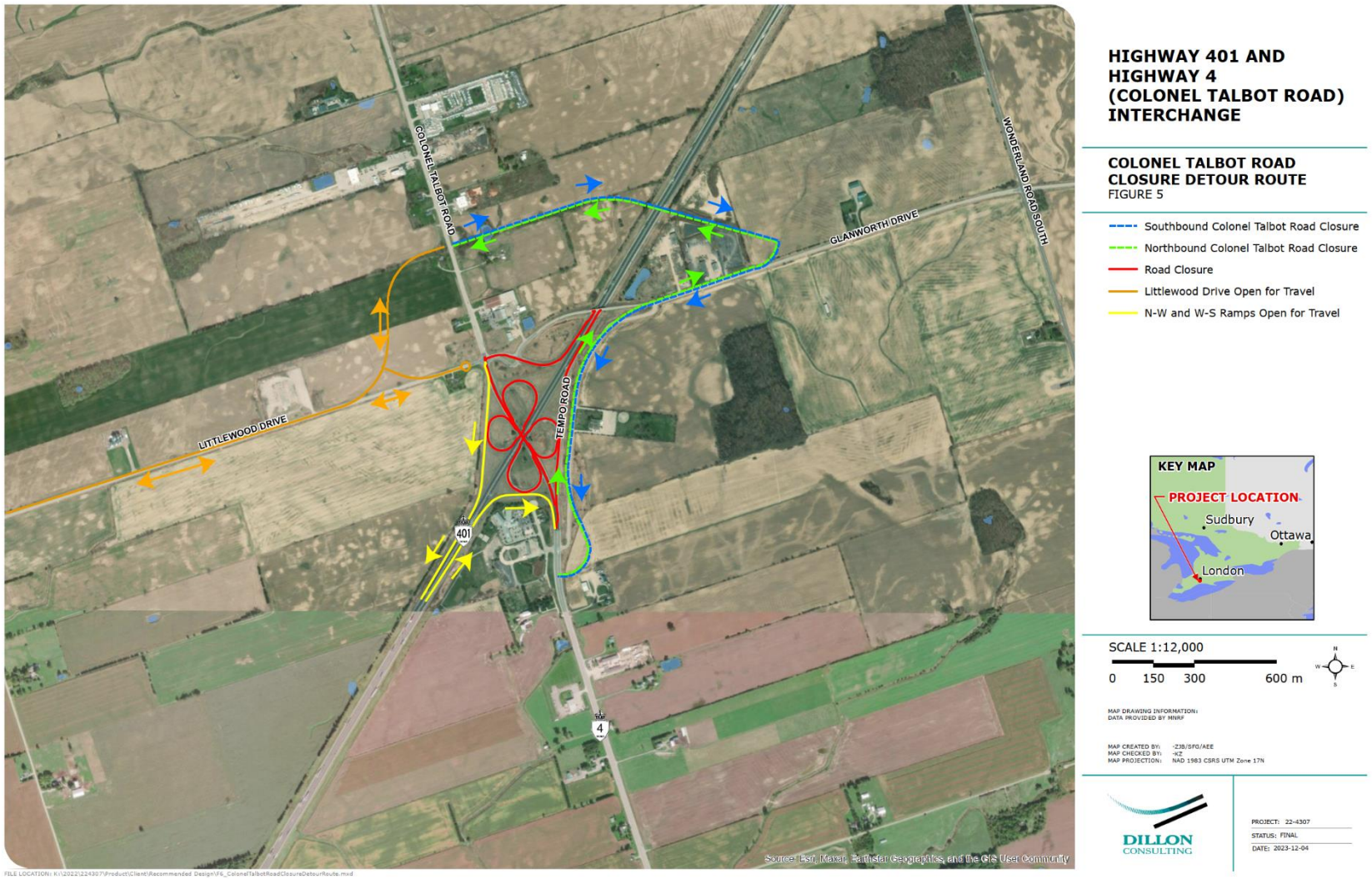


Figure 6: Littlewood Drive and Glanworth Drive Detour Route

3.10.4 Tempo Road

Access to Tempo Road will be maintained from either Highway 4 (Colonel Talbot Road) or Glanworth Drive for short durations during partial closures to complete tie-ins for new connections with the realigned Tempo Road.

3.10.5 Burtwistle Lane

Closures are not anticipated on Burtwistle Lane. Some construction activities may require temporary flagging operations.

3.10.6 Green Lane Landfill Designated Truck Route

The existing Green Lane Landfill, located on Southminster Bourne approximately 6 km southwest of the Highway 401/Highway 4 (Colonel Talbot Road) interchange, utilizes the Highway 401 and Highway 4 (Colonel Talbot Road) interchange as a designated truck route. Temporary alternative truck haul routes will be provided to Green Lane Landfill through the use of the signed detour routes noted in **Section 3.10** and will not require modifications to the landfill's Environmental Compliance Approval (ECA) or agreement with Elgin County.

3.11 Design Refinements

Minor refinements to the Preferred Design have been incorporated to accommodate anticipated increases in traffic due to growth in the area. A second left turn lane was added to the E-N/S ramp (**Figure 7**) and the W-N/S ramp right turn lane was adjusted (**Figure 8**).

Figure 7: Highway 401 (Colonel Talbot Road) Interchange E-N/S Ramp

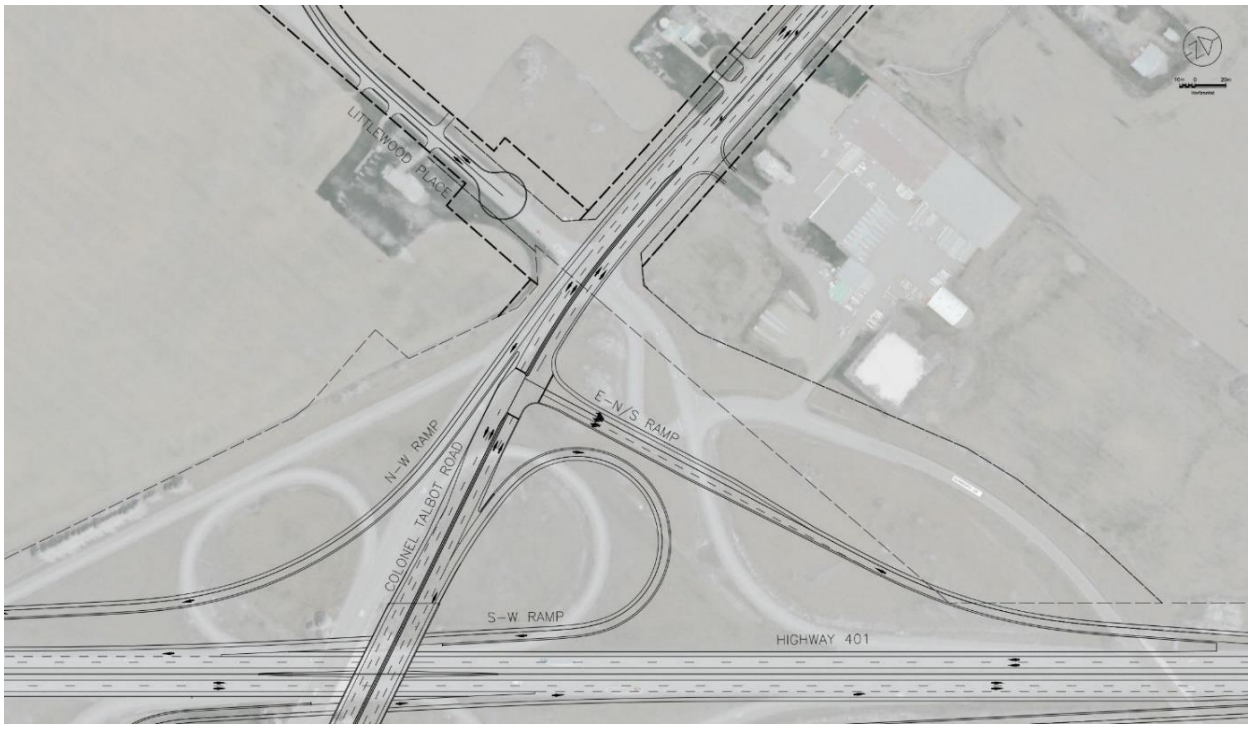


Figure 8: Highway 401 (Colonel Talbot Road) Interchange W-N/S Ramp

4.0 Environmental Impact Assessment and Mitigation Measures

The following section will review and refine the impact assessment and mitigation measures developed in the Procurement Ready Report to address potential environmental concerns due to the construction of the proposed improvements.

The general landscape in the Study Area consists of predominantly agricultural lands used for the production of cash crops. The Study Area also consists of commercial properties, woodlands, the Fournie Drain and Gold Seal Drain, and a pond feature northeast of the interchange. The Study Area is located within the Lake Erie Source Protection Region.

The proposed improvements are anticipated to be constructed over three construction seasons, subject to final approvals. MTO will acquire the necessary property for the improvements. Traffic detours, as outlined in **Section 3.9** of this DCR, are required during construction.

Through Detailed Design, impacts to adjacent land uses outside of the acquired land have been minimized to the extent possible. With appropriate mitigation measures implemented during construction, potential impacts can be avoided, mitigated, or minimized to the greatest extent possible.

The following sections outline the potential natural, socio-economic, and cultural environment impacts anticipated during construction of the improvements. Environmental protection, mitigation measures, monitoring and contingency measures noted below have been incorporated into the construction contract.

4.1 Highway, Safety and Traffic Engineering

4.1.1 Traffic

Traffic delays due to construction are unavoidable and have been minimized to the extent possible. As outlined in **Section 3.9**, local road and highway closures will be required to complete construction. Signed detour routes will be used to direct traffic for

Highway 401, Highway 4 (Colonel Talbot Road), Glanworth Drive and Littlewood Drive closures. No signed detours will be provided during closures of the interchange ramps and additional meetings with impacted municipalities and Emergency Service Providers will take place prior to construction.

Temporary alternative truck haul routes will be provided to Green Lane Landfill through the use of the signed detour routes noted in **Section 3.10** and will not require modifications to the landfill's ECA or agreement with Elgin County.

Advanced signage will be posted a minimum of seven days before the start of construction, advising motorists of potential traffic delays.

4.1.2 Construction Traffic

Construction traffic will access the construction area from the existing road network at specified construction access and/or egress locations. Traffic disruptions on the highway will be minimized by providing advance notification of closures and through the use of detour routes.

4.1.3 Emergency Services

Emergency Service Providers, including the OPP, London Police Service, London Fire Department and Middlesex-London Paramedic Service were provided project notices throughout the study process and invited to provide feedback. Additional consultation with appropriate emergency services providers will take place prior to construction.

Road closures, lane reductions and detour routes may result in potential emergency services delays to incident locations. To minimize delays, emergency vehicles will be given priority access through the construction zone and Emergency Service Providers will be updated throughout the project on construction staging, including notification 14 days in advance of the construction start date, prior to highway and/or road closures, and any significant changes to traffic operations.

Emergency Service Providers will be invited to attend and provide feedback at regularly scheduled progress meetings, including a pre-construction meeting tentatively scheduled for Spring 2024 and monthly progress meetings during construction.

4.1.4 Utilities

The interchange improvements have impacts on existing utilities within the provincial and municipal road ROWs. Relocation of utilities have been coordinated with the affected utilities and MTO arranged for completion prior to construction of the interchange improvements.

4.2 Natural Environment

Natural environment investigations were initially completed during the Preliminary Design. However, due to the age of the surveys, additional site reconnaissance and update memos were completed during the Detailed Design stage.

Terrestrial field investigations were completed on July 26 and July 31, 2023, and a Terrestrial Ecosystem Impact Assessment Update Memo was completed in 2023, which reviewed the following background information resources:

- Terrestrial Ecosystem Assessment Report (TEAR; Dillon, 2015); and,
- TEAR Update (Dillon, 2018).

A Fish and Fish Habitat Impact Assessment Update Memo was completed in November 2023, which reviewed the following background information resources:

- MTO Mega EA – Assignment 1: Fish and Fish Habitat Existing Conditions Memo (FFHEC; Dillon, 2014);
- Preliminary Fish and Fish Habitat Assessment Report (FFHAR; Dillon, 2015);
- Draft Fish and Fish Habitat Existing Conditions and Impact Assessment Memorandum (Parsons, 2022);
- Interim Environmental Guide for Fisheries (MTO, 2020); and,
- MTO/DFO/MNRF Protocol for Protecting Fish and Fish Habitat on Provincial Transportation Undertakings (V4, 2020).

Confirmatory fisheries assessments were completed by Dillon in 2023 to confirm the conditions outlined in the 2014, 2015, and 2022 reports.

The following sections provide an overview of the natural environment in the Study Area and results of the additional surveys that were completed. Overall, impacts to

wildlife and natural features have been determined to be minimal in duration provided the mitigation measures developed are implemented during construction.

4.2.1 Vegetation and Trees

Vegetation removal will be required within the Study Area to accommodate changes to the alignment of existing roads in the vicinity of Highway 401 and Highway 4 interchange and the replacement and realignment of the Highway 4 bridge and the Glanworth Drive bridge. The vegetation to be removed is limited to herbaceous ground cover and individual hedgerow and landscape trees. The removal of vegetation within the Study Area, including the 404 trees requiring removal, will result in a loss of tree canopy, and decreased species richness and abundance, potentially causing the following impacts:

- Increased vulnerability to invasion by non-native species;
- Decreased shade and cover for wildlife;
- Increased erosion and sedimentation of adjacent land;
- Vegetation dieback at the edge of natural features; and,
- Localized temporary displacement of wildlife.

During construction, impacts to adjacent natural environment features will be minimized and/or avoided by implementing the following mitigation measures:

- Vegetation removal should occur outside the bat active season (April 1 to September 30);
- Vegetation removal should occur outside the breeding bird period (April 1 to August 31);
- A qualified avian biologist conducts a nest sweep of the vegetation to be removed prior to work commencing and determination that there are no nests of Schedule 1 bird species (Migratory Birds Regulations SOR-2022-105) or active nests, in or close to the work area, within 48 hours of removal;
- Minimizing the amount of vegetation removal as much as possible;
- Delineating Tree Protection Zones (TPZs) on contract drawings;
- Following tree felling and grubbing procedures;
- Construction Specification for Clearing, Close Cut Clearing and Grubbing;

- Implementing appropriate erosion and sediment control measures and re-vegetating with native species;
- Stabilizing areas temporarily cleared of vegetation prior to removal and erosion and sedimentation control measures; and,
- Restoring and/or re-vegetating disturbed areas with native species to minimize invasion and colonization by non-native species, increase shade/cover for wildlife and mitigate edge disturbance effects.

The improvements will have limited impacts on the terrestrial natural environment and are not anticipated to have a significant impact to vegetation, wildlife or the surrounding area if these mitigation measures are followed.

4.2.2 Invasive Species

Phragmites (*Phragmites australis spp. australis*) is present throughout the Study Area, commonly seen in roadside ditches and areas of standing water. It is a highly invasive perennial that is able to grow at a rapid pace and spreads easily. Under the Ontario *Invasive Species Act* (2015) disposal of vegetation and topsoil removed from areas where Phragmites is present requires special handling to prevent spreading.

This project will require vegetation removals, including existing Phragmites and Phragmites-impacted soil. To minimize the potential spread of Phragmites as a result of disturbance, an Invasive Species Management Plan shall be implemented during construction and all excess materials with Phragmites and Phragmites-impacted soils shall be managed within the Excess Materials Management Areas (EMMAs); designated areas within the interchange to manage excess materials. Mitigation measures include:

- Following inspection and cleaning recommendations outlined in the Clean Equipment Protocol for Industry (Ontario Invasive Plant Council, 2016);
- Removal timing to occur before the seed head develops (late summer) to prevent spread; and,
- If removal must occur with seed heads present, all equipment, clothing and footwear must be cleaned before leaving the site and plastic bags or tarps must be used to transport the plant material to a burial site.

4.2.3 Wildlife and Wildlife Habitat

Four types of Candidate Significant Wildlife Habitat (SWH) were identified within the Study Area in the 2015 and 2018 reports and updated in 2023:

- Turtle Overwintering Areas;
- Amphibian Breeding Habitat (Wetland);
- Bat Maternity Colonies; and,
- Special Concern and Rare Wildlife Species (Snapping Turtle).

Candidate SWH within the Study Area are mostly outside of the existing ROW and area of impact for the works (**Figure 9**). Impacts to these potential habitats are not expected as long as appropriate mitigation measures are implemented, with the exception of one man-made pond feature northeast of the interchange that will be removed to facilitate realignment of Glanworth Drive.

Figure 9: Candidate Significant Wildlife Habitat

During construction, impacts to candidate SWH will be minimized and/or avoided by implementing the following mitigation measures:

- The man-made pond to be removed will require salvage of species that may be present. A License to Collect Fish issued by the Ministry of Natural Resources and Forestry (MNRF) under the *Fish and Wildlife Conservation Act* (1997) and a Wildlife Scientific Collectors Authorization should be obtained prior to salvage of species. Timing of the salvage will be performed in coordination with dewatering operations;
- The man-made pond feature to be removed will not require exclusion fencing, as it will ultimately be dewatered. The dewatering shall be overseen by an environmental monitoring, be conducted outside of the fisheries timing windows and will include the use of an end-of-pipe screen, as outlined in **Section 4.2.6**.
- Exclusion fencing will be required around the three areas identified for candidate SWH Turtle Overwintering Areas and candidate Amphibian Breeding Habitat (Wetland) that is to remain in place until post-construction. The fencing will follow guidelines set out on the MNRF's Best Practices Technical Note on Reptile and Amphibian Exclusion Fencing (MNRF, 2021) in order to provide the most effective protective function and prevent mortality to herptiles. Exclusion fencing should be installed prior to emergence from hibernation (typically done between November to March);
- A SAR awareness package and awareness training will be provided to all staff working on site;
- Workers must be vigilant and check work areas and machinery for the presence of herptiles prior to each day of construction;
- If wildlife is encountered in the construction area, the Contractor will be required to temporarily suspend work until the animal is out of harm's way. If the species persists in the work area, a person qualified to handle wildlife should be contacted to relocate the animal; and,
- Any SAR sightings must be reported to MNRF's Natural Heritage Information Centre.

4.2.4 Migratory Birds

The Highway 4 (Colonel Talbot Road) bridge was evaluated for Barn Swallow habitat and other migratory bird nests during the 2023 field surveys and no nests were observed. The Colonel Talbot Road bridge is narrow with uneven surfaces on the underside. The

bridge conditions along with heavy traffic traveling past the bridge makes this bridge poor quality habitat for this species. Barn Swallow has been de-listed under the *Endangered Species Act* (2007); however, birds and nests remain protected under the *Migratory Birds Convention Act* (1994) and require mitigation measures should they be encountered prior to or during construction.

The Glanworth Drive bridge could not be inspected in 2023 for bird nests due to safety issues for accessing and observing the underside of the bridge. Due to the heavy traffic in the area, this bridge is poor quality habitat for nesting bird species.

A Cliff Swallow nest was observed in Culvert 6 in the southern extent of the Study Area on July 25, 2023. The observed nest was inactive at the time of the assessment. This culvert is not anticipated to be impacted by the project activities and as such no impacts are anticipated to this nest or species.

During construction, potential impacts to migratory birds will be minimized and/or avoided by implementing the following mitigation measures:

- Vegetation removal outside of the breeding bird period of April 1 to August 31;
- A qualified avian biologist conducts a nest sweep of the vegetation to be removed prior to work commencing and determination that there are no nests of Schedule 1 bird species (Migratory Birds Regulations SOR-2022-105) or active nests, in or close to the work area, within 48 hours of removal;
- Workers must be vigilant and check work areas for the presence of breeding birds and nests containing eggs or young; and,
- If breeding birds and/or nests are encountered, work shall not continue until after August 31 or as soon as it has been determined that the young have left the nest.

4.2.5 Species at Risk (SAR)

The Terrestrial Ecosystem Impact Assessment Update Memo (Dillon, 2023) identified seven Species at Risk (SAR) that had potential habitat within the Study Area:

- Red-headed Woodpecker;
- Four SAR bat species (Eastern Small-footed Myotis, Little Brown Myotis, Northern Myotis, and Tri-colored Bat);
- Eastern Flowering Dogwood; and,
- Butternut.

The field surveys undertaken in 2023 confirmed the potential habitat for Red-headed Woodpecker and SAR bat species. Although potential habitat for Eastern Flowering Dogwood or Butternut were identified through the background review, neither of these species were observed during the field surveys.

In addition to the species identified above, during the 2023 field surveys, Eastern Meadowlark was heard calling and was observed within and adjacent to the north and west loops of the Highway 401 interchange. However, the study area does not contain suitable habitat for this species and although the species was observed, it is assumed that breeding activities occurred in a different location and the individual was using the Study Area either for foraging or as a resting place before moving to more suitable nesting habitat.

An updated investigation of the terrestrial habitat within the Study Area was conducted and the potential impacts to the newly identified SAR (Red-headed Woodpecker and SAR Bats) was discussed.

Bats have the potential to roost in the identified dead trees associated with the Fresh-Moist Lowland Deciduous Forest habitat. Mitigation measures for SAR bats are based on guidance provided by the MECP's 'Best Practice Technical Note – Knowledge of Active Seasons for Species at Risk in Ontario' (2022). The mitigation measures will include tree removals outside of the bat active period (April 1 to September 30) and avoiding loud noise and/or vibration outside of the bat active period.

Impacts to the Red-headed Woodpecker include disturbance and/or removal of trees in the deciduous forest located in the northern portion of the Study Area. During the 2023 field surveys, snag trees as well as tree species known to be typical of Red-headed Woodpecker habitat were identified. As such, there is potential for this species to be present within the forest community. The required removal of trees within this community may impact the habitat of Red-headed Woodpecker in addition to potentially disturbing nesting birds. Mitigation measures are similar to those outlined under **Section 4.2.5.** Additional mitigation measures include avoiding loud noise and/or vibration outside of the breeding bird period (April 1 to August 31) and consideration for the habitat adjacent to the work areas.

Potential impacts to Red-headed Woodpecker and SAR bat habitat as a result of the proposed improvements are not eligible to be addressed through a Notice of Activity registration under s23.18 of *O.Reg. 242/08* "Threats to health and safety; not imminent", as the forest is located outside of the existing interchange corridor. As such, an Information Gathering Form and Avoidance Alternatives Form were prepared and submitted to the MECP for consideration to determine if a permit will be required. In addition, acoustic bat surveys may be completed in June and breeding bird surveys completed from May to early July in the forest. If no SAR are identified during these surveys, no further action in the permitting process would be required for the removal of the forest. If SAR are identified during these surveys, the permitting process may proceed.

4.2.6 Fish and Fish Habitat

A fisheries assessment and general aquatic conditions assessment was completed by a Dillon Registry, Appraisal and Qualifications System (RAQs) Qualified Fisheries Specialist to confirm fish habitat conditions within the Fournie Drain (**Figure 10**), a man-made pond located north of the interchanges, as well as potential connecting fish habitat to the pond at the Best Western Stoneridge Inn. The 2023 assessment also included previously unevaluated portions of the Study Area including the Fournie Drain south of Tempo Road and the Gold Seal Drain at Glanworth Drive. The following information outlines the results of the site investigation and analysis:

- MNRF confirmed a restricted activity window of March 31 to July 1 of any given year for the Fournie Drain;
- The new Study Area of the Fournie Drain, between Culvert 6 and Culvert 15, was observed to be a permanent watercourse with riffle and run habitats;
- The Gold Seal Drain is identified as a closed/tile drain for 1.5 km downstream of the Study Area, where it becomes open and is classified as a Class E drain;
- The pond at the Best Western Stoneridge Inn is a dry stormwater management pond designed to be dry most of the year. The pond outlets into the Fournie Drain through a culvert that runs below ground only discharging to the drain after rainfall events; and,
- The man-made pond located north of the interchange is considered an offline, man-made waterbody with a lack of connectivity to a fishery.

Using MTO's Fish Guide (2020), it was determined that the tributary to the Fournie Drain, Gold Seal Drain and pond at the Best Western Stoneridge Inn are not considered to be waterbodies as they are not directly connected to a fish bearing waterbody and do not provide habitat to fish. The man-made pond north of the interchange is not considered to be fisheries habitat as an outlet channel occurs below ground surface and is used only for flow conveyance.

Although the 2022 Parsons assessment determined that the pond at the Stoneridge Inn had the potential to result in Harmful Alteration Disruption and Destruction (HADD) of fish habitat, Dillon's 2023 assessment determined that it is unlikely fish would utilize the enclosed drain as passage to the pond due to its length and size, velocity of flows and due to a drop barrier made through a manhole within the culvert. While there is potential for fish to occupy the pond, it is unlikely that the drain connecting the pond to the watercourse is suitable for fish passage.

The 2014 Dillon assessment of the Fournie Drain determined that the drain is a warmwater feature with moderate to low fish habitat sensitivity, which was based on the presence of permanent habitat and presence of baitfish and panfish species. The 2015 Dillon impact assessment report concluded that the proposed works were considered to have a "Moderate-High Risk" of causing Serious Harm to fish and it was recommended that a Moderate-High Risk Project Notification Form 2 be prepared and submitted to DFO for review. A 2022 Assessment (Parsons) confirmed fish habitat conditions. The 2023 assessment confirmed these conditions.

Phragmites was identified in the pond at the Best Western Stoneridge Inn as well as throughout wet, low-lying areas within the project Study Area, and will be dealt with in accordance with the mitigation measures outlined in **Section 4.2.2**.

Figure 10: Drainage

Proposed works to the Fournie Drain will result in the removal of organic structure, emergent aquatic vegetation, aquatic macrophytes, benthic macroinvertebrates, and substrates. The change in substrate composition will be permanent in nature and it is anticipated that it may take multiple seasons for the instream organic structure, aquatic vegetation and aquatic macrophytes to establish. This in turn is expected to change food supply and in-stream cover throughout the realigned sections of the Fournie Drain. Based on the proposed works, it is anticipated that the habitat within the Fournie Drain will remain suitable, but with reduced productivity for feeding, cover and refuge habitat.

After mitigation, potential residual effects may occur from:

- Change in habitat structure and cover;
- Change in food supply;
- Change in sediment concentrations;
- Change in nutrient concentrations; and,
- Change in water temperature.

The following mitigation measures will be included in the construction contract to mitigate potential impacts to fish and fish habitat adjacent to the construction area during construction:

- To protect sensitive life stages/processes of migratory and resident fish, no in-water work is to occur between March 31 to July 1 of any given year;
- In-stream work areas will be isolated from flow and dewatered to permit work in the dry;
- Fish salvages will be performed under a Licence to Collect Fish for Scientific Purposes (LCFSP) from the MNRF in coordination with dewatering operations, if necessary, and all fish will be released alive downstream of the work site (unless otherwise noted in the LCFSP);
- Flow will be maintained downstream during construction via dam and pump technology or complete bypass, as applicable;
- Dewatering and use of pumps shall be conducted in accordance with the Contract and Best Management Practices including:
    - Pumping system shall be sized to accommodate required flows of the waterbody during the construction period. Pumps shall be monitored at all

times, and back-up pumps shall be readily available on-site in the event of pump failure; and
    - Sediment laden dewatering discharge shall be pumped into a vegetated area, settling basin or similar measure greater than 30 m from the watercourse to prevent sediment and other deleterious substances from entering any waterbody.
- All water intakes and outlets in the watercourse will have screens to prevent entrainment or impingement of fish as per DFO's Interim Code of Practice: End of Pipe Fish Screens (2020);
- New box culverts will be installed in-line with the existing watercourse, levelled and embedded at least 300 millimetres (mm) to facilitate the re-establishment of substrate in the new culvert. The areas of realignment of Fournie Drain will be completed in isolation of the existing channel and connected at the end of construction once stabilization has been achieved and flow resumed;
- All disturbed areas will be restored to pre-construction conditions and stabilized to prevent erosion;
- Appropriate erosion and sediment control measures must be installed around the work area to prevent migration of loose soils and accumulated sediment downstream or to adjacent areas:
    - Effective sediment and erosion control will follow MTO's 'Environmental Guide for Erosion and Sediment Control During Construction of Highway Projects' (2015), including keeping required clearing and grubbing to a minimum, installing silt fence along watercourse banks and around fill placement areas and through the use of erosion and sediment control measures such as filter socks and check dams.
- Equipment shall arrive on site in clean conditions and be maintained free of fluid leaks;
- Equipment re-fuelling and maintenance shall take place in a manner that prevents any sediment and other deleterious substances from entering into a waterbody;
- Maintenance and fuelling to take place a minimum of 30 m from waterbodies;
- An emergency spill kit shall be kept on site to address any fluid leaks or spills from equipment;

- Handling of fuel, excess materials and debris will be properly managed on-site and removed as per the standard construction practices necessary to protect watercourses;
- All materials used or generated (i.e., organics, soils, woody debris, temporary stockpiles, construction debris, etc.) will be temporarily stored, handled and disposed of during site preparation, construction and clean-up in a manner that prevents entry into watercourses;
- Any Phragmites encountered and/or removed will be dealt with as per the Invasive Species Management Plan and best management practices outlined in **Section 4.2.2**; and,
- Any unused excavated material will be managed as per *O.Reg. 406/19 "*On-Site and Excess Soil Management".

4.3 Water Resources

4.3.1 Source Water Protection

The interchange improvements are not located near identified Well Head Protection Areas (WHPAs) or in areas with Highly Vulnerable Aquifers (HVAs). The project is located in an area with low vulnerability for groundwater recharge since no significant groundwater recharge areas were identified in the Study Area.

Ancillary project activities (application of road salt, handling and storage of fuel, etc.) pose a low risk to local groundwater and surface water quality. To minimize threats from these activities, MTO will apply current best management practices (e.g., MTO's Salt Management Plan), adhere to established Ministry plans and policies, and implement special contract provisions protecting ground and surface water during construction.

4.3.2 Stormwater Quality and Control

The Highway 401 and Highway 4 (Colonel Talbot Road) Interchange Reconfiguration and Highway 4 (Colonel Talbot Road) and Glanworth Drive Bridge Replacements will cause direct and indirect impacts on the existing drainage infrastructure. The following improvements will be completed as part of the proposed works:

- New storm sewer system along Highway 4 (Colonel Talbot Road) raised median;
- New catch basins or gutter outlets at the four corners of the Colonel Talbot Road and Glanworth Drive bridges;
- New culverts are required to accommodate the proposed improvements to the ramps;
- Four culverts crossing Highway 401 will require extensions to accommodate the future Highway 401 speed change lanes and/or lane expansion;
- Installation of new culverts under the realigned Glanworth Drive will be needed to maintain existing drainage patterns;
- The Fournie Drain will be realigned approximately 175 m south of Culvert 3 to accommodate the new S-E ramp;
- Additional culverts will be added under Tempo Road to maintain the existing channel path of the Fournie Drain;
- Tempo Road will be realigned to accommodate the proposed highway expansion and new Glanworth Drive Bridge;
- Additional catch basins and a new culvert will be added to the Gold Seal Drain to maintain existing drainage patterns of the municipal drain;
- Removal of culverts under abandoned roadways replaced with roadside ditches along Colonel Talbot Road to maintain the existing drainage pattern;
- Removal of culverts under the embankments at the existing Glanworth Drive Bridge;
- Two new storm sewer crossings will be added across Highway 401 westbound and eastbound lanes; and,
- Removal of existing subdrains under the outside shoulders and speed change lanes of Highway 401 to be removed or widened.

Portions of the existing storm sewer system will require reconstruction at appropriate offsets and elevations to accommodate the central foundation and pier arrangement for the new bridges and high mast illumination footings.

The remaining modifications to the drainage system include reconfiguration of the existing storm sewer system servicing the interchange area and the median of Highway 401 and the addition and/or replacement of small diameter circular drainage culverts along the new ramp, Glanworth Drive, and Tempo Road alignments.

The culvert modifications have the potential to cause erosion and/or sedimentation and downstream fish and fish habitat impacts. An erosion and sedimentation control plan will be included in the construction contract to mitigate temporary and long-term impacts. Generally, this mitigation will include placing seed and cover as quickly as possible, in addition to the installation of erosion and sediment control measures such as flow check dams and erosion control blankets to mitigate impacts to existing culvert locations and locations where drainage networks leave the construction limits.

4.3.3 Erosion and Sediment Control

Grading and other construction activities have the potential to cause erosion on-site and sedimentation of adjacent natural features. The primary intent of the mitigation measures developed for the project is to prevent erosion, where possible. The secondary intent is to capture sediment, should erosion occur. The construction contract will include the following measures and provisions to minimize potential erosion and capture any sedimentation:

- Erosion and sedimentation control measures, such as bonded fibre matrix, erosion control blanket, seed and mulch, rip rap, and rock flow checks, etc.;
- In-line measures, such as flow checks and rock flow checks, will enhance sedimentation control in ditches; and,
- An Operational Constraint in the contract (Erosion and Sedimentation Control – General) includes timing restrictions to restrict the length of time between the commencement of any work, which disturbs earth surfaces and the application of final cover.

The MTO 'Environmental Guide for Erosion and Sediment Control during Construction of Highway Projects Manual' includes a series of standard procedural and structural Best Management Practices (BMPs) in Appendix E: Fact Sheets. The series of 37 BMPs are an inclusive list of Erosion and Sediment Control (ESC) practices that have been successfully implemented on MTO highway reconstruction projects throughout Ontario.

The construction activities and environmental constraints throughout the project limits have been reviewed and the list of 37 BMPs have been screened based on site specific design elements of the proposed construction. These procedural and structural BMPs have been incorporated into the sediment and erosion control plan and part of the

new-construction drawings and specifications for the construction project. These include the use of silt fence barrier, check dams and fibre rolls, along with rip-rap at the end of culvert extensions.

A site-specific Erosion and Sedimentation Control Plan, to contain the construction area, will be developed following MTO's 'Environmental Guide for Erosion and Sediment Control during Construction of Highway Projects'. The Contract will include the following measures and provisions to minimize potential erosion and capture any sedimentation:

- Minimize the disturbance of existing well-vegetated ditches and grassed slopes;
- Protect undisturbed slopes and sensitive ditching with silt fence and fibre rolls or equivalent. These measures must remain in place until exposed soils are stabilized/re-vegetated;
- Place erosion control blanket or equivalent on 3:1 or greater slopes where height warrants its use;
- Place appropriately sized rip rap and geotextile at new and existing sewer outlets; and,
- A maximum of 45 days shall be permitted between the commencement of any work which disturbs earth surfaces and the application of final cover, with that time reduced to 15 days in riparian areas.

4.3.4 Climate Change

To support the MTO's mandate to develop sustainable infrastructure that accounts for climate change, the Drainage Team completed the hydrologic assessment considering MTO Highway Standards Branch Engineering Memorandum #2016-14 "Implementation of the Ministry's Climate Change Consideration in the Design of Highway Drainage Infrastructure". As well, the hydraulic analysis of the crossings were completed using methods and software acceptable to MTO technical design standards, including the 'Highway Drainage Design Standards' (2008) and 'Drainage Manual' (1997).

4.4 Contamination and Waste Management

4.4.1 Contaminated Materials

Dillon completed a Contamination Overview Study (2015 and updated in 2018) for the project. The study identified four areas with high potential for subsurface

contamination. These included former gas bars north and south of Highway 401, an industrial use north of Highway 401, a site with several areas of potential contamination south of Highway 401 and several locations of multiple spills in the vicinity of the Highway 401 and Highway 4 (Colonel Talbot Road) interchange.

The 2018 Contamination Overview Study identified areas where Phase 1 and/or Phase 2 Environmental Site Assessments (ESA) were required prior to construction. These Phase 1 and II ESA investigations are underway to determine recommendations for contaminated soils based on the design footprint. The results of these investigations will be used to guide the management of soils for reuse and/or disposal, with the recommendations updated and carried forward into the construction contract.

4.4.2 Excess Soils

Excess materials will be managed within the Study Area limits. And are therefore, not be considered "excess" soil under *O.Reg. 406/19*. As a result, the project is exempt from the requirements to file a notice on the Registry and the associated Reuse Planning Requirements under Section 8 of *O.Reg. 406/19.* An Excess Materials Management Plan will be prepared before construction.

4.4.3 Spills Handling

The construction contract will include provisions for the handling of spills during construction. As required for all MTO construction contracts, the General Conditions specify incident management, under several pieces of legislation, for protecting the environment and natural features.

4.5 Human Health

4.5.1 Noise

A Noise Assessment was completed (Dillon, 2021) which identified that noise receptors exceeded the 65 A-weighted decibel (dBA) threshold in both existing and proposed conditions. Analysis of noise mitigation measures indicated that a noise barrier wall was not financially feasible as it did not meet the MTO threshold for cost per benefited receptor and as such, noise mitigation measures (i.e., noise barrier wall) are not considered feasible for this project.

Noise impacts during construction will be mitigated by construction best practices. As per the MTO 'Environmental Guide for Noise' (2022), construction noise and vibration must adhere to the Ministry of the Environment, Conservation and Parks Standard Provisions pertaining to noise.

To minimize the potential for construction noise impacts, the following outlines generally accepted construction practices, which must be followed by the Contractor:

- All construction equipment should be properly maintained to limit noise emissions. As such, all construction equipment should be operated with effective muffling devices in good working order; and,
- In the presence of persistent noise complaints, all construction equipment shall be verified to comply with MECP NPC-115 guidelines.

4.5.2 Air Quality

The lands in the immediate vicinity are primarily agricultural, with some commercial uses located just outside of the Study Area. There will be some minor dust and air quality impacts on adjoining land uses during construction. Potential impacts will be minimized as required in the MTO General Conditions of Contract, which requires the Contractor to minimize dust during construction and outlines the requirements for the use of waste and product dust suppressants during construction. Dust will be controlled in accordance with the General Conditions so that it does not affect traffic, enter surface water or escape beyond the right-of-way causing a nuisance to residents, businesses or utilities.

Other potential air quality impacts will be minimized during construction by the following measures:

- Use well-maintained heavy equipment and machinery, and comply with operating specifications;
- Minimize operation and idling of gas-powered equipment and vehicles, especially during smog and poor air quality advisories;
- Minimize vehicular traffic on exposed soils and stabilize high traffic areas with suitable cover material;
- Avoid excavation and other construction activities with potential to release airborne particulates during windy and prolonged dry periods;

- Stabilize stockpiled excavated soils in areas upwind of sensitive receptors;
- Cover or otherwise contain loose construction materials with potential to release airborne particulates during transport, installation or removal; and,
- Restore disturbed areas as soon as possible to minimize the duration of soil exposure.

4.6 Socio-Economic Environment

4.6.1 Land Use and Property Impacts

Most of the lands surrounding the Study Area are farmlands used for the production of cash crops. Other uses near the interchange include farm and non-farm related residences (approximately 10 residents within 1 km of the interchange) and institutional, commercial, and industrial uses.

Many large farming operations, farm-related commercial uses and other commercial uses rely on the interchange and local road network for their business.

The project impacts approximately 9.5 ha of land used for agricultural production of cash crops. To mitigate impacts, the realignment of Glanworth Drive and Littlewood Drive to the north is identified to occur along existing property boundaries where possible; this minimized fragmentation of farmland to the extent possible.

MTO is in the process of acquiring the necessary property for the improvements. Impacts on other land use and property include:

- Some property is required from ABC Sanitation on Highway 4. The small size and location of the required property does not affect the operation of the sanitation business;
- Realignment of Burtwistle Lane requires property and site modifications to the existing Best Western Plus Stoneridge Inn and Conference Centre. Site modifications will include relocation of the existing stormwater management pond;
- The slight realignment of the west-north and west-south interchange ramp requires some property from the Best Western Stoneridge Inn and Conference Centre. The property required does not impact the physical hotel structure or site layout;
- Realignment of Littlewood Road requires some property from Central McKinley International Ltd. The property required severs the existing parcel but does not

impact the current site operations; currently the site is used for transport truck storage and parking. The severance will result in the loss of 1.7 ha of land currently rented out by the company for agricultural production. The severance may impact potential future site development opportunities;

- A small portion of property from Gentek and a new Highway 4 entrance and site layout modifications are required for the Project. The property requirements do not impact the operation or future ability of Gentek to expand on the property parcel. The entrance and site layout modifications are required to adhere to MTO Access Management Guidelines; and,
- Approximately 1.2 ha of property from AAROC along Glanworth Drive is required to accommodate realignment of Glanworth Drive. The property is currently used for agricultural production with plans for future development. The property required may impact future site development potential.

Short-term construction impacts including noise, vibrations, and air quality (fugitive dust) are anticipated to be typical of any highway construction project. Mitigation measures are addressed in **Section 4.5**.

During construction, heavy equipment and machinery will be traveling to and from staging areas and on the local and provincial road networks. All traffic staging will adhere to Book 7 of the Ontario Traffic Manual (2022).

4.6.2 Light Trespass

Illumination improvements proposed as part of the project has been designed to minimize light trespass and reduce night sky pollution. Light trespass will be minimized through selection of light fixtures, shielding and pole placement. These methods will minimize the amount of light on neighbouring properties and reduce impacts to adjacent natural heritage features to minimize impacts on wildlife.

4.7 Cultural Resources

4.7.1 Archaeology

The project impacts 9.3 ha of land with archaeological potential. Based on this, there is potential to cause disturbance/destruction of archaeological resources during construction.

A Stage 1-2 Archaeological Assessment determined that further Stage 2 and Stage 3 assessments were required for the project. The Stage 2 and 3 Archaeological Assessments were completed in October 2023, and it was determined that Stage 4 assessments were not required. An Archaeological Assessment Report will be submitted for concurrence from the MCM prior to construction.

MTO's General Conditions of Contract require the Contractor to suspend work immediately and notify the Contract Administrator in the event that archaeological resources or human remains are identified.

4.7.2 Cultural Heritage Resources

The project Study Area was previously screened for built heritage resources or cultural heritage landscapes in accordance with the Ontario Heritage Bridge Guidelines. The Colonel Talbot Road and Glanworth Drive bridges were determined to not have heritage significance, as documented in the Cultural Heritage Evaluation Report (CHER) prepared by Archaeological Services Inc. (2013) and are not eligible for inclusion on the Ontario Heritage Bridge List, however, both bridges were evaluated as having cultural heritage value based on design and contextual and historical value.

5.0 Summary of Environmental Concerns and Commitments

The environmental mitigation measures recommended in the Procurement Ready Report were reviewed and revised based on the final Detailed Design. The works are not anticipated to have significant impacts on the natural, cultural or socio-economic environment in close proximity to the Study Area. **Table 1** provides a summary of the environmental impacts and mitigation measures that will be carried forward into the construction contract.

5.1 Environmental Clearance and Approvals

As required by the MTO Class EA, all permits, approvals, and exemptions required for the project must be obtained prior to Environmental Clearance – Construction Start being issued. Design-related environmental approvals and permits required prior to construction include:

- Concurrence of the Stage 2 and 3 Archaeological Assessment report into the Ontario Public Register of Archaeological Reports by the MCM; and,
- Environmental Clearance – Construction Start following the DCR comment period.

The following submissions are under review:

- MECP is reviewing project documentation to determine if a permit is required under the *Endangered Species Act* for potential impacts to SAR bats and/or Red-headed Woodpecker. If a permit is deemed to be required, it will be obtained before construction can begin in the impacted area; and,
- DFO is reviewing the Request for Review. If an Authorization under the *Fisheries Act* (1985) is required, or DFO provides a Letter of Advice, these will be obtained prior to construction in the impacted areas.

5.2 Review of the Design and Construction Report (DCR)

A Notice of Completion to announce the DCR comment period will be sent to the project contact list and will be posted in The Londoner and L'Action newspapers. The DCR will be available for a 30-day public and agency comment period. MTO will consider all comments received. Following the 30-day comment period and the 30 MECP review period, the DCR is considered to be cleared under MTO's Class EA.

Table 1: Summary of Environmental Concerns and Commitments

Identification number (I.D.#)	I.D. # Sub-issues	Potential Impacts/Concerns	Potentially Interested Agencies/ Stakeholders	Mitigation/Protection/Monitoring
1. Highway, Safety, Construction Traffic and Emergency Service Access	1.1. Traffic Operations, Delays and Safety	• Traffic delays caused by nightly full closures to Highway 401 and lane reductions on Highway 401 eastbound and westbound • Traffic delays caused by nightly full closures to Highway 4 (Colonel Talbot Road) and lane reductions on Highway 4 (Colonel Talbot Road) northbound and southbound • Traffic delays caused by Littlewood Drive and Glanworth Drive closures • Traffic delays caused by interchange ramp closures during interchange reconfiguration	City of London (City), Middlesex County (Middlesex), Elgin County (Elgin), Emergency Service Providers, Green Lane Landfill, Provincial Highway Road Users, Local Road Users, Business Owners, Residents	• Undertake additional consultation with impacted municipalities and emergency services providers prior to construction. • Advanced signage will be posted at least 7 days in advance of construction start, advising motorists of potential traffic delays. • All traffic control measures will be implemented following Ontario Traffic Manual Book 7 – Temporary Conditions. • Construction traffic will access the construction area from the existing road network at specified construction access/egress locations. • Signed detour routes will be used to direct traffic for Highway 401, Highway 4 (Colonel Talbot Road), Littlewood Drive, Glanworth Drive and Tempo Road closures. • Temporary construction barrier will be used to separate traffic from construction operations. • Store equipment and materials at a minimum offset from live traffic to minimize potential hazards for the travelling public.
	1.2. Construction Traffic	• Potential traffic disruptions caused by construction vehicles	City, Middlesex, Elgin, Emergency Services Providers, Green Lane Landfill, Provincial Highway Road Users, Local Road Users, Business Owners, Residents	• Construction traffic will access work area from the existing road network at specified construction access and egress locations. • Disruptions will be minimized by following Ontario Traffic Manual Book 7 – Temporary Conditions. • A construction staging area will be created within the existing interchange.
	1.3. Emergency Services	• Potential emergency vehicle delays during construction	Emergency Service Providers	• Undertake additional consultation with impacted municipalities and emergency services providers prior to construction.

Identification number (I.D.#)	I.D. # Sub-issues	Potential Impacts/Concerns	Potentially Interested Agencies/ Stakeholders	Mitigation/Protection/Monitoring
				• All Emergency Service Providers (police, fire, ambulance) will be notified 14 days in advance of construction start, prior to highway and/or road closures, and any significant changes to traffic operations. • Emergency vehicles will be given priority access through the construction zone. • Emergency Service Providers will be updated throughout the project on construction staging, including the construction start date and any significant changes to traffic operations. • Emergency Service Provider contact information will be provided to the Contractor and they will be invited to attend regularly scheduled progress meetings throughout construction.
2. Natural Environment	2.1. Natural Features, Vegetation	• Potential impacts to identified SAR species • Increased vulnerability of the areas cleared of vegetation to invasion by non-native species • Permanent decrease in shade and cover for wildlife • Increased erosion and sedimentation of lands adjacent to the construction area • Permanent removal of vegetation communities along the edge of larger, contiguous features	Ministry of Natural Resources and Forestry (MNRF), Ministry of the Environment, Conservation and Parks (MECP), Kettle Creek Conservation Authority (KKCA), City, Middlesex, Elgin	There is potential for impacts to SAR due to vegetation removals. To mitigate potential impacts from the removals as a result of construction activities, the following mitigation measures and best management practices will be implemented during construction: • Tree and vegetation removals must occur outside the bat active season (April 1 to September 30). • Tree and vegetation removals must occur outside the breeding bird period (April 1 to August 31). • Tree and vegetation removals or construction works can occur during restricted periods if a qualified avian biologist conducts a nest search of the area within 48 hours prior to work commencing and determines that active nests of Schedule 1 bird species (Migratory Birds Regulations SOR-2022-105) are not observed in proximity to the work area. If breeding birds and/or nests are encountered, works should not continue in the location of the nest until after August 31

Identification number (I.D.#)	I.D. # Sub-issues	Potential Impacts/Concerns	Potentially Interested Agencies/ Stakeholders	Mitigation/Protection/Monitoring
				or as soon as it has been determined that the young have fledged and left the nest. • Follow tree felling and grubbing procedures, Construction Specification for Clearing, Close Cut Clearing, and Grubbing. • Minimizing the amount of vegetation and tree removals to the extent possible. • Delineating Tree Protection Zones (TPZs) on Contract drawings. • Implement appropriate erosion and sediment control (ESC) measures. • Restoring and/or re-vegetating temporarily disturbed areas will be restored and/or re-vegetated with native species to minimize invasion and colonization by non-native species, increase shade/cover for wildlife and mitigate edge disturbance effects. • Restore all disturbed areas to pre-construction conditions and stabilize within 45 days to prevent erosion. • Final cover, including seeding and erosion control blanket must be completed by November 1, of any given year.
	2.2. Invasive Species	• Potential spread of Phragmites as a result of disturbance	MNRF, MECP, KCCA, City, Middlesex, Elgin	A Phragmites Management Plan will be implemented by the Contractor during construction as detailed in the Excess Materials Management Plan, and includes: • Excess materials with Phragmites and Phragmites-impacted soils shall be managed within the Excess Materials Management Areas (EMMAs). • Removal to occur before the seed head develops to prevent spread (late summer). • All equipment, clothing and footwear must be cleaned before leaving the site. • Plastic bags or tarps must be used to transport the plant material to burial sites.

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	2.3. Wildlife and Wildlife Habitat	• Disruption to wildlife movement and wildlife avoidance during active construction; • Disturbance to herptiles that could be traveling through or utilizing riparian habitats within and adjacent to the construction area; and, • Permanent removal of vegetation with the potential to provide wildlife habitat	MNRF, MECP, KCCA	• The pond feature to be removed for the Glanworth Drive realignment will require salvage of species that may be present. A License to Collect Fish issued by the MNRF under the *Fish and Wildlife Conservation Act* (1997) and a Wildlife Scientific Collectors Authorization should be obtained prior to salvage of species. Timing of the salvage will be performed in coordination with dewatering operations. The water intake will have screens to prevent entrainment or impingement of wildlife • Exclusion fencing will be required around the three areas identified for candidate SWH Turtle Overwintering Areas and candidate Amphibian Breeding Habitat (Wetland) that is to remain in place until post-construction. The fencing will follow guidelines set out in the MNRF's Best Practices Technical Note on Reptile and Amphibian Exclusion Fencing (MNRF, 2021) in order to provide the most effective function and prevent mortality to herptiles. Exclusion fencing should be installed prior to emergence from hibernation (typically done November – March). • All holes or other disrepair found in the exclusion fence should be fixed by the Contractor immediately after discovery. Any debris on the wildlife side of the fence that could breach the fencing should be moved a minimum distance of 1.0 m from the fence. • Workers must be vigilant and check work areas and machinery for the presence of wildlife prior to each day of construction and periodically throughout the day. • If wildlife is encountered in the work area, the Contractor will temporarily suspend work until the animal is out of harm's way. If the species persists in the work area, a qualified person to handle wildlife should be contacted to relocate the animal.

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				• Tree and vegetation removals are to be completed outside of the breeding bird season (April 1 and August 31) and bat active period (April 1 to September 30).
	2.4. Species at Risk (SAR)	• Potential to impact Red-headed Woodpecker entering, nesting, roosting or foraging within the construction area • Potential to impact SAR bats entering, nesting, roosting or foraging within the construction area	Construction site personnel and visitors	• Tree and vegetation removals to be completed outside of the breeding bird season (April 1 and August 31) and bat active period (April 1 to September 30). • The Contractor will avoid loud noise and/or vibration during the breeding bird and active bat periods. • A SAR awareness package and awareness training will be provided to all staff working on the site. • Temporary exclusionary fencing should be installed adjacent to the areas of suitable turtle habitat prior to April 15 and maintained until October 1 to exclude turtles from the work area. • Prior to each day of construction and periodically throughout the day, the Contractor will conduct a sweep of the work area to confirm no SAR are present. • Should SAR be encountered, work should be stopped to allow the individual to leave the sites and the observation should be reported to the MECP. The Environmental Manager and Contract Administrator shall be notified immediately. • Any SAR sightings must be reported to MNRF's Natural Heritage Information Centre. • Exclusionary fencing will follow guidelines set out in the Ministry of Natural Resources and Forestry's Best Practices Technical Note on Reptile and Amphibian Exclusion Fencing (2021) to provide the most effective protection and prevent mortality. • Registration of the impacts to candidate Red-headed Woodpecker habitat and SAR bat habitat will be addressed

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				through an Information Gathering Form (IGF) and Alternatives Assessment Form (AAF) submitted to MECP for consideration if an Overall Benefit Permit will be required. In addition, acoustic bat surveys may be completed in June and breeding bird surveys completed from May to early July in the forest. If no SAR are identified during these surveys, no further action in the permitting process would be required for the removal of the forest. If SAR are identified during these surveys, the permitting process may proceed.
	2.5. Migratory Nesting Birds	• Potential destruction of nests, eggs or young prior to and during construction • Disturbance to migratory birds that could be utilizing the vegetation adjacent to the construction area • Temporary exclusion from potential nesting sites located within the ROW • Marginal loss of potential nesting habitat resulting from clearing or trimming of trees and shrubs	MNRF, MECP, Environment and Climate Change Canada (ECCC)	To protect birds and comply with the MBCA, the following measures will be incorporated into the construction Contract: • Tree and vegetation removals to be completed outside of the breeding bird season (April 1 and August 31). • Vegetation removal or construction works can occur during restricted periods if a qualified avian biologist conducts a nest search of the area within 48 hours prior to work commencing and determines that active nests of Schedule 1 bird species (Migratory Birds Regulations SOR-2022-105) are not observed in proximity to the work area. If breeding birds and/or nests are encountered, works should not continue in the location of the nest until after August 31 or as soon as it has been determined that the young have fledged and left the nest. • A nest survey shall be conducted on the Highway 4 (Colonel Talbot Road) and Glanworth Drive bridges prior to work on the bridges to confirm no active bird nests or young are present. • The Contractor will not destroy the active nests (nests with eggs or young birds) or wound or kill birds of species protected under the MBCA or Regulations under that Act.

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				• If migratory birds are observed to be nesting in the construction area and/or nests are encountered, works will not continue in that location until it had been determined that the nest is no longer active (i.e., young have fledged and left the nest). • Workers must be vigilant and check work areas for the presence of breeding birds and nests containing eggs and young.

	2.6. Fish and Fish Habitat	• Impacts to fish and fish habitat during in-water works and dewatering activities	Fisheries and Oceans Canada (DFO), MNRF, MECP, KCCA	• To protect sensitive life stages/processes of resident fish, no in-water work is to occur between March 31 to July 1, of any given year.
				• In-stream work areas will be isolated from flow and dewatered to permit work in the dry.
				• Fish salvages will be performed (under a Licence to Collect Fish for Scientific Purposes (LCFSP) in coordination with dewatering operations, if necessary, and all fish will be released alive downstream of the work site (unless otherwise noted in the LCFSP, in particular for the removal of any ponds.
				• Flow will be maintained downstream at all times during construction via dam and pump technology or complete bypass, as applicable.
				• Dewatering and use of pumps shall be conducted using Best Management Practices and Contract specifications:
				  ○ Pumping system shall be sized to accommodate required flows of the during the construction period. Pumps shall be monitored at all times, and back-up pumps shall be readily available on-site in the event of pump failure
				  ○ Sediment laden dewatering discharge shall be pumped into a vegetated area, settling basin or

Identification number (I.D.#)	I.D. # Sub-issues	Potential Impacts/Concerns	Potentially Interested Agencies/ Stakeholders	Mitigation/Protection/Monitoring
				similar measure >30 m from the watercourse and prevent sediment and other deleterious substances from entering any waterbody • As per DFO Interim Code of Practice: End-of-Pipe Fish Screens, all water intakes and outlets in the watercourse will have screens to prevent entrainment or impingement of fish • Tree and vegetation removals are to be minimized where possible, and disturbed terrestrial riparian areas will be restored to pre-construction conditions and stabilized to prevent erosion. . • Box culverts will be installed in-line with the existing watercourse, levelled and embedded at least 300 mm to facilitate the re-establishment of substrate in the new culvert. The areas of realignment of the Fournie Drain will be completed in isolation of the existing channel and connected at the end of construction once stabilization has been achieved and flow resumed. • All disturbed areas will be restored to pre-construction conditions and stabilized to prevent erosion.. • All seed is to be placed in late August – September or early in the Spring. • Appropriate erosion and sediment control measures must be installed around the work area to prevent migration of loose soils and accumulated sediment downstream or to adjacent areas). ○ Effective sediment and erosion control will follow MTO's Environmental Guide for Erosion and Sediment Control During Construction of Highway Projects (MTO 2015), including keeping required clearing and grubbing to a minimum and installing silt fence along watercourse banks and around fill

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				placement areas and through the use of erosion and sediment control measures such as filter socks and check dams. • Operate machinery on land from outside the water in a manner that minimizes disturbance to the banks and/or bed of the watercourse. • Equipment shall arrive on site in a clean condition and is maintained free of fluid leaks, invasive species and noxious weeds. • Equipment re-fuelling and maintenance shall take place in a manner that prevents any sediment and other deleterious substances from entering into a waterbody). • Maintenance and fuelling of equipment to take place a minimum of 30 m from waterbodies. • An emergency spill kit shall be kept on site to address any fluid leaks or spills from equipment. • Handling of fuel, excess materials and debris will be properly managed on-site and removed as per the standard construction practices necessary to protect watercourses. • All materials used or generated (i.e., organics, soils, woody debris, temporary stockpiles, construction debris, etc.) will be temporarily stored, handled and disposed of during site preparation, construction and clean-up in a manner that prevents entry into watercourses. • Any unused excavated material will be managed as per O.Reg. 406/19 On-site and Excess Soil Management.
	2.7. Groundwater and Source Water Protection	• Potential for contamination and/or impact on during and after construction.	MNRF, MECP, KCCA, City, Middlesex, Elgin	• General Conditions in the Contract outline incident management requirements for protecting the environment and natural features in the event of a spill. MTO General Conditions of Contract and OC (Spill Prevention and

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				Response Contingency Plan) will be included in the Contract. • The Contractor will have a robust spill management plan in place during construction and the spill kit on site should contain a supply of absorbent products such as booms, pads and socks. • In the event of a spill or release of product, The Contractor's Spill Management Plan must be initiated. • In the event of a spill of fuel or other hazardous material, remedial actions must be undertaken immediately; • A Discharge Monitoring Plan will include daily record of volumes pumped and are to be recorded by the Contractor. The notifications and reporting outlined in the Water Taking and Discharge Plan are to be followed. • The pumped volume from the proposed works will be less than 400,000 L/day, which is the maximum allowed under the EASR; • During construction activities, efforts will be made to reduce and mitigate impacts to the surrounding environment; • Water will be visually inspected prior to pumping to ensure it is free of floating and settleable solids and does not contain oil or other substances, including olfactory and visual inspection, and must be removed prior to discharge; • Pumped water from the excavation area will be discharged through a filter bag prior to being discarded to adjacent lands; • The management and discharge of pumped excavation water will be managed by the Contractor in accordance with the Discharge Monitoring Plan;

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				• In the event that complaints are received from nearby property owners relating to water taking activities, they will be recorded and be reported to MECP by the Contractor; • If mobile treatment is employed, it must be completed by a licensed contractor that meets provincial requirements and holds an approved Mobile Sewage Works Environmental Compliance Approval; • Where stockpiles are stored during construction activities, erosion control measures will be implemented, where required, and inspected and maintained on a regular basis; • The Contractor will ensure that all waste material including from construction activities is disposed of through an approved waste management facility and in compliance with MECP regulations; • The Contractor's standard practices for containment and spill management will be implement to reduce the potential for deleterious substances being discharged from the proposed works; • Refuelling and maintenance of vehicles will be conducted a minimum 100 m from waterbodies.
	2.8. Drainage and Stormwater Management	• Potential impacts to quantity and quality of surface water to receiving watercourses.	MNRF, MECP, KCCA, City, Middlesex, Elgin	• An ESC plan will be included to mitigate temporary and long-term impacts including placing seed and cover as quickly as possible during late August – September or in the early spring in addition to the installation of ESC measures such as flow check dams and erosion control blankets. • Barriers will be installed within the drainage network to mitigate impacts to existing culvert locations and locations where drainage networks leave the construction limits.
	2.10. Erosion and Sediment Control (ESC)	• On-site erosion and deposition into natural areas.	MNRF, MECP, KCCA, Middlesex, Elgin	• An ESC plan will be developed following MTO's 'Environmental Guide for Erosion and Sediment Control during Construction of Highway Projects Manual' (2015),

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				which includes a series of standard procedural and structural Best Management Practices in Appendix E: Fact Sheets. These Best Management Practices will be incorporated into the ESC and part of the new construction drawings and specifications for the project. • The Contract will include the following measures and provisions to minimize potential erosion and capture any sedimentation: ○ Erosion and sedimentation control measures, such as bonded fibre matrix, erosion control blanket, seed and mulch, rip rap and rock flow checks, etc. ○ In-line measures such as flow check dams and rock flow checks will enhance sedimentation control in ditches. ○ An Operational Constraint in the contract (ESC – General) includes timing restrictions to restrict the length of time between commencement of any work, which disturbs earth surfaces and the application of final cover. ○ Minimize the disturbance of existing well-vegetate ditches and grassed slopes. ○ Protect undisturbed slopes and sensitive ditching with silt fence and fibre rolls or equivalent. These measures must remain in place until exposed soils are stabilized and/or re-vegetated. ○ Place erosion control blanket or equivalent on 3:1 or greater slopes where height warrants its use. ○ Place appropriately sized rip rap and geotextile at new and existing sewer outlets. ○ A maximum of 45 days shall be permitted between the commencement of any work which disturbs earth surfaces and the application of final cover,

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				with that time reduced to 15 days in riparian areas. • Silt fencing will be installed following procedures outlined in OPSS 805 where surfaces will be cleared of vegetation and there is a risk of sediment release into natural features • ESC measures shall be monitored regularly and/or after every 10 mm or greater rainfall event as they could require periodic cleaning, maintenance and/or re-construction. If deficiencies are found, they should be repaired and/or replaced promptly. • Grading, placement of topsoil and seeding specifications will be implemented to decrease erosion potential and promote suitable vegetation regeneration. • Areas temporarily cleared of vegetation will be stabilized (e.g., vegetated/seeded) prior to removal of ESC measures. • Grading, placement of topsoil and seeding specifications will be implemented to decrease erosion potential and promote suitable vegetation regeneration. • All cover should be completed no later than November 1. • If construction works require dewatering, a dewatering plan will be prepared in accordance with environmental best management practices. • Contract includes an SP for 'Erosion and Sedimentation Control - General. This SP includes timing restrictions to restrict the length of time between the commencement of any work which disturbs earth surfaces and the application of final cover and requires run-off from construction materials and any stockpiles shall be contained and discharged.

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	2.11. Earth Excavation	• Final placement of excess earth materials	MECP, City, Middlesex, Elgin	• Excess Earth will be managed on site in accordance with *O.Reg. 406/19*, as detailed in the Excess Materials Management Plan.
3. Contamination and Waste Management	3.1. Spills Handling	• Potential adverse impacts of spills on environment and natural features including release of deleterious substances.	MNRF, MECP, KCCA, City, Middlesex, Elgin	• Operational Constraint for the Contractor will have a robust spill management plan in place during construction and the spill kit on site should contain a supply of absorbent products such as booms, pads and socks. • MTO General Conditions of Contract specifies incident management requirements following relevant legislation including, Environmental Protection Act, Fisheries Act, Gasoline Handling Act, Ontario Pesticides Act, Ontario Water Resources Act and Transportation of Dangerous Goods Act.
	3.2. Contaminated Soils	• Proper handling and disposal of potentially contaminated soils. • Potential to encounter contaminated soils during construction.	MECP	• The Contractor will be responsible for the removal and disposal of any contaminated soil as per Contract specifications • MTO General Conditions of Contract and provisions included in MTO Contracts for Construction dictate procedures for notification and handling of contaminated materials not previously identified.
4. Land Uses and Socio-Economic Environment	4.1. Construction Noise	• Increase in ambient noise levels during construction.	Area residents, MECP, City	• Overnight construction activities will be required to complete the work. To minimize the potential for construction noise impacts, the following outlines generally accepted construction practices which must be followed by the Contractor: • All construction equipment should be properly maintained to limit noise emissions. As such, all construction equipment should be operated with effective muffling devices in good working order

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				• In the presence of persistent noise complaints, all construction equipment shall be verified to comply with MECP NPC-115 guidelines • In the presence of persistent complaints and subject to the results of a field investigation, alternative noise control measured 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.
	4.2. Air Quality and Dust	• Potential dust and air quality impacts caused by construction and construction traffic.	Area residents, MECP, City	• Impacts minimized by Contractor compliance with MTO General Conditions of Contract to minimize dust and other air quality impacts. Standard construction practices including: • Use well-maintained heavy equipment and machinery and comply with operating specifications • Minimize operation and idling of gas-powered equipment and vehicles, especially during smog advisories • Minimize vehicular traffic on exposed soils and stabilize high traffic areas with suitable cover material • Avoid excavation and other construction activities with potential to release airborne particulates during windy and prolonged dry periods • Stabilize stockpiled excavated soils in areas upwind of sensitive receptors • Cover or otherwise contain loose construction materials with potential to release airborne particulates during transport, installation or removal • Restore disturbed areas as soon as possible to minimize the duration of soil exposure.

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5. Cultural Heritage Resources	5.1. Archaeology	• Potential destruction/disturbance to deeply buried archaeological resources and/or unmarked human remains during construction.	Indigenous communities, Ministry of Citizenship and Multiculturalism (MCM)	• Avoided by MTO General Conditions in the Contract that requires the Contractor to suspend work immediately and notify the Contract Administrator in the event that archaeological resources or human remains are identified.

5.3 Environmental Construction Inspection and Monitoring

This study included the development of appropriate mitigation measures and provisions for implementation during all stages of construction to fulfill the regulatory and contract requirements, protect the environment and meet MTO obligations. An Environmental Monitor will be required as per the Contract. The Environmental Monitor role will include and is not limited to:

- Attending the stie bi-weekly to document and report on site conditions;
- Inspecting, monitoring and administering environmental requirements during construction to ensure the implementation and effectiveness of the measures and provisions included in the Contract;
- Assessing the adequacy of measures and provisions, anticipate problems and develop appropriate solutions; and,
- Thoroughly evaluating any changes proposed by the Contractor to ensure that changes meet the intent of the measures and provisions outlined in the Contract and reflect prevailing conditions on site.

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