Ontario

HIGHWAY 401/ KINGSTON ROAD 38 INTERCHANGE INTERIM OPERATIONAL IMPROVEMENTS DETAIL DESIGN

G.W.P. 4049-11-00

Class Environmental Assessment for Provincial Transportation Facilities (2000) Group 'B' Project

ONTARIO MINISTRY OF TRANSPORTATION

EASTERN REGION

DESIGN AND CONSTRUCTION REPORT

MAY 2018

Ontario

HIGHWAY 401/KINGSTON ROAD 38 INTERCHANGE
INTERIM OPERATIONAL IMPROVEMENTS
DETAIL DESIGN

CITY OF KINGSTON

DESIGN AND CONSTRUCTION REPORT
G.W.P. 4049-11-00

Class Environmental Assessment for Provincial Transportation Facilities (2000) Group 'B' Project

Prepared for the Ontario Ministry of Transportation, Eastern Region
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Ontario

THE PUBLIC RECORD

Ontario Ministry of Transportation

Highway 401/Kingston Road 38 Interchange – Interim Operational Improvements

DESIGN AND CONSTRUCTION REPORT

G.W.P. 4049-11-00

A copy of this Design and Construction Report (DCR) is available for review at the following locations during normal hours of operation:

Kingston City Hall
Office of the City Clerk
216 Ontario Street
Kingston Ontario

Monday – Friday: 8:30 a.m. - 4:30 p.m.

Ministry of Transportation
Eastern Region
1355 John Counter Boulevard
Kingston Ontario

Monday – Friday: 8:30 a.m. - 4:30 p.m.

INVISTA Centre
Front Desk
1350 Gardiners Road
Kingston Ontario

Monday – Sunday: 8:00 a.m. - 8:00 p.m.

Kingston Public Library
Isabel Turner Branch
935 Gardiners Road
Kingston Ontario
Monday – Thursday: 9:00 a.m. - 9:00 p.m.
Friday – Saturday: 9:00 a.m. - 5:00 p.m.

A digital copy of this report is also available on the project website, hwy401kr38.ca in the documentation section.

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Executive Summary

The Project

The Ontario Ministry of Transportation (MTO) retained Stantec Consulting Ltd. (Stantec) to complete the Detail Design and contract preparation for the Highway 401/Kingston Road 38 Interchange Interim Operational Improvements (G.W.P. 4049-11-00).

The Highway 401 interchange at Kingston Road 38 is in Kingston, Ontario in the former Township of Kingston. The interchange is located directly north of the main urban area and is one of six interchanges along the Highway 401 corridor that provide access to the City of Kingston. Within the urban area, Kingston Road 38 is known as Gardiners Road.

Environmental Assessment Process

The Highway 401/Kingston Road 38 interchange interim improvements project is being completed in accordance with the MTO Class Environmental Assessment for Provincial Transportation Facilities, 2000 (Class EA) process for Group 'B' projects. Group 'B' undertakings include major improvements to existing transportation facilities.

This Design and Construction Report (DCR) builds on the *Transportation Environmental Study Report* (TESR) prepared for the *Highway 401/Kingston Road 38 Interchange Operational Improvements, Preliminary Design and Class Environmental Assessment Study*, G.W.P. 4049-11-00 (MMM Group, January 2016), which outlined the existing environmental conditions, needs and justification for the improvements, alternative solutions and designs, consultation, selection of the Technically Preferred Alternatives for both long term and interim improvements and proposed environmental mitigation measures. The TESR received environmental clearance in March 2016.

A comprehensive Consultation Plan was developed for Detail Design to address the requirements of the MTO Class EA and to inform stakeholders of the project and provide for input throughout the course of the project. The contact list was generated based on the list of contacts that were involved in the Preliminary Design study. Contacts on the mailing list were removed, added, and updated as relevant to the Detail Design.

As required under the Class EA, this DCR is being made available for a 30-day public review period. The Project Team will respond to all comments received during the 30-day public review; however, there is no opportunity to request a Part II Order (bump-up) from the Minister of the Environment and Climate Change (MOECC), since the opportunity was provided during Preliminary Design.

Following the 30-day review, construction may commence in accordance with the description provided in this document, contingent upon the receipt of any other required approvals, permits and authorizations.

A digital copy of this report is also available on the project website, **hwy401kr38.ca** in the documentation section. The website includes a "Contact Us" feature to allow visitors to submit comments and questions through the dedicated project email address [comments@hwy401kr38.ca].

The Recommended Plan

In advance of full implementation of the recommended long-term interchange improvements, interim interchange improvements were identified to provide operational benefits in the short term. The interim operational improvements project outlined in this document includes the following components:

- Reconfiguration of the Highway 401 westbound Parclo B on-ramp (N/S-W) and off-ramp (E-N/S) to align with the McIvor Road intersection
- Reconfiguration of the Highway 401 eastbound off-ramp (W-N/S)
- Replacement of the Highway 401 westbound Collins Creek Bridge
- Drainage improvements including two new Stormwater Management Facilities
- New, expanded commuter lot in the southeast quadrant
- New traffic signals at the north and south ramp terminals
- Replacement of guiderail and illumination

A detailed description of the recommended plan for interim improvements is included in Section 3.0.

Changes from the Preliminary Design Plan for Interim Improvements

The Preliminary Design Technically Preferred Alternative proposed to widen the existing Highway 401 westbound Collins Creek Bridge to the north by approximately 7 m to accommodate the westerly shift of the Highway 401 westbound speed change lane. During Detail Design further evaluation of the bridge improvement alternatives determined that replacement of the Highway 401 westbound Collins Creek Bridge is preferred over the rehabilitation alternative.

The TESR identified short term closure of the carpool facility during construction. The refined staging plan proposes closure for 1 year.

The TESR did not identify the need to close McIvor Road. The closure of an approximate 140 m section of McIvor Road between Kingston Road 38 and Jackson Mills Road is proposed for approximately 3 – 4 weeks. McIvor Road east of Jackson Mills Road will remain open with access to Highway 401 via Sydenham Road.

Implementation / Construction Staging

It is anticipated that the project will be constructed in six stages over 2.5 construction seasons starting in the fall of 2018 with completion in 2020.

The TESR outlined a preliminary staging strategy for the proposed interim improvements. The staging strategy has been further refined based on additional information, MTO requirements and the desire to reduce impacts to traffic movements.

While the construction staging presented in Section 3.2 was developed with the goal of minimizing lane and ramp closures to the extent possible, some closures are required to accommodate the proposed construction activities. The general staging overview includes the following:

- Two lanes on Highway 401 maintained at all times during the day
- Single lane on Highway 401 occurs only during night time hours
- Highway 401 eastbound lane closures only at night
- Highway 401 westbound driving lane closure is longer term during replacement of the Highway 401 westbound Collins Creek bridge (2019 construction)
- Periodic short duration night time ramp closures are required
- Kingston Road 38 maintains two lanes in each direction during daytime hours, however nightly lane reductions are required
- Temporary closure (approximately 3 weeks) of an approximate 140 m section of McIvor Road between Kingston Road 38 and Jackson Mills Road is required with access from McIvor Road to Highway 401 via Sydenham Road
- Temporary closure of the commuter parking lot is required from fall 2018 to fall 2019 (signage to use alternate locations will be provided)

Summary of Environmental Effects and Commitments

The proposed improvements to the Highway 401 and Kingston Road 38 Interchange and Highway 401 westbound Collins Creek bridge can be completed without significant adverse effects to the natural, social and cultural environment in the study area. Long

term effects from the construction of the operational improvements are considered negligible.

A summary of environmental effects, proposed mitigation and commitments, as identified at the end of the study is provided in Table 10. The table forms a comprehensive checklist of the commitments made to external agencies, the public and other stakeholders during Preliminary and Detail Design.

Specific environmental controls based on these mitigation measures will be included in the contract documents and drawings to address environmental concerns during the construction phase.

On-site construction supervisory staff will make sure that environmental protection measures, as outlined in this report and in the contract package, are being implemented and are effective. This includes making sure that the implementation of mitigating measures and key design features is consistent with commitments made to external agencies prior to construction. If protective measures do not address concerns identified or if major problems develop, the appropriate agency will be contacted to provide additional input.

1.0 OVERVIEW OF THE UNDERTAKING

1.1 INTRODUCTION

The Ontario Ministry of Transportation (MTO) retained Stantec Consulting Ltd. (Stantec) to complete the Detail Design and contract drawings and tender documents for the Highway 401/Kingston Road 38 Interchange Interim Operational Improvements (G.W.P. 4049-11-00).

The Highway 401 interchange at Kingston Road 38 is in Kingston, Ontario in the former Township of Kingston. The interchange is located directly north of the main urban area and is one of six interchanges along the Highway 401 corridor that provide access to the City of Kingston. Within the urban area, Kingston Road 38 is known as Gardiners Road. The location of the interchange is illustrated on Exhibit 1.

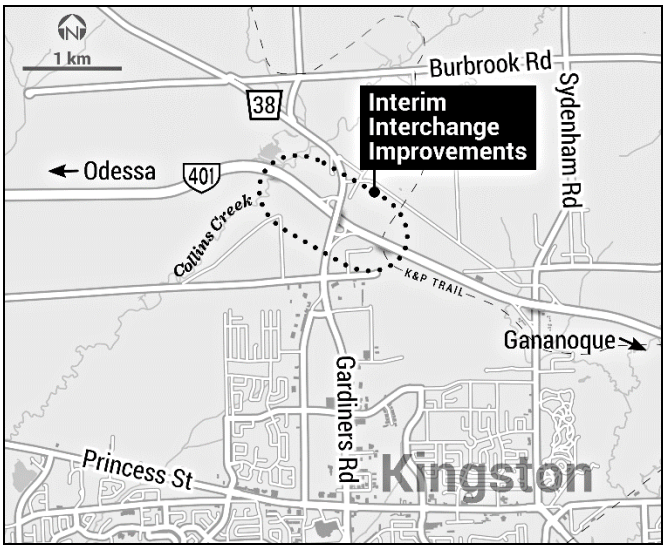

Exhibit 1: Project Location

This *Design and Construction Report* (DCR) builds on the *Transportation Environmental Study Report* (TESR) prepared for the *Highway 401/Kingston Road 38 Interchange Operational Improvements, Preliminary Design and Class Environmental Assessment Study, G.W.P. 4049-11-00* (MMM Group, January 2016), which outlined the existing environmental conditions, needs and justification for the improvements, alternative solutions and designs, consultation, selection of the Technically Preferred Alternatives for both long term and interim improvements and proposed environmental mitigation measures. The TESR received environmental clearance in March 2016.

1.2 PROJECT BACKGROUND – PRELIMINARY DESIGN AND ENVIRONMENTAL ASSESSMENT STUDY

The existing interchange was originally constructed in the 1960s. Minor modifications were completed when Highway 401 was widened to six lanes between Montreal Road and Kingston Road 38. The interchange is characterized as having several issues/concerns that require operational and structural improvements. This interchange is an integral connection between the City of Kingston and the provincial highway network. As such, it experiences high volumes which generates queuing and delay at the interchange that is further exacerbated by the undesirable geometry of the existing eastbound off-ramp and westbound on- and off-ramps.

The Preliminary Design and Class EA Study for operational improvements to the Highway 401 interchange at Kingston Road 38 reviewed planning and design options that included: relocation of ramps; relocation of the commuter lot; widening, replacement or rehabilitation of the bridge, additional through and turning lanes. These were designed to address traffic conditions until the project horizon year of 2033.

The study identified geometric and operational issues associated with the interchange, including:

- High traffic volumes on Kingston Road 38, resulting in delays and queuing during peak periods, particularly where northbound traffic on Kingston Road 38 turns left onto the westbound Highway 401 on-ramp
- A lack of dedicated left-turn lanes from Kingston Road 38 to Highway 401 on-ramps, contributes to queuing and delays
- Increasing volumes of traffic using the interchange
- Limited storage capacity on the Highway 401 off-ramps, resulting in queuing that can back up onto the highway during peak periods
- Highway 401 off-ramps with small ramp radii are less than desirable and can be difficult to navigate

The TESR included a detailed analysis where a short-list of eight alternatives were evaluated against key measures reflecting technical, environmental, cost and constructability considerations. The result was a Technically Preferred Alternative for long-term improvements (10-20 years) at the interchange. The recommended long-term interchange improvements identified in the TESR included:

- New eastbound on-and off-ramps in the southwest quadrant of the interchange
- Realignment of the westbound on- and off-ramps in the northwest quadrant

- New northbound left-turn lanes at the north ramp terminal
- Realignment of Kingston Road 38 to the west and replacement of the existing Kingston Road 38 underpass
- Replacement of the existing carpool lot with a new, larger commuter facility in the southeast quadrant of the interchange
- Widening of the Highway 401 westbound Collins Creek bridge

In advance of full implementation of the recommended long-term interchange improvements, interim interchange improvements were identified to provide operational benefits in the short term; these build towards the long term with minimal throw away. In general, the proposed interim improvements identified in the TESR included:

- Shifting the north ramp terminal to McIvor Road and realigning the westbound on- and off-ramps to accommodate a larger 'loop' ramp radius
- Widening the Highway 401 westbound Collins Creek Bridge to accommodate the westbound on-ramp speed change lane
- Providing a channelized right-turn lane on the westbound off-ramp, for traffic exiting Highway 401 westbound to Kingston Road 38 southbound
- Adding two northbound left-turn lanes at the ramp terminal on the north side of Highway 401 to reduce traffic delays
- Adding a southbound left-turn lane at the ramp terminal on the south side of Highway 401
- Providing dual right-turn lanes for traffic exiting Highway 401 eastbound to Kingston Road 38 southbound
- Replacing the existing commuter parking lot with a larger commuter lot in the southeast quadrant

1.2.1 Changes to the Technically Preferred Alternative

The Preliminary Design Technically Preferred Alternative proposed to widen the existing Highway 401 westbound Collins Creek Bridge to the north by approximately 7 m to accommodate the westerly shift of the Highway 401 westbound speed change lane. During Detail Design further evaluation of the bridge improvement alternatives determined that replacement of the Highway 401 westbound Collins Creek Bridge is preferred over the rehabilitation alternative.

1.3 SUMMARY DESCRIPTION OF THE UNDERTAKING

The interim operational improvements project outlined in this document includes the following components:

- Reconfiguration of the Highway 401 westbound Parclo B on-ramp (N/S-W) and off-ramp (E-N/S) to align with the McIvor Road intersection
- Reconfiguration of the Highway 401 eastbound off-ramp (W-N/S)
- Replacing the Highway 401 westbound Collins Creek Bridge
- Drainage improvements including two new Stormwater Management facilities
- New, expanded commuter lot in the southeast quadrant
- New traffic signals at the north and south ramp terminals
- Replacement of guiderail and illumination

The Detail Design Study has refined these improvements in preparation for construction. A detailed description of the recommended plan for interim improvements is included in Section 3.0.

1.3.1 Related Works

The MTO is preparing a Detail Design for the rehabilitation of the Highway 401 eastbound Collins Creek Bridge which is being conducted under a separate EA. The work has not been included as part of this Detail Design study, however, it will be included in the contract tender documents for construction.

1.4 ENVIRONMENTAL ASSESSMENT PROCESS

The *Ontario Environmental Assessment Act* (OEAA) governs the conduct of Planning, Preliminary Design and Detail Design studies in the province of Ontario. MTO's *Class Environmental Assessment for Provincial Transportation Facilities* (Class EA) was approved under the OEAA in 1997 and was amended in 2000. The Class EA document defines groups of projects and activities, and the environmental assessment processes that the MTO has committed to follow for these projects. Provided this process is followed, projects and activities included under the Class EA do not require formal review or approval under the OEAA. There is an opportunity at any time during the MTO Class EA process for interested persons to provide comments and review outstanding issues.

The Highway 401/Kingston Road 38 interchange interim improvements project is being completed in accordance with the MTO Class EA process for Group 'B' projects. Group 'B' undertakings include major improvements to existing transportation facilities.

1.4.1 Project Specific Study Process

This Detail Design project involves the preparation of a contract document and includes the submission of a DCR documenting the Detail Design process, potential impacts, and proposed mitigation measures.

As outlined in Exhibit 2, approval of the DCR is the final task in the Detail Design process.

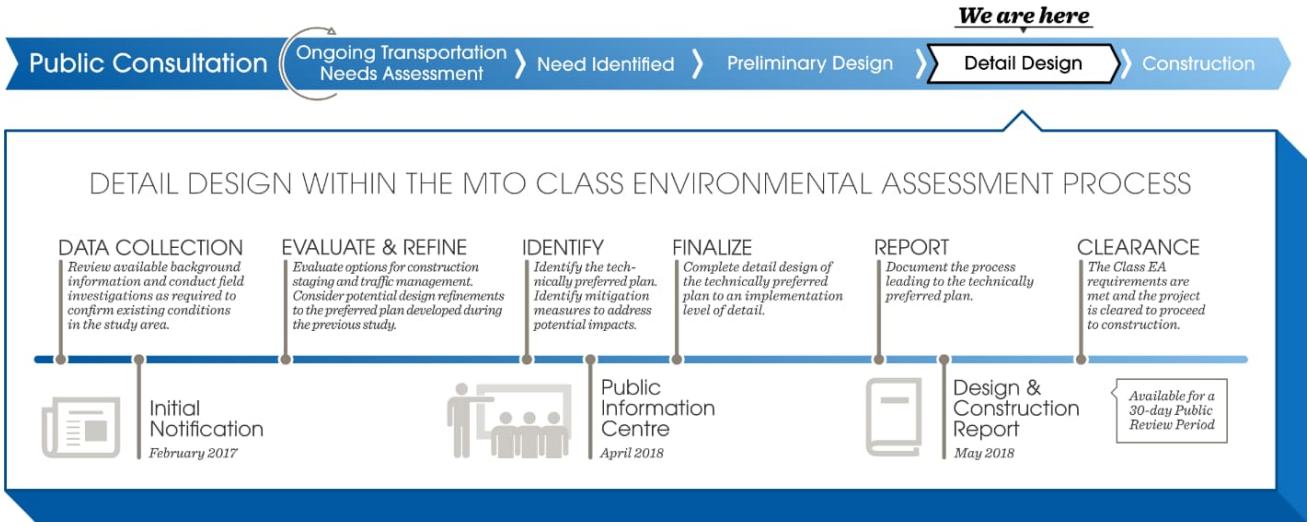

Exhibit 2: Detail Design Process

1.5 PURPOSE OF THE DESIGN AND CONSTRUCTION REPORT

The DCR is intended to document the following:

- A summary description of the project
- A summary of the Class EA process followed
- A description of significant transportation engineering and environmental issues and how they were addressed
- A description of the Recommended Plan
- A summary of stakeholder and public consultation

- Identification of project approvals that must be obtained prior to construction
- A detailed description of anticipated environmental effects and recommended mitigation measures that will be incorporated into the contract documents

As required under the Class EA, this DCR is being made available for a 30-day public review period. The Project Team will respond to all comments received during the 30-day public review; however, there is no opportunity to request a Part II Order (bump-up) from the Minister of the Environment and Climate Change (MOECC), since the opportunity was provided during Preliminary Design.

1.5.1 Notice of Submission Design and Construction Report

A "Notice of Submission" was placed in the Kingston Whig Standard and the Kingston This Week concurrent with the filing of the DCR. The purpose of the notice is to inform the public that a DCR, documenting the Detail Design and associated environmental protection measures has been prepared and will be available from **May 5, 2018 to June 4, 2018** for a 30-day public review period.

The notice, along with a digital copy of this report, was also placed on the project website, hwy401kr38.ca.

A sign notifying carpool lot users of the public review period was also displayed at the carpool lot. Letters have been sent notifying government agencies, Indigenous communities, municipalities, emergency services and members of the public on the study mailing list of the DCR submission for a 30-day public review period.

If there are no outstanding concerns after the 30-day public review period has expired, further documentation will not be prepared, and construction may commence without further notice. Comments during the review period may be submitted via the project website, hwy401kr38.ca.

The DCR can be reviewed on the project website, **hwy401kr38**.ca or at the following locations during normal hours of operation:

Kingston Public Library
Isabel Turner Branch
935 Gardiners Road
Kingston Ontario

Kingston City Hall
Office of the City Clerk
216 Ontario Street
Kingston Ontario

INVISTA Centre
Front Desk
1350 Gardiners Road
Kingston Ontario

Ministry of Transportation
Eastern Region
1355 John Counter Boulevard
Kingston Ontario

The Project Team is available to discuss the information provided in this report or project-related inquiries and can be contacted as follows:

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Postal Bag 4000
Kingston ON K7L 5A3

Tel: 613-545-4871
Toll-free: 1-800-267-0295
E-mail: tina.white@ontario.ca

For environmental issues of broader concern, reference should be made to the January 2016 TESR that was completed by MMM Group Limited which is available in digital format on the project website, **hwy401kr38.ca.**

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2.0 CONSULTATION PROCESS

Consistent with the requirements for Group 'B' projects under the MTO Class EA, consultation was on-going throughout the course of the project. Federal, provincial, and municipal agencies, Indigenous communities, local political representatives, special interest groups, members of the public and other stakeholders were identified at the start of Preliminary Design and carried forward to Detail Design.

The City of Kingston is a designated area under the *French Languages Service Act* and is subject to the requirements of the Act. Advertisements were published in English and French and all other public material, apart from technical information, was shown in both English and French.

2.1 CONSULTATION DURING DETAIL DESIGN

A comprehensive Consultation Plan was developed for Detail Design of the Highway 401/Kingston Road 38 Interchange Interim Improvements (G.W.P. 4049-11-00) to address the requirements of the MTO Class EA and to inform stakeholders of the project and provide for input throughout the course of the project.

The plan included:

- Ontario Government Notices (OGNs) published in local newspapers
- Indigenous Communities consultation
- Notification letters and emails to elected representatives; external agency, stakeholder and interest group representatives; and property owners and members of the public
- A Public Information Centre (PIC)
- Signage at the existing carpool lot at consultation milestones
- Correspondence and meetings with external agencies
- A project website
- Filing of the Design and Construction Report for a 30-day public review

The contact list was generated based on the list of contacts that were involved in the Preliminary Design study. Contacts on the mailing list were removed, added, and updated as relevant to the Detail Design.

2.1.1 Indigenous Communities

An Indigenous Communities Consultation Plan was developed at the start of Detail Design and carried out in accordance with Ontario's New Approach to Indigenous Affairs.

Letters to Indigenous communities and contacts as outlined in Table 1, were sent by MTO on March 2, 2017 to invite their communities to participate in this Detail Design study and assist in updating the environmental, social, and cultural values their communities may have within the study area. The OGN for Study Commencement was enclosed.

Letters were also sent on March 27, 2018 to invite Indigenous communities to the PIC on April 11, 2018. The PIC notice was enclosed.

The OGN for Study Submission announcing the 30-day review period for the DCR was sent by MTO on April 30, 2018.

Table 1: Indigenous Communities

Indigenous Community Contacts	
• Alderville First Nation • Algonquins of Ontario Consultation Office • Algonquins of Pikwakanagan First Nation • Beausoleil First Nation (Christian Island) • Chippewas of Georgina Island First Nation • Chippewas of Rama First Nation • Curve Lake First Nation • Hiawatha First Nation • Mohawks of the Bay of Quinte	• Mohawk Council of Akwesasne • Moose Deer Point First Nation • Wahta Mohawks (Mohawks of Gibson) • High Land Waters Métis Council • Williams Treaty First Nations Process Coordinator • Shabot Obaadjiwan First Nation • Metis Nation of Ontario • Mississaugas of the New Credit First Nation • Mississaugas of Scugog Island First Nation

The Chippewas of Rama advised that the Notice of Study Commencement was shared with council and forwarded to Ms. Karry Sandy McKenzie, Williams Treaties First Nation Process Coordinator/ Negotiator for review.

Copies of the notification letters are provided in Appendix A.

2.1.2 Local Political Representatives

Letters to the MPP and local elected officials (Table 2) were sent by MTO on February 23, 2017 to announce the Detail Design for interim improvements and to advise in advance of the dates that the OGN would be published in local newspapers. The OGN for Study Commencement was enclosed.

MTO letters were also sent on March 27, 2018 to invite political representatives to the PIC and to advise in advance of the dates that the OGN would be published in local newspapers. The PIC notice was enclosed. The Councillors for Countryside and Collins Bayridge attended the PIC.

The OGN for Study Submission announcing the 30-day review period for the DCR was sent by MTO on April 30, 2018.

Table 2: Local Elected Officials

Local Elected Officials	
• MPP, Kingston and the Islands • Mayor, City of Kingston • Councillor, District 2 Loyalist-Cataraqui	• Councillor, District 1 Countryside • Councillor, District 3 Collins-Bayridge • Councillor, District 6 Trillium

Copies of the notification letters are provided in Appendix A.

2.1.3 External Agencies

On March 2, 2017 letters were sent to provincial ministries, municipal departments within the City of Kingston, utilities, and interest groups to announce the commencement of the Detail Design for the interim improvements. An agency comment form was enclosed to provide the opportunity to provide new information or identify specific interests regarding the project.

Letters with the PIC Notice were sent on March 27, 2018 to invite external agency representatives to the attend the PIC anytime between 3 p.m. and 8 p.m. on April 11, 2018. Representatives from the City of Kingston Engineering Department and the Cataraqui Region Conservation Authority attended the PIC.

The OGN for Study Submission announcing the 30-day review period for the DCR was sent to external agencies on April 30, 2018.

External agencies and stakeholders contacted are listed in Table 3.

Table 3: External Agencies/Stakeholders

Ministries/Agencies	
• Correctional Services Canada • Ministry of Natural Resources and Forestry, Peterborough District • Infrastructure Ontario • Ministry of Tourism, Culture and Sport	• Ministry of the Environment and Climate Change • Ministry of Transportation (Goods Movement) • Ontario Provincial Police, Frontenac Detachment
Municipalities and Local Agencies	
• Clerk, City of Kingston • Traffic Division, City of Kingston • Public Works, City of Kingston • Planning, Building & Licensing, City of Kingston • Planning & Development, City of Kingston • Engineering, City of Kingston • Recreation Programs, City of Kingston • Transit Service Project Manager, City of Kingston • Transportation Services, City of Kingston	• Kingston Police • Kingston Fire and Rescue • Kingston Transit • Kingston Economic Development Corporation • Cataraqui Region Conservation Authority (CRCA) • Planning and Economic Development, Frontenac County • Heritage Kingston, Committee Clerk • Chief Administrative Officer, Frontenac County • Frontenac Paramedic Services
Utilities	
• Eastern Ontario Power • All Stream (Zayo Canada Inc.) • Enbridge Gas Distribution Inc. • Union Gas Ltd. • Rogers Communications	• Bell Canada • Hydro One Networks Inc. • Utilities Kingston • Cogeco Inc.

Stakeholders/Interest Groups	
• Limestone District School Board • Algonquin and Lakeshore Catholic District School Board • Tri-Board Student Transportation Services • Conseil des Ecoles Publiques de l'Est de l'Ontario • Conseil des Ecoles Catholiques due Centre-Est • Consortium de transport scolaire d'Ottawa *added following PIC as a result of public input	• Frontenac Heritage Foundation • Lennox and Addington Ridge Runners Snowmobile Club • Ducks Unlimited • Kingston Chamber of Commerce • Ontario Trucking Association • Rideau Trail Association • Centre for Transport Training Inc.

Selected correspondence from external agencies and stakeholders is provided in Appendix B. A summary of input received, and responses provided to external agencies and municipalities during Detail Design is provided in Table 4.

Table 4: Summary of Input Received and Action Taken

Contact Information	Comment	Action taken by the
Heritage Program Unit Ministry of Tourism Culture and Sport 401 Bay Street Toronto ON M7A 0A7	• Correspondence (April 7, 2017) requested confirmation that the study area has been screened for cultural heritage resource assessment/cultural heritage archaeological potential • Email (May 31, 2017) requested copies of heritage/archaeology reports • Email (June 5, 2017) confirmed that MTCS acknowledges that the technically preferred alternative will not affect the municipally recognized heritage property and that the Stage 1 and 2 archaeological assessments have identified low archaeological potential in study area • Recommend standard mitigation measures in the event that archaeological resources are encountered during construction	• Correspondence (Apri advised that Stage 1 a archaeological assess study area is free of a concern and showed r archaeological resour • The MTO reviewed th the Heritage Bridges I Assessment Guide Or Neither of the Collins the Kingston Road 38 identified as significan further assessment wa • Email (June 2, 2017) p reports via Stantec ftp • Email (June 8, 2017) a comments; confirmed mitigation measures w contract documents
Environmental Specialist Infrastructure Ontario 1 Dundas St West Suite 2000 Toronto ON M5G 2L5	• Correspondence (March 9, 2017) advised that it is unclear if MOI lands are required for the project • Telecon (April 10, 2017) confirmed that IO defers the EA and associated works to MTO • Transfer of lands process requires that a request letter be sent from MTO indicating that	• Confirmed requiremen EA process • Email (April 16, May 1 requested confirmatio • MTO secured signed A Transfer with Permiss Construct (from IO on

Contact Information	Comment	Action taken by the
	the lands are required for a specific purpose	for the SWM Pond pro
Ministry of Natural Resources and Forestry Peterborough District 300 Water Street South Tower, 1st Floor Peterborough ON K9J 8M5	• Email August 30, 2017 confirmed IGF receipt • Email October 17, 2017 responded to submission with comments related to registration under exemption 23.6 of Ontario Regulation 242/08 • Recommend no tree removals occur from April 1st to mid-August to ensure there is no impact to potential roosts • Why were Blanding's Turtles not considered in the IGF? MNRF contacted by MTO on August 22, 2016 to report that Blanding's Turtle had been observed near the interchange • Requested written confirmation to confirm that turtle surveys were conducted, and Blanding's Turtle was not found historically or during field work in the study area • MNRF will consult with project team related to the IGF and address any questions raised towards achieving applicable regulatory approvals • Registration may be required if impacts cannot be avoided • MNRF to respond to December 22, 2017 submission	• Information Gathering submitted August 29, • Teleconference Nover review field work and • Consultant to provide documentation and co impact. • Timing windows to res removals between Apr 15 can be accommoda like Migratory Bird pro • Provided results of tur survey on June 15, 20 mitigation measures to • Submitted correspond 22, 2017 in response comments received or • Blanding's Turtle reco identified during the ba • Consultation with MNR mitigation measures re at Risk are included in document and drawing • Consultation is ongoin
Cataraqui Region Conservation Authority	• Email (March 8, 2017) advised that	• Correspondence (Apri

Contact Information	Comment	Action taken by the
1641 Perth Road PO Box 160 Glenburnie ON K0H 1S0	implementation of appropriate sediment and erosion control measures should be employed during construction • Consider potential for increased risk of flooding to adjacent properties and roads as it relates to bridge & highway embankment widening on Collins Creek Floodplain • CRCA is updating floodplain mapping for Collins Creek –should be used when available • C. Woods noted (June 6, 2017) that Collins Creek mapping project is on hold indefinitely and advised not to wait for it • Southwest corner of study area is identified as significant woodland, based on size, in the Central Cataraqui Region Natural Heritage Study (CRCA, 2006). The forest was identified as a high-quality forest in the Collins Watershed Study (1992) • CRCA representative attended PIC on April 11, 2018	confirmed no impact t Floodplain anticipated • Drainage study will be avoid flooding and imp function; the 1:100-ye elevation used by CR modelled • Stantec telephoned (J inquire about Collins C model • Confirmed stormwater ponds will be construc • Confirmed new minim of Highway 401 westb Creek bridge will matc minimum soffit elevati improve the hydraulic bridge, relative to exis due to the larger span • Following the removal significant woodland, t expected to retain mu significance; however, diversity and value wil
Ontario Trucking Association 555 Dixon Road Toronto ON	• Correspondence (March 14, 2017) requested that trucking activities be considered in the design of new infrastructure and the	• Correspondence (Apri advised that final desi accommodate Long C

Contact Information	Comment	Action taken by the
M9W 1H8	maintenance and upgrading of existing infrastructure • Minimize closures; maintain sufficient horizontal/vertical clearances to accommodate truck configurations and over-dimensional loads; provide advanced communications on lane closures; provide sufficient traffic warning devices suitable for all weather conditions and time of day well in advance of construction zones • This interchange is one of the most important in the province for LCV traffic – it provides access to a key rest/emergency stop location as well as a mid-trip switching point for LCVs travelling between Quebec and GTA • Provided copy of letter dated March 2015 detailing concerns during Preliminary Design phase and copy of Ontario LCV Program Conditions (dated March 2015)	Vehicles (LCVs) but re occur during construct • Contractor will notify s advance of ramp closu signage will be utilized • Copied to J. Lynch, M Vehicle Weights and D • Considered comments for interim improveme • OTA will be notified in start of construction re construction schedule weeks in advance of a closures affecting the LCVs
Construction Coordinator Rideau Trail Association PO Box 15 Kingston ON K7L 4V6	• Email - the Rideau Trail follows the K&P Trail which goes underneath Highway 401 near this location, and may be affected by the reconfiguration of the 401/Kingston Road 38 interchange	• Added to project maili • Impacts to Rideau Tra anticipated as a result improvements
Manager, Engineering Eastern Ontario Power PO Box 1179 Cornwall ON K6H 5V3	• Email (April 11, 2017) advised that Eastern Ontario Power does not have any utilities within the affected area	• Noted by the project te

Contact Information	Comment	Action taken by the
GIS/CAD Specialist Zayo Canada Inc. 50 Worcester Road Etobicoke ON M9W 5X2	• Email (March 13, 2017) advised that Allstream Inc. was acquired by The Zayo Group (HQ Boulder CO) in January 2016 • No plant in the area	• Noted by the project te updated
District Engineer Union Gas 1653 Venture Drive Kingston ON K7P 0E9	• Email (March 15, 2017) advised that Enbridge Gas Distribution Inc. has no gas infrastructure in Kingston, Ontario	• Noted by the project te
Outside Plant Engineer Rogers Communications 8200 Dixie Road Brampton ON L6T 0C1	• Email (April 13, 2017) advised that Rogers has no infrastructure in the study area. The fiber optic cable is located along the CN Rail right of way	• Noted by the project te
Bell Canada 450 Princess Street Floor 2 PO Box 460 Kingston ON K7L 4W5	• In telephone call (April 6, 2017) confirmed the presence of a fibre optic service running through the interchange as well as its alignment • Bell also identified that fibre optic running along McIvor Road does not exist and only runs up Paige Road • Confirmed underground communications related to the telephone booth in the carpool lot and under Kingston Road 38	• Noted by the project te • Ongoing communicati optic service relocatio • Utility relocations will b advance of constructio

2.1.4 Public Involvement During Detail Design

Public participants included property owners, business owners, community interest groups and the travelling public.

On March 2, 2017 letters were sent to property owners, business owners, community interest groups interest groups on the study mailing list to announce the commencement of the Detail Design for the interim improvements.

Letters with the PIC Notice were sent on March 27, 2018 to invite property owners and members of the public on the study mailing list to the attend the PIC anytime between 4 p.m. and 8 p.m. on April 11, 2018.

The OGN for Study Submission announcing the 30-day review period for the DCR was sent to property owners and members of the public on the study mailing list, on April 30, 2018.

Public comments received as a result of the study commencement notice, and the responses provided are summarized in Table 5.

Table 5: Public Input

Comment	Response
Will the westbound off-ramp follow the current route, but in a wider circle, to head east into McIvor Road?	Email response (April 25, 2017) acknowledged comments and identified that the Recommended Design aligns the north ramp terminal with McIvor Road. The design includes longer off ramp lanes and provides a signalized intersection at the ramp terminal and McIvor Road. Individual added to the project mailing list.
A property owner backing onto McIvor Road requested that the landscape plan should be changed to replace deciduous trees with coniferous trees to provide year-round protection.	Email response from MTO (March 1, 2017) acknowledged comments and noted that the landscape plan presented in the planning phase was conceptual in nature. The plan will be refined in Detail Design for the long-term interchange improvements. There is an opportunity to provide comments during the Detail Design phase, as well as at the public meeting. Individual added to the project mailing list.

The westbound lane that leads to the off ramp is not long enough to safely accommodate the backlog of slower/stopped vehicles that accumulate during busy times, or when there are problems on the road/bridge overhead. Often during these times, drivers must suddenly come to a stop or significantly reduce their speed in the northernmost westbound lane, even if they are not planning on exiting. A longer exit lane and perhaps a longer and coordinated green light (before and after the bridge) during rush hour should alleviate congestion and reduce the likelihood of collisions.	Email response (April 24, 2017) acknowledged comments and confirmed that the Project Team is refining the interim interchange improvements as outlined in the TESR, approved in January 2016, including the ramps on the north side of the interchange. The recommended design aligns the north ramp terminal with McIvor Road. This design results in longer off ramp lanes and provides a signalized intersection at the ramp terminal and McIvor Road. Individual added to the project mailing list.
Will public access to the K&P Trail be improved as part of the project? Specifically, I am hoping safe pedestrian and cyclist access to the K&P Trail will be made possible via the new north extension of Centennial Road. This location is within the boundaries of GWP 4049-11-00. The proposed new access point would reduce cyclist traffic on the 401/Gardiners Rd Interchange.	Email response (April 3, 2018) from MTO Project Manager, acknowledged email regarding trail access. This project does not impact the K&P trail and is not part of any improvements at the interchange. The north extension of the Centennial Road is a municipal undertaking and all comments regarding this should be directed to the City. Your comments have been forwarded to the City Engineering department. Thank you again for your interest and if you have any other comments / concerns, please contact me.

2.1.4.1 Project Website

A project website (hwy401kr38.ca) was developed and made operational to provide the public with easy access to project information, including background information, an opportunity to submit comments, and the ability to transfer information easily throughout the course of the study. The website hosted all pertinent study information such as Ontario Government Notices, PIC displays and reports for public review and included links to project-specific documentation (i.e., TESR, study notifications, and supplementary information such as the Class EA document). The website also included a “Contact Us” feature to allow visitors to submit comments and questions through the dedicated project email address [comments@hwy401kr38.ca].

The website conforms to current *Accessibility for Ontarians with Disabilities Act* (AODA) requirements, WCAG 2.0 Level A, allowing all visitors to benefit from the available information.

2.1.4.2 Letter Notifications

Direct notification letters were sent to stakeholders, and property owners in the study area, as well as members of the public who expressed an interest in the study, at all study milestones. The letters included a copy of the Study Commencement Notice. In addition, a notice was sent by Canada Post Un-Addressed Admail to selected postal codes near the project. Anyone who responded was added to the project mailing list. The selected areas were reduced for the PIC mailing to cover off those most affected by the closure of McIvor Road between Kingston Road 38 and Jackson Mills Road. The OGN was also sent as an email attachment to individuals on the email contact list.

2.1.4.3 Newspaper Notifications

The Ontario Government Notice of Detail Design Study Commencement was published in the *Kingston EMC* on March 9, 2017 and *Kingston Whig-Standard* on March 11, 2017. The notice included the project limits, described the project including the interim improvements, and the Class EA process.

To provide public awareness of the PIC and to invite anyone with an interest in the study to attend the PIC, a notice was published in the *Kingston This Week* on March 29, 2018 and *Kingston Whig-Standard* on March 31, 2018.

The Notice of Submission of the Design and Construction Report (DCR) was published in the *Kingston This Week* on May 3, 2018 and *Kingston Whig-Standard* on May 5, 2018. Copies of the notices are provided in Appendix A.

2.1.4.4 Carpool Lot Signage

A sign advising of Study Commencement and Project Contacts was placed at the carpool lot in the southwest quadrant of the interchange on March 28, 2017. The purpose of this sign was to advise users of the carpool lot of the study and to seek their input, as they would be directly affected during construction and by the relocation of the lot to the southeast quadrant.

An updated sign with details of the Public Information Centre (PIC) was placed at the carpool lot on March 29, 2018 and another sign advising of the Notice of Study Submission was placed at the carpool lot on May 4, 2018.

2.1.4.5 Public Information Centre

A Public Information Centre (PIC) was held on April 11, 2018 at the Invista Centre in Kingston. The meeting venue was the same one that was used for the two PICs during Preliminary Design and was fully accessible. External agencies were invited to attend the PIC from 3:00 p.m. to 4:00 p.m., one hour in advance of the public session from 4:00 p.m. to 8:00 p.m.

The PIC formed part of the overall consultation plan that was designed to involve stakeholders early and throughout the study to identify concerns and provide opportunities for input. The purpose of the PIC was to display and seek input on the proposed project; present information on potential environmental impacts and proposed mitigation measures; and, answer project related questions.

The following information was presented at the PIC:

- Interim operational improvements
- Public information centre
- The study area
- Need for interim improvements
- Why improve the interchange
- Study process
- The recommended plan
- Highway 401 WB Collins Creek bridge
- The recommended bridge
- Traffic management during construction – staging plans
- Traffic management summary
- Environmental management
- Next steps

The text panels and displays were available for review and the Project Team was present to answer questions and discuss the project. Comment sheets were provided, and attendees were encouraged to return them either in the comment sheet box at the meeting, or by mail/e-mail until the April 27, 2018 comment deadline. The display boards were uploaded to the project website on the day of the PIC. Non-technical information was provided in English and French to comply with the *French Language Services Act* requirements. A bilingual project team member was available at the Public Information Centre to review displays and answer questions as needed.

A copy of the PIC materials is provided in Appendix C.

Approximately 37 members of the public attended the PIC. Ten comment sheets were submitted during the event and two emails were received the following day. All names

and addresses from the comment sheets and visitor register were added or updated on the project mailing list.

Table 6 summarizes the verbal and written comments, issues and concerns raised at or following the PIC and how they were addressed.

Table 6: Summary of PIC Comments and How They Were Addressed

Comment	Response
• Noted concerns about noise and construction traffic on McIvor Road • Don't want rattling windows during normal "sleeping hours"	• Noted concerns regarding disruption of McIvor Road • Night-time construction activity will be required to mi traffic and the duration of construction • A noise by-law exemption from the City of Kingston w to construction - the Contractor will be required to ke construction equipment to a minimum and to maintai good working order to reduce noise from constructio
• Concern regarding proximity of new N/S-W ramp to Harpell Road • Requested information about property expropriation • Noted concerns about noise - asked if a noise study was undertaken • Would appreciate consideration of landscaping on north side of N/S-W ramp adjacent to property at end of Harpell Road to provide a visual and sound barrier • Requested electronic copy of TESR • Expressed concern regarding safety at	• Noted concerns regarding proximity of building lot to • MTO has already acquired property to facilitate this p property requirements were not identified during Deta • The noise assessment conducted during Preliminary Group, 2015) determined that the proposed improver have any adverse noise impacts on the noise sensitiv situated in proximity to the interchange • Permanent noise mitigation measures were not found • Vegetation removals will be limited only to what is ne accommodate construction. Disturbed areas will be r feasible with native plant species to reduce erosion, i stability, increase filtration and reduce overland flow. will review feasibility of a landscaping buffer along the

Comment	Response
the intersection of Harpell Road and Kingston Road 38. Illumination should be considered due to increased traffic • Build fence and ditch between ramp and adjacent property to prevent water runoff flooding property and animals from crossing • Minimize night construction	warranted • TESR available on project website: hwy401kr38.ca • Concerns regarding entrance to Harpell Road safety were forwarded to the City of Kingston Engineering D • The project has been designed to provide positive dr • Night-time construction activity will be required to mi traffic and the duration of construction • A noise by-law exemption from the City of Kingston w to construction - the Contractor will be required to ke construction equipment to a minimum and to maintai good working order to reduce noise from constructio
• Suggestion for a traffic assessment at Harpell Road and Kingston Road 38 due to concerns about safety as there is a school bus stop at this location • It is too bad you have to cut down trees for the new ramps - will there be an opportunity to plant more	• Noted safety concerns at intersection of Harpell Roa Road 38 • Concerns regarding entrance to Harpell Road were f of Kingston Engineering Department • Speed limits and safety requirements for highways a based on highway geometrics, intersection and entra roadway characteristics - all such comments have be MTO Traffic Section for review • Noted concern about tree removals - a Preliminary L

Comment	Response
	been developed and outlines potential mitigation and measures • Opportunities to enhance landscaping in certain area
• Good detail and verbal explanations - Seeing the staging illustrations helps	• Noted support of the project
• Need for emergency access on McIvor Road during the three-week closure • Set-up proposed will definitely lead to better traffic flow through the interchange	• Noted concerns related to temporary closure of McIv Kingston Road 38 and Jackson Mills Road • Emergency service providers will be notified in advan • Noted support of the project
• I need to know if the title on the land will require a noise clause put on it • This will reduce property value	• Noted concerns related to noise and property values the Project Team will review the issue in accordance Protocol • The noise assessment conducted during Preliminary Group, 2015) determined that the permanent noise m found to be not warranted at the Kingston Road 38 in • Temporary noise associated with construction may b adjacent residences – standard mitigation measures implemented to address temporary impacts

Comment	Response
• Noted support for the project – drive by every day and the traffic is really bad	• Noted support of the project
• Improvements will lead to better traffic flow • Noted approval for minimizing traffic impacts during the day with closures done at night • Strongly suggest identifying alternate carpool lot at Sydenham Road and Highway 401 at Cataraqui Arena while existing lot is closed	• Noted support of the project • Noted support for night-time closures • Carpool lot users will be directed to alternate location carpool lot is closed
• Looks great, much needed	• Noted support of the project
• Impressed with the work by the Project Team and the project to date • Children attend the Francophone school (under the CEPEO Board which was consulted) but not the bus company which is not part of the Tri-Board system http://www.transportscolaire.ca • Noted concern about student pick-up	• Noted comments and support of the project • "Consortium de transport scolaire d'Ottawa" has beer mailing list and will receive the Notice of Study Subm project to their attention • Disruption to student transportation pick-up spot at th limits on Kingston Road 38 are not anticipated. All lar Road 38 will be open during the day. Nightly lane red required to complete pavement rehabilitation of existi

Comment	Response
spot • Request to be informed of final design with respect to impacts to the area near our property and driveway off Kingston Road 38 and related drainage ditch/culvert	• There will be some day-time traffic disruption on King to construction at McIvor Road intersection and the n • A Communications Plan will be in place to advise the Ontario Trucking Association, student transportation and emergency services of planned closures and det • Noted concerns related to property and driveway entr will review design with you to confirm impacts, if any
• Concerned about using the eastbound on-ramp for access to and from the new carpool lot which presents a greater inherent risk for vehicle configuration compared to the existing configuration • Has the option of relocating the car park to just outside the perimeter of this major intersection been investigated	• Concern about eastbound on-ramp noted • The existing eastbound on-ramp will be retained, with adjustment to accommodate the realigned Kingston R • The signing and pavement markings will clearly indic movements that are permitted • Turn lanes will be provided so traffic can pull out of th movement • Locating the commuter lot in the SE quadrant was a the space without the need to acquire additional prop impact the natural environment

3.0 DETAILED DESCRIPTION OF THE RECOMMENDED PLAN

Detail design develops a transportation plan to the design implementation level of detail. The Recommended Plan is the most technically, environmentally, and economically suitable option for addressing the project objectives. This section of the report describes the Recommended Plan for the Highway 401/Kingston Road 38 Interchange Interim Operational Improvements. Refer to Exhibit 3: Recommended Plan.

The New Construction drawings for the Recommended Plan are provided in Appendix D.

3.1 MAJOR FEATURES OF THE PROPOSED WORKS

3.1.1 Geometric and Operational Improvements

The interim improvements will provide geometric and operational benefits at the interchange. No work is proposed to the Kingston Road 38 underpass as part of the interim improvements.

The existing Kingston Road 38 roadway has a four-lane rural platform with paved shoulders. Highway 401 at the Kingston Road 38 structure conveys eight lanes of traffic, with three through lanes and one off-ramp lane, separated by a concrete barrier wall and paved shoulders in both directions. The outer shoulders within the project limits are approximately 3 m wide with narrower sections at the existing structures.

McIvor Road is a two-lane municipal rural roadway, with gravel shoulders. Currently the intersection of Kingston Road 38 and McIvor Road is offset, approximately 200 m, from the existing north ramp terminal intersection.

The scope of this project is to enlarge the Highway 401 westbound on-ramps and off-ramps, shifting the north ramp terminal to align with McIvor Road, and construct a new Highway 401 eastbound off-ramp in the southwest quadrant of the interchange. A new commuter lot will also be constructed in the southeast quadrant, replacing the existing eastbound off-ramp loop ramp. The existing eastbound on-ramp will be retained. Kingston Road 38 will retain its existing alignment and be widened at the north and south terminals to accommodate additional turn lanes. Highway 401 westbound Collins Creek Bridge will be replaced and widened to accommodate the new N/S-W ramp speed change lane and 2.50 m median shoulder.

The existing westbound on- and off-ramps in the northwest quadrant and the existing eastbound off-ramp in the southeast quadrant will be removed.

Significant rock/earth grading works and vegetation removals within the right-of-way will be required for the new ramps and commuter parking lot.

3.1.2 Drainage and Stormwater Management

The existing drainage system consists of open ditches, swales, culverts, and ditch inlets. A Stormwater management (SWM) facility is located on the south side of Highway 401, east of the Collins Creek bridge.

The proposed drainage and stormwater management systems include six new culverts, three replacement culverts, and one culvert extension. The SWM system includes a new dry SWM facility located in the southwest corner of the McIvor Road and Jackson Mills Road intersection to provide quantity control. The existing SWM facility, on the south side of Highway 401 east of Collins Creek, will be relocated to immediately south of the its current location and expanded to provide water quality and quantity treatment.

3.1.3 Highway 401 Westbound Collins Creek Bridge - Site 7-56/2

The Highway 401 westbound Collins Creek Bridge is approximately 800 m west of the Kingston Road 38 interchange. The existing structure, constructed in 1959, is a single-span reinforced concrete rigid frame bridge that carries three lanes of Highway 401 westbound traffic over Collins Creek. The structure has a clear span of 9.144 m and a relatively narrow median shoulder width. In 1988, the original concrete curbs, posts, and rails were removed and replaced with reinforced concrete barrier walls on the north and south side of the bridge.

The Highway 401 eastbound Collins Creek Bridge is located south of the Highway 401 westbound Collins Creek Bridge.

The interim improvements include the addition of the N/S-W speed change lane that will need to be carried by the Highway 401 westbound Collins Creek Bridge. The addition of the speed change lane requires the bridge width to be at least 4.8 m wider than its current width to accommodate the 3.5 m lane and the 2.5 m (minimum) shoulder.

3.1.3.1 Improvement Alternatives

The Preliminary Design Technically Preferred Alternative proposed to widen the Highway 401 westbound Collins Creek Bridge to the north by approximately 7 m to accommodate the westerly shift of the Highway 401 westbound speed change lane.

During Detail Design, two alternatives were considered to address the structure's condition and age, the structural evaluation results, and the interchange improvements.

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Table 7: Highway 401 Westbound Collins Creek Bridge Improvement Alternatives

Improvement Alternatives	Considerations
1. Rehabilitation of the existing bridge and Widening to the north	• Future bridge widening when replaced in approximately 30 years • Maintains existing narrow median shoulder width until bridge is replaced • Future replacement will have more significant impacts to traffic due to increase in traffic volumes
2. Structure Replacement	• Accommodates future highway widening • Provides wider median shoulder (2.5 m minimum) • Grade raise can be accommodated more easily now than in future • Reduces footprint impacts in Collins Creek

3.1.3.2 Recommended Alternative

Alternative 2 - Replacement is the recommended option and consists of the replacement of the existing bridge with a 22 m wide single-span slab-on-girder integral abutment bridge. This bridge width would provide a 3.3 m (minimum) outside shoulder and a 2.5 m (minimum) median shoulder.

The use of a slab-on-girder integral abutment bridge is preferred over a rigid frame bridge for the structure types at this location for the following reasons:

1. Grade raise associated with a rigid frame structure with a span length equal to that of the slab-on-girder bridge would be about the same. The rigid frame structure will have a thinner structure thickness at mid-span. However, the grade raise will be dependent on the minimum soffit elevation. The two structure types will have the same structure thickness at the minimum soffit elevation location (i.e., at the deck/abutment connection).

2. Rigid frame construction would require falsework, which would likely need to be supported by beams spanning from the abutments to avoid falsework within the watercourse. These beams would reduce the opening under the bridge during construction.

3. A rigid frame structure would require a longer construction duration due to the additional piling and the falsework installation.

The superstructure for the slab-on-girder integral abutment bridge will consist of a 150 mm (minimum) thick cast-in-place concrete deck on side-by-side pre-stressed concrete box girders (800 mm deep). The bridge span would be 20.7 m, which is significantly longer than the existing bridge, to permit construction of the new abutments, including piles, behind the existing abutment and wingwall footings.

Two construction stages will be utilized to complete the replacement of the bridge. Minimum lane widths of 3.5 m and shoulder widths of 0.5 m will be provided in each stage. The first stage of construction will maintain two lanes of traffic on the bridge; traffic would be shifted to the south using the above mentioned reduced shoulder widths. The second stage of construction will provide two lanes of traffic on the new bridge to complete replacement of the south portion.

To accommodate two lanes of traffic during staged construction, the bridge will have to be over built by about 1.2 m. This will result in the outside shoulder varying in width from 3.4 m to 3.8 m.

The General Arrangement Drawings for the Collins Creek Bridge are provided in Appendix D.

3.1.4 Commuter Parking Lot (Carpool Lot)

An existing carpool lot with capacity for 71 spaces is located on the west side of Kingston Road 38 opposite the south ramp terminal of the interchange. Temporary disruption to the existing carpool lot operations at the interchange will occur during construction.

The new commuter parking lot in the southeast quadrant will replace the existing lot and will have a capacity of approximately 200 spaces. Access to the carpool lot will be from the north to east (N-E) ramp. Motorists leaving the carpool lot will be able to access eastbound Highway 401 directly using a left turn to the north to east (N-E) ramp or alternatively to Kingston Road 38 (north/south) using the traffic signals at the new west to north/south (W-N/S) ramp/north to east (N-E) ramp/Kingston Road 38 intersection.

A turn simulation analysis was used to consider passenger car and single unit truck turning for potential conflict points for vehicles entering or exiting the Commuter Parking Lot. The results were used to shift the exit laneway south by approximately 3 m compared to the preferred interim operational improvements identified in the TESR.

Accommodation for Public Transit buses was also considered. A single unit inter-city bus can pass through the proposed commuter lot, although it is recognized that Kingston Public Transit service currently terminates at the Invista Centre, located 1 km south on Gardiners Road.

The following recommendations were made for the commuter parking lot:

- A 1 m shoulder is provided around the perimeter of the parking lot
- The paved surface of the parking lot should not slope more than 2.0% in any direction
- Increased number of barrier-free spaces from five to ten and reconfigured between the access and egress laneways; designed in accordance with MTO requirements
- The interim egress laneway and intersection with Kingston Road 38 and the west to north/south (W-N/S) ramp has been reconfigured to accommodate opposing left turn movements

Rock/earth grading works and vegetation removal will be required in the southeast quadrant of the interchange to accommodate the new lot.

3.1.5 Utilities

There is a buried high priority Fibre Optic Transport Service (FOTS) line owned by Bell Canada and installed in 1986 which runs along the Highway 401 south property line west of the interchange, under the new SWM pond and W-N/S ramp and to a manhole located near the existing car pool lot. From the manhole, the FOTS crosses under Kingston Road 38, and the W-N/S and N/S-E ramps. In addition, Bell has confirmed other underground communications tying in the phone booth at the commuter parking lot and under Kingston Road 38 to the traffic controller. There is no FOTS along McIvor Road. The buried Bell FOTS line will be lowered in place in the conflict areas at the new SWM pond and W-N/S ramp to provide sufficient clearance for the construction.

Hydro One has poles along the east side of Kingston Road 38 (KR38) which are in conflict with the proposed commuter parking lot and the new traffic signals required at the intersection of KR38 and McIvor Road. The poles in conflict will be relocated.

Utility relocations will be completed in advance of construction, where feasible. The composite utility plans are provided in Appendix D.

3.1.6 Traffic Signals

Traffic signals are currently in place at the north and south ramp terminals, and at the McIvor Road and Kingston Road 38 intersection.

The north terminal at the east to north/south (E-N/S) ramp has an existing traffic signal, as well as pedestrian signals and pedestrian push buttons. There is a cross walk for the west and south legs of the intersection, however the intersection does not does not meet the requirements of the *Accessibility for Ontarians with Disabilities Act* (AODA).

The south terminal at the west-north/south (W-N/S) ramp has a traffic signal, although it does not include pedestrian crossing facilities or pedestrian equipment.

New traffic signals will be required at both the north terminal and south terminal ramps. The McIvor Road and Kingston Road 38 intersection will be amalgamated into the north ramp terminal.

South of Highway 401, motorists leaving the commuter parking lot will access eastbound Highway 401 directly using the left turn to the north to east (N-E) ramp, or alternatively to Kingston Road 38 using the traffic signals at the new west to north/south (W-N/S) ramp/ north to east (N-E) ramp/ Kingston Road 38 intersection.

3.1.7 Roadside Safety

The existing guiderail, where impacted or substandard, at the Kingston Road 38 interchange will be updated to reflect current Ministry standards. Most of the existing guiderail on Kingston Road 38 will be impacted by the minor road widening. Structure connections will be updated for the Kingston Road 38 underpass. Guiderail on Highway 401 westbound at the Collins Creek bridge will be replaced, as well as a short section of median concrete barrier that is impacted by the localized grade raise on Highway 401. The new interchange ramps (N/S-W, E-N/S and W-N/S) will be assessed and new guiderail added where required, in accordance with Ministry standards.

3.1.8 Illumination Improvements

The interchange is partially illuminated. Full illumination exists on Kingston Road 38 between the north and south ramp terminals, as well as both eastbound and westbound off-ramps (W-N/S and E-N/S). Decision point* illumination or partial illumination at a decision point or point(s) where identification is required will be provided. The term refers to an installation with less luminaires than that required for a continuous or full illumination system. The interchange will retain partial illumination at new decision points for the ramps. Kingston Road 38 will maintain full illumination using conventional lighting. No illumination was identified as being required for the Highway 401 westbound Collins Creek Bridge.

**Decision point - an information source or hazard which is difficult to perceive in a roadway environment, requiring the driver to recognize the hazard or its potential threat, select an appropriate action, and complete the manoeuvre safely and efficiently.*

3.1.9 Signage

An existing sign inventory was completed as part of the study which noted few existing signs in need of replacement due to condition. The existing signage will remain where not impacted by construction. For realigned ramps and other areas impacted by

construction along both Highway 401 and Kingston Road 38, a new signing plan will be developed. A new advance sign and bullnose sign for the W-N/S ramp will be required due to the reconfiguration of the ramp further to the west. A ground-mounted sign will be used for the advance sign, while a cantilever overhead sign will be used at the bullnose of the W-N/S ramp on Highway 401.

3.1.10 Property

The acquisition of private property adjacent to the interchange was completed in advance of detail design. The transfer of lands south of the existing stormwater management pond on the south side of Highway 401 east of Collins Creek to MTO from Infrastructure Ontario is complete. No additional property requirements were identified during Detail Design.

3.2 TRAFFIC / CONSTRUCTION STAGING

It is anticipated that the project will be constructed in six stages over 2.5 construction seasons starting in the fall of 2018 and ending in 2020. The proposed construction staging drawings as displayed at the PIC are provided in Appendix C and outlined in Table 8.

Table 8: Proposed Traffic / Construction Staging

Stage	Key Highlights
Stage 1	– Highway 401 embankment widening/pre-loading at westbound Collins Creek Bridge requires closure of Highway 401 westbound driving lane for contractor access, and temporary reduction in the length of the westbound on-ramp speed change lane – Night-time closure of Highway 401 eastbound driving lane to place temporary concrete barrier on shoulder for new eastbound off-ramp construction – Existing lane widths maintained for Highway 401 traffic. Two lanes in each direction on Highway 401 maintained during daytime hours; night-time lane closures only – Access to new Highway 401 eastbound off-ramp and stormwater management pond requires temporary closure of the existing commuter parking lot (fall 2018 to fall 2019) – All existing interchange ramps open – Kingston Road 38 all lanes open during the day (some night-time lane reductions may be required)

Stage	Key Highlights
	– Install temporary traffic signal heads at Kingston Road 38/McIvor Road to permit contractor access/egress to the northwest quadrant from Kingston Road 38 – Significant rock/earth grading work for new ramps and commuter parking lot will continue through Stage 2
Winter Shutdown	– Highway 401 and Kingston Road 38, all lanes open to existing widths – No lane reductions/closures – all lanes open – Highway 401 westbound outside shoulder slightly reduced at Collins Creek – Existing interchange ramps open; new ramps remain under construction – Existing commuter parking lot remains closed
Stage 2	– Removal and construction of the north half of Highway 401 westbound Collins Creek Bridge, requires long duration reduction of Highway 401 westbound to two lanes, and a temporary reduced length westbound on-ramp speed change lane – Highway 401 eastbound all lanes open, and all existing interchange ramps are open – Kingston Road 38 night-time lane reductions will be required – Continuation of rock/earth grading work for new ramps and commuter parking lot – Existing commuter parking lot remains closed
Stage 3	– Removal and construction of the south half of Highway 401 westbound Collins Creek Bridge, requires long duration reduction of Highway 401 westbound to two lanes and a temporary reduced length westbound on-ramp speed change lane – Highway 401 eastbound nightly lane reduction to one lane at Collins Creek to construct widening of Highway 401 for new off-ramp speed change Stage 3B-3C) – Removal of existing Highway 401 eastbound off-ramp and speed change lane requires nightly reduction to a single lane (Stage 3D) – All existing interchange ramps are open (Stage 3A-3C)

Stage	Key Highlights
	– New eastbound off-ramp open (Stage 3D) – Kingston Road 38 night-time lane reductions anticipated – Commuter parking lot remains closed; reopens for winter shutdown
Winter Shutdown	– Highway 401 and Kingston Road 38, all lanes open to existing widths – Existing westbound on- and off-ramps and east bound on-ramp are open – New eastbound off-ramp open – New commuter parking lot open
Stage 4	– Highway 401 all lanes open during Stages 4A and 4B – Kingston Road 38 all lanes open during the day – Kingston Road 38 lane reductions nightly to complete the pavement rehabilitation and widening of the existing lanes – 140 m section of McIvor Road closed between Kingston Road 38 and Jackson Mills Road (with Highway 401 access via Sydenham Road) during Stage 4B and 4C for approximately 3 weeks – Highway 401 westbound lane and westbound off-ramp nightly closures required at the end of Stage 4C to complete the westbound off-ramp tie in – Highway 401 westbound lane closure to complete removal of existing westbound off-ramp speed change lane during Stage 4D
Stage 5	– All lanes open on Highway 401; all new ramps open – Complete permanent traffic signal installation, and removal of temporary traffic signals at the north and south ramp terminals – Kingston Road 38 nightly lane reductions
Stage 6	– All lanes open on Highway 401; all new ramps open – Kingston Road 38 nightly lane reductions south of Highway 401 to complete pavement rehabilitation

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4.0 ENVIRONMENTAL ISSUES AND COMMITMENTS

Environmental factors were assessed during Preliminary Design to determine existing conditions and identify mitigation measures to minimize and/or address potential impacts associated with the proposed works as detailed in Table 7.5 of the TESR (MMM Group, 2016). The TESR identified mitigation measures for the interchange improvement project related to the following factors:

- Fisheries and Aquatic Habitat
- Vegetation
- Wildlife and Species at Risk
- Management of Excess Materials
- Erosion and Sediment Control
- Noise
- Visual Impact
- Archaeological Resources
- Traffic Operations
- Landscaping

Additional field work and background research was undertaken during Detail Design to update information related to fish and fish habitat and terrestrial ecosystems in the study area and identify changes to statutory requirements.

Mitigation measures include planning decisions, design features, construction requirements and construction constraints. Environmental contract specifications, including standard and non-standard special provisions (SPs), Ontario Provincial Standard Specifications (OPSS) and MTO General Conditions of Contract, will be included in the contract documents to address specific environmental and operational concerns.

Applicable commitments from the Preliminary Design and Environmental Assessment Study and additional commitments developed during Detail Design (i.e., based on the impact assessment and changes to statutory requirements) are summarized in the following sections.

4.1 FISH AND FISH HABITAT

As part of the background data collection, Stantec reviewed the information provided in the Fish and Fish Habitat Impact Assessment Report prepared during Preliminary Design of the interchange improvements (MMM Group, 2015).

Stantec completed a fish and fish habitat survey on May 1, 2017. Since a summer survey (September 2013) was completed during Preliminary Design, the workplan

consisted of only a spring survey. Water level was high at the time of the 2017 survey, with flooded vegetation upstream and downstream of Highway 401.

No aquatic species at risk (SAR) are documented in the study area and, no aquatic SAR were observed during Stantec's field survey.

The Ministry of Natural Resources and Forestry (MNRF) did not reply to the request for background data submitted in January and June 2017; therefore, the background data provided below are from the *Fish and Fish Habitat Impact Assessment Report for Highway 401/Kingston Road 38 Interchange Improvements* (MMM Group, 2015).

Within the study area, one major watercourse, Collins Creek, and two branches of one of its tributaries (WC 1 and WC2) were identified. The watercourses are illustrated on Exhibit 4: Fish and Fish Habitat.

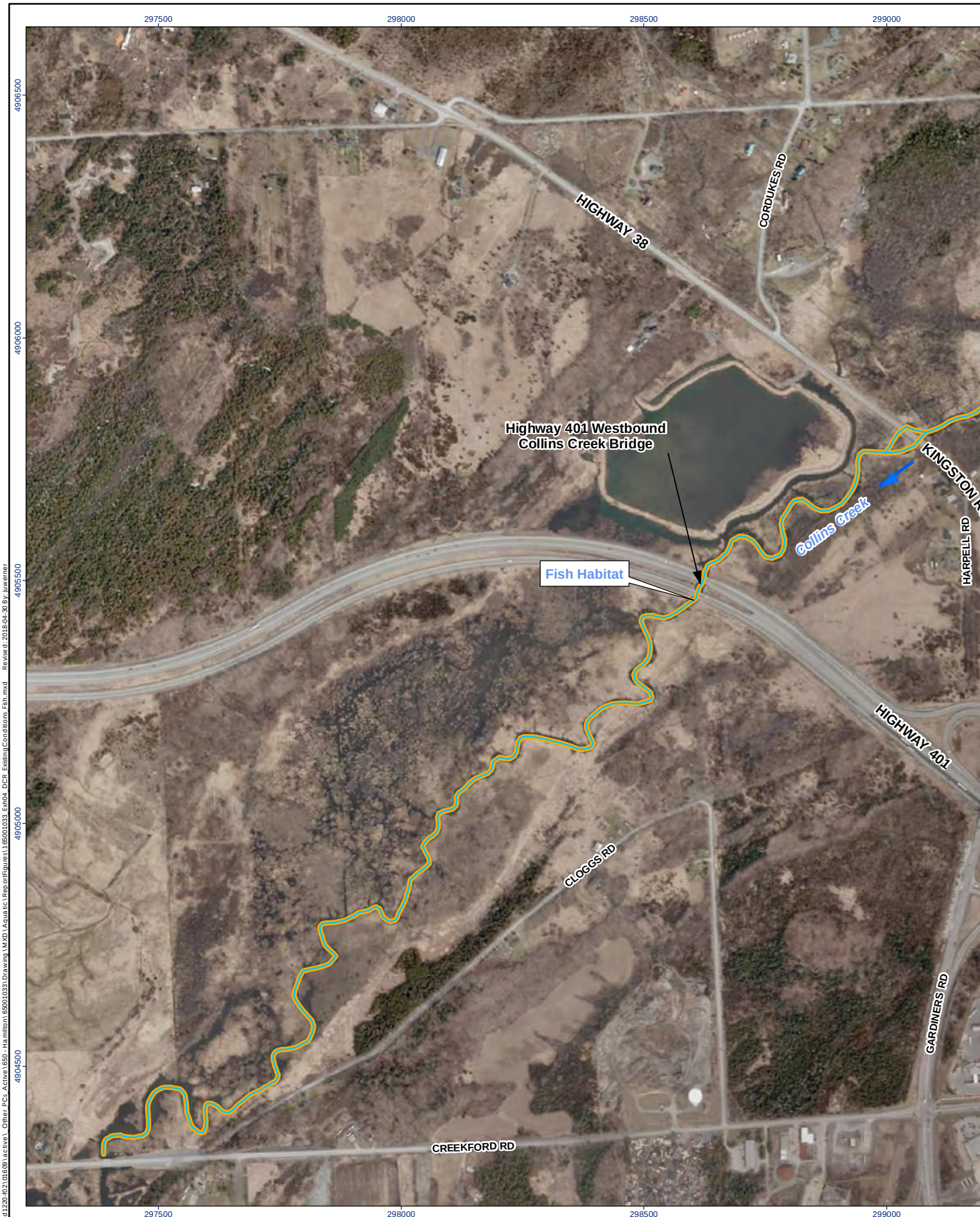
Collins Creek

Collins Creek is located approximately 800 m west of the Kingston Road 38 Interchange. During Stantec's May 2017 site visit, water in Collins Creek was above bankfull level and the creek was in a flood condition both upstream and downstream of Highway 401. The channel was a fast-flowing run, with a wetted width of approximately 15 m and depth that ranged from 1 m to over 1.5 m. Bottom substrate was silt and clay; however, due to high velocities, high water levels and turbidity, visibility of the creek bottom was poor. Instream cover was provided by semi-submerged and submerged grasses and cattails along the shorelines. During the flooded spring conditions, some instream cover was provided by fallen woody debris located on both upstream and downstream of the highway right-of-way.

Stantec captured Banded Killifish (*Fundulus diaphanus*), Fathead Minnow (*Pimephales promelas*), Common Shiner (*Luxilus cornutus*), Golden Shiner (*Notemigonus crysoleucas*), Pumpkinseed (*Lepomis gibbosus*) and White Sucker (*Catostomus commersonii*).

Collins Creek supports a diverse warmwater fish community. Within the area investigated, Collins Creek provides general feeding habitat for fish species that occur in the creek, nursery/rearing habitat and a migratory route between upstream habitat and the large wetland located downstream of the right-of-way. During Preliminary Design it was concluded that the highway embankments do not provide suitable Northern Pike spawning habitat due to their slope; specifically, the embankment slopes were too steep to provide the flooded vegetation that Northern Pike use to spawn (MMM 2015).

The proposed new Highway 401 westbound Collins Creek Bridge consists of a single-span slab-on-girder integral abutment bridge with a span of 20.7 m. The new bridge will



be widened on the north side of Highway 401 due to the need for embankment widening for the speed change lane. The new minimum soffit elevation will match the existing minimum soffit elevation (elevation 87.89 m), which will improve the hydraulic capacity of the bridge, relative to existing conditions, due to the larger span.

4.1.1 Watercourse 1 (Unnamed Tributary of Collins Creek 1)

Watercourse 1 originates at a stormwater management (SWM) pond located on the south side of Highway 401 and east of Gardiners Road. Water flows north from the SWM pond into a low lying, cattail marsh mixed with silt, gravel and cobble (riprap) prior to draining under Highway 401 through a 1.0 m diameter PVC culvert. During Stantec's May 2017 site visit, water depth upstream of Highway 401 ranged from 0.05 to 0.10 m in the ill-defined channel.

North of Highway 401 (downstream), the water flowed out of a 1.5 m x 2.0 m concrete box culvert into a bedrock and cobble channel comprised of a cascade/riffle/run sequence. Instream cover was provided by cobble and sparse small woody debris. Except for fibrous algae, there was no aquatic vegetation. Average water depth was 0.6 m to 1.0 m and wetted width ranged 0.15 m to 0.30 m. Approximately 30.0 m downstream of the box culvert, there was a series of cascades, that ranged from 0.10 to 0.70 m high. Downstream of the cascades, the tributary flowed through a small wooded area with a grassy floodplain. An ill-defined channel with braided flow was observed upstream of McIvor Road in the grassy vegetation. The watercourse crossed McIvor Road through a perched 0.75 m wide CSP and continued downstream through the grass lined right-of-way. One Fathead Minnow and a young-of-the-year cyprinid were captured on the downstream side of McIvor Road.

Stantec's field investigation confirmed the findings of the 2013 habitat assessment that the watercourse has permanent flow and that habitat within the highway right-of-way contributes to a downstream Commercial Recreational or Aboriginal (CRA) fishery. The cascades at the Highway 401 right-of-way and the perched culvert at McIvor Road are impediments and barriers to fish passage.

4.1.2 Watercourse 2 (Unnamed Tributary to Collins Creek 2)

Watercourse 2 is located on the north side of Highway 401 and consists of highway ditch that conveys runoff from Highway 401 and nearby land. A moderately well-defined channel consisting primarily of run morphology flowed west through the grass lined ditch to the Rideau Rail Trail. Average depth was 1 cm to 5 cm within the run, with a maximum pool depth of 30 cm. Wetted width ranged from 0.1 m to 0.3 m within the run morphology and up to 1 m wide within the pools. Substrates consisted of grasses, muck, detritus, bedrock, cobble and gravel. Overland drainage from a seep on the south side of Highway 401 flowed through the large trail culvert beneath Highway 401 and

water converged at the small CSP culvert under the Rideau Rail Trail. Downstream of the CSP culvert, the watercourse loses definition and flow dispersed in the dense cattails. Watercourse 2 may flow permanently due to the seep on the south side of Highway 401. Flow in this watercourse contributes to a downstream CRA fishery.

Potential Impacts Collins Creek

Rock protection is required at the bridge abutments and will extend into the creek. The rock protection will extend below the high-water level along both creek banks beneath the Highway 401 westbound bridge. No geotextile will be placed within the watercourse. Due to the greater span of the new bridge relative to existing conditions, the shape of the cross section of the creek beneath the bridge will change. Beneath the bridge there are no creek banks and the concrete abutments extend to the creek bottom. The new abutments will be located behind the existing ones and 2:1 slope will provide a range of water depths along the stream margins under the bridge. Construction of the new abutments and removal of the existing bridge will require a temporary flow passage system (isolation of the work areas) such as a flume or cofferdam.

Removal and construction of the north half of the Highway 401 westbound Collins Creek Bridge is expected to occur from mid-May to mid-August. The work area in the northwest and northeast quadrants of the bridge will be isolated prior to the restricted activity period for in-water work (April 1) to allow work to proceed during this period. An area of approximately 36 m^2 will be isolated on the north side of the bridge (total area in the northwest and northeast quadrants). The area of fish habitat that will be unavailable will diminish during the construction period, as water level drops later in the spring. Measures used to isolate the area will not be removed during the restricted activity period for in-water work. Removal and replacement of the south half of the Highway 401 westbound Collins Creek Bridge is expected to from mid-August to mid- November. Approximately 31 m^2 of habitat will be unavailable during this period. The area was calculated using the 5-year flow; therefore, the actual isolated area will likely be smaller since construction will occur in summer when lower water levels are expected.

A fisheries assessment was completed at Step 4 of the Fisheries Protocol, 2016. The bridge replacement will result in the following residual effects:

1. Change in Habitat Structure and Cover: The creek margins beneath the bridge will change from vertical concrete bridge abutments to a 2:1 slope lined with rock protection. The sloped stream margin under the bridge will provide approximately 132 m^2 of habitat structure and diversity and coarse material for food production (invertebrates) that was previously unavailable. The change in habitat structure and cover along the shoreline beneath the new bridge is permanent.

Approximately 79 m^2 of shoreline habitat on the north side of the bridge will be permanently altered due to the increased width of the new bridge and placement of rock

protection below the high-water level. The habitat will change from grassed highway embankment and shallow creek margins to rock-lined embankments. On the south side of the bridge, the addition of rock protection below the high-water level will result in a change of approximately 26 m^2 of habitat. The habitat will change from grassed highway embankment to rock-lined embankments. The change in habitat structure and cover beside the bridge is permanent.

2. Change in Nutrient Concentrations: A change in nutrient concentrations may occur due to disturbance to riparian vegetation in the work area and will be short-term since vegetation will re-establish following construction.

3. Change in Access to Habitat: During spring construction, approximately 36 m^2 of habitat will be isolated by coffer dams on the north side of the bridge and will be temporarily unavailable for use by fish (approximately April 1 to mid-August). During summer construction, approximately 31 m^2 of habitat will be isolated by coffer dams on the south side of the bridge and will be temporarily unavailable for use by fish (approximately mid-August to mid-November).

Following bridge construction, water velocity in Collins Creek at the approach to the Highway 401 westbound Collins Creek bridge (i.e., upstream side of the bridge) will increase slightly, during 2 year and 5-year flow events. Under both flow scenarios, the proposed water velocity is within the range of prolonged swimming speed for gamefish species (0.08 m/s to 1.63 m/s) and adult suckers (0.4 m/s to 1.5 m/s) (MTO 2006). In both flow scenarios, the water velocity at the downstream side of Highway 401 (i.e., exiting the existing structure under the eastbound lanes) will not change following construction of the westbound bridge. Under both flow scenarios, the water velocity at the outflow of the eastbound lane bridge is greater than the prolonged swimming speeds of gamefish and adult suckers. Although water velocities will increase at the approach to the bridge, the change will not result in a change in access to habitat for fish in Collins Creek.

There is low risk of serious harm to fish and fish habitat from the residual effects of the bridge replacement.

Potential Impacts Watercourse 1 and Watercourse 2

The interchange improvements will not directly affect fish or fish habitat in Watercourse 1 and Watercourse 2 since there is no fish habitat within the footprint of the proposed commuter parking lot in the southeast quadrant. Watercourse 1 and Watercourse 2 support a CRA fishery located downstream of the Highway 401 right of way.

Significant rock/earth grading works and vegetation removals within the right-of-way will be required for the new ramps and commuter parking lot. Erosion and sediment control

measures are recommended during removal of the existing W-N/S ramp for work within 30 m of the watercourses to reduce the risk of downstream sediment transport into Watercourse 1 and ultimately Watercourse 2. during construction.

Mitigation

Works in-water and along the banks of Collins Creek will be minimized where possible and comply with operational constraints outlined in the contract. The following Ontario Provincial Standard Specifications (OPSS) are applicable to the project:

OPSS 180 General Specification for the Management of Excess Materials

OPSS 182 General Specification for Environmental Protection for Construction in Waterbodies and on Waterbody banks

OPSS 185 General Specification for Temporary Flow Control for Construction in Waterbodies

OPSS 518 Construction Specification for Control of Water from Dewatering Operations

OPSS 804 Construction Specification for Seed and Cover

OPSS 805 Construction Specification for Temporary Erosion and Sediment Control Measures

Implementation of the OPSSs are applicable to the Collins Creek bridge replacement. Due to the presence of fish habitat in Watercourse 1 downstream of Highway 401 (at McIvor Road), OPSS 182 and OPSS 805 are recommended to reduce the risk of sediment transport to downstream habitat during removal of the W-NS ramp.

To protect fish and fish and fish habitat, the mitigation measures described below should be followed.

Fish Protection

Environmental Protection for Construction in Waterbodies and Waterbody Banks shall be conducted in accordance with OPSS 182, OPSS 185 and OPSS 518 which include:

- The restricted activity period for in-water work in fish habitat with a warmwater thermal regime is April 1 to June 30 (work is permitted from July 1 to March 31)
- Temporary Flow Diversion - Isolation of the stream channel from in-water construction activities prior to April 1 - minimize duration of in-water work whenever possible and make sure that in-water work areas are appropriately isolated

- Retain a qualified environmental professional to make sure applicable permits for relocating fish are obtained and to capture any fish trapped within an isolated/enclosed area at the work site and safely relocate them to an appropriate location in the same waters. Fish may need to be relocated again, should flooding occur on the site.
- Dewatering and the Use of Pumps - screen water intakes or outlet pipes to prevent entrainment or impingement of fish

Erosion and Sediment Control

Erosion and Sediment Control (ESC) measures will be implemented to prevent migration of sediment laden runoff or other contaminants from the construction zone to Collins Creek and Collins Creek PSW, and Watercourse 1 and 2.

Inspection and maintenance of the measures will be required over the course of the construction project. Mitigation related to sediment and erosion controls, dewatering and the use of pumps are specified in Ontario Provincial Standards Specifications (OPSS) 182, 518, and 805 and include:

- Installation of effective erosion and sediment control measures before starting work to prevent sediment from entering the waterbody
- Erosion and sediment control measures shall be monitored and maintained until all disturbed ground has been permanently stabilized, suspended sediment has resettled to the bed of the waterbody or settling basin and runoff water is clear
- All works shall be conducted in an isolated area using coffer dams or similar techniques
- Only materials free of fines will be used in and adjacent to Collins Creek and the adjacent PSW

Site Re-vegetation and Stabilization

Applicable OPSS for Preservation of Riparian Vegetation and Restoration of Disturbed areas include OPSS 182 and OPSS 804. Mitigation measures include:

- Preservation of Riparian Vegetation - clearing of riparian vegetation should be kept to a minimum where possible
- Minimize the removal of woody debris, rocks, sand or other materials from the banks, or the bed of the waterbody below the ordinary high-water mark

- Restoration of Disturbed Areas - immediately stabilize banks disturbed by any activity associated with the project to prevent erosion and/or sedimentation through re-vegetation with native seed species suitable for the site
- For the replacement rock protection and new rock lined embankment, appropriately sized, clean rock is to be used; and that rock is installed at a similar slope to maintain a uniform bank and natural creek alignment

Removal of Collins Creek Bridge

Management of Excess Materials - All excess material shall be managed in accordance with OPSS 180. Mitigation measures include:

- Appropriate containment system will be designed and implemented during the removal of the existing Highway 401 westbound Collins Creek structure to prevent entry of debris into Collins Creek
- The system should accommodate large materials and fine particulates and monitored to remove and appropriately dispose of accumulated material
- Materials that fall in the water will be carefully retrieved to minimize disturbance

4.2 TERRESTRIAL RESOURCES

During Preliminary Design, terrestrial ecosystem sensitivities were identified and evaluated within the study area and documented by MMM Group, 2015. Eastern Small-footed Myotis, Little Brown Myotis and Northern Long-eared Myotis were added to the ESA Species at Risk in Ontario list in January 2013 and June 2014 and were not assessed within the study area during Preliminary Design. The TESR recommended screening during Detail Design for nesting Barn Swallow under the Collins Creek Bridge and SAR bat species that may occur in the area.

A Terrestrial Ecosystem Existing Conditions and Impact Assessment was completed to supplement the 2015 study. Field investigations were undertaken by Stantec to confirm the existing conditions and to conduct additional surveys to identify the presence of Species of Conservation Concern. Field surveys were conducted on the following dates:

April 13/14, 2017	Bat habitat assessment, wildlife habitat assessment, incidental wildlife;
June 1, 2017	Grassland bird survey; botanical inventory of alvar habitat, deployment of bat detectors;
June 15, 2017	Turtle mortality survey along the north and south side of Kingston Road 38 between Cordukes Road and Harpell Road and retrieval of bat detectors;

July 6, 2017 Eastern Whip-poor-will evening survey;

July 7, 2017 Grassland breeding bird survey; botanical inventory of alvar habitat.

4.2.1 Vegetation

During the 2017 field surveys, 26 vegetation communities were identified within the study area, from the following 13 ecosites: shrub alvar, cultural meadow, coniferous plantation, cultural thicket, cultural woodland, residential, coniferous forest, deciduous forest, meadow marsh, shallow marsh, thicket swamp, open water and shallow aquatic.

The northwest and southwest quadrants west of Kingston Road 38 contained open aquatic, shallow aquatic, shallow marsh, and meadow marsh vegetation communities along Collins Creek PSW, bordered by lowland deciduous forest transitioning to cultural meadows and woodlands, and mesic deciduous forests. Vegetation communities immediately west of Kingston Road 38 included coniferous forests, meadow marsh and an alvar community. Vegetation communities' northeast of the interchange included cultural thickets, woodlands and meadows, coniferous plantations and deciduous forests, isolated patches of thicket swamps and meadow marshes, and several residences. Vegetation communities southeast of the interchange had more anthropogenic disturbance, such as commercial buildings and infrastructure, stormwater management ponds, construction areas, and disturbed meadows and thickets. Portions of the coniferous and deciduous forests southwest of the interchange consisted of unevaluated wetland communities. These communities are shown (on next page) in Exhibit 5: Existing Vegetation Within the Study Area.

Potential Impacts

The proposed works in all quadrants of the interchange will require some removal of treed vegetation cover and terrestrial habitat to accommodate construction. Direct impacts on these communities include cut/fill and permanent vegetation removal to accommodate new road surfaces. Rock cuts and contouring of the ramps and adjacent slopes will likely result in the removal of all vegetation within the MTO right-of-way. The total area of vegetation that will be removed is approximately 3.39 hectares (ha).

Permanent vegetation removal is required for the construction of the new carpool lot in the southeast quadrant of the interchange. This area is already highly disturbed due to periodic maintenance activities and the effects of surrounding roads. Removal of this vegetation will not result in a loss of significant ecological function. Standard mitigation measures for erosion and sediment control are warranted.

Removal of old field meadow type vegetation will be required for the installation of a SWM pond in the southeast quadrant. Vegetation in this area is composed of common and widespread species that are not limited in the study area.

A dry SWM pond will be constructed on the south side of McIvor Road and Jackson Mills Road. This area contains Gray Dogwood Mineral Thicket Swamp/Dry-Moist Old Field Meadow type vegetation which is common and widespread

Other potential impacts associated with the proposed interchange improvements and bridge replacement include soil compaction, siltation of onsite natural communities and water bodies, vegetation disturbance, spills of deleterious substances into natural communities, noise disturbance and encounters with wildlife.

Mitigation

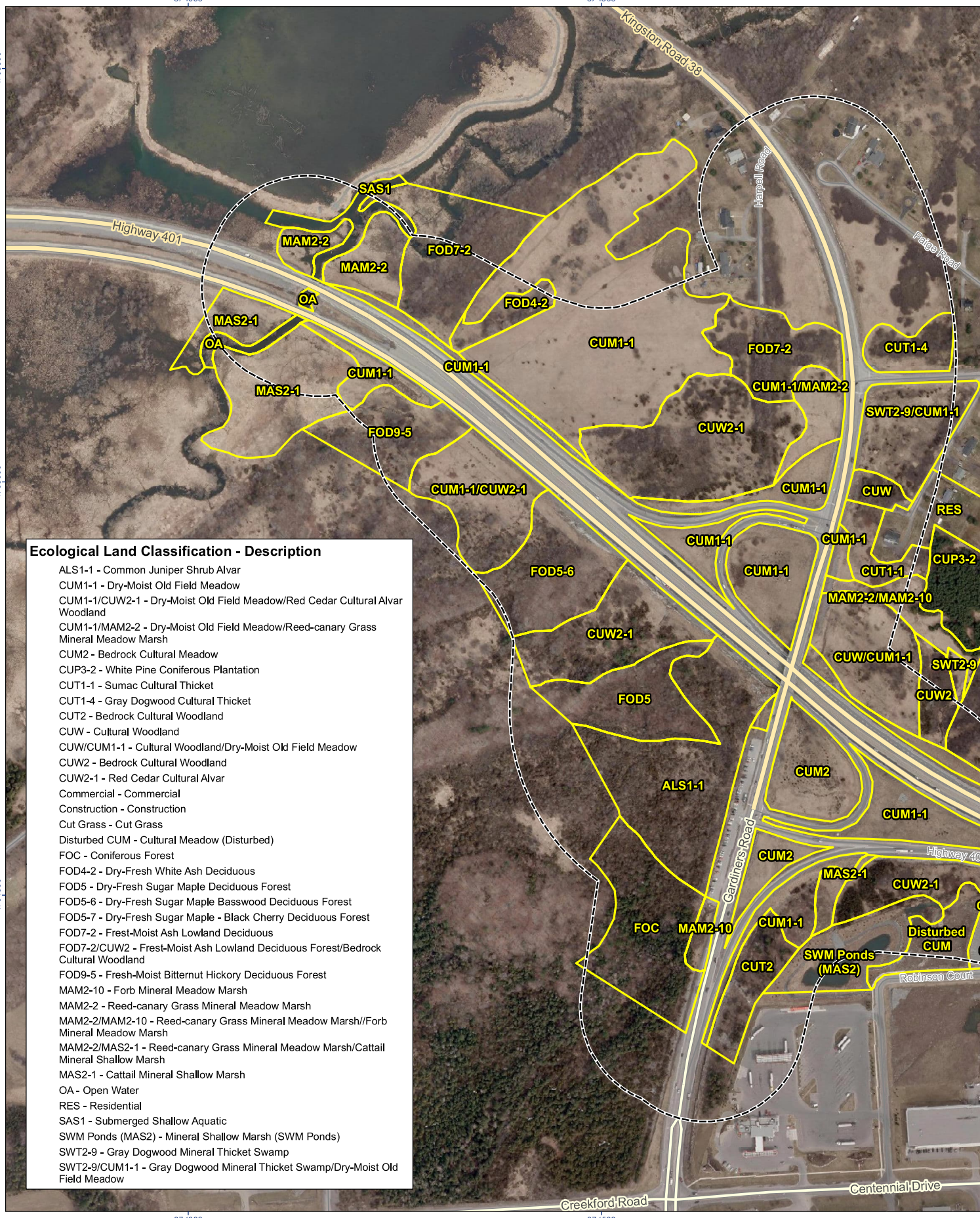
These impacts are considered to be short term, localized to the construction area during construction activities, and will be mitigated through the application of appropriate construction techniques and standard mitigation measures as follows.

- In areas where sensitive natural features occur (i.e., Collins Creek PSW; alvar; significant woodlots) adjacent to construction activities, barriers for tree protection (e.g., snow fencing) should be considered, where feasible, to protect vegetation that is to be retained
- Barrier fencing should be established as appropriate - if trees are absent a qualified biologist should delineate the limit of the feature in the field
- Areas to be cleared of existing vegetation should be clearly marked to prevent unnecessary clearing
- Barrier fencing may be coincident with silt fencing used to control erosion and sediment transport at the site
- Edge management techniques should be employed along newly created edges of forest communities
- Native soil and seed bank retention, including avoidance of root grubbing along disturbed edges, and other edge management recommendations should be implemented

4.2.2 Wildlife Resources

4.2.2.1 Habitat for Species at Risk

Habitat assessments were completed for provincial Species at Risk (SAR) and/or Species of Conservation Concern (SOCC) with at least one existing record on file with



Ecological Land Classification - Description

- ALS1-1 - Common Juniper Shrub Alvar
- CUM1-1 - Dry-Moist Old Field Meadow
- CUM1-1/CUW2-1 - Dry-Moist Old Field Meadow/Red Cedar Cultural Alvar Woodland
- CUM1-1/MAM2-2 - Dry-Moist Old Field Meadow/Reed-canary Grass Mineral Meadow Marsh
- CUM2 - Bedrock Cultural Meadow
- CUP3-2 - White Pine Coniferous Plantation
- CUT1-1 - Sumac Cultural Thicket
- CUT1-4 - Gray Dogwood Cultural Thicket
- CUT2 - Bedrock Cultural Woodland
- CUW - Cultural Woodland
- CUW/CUM1-1 - Cultural Woodland/Dry-Moist Old Field Meadow
- CUW2 - Bedrock Cultural Woodland
- CUW2-1 - Red Cedar Cultural Alvar
- Commercial - Commercial
- Construction - Construction
- Cut Grass - Cut Grass
- Disturbed CUM - Cultural Meadow (Disturbed)
- FOC - Coniferous Forest
- FOD4-2 - Dry-Fresh White Ash Deciduous
- FOD5 - Dry-Fresh Sugar Maple Deciduous Forest
- FOD5-6 - Dry-Fresh Sugar Maple Basswood Deciduous Forest
- FOD5-7 - Dry-Fresh Sugar Maple - Black Cherry Deciduous Forest
- FOD7-2 - Frest-Moist Ash Lowland Deciduous
- FOD7-2/CUW2 - Frest-Moist Ash Lowland Deciduous Forest/Bedrock Cultural Woodland
- FOD9-5 - Fresh-Moist Bitternut Hickory Deciduous Forest
- MAM2-10 - Forb Mineral Meadow Marsh
- MAM2-2 - Reed-canary Grass Mineral Meadow Marsh
- MAM2-2/MAM2-10 - Reed-canary Grass Mineral Meadow Marsh//Forb Mineral Meadow Marsh
- MAM2-2/MAS2-1 - Reed-canary Grass Mineral Meadow Marsh/Cattail Mineral Shallow Marsh
- MAS2-1 - Cattail Mineral Shallow Marsh
- OA - Open Water
- RES - Residential
- SAS1 - Submerged Shallow Aquatic
- SWM Ponds (MAS2) - Mineral Shallow Marsh (SWM Ponds)
- SWT2-9 - Gray Dogwood Mineral Thicket Swamp
- SWT2-9/CUM1-1 - Gray Dogwood Mineral Thicket Swamp/Dry-Moist Old Field Meadow

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MNRF and/or an overlapping range in the study area. Species with suitable habitat in the study area have a reasonable probability of occurring.

Table 9: Habitat Descriptions and Suitability Assessment for Potential SAR

Common Name	Status	Habitat Description	Habitat Suitability
Reptiles			
Snapping Turtle (*Chelydra serpentine*)	SC provincially and federally	Highly aquatic, prefer slow-moving water with soft substrates, such as ponds, shallow bays, and river edges (COSEWIC 2008). Nests are generally laid in open sandy substrates along waterways, but have also been observed in road shoulders, lawns and forest clearings (COSEWIC 2008).	Snapping Turtles were only observed during road mortality surveys along portions of the study area. Turtle nests were documented along the Kingston Road 38 road shoulders at Collins Creek and have been documented in the north shoulder of the Westbound bridge (MTO pers. comm.); however, candidate Turtle Nesting Areas were not documented elsewhere in the study area. Collins Creek may provide suitable overwintering habitat. **Suitable habitat is present.**
Blandings Turtle (*Emydoidea blandingii)*	THR provincially and federally	Blanding's Turtles frequent lakes, ponds, and marshes, and prefer shallow water with abundant aquatic vegetation and a soft bottom (MacCulloch 2002). Nesting occurs in dry conifer or mixed hardwood forests, up to 410 m from any body of water, in loose substrates including sand,	MNRF noted a record of Blanding's Turtle in the area. The PSW likely provides suitable overwintering habitat. Collins Creek may be used as a travel corridor or for dispersal and could provide overwintering habitat. **Suitable habitat is**

Common Name	Status	Habitat Description	Habitat Suitability
		organic soil, gravel and cobblestone, nesting may also occur along gravel roadways (COSEWIC 2005).	**present.**
Birds			
Barn Swallow (*Hirundo rustica*)	THR provincially and federally	Nest on walls or ledges of barns and other human-made structures such as bridges, culverts or other buildings; forages in open areas for flying insects (COSEWIC 2011a).	A single nest was observed on the Highway 401 eastbound bridge over Collins Creek. Both the Highway 401 eastbound and westbound bridges over Collins Creek are suitable for Barn Swallow nesting. **Suitable habitat is present.**
Bobolink (*Dolichonyx oryzivorus*)	THR provincially and federally	Nests primarily in forage crops with a mixture of grasses and broad-leaved forbs, predominantly hayfields and pastures (COSEWIC 2010).	No individuals were observed during 2017 surveys. Suitable habitat is present in meadows northwest of the Highway 401/Kingston Road 38 interchange. **Suitable habitat is present.**
Eastern Meadowlark (*Sturnella magna*)	THR provincially and federally	Meadows, hayfields and pastures; also, other open habitat types including mown lawn (COSEWIC 2011b). Prefers large (~5 ha), low-lying wet grasslands with abundant litter (COSEWIC 2011b).	Individuals were detected during 2017 surveys. Suitable habitat is present in meadows northwest of the Highway 401/Kingston Road 38 interchange. **Suitable habitat is present.**

Common Name	Status	Habitat Description	Habitat Suitability
Mammals			
Eastern Small-footed Myotis (*Myotis leibii)*	Endangered provincially	Trees, rock outcrops, buildings for roosting and nesting; caves and mines for hibernation (Humphrey 2017)	Three individual calls from bat species at risk were recorded from more than 2,000 calls recorded between June 1 and June 15, 2017. These calls were identified as from one of the three Myotis bat species (Little Brown, Northern or Eastern Small-footed) but identification to species was not possible. Candidate maternity roost trees were present in the study area; however, it is unlikely that the trees are being used as maternity roosts by SAR bats given that only three calls were detected. **Suitable maternity habitat is absent.**
Little Brown Myotis (*Myotis lucifugus)*	Endangered provincially and federally	Trees, rock outcrops, buildings for roosting and nesting; caves and mines for hibernation (COSEWIC 2013)	
Tri-colored Bat (*Perimyotis subflavus*)	Endangered provincially and federally	Trees for roosting and nesting; caves and mines for hibernation (COSEWIC 2013).	Candidate maternity roost trees were present in the study area; however, it is unlikely that the trees are being used as maternity roosts by SAR bats given that only three calls were detected, and none from this species. **Suitable maternity habitat is absent.**

Although Eastern Whip-poor-will records were not identified for the study area during the background review, and survey requirements for this species were not identified during consultation with the MNRF, Stantec conducted a single survey visit, and no

individuals were detected. Eastern Whip-poor-wills breed in open woodlands with frequent clearings for nesting. Its preferred nesting sites contain shaded leaf litter or pine needles and generally occur along wooded edges or in clearings without any herbaceous growth (Cadman et al. 2007).

The survey was conducted where new build areas overlay the best available habitat for this species. Upon completion of the survey, the habitat was deemed unsuitable because it was young to mid-age. The new build area for the Highway 401 east off-ramp also overlays open woodland (CUW2-1) southwest of the Highway 401 and Kingston Road 38 interchange; however, the canopy openings and forest edge habitat occurred much less frequently at this location. For these reasons, it was determined that habitat within the study area was not suitable for Eastern Whip-poor-will.

Although Blanding's Turtle were not identified in the study area during field investigations during both Preliminary and Detail Design, MTO provided updated background information from MNRF for the Highway 401 Eastbound Collins Creek Bridge (2016) which identified Blanding's Turtle in the study area.

In conclusion, suitable habitat is present for Blandings Turtle, Snapping Turtle, Barn Swallow, Bobolink and Eastern Meadowlark. Snapping Turtle, Eastern Meadowlark, and *Myotis* species bats were documented during field visits; all other species were not observed in the study area.

4.2.2.2 Bat Surveys

Trees within the areas proposed for removal were assessed for their potential to support bat maternity colonies. All potential maternity roost trees (i.e. snag trees > 10cm dbh) documented were mapped in GIS. Fifteen snag trees >25 cm diameter at breast height (dbh) with cavities are present within the area proposed for removal.

Three individual calls from bat species at risk were recorded from more than 2,000 calls recorded between June 1 and June 15, 2017. These calls were identified as from one of the three Myotis bat species (Little Brown, Northern or Eastern Small-footed) but identification to species was not possible. It is unlikely that the trees are being used as maternity roosts by SAR bats given that only three calls were detected.

Because there is a possibility that bat maternity roosts may be present, a timing restriction for vegetation clearing will be implemented to avoid the core maternity season and reduce the potential construction phase impacts to bats. Vegetation clearing will be restricted between April 1 and August 15. If any additional vegetation removal is proposed, then these areas should be surveyed by a qualified biologist prior to removal.

4.2.2.3 Migratory Birds

During grassland breeding bird surveys on April 14, June 1 and July 7, 2017, two species at risk (Barn Swallow, Eastern Meadowlark) were observed. Eastern Meadowlark were detected on April 14, 2017 during bat habitat assessments and again on June 1, 2017 during targeted surveys. Eastern Meadowlark were present in the old field meadow habitat southwest of Harpell Road in the northwest quadrant of the study area. Eastern Meadowlark was not detected in the study area on July 7, 2017.

There was one Barn Swallow nest on the Highway 401 eastbound Collins Creek bridge, which was observed during surveys conducted in 2013 (MMM Group, 2015). A Barn Swallow nest scar was observed on the same bridge in May 2017. No nests were present on the Highway 401 westbound bridge.

4.2.2.4 Significant Wildlife Habitat

The Juniper shrub alvar habitat identified in the previous study was relatively disturbed in nature and contained numerous exotic species. Although several of the identified species may occur within alvars, none of the species identified in 2017 were considered strong alvar plant indicators, which is further suggestive of the degraded habitat quality. The treed canopy in this community was short and open. Eastern red cedar was dominant with uncommon occurrences of various other trees and tall shrubs. The ground layer was dominated by species such as common juniper, common viper's-bugloss, annual fleabane, oxeye daisy, thyme-leaved sandwort, tall hawkweed, sleepy catchfly, poison ivy and early goldenrod. Crevices in alvar bedrock may provide habitat for snakes.

Based on the habitat that is present in the study area and historic records, habitat for the following SOCC and provincially rare wildlife are assumed present:

- Snapping Turtle – suitable habitat is present in Collins Creek and along the Kingston Road 38 road shoulders at Collins Creek
- Barn Swallow – suitable habitat is present on both the Highway 401 eastbound and westbound bridges over Collins Creek
- Bobolink – suitable habitat is present in meadows northwest of the Highway 401/Kingston Road 38 interchange
- Eastern Meadowlark – suitable habitat is present in meadows northwest of the Highway 401/Kingston Road 38 interchange

Potential Impacts

The Westbound Collins Creek Bridge will be replaced and widened. Suitable overwintering habitat for turtles is present in the PSW and Collins Creek. However, new build areas do not overlay the PSW or Collins Creek. Turtle nests were documented along the Kingston Road 38 road shoulders at Collins Creek; however, candidate Turtle Nesting Areas were not documented elsewhere in the Study Area. Turtles may be particularly vulnerable during peak activity periods, including movement between wintering and nesting sites. Snapping Turtles inhabiting Collins Creek Complex PSW may seek out the gravel shoulders of Highway 401 and Kingston Road 38 for nesting. Unless mitigation measures are applied, construction activity could damage nests or disturb nesting activity, including incubation and emergence of hatchings at these locations. Nesting activity typically occurs during the summer months (approximately June through September).

The new ramps for Highway 401 overlay suitable grassland habitat for Eastern Meadowlark at one location, northwest of the Highway 401 and Kingston Road 38 interchange. The habitat patch size is 6.4 ha. The new Highway 401 N/S-W on-ramp will remove 0.2 ha (3.1% of the total area). The habitat abuts Highway 401, and additional indirect impacts associated with the new ramp, such as traffic noise, are expected to be negligible.

Within the study area, open alvar habitat has the potential to act as roosting habitat for Eastern Small-footed Myotis. However, no long-term impacts to this species are anticipated based on the interim works. Large trees along the right of way have the potential to act as maternity roosts for Little Brown Myotis and the Tri-colored Bat, if suitable peeling bark or cavities are present. Mature tree clearing is proposed; however, no long-term impacts to these species are anticipated as it is unlikely that the trees are being used for maternity roosts for endangered bat species, based on the small number of calls observed in 2017.

Potential habitat for Bobolink is present in meadow habitats in the study area; however, the species was not observed during field surveys in 2013 and 2014 or during 2017 Stantec field surveys.

Both the Highway 401 Collins Creek Bridges are suitable for Barn Swallow nesting. Construction activities on the Highway 401 westbound bridge are not expected to interfere with Barn Swallow nests on the Highway 401 eastbound bridge. The Collins Creek structures should be checked for active nests prior to April 1 in the year of construction. If Barn Swallow returns to either bridge to nest, the project will be registered under O. Reg. 242/08.

Other species at risk and provincially rare species that may occur adjacent to the work zones and right of way and may experience indirect impacts include Black Tern (adjacent marshes only).

The proposed interchange improvements and bridge replacement will require rock and earth clearing and grading, which will result in some vegetation removal and loss of terrestrial habitat (approximately 3.39 ha). Clearing and grubbing of vegetation may result in direct impacts to wildlife and nesting migratory birds protected by provincial and federal legislation. Cuts into rock may impact snakes. Potential indirect impacts associated with the proposed works could include siltation of onsite natural communities and watercourses, spills of deleterious substances into natural communities, and noise impacts during construction. These impacts are considered to be short term, localized to the construction area during construction activities, and/or avoidable through the application of appropriate construction techniques and mitigation measures.

Mitigation

- Direct impacts to turtles will be mitigated during construction using barrier fencing to exclude turtles from work areas to be installed before May 15 or after September 15 (i.e., outside of turtle nesting season)
- No in water work between October 15 and April 15th unless the area is excluded for hibernating prior to October 15
- A thorough visual search will occur before work commences each day by construction contractors to avoid interaction with turtles - if turtles are encountered during construction, work at that location will stop until the reptiles are no longer present
- Factsheets will be provided to all construction staff to assist with identification of turtle SAR - observations of SAR will be reported to MNRF within 48 hours
- Advise workers not to harm or harass any turtles or other wildlife encountered
- During ditching and grading activities, disturbance will be limited to the greatest extent possible and piling dirt in fallow vegetation will be avoided
- If work is scheduled during the core nesting breeding bird period of April 1 to August 31 clearing and grubbing will be preceded by a survey by a qualified avian biologist to identify active nests; active nests will not be disturbed
- Vegetation clearing in Eastern Meadowlark habitat will be restricted between May 1 and July 31, as per Ontario Regulation (O. Reg.) 242/08
- Measures to exclude wildlife from the construction zone will be implemented

- Permanent barrier fencing to address turtle mortality at the Highway 401 westbound and eastbound Collins Creek Bridge crossings will be installed

4.2.2.5 Species of Conservation Concern

Targeted surveys were carried out to record any species protected by the *Endangered Species Act*, 2007 (ESA) and/or the *Migratory Bird Convention Act*, 1994 (MBCA). Grassland breeding bird surveys, Eastern Whip-poor-will surveys, and a turtle mortality assessment on Kingston Road 38 between Cordukes Road and Harpell Road were used to study the potential for SAR occurring in the study area. In addition, a bat habitat assessment and acoustic monitoring investigation was conducted for the potential presence of Myotis species (*Little Brown Myotis, Northern Myotis & Tri-Colored Bat)* as this was a commitment carried forward from Preliminary Design.

Based on the habitat that is present in the Study Area and historic records, habitat for the following SOCC and provincially rare wildlife are assumed present:

- Snapping Turtle – suitable habitat is present in the PSW, along Collins Creek and along the Kingston Road 38 road shoulders at Collins Creek
- Blanding's Turtle - suitable habitat is present in the PSW, along Collins Creek and along the Kingston Road 38 road shoulders at Collins Creek
- Barn Swallow – suitable habitat is present on both the Highway 401 eastbound and westbound bridges over Collins Creek
- Bobolink – suitable habitat is present in meadows northwest of the Highway 401/Kingston Road 38 interchange
- Eastern Meadowlark – suitable habitat is present in meadows northwest of the Highway 401/Kingston Road 38 interchange

<u>Potential Impacts</u>

Barn Swallow, Black Tern, and Snapping Turtle and Blandings Turtle may occur near Collins Creek. Bobolink, and Eastern Meadowlark may inhabit the meadows north of Collins Creek Bridge. Species at Risk (SAR) may nest and forage near the north bridge over Collins Creek.

New build areas overlay suitable grassland habitat for Bobolink and Eastern Meadowlark at one location, northwest of the Highway 401 and Kingston Road 38 interchange. The new Highway 401 west on-ramp will remove 0.2 ha of Eastern Meadowlark habitat. The new ramp will be located at the edge of the habitat and will not fragment the habitat into smaller patches. Because the major part of the habitat will remain intact, and new indirect impacts are negligible, the habitat is expected to remain

suitable for Eastern Meadowlark after construction of the new ramp is complete. A timing restriction for vegetation clearing will be implemented to reduce the likelihood pf construction phase impacts to Eastern Meadowlark.

Potential impacts to Species at Risk (SAR) are under review by the Ministry of Natural Resources and Forestry (MNRF) to determine if registration of the works and/or a permit under the *Endangered Species Act* is required.

Mitigation

- Vegetation clearing in Eastern Meadowlark habitat will be restricted between May 1 and July 31, as per Ontario Regulation (O. Reg.) 242/08
- Factsheets will be provided to all construction staff to assist with identification of SAR. Observations of SAR will be reported to MNRF within 48 hours
- Confirm no Barn Swallow nesting activity on Highway 401 westbound Collins Creek Bridge
- Incorporate standard mitigation practices and timing windows for wildlife, vegetation, fish and SAR
- Standard mitigation measures for excluding wildlife from the construction zone at Collins Creek will minimize impacts to SAR at this location

4.2.2.6 Designated Natural Areas

Significant natural heritage features were evaluated as per the *Environmental Reference for Highway Design* (MTO 2013). The following designated natural area features are within one km of the study area, but direct impacts are not anticipated:

- Lower Collins Creek Wetland Complex Provincially Significant Wetland (Collins Creek PSW)
- Collins Creek riparian corridor
- Significant Valleylands along Collins Creek
- Wildlife linkages and corridors along Collins Creek

The City of Kingston Official Plan identifies a significant woodland with deciduous and coniferous forest stands in the southwest quadrant. There is a contributory woodland in the northwest quadrant.

Potential Impacts

Approximately 2.1 ha of vegetation from within forested lands including from lands designated as significant woodlands will be removed. The significant woodland owned by the City of Kingston was assessed by MMM Group during Preliminary Design to identify how the proposed works might affect the function of the woodland. It was concluded that the woodland would retain its significance for most of the evaluated categories (i.e., woodland size, ecological functions) following the implementation of the preferred design. One criterion, the uncommon characteristics feature of the woodland, will be eliminated with the removal of the uncommon ALS1-1 community (i.e., shrub alvar). Following the removal of the 2.1 ha of significant woodland, the woodland is expected to retain much of its ecological significance; however, its overall habitat diversity and value will be reduced.

The Collins Creek PSW is buffered by deciduous forest and cultural meadow that parallel Highway 401 to the north and south. Impacts to the wetland are not anticipated based on its location and buffer relative to the work zone. Potential indirect impacts may occur through the inadvertent discharge of sediments, stockpiled earth, oils, fuels and other deleterious substances from work areas, and are mitigated through standard environmental protection measures.

Mitigation

Generally, the proposed works can either avoid the identified sensitive habitat or species, or specific pre- and post-construction activities can be implemented as outlined in Table 10.

4.2.3 Hydrology / Surface Water

Potential Impacts

The minimum soffit elevation of the proposed Highway 401 westbound bridge over Collins Creek will match the existing low soffit elevation of 87.89 m. However, the span of the new bridge will be increased from 9.14 m to 19.5 m. This will increase the hydraulic capacity of the bridge as compared to the existing. Under existing conditions, 0.04 m of vertical clearance is provided from the high water level (HWL), which is defined as the 100-year return period event water level. Under proposed conditions, 0.24 m of clearance will be provided until the Highway 401 eastbound bridge over Collins Creek is replaced. Ultimately, 0.58 m of clearance will be provided, assuming a new eastbound replacement structure similar to the westbound.

The clearances of 0.04 under existing conditions, 0.24 m under proposed conditions, and 0.58 m under future conditions are lower than the standard 1.0 m clearance. While the proposed structure results in a grade raise of approximately 0.4 m of Highway 401,

the additional grade raise required to provide the standard clearance would significantly increase the limits of construction, the construction duration, cost of the highway improvements, and would result in property impacts. Through extensive review and discussion with the MTO, the Ministry has elected to proceed with a condition that is improved over existing but does not meet the minimum standard.

Mitigation

Stormwater management measures as outlined in Section 3.1.2 will be implemented to mitigate the potential water quantity and quality impacts resulting from the increase in impervious area.

Pond SWM-1, a dry pond facility located in the north-east quadrant of the interchange is required to provide peak flow control. Outflows from the pond will drain to the McIvor Road south ditch.

Flows from the vicinity of the new commuter lot will be directed to Pond SWM-2, the relocated existing SWM pond east of the Collins Creek bridge on the south side of Highway 401. It will be a wet facility to provide water quantity and quality treatment, prior to discharging to the existing pond outlet swale, and ultimately to Collins Creek.

4.2.4 Erosion and Sediment Control

Potential Impacts

Erosion and sediment have the potential to contaminate the surrounding environment if not managed properly during construction.

Mitigation

Erosion and sediment control measures will be implemented and monitored during construction to prevent the migration of soils from the site and to reduce the risk of impacts to the natural environment. Consideration will be given to include barrier fencing coincident with sediment fencing following the Best Practices Technical Note – *Reptile and Amphibian Exclusion Fencing (MNR 2013),* as appropriate.

The primary principles associated with sedimentation and erosion protection measures are to: (1) minimize the duration of soil exposure; (2) retain existing vegetation, where feasible; (3) encourage re-vegetation; (4) divert runoff away from exposed soils; (5) keep runoff velocities low; and to (6) trap sediment as close to the source as possible. To address these principles, the following mitigation measures are recommended:

- Sediment fencing and/or barriers will be used along construction areas that are adjacent to sensitive natural features (e.g. wetlands and watercourses)

- No equipment will be permitted to enter natural areas beyond the barrier fencing during construction
- All materials requiring stockpiling (fill, topsoil, etc.) will be stabilized and kept a safe distance (>15 m) from natural areas
- All exposed soil areas within 120 m of sensitive natural features (e.g. wetlands and watercourses) will be stabilized (seed mixes; sourced locally if possible) and re-vegetated, through the placement of seed and mulching or seed and an erosion control blanket within 15 days of soil exposure (45 days in all other areas) but no later than October 30.
- Equipment will be refueled a minimum of 30 m away from sensitive natural features (e.g. wetlands and watercourses) to avoid potential impacts, in the event that an accidental spill occurs
- In addition to any specified requirements, additional sediment fence will be available on site, prior to grading operations, to provide a contingency supply in the event of an emergency
- All erosion and sediment controls should be monitored regularly and properly maintained, as required
- Controls are to be removed only after the soils of the construction area have been stabilized and adequately protected until cover is re-established
- The limits of construction adjacent to sensitive natural features (e.g. Collins Creek PSW; alvar; significant woodlots) to be retained will be fenced prior to construction, and monitored during construction (along with erosion and sediment control measures) to make sure that the limits are maintained with respect to vehicular traffic and soil or equipment stockpiling
- The Contractor is required to restore any disturbed natural areas to pre-construction conditions
- Banks of watercourses disturbed during site access or ditch construction will be re-stabilized to pre-construction configuration and condition (or better) using species native and naturally occurring to the site, where possible
- Any ditch maintenance activities occurring within 30 m of a watercourse will follow MTO’s Best Management Practices (BMP) for ditch maintenance

4.2.5 Management of Excess Materials

Potential Impacts

Waste, excess materials (including salt impacted soil) and emissions have the potential to contaminate the surrounding environment if not managed properly.

Mitigation

- Excess materials will be managed in accordance with provincial standards
- Measures to minimize dust resulting from the contractor's removal operations during construction will be included in the Contract
- Management of debris from concrete removal operations will be required to prevent materials from entering Collins Creek

4.3 SOCIAL / ECONOMIC ENVIRONMENT

4.3.1 Land Use

The Highway 401 corridor is a six-lane divided freeway within the project limits. The project is located within the City of Kingston, with industrial lands to the south of the interchange, and residential rural land to the north. The interchange with Kingston Road 38 provides access to Gardiner's Road industrial and commercial areas to the south.

The Cataraqui Industrial Estates business park in the southeast quadrant of the interchange is an origin/destination for commercial truck traffic. There are no direct impacts to the business park lands.

Long Combination Vehicles (LCVs) routinely use this interchange to access truck stops and terminals immediately south of Highway 401. The final design will accommodate turning movements for LCVs, however there may be restrictions during the construction phase.

No impacts to current land uses are anticipated and therefore mitigation is not required.

4.3.2 Traffic Operations

Potential Impacts

The TESR outlined a preliminary staging strategy for the proposed interim improvements. The preliminary staging strategy has been further refined based on additional information, MTO requirements and the desire to reduce impacts to traffic movements.

While the construction staging presented in Section 3.2 was developed with the goal of minimizing lane and ramp closures to the extent possible, some closures are required to accommodate the proposed construction activities. The general staging overview proposed includes the following:

- Two lanes on Highway 401 maintained at all times during the day
- Single lane on Highway 401 occurs only during night time hours
- Highway 401 eastbound lane closures only at night
- Highway 401 westbound lane closure is longer term during replacement of the Highway 401 westbound Collins Creek bridge (2019 construction)
- Periodic short duration night time ramp closures are required
- Kingston Road 38 maintains two lanes in each direction during daytime hours, however nightly lane reductions are required
- Temporary closure of a 140 m section of McIvor Road between Kingston Road 38 and Jackson Mills Road is required with access from McIvor Road to Highway 401 via Sydenham Road
- Temporary closure of the commuter parking lot is required from fall 2018 to fall 2019 (signage to use alternate locations will be provided)

4.3.2.1 Changes since Preliminary Design

The TESR identified short term closure of the carpool facility during construction. The refined staging plan proposes closure for 1 year.

The closure of an approximate 140 m section of McIvor Road between Kingston Road 38 and Jackson Mills Road is proposed for approximately 3 to 4 weeks. McIvor Road east of Jackson Mills Road will remain open with access to Highway 401 via Sydenham Road.

Mitigation

- Local residents, the City of Kingston, the Ontario Trucking Association, and emergency service providers will be notified in advance of planned closures and detours
- Appropriate temporary and advanced signage will be used in all construction zones to ensure advanced warning of construction activities taking place and will provide notice of upcoming closures and detours

- Existing carpool lot users will be directed to alternate locations during the closure

4.3.3 Aesthetics and Landscape

Potential Impacts

The proposed improvements will result in changes to the surrounding landscape through vegetation clearing and other construction disturbances.

Mitigation

Minor alterations to the landscape character of the area will occur due to the interim operational improvements. Mitigation measures include protection of existing vegetation and limiting vegetation removals to only what is necessary to accommodate construction. Disturbed areas will be vegetated where feasible with native plant species to reduce erosion, improve slope stability, increase filtration and reduce overland flow.

Cultural vegetation will be protected and preserved, where feasible. This vegetation can enhance the scenic character of the transportation corridor and provide buffer, screening and aesthetic value.

4.3.4 Air Quality

Potential Impacts

Construction activities associated with the project (i.e., storage, on-site movement and grading of earth material, structural rehabilitation, and replacement) will have the potential to generate dust.

Mitigation

Dust control will adhere to standard MTO procedures and includes the use of MOECC approved dust suppressants to minimize emissions and prohibit visible emissions from escaping beyond the construction site.

Dust and local air quality impacts to properties adjacent to the study area during construction will be minimized by General Conditions in the contract. These include: minimizing operation and idling of gas powered equipment and vehicles, minimizing vehicular traffic on exposed soils and stabilizing high traffic areas with suitable cover material, restoring disturbed areas as soon as possible to minimize the duration of soil exposure, and controlling dust emissions by the application of suitable dust suppressant materials.

4.3.5 Noise

The noise assessment conducted during Preliminary Design (MMM Group, 2015) determined that the proposed improvements to the Highway 401/Kingston Road interchange would not have any adverse noise impacts on the noise sensitive land uses situated in proximity to the interchange. Noise Sensitive Areas (NSAs) include the surrounding residential areas in the northeast, northwest and southwest quadrant of the interchange. Although permanent noise mitigation measures were not found to be warranted for the proposed improvements, it was recommended that noise control be adhered to during construction of the improvements.

Potential Impacts During Construction

The City of Kingston Noise By-law (2004-52) includes a restriction on making construction related noise between 7:00 p.m. to 7:00 a.m. as well as on Sundays and statutory holidays. There will be an increase in noise levels during construction. Night-time work will be required to minimize traffic closure impacts on Highway 401 and Kingston Road 38. Night construction activities may include saw cutting, grading and excavation, paving and placement of granular materials and concrete and placement of temporary concrete barrier for lane closures.

Mitigation

The Contractor will abide by the City of Kingston municipal noise control by-law for day-to-day operations. However, night-time and weekend construction activity will be required to minimize traffic closure impacts and to minimize the duration of construction. A noise by-law exemption from the City of Kingston will be sought prior to construction. The Contractor will be required to keep the idling of construction equipment to a minimum and to maintain equipment in good working order to reduce noise from construction activities. NSAs will be identified in the contract package using Special Provision 199F33.

4.4 CULTURAL ENVIRONMENT

4.4.1 Built Heritage and Cultural Landscapes

Heritage features in the study area were assessed and documented during Preliminary Design. The proposed works are not anticipated to directly or indirectly impact the heritage features in the northeast quadrant of the interchange. Therefore, mitigation is not proposed.

4.4.2 Archaeology

A Stage 1-2 Archaeological Assessment was carried out during the Preliminary Design study, to assess the proposed improvements to the Highway 401/Kingston Road 38 interchange. No evidence of archaeological resources was encountered, and no artifacts were removed from the site. The report recommended that no further archaeological assessment of the project is required. The study area is free of archaeological concerns based on the field assessment for archaeological potential.

There is potential for deeply buried archaeological deposits to be discovered during construction.

Mitigation

If deeply buried archaeological deposits are discovered during construction, the Ministry of Tourism, Culture and Sport should be notified immediately and work in the vicinity of the discovery must be suspended immediately. In addition, if unmarked human remains are encountered the provisions of the *Funeral, Burial, and Cremation Services Act* (2002) apply. Notification must be made to the Ontario Provincial Police, or local police, who will conduct a site investigation and contact the District Coroner. Notification to the MTO Environmental Planner will occur so that the MTO Regional Archaeologist can be informed. Notification to MTCS and the Registrar of Cemeteries, Ministry of Government and Consumer Services shall also be undertaken.

Should other cultural heritage values (archaeological or historical materials or features) be identified during operations, all activity in the vicinity of the discovery will be suspended and the MTCS archaeologist contacted.

4.5 ENVIRONMENTAL PERMITS AND APPROVALS

4.5.1 Permit to Take Water

A Permit to Take Water (PTTW) from the Ministry of the Environment and Climate Change may be required for dewatering of the excavations for the Collins Creek Bridge abutments. This permit and or an Environmental Activity Sector Registry (EASR) will be obtained prior to construction.

4.5.2 Fisheries Act

The project was assessed as per the MTO/DFO/MNRF Protocol for Protecting Fish and Fish Habitat on Provincial Transportation Undertakings (the Protocol) (MTO 2016a). With respect to the Highway 401 westbound Collins Creek bridge replacement, a fisheries assessment was completed at Step 4 of the Protocol. The bridge replacement

will not result in serious harm to fish and fish habitat and the Project Notification Form can be completed from Step 5 of the Protocol.

4.5.3 Endangered Species Act and Species at Risk

The provincial *Endangered Species Act* (ESA) prohibits the killing, harming, harassing, capturing or taking of a living member of a species listed as Threatened, Endangered or Extirpated by the Species at Risk in Ontario (SARO) list (O. Reg 230/08) (S. 9), or the damage to habitat of similarly designated species (S. 10), except where a permit is issued under S. 17(2) of the same act or the Activity is registered under the Species at Risk Registry (the Registry), which was introduced alongside O. Reg 242/08 of the ESA in 2014. O. Reg 242/08 provides a regulatory framework for the registry process, which exempts activities that meet a defined set of criteria, as outlined within the regulation, from the ESA S.17(2) permit process. Not all species or activities are eligible for the Registry.

Federally protected endangered, threatened and special concern species are identified in Schedule 1 of SARA. SARA applies to federally owned lands, with the exception of fish (those species covered by the *Fisheries Act* (FA 1985) and migratory birds (those species covered by the *Migratory Bird Convention Act* (MBCA 1994), which are afforded protection on all lands.

Potential impacts to SAR are under review by the MNRF to determine if registration of the works and/or a permit under the ESA is required. Registration for Barn Swallow is not required unless new nests are established on the Highway 401 westbound Collins Creek bridge.

The impact assessment determined that removal of 0.2 ha edge habitat at this site will not likely impact Eastern Meadowlark habitat in such a way so as to constitute damage or destruction of habitat and therefore registration of this activity under Regulation 242/08 is not warranted. Stantec has notified MNRF of this assessment and requested any feedback. No feedback has been received at the time of this report was published.

4.5.4 Noise By-Law Exemption

A noise by-law exemption to the City of Kingston Noise By-law Number 2004-52 is required for night work to facilitate the construction schedule and night-time lane closures for construction staging. The noise by-law exemption will be sought prior to construction.

4.5.5 Migratory Bird Convention Act

Active nests and eggs of species listed under the *Migratory Birds Convention Act*, 1994 (MBCA), shall not be destroyed during migratory bird nesting season (April 1 to August 31). No work shall be permitted to proceed that would result in the destruction of active nests or the harassing, wounding, or killing of birds protected under the MBCA.

4.5.6 Navigation Protection Act

The *Navigation Protection Act* (NPA) authorizes and regulates interferences with the public right of navigation. The watercourse of the Collins Creek is not listed in the schedule of navigable waters in the *Navigation Protection Act* (NPA, 2014) and is exempt from the NPA application process.

4.6 SUMMARY OF ENVIRONMENTAL EFFECTS, PROPOSED MITIGATION, COMMITMENTS

The proposed improvements to the Highway 401 and Kingston Road 38 Interchange and Highway 401 westbound Collins Creek bridge can be completed without significant adverse effects to the natural, social and cultural environment in the study area. Long term effects from the construction of the operational improvements are considered negligible.

The project team develops environmental protection, mitigation and compensation measures. Some of these measures are integrated as part of the design while others need to be specified in the contract. Standard and site specific environmental protection measures are available to address potential effects to natural areas that may occur because of the proposed project. Contract specific provisions have been developed and will be included in the final contract documents to further minimize the potential for impacts on the environment.

These mitigation and monitoring measures have been refined based on the original commitments outlined in the TESR prepared during Preliminary Design. Potential impacts can be avoided or mitigated by the measures and provisions included in the construction contract.

A summary of environmental effects, proposed mitigation and commitments, as identified at the end of the study is provided in Table 10. The table forms a comprehensive checklist of the commitments made to external agencies, the public and other stakeholders during Preliminary and Detail Design.

Abbreviations

MTO	Ontario Ministry of Transportation
DFO	Department of Fisheries and Oceans
MNRF	Ministry of Natural Resources and Forestry
MOECC	Ministry of the Environment and Climate Change
MTCS	Ministry of Tourism, Culture and Sport
EMS	Emergency Management Services
CRCA	Cataraqui Region Conservation Authority
CWS	Canadian Wildlife Service
OTA	Ontario Trucking Association
UTIL	Utilities
City	City of Kingston

Table 10: Summary of Environmental Concerns and Commitments

ID#	Environmental Element/Concern and Potential Effects	Concerned Agencies	#	Mitigation / Protection / Monit
1.0	**General Environmental Protection Measures**			
1.1	Mitigation measures must be properly implemented in order to minimize the environmental impacts of the bridge replacement and interchange improvements including the new commuter parking lot and SWM ponds.	MTO MOECC MNRF	1.1.1	• Environmental inspections should take p construction to ensure that all mitigation implemented properly, maintained and re remedial measures are initiated in a time warranted *Environmental protection shall be conducted Contract Drawings and Tender Document.* *Operational Constraint Environmental – Ger Protection* *Operational Constraint Environmental – Spil Response Contingency Plan*
2.0	**Vegetation**			
2.1	Construction of the improvements requires removal of vegetation. During construction adjacent to vegetated areas, heavy equipment could damage peripheral vegetation from contact, excavation	MTO MNRF	2.1.1	• During construction, right-of-way vegetat and vegetation retention zones should be and vegetation that does not require rem protected • Equipment, materials and other construc should not be permitted in vegetation ret *Environmental protection shall be conducted Contract Drawings and the following Ontario Standards:* *OPSS 201 - Clearing and Grubbing*

ID#	Environmental Element/Concern and Potential Effects	Concerned Agencies	#	Mitigation / Protection / Monit
	and/or soil compaction.			*OPSS 801 – Protection of Trees* *OPSS 180 – Management of Excess Materi* *Operational Constraint – Timing Constraint f* *Special Provision – Earth Excavation, Gradi*
			2.1.2	• Vegetation removal should be kept to the to perform the work *OPSS 201*
			2.1.3	• Appropriate vegetation clearing techniqu (i.e., felling trees away from retained natu watercourses) *OPSS 201, 801 and 805*
			2.1.4	• All unnecessary traffic, dumping and stor over tree root zones adjacent to natural / should be avoided *OPSS 801* *Operational Constraint Construction Access*
			2.1.5	• Cut and grubbed material should be disp chipping or other appropriate means *OPSS 201*
2.2	Works will impact Alvar habitat in the southwest quadrant of the	MTO MNRF	2.2.1	• Intrusion into and disturbance of the sign and alvar habitats should be minimized t possible

ID#	Environmental Element/Concern and Potential Effects	Concerned Agencies	#	Mitigation / Protection / Monit
	interchange. Works will impact significant woodland. Collins Creek Provincially Significant Wetland may be impacted by the highway widening and bridge replacement.			*SP 199F12 – Environmentally Sensitive Are*
			2.2.2	• Vegetation protection zones should be e marked in the field around areas not requ *Contract drawings* *SP 199F12 – Environmentally Sensitive Are*
			2.2.3	• Reseeding adjacent to areas of alvar hab minimized to avoid intrusion of non-native alvar habitat *SP 199F12 – Environmentally Sensitive Are*
			2.2.4	• In areas where sensitive natural features construction activities, barriers for tree pr fencing) should be erected, where feasib vegetation that is to be retained *SP 199F12 – Environmentally Sensitive Are* *OPSS 801*
			2.2.5	Barrier fencing should be established at, or l drip-line, as appropriate – if trees are abs biologist should delineate the limit of the *OPSS 801*
			2.2.6	• Barrier fencing may be coincident with si control erosion and sediment transport a *OPSS 801; OPSS 805*

ID#	Environmental Element/Concern and Potential Effects	Concerned Agencies	#	Mitigation / Protection / Monit
			2.2.7	• Areas to be cleared of existing vegetatio marked to prevent unnecessary clearing *OPSS 801*
			2.2.8	• Native soil and seed bank retention, inclu root grubbing along disturbed edges, and management recommendations should b *OPSS 801; OPSS 805*
3.0	**Wildlife and Species at Risk (SAR)**			
3.1	Construction activity near Collins Creek could block passage or interact with turtle nests or nesting activity, although the right of way is not considered significant wildlife habitat. Snakes and their habitat may be impacted by construction activities (i.e., excavation, noise	MNRF	3.1.1	• In-water work should be avoided betwee April 30 to avoid disturbing hibernating tu • Where feasible temporary barrier fencing implemented in advance to allow winter v *OPSS 182*
			3.1.2	• If construction is to occur between April the following measures should apply: – Install exclusionary fencing at the limi zone by April 30 or by ground-thaw o whichever comes last, to prevent turtl the construction zone – Conduct daily visual sweeps prior to and continue until October 31 – A Turtle Fact Sheet will be made avai

ID#	Environmental Element/Concern and Potential Effects	Concerned Agencies	#	Mitigation / Protection / Monit
	and vibration).			Contractor *Requirements should be outlined in Operati* *– Protection of Species at Risk* *Operational Constraint – Wildlife Fencing* *Operational Constraint Environmental – Pre* *Harassment* *S199F12 – Environmentally Sensitive Areas*
			3.1.3	• If active turtle or snake nests (with eggs encountered, appropriate measures shou avoid disturbance to the nest and a Pete MNRF Biologist should be contacted to c options *NSP – Protection of Species at Risk*
3.2	Wildlife may be disturbed by construction activities.	MNRF CWS	3.2.1	• Wildlife incidentally encountered during c not knowingly be harmed and should be away from the construction zone on its o *NSP – Prevention of Wildlife Harassment*
			3.2.2	• If wildlife encountered during constructio from the zone, an Environmental Inspect animal to a safe area *NSP – Prevention of Wildlife Harassment*
3.3	Destruction or disturbance of birds or	MNRF CWS	3.3.1	• The core nesting period for migratory bir identified as April 1 to August 31, althoug

ID#	Environmental Element/Concern and Potential Effects	Concerned Agencies	#	Mitigation / Protection / Monit
	active nests protected under the *Migratory Birds Convention Act (MBCA)* is not permitted.			occur outside of this period • The Contractor shall not destroy nests of migratory birds. When these nests are en Ministry's Contract Administrator must be • If nesting is initiated during construction, until the nest is no longer active to avoid MBCA • If clearing and grubbing work is schedule the restricted period, then no mitigation w *Operational Constraint Environmental – Mig Protection General*
3.4	Sensitive species or Species at Risk may be present in the area and could be impacted by construction activities.	MNRF CWS	3.4.1	• Fact sheets for Snapping Turtle, Blandin Meadowlark and Barn Swallow will be pr construction site staff to inform them that the work zone • Permanent barrier fencing will be installe mortality at the Highway 401 westbound Collins Creek Bridge crossings *Operational Constraint Environmental - Prot at Risk*
			3.4.2	• Staff will be advised to follow protocol es addressing and reporting SAR species th construction area *Operational Constraint Environmental - Prot*

ID#	Environmental Element/Concern and Potential Effects	Concerned Agencies	#	Mitigation / Protection / Monit
				at Risk
3.5	Barn Swallow are present in the vicinity and the Collins Creek Bridges are suitable for nesting.	MNRF CWS	3.5.1	• The Collins Creek structures should be c nests in the year of construction • If Barn Swallow are present, the project v under O. Reg. 242/08 *Operational Constraint Environmental - Prot at Risk*
3.6	Potential habitat for Eastern Meadowlark in the northwest quadrant will be impacted.	MNRF CWS	3.5.2	• A timing restriction for vegetation clearing implemented to reduce the likelihood of c impacts to Eastern Meadowlark - Vegeta restricted between May 1 and July 31, as Regulation (O. Reg.) 242/08 *Operational Constraint – Timing Constraint f*
4.0	**Fish and Fish Habitat**			
4.1	Fish protection at Collins Creek Construction of the abutments and removal of the existing bridge will require a temporary flow passage system. Residual effects of bridge replacement include change in habitat structure and	MTO MNRF DFO CRCA	4.1.1	Environmental protection for construction in waterbody banks includes: – The restricted activity period for in-wa habitat with a warmwater thermal reg June 30 (work is permitted from July – Temporary Flow Diversion - isolation channel from in-water construction ac duration of in-water work whenever p sure that in-water work areas are app – Retain a qualified environmental profe

ID#	Environmental Element/Concern and Potential Effects	Concerned Agencies	#	Mitigation / Protection / Monit
	cover; potential change in nutrient concentrations and temporary change in access to habitat during temporary flow diversion.			sure applicable permits for relocating and to capture any fish trapped within isolated/enclosed area at the work sit relocate them to an appropriate locati waters – Fish may need to be relocated again, occur on the site – Dewatering and the Use of Pumps - s or outlet pipes to prevent entrainment fish – a dewatering management plar implemented as required – The work area in the northwest and n of the bridge will be isolated prior to t period for in-water work to allow work this period – Measures used to isolate the area ca until July 1 – Rock protection is required at the abu extend into the creek. It should be riv free of fines, and sized appropriately flows – No geotextile will be placed within the – Machinery should be operated on lan minimizes disturbance to the banks o *Environmental protection shall be conducted*

ID#	Environmental Element/Concern and Potential Effects	Concerned Agencies	#	Mitigation / Protection / Monit
				Contract Drawings and the following Ontario Standards: *OPSS 182 - General Specification for Enviro Protection for Construction in Waterbodies a Banks* *OPSS 805 - Construction Specification for T and Sediment Control Measures* *OPSS 180 - Management of Excess Materia* *OPSS 185 General Specification for Tempo for Construction in Waterbodies* *OPSS 518 Construction Specification for Co Dewatering Operations* *OPSS 804 Construction Specification for Se*

ID#	Environmental Element/Concern and Potential Effects	Concerned Agencies	#	Mitigation / Protection / Monit
4.2	Debris and other deleterious substances may enter the watercourses as a result of construction and in the event of spills.	MTO MNRF DFO CRCA	4.2.1	Removal of Highway 401 westbound Collins – Appropriate containment system will implemented during the removal of th prevent entry of debris into Collins Cr – The system should accommodate lar fine particulates and monitored to ren appropriately dispose of accumulated – Materials that fall in the water will be minimize disturbance *Operational Constraint Environmental – Equ* *Maintenance and Washing* *Operational Constraint Environmental – Mar* *Effluent from Concrete Cutting/Grinding* *Operational Constraint Environmental – Cor* *During Removal of Concrete/Structure and S* *Repair/Construction*
4.3	The change in habitat structure and cover beside the bridge is permanent. A change in nutrient concentrations may occur due to disturbance to riparian	MTO MNRF DFO CRCA	4.3.1	Removal of riparian vegetation shall be kept help maintain the stability of waterbody bank – Minimize the removal of natural mate herbaceous plants, woody debris, an banks or the shoreline of the waterbo vegetation plantings of native species – Stabilize and reinforce banks to pre-d condition (or better) using properly de installed stabilization measures – if ro

ID#	Environmental Element/Concern and Potential Effects	Concerned Agencies	#	Mitigation / Protection / Monit
	vegetation in the work area and will be short-term since vegetation will re-establish following construction.			armouring is required, ensure that ap clean rock is used, and that rock is in slope to maintain a uniform bank / sh stream / shoreline alignment – Stabilize and re-vegetate (or use othe appropriate to the site conditions) all exposed soil – incorporate temporary biodegradable materials, nurse-crop provide interim stabilization until vege established, where possible *OPSS 182 - General Specification for Enviro Protection for Construction in Waterbodies a Banks* *OPSS 805 - Construction Specification for T and Sediment Control Measures*
4.4	Watercourse 1 and Watercourse 2 support a CRA fishery located downstream of the Highway 401 right-of-way.	MTO MNRF DFO CRCA	4.4.1	• Erosion and sediment control measures for work within 30 m of the watercourses downstream sediment transport during c *OPSS 805 - Construction Specification for T and Sediment Control Measures*
5.0	**Management of Waste/Debris and Excess Materials**			
5.1	Excess earth managed outside the right-of-way as disposable fill may	MTO MOECC	5.1.1	• Excess material will be managed in acco Ontario Provincial Standard Specificatio *Operational Constraint - Management of Ex*

ID#	Environmental Element/Concern and Potential Effects	Concerned Agencies	#	Mitigation / Protection / Monit
	have salt impacts.			*Salt Impacts*
5.2	Construction waste has the potential to contaminate the surrounding environment if not managed properly.	MTO MOECC	5.2.1	• Construction waste should be removed c managed by the Contractor in accordanc standards *OPSS 180 – Management of Excess Materi Management of Effluent from Concrete Cutt OPSS 182 Environmental Protection for Cor Waterbodies and on Waterbody Banks*
5.3	Dust to be generated during construction, which may adversely affect air quality and adjacent wildlife habitat.	MTO MOECC	5.3.1	• Dust control should be completed using l suppressants, and in accordance with M conditions *Operational (Constraint Environmental) – Co during Removal of Concrete, Concrete Repa Concrete Sawcutting*
5.4	Significant rock/earth grading works and vegetation removals within the right-of-way will be required for the new ramps and commuter parking lot.	MTO MNRF	5.4.1	The installation, monitoring, maintenance, a temporary erosion and sediment control mea according to *OPSS 182 and OPSS 805* *Contract documents will emphasize reducing recycling materials generated during constru*

ID#	Environmental Element/Concern and Potential Effects	Concerned Agencies	#	Mitigation / Protection / Monit
6.0	**Erosion and Sediment Controls**			
6.1	Exposed surfaces resulting from clearing and grading can lead to erosion.	MTO MNRF	6.1.1	• Design and implement standard Erosion Control (ESC) measures, consistent with Standards and Specifications (OPSS), to construction zone, manage site drainage erosion of exposed soils and migration o – ESC measures should be implemente commencement of works, and mainta phases of the project, until vegetation and all disturbed ground is permanen – ESC measures should include: regula maintenance, and removal of non-bio materials (i.e., commercial seed mats cloth, etc.) once this site is stabilized – The limits of construction adjacent to to be retained will be fenced prior to c monitored during construction (along erosion control measures) to ensure t maintained with respect to vehicular t equipment stockpiling – In addition to any specified requireme sediment fence should be available o grading operations, to provide a conti the event of an emergency *Environmental protection shall be conducted Contract Drawings and the following Ontario*

ID#	Environmental Element/Concern and Potential Effects	Concerned Agencies	#	Mitigation / Protection / Monit
				Standards *OPSS 182 - General Specification for Enviro Protection for Construction in Waterbodies a Banks* *OPSS 805 - Construction Specification for T and Sediment Control Measures* *OPSS PROV 804 Construction Specification Cover* *OPSS 805 Temporary Erosion and Sedimer*
6.2	Sediment and dust may enter sensitive natural features.	MTO MNRF	6.2.1	• Limit soil erosion and spread of invasive during rehabilitation through installation around work areas and post-construction vegetation with species that are native to encouragement of natural re-vegetation
			6.2.2	• Sediment fencing and/or barriers will be construction areas adjacent to natural ar
			6.2.3	• Materials requiring stockpiling (fill, topsoi stabilized and kept a safe distance (> 30 natural features, drainage features and t
			6.2.4	• Exposed soil areas will be stabilized and through the placement of seed and mulch erosion control blanket within 15 days of days in all other areas) but no later than
			6.2.5	• Refueling of equipment will be carried ou sensitive natural features with the larges (minimum 30 m) to avoid potential impac

ID#	Environmental Element/Concern and Potential Effects	Concerned Agencies	#	Mitigation / Protection / Monit
				an accidental spill occurs
			6.2.6	• Banks of the Collins Creek disturbed dur construction will be re-stabilized to pre-c configuration and condition (or better) us native to the site, where possible
7.0	**Noise**			
7.1	Increased noise impacts are anticipated for nearby residents during construction.	City Local Residents	7.1.1	• Construction equipment is to be in good fully functioning mufflers and shall compl noise emission standards • All equipment shall be restricted to the m time to perform the work
			7.1.2	• Noise sensitive areas will be designated *SSP 199F33, Construction Noise Constraint*
			7.1.3	• A noise complaint protocol will be establi residents have any concerns during cons
7.2	Night-time work will be required to minimize traffic closure impacts on Highway 401 and Kingston Road 38.	City Local Residents	7.2.1	• The City of Kingston Noise By-law (2004 restriction on making construction relate 7:00 p.m. to 7:00 a.m., as well as on Sur holidays
			7.2.2	• An exemption to the City of Kingston Noi sought to permit construction during the 7:00 p.m. to 7:00 a.m. weekdays *SSP 199F31 Environmental Exemptions and*
8.0	**Archaeology**			
8.1	Potential for	MTCS	8.1.1	• If deeply buried archaeological deposits during the Contractor's operations, the M

ID#	Environmental Element/Concern and Potential Effects	Concerned Agencies	#	Mitigation / Protection / Monit
	archaeological finds or remains to be discovered during construction.	Indigenous communities		Culture and Sport should be notified imm near the discovery must be suspended ir
			8.1.2	• If unmarked human remains are encount of the *Funeral, Burial, and Cremation Se* apply. Notification must be made to the C Police, or local police, who will conduct a and contact the District Coroner. Notifica Environmental Planner will occur so that Archaeologist can be informed. Notificati Registrar of Cemeteries, Ministry of Gove Consumer Services shall also be underta
			8.1.3	• Should other cultural heritage values (arc historical materials or features) be identif operations, all activity near the discovery and the MTCS archaeologist contacted *Notice to Contractor – Areas of Archaeologi Archaeological Material* *General Conditions of the Contract*
9.0	**Traffic Operations**			
9.1	Construction is anticipated to take place over 2.5 construction seasons. During construction traffic operations on	MTO Public Businesses EMS OPP OTA	9.1.1	• Provide notification through the provision Ahead" signage as per OTM Book 7 *Temporary Advance Information Signs*
			9.1.2	• A Traffic Management Plan and a Comm be implemented to minimize the impacts provide advance notification to the travel

ID#	Environmental Element/Concern and Potential Effects	Concerned Agencies	#	Mitigation / Protection / Monit
	Highway 401 and Kingston Road 38 will be impacted by lane reductions and short duration ramp closures. Construction and traffic staging have the potential to result in traffic delay through the work zone, including impacts to access for emergency service providers.			advance of lane/ramp closures *Traffic Control Signing*
			9.1.3	• Emergency services, the City of Kingstor Association, residents, and local student services will be notified in advance of the construction regarding the construction s least two weeks in advance of all lane ar *Communications Plan* *Notice to Contractor - Notification Requirem* *Service Providers*
			9.1.4	• Appropriate temporary and advanced sig all construction zones to ensure advance construction activities taking place and w upcoming closures and detours *Operational Constraint – Night Work* *Operational Constraint - Maintenance of Tra* *Operational Constraint - Temporary Lane Cl* *Special Provision - Temporary Traffic Contro* *Special Provision - Protection of Public Traf* *General Conditions in the Contract*

ID#	Environmental Element/Concern and Potential Effects	Concerned Agencies	#	Mitigation / Protection / Monit
9.2	Long Combination Vehicles (LCVs) routinely use the interchange to access truck stops and terminals immediately south of Highway 401.	MTO OTA EMS	9.2.1	• Provide notification through the provision Ahead" signage as per OTM Book 7 • Ontario Trucking Association will be notif the start of construction regarding the co and in advance of all lane and ramp clos movements *Communications Plan* *Notice to Contractor - Notification Requirem* *Service Providers*
9.3	The existing carpool lot will be temporarily closed during construction.	MTO City Public Businesses	9.3.1	• Signage to use alternate locations will be advance of the temporary closure *Advance Information Sign at Existing Lot*
9.4	McIvor Road will be temporarily closed between Kingston Road 38 and Jackson Mills Road during construction.	MTO Public Businesses	9.4.1	• Signage will direct access to Highway 40 Road in advance of the closure *Notice to Contractor - Notification Requirem* *Service Providers*
10.0	**Aesthetics and Landscape**			
10.1	The proposed improvements will result in changes to the surrounding landscape	City MTO Local residents	10.1.1	• Landscape mitigation and enhancement appropriate for the interim improvements contract documents
			10.1.2	• Opportunities for enhancing landscaping

ID#	Environmental Element/Concern and Potential Effects	Concerned Agencies	#	Mitigation / Protection / Monit
	through vegetation clearing and other construction disturbances.			the carpool lot location will be reviewed *Contract Drawings*
11.0	**Groundwater**			
11.1	Dewatering activities may be required for embankment widening at Collins Creek Bridge.	MTO MOECC MNRF	11.1.1	• Conduct dewatering activities in accorda control procedures *OPSS 518*
			11.1.2	• Terms and conditions of Permit to Take V Environmental Activity and Sector Regist adhered to (if permit is required) *SSP 199F31 Environmental Exemptions and*
12.0	**Utilities**			
12.1	Potential for impacts to existing utilities.	MTO City of Kingston Utilities	12.1.1	• Utility relocations will be undertaken in ac construction
			12.1.2	• All existing utilities will be protected as re conflicts or impacts during construction

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5.0 MONITORING

An independent on-site Contract Administrator (CA Consultant) is retained by MTO to confirm that construction proceeds in accordance with the contract documentation, including environmental protection.

An Environmental Synopsis will be developed so that the CA Consultant and the Contractor are made aware of, and are prepared to deal with, environmental issues that may arise during construction. Specific environmental controls based on these mitigation measures will be included in the contract documents and drawings to address environmental concerns during the construction phase.

On-site construction supervisory staff will ensure that environmental protection measures, as outlined in this report and in the contract package, are being implemented and are effective. This includes making sure that the implementation of mitigating measures and key design features is consistent with commitments made to external agencies prior to construction. If protective measures do not address concerns identified or if major problems develop, the appropriate agency will be contacted to provide additional input.

If the impacts of construction are different than anticipated, or that the method of construction is such that there are greater than anticipated impacts, the Contractor's method of operation will be modified to reduce those impacts. Any changes proposed by the Contractor should be thoroughly evaluated to make sure that the intent of the mitigation measures and contract provisions is maintained. The CA Consultant is there to make sure that MTO and appropriate agencies are contacted.