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AECOM Imagine it. Delivered.

Ministry of Transportation (MTO)

Fish and Fish Habitat Preliminary Impact Assessment Report: Hanlon Expressway / Wellington Road 34 Midblock Interchange (GWP No. 3059-20-00)

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1. Introduction

AECOM Canada Limited (AECOM) has been retained by the Ontario Ministry of Transportation (MTO) to undertake a Preliminary Design Review, Detailed Design (to a Design-Build-Ready status) under Class Environmental Assessment (EA) for Provincial Transportation Facilities (2000) for improvements to Highways 6 and 401 in the Township of Puslinch, Wellington County, and the City of Hamilton (GWP 3042-14-00). The planned transportation improvements will provide a better connection between the Highways 6 and 401 corridors which will reduce road congestion, collision potential and associated costs and encourage the utilization of Hanlon Expressway (Highway 6 north of Highway 401) which will support municipal planning initiatives.

The first phase of implementing the GWP 3042-14-00 improvements will include the improvements along Hanlon Expressway north of Highway 401. This first phase, henceforth referred to as the Hanlon Expressway / Wellington Road 34 Midblock Interchange project (GWP 3059-20-00), includes the new Wellington Road 34 flyover structure at Hanlon Expressway, the new interchange on Hanlon Expressway midway between Wellington Road 34 and Maltby Road, and other associated connecting roadways.

This Project will be conducted following the approved environmental planning process for Group 'C' projects in accordance with the *Class Environmental Assessment for Provincial Transportation Facilities* (MTO, 2000).

The purpose of this report is to present the results of the Fish and Fish Habitat Impact Assessment documented by AECOM to fulfill the requirements under the MTO Environmental Guide for Fish and Fish Habitat ("the Guide") (2020a), and the 2020 protocol entitled MTO/DFO/MNRF Protocol for Protecting Fish and Fish Habitat on Provincial Transportation Undertakings, Version 4 ("the Protocol") (2020b), and to provide mitigation measures in accordance with the *Environmental Reference for Highway Design* (ERHD, MTO, 2013) for the proposed works at the Hanlon Expressway / Wellington Road 34 Midblock Interchange sites.

Table 1 (Template D.1) below provides the Latitude and Longitude for the structures assessed under the Protocol in this report.

Table 1: Location of Work Within Fish Habitat (Template D1)

GWP	Waterbody ID	Road/Highway	Municipality	Latitude	Longitude
3059-20-00	401-6-25	Wellington Road 34	Guelph	43.457101	-80.180870
3059-20-00	401-6-26	Wellington Road 34	Wellington County	43.456023	-80.187423
3059-20-00	401-6-27	Wellington Road 34	Wellington County	43.457579	-80.178354
3059-20-00	401-6-30	Concession Road 7	Wellington County	43.464426	-80.176444
3059-20-00	401-6-31	Hanlon Expressway	Wellington County	43.455177	-80.179957

2. Project Description

The purpose of the project is the construction of a new interchange on the Hanlon Expressway between Wellington Road 34 and Maltby Road with new access roads to the interchange from Wellington Road 34 and Concession Road 7. The project also includes construction of a new Wellington Road 34 flyover structure at the existing intersection of Wellington Road 34 and the Hanlon Expressway and widening of the Hanlon Expressway and the existing roadway along Wellington Road 34 and Concession Road 7. The roadway widening of Wellington Road 34 and realignment and minor widening of Concession Road 7 requires culvert replacement and extension – with channel re-alignments/tie-ins to accommodate the extended replacement culverts – including five culverts in watercourses that provide fish habitat. Additionally, the widening of the Hanlon Expressway requires the relocation of the roadside drainage tie-ins at the outlet; however, no culvert work is proposed at this location. Given the proposed works include replacement and installation of drainage culverts that do not provide fish habitat, a summary of only those culverts that provide fish habitat and are subject of this report is provided in **Table 2**. Figures are provided in **Appendix A** which detail the location of each watercourse crossing. Photographs of each location are provided in **Appendix B**.

Table 2: Summary of Proposed Works

Watercourse ID	Structure ID	Watercourse	Summary of Proposed Works
401-6-25	SR-7A	McCrimmons Creek Tributary	- Clearing and grubbing of riparian vegetation to accommodate culvert replacement and extension. o Substantial removal (up to 50%) of riparian trees and vegetation in constrained areas may be required to accommodate the roadside drainage feature parallel to the widened Hanlon Expressway east of 401-6-25. - In-water works proposed. - Works include removal of existing CSP culvert, installation of extended open-foot concrete culvert, and channel realignment/tie-in to the extended culvert.
401-6-26	SR-11	McCrimmons Creek Tributary	- Clearing and grubbing of riparian vegetation to accommodate culvert replacement and extension. - In-water works proposed. - Works include removal of existing CSP culvert, installation of extended concrete box culvert, and channel realignment/tie-in to the extended culvert.
401-6-27	SR-5	McCrimmons Creek	- Clearing and grubbing of riparian vegetation to accommodate culvert replacement and extension. - In-water works proposed. - Works include removal of existing CSP culvert, installation of extended open-foot concrete culvert, and channel realignment/tie-in to the extended culvert.
401-6-30	CR7-1	McCrimmons Creek	- Clearing and grubbing of riparian vegetation to accommodate culvert replacement and extension. - In-water works proposed.

Watercourse ID	Structure ID	Watercourse	Summary of Proposed Works
			- Works include removal of existing CSP culvert, installation of extended open-foot concrete culvert, and channel realignment/tie-in to the extended culvert.
401-6-30	CR7-2	McCrimmons Tributary	- Clearing and grubbing of riparian vegetation to accommodate culvert replacement and extension. - In-water works proposed. - Works include removal of existing CSP culvert, installation of extended open-foot concrete culvert, and channel realignment/tie-in to the extended culvert.
401-6-31	H6-2	McCrimmons Creek	- Clearing and grubbing of riparian vegetation to accommodate drainage tie-ins on either side of the Hanlon Expressway as part of the widening of the highway. - Works include isolation and flow diversion at new drainage channel tie-on locations. No culvert work is proposed at this location.

3. Background Data Collection

Background information on the fish and fish habitat features of the Study Area were obtained through review of existing material from the following sources:

- MNRF Make-a-Map online application tool (MNRF, 2021);
- MNRF Make-a-Map: Land Information Ontario (LIO, 2021);
- MNRF Guelph District Office correspondence (2017, 2021);
- Fisheries and Oceans Canada (DFO) SAR online mapping (DFO, 2021);
- Environmental Assessment and Preliminary Design Report, Freelton Northerly 16.9 km to Guelph (September 1995)
- Transportation Environmental Study Report (TESR) The Preliminary Design and EA for Highway 401 Improvements from Hespeler Road to Halton Region Boundary (GWP 8-00-00) (November 2012)
- GWP 8-00-00 – Highway 401 Preliminary Design and Class Environmental Assessment Study Final Report (June 2014); and,
- Aerial photography (2021).

McCrimmons Creek and its tributaries drain primarily agricultural areas in the northern and western portions of the Study Area. The creek and several of its tributaries have been designated by the MNRF as coldwater streams. The McCrimmons Creek system's fisheries have been surveyed in at least three separate studies since the Hanlon Expressway was completed in 1976 to determine the effects of the highway facility on the watercourse and the need for habitat rehabilitation. Migratory fishes including Brown Trout (*Salmo trutta*) and Brook Trout (*Salvelinus fontinalis*) have been identified within the Study Area.

Reaches of McCrimmons Creek and its tributaries (primarily downstream of the study area) have been subject to extensive rehabilitation efforts by local fishing clubs, the MNRF and others. As part of the supplementary investigations, habitat assessments were conducted throughout the McCrimmons Creek area to document the existing conditions of watercourses potentially affected by proposed highway improvements.

The following fish species are known to occur in McCrimmons Creek: Blacknose Dace, Bluntnose Minnow, Brook Stickleback, Brook Trout, Brown Trout, Central Mudminnow, Common Shiner, Creek Chub, Fathead Minnow, Rainbow Darter, Rock Bass, White Sucker (MNRF, 2021). Additionally, MNRF has identified Brook and Brown Trout spawning habitat within McCrimmons Creek and its tributaries.

A review of the resources listed in Section 2, including DFO's online aquatic SAR mapping tool and MNRF Make-a-Map: Natural Heritage Information, did not identify any aquatic SAR within the Study Area.

A request for available background data associated with the entire Highways 401 and 6 Study Area (GWP 3042-14-00) was submitted to the Guelph district MNRF on April 27, 2017 and updated species information on March 11, 2021. The information request included the following: waterbody types, habitat information/location, fish species present including in-water work timing window, MNRF management objectives, MNRF interpretation of fish and fish habitat sensitivity, presence and location of fisheries, groundwater discharge areas and benthic invertebrate data. The background information collected from the sources listed above, including information provided by from MNRF, has been incorporated into this report. A copy of agency correspondence can be found in **Appendix C**.

4. Fish and Fish Habitat Existing Conditions

Aquatic field investigations were conducted in 2017 and 2018 by AECOM ecologists to complete detailed fish and fish habitat assessments of the watercourses within the Study Area. Fisheries assessments were conducted in accordance with the requirements under the 2016 Protocol; however, the Protocol and Guide was updated in 2020, and as such the data collected has been assessed under the new Protocol as directed by MTO. AECOM ecologists visited the sites to document existing habitat conditions in order to facilitate making a determination on whether or not the proposed works would result in a harmful alteration, disruption or destruction of fish habitat (HADD), or the death of fish, and therefore require a *Fisheries Act Authorization*. Insufficient information was available from the MNRF to characterize the fish community for all watercourses within the Study Area, and as such primary collection of fish community data (i.e., fish community sampling) was conducted by AECOM in 2018. **Table 3** summarizes the fish habitat conditions at each structure based on Template D2A and **Table 4** summarizes the existing fish community at each structure based on Template D2B of the Guide (MTO 2020).

A full description of existing conditions is available in the *Fish and Fish Habitat Existing Conditions Report: Hanlon Expressway / Wellington Road 34 Midblock Interchange (GWP No. 3059-20-00)* (AECOM 2021). Through the background information review, consultation with MNRF and fish habitat and fish community assessments, it was determined that six (6) watercourses were permanent features that provide direct fish habitat. Significant habitat is present at three (3) crossings of McCrimmons Creek and its tributaries (401-6-25, 401-6-27, and 401-6-31) due to the presence of trout spawning habitat and its coldwater thermal regime. No Critical Habitat (SARA) for SAR was identified within the Study Area. A photographic record was documented during the field surveys and is provided in **Appendix B**. Field notes recorded during the fish habitat assessments are provided in **Appendix D**.

4.1 Station 401-6-25 [SR-7A]

This McCrimmons Creek Tributary is a coldwater system (MNRF, 2017) that flows under Wellington Road 34 to its confluence with the main branch of McCrimmons Creek downstream of the crossing.

Within the assessed upstream reach, the watercourse is representative of a naturalized system with a morphology that consists of flats (85%), runs (10%) and pools (5%). At the time of site investigation, the mean wetted width was approximately 1.4 m and the mean wetted depth approximately 0.14 m. Substrates were mainly comprised of detritus, sand, gravel and silt. Banks were slightly unstable and the associated riparian cover was high (60-90% cover), consisting of trees and shrubs. Instream cover (70% total cover) was provided primarily by organic debris (35%), instream woody debris (30%), overhanging woody debris (20%), undercut banks (10%) and boulders (5%). Groundwater upwellings and watercress were observed.

Within the assessed downstream reach, the watercourse is representative of a naturalized system with a morphology that primarily consists off runs (85%) and riffles (15%). At the time of field reconnaissance, the mean wetted width was approximately 1.1 m and the mean wetted depth approximately 0.18 m. Substrates were mainly comprised of clay and gravel. Banks were moderately unstable due to erosion and the associated riparian cover was high (60-90% cover), consisting of trees and shrubs. Instream cover (70% total cover) was provided primarily by undercut banks (40%), woody debris (30%) and organic debris (30%). Groundwater upwellings, watercress and suitable salmonid spawning habitat were observed.

The watercourse is permanent and provides habitat for coldwater species (MNRF 2021). Fish were captured during field investigations. Fish community assemblage can be found in **Table 4**. The assessed reach provides habitat for migration, spawning, feeding and rearing, including Brook Trout (a sensitive species); however, the coldwater

habitat with groundwater upwellings is generally non-limiting throughout the Study Area. According to DFO online mapping (2020), aquatic SAR habitat has not been identified within this watercourse.

4.2 Station 401-6-26 [SR-11]

This unnamed stream is presumed to be a tributary of McCrimmons Creek and flows north to south through a wetland, crossing Wellington Road 34 west of Hanlon Expressway.

Within the assessed upstream reach, the morphology consists of pools (30%), riffles (10%) and runs (10%) flowing through a greater wetland (50%). At the time of field reconnaissance, the mean wetted width of the defined channel was approximately 0.4 m and the mean wetted depth approximately 0.13 m. Substrates were mainly comprised of detritus and muck. Banks were not well defined and the associated riparian cover was moderate (30-60% cover), consisting of common reed, trees and shrubs. Instream cover (80% total cover) was provided primarily by emergent vegetation (90%) and organic debris (10%). Groundwater upwellings, organic oily sheen and iron staining were observed.

Within the assessed downstream reach, the morphology consists of flats (20%) flowing through a greater wetland (80%), with only a partially defined channel visible. At the time of field reconnaissance, the mean wetted width of the defined channel was approximately 0.5 m and the mean wetted depth approximately 0.15 m. Substrates were mainly comprised of detritus and muck. Banks were not well defined and the associated riparian cover was moderate (30-60% cover), consisting of common reed, trees and shrubs. Instream cover (80% total cover) was provided primarily by emergent vegetation (90%) and woody debris (10%). Groundwater upwellings, organic oily sheen and iron staining were observed.

The watercourse is permanent and provides habitat for warmwater species (MNRF 2021). Fish were captured during field investigations. See **Table 4** for the fish community assemblage. The assessed reach provides habitat for fish migration, feeding and rearing. No sensitive or significant habitat was observed. According to DFO online mapping (2020), aquatic SAR habitat has not been identified within this watercourse.

4.3 Station 401-6-27 [SR-5]

This main branch of McCrimmons Creek is a coldwater system (MNRF, 2017) that flows under Wellington Road 34 to its confluence with Mill Creek downstream of the structure.

The upstream reach was not assessed due to property access limitations and was not visible from the ROW.

Within the assessed downstream reach, the watercourse is representative of a naturalized system with a morphology that consists of runs (40%), flats (30%), riffles (15%) and pools (15%). At the time of field reconnaissance, the mean wetted width was approximately 1.5 m and the mean wetted depth approximately 0.25 m. Substrates were mainly comprised of gravel, sand, cobble and silt. Banks were stable and the associated riparian cover was high (60-90% cover), consisting of trees and shrubs. Instream cover (70% total cover) was provided primarily by undercut banks (30%), woody debris (30%), cobble (20%) and organic debris (20%). Groundwater upwellings, watercress and suitable salmonid spawning habitat were observed.

The watercourse is permanent and provides habitat for coldwater species (MNRF 2021). Fish were captured during field investigations. The fish community assemblage can be found in **Table 4**. The assessed reach provides habitat for migration, spawning, feeding and rearing, including Brook Trout (a sensitive species); however, the coldwater habitat with groundwater upwellings is generally non-limiting throughout the Study Area. According to DFO online mapping (2020), aquatic SAR habitat has not been identified within this watercourse.

4.4 Station 401-6-30 [CR7-1 and CR7-2]

The main branch of McCrimmons Creek (CR-1) crosses Concession Road 7 west of Hanlon Expressway and confluences with a small side tributary (CR7-2) within the MTO ROW.

Within the assessed upstream and downstream reaches, the feature consists of a Provincially Significant Wetland (PSW) with no defined channel. Substrates were mainly comprised of detritus and muck. Banks were not defined and the associated riparian cover was moderate (30-60% cover), consisting of common reed, trees and shrubs. Instream cover (80% total cover) was provided primarily by emergent vegetation (90%) and organic debris (10%). Iron staining was observed.

The watercourse is permanent and provides habitat for coldwater species (MNRF 2021). Fish were captured during field investigations. The fish community assemblage can be found in **Table 4**. The assessed reach provides habitat for migration, spawning, feeding and rearing, including Brook Trout (a sensitive species); however, the coldwater habitat with groundwater upwellings is generally non-limiting throughout the Study Area. According to DFO online mapping (2020), aquatic SAR habitat has not been identified within this watercourse.

4.5 Station 401-6-31 [H6-2]

This main branch of McCrimmons Creek crosses the Hanlon Expressway at the southern limit of the Study Area south of Wellington Road 34.

The downstream reach could only be assessed for approximately 10 m within the ROW due to property access limitations. Within the assessed downstream reach, the watercourse is representative of a naturalized system with a morphology that consists of runs (50%), flats (40%), and riffle (10%). At the time of field assessment, the mean wetted width was approximately 1.3 m with a bankfull depth of 1.5 m and a mean wetted depth of 0.15 m and bankfull depth of 0.45 m. Substrates were mainly comprised of sand with lesser amounts of clay, and cobble and gravel with sparse boulders at the culvert outlet. Banks were slightly unstable with undercut banks and the associated riparian cover was high (60-90% cover), consisting of herbaceous vegetation and vascular macrophytes at the culvert outlet and trees and shrubs further downstream. Instream cover (90% total cover) was provided primarily by instream vascular macrophytes (50%), undercut banks (30%), and cobble (10%). Groundwater upwellings, watercress and suitable salmonid spawning habitat were observed

The upstream reach was not assessed due to property access limitations and was not visible from the ROW. The watercourse is permanent and provides habitat for coldwater species (MNRF 2021). The fish community assemblage is the same as 401-6-27 and can be found in **Table 4.** According to DFO online mapping (2020), aquatic SAR habitat has not been identified within this watercourse.

Table 3: Existing Fish and Fish Habitat Conditions Summary Table (Template D2A)

Waterbody ID	Date	Flow	Thermal Regime*	Fish Habitat*	Substrate Type	Channel Morphology	Vegetation	Constraints & Opportunities	Significant Fish Habitat
Station 401-6-25 McCrimmons Creek Tributary	25-Jul-17	Permanent	Cold	Direct	Clay, gravel, boulder, sand, silt, detritus	Upstream: Flats (85%) Runs (10%) Pools (5%) Downstream: Runs (85%) Riffles (15%)	Watercress	None	Trout spawning habitat*
Station 401-6-26 McCrimmons Creek Tributary	26-Jul-17	Permanent	Warm	Direct	Muck, detritus	Upstream: Greater wetland (50%) Pools (30%) Riffles (10%) Runs (10%) Downstream: Greater wetland (80%) Flats (20%)	Cattails	None	Groundwater upwelling
Station 401-6-27 McCrimmons Creek	27-Jul-17	Permanent	Cold	Direct	Silt, sand, clay, cobble, gravel, detritus	Downstream: Runs (40%) Flats (30%) Riffles (15%) Pools (15%).	Watercress	None	Trout spawning habitat*
Station 401-6-30 McCrimmons Creek and Tributary	25-Jul-17	Permanent	Cold	Direct	Muck, silt, detritus	N/A	Cattails	Mill Creek Puslinch Wetland Complex PSW	None
Station 401-6-31 McCrimmons Creek	26-Jul-17	Permanent	Cold	Direct	Sand, clay, cobble, gravel, boulder	Downstream Run (50%) Flats (40%) Riffle (10%)	Watercress, Cattails	None	Trout spawning habitat*

*Information provided by MNRF (2021).

Table 4: Existing Fish Community Summary Table (Template D2B)

Waterbody ID	Fish Species Present	Year Class(es)	Species at Risk Present	In-water Works Timing Window*
401-6-25 McCrimmons Creek Tributary	Blacknose Dace, Bluntnose Minnow, Brook Stickleback, Brook Trout, Brown Trout, Central Mudminnow, Common Shiner, Creek Chub, Fathead Minnow, Rainbow Darter, Rock Bass, White Sucker (MNRF, 2021)	All	None	July 16 - Sept 30
401-6-26 McCrimmons Creek Tributary	Central Mudminnow (AECOM, 2018)	Adult	None	July 16 - Sept 30
401-6-27 McCrimmons Creek	Blacknose Dace, Bluntnose Minnow, Brook Stickleback, Brook Trout, Brown Trout, Central Mudminnow, Common Shiner, Creek Chub, Fathead Minnow, Rainbow Darter, Rock Bass, White Sucker (MNRF, 2021) Brook Trout, Brown Trout (AECOM, 2018)	All	None	July 16 - Sept 30
401-6-30 McCrimmons Creek and Tributary	Blacknose Dace, Bluntnose Minnow, Brook Stickleback, Brook Trout, Brown Trout, Central Mudminnow, Common Shiner, Creek Chub, Fathead Minnow, Rainbow Darter, Rock Bass, White Sucker (MNRF, 2021)	N/A	None	July 16 - Sept 30
401-6-31 McCrimmons Creek	Blacknose Dace, Bluntnose Minnow, Brook Stickleback, Brook Trout, Brown Trout, Central Mudminnow, Common Shiner, Creek Chub, Fathead Minnow, Rainbow Darter, Rock Bass, White Sucker (MNRF, 2021)	All	None	July 16 - Sept 30

*Provided by DFO (2021).

5. Impact Assessment

The following provides a summary of the proposed activities in or near water identified under the current scope of work. For additional detail, refer to the Design Build Ready design drawings.

5.1 Description of Proposed Works

5.1.1 Coldwater Culvert Locations

Below is an overview of activities proposed at each culvert location.

5.1.1.1 401-6-25 [SR-7A]

- Culvert replacement with extension (CSP to open-bottom culvert to restore groundwater connectivity and improve Brook Trout spawning habitat)
- Natural Channel tie-ins
- Substantial Riparian vegetation removal (up to 50% of the riparian cover to accommodate the highway widening)
- Grading with the associated road widening
- Highway resurfacing

5.1.1.2 401-6-27 [SR-5]

- Culvert replacement with extension (CSP to open-bottom culvert to restore groundwater connectivity and improve Brook Trout spawning habitat)
- Natural Channel tie-ins
- Riparian vegetation removal
- Grading with the associated road widening
- Highway resurfacing

5.1.1.3 401-6-30 [CR7-1 and CR7-2]

- Culvert replacement with extension (CSP to open-bottom culvert to restore groundwater connectivity and improve Brook Trout spawning habitat)
- Culverts will be shifted to match the proposed road alignment
- Natural Channel tie-ins and natural channel restoration where the culvert has been shifted
- Riparian vegetation removal
- Grading with the associated road widening
- Highway resurfacing

5.1.1.4 401-6-31 [H6-2]

- Ditch tie-ins at McCrimmons Creek
- No culvert work proposed

A summary of the existing and proposed culverts is provided in **Table 5**.

5.1.2 Warmwater Culvert Location 401-6-26 [SR-11]

- Culvert replacement with extension (CSP to closed-bottom box culvert)
- Natural Channel tie-ins
- Riparian vegetation removal
- Grading with the associated road widening
- Highway resurfacing

A summary of the proposed works is provided in **Table 5**.

Table 5: Proposed Works

Waterbody ID/Crossing # /Station	Existing Structure				New Structure				Proposed Work
	Type	Length (mm)	Width (mm)	Height (mm)	Type	Length (mm)	Width (mm)	Height (mm)	
401-6-25 (SR-7A)	CSP	24410	1000	1000	Non-Rigid Frame Open (NRFO)	52000	2500	1500	Culvert replacement with extension to be installed along this McCrimmons Creek Tributary. The new culvert will incorporate provisions to enhance fish habitat. Replacement culvert extension of ~30 m; however, the open-bottom restores~36.6 m^2 of habitat with native substrates and a groundwater connection.
401-6-26 (SR-11)	CSP	19000	450	450	Conc. Box	28000	1200	910	Culvert replacement with extension to be installed along this McCrimmons Creek Tributary. The new culvert will incorporate provisions to enhance fish habitat. Replacement culvert extension of ~11 m; however, the widening of

Waterbody ID/Crossing # /Station	Existing Structure				New Structure				Proposed Work
	Type	Length (mm)	Width (mm)	Height (mm)	Type	Length (mm)	Width (mm)	Height (mm)	
									culvert provides ~14.25 m of habitat.
401-6-27 (SR-5)	CSP	20150	1000	1000	NRFO	38000	2930	1500	Culvert replacement with extension to be installed along McCrimmons Creek. The new culvert will incorporate provisions to enhance fish habitat. Replacement culvert extension of ~20 m; however, the open-bottom restores 38.9 m^2 of habitat with a groundwater connection.
401-6-30	CSP (CR7-1) CSP (CR7-2)	12150 12150	1000 450	1000 450	NRFO NRFO	22000 22000	1800 1200	1200 1200	Culvert replacements with extension to be installed along McCrimmons Creek and the small tributary. The new culverts will incorporate provisions to enhance fish habitats. Replacement culvert extensions of ~12 m for both; however, the open-bottom restores 9.72m^2 of habitat at CR7-1 and 9.11 m^2 of habitat at CR7-2 with a groundwater connection.

5.2 MTO Routine Works

Project activities were assessed against the list of MTO Routine Works in Table 2 of the *MTO/DFO/MNRF Protocol for Protecting Fish and Fish Habitat on Provincial Transportation Undertakings* – Version 3, 2016. Routine works are those within the MTO ROW, which includes the shoulders and paved area that do not occur within the waterbody and can be mitigated to prevent sediment / debris from entering into an aquatic feature. Proposed works associated with drainage (where no in-water work is proposed within fish habitat), electrical, signage, and pavement resurfacing are all covered by MTO Routine Works. Activities such as culvert replacement with

extensions, grading within 30 m of a water, riparian vegetation removal, ditch tie-ins, etc., have all been carried forward to Step 3.

5.3 MTO Best Management Practices

Project activities for all the culvert replacements with extension in fish habitat were assessed against the MTO Best Management Practices (BMP) Manual for Fisheries (MTO, 2020) to determine which activities can be addressed by BMPs as per Step 3 in the Protocol. Application of BMPs requires adherence to the Operational Constraints and Protection Measures identified in each BMP. Certain conditions and provisions are outlined in each BMP (e.g. work must be completed within the allowable in-water work timing window, etc.) which must be met in order to remain in compliance. Applicable notification procedures are required for use of BMPs. **Table 6** summarizes the activities carried forward from Step 2 and the applicable BMP.

Table 6: Summary of Construction Activity and Associated BMP

Activity	Associated BMP
Vegetation removal within the road ROW to accommodate the culvert replacement and extension	Maintenance of Riparian Vegetation in Existing Right-of-Way BMP
Vegetation removal within the highway ROW to accommodate the highway widening along the Tributary to McCrimmons Creek (401-6-25)	No, as more than 1/3 of the wood riparian vegetation will be removed to accommodate the road widening
Culvert removal and replacement	None

There is no applicable BMP for the proposed culvert replacement and extension; therefore, these proposed works and the riparian vegetation removal along 401-6-25 will be carried forward for a full impact assessment.

5.4 Fisheries Assessment Protocol

Step 4 of the Protocol is a Fisheries Assessment Process which applies to project activities that may have an impact on fish habitat and that do not qualify as MTO Routine Works (Step 1) nor meet the conditions of the MTO Best Management Practices Manual for Fisheries (Step 3).

5.4.1 Potential Impacts

The proposed activities associated with the work described in **Section 5.1** that did not meet the MTO Routine Works or Fisheries BMP requirements have been assessed to determine the potential impacts to the fish and fish habitat. Potential impacts to fish habitat have been identified using the Pathway of Effects (PoE) diagrams provided in the Guide. The PoE diagrams are used to display how activities may impact the aquatic environment, and to determine the mitigation and protection measures that would be required to minimize or avoid these impacts. This is accomplished through the use of pathways, stressors and residual effects flow charts, and has been developed for both in-water and land-based construction activities.

5.4.2 Pathways of Effects Assessment

The following is a summary of the potential negative effects on fish and fish habitat which may result from activities associated with the proposed work that is applicable to all works described in **Section 5.1** unless specifically noted. The Aquatic Effects Assessment Table (Template D3) is provided in **Appendix E**.

Land-based Activities

- Use of industrial equipment may result in alterations to contaminant concentrations from fuel or fluid leaks. An increase in sediment may result from increased erosion potential where industrial equipment has exposed and loosened soils. Cleaning or maintenance of structures may result in changes to contaminant and sediment concentrations if wash water is allowed to enter a waterbody.
- Vegetation clearing may result in alterations to sediment concentrations and habitat structure and cover as a result of increased erosion potential and sediment deposition. Changes in food supply and nutrient concentrations may result from the loss of external inputs with a reduction in riparian vegetation. The use of herbicides may result in changes to contaminant concentrations.
  - Due to the proximity of the roadside drainage feature (401-6-24) west of the Hanlon Expressway parallel to the culvert crossing at station 401-6-25, tree and other vegetation removal to relocate the drainage feature to accommodate the roadway widening may result in removal of more than 1/3 of the riparian vegetation along watercourse.
- Grading may result in alterations to sediment concentrations and habitat structure and cover as a result of increased erosion potential and sediment deposition.

In-water Activities

- Placement of material or structures in water can result in changes in channel or shoreline morphology, aquatic macrophytes, and substrate composition. This can lead to changes in sediment concentration, habitat structure and cover, food supply, nutrient concentrations and may result in direct or indirect fish mortality.
- Removal of aquatic vegetation may result in changes in dissolved oxygen concentrations, food supply, nutrient concentrations, habitat structure and cover, sediment concentrations or contaminant concentrations as a result of the release of sediment, nutrient inputs, habitat and light penetration.
- Use of industrial equipment below the HWM could result in fish mortality, as well as alterations to sediment concentrations from the release of sediment or an increase in contaminant concentrations from fluid leaks from equipment.
- The installation of in-water work isolations measures may result in the incidental entrainment and potential mortality of fish and limit access for fish to habitats.
- Any dewatering and pumping of isolated in-water work areas could displace or kill fish, change access to and composition of habitat features. Alterations to flows could increase erosion and scour potential and result in alterations to temperatures and concentrations of sediment, food, contaminants or nutrients; and, water extraction using pumps could result in fish mortality by entrainment in pumps and machinery.
- Improper management of wastewater can result in a change in water temperature, change in migration access to habitat, change of dissolved oxygen concentration, change in nutrient concentrations change in contaminant concentrations and introduction of pathogens, disease vectors and exotics.
- Alterations to flows could increase erosion and scour potential and result in alterations to temperatures and concentrations of sediment, food, contaminants or nutrients.

- Changes to fish passage could result in changes in water chemistry/temperature and flow alternation which may lead to incidental entrainment, impingement or mortality of resident species and changes to habitat access.
- Structure removals could result in changes to channel morphology or shoreline morphology and habitat structure or cover.

5.5 Mitigation

The following is a description of design and mitigation measures prescribed in the Mitigation Measures Master Table in Section 5: Impact Assessment and Mitigation of the Guide (2020) designed to mitigate or avoid the potential negative effects identified above. These measures shall be incorporated in the contract documents.

5.5.1 Site Specific Mitigation Measures

The following mitigation and protection measures shall be incorporated into the work plan. Associated Ontario Provincial Standard Specifications (OPSS) and MTO Central Region Special Provisions (SP) are listed in **Section 5.7**.

Operational Constraints

- Access to waterbodies and banks shall be limited to protect riparian vegetation and to minimize bank disturbance; and
- In-water work below the HWM and work on watercourse banks shall be carried out during the appropriate timing window:
  - Permitted in-water timing window of July 16 – September 30 (i.e., no in-water work is permitted from October 1 – July 15).

Management Practices and Controls

- The Design Builder will complete an Erosion and Sediment Overview Risk Assessment (ESORA) and a two part main and supplemental Erosion and Sediment Control plan to contain/isolate exposed soils, stockpiled materials and unstable areas in the work zone and to prevent the release of sediment to all waterbodies and ensure the work site is stabilized prior to removal of ESC measures following construction (as per OPSS 805). Site-specific ESC plans should be developed for each watercourse crossing where work is proposed within 30 m of a watercourse.
- Design and implement an in-water work area isolation plan to maintain clean flow around the work area where in-water work is proposed (as per OPSS 805 and OPSS 517). The design shall:
  - Use only clean materials free of particle matter for temporary cofferdams;
  - Manage flow withdrawal and discharge to prevent erosion and the release of sediment to a waterbody; and
  - Ensure work zones are stabilized against high flows at the end of each work day.
- Design and install culverts to prevent creation of barriers to fish movement and maintain bankfull channel functions and habitat functions to the extent possible. Where permanent in-water structures are placed in fish habitat, naturalize these areas by placing river stone below the 2-year HWM (as per OPSS 825 and 1005). Design and install in-stream cover to replace or re-instate fish cover removed, altered or disturbed during construction.

- As per OPSS 182, any fish isolated in the work area shall be transferred (using appropriate capture, handling and release techniques to prevent harm and minimize stress) downstream or away from the construction area. Fish screens shall be used to avoid entrainment of fish in pumps or hoses.
- Design and implement a work area containment plan to isolate all above-water work to prevent the release of sediment or other contaminants to a waterbody (as per OPSS 517). The design shall include regular inspection, repair, removal and disposal of isolation measures and materials. Work zones should be clearly delineated prior to works to avoid the unintentional intrusions into nearby natural area.
- Where possible, organic material barriers (i.e., fibre roll barrier, sediment log, coir rolls etc.) shall be used in the drainage ditches to mitigate sediment transport;
- Materials used or generated during construction (i.e., organics, soil, woody debris, temporary stockpiles, construction debris, etc.) shall be stored and managed in a way that prevents the release of these materials to a waterbody. This shall include storing materials a safe distance from a waterbody (i.e., greater than 30 m from any watercourse) and/or isolation measures (as per OPSS 182);
- Dewatering operations shall be managed to prevent erosion or the release of sediment-laden water to a waterbody (as per OPSS 805);
- A Spills Management Plan shall be prepared and shall include materials, instructions, education and emergency numbers. The plan shall be kept onsite at all times, communicated to work crews and be properly implemented in the event of accidental spills (Spill Prevention and Response Contingency Plan as per OPSS 182); and,
- Operate, store and maintain equipment and associated materials in a manner and at a distance that prevents the entry of any deleterious substance from entering a waterbody (as per OPSS 182). Any part of equipment entering the waterbody or operating from the bank shall be cleaned, free of fluid leaks and in good working condition.

- Isolated in-water work areas must be cleared of fish prior to commencement of work. Fish must be released unharmed downstream. Intakes of pumps and hoses for de-watering of in-water work areas shall be screened to avoid impingement and/or entrainment of fish (as per OPSS 182).

Rehabilitation

- Re-stabilize any portion of the bed of a waterbody disturbed during construction to pre-construction conditions (or better). This shall include substrates (as per OPSS 182 and OPSS 1005). Design details within this report as they relate to any in channel rehabilitation will be updated by the design builder in detail design stage;
- Re-stabilize the banks of a waterbody that have been disturbed during construction to pre-construction conditions or better (as per OPSS 182 and OPSS 804). This shall include riparian vegetation or stone material, temporary measures and the avoidance of hard engineering; and
- Re-stabilize and re-vegetate soils exposed or disturbed during construction, including new or cleaned-out ditches (as per OPSS 182).
- A landscape planting plan for the east side of 401-6-25 (the reach adjacent to the highway) will be developed to restore riparian cover along the coldwater stream. The plan will include trees and shrubs large enough to immediately restore 50% riparian cover on the east side (for a total riparian cover of 75%) and should be developed by a Landscape Architect with inputs from a terrestrial biologist.

Monitoring

- In-water and near-water work shall be monitored daily to ensure mitigation measures are properly implemented, functioning, maintained and repaired as needed, and removed following construction (as per OPSS 182); and,
- Erosion and Sediment Control in accordance with MTO NSSP (OPSS 805 and SP805F01).

5.6 Environmental Provisions

The following OPSSs and MTO Central Region SPs are recommended for inclusion in the contract documents.

- Environmental Protection During Work in Watercourses and on Watercourse Banks in accordance with OPSS 182;
- Temporary Erosion and Sediment Control Measures in accordance with OPSS 805 and Erosion and Sediment Control in accordance with MTO NSSP (OPSS 805 and SP805F01);
- Environmental Incident Management Under Legislation Protecting the Environment and Natural Resources in accordance with OPSS 100;
- Management of Excess Materials in accordance with OPSS 180;
- General Environmental Protection in accordance with MTO NSSP;
- Maintenance of Existing Drainage in accordance with MTO NSSP;
- Spill Prevention and Response Contingency Plan in accordance with MTO NSSP;
- Timing of in-water Work in accordance with SSP101F23;
- Construction Specification for Dewatering in accordance with OPSS 517;
- Placement of Aggregates in Waterbodies in accordance with OPSS.PROV 825; and
- Material Specification for Aggregates – Streambed Material with OPSS.PROV 1005.

Design considerations tables were prepared for the proposed works at each crossing and are presented in **Table 7** to **Table 10** below.

Table 7: Design Considerations Table for Station 401-6-25 and 401-6-27

Factors to Consider	Design Considerations Provided by the Fisheries Assessment Specialist	Describe How Each Factor Was Addressed Through Design
In-water Works Timing Window	Confirmed by MNRF that the watercourse is considered coldwater. Timing Window where work can occur is July 16 – September 30. In-water work is required at McCrimmons Creek (401-6-27) and the McCrimmons Creek Tributary (401-6-25).	The construction schedule and in-water work will be planned in order to comply with the in-water work timing window.
Fish Passage	Migratory fish present include Brook Trout and Brown Trout. Currently no fish impediments are present within McCrimmons Creek or the McCrimmons Creek Tributary.	Timing restrictions for in-water works shall be implemented to protect the sensitive life stages/processes of migratory and resident fish.

Factors to Consider	Design Considerations Provided by the Fisheries Assessment Specialist	Describe How Each Factor Was Addressed Through Design
	Replacement works will maintain or improve fish passage through the site.	Fish screens shall be used to avoid entrainment of fish in pumps or hoses.
Significant Fish Habitat	The assessed reaches provide habitat for migration, spawning, feeding and rearing and is contains sensitive spawning areas. No habitat classified as critical by the *Species at Risk Act* (SARA) was identified.	Timing restrictions for in-water works shall be implemented to protect the sensitive life stages/processes of migratory and resident fish.
Constraints and Opportunities	Incorporation of design best management practices (BMPs) for culvert works (e.g. refuge pools, low-flow channels, etc.).	Natural channel design tie-ins at culvert inlet and outlet. Culverts sized to bankfull width and to meet hydraulic requirements.
Other considerations	Stream bed protection will consist of native material where possible and any rock protection below the highwater mark will consist of round riverstone in accordance with OPSS1005 and NSSP008. Should the substantial removal (up to 50%) of woody riparian vegetation east of station 401-6-25 be proposed in detail design, a replanting plan should be developed and implemented to restore cover for McCrimmons Creek. Aquatic invasive species have been found within the Study Area (*Phragmites australis).*	Authorization under the Fisheries Act may be required to undertake works that may impact Brook Trout and Brown Trout. The replanting plan will restore 50% of the removed cover immediately upon completion of the grading works along station 401-6-25 by planting suitable native trees and shrubs and reseeding the riparian area; thus restoring the area to 75% total riparian cover immediately and eventually 100% as the younger vegetation grows.

Table 8: Design Considerations Table for Station 401-6-26

Factors to Consider	Design Considerations Provided by the Fisheries Assessment Specialist	Describe How Each Factor Was Addressed Through Design
In-water Works Timing Window	Confirmed by MNRF that the watercourse is considered warmwater. Timing Window where work can occur July 16 – September 30. In-water work is required at this McCrimmons Creek Tributary.	The construction schedule and in-water work will be planned in order to comply with the in-water work timing window.

Factors to Consider	Design Considerations Provided by the Fisheries Assessment Specialist	Describe How Each Factor Was Addressed Through Design
Fish Passage	Currently no fish impediments are present within McCrimmons Creek Tributary. Replacement works will maintain or improve fish passage through the site.	Timing restrictions for in-water works shall be implemented to protect the sensitive life stages/processes of migratory and resident fish. Fish screens shall be used to avoid entrainment of fish in pumps or hoses.
Significant Fish Habitat	The assessed reaches provide habitat for migration, spawning, feeding and rearing and is contains sensitive spawning areas. No habitat classified as critical by the *Species at Risk Act* (SARA) was identified.	Timing restrictions for in-water works shall be implemented to protect the sensitive life stages/processes of migratory and resident fish.
Constraints and Opportunities	Incorporation of design best management practices (BMPs) for culvert works (e.g. refuge pools, low-flow channels, etc.).	Natural channel design tie-ins at culvert inlet and outlet. Culverts sized to bankfull width and to meet hydraulic requirements.
Other considerations	Should stream bed protection be proposed in detail design, it should consist of native material where possible and any rock protection below the highwater mark should be round riverstone in accordance with OPSS1005 and NSSP008. Aquatic invasive species have been found within the Study Area (*Phragmites australis).*	Review under the Fisheries Act may be required to undertake works that may impact fish and fish habitat. Replanting plan will revegetate exposed soils and areas cleared to facilitate the replacement culvert installation within the ROW.

Table 9: Design Considerations Table for Station 401-6-30

Factors to Consider	Design Considerations Provided by the Fisheries Assessment Specialist	Describe How Each Factor Was Addressed Through Design
In-water Works Timing Window	Confirmed by MNRF that the watercourse is considered coldwater. Timing Window where work can occur is July 16 – September 30. In-water work is required at McCrimmons Creek and the small tributary.	The construction schedule and in-water work will be planned in order to comply with the in-water work timing window.

Factors to Consider	Design Considerations Provided by the Fisheries Assessment Specialist	Describe How Each Factor Was Addressed Through Design
Fish Passage	Migratory fish present include Brook Trout and Brown Trout. Currently no fish impediments are present within McCrimmons Creek or the small tributary. Replacement works will maintain or improve fish passage through the site.	Timing restrictions for in-water works shall be implemented to protect the sensitive life stages/processes of migratory and resident fish. Fish screens shall be used to avoid entrainment of fish in pumps or hoses.
Significant Fish Habitat	The assessed reaches provide habitat for migration, spawning, feeding and rearing and is contains sensitive spawning areas. No habitat classified as critical by the *Species at Risk Act* (SARA) was identified.	Timing restrictions for in-water works shall be implemented to protect the sensitive life stages/processes of migratory and resident fish.
Constraints and Opportunities	Incorporation of design best management practices (BMPs) for culvert works (e.g. refuge pools, low-flow channels, etc.). Mill Creek Puslinch Wetland Complex is a PSW found within the Study Area.	Natural channel design tie-ins at culvert inlet and outlet. Culverts sized to bankfull width and to meet hydraulic requirements. This area needs to be protected during the construction phase of the project. Design considerations shall be incorporated during detailed design and mitigation measures shall be implemented prior to and during the construction to ensure no harm occurs to this significant feature.
Other considerations	Should stream bed protection be proposed in detail design, it should consist of native material where possible and any rock protection below the highwater mark should be round riverstone in accordance with OPSS1005 and NSSP008. Aquatic invasive species have been found within the Study Area (*Phragmites australis).*	Authorization under the Fisheries Act may be required to undertake works that may impact Brook Trout and Brown Trout. Replanting plan will revegetate exposed soils and areas cleared to facilitate the replacement culvert installation within the ROW.

Table 10: Design Considerations Table for Station 401-6-31

Factors to Consider	Design Considerations Provided by the Fisheries Assessment Specialist	Describe How Each Factor Was Addressed Through Design
In-water Works Timing Window	Confirmed by MNRF that the watercourse is considered coldwater. Timing Window where work can occur is July 16 – September 30. In-water work is required at this reach of McCrimmons Creek.	The construction schedule and in-water work will be planned in order to comply with the in-water work timing window.
Fish Passage	Migratory fish present include Brook Trout and Brown Trout. Currently no fish impediments are present within the McCrimmons Creek. Tie-in works will maintain fish passage through the site.	Timing restrictions for in-water works shall be implemented to protect the sensitive life stages/processes of migratory and resident fish. Fish screens shall be used to avoid entrainment of fish in pumps or hoses.
Significant Fish Habitat	The assessed reaches provide habitat for migration, spawning, feeding and rearing and is contains sensitive spawning areas. No habitat classified as critical by the *Species at Risk Act* (SARA) was identified.	Timing restrictions for in-water works shall be implemented to protect the sensitive life stages/processes of migratory and resident fish.
Constraints and Opportunities	Mitigate for increased roadway runoff flow at new drainage channel tie-in locations.	The drainage plan will implement flat bottoms and flow control features in the drainage channels to manage flow and turbidity entering receiving watercourse.
Other considerations	Stream bed protection will consist of native material where possible and any rock protection below the highwater mark will consist of round riverstone in accordance with OPSS1005 and NSSP008. Should the substantial removal (up to 50%) of woody riparian vegetation east of station 401-6-25 be proposed in detail design, a replanting plan should be developed and implemented to restore cover for McCrimmons Creek. Aquatic invasive species have been found within the Study Area (*Phragmites australis).*	Authorization under the Fisheries Act may be required to undertake works that may impact Brook Trout and Brown Trout.

5.7 Determination of HADD

Following the completion of the impact assessment (including the identification of environmental protection and mitigation measures), it was determined that the potential negative residual effects of the proposed works can be avoided or mitigated. Provided environmental protection and mitigation measures are properly implemented, monitored and are maintained for effectiveness for the duration of construction, it is anticipated that the harmful alteration, disruption or destruction of fish habitat is unlikely. These works and their associated residual effects, both negative and positive, are discussed below.

For the coldwater watercourses, the proposed works will result a permanent alteration of habitat at culvert crossings stations 401-6-25, 401-6-27, and 401-6-30. The existing CSP culverts will be replaced with open-bottom concrete culverts, which will restore groundwater connectivity, add natural streambed material, and provide an overall improvement of Brook Trout and Brown Trout habitat. Fish within the isolated work areas for the proposed culvert replacements with extension will be captured and relocated out of the isolated work area and live released downstream prior to commence of construction. Natural channel design will be used to tie-in the existing watercourse to new culvert inlets and outlets to provide long-term stability. Culverts have been sized with inputs from both drainage engineers and a fluvial geomorphologist to ensure the maintenance of a low-flow channel. Where shifting of the culvert locations is required (Station 401-6-30), the area will be restored following natural channel design principles.

For the warmwater watercourse, the proposed works will result in the permanent alteration of culvert crossings at station 401-6-26. The existing CSP culvert will be replaced with a box culvert that will be countersunk to a minimum of 10% of the culvert height to ensure fish passage and allow mobilization of native substrate material into the culvert. Natural channel design will be used to tie-in the existing watercourse to new culvert inlets and outlets to provide long-term stability. Culverts have been sized with inputs from both drainage engineers and a fluvial geomorphologist to ensure the maintenance of a low-flow channel.

5.8 ESA and SARA Approvals and/or Permits

No aquatic SAR that are afforded protection under SARA or ESA are known to occur in the Study Area. Consequently, permits under SARA and ESA are not required for the proposed works.

5.9 Potential Fish Habitat Enhancement or Offsetting Opportunities

MNRF did not provide any potential fish habitat enhancement or offsetting opportunities during correspondence from 2018 to 2019. However, fish habitat enhancement/offsetting opportunities have been included where in-water works are proposed. From a review of proposed works, the design considerations for the coldwater watercourses outlined in **Table 7**, **Table 9**, and **Table 10** identified potential fish habitat enhancements that could include the provision of utilizing native stream bed material where possible. Any rock protection below the highwater mark should be round riverstone in accordance with OPSS1005 and OPSS 825. Additionally, culvert works should be designed in away that maintain and restore groundwater upwellings to provide ground to surface water connection for Brook and Brown Trout spawning and will incorporate natural channel tie-ins.

The design considerations for the warmwater watercourse outlined in **Table 8** identified potential fish habitat enhancements that could include the provision of utilizing native stream bed material where possible. Any rock protection below the highwater mark should be round riverstone in accordance with OPSS1005 and OPSS 825.

6. Conclusions

Six (6) watercourse crossings were assessed as part of this impact assessment. Through the background information review, consultation with MNRF and the 2017-2018 fish and fish habitat field investigations, it has been determined that McCrimmons Creek and its tributaries within the Study Area are permanently flowing, coldwater (401-6-25, 401-6-27, 401-6-30, and 401-6-31) and warmwater (401-6-26) features that support a diverse fish community including sensitive spawning habitat for trout species. A Request for Review (RfR) was submitted to DFO for review of the proposed works under the *Fisheries Act* based on the initial design, to which DFO issued a Letter of Advice (LOA). Within the LOA, the permitted in-water work timing window, as determined by DFO, for all proposed in-water works is July 16 – September 30 (i.e., no in-water work is permitted from October 1 – July 15). Further consultation with DFO is underway to incorporate a few recent design changes into the LOA that were not included in the original RfR submission. These design changes have been captured and addressed in this Preliminary Impact Assessment. The draft DFO LOA is provided in **Appendix F**.

No Critical Habitat (SARA) or aquatic SAR that are afforded protection under SARA or ESA are known to occur in the Study Area. Consequently, permits under SARA and ESA are not required for the proposed works.

Construction activities not covered by MTO Routine Works (**Section 5.2**) and MTO BMPs (**Section 5.3**) were carried forward to Step 4 of the Fisheries Assessment Process. AECOM Fisheries Biologists certified in the MTO Registry, Appraisal and Qualification System (RAQS) as Fisheries Assessment Specialists have assessed the potential negative impacts of the proposed work and recommended appropriate mitigation measures to avoid or negate these impacts (**Section 5.5**). Although a permanent alteration of fish habitat is anticipated from the proposed works at the replacement culvert locations, the open-bottom replacement culverts will restore groundwater connectivity, add natural streambed material, and provide an overall net improvement of Brook Trout and Brown Trout habitat, while the box culvert replacement was designed to maintain fish passage and will be countersunk and backfilled with native substrate. The Hanlon Expressway drainage channel tie-ins relocation will require a temporary alteration to divert flows and connect the drainage channels at their new locations. The Fish and Fish Habitat Impact Documentation (Template D4) is provided in **Appendix G**.

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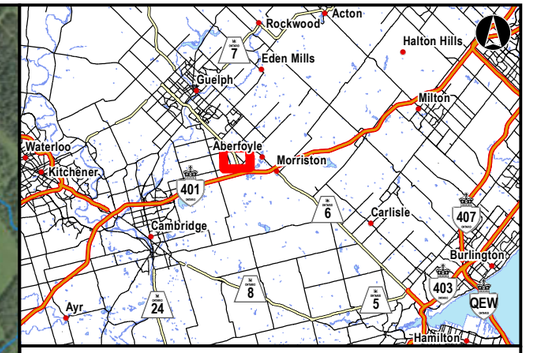
Appendix A

Figures



Legend

- Watercourse Crossing
- Culvert
- Watercourse
- Municipality
- Limits of Work

0 0.35 0.7
Kilometers

Hanlon Expressway / Wellington Road 34 Midblock Interchange

Study Area

May, 2021	1:10,000 * when printed 11"x17"	Datum: NAD 1983 MTM 10 Source: MNRF, MMAH, AECOM, MTO
P#: 60541071	V#: 001	**Figure 1**

AECOM

Map Location: \\na.aecomnet.com\Hamilton\CAN\CNTLegacy\CAN\CNTPROJData\Projects\60541071\HWY 401-6\900\CAD_GIS\620-629 (GIS-Graphics)\Design\01_Reports\MXD\60541071Fig1_StudyArea_20210518.mxd
Date Saved: 5/18/2021 1:43:21 PM User Name: cbeck

AECOM Imagine it. Delivered.

Appendix B

Photolog

AECOM Imagine it. Delivered.

PHOTOGRAPHIC LOG

Client Name:	Site Location	Project No.
Ministry of Transportation Ontario	Hanlon Expressway – Wellington Road 34, Wellington County	60541071

Photo No.	Date
1	7/25/2017

Direction Photo Taken

South

Description

Overview of Site 401-6-25 downstream of Wellington Road 34.

Photo No.	Date
2	7/25/2017

Direction Photo Taken

South

Description

Substrate in Site 401-6-25 downstream of Wellington Road 34.

AECOM Imagine it. Delivered.

PHOTOGRAPHIC LOG

Client Name:	Site Location	Project No.
Ministry of Transportation Ontario	Hanlon Expressway – Wellington Road 34, Wellington County	60541071

Photo No.	Date
3	7/25/2017

Direction Photo Taken

North

Description

Overview of Site 401-6-25 upstream of Wellington Road 34.

Photo No.	Date
4	7/25/2017

Direction Photo Taken

North

Description

Watercress in Site 401-6-25 upstream of Wellington Road 34.

AECOM Imagine it. Delivered.

PHOTOGRAPHIC LOG

Client Name:	Site Location	Project No.
Ministry of Transportation Ontario	Hanlon Expressway – Wellington Road 34, Wellington County	60541071

Photo No.	Date
5	7/26/2017

Direction Photo Taken

South

Description

Overview of Site 401-6-26 downstream of County Road 34.

Photo No.	Date
6	7/26/2017

Direction Photo Taken

South

Description

Iron staining in Site 401-6-26 downstream of County of Road 34.

AECOM Imagine it. Delivered.

PHOTOGRAPHIC LOG

Client Name:	Site Location	Project No.
Ministry of Transportation Ontario	Hanlon Expressway – Wellington Road 34, Wellington County	60541071

Photo No.	Date
7	5/17/2018

Direction Photo Taken

North

Description

Overview of Site 401-6-26 upstream of County Road 34 with iron staining.

Photo No.	Date
8	5/17/2018

Direction Photo Taken

North

Description

Natural sheen in Site 401-6-26 upstream of County Road 34.

AECOM Imagine it. Delivered.

PHOTOGRAPHIC LOG

Client Name:	Site Location	Project No.
Ministry of Transportation Ontario	Hanlon Expressway – Wellington Road 34, Wellington County	60541071

Photo No.	Date
9	5/17/2018

Direction Photo Taken

South

Description

Overview of Site 401-6-27 downstream.

Photo No.	Date
10	5/17/2018

Direction Photo Taken

South

Description

Spawning substrate in Site 401-6-27 downstream.

AECOM Imagine it. Delivered.

PHOTOGRAPHIC LOG

Client Name:	Site Location	Project No.
Ministry of Transportation Ontario	Hanlon Expressway – Wellington Road 34, Wellington County	60541071

Photo No.	Date
11	4/23/2021

Direction Photo Taken

South

Description

Overview of Site 401-6-27 upstream.

Photo No.	Date
12	4/23/2021

Direction Photo Taken

South

Description

Substrate in Site 401-6-27 upstream.

AECOM Imagine it. Delivered.

PHOTOGRAPHIC LOG

Client Name:	Site Location	Project No.
Ministry of Transportation Ontario	Hanlon Expressway – Wellington Road 34, Wellington County	60541071

Photo No.	Date
13	7/27/2017

Direction Photo Taken

West

Description

Overview of Site 401-6-30 downstream of Concession Road 07.

Photo No.	Date
14	7/27/2017

Direction Photo Taken

East

Description

Overview of Site 401-6-30 upstream of Concession Road 7.

AECOM Imagine it. Delivered.

PHOTOGRAPHIC LOG

Client Name:	Site Location	Project No.
Ministry of Transportation Ontario	Hanlon Expressway – Wellington Road 34, Wellington County	60541071

Photo No.	Date
15	7/26/2017

Direction Photo Taken

West

Description

Overview of Site 401-6-31 downstream of the Hanlon Expressway.

Photo No.	Date
16	7/26/2017

Direction Photo Taken

East

Description

Substrate in Site 401-6-31 downstream.

AECOM Imagine it. Delivered.

Appendix C

Correspondence

Date April 24, 2017

Address

Re:

Attention: [CONTACT NAME]

In accordance with the *MTO/DFO/MNRF Protocol for Protecting Fish and Fish Habitat on Provincial Highway Undertakings - Version 3,* 2016, this letter is to request fisheries information from the Ministry of Natural Resources and Forestry (MNRF) for the Ministry of Transportation's (MTO) undertaking of Natural Heritage Features and Species at Risk Records Request for Information for the Highways 6 & 401 from Hamilton North Limits to Guelph South Limits.

The Ministry of Transportation (MTO) has retained AECOM Canada Ltd. to undertake preliminary design, environmental assessment updates and detailed design for the Highways 6 & 401 from Hamilton North Limits to Guelph South Limits and the Highway 6 (Hanlon Expressway) Improvements, and detailed design for the replacement of Puslinch Township Bridge #11 (Concession Road 7) and Highway 401 underpass Projects.

The proposed highway improvements are expected to include: new bridges, replacement of culverts and/or extensions, culvert rehabilitation and maintenance, and potential wingwall improvements.

In a north to south progression from College Avenue in the City of Guelph to the 401 along the Hanlon Parkway, the identified crossings within the study area include:

- Hanlon's Creek
- Mill Creek
- Aberfoyle Creek

In an east to west progression from the eastern study limits along the 401 to the western study limits, the identified crossings within the study area include:

- Irish Creek
- Unnamed tributary (1)
- Mill Creek
- Aberfoyle Creek
- Unnamed tributary (2)
- Unnamed tributary (3)
- Mountsberg Creek

In a north to south progression from the 401 to the southern study limits along the Highway 6 through Morriston, the identified crossings within the study area include:

- Bronte Creek

Other watercourses identified within the study area include:

- Fletcher Creek

Fisheries and Oceans Canada (DFO) provides a Distribution of Aquatic SAR mapping for the study area. The DFO mapping provides a general indication of the potential habitat, but does not confirm presence or absence from the site. The DFO mapping for the drainage features within the study area do not have any SAR listed.

As per Step 2 of the MTO/DFO/MNR Fisheries Protocol, we request that MNRF complete the attached table that includes information on fish communities and habitat.

Please see the attached for details regarding the watercourses within the project limits.

We look forward to MNRF's response to our request within **30 working days**, as specified in the Protocol.

Michael Godard
Fisheries Biologist

c.c. MTO ENVIRONMENTAL SECTION

[INSERT MTO PROJECT TITLE]

Waterbody Name and location (GPS coordinates & Google Earth map)	Watercourse classification (i.e. warmwater, coldwater)	Habitat information/ locations (fish passage barriers, known spawning habitats, groundwater upwellings, migratory corridors etc.)	Historical data on fish species present, including whether the subject waterbody(s) [SPECIFY LOCATION] are considered to support any vulnerable, threatened or endangered aquatic species	MNR fisheries management objectives, if applicable	In-water timing windows for construction
Hanlon's Creek – 43.50343 °N 80.22878 °W					
Mill Creek - 43.45538°N 80.17928°W					
Aberfoyle Creek - 43.49912°N 80.17276°W					
Irish Creek – 43.42678°N 80.26972°W					
Unnamed Trib (1) – 43.43960°N 80.21879°W					
Bronte Creek – 43.44700°N 80.11442°W					
Unnamed tributary (2) –43.46352°N 80.09111°W					
Unnamed tributary (3) - 43.46438°N 80.08682°W					
Mountsberg Creek -43.46843°N					

80.07257°W					
Fletcher Creek - 43.41967°N 80.09150°W					

NOTE:

- The applicant shall complete the waterbody name and location (column 1) and attach a Google Earth map or MTO project map identifying each waterbody and submit to MNRF.
- MNRF is required as per Step 2 of the Fisheries Protocol to provide the applicant with the information outlined in the table above (columns 2-6) within **30 working days**.

Waterbody Name and location (GPS coordinates & Google Earth map)	Watercourse classification (i.e. warmwater, coldwater)	Habitat information/ locations (fish passage barriers, known spawning habitats, groundwater upwellings, migratory corridors etc.)	Historical data on fish species present, including whether the subject waterbody(s) [SPECIFY LOCATION] are considered to support any vulnerable, threatened or endangered aquatic species	MNR fisheries management objectives, if applicable	In-water timing windows for construction *Prohibited Time Period*
Hanlon's Creek – 43.50343 °N 80.22878 °W	Coldwater		Bluntnose Minnow Brook Stickleback Brook Trout Central Mudminnow Creek Chub Eastern Blacknose Dace Fathead Minnow Longnose Dace Mottled Sculpin Northern Redbelly Dace Pumpkinseed White Sucker		October 1 – June 30
Mill Creek - 43.45538°N 80.17928°W	Cold	Brook trout spawning Brown trout spawning	Bluntnose Minnow Brook Stickleback Brook Trout Brown Trout		October 1 to June 30

			Central Mudminnow Common Shiner Creek Chub Eastern Blacknose Dace Fathead Minnow Rainbow Darter Rock Bass White Sucker		
Aberfoyle Creek - 43.49912°N 80.17276°W	No information in our records for this coordinate				
Irish Creek – 43.42678°N 80.26972°W	Warm	Northern Pike Spawning	White Sucker Northern Pike Central Mudminnow Brook Stickleback Pumpkinseed		March 15 – June 30
Unnamed Trib (1) – 43.43960°N 80.21879°W	Cold		Bluntnose Minnow Brook Stickleback Brook Trout Brown Trout Central Mudminnow Common Shiner Creek Chub Eastern Blacknose Dace Fathead Minnow Rainbow Darter Rock Bass		October 1 – June 30

			White Sucker		
Bronte Creek –43.44700°N 80.11442°W	No fisheries information on file				
Unnamed tributary (2) – 43.46352°N 80.09111°W	No fisheries information on file				
Unnamed tributary (3) - 43.46438°N 80.08682°W	No fisheries information on file				
Mountsberg Creek - 43.46843°N 80.07257°W	Cold	Northern Pike spawning area downstream	Banded Killifish Brassy Minnow Brook Stickleback Brook Trout Central Mudminnow Creek Chub Eastern Blacknose Dace Fathead Minnow Largemouth Bass Northern Hog Sucker Northern Pike Pearl Dace Pumpkinseed White Sucker		October 1 – June 30
Fletcher Creek - 43.41967°N 80.09150°W	Cold	Brook Trout spawning area downstream	Brook Stickleback Brook Trout Central Mudminnow Creek Chub Eastern Blacknose Dace		October 1 – June 30

			Largemouth Bass Mottled Sculpin Northern Pike Northern Redbelly Dace Pearl Dace Pumpkinseed Spottail Shiner White Sucker Yellow Perch		

Ministry of Transportation

Ontario

Date: March 11, 2021

Re: Highways 6 and 401 Improvements

Attention: Guelph District MNRF

In accordance with the MTO/DFO/MNRF Protocol for Protecting Fish and Fish Habitat on Provincial Highway Undertakings, this letter is to provide notification to the Ministry of Natural Resources and Forestry that the Ministry of Transportation is undertaking the following works:

> AECOM Canada Limited (AECOM) has been retained by the Ontario Ministry of Transportation (MTO) to undertake the Preliminary Design Review, Detail Design and Class Environmental Assessment Study (Group 'A') for improvements to Highways 401 & 6 (Hanlon Expressway) between Hamilton and Guelph.

Please see the attached for details regarding the watercourses within the project limits.

We have data on file in relation to these watercourses (attached) from 2017 and 2018 and are requesting that MNRF confirm whether this data is still valid and provide updated information where applicable.

We look forward to MNRF's response to our request within **30 working days**, as specified in the Fisheries Protocol.

Olivia Butty

Aquatic Ecologist

MTO PROJECT TITLE:

Location*	**Waterbody Name***	**Waterbody GPS (UTM)** (Attach Google Earth map)		**Watercourse Classification** (i.e. warmwater, coldwater)	**Habitat Information** (Include details/locations for fish passage barriers, known spawning habitats, groundwater upwellings, migratory corridors, etc.)	**Historical Data** (Include details on the historical fish species present, and if the waterbody is considered to support any vulnerable, threatened, or endangered aquatic species.)	**MNRF Fisheries Management Objectives** (If applicable, include details)	**In-Water Timing Windows for Construction** (Provide dates)
	401-6-01 Unnamed	0564390	4810302	NA	None	None		Roadside conveyance only
	401-6-02 Unnamed	0564719	4810392	NA	None	None		Roadside conveyance only
	401-6-03 Unnamed	0565147	4810508	Warm	Groundwater upwelling	Brook Stickleback (AECOM, 2018)		July 1 – March 31
	401-6-04 Pond Creek	0565838	4810693	Cold	Spawning areas downstream in Mill Creek	Trout (MNRF, 2017) Blacknose Dace, Bluntnose Minnow, Brook Stickleback, Brook Trout, Brown Trout, Central Mudminnow, Common Shiner, Creek Chub, Fathead Minnow, Rainbow Darter, Rock	Refer to Grand River Fisheries Management Plan	July 1 – September 15

						Bass, White Sucker (ARA - 2019)		
	401-6-05 McCrimmons Creek	0566247	4810817	Cold	Spawning areas	Bluntnose Minnow, Brook Stickleback, Brook Trout, Brown Trout, Central Mudminnow, Common Shiner, Creek Chub, Eastern Blacknose Dace, Fathead Minnow, Rainbow Darter, Rock Bass, White Sucker (MNRF, 2017)	Refer to Grand River Fisheries Management Plan	July 1st- Sept 30th
	401-6-07 Aberfoyle Creek	0566901	4810924	Cold	Spawning areas	Brook Trout (MNRF, 2017) Blacknose Dace, Bluntnose Minnow, Brook Stickleback, Brook Trout, Brown Trout, Central Mudminnow, Common Shiner, Creek Chub, Fathead Minnow, Rainbow Darter, Rock Bass, White Sucker (ARA – 2019)	Refer to Grand River Fisheries Management Plan	July 1st- Sept 30th
	401-6-08 Unnamed	0567473	4811076	Warm	None	Small-bodied fishes observed (AECOM, 2017)	Refer to Grand River Fisheries Management Plan	July 1 – March 31

	401-6-09 Unnamed	0568238	4811088	NA	None	None		Roadside conveyance only
	401-6-10 Unnamed	0568871	4811081	NA	None	None		Roadside conveyance only
	401-6-12 Unnamed	0569334	4811071	NA	None	None		Roadside conveyance only
	401-6-13 Unnamed	0569460	4811069	NA	None	None		Roadside conveyance only
	401-6-14 Unnamed	0569883	4811136	NA	None	None		Roadside conveyance only
	401-6-15 Unnamed	0570336	4811192	NA	None	None		Roadside conveyance only
	401-6-16 Unnamed	0570583	4811391	NA	None	None		Roadside conveyance only
	401-6-17 Unnamed	0570886	4811516	NA	None	None		Roadside conveyance only
	401-6-18 Unnamed	0570982	4811645	NA	None	None		Roadside conveyance only
	401-6-19 Unnamed	0571487	4811929	NA	None	None		Roadside conveyance only
	401-6-20 Unnamed	0571695	4812018	NA	None	None		Roadside conveyance only
	401-6-21 Unnamed	0572030	4812084	NA	None	None		Roadside conveyance only
	401-6-22 Unnamed	0572508	4812275	NA	None	None		Roadside conveyance only
	401-6-23A Unnamed	0565526	4813729	NA	None	None		Roadside conveyance only
	401-6-23 Unnamed	0565512	4813712	NA	None	None		Roadside conveyance only

	401-6-24 Unnamed	0566262	4811930	Cold	Brook Trout Spawning Area	Blacknose Dace, Bluntnose Minnow, Brook Stickleback, Brook Trout, Brown Trout, Central Mudminnow, Common Shiner, Creek Chub, Fathead Minnow, Rainbow Darter, Rock Bass, White Sucker (MNRF ARA -	Refer to Grand River Fisheries Management Plan	July 1st- Sept 30th
	401-6-25 McCrimmons Creek	0566254	4811925	Cold	Groundwater upwelling, spawning areas	Blacknose Dace, Bluntnose Minnow, Brook Stickleback, Brook Trout, Brown Trout, Central Mudminnow, Common Shiner, Creek Chub, Fathead Minnow, Rainbow Darter, Rock Bass, White Sucker (MNRF, 2021)	Refer to Grand River Fisheries Management Plan	July 1st- Sept 30th
	401-6-26 Unnamed	0565736	4811800	Warm	Groundwater upwelling	Central Mudminnow (AECOM, 2018)		July 1 – March 31
	401-6-27 McCrimmons Creek Tributary	0566472	4811958	Cold	Spawning areas	Blacknose Dace, Bluntnose Minnow, Brook Stickleback, Brook Trout, Brown Trout, Central Mudminnow, Common Shiner, Creek Chub, Fathead Minnow, Rainbow Darter, Rock	Refer to Grand River Fisheries Management Plan	July 1st- Sept 30th

						Bass, White Sucker (MNRF, 2021)		
	401-6-30 Unnamed	0566627	4812728	Cold	None	Blacknose Dace, Bluntnose Minnow, Brook Stickleback, Brook Trout, Brown Trout, Central Mudminnow, Common Shiner, Creek Chub, Fathead Minnow, Rainbow Darter, Rock Bass, White Sucker (MNRF, 2021)	Refer to Grand River Fisheries Management Plan	July 1st- Sept 30th
	401-6-31 McCrimmons Creek Tributary	0566345	4811690	Cold	Potential groundwater upwelling	Blacknose Dace, Bluntnose Minnow, Brook Stickleback, Brook Trout, Brown Trout, Central Mudminnow, Common Shiner, Creek Chub, Fathead Minnow, Rainbow Darter, Rock Bass, White Sucker (MNRF, 2021)	Refer to Grand River Fisheries Management Plan	July 1st- Sept 30th
	401-6-32 McCrimmons Creek Tributary	0566478	4811214	Cold	Brook Trout Spawning Area	Brook Stickleback,Central Mudminnow (ARA – 2013) Blacknose Dace, Bluntnose Minnow, Brook Stickleback, Brook Trout, Brown Trout, Central Mudminnow, Common Shiner, Creek Chub,	Refer to Grand River Fisheries Management Plan	July 1st- Sept 30th

						Fathead Minnow, Rainbow Darter, Rock Bass, White Sucker (MNRF, 2021)		
	401-6-33 Unnamed	0575154	4808132	NA	None	None		Roadside conveyance only
	401-6-34 Unnamed	0574316	4808834	NA	None	None		Roadside conveyance only
	401-6-35 Unnamed	0574402	4808546	NA	None	None		Roadside conveyance only
	401-6-36 Unnamed	0574456	4808554	Warm	None	None		July 1 – March 31
	401-6-37 Bronte Creek	0571625	4810828	Brook Trout Captured downstream at Leslie Road Crossing. Likely Cold Water Thermal Regime.	None	Brook Stickleback (AECOM, 2017) Brook Trout, Central Mudminnow, Longnose Dace captured downstream at Leslie Road Crossing (MNRF, 2021)		July 1st- Sept 30th
	401-6-40 Unnamed	0572781	4809576	NA	None	None		Roadside conveyance only
	401-6-41 Unnamed	0570364	4811983	NA	None	None		Roadside conveyance only
	401-6-42	0573422	4808682	Cold	None	Pumpkinseed, Brook Stickleback, Northern		July 1st- Sept 30th

	Fielding Lane Ponds					Redbelly Dace, Central Mudminnow (AECOM, 2017) Blacknose Dace, Brook Stickleback, Brook Trout, Central Mudminnow, Creek Chub, Largemouth Bass, Mottled Sculpin, Northern Pearl Dace, Northern Pike, Northern Redbelly Dace, Pumpkinseed, Spottail Shiner, White Sucker, Yellow Perch (ARA – 2010		
	401-6-50 Morriston Pond	0571129	4810771	Brook Trout Captured downstream at Leslie Road Crossing. Likely Cold Water Thermal Regime.	None	Brook Trout, Central Mudminnow, Longnose Dace captured downstream at Leslie Road Crossing (MNRF, 2021)		July 1st- Sept 30th
	401-6-51 Unnamed	0570750	4810261	Unknown	None	None		July 1 – March 31
	401-6-52 Unnamed	0570559	4810063	Warm	None	Brown Bullhead, Fathead Minnow (AECOM, 2017)		July 1 – March 31
	401-6-53	570936	4811109	Unknown	Dry pond			July 1 – March 31

	Unnamed Pond							
	H-6-1 Hanlon Creek	562186	4817057	Cold	White Sucker spawning observed	Blacknose Dace, Blacknose Dace, Bluntnose Minnow, Brook Stickleback, Brook Trout, Central Mudminnow, Creek Chub, Fathead Minnow, Longnose Dace, Mottled Sculpin, Northern Redbelly Dace, Pumpkinseed, White Sucker (MNRF, 2021)	Refer to Grand River Fisheries Management Plan	July 1st- Sept 30th
	H-6-2	560664	4818736	Warm	None	None		July 1 – March 31

*Applicant **must** complete these columns as part of the submission.
Where information is available from other sources, include in the appropriate column with source reference prior to submission to MNRF.

Butty, Olivia

From: Denyes, David (MNRF) <David.Denyes@ontario.ca>
Sent: Tuesday, March 16, 2021 9:38 AM
To: Butty, Olivia
Cc: Laurence, Anne Marie (MNRF)
Subject: [EXTERNAL] RE: Request for Information: Highways 6 and 401 Improvements
Attachments: MNRF Information Request_401-MNRF_Updates.docx

Hi Olivia,

As per your request, I have reviewed the MNRF Information Request Table and included any additional information. The updates have been made in red so they are easier to track.

I would recommend that you refer to the Grand River Fisheries Management Plan for information on MNRF Fisheries Management Objectives for the Grand River Tributaries. You may be able to reach out to the GRCA for a copy of this document- https://www.grandriver.ca/en/our-watershed/Fisheries-Management-Plan.aspx

If you have any questions, please don't hesitate to contact me.

Best Regards,

David

David Denyes
Management Biologist
Ministry of Natural Resources and Forestry
Vineland Field Office
4890 Victoria Avenue North
Vineland Station ON, L0R 2E0
Tel: (289) 241-6872
david.denyes@ontario.ca

From: Butty, Olivia <Olivia.Butty@aecom.com>
Sent: March-11-21 10:15 AM
To: Laurence, Anne Marie (MNRF) <annemarie.laurence@ontario.ca>
Subject: Request for Information: Highways 6 and 401 Improvements

Hello Anne Marie,

In accordance with the MTO/DFO/MNRF Protocol for Protecting Fish and Fish Habitat on Provincial Highway Undertakings, this letter is to provide notification to the Ministry of Natural Resources and Forestry that the Ministry of Transportation is undertaking the following works:

AECOM has been retained by the Ministry of Transportation (MTO) to provide an Aquatic Existing Conditions and Impact Assessment Report for the Highways 6 and 401 Improvements from Hamilton North Limits to Guelph South Limits (G.W.P. 3042-14-00). MNRF provided information for this project in 2017; however, following field investigations a

number of additional watercourses were identified within the study area and as such, AECOM is requesting updated information. Please see the attached for details regarding the watercourses within the project limits.

We look forward to MNRF's response to our request within 30 working days, as specified in the Fisheries Protocol.

We appreciate any assistance that you may be able to provide. Should you have any questions or require further information to assist you in this request, please do not hesitate to contact me.

Thank you,
Olivia

Olivia Butty, B.Sc. Hons.
Aquatic Ecologist
D: 519-840-2265
C: 519-766-5530
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From: Aberdein, Andrew
Sent: June-29-21 10:59 AM
To: FPP.CA / PPP.CA (DFO/MPO)
Cc: Easterling, Katie; DeDecker, Julia; andrea.hasler@ontario.ca; Susan.Wagter@ontario.ca
Subject: RE: LoA 21-HCAA-00889 Culvert Replacements, McCrimmins Creek, Wellington
Attachments: Letter C - 21-HCAA-00889 Culvert Replacements, McCrimmins Creek, Wellington.pdf; 60541071-Mid-Block-DFO-RfR-20210430-signed.pdf; MAP-60541071-Fig1_StudyArea-20210518.pdf

Good morning Lilia,

Concerning the Letter of Advice (LOA) issued for the Hanlon Expressway / Wellington Road 34 Midblock Interchange (GWP 3059-20-00) (DFO File No. 21-HCAA-00889), the following items detail revisions to and provide further clarification on the submitted Request for Review (RfR) on which the issued LOA was based. It is anticipated these revisions will not alter the outcome of DFO's review of the proposed works and represent minor alterations to the issued LOA. For convenience, a copy of the original LOA and RfR, as well as updated mapping of the proposed work locations, are attached.

Item No.

1. As shown in the proposed culvert works table below (highlighted), there has been a culvert name change at watercourse 401-6-26 which is now culvert SR-11 (SR-9 previously) and the proposed new structure is 1200x910 (1800x1200 previously), which provides 14.25 m^2 of additional habitat (25.7 m^2 previously). This change affects the Section D detailed description of the aquatic environment and the Section E description of the footprint below the high water mark within the RfR and the details of the proposed works for this structure in the LOA.

2. Similarly, as shown in the proposed culvert works table below (highlighted), the proposed culvert sizing for CR7-2 at 401-6-30 is now 1200x1200 mm (1800x1200 previously), which restores 9.11 m^2 of habitat with a groundwater connection (16.4 m^2 previously). This change affects the Section E description of the footprint below the high water mark within the RfR and the details of the proposed works for this structure in the LOA. Note: this culvert may undergo further refinement in detail design once updated flow models are received from the GRCA.

Proposed Culvert Works

Waterbody ID/Crossing # /Station	Existing Structure				New Structure				Proposed Work
	Type	Length (mm)	Width (mm)	Height (mm)	Type	Length (mm)	Width (mm)	Height (mm)	
401-6-25 (SR-7A)	CSP	24410	1000	1000	Non-Rigid Frame Open (NRFO)	52000	2500	1500	Culvert replacement with extension to be installed along this McCrimmons Creek Tributary. The new culvert will incorporate provisions to enhance fish habitat. Replacement culvert extension of ~30 m; however, the

									perforated/open-bottom restores ~36.6 m^2 of habitat with native substrates and a groundwater connection.
401-6-26 (SR-11)	CSP	19000	450	450	Conc. Box	28000	1200	910	Culvert replacement with extension to be installed along this McCrimmons Creek Tributary. The new culvert will incorporate provisions to enhance fish habitat. Replacement culvert extension of ~11 m; however, the widening of culvert provides ~14.25 m^2 of habitat.
401-6-27 (SR-5)	CSP	20150	1000	1000	NRFO	38000	2930	1500	Culvert replacement with extension to be installed along McCrimmons Creek. The new culvert will incorporate provisions to enhance fish habitat. Replacement culvert extension of ~20 m; however, the perforated/open-bottom restores 38.9 m^2 of habitat with a groundwater connection.
401-6-30	CSP (CR7-1) CSP (CR7-2)	12150 12150	1000 450	1000 450	NRFO NRFO	22000 22000	1800 1200	1200 1200	Culvert replacements with extension to be installed along McCrimmons Creek and the small tributary. The new culverts will incorporate provisions to enhance fish habitats. Replacement culvert extensions of ~12 m for both; however, the perforated/open-bottom restores 9.72m^2 of habitat at CR7-1 and 9.11 m^2 of habitat at CR7-2 with a groundwater connection.

3. There are additional design details to provide for the McCrimmon's Creek tributary (401-6-25) where it flows parallel to the western side of Highway 6 at Wellington Road 34. The widening of Highway 6 will require the relocation of the roadside drainage ditch – identified as 401-6-24 – toward the McCrimmon's Creek tributary which will require regrading and vegetation removal adjacent to the tributary where it flows parallel to the drainage ditch. However, the grading design has been refined to:
    1. Minimize the need for vegetation removal along the eastern bank of the McCrimmon's Creek tributary to the greatest extent possible, and
    2. Where vegetation removal is required, maintain an approximate 3.0 m wide berm between the tributary channel and the ditch to allow the immediate replanting of

trees and shrubs upon the completion of grading work to achieve at least 50% restoration of the vegetation removed on the east side of the tributary (for 75% total cover at a minimum) to meet the MTO BMP requirements.

4. In addition, not included in the original RfR submission was the need to relocate the existing roadside drainage ditch tie-ins to McCrimmon's Creek at site 401-6-31 (H6-2) on either side of Highway 6 at the southern extent of the work area to accommodate the widening of Highway 6. No culvert replacement or extension work at culvert H6-2 is proposed, only the relocation of the ditch tie-ins to McCrimmon's Creek along the proposed widened alignment. It is unknown at this phase whether works within the high-water mark or wetted channel of McCrimmon's Creek at this location will be required for the relocation of the ditch tie-ins, but if required, a portion or all of McCrimmon's Creek can be isolated, dewatered, and fish relocated within the applicable timing window to facilitate any required in-water work.

5. Additional clarification for 401-6-30 (located along Concession Road 7) – the existing road alignment for Concession Road 7 will be shifted to the east and the replacement culvert with extension will be shifted to match the proposed road alignment. As per the RfR, the culvert replacement with extension will replace the existing CSPs with open-bottom or perforated box culverts to restore groundwater connectivity and improve Brook Trout and Brown Trout spawning habitat within the main tributary and small side channel. Where the road has been shifted away from the existing alignment, but remaining within the existing right-of-way (RoW), there will be natural channel tie-ins and natural channel restoration.

Please do not hesitate to reach out if you require additional information or clarification on these items.

Regards,

Andrew Aberdein, M.E.S.
Aquatic Ecologist, Impact Asessment & Permitting, Canada
M +1-519-503-6178
andrew.aberdein@aecom.com

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aecom.com

From: FPP.CA / PPP.CA (DFO/MPO) <fisheriesprotection@dfo-mpo.gc.ca>
Sent: June-14-21 2:39 PM

To: Aberdein, Andrew <andrew.aberdein@aecom.com>
Cc: Easterling, Katie <katie.easterling@aecom.com>; DeDecker, Julia <Julia.DeDecker@aecom.com>; andrea.hasler@ontario.ca; Susan.Wagter@ontario.ca
Subject: [EXTERNAL] LoA 21-HCAA-00889 Culvert Replacements, McCrimmins Creek, Wellington

Hello Andrew Aberdein,

Fisheries and Oceans Canada (DFO) has completed their review of the proposed Culvert Repairs in Tributaries to McCrimmins Creek (DFO file number 21-HCAA-00889). Please find attached the Letter of Advice (LOA) for the proposed works. If you have any questions or comments about this letter please feel free to contact me.

This email and attachment are considered to be the original letter as no hard copy will be sent by mail unless requested.

Thank you,

Lilia Schoot Uiterkamp
Biologist | Biologiste
Fisheries and Oceans Canada| Pêches et Océans Canada
Ontario and Prairie Region| Région de l'Ontario et des Prairies
Fish and Fish Habitat Protection Program| Programme de protection du poisson et de son habitat

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From: Aberdein, Andrew <andrew.aberdein@aecom.com>
Sent: May 4, 2021 11:15 AM
To: FPP.CA / PPP.CA (DFO/MPO) <fisheriesprotection@dfo-mpo.gc.ca>
Cc: Easterling, Katie <katie.easterling@aecom.com>; DeDecker, Julia <Julia.DeDecker@aecom.com>; andrea.hasler@ontario.ca; Susan.Wagter@ontario.ca
Subject: 21-HCAA-00889 - Request for Review - MTO Hanlon Expressway / Wellington Road 34 Mid-Block Interchange (GWP No. 3059-20-00)

Good morning,

Please find attached a completed Request for Review package for the MTO Hanlon Expressway / Wellington Road 34 Mid-Block Interchange (GWP No. 3059-20-00) project. The package includes a map of the project area, the existing fish habitat and fish community summary tables, a Pathway of Effects (PoE) table, and a photographic log. Five of the existing culverts within the project area planned for replacement with extensions – 401-6-30 (CR7-1 and CR7-2), 401-6-27 (SR-5), 401-6-26 (SR-9), and 401-6-25 (SR-7A) – were identified as fish habitat based on MNRF correspondence and fish community sampling and are the subject of this Request for Review.

If you have questions or require additional information, please do not hesitate to reach out to myself or Katie Easterling (katie.easterling@aecom.com).

Regards,

Andrew Aberdein, M.E.S.
Aquatic Ecologist
Water & Natural Resources, Environment, Canada

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andrew.aberdein@aecom.com

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Request for Review

Please note that Guidance on Submitting a Request for Review is available at the end of this form. This guidance explains the requirements for a Request for Review by DFO under the fish and fish habitat protection provisions of the *Fisheries Act*. All information requested must be provided. If you attach documents to your application with additional information, you must still provide appropriate summaries in the spaces provided on the application document or your application will be considered incomplete.

A) Contact information

Name of Business/Company:

Ministry of Transportation (MTO)

Name of Proponent:

Andrea Hasler - Environmental Planner;
Sarah Jewell - Project Engineer

Mailing address:

301 St. Paul Street, 2nd Floor;
659 Exeter Road

City/Town:

St. Catharines; London

Province/Territory:

Ontario; Ontario

Postal Code:

L2R 7R4; N6E 1L3

Tel. No. :

289-763-7938; 548-388-3110

Fax No.:

Email:

andrea.hasler@ontario.ca; sarah.jewell@ontario.ca

Is the Proponent the main/primary contact? ○ Yes ◉ No

Select additional contact:
Contractor/Agency/Consultant *(if applicable)*

Katie Easterling
AECOM Canada Ltd

Mailing address:

50 Sportsworld Crossing Road
Unit 290

City/Town:

Kitchener

Province/Territory

Ontario

Postal Code:

N2P OA4

Tel. No. :

1-519-650-861C

Fax No.:

Email:

katie.easterling@aecom.com

All definitions are provided in Section G of the Guidance on Submitting a Request for Review

If no, please enter information for the primary contact or any additional contact.

Katie Easterling
AECOM Canada Ltd.
50 Sportsworld Crossing Road Unit 29C
Kitchener ON N2P 0A4
katie.easterling@aecom.com

B) Description of Project

If your project has a title, please provide it.

Ministry of Transportation Hanlon Expressway / Wellington Road 34 Mid-Block Interchange (GWP No. 3059-20-00)

Is the project in response to an emergency circumstance*? ○ Yes ◉ No

Does your project involve work in water? ◉ Yes ○ No

If yes, is the work below the High Water Mark*? ◉ Yes ○ No

What are you planning to do? Briefly describe all project components you are proposing in or near water.

AECOM Canada Limited (AECOM) has been retained by the Ontario Ministry of Transportation (MTO) to undertake a Preliminary Design Review, Detailed Design (to a Design-Build-Ready status) under Class Environmental Assessment (EA) for Provincial Transportation Facilities (2000) for improvements to Highways 6 and 401 in the Township of Puslinch, Wellington County, and the City of Hamilton (GWP 3042-14-00). The planned transportation improvements will provide a better connection between the Highways 6 and 401 corridors which will reduce road congestion, collision potential and associated costs and encourage the utilization of Hanlon Expressway (Highway 6 north of Highway 401) which will support municipal planning initiatives.

The first phase of implementing the GWP 3042-14-00 improvements will include the improvements along Hanlon Expressway north of Highway 401. This first phase, henceforth referred to as the Hanlon Expressway / Wellington Road 34 Mid-Block Interchange project (GWP 3059-20-00), includes the new Wellington Road 34 flyover structure at the Hanlon Expressway, the new interchange on the Hanlon Expressway midway between Wellington Road 34 and Maltby Road, and other associated connecting roadways. The associated connecting roadway works require culvert replacement and extension - with channel realignments/tie-ins to accommodate the extended replacement culverts - of five existing roadway culverts in watercourses that provide fish habitat as determined by records from agency background information requests and fish community sampling conducted for the project.

The extended replacement culverts will also require the relocation of utilities present within the existing road allowance. These utilities will be relocated to within the new road allowance along the connecting roadways prior to the culvert replacements. The watercourse crossing method (open-cut trench, horizontal directional drill, buried above the culvert) for the installation of the relocated utilities will be dependent on the type of utility (telecommunications, hydro, gas).

How are you planning to do it? Briefly describe the construction materials, methods and equipment that you plan to use.

For the fish-bearing culvert crossings (401-6-30 [CR7-1 and CR7-2], 401-6-27 [SR-5], 401-6-25 [SR-7A], and 401-6-26 [SR-9]), in-water works will be completed within the designated timing window and the in-water work area will be isolated to exclude fish and all fish within the isolated work area will be relocated downstream outside the work area prior to dewatering. The roadway surface over the existing culvert crossings will be excavated and the existing CSP culverts removed. At four of the crossings where cold-water Brook Trout and Brown Trout habitat with active groundwater upwellings were documented, the existing CSP culverts will be replaced with extended open-bottom culverts or perforated box culverts to restore groundwater connectivity and improve Brook Trout and Brown Trout spawning habitat. At the fifth fish-bearing culvert crossing (401-6-26 [SR-9]), which provides warm-water fish habitat, the existing CSP culvert will be replaced by an extended concrete box culvert. The concrete box culvert will be countersunk to embed 10% of the culvert height and all culverts backfilled with native substrate materials and appropriately sized to maintain low flow fish passage following HEC-RAS assessment.

Include a site plan (figure/drawing) showing all project components in and near water.

Are details attached? ◉ Yes ○ No

Identify which work categories apply to your project.

All definitions are provided in Section G of the Guidance on Submitting a Request for Review

- [ ] Aquaculture Operations
- [x] Aquatic Vegetation Removal
- [ ] Beaches
- [ ] Berms
- [ ] Blasting / Explosives
- [ ] Boat Houses
- [ ] Boat Launches / Ramps
- [ ] Breakwaters
- [ ] Bridges
- [x] Cable Crossings
- [ ] Causeways
- [x] Culverts
- [ ] Dams
- [x] Dewatering / Pumping
- [ ] Docks
- [x] Dredging / Excavation
- [ ] Dykes
- [ ] Fishways / Ladders
- [ ] Flow Modification (hydro)
- [ ] Groundwater Extraction
- [ ] Groynes
- [ ] Habitat Restoration
- [ ] Ice Bridges
- [ ] Log Handling / Dumps
- [ ] Log Removal
- [ ] Moorings
- [ ] Open Water Disposal
- [ ] Piers
- [x] Riparian Vegetation Removal
- [ ] Seismic Work
- [ ] Shoreline Protection
- [ ] Stormwater Management Facilities
- [ ] Surface Water Taking
- [ ] Tailings Impoundment Areas
- [ ] Temporary Structures
- [ ] Turbines
- [ ] Water Control Structures
- [ ] Water Intakes / Fish Screens
- [ ] Water Outfalls
- [x] Watercourse Realignment
- [ ] Weirs
- [ ] Wharves
- [ ] Wind Power Structures

- [ ] Other Please Specify

Was your project submitted for review to another federal or provincial department or agency? ○ Yes ◉ No

If yes, indicate to whom and associated file number(s).

N/A

C) Location of the Project

Coordinates of the proposed project Latitude 43.45710 N Longitude -80.18087C W

OR UTM zone , Easting

Northing

Include a map clearly indicating the location of the project as well as surrounding features

Name of Nearest Community (City, Town, Village): Guelph

Municipality, District, Township, County, Province: Wellington County

Name of watershed (if applicable): Mill Creek

Name of watercourse(s) or waterbody(ies) near the proposed project. McCrimmons Creek

All definitions are provided in Section G of the Guidance on Submitting a Request for Review

Provide detailed directions to access the project site:

From Highway 401 take the Highway 6 North exit toward Guelph ON.
Continue north on Highway 6 toward Guelph ON.
The project site begins south of the intersection of Highway 6 with Wellington Road 34 and continues to north of Maltby Road West/ Concession Road 4.

D) Description of the Aquatic Environment

Identify the predominant type of aquatic habitat where the project will take place.

- ○ Estuary (Estuarine)
- ○ Lake (Lacustrine)
- ○ On the bank/shore at the interface between land and water (Riparian)
- ◉ River or stream (Riverine)
- ○ Salt water (Marine)
- ○ Wetlands (Palustrine)

Provide a detailed description of biological and physical characteristics of the proposed project site. This description should include information on aquatic species at risk* (https://www.canada.ca/en/environment-climate-change/services/species-risk-public-registry.html), their residence* and critical habitat* if found in the area. An overview of the distribution of aquatic species at risk and the presence of their critical habitat within Canadian waters can be found here http://dfo-mpo.gc.ca/species-especes/sara-lep/map-carte/index-eng.html

401-6-30 (CR7-1 and CR7-2)
This Unnamed Tributary to McCrimmons Creek crossed County Road 7 east of Highway 6 and north of Wellington Road 34. Within the assessed upstream and downstream reaches, the feature consisted of a Provincially Significant Wetland with no defined channel. Substrates were mainly comprised of detritus and muck. Banks were not defined and the associated riparian cover was moderate (30-60%), consisting of common reed, trees and shrubs. Instream cover (80% total cover) was provided primarily by emergent vegetation (90%) and organic debris (10%). Iron staining was observed.

According to MNRF records, the watercourse was permanent and provided habitat for coldwater species including the following: Blacknose Dace, Bluntnose Minnow, Brook Stickleback, Brook Trout, Brown Trout, Central Mudminnow, Common Shiner, Creek Chub, Fathead Minnow, Rainbow Darter, Rock Bass, and White Sucker. According to DFO aquatic species at risk (SAR) mapping, aquatic SAR were not documented within this watercourse.

The location of the second existing culvert crossing (at the proposed CR7-2 culvert location north of CR7-1) could not be confirmed in the field. No defined channel was observed at the time of assessment and the existing culvert may have been buried.

401-6-27 (SR-5)
The main branch of McCrimmons Creek (sometimes also identified as a tributary to Mill Creek) crossed Wellington Road 34 east of Highway 6. Within the assessed downstream reach, the watercourse was representative of a naturalized system with a morphology that consists off runs (40%), flats (30%), riffles (15%) and pools (15%). At the time of assessment, the mean wetted width was approximately 1.5 m and the mean wetted depth approximately 0.25 m. Substrates were mainly comprised of gravel, sand, cobble and silt. Banks were stable and the associated riparian cover was high (60-90% cover), consisting of trees and shrubs. Instream cover (70% total cover) was provided primarily by undercut banks (30%), woody debris (30%), cobble (20%) and organic debris (20%). Groundwater upwellings, watercress and suitable salmonid spawning habitat were observed.

According to MNRF records, the watercourse was permanent and provided habitat for coldwater species including the following: Blacknose Dace, Bluntnose Minnow, Brook Stickleback, Brook Trout, Brown Trout, Central Mudminnow, Common Shiner, Creek Chub, Fathead Minnow, Rainbow Darter, Rock Bass, and White Sucker. Brook Trout and Brown Trout were captured during AECOM fish community sampling in 2018. According to DFO aquatic SAR mapping, aquatic SAR were not documented within this watercourse.

401-6-25 (SR-7A)
This tributary to McCrimmons Creek crossed Wellington Road 34 southward west of Highway 6. A separate parallel culvert (identified as 401-6-24) was located east of the tributary to McCrimmons Creek crossing of Wellington Road 34 within the roadside drainage feature of

All definitions are provided in Section G of the Guidance on Submitting a Request for Review

Highway 6. Within the assessed upstream reach, the watercourse was representative of a naturalized system with a morphology that consisted of flats (85%), runs (10%) and pools (5%). At the time of assessment, the mean wetted width was approximately 1.4 m and the mean wetted depth approximately 0.14 m. Substrates were mainly comprised of detritus, sand, gravel and silt. Banks were slightly unstable and the associated riparian cover was high (60-90%), consisting of trees and shrubs. Instream cover (70% total) was provided primarily by organic debris (35%), in-stream woody debris (30%), overhanging woody debris (20%), undercut banks (10%) and boulders (5%). Groundwater upwellings and watercress were observed.

Within the assessed downstream reach, the watercourse was representative of a naturalized system with a morphology that consisted of runs (85%) and riffles (15%). At the time of assessment, the mean wetted width was approximately 1.1 m and the mean wetted depth approximately 0.18 m. Substrates were comprised of clay and gravel. Banks were moderately unstable due to erosion and the associated riparian cover was high (60-90%), consisting of trees and shrubs. Instream cover (70% total) was provided primarily by undercut banks (40%), woody debris (30%) and organic debris (30%). Groundwater upwellings, watercress and suitable salmonid spawning habitat were observed.

According to MNRF records, the watercourse was permanent and provided habitat for coldwater species including the following: Blacknose Dace, Bluntnose Minnow, Brook Stickleback, Brook Trout, Brown Trout, Central Mudminnow, Common Shiner, Creek Chub, Fathead Minnow, Rainbow Darter, Rock Bass, and White Sucker. According to DFO aquatic SAR mapping, aquatic SAR were not documented within this watercourse.

401-6-26 (SR-9)
This unnamed tributary to McCrimmons Creek flowed southward through a wetland across County Road 34 west of Highway 6. With n the assessed upstream reach, the morphology consisted of pools (30%), riffles (10%) and runs (10%) flowing through a greater wetland (50%). At the time of assessment, the mean wetted width of the defined channel was approximately 0.4 m and the mean wetted depth approximately 0.13 m. Substrates were mainly comprised of detritus and muck. Banks were not well defined and the associated riparian cover was moderate (30-60%), consisting of common reed, trees and shrubs. Instream cover (80% total cover) was provided primarily by emergent vegetation (90%) and organic debris (10%). Groundwater upwellings, organic oily sheen and iron staining were observed.

Within the assessed downstream reach, the morphology consists of flats (20%) flowing through a greater wetland (80%), with only a partially defined channel visible. At the time of assessment, the mean wetted width of the defined channel was approximately 0.5 m anc the mean wetted depth approximately 0.15 m. Substrates were mainly comprised of detritus and muck. Banks were not well defined and the associated riparian cover was moderate (30-60%), consisting of common reed, trees and shrubs. Instream cover (80% total) was provided primarily by emergent vegetation (90%) and woody debris (10%). Groundwater upwellings, organic oily sheen and iron staining were observed.

According to MNRF records, the watercourse was permanent and had a warm-water thermal regime. Central Mudminnow were captured by AECOM during fish community sampling in 2018 According to DFO aquatic SAR mapping, aquatic SAR were not documented within this watercourse.

Include representative photos of affected area (including upstream and downstream area) and clearly identify the location of the project.

E) Potential Effects of the Proposed Project

Have you reviewed the Pathways of Effects (PoE) diagrams (http://www.dfo-mpo.gc.ca/pnw-ppe/pathways-sequences/index-eng.html) that describe the type of cause-effect relationships that apply to your project?

(●) Yes ( ) No

If yes, select the PoEs that apply to your project.

- ☒ Addition or removal of aquatic vegetation
- ☒ Change in timing, duration and frequency of flow
- ☐ Cleaning or maintenance of bridges or other structures
- ☐ Dredging
- ☒ Excavation
- ☒ Fish passage issues
- ☒ Grading
- ☐ Marine seismic surveys
- ☒ Placement of material or structures in water
- ☒ Riparian Planting
- ☐ Streamside livestock grazing
- ☒ Structure removal
- ☐ Use of explosives
- ☒ Use of industrial equipment
- ☒ Vegetation Clearing
- ☐ Wastewater management

All definitions are provided in Section G of the Guidance on Submitting a Request for Review

☐ Organic debris management ☐ Water extraction

☐ Placement of marine finfish aquaculture site

Will there be changes (i.e., alteration) in the fish habitat*? ◉ Yes ○ No ○ Unknown

If yes, provide a description.

The longer replacement culverts at the existing crossings will result in alteration of fish habitat, but the culvert design – replacing the existing CSPs with open-bottom culverts/box culverts sized appropriately to maintain low flow fish passage based on HEC-RAS assessment and appropriately sized streambed material – will result in a net improvement of fish habitat by restoring groundwater connectivity and native stream bed substrates while ensuring fish passage is maintained. Additionally, natural channel design tie-ins will be designed within the RoW to connect the existing channel with the new culvert.

Is there likely to be a harmful alteration, disruption or destruction of habitat used by fish? ○ Yes ◉ No ○ Unknown

Is there likely to be destruction or loss of habitat used by fish? ○ Yes ◉ No ○ Unknown

What is the footprint (area in square meters) of your project that will take place below the high water mark*?

Existing Culverts:
401-6-30 (CR7-1): 12.15 m (length) x 1000 mm CSP, area = 12.15 m2
401-6-30 (CR7-2): 12.15 m x 450 mm CSP, area = 4.86 m2
401-6-27 (SR-5): 20.15 m x 1000 mm CSP, area = 20.15 m2
401-6-25 (SR-7A): 24.41 m x 1000 mm CSP, area = 24.41 m2
401-6-26 (SR-9): 19.0 m x 450 mm CSP, area = 8.55 m2

Proposed Culverts:
401-6-30 (CR7-1): 24 m (length) x 1800x1200 mm open-bottom culvert, total footprint = 43.2 m2
- extension is approximately ~12 m, increased area of disturbance compared to existing = 12 m x 1.8 m = 21.6 m2
- widening of existing culvert crossing creates additional habitat = 12.15 m x 0.8 m = 9.72 m2

401-6-30 (CR7-2): 24 m (length) x 1800x1200 mm open-bottom culvert, footprint = 43.2 m2
- extension is approximately ~12 m, increased area of disturbance compared to existing = 12 m x 1.8 m = 21.6 m2
- widening of existing culvert crossing creates additional habitat = 12.15 m x 1.35 m = 16.4 m2

401-6-27 (SR-5): 40 m (length) x ~2.93 m wide open-bottom culvert, total footprint = 117 m2
- extension is approximately ~20 m, increased area of disturbance compared to existing = 20 m x 2.93 m = 58.6 m2
- widening of existing culvert crossing creates additional habitat = 20.15 m x 1.93 m = 38.9 m2

401-6-25 (SR-7A): 54 m (length) x ~2.5 m wide open-bottom culvert, total footprint = 135 m2
- extension is approximately ~30 m, increased area of disturbance compared to existing= 30 m x 2.5 m = 75 m2
- widening of existing culvert crossing creates additional habitat = 24.41 m x 1.5 m = 36.6 m2

401-6-26 (SR-9): 30 m (length) x 1800x1200 concrete box culvert, total footprint = 54.0 m2
- extension is approximately ~11 m, increased area of disturbance compared to existing = 11 m x 1.8 m = 19.8 m2
- widening of existing culvert crossing creates additional habitat = 19.0 m x 1.35 m = 25.7 m2

Is your project likely to change water flows or water levels? ○ Yes ◉ No ○ Unknown

If your project includes withdrawing water, provide source, volume, rate and duration.

N/A

If your project includes a water control structure, provide the % of flow reduction.

N/A

If your project includes discharge of water, provide source, volume and rate

N/A

All definitions are provided in Section G of the Guidance on Submitting a Request for Review

Will your project cause death of fish? ○ Yes ◉ No ○ Unknown

If yes, how many fish will be killed (for multi-year project, provide average)? What species and lifestages?

N/A

What is the time frame of your project?

The construction will start on 06/01/2021 and end by 12/31/2025

If applicable, the operation will start on MM/DD/YYYY and end by MM/DD/YYYY

If applicable, provide schedule for the maintenance

N/A

If applicable, provide schedule for decommissioning

N/A

Are there additional effects to fish and fish habitat that will occur outside of the time periods identified above? ○ Yes ◉ No

(If yes, provide details)

N/A

Can you follow appropriate Timing Windows (http://www.dfo-mpo.gc.ca/pnw-ppe/timing-periodes/index-eng.html) for all your project activities below the High Water Mark*? ◉ Yes ○ No

(If no, provide explanations.)

N/A

Have you considered and incorporated all options for redesigning and relocating your project to avoid negative effects to fish and fish habitat?

◉ Yes ○ No

If yes, describe.

The location of the proposed Highway 6 and Wellington Road 34 Mid-Block interchange was selected north of Wellington Road 34 to avoid the fish habitat and wetlands present at the existing intersection of Highway 6 and Wellington Road 34. Only improvements to the existing approach roads will require replacement and extension of culverts within fish habitat, the new interchange itself will not require additional watercourse crossings or in-water work in fish habitat.

Have you consulted DFO's Fish and Fish Habitat Protection Measures Habitat (http://www.dfo-mpo.gc.ca/pnw-ppe/measures-mesures/index- eng.html) to determine which measures apply to your project? ◉ Yes ○ No

Will you be incorporating applicable measures into your project? ◉ Yes ○ No

If yes, identify which ones. If No, identify which ones and provide reasons.

Prevent the Death of Fish
- Fish present within the isolated work areas for the replacement culverts will be relocated out of the isolated work and released downstream prior to culvert removal and replacement.

Maintain Fish Passage
- The replacement culverts will be appropriately sized to maintain fish passage during low flow conditions based on HEC-RAS assessment and backfilled with native substrate material.

All definitions are provided in Section G of the Guidance on Submitting a Request for Review

Contaminant and Spill Management
- Activities near water will be planned such that deleterious substances do not enter the watercourses.
- Equipment maintenance anc refueling will not occur within 30 m of the watercourses.

Erosion and Sediment Control
- An Erosion and Sediment Control (ESC) Plan will be developed for the site and ESC measures (silt fence) will be implemented prior to and maintained during the construction phases to prevent entry of sediment into the watercourses.
- Regular inspection and maintenance of ESC measures will be completed during the course of construction and repairs to ESC measures will be completed if damage occurs.
- Non-biodegradable ESC materials will be removed once the site is stabilized.

Riparian Vegetation Clearing
- The amount of vegetation disturbed will be limited to only that which is necessary to replace and extend the proposed culverts.
- Clearing of vegetation will be kept to a minimum by using existing roads to access the work sites
- Tree protection will be installed around trees not identified for removal prior to construction.

Use of Industrial Equipment
- Machinery will arrive on site in clean condition and free of fluid leaks, invasive species, and noxious weeds.
- Machinery will not enter the watercourse and movement of machinery within the vicinity of the watercourse will be kept to a minimum
- Equipment maintenance anc refueling will not occur within 30 m of the watercourse and no fuel or chemical containers will be stored on site.
- Appropriate emergency spill kits will be available on site.

Have you considered whether DFO standards and codes of practice apply to your project? ○ No ◉ Yes

If Yes, include a list.

End-of-pipe fish protection screens for small water intakes in freshwater
Temporary cofferdams and diversion channels

Have you considered other avoidance and mitigation measures? ○ No ◉ Yes

If Yes, include a list.

- Replacement of existing CSP culverts with open-bottom culverts to restore groundwater connectivity and natural substrates through the watercourse culvert crossings.
- Minimizing grading and extensions of culverts to the extent possible.

Are there any relevant measures that you are unable to incorporate? ○ Yes ◉ No

(If yes, identify which ones.)

N/A

What harmful effects to fish and fish habitat do you foresee after taking into account the avoidance and mitigation measures described above?

No harmful alteration, disruption, or destruction (HADD) of fish habitat or death of fish is anticipated. Open-bottom culverts are proposed in the coldwater watercourses to replace the existing undersized CSP culverts. The open bottom culvert or perforated culvert will restore groundwater connectivity, add natural streambed spawning material, and provide an overall net improvement of Brook Trout and Brown Trout habitat. Fish within the isolated work areas for the proposed culvert replacement/extension will be relocated out of the work area and live released downstream prior to construction. Works will be completed with the application of appropriate ESC mitigation measures and measures to prevent contaminants and other deleterious substances from entering the watercourse. Natural channel design will be used to tie in the existing watercourse to the new culvert inlets and outlets to provide long term stability. Culverts have been sized with inputs from both drainage engineers and a fluvial geomorphologist and in the case of the one box culvert, will be counter sunk to a minimum 10% to ensure fish passage.

Do these include effects on aquatic species at risk*? ○ Yes ◉ No

If yes, please describe, including how many individuals will be harmed, harassed, or otherwise affected by the project, and how?

N/A

Do these include effects on areas identified as their residence or critical habitat? ○ Yes ◉ No

If yes, please describe

N/A

Are there any aquatic invasive species in the vicinity of your project area? ○ Yes ◉ No

(If yes, identify which ones.)

N/A

Does your project aim to, or will it be likely to, effect any of these aquatic invasive species? ○ Yes ◉ No

If yes, how?

N/A

F) Signature

I, Katie Easterling (print name) certify that the information given on this form is to the best of my knowledge, correct and completed

K Easterling

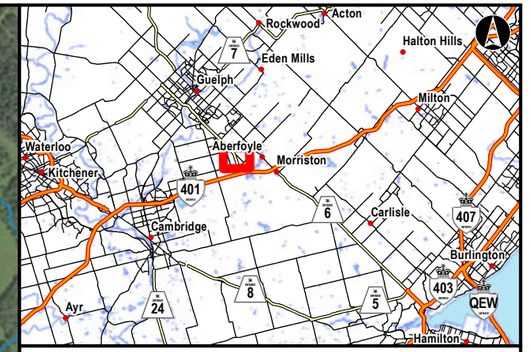
Signature

30/04/202

Date

Information about the above-noted proposed work or undertaking is collected by DFO under the authority of the *Fisheries Act* for the purpose of administering the Fish and Fish Habitat protection provisions of the *Fisheries Act*. Personal information will be protected under the provisions of the *Privacy Act* and will be stored in the Personal Information Bank DFO-PPU-680. Under the *Privacy Act*, Individuals have a right to, and on request shall be given access to any personal information about them contained in a personal information bank. Instructions for obtaining personal information are contained in the Government of Canada's Info Source publications available at www.infosource.gc.ca or in Government of Canada offices. Information other than "personal" information may be accessible or protected as required by the provision of the *Access to Information Act*.

**All definitions are provided in Section G of the Guidance on Submitting a Request for Review*



Legend

- Watercourse Crossing
- Culvert
- Watercourse
- Railway
- Property Fabric
- Municipality
- Limits of Work

0 0.375 0.75
Kilometers

Hanlon Expressway / Wellington Road 34 Mid-Block Interchange

Study Area

Mar, 2021	1:10,000 * when printed 11"x17"	Datum: NAD 1983 MTM 10 Source: MNRF, MMAH, AECOM, MTO
P#: 60541071	V#: 001	**Figure 1**

AECOM

Table 1: Existing Fish and Fish Habitat Conditions Summary Table (Template D2A)

Waterbody ID	Date	Flow	Thermal Regime*	Fish Habitat*	Substrate Type	Channel Morphology	Vegetation	Constraints & Opportunities	Significant Fish Habitat
Station 401-6-23 Unnamed	25-Jul-17	Ephemeral	N/A	Not fish habitat	N/A	N/A	Meadow species; No aquatic vegetation present	None	None
Station 401-6-24 McCrimmons Creek Tributary	25-Jul-17	Permanent	Cold	Direct (MNRF, 2021)	Muck	Upstream: Standing water (100%) Downstream: Runs (85%) Riffles (15%)	Cattails	None	Spawning areas*
Station 401-6-25 McCrimmons Creek	25-Jul-17	Permanent	Cold	Direct	Clay, gravel, boulder, sand, silt, detritus	Upstream: Flats (85%) Runs (10%) Pools (5%) Downstream: Runs (85%) Riffles (15%)	Watercress	None	Spawning areas*
Station 401-6-26 McCrimmons Creek Tributary	26-Jul-17	Permanent	Warm	Direct	Muck, detritus	Upstream: Greater wetland (50%) Pools (30%) Riffles (10%) Runs (10%) Downstream: Greater wetland (80%) Flats (20%)	Cattails	None	Groundwater upwelling
Station 401-6-27 McCrimmons Creek Tributary	27-Jul-17	Permanent	Cold	Direct	Silt, sand, clay, cobble, gravel, detritus	Downstream: Runs (40%) Flats (30%) Riffles (15%) Pools (15%).	Watercress	None	Spawning areas*

Waterbody ID	Date	Flow	Thermal Regime*	Fish Habitat*	Substrate Type	Channel Morphology	Vegetation	Constraints & Opportunities	Significant Fish Habitat
Station 401-6-30 McCrimmons Creek Tributary	25-Jul-17	Permanent	Cold	Direct	Muck, silt, detritus	N/A	Cattails	None	None

*Information provided by MNRF (2021).

Table 2: Existing Fish Community Summary Table (Template D2B)

Waterbody ID	Date	Fish Species Present	Year Class(es)	Species at Risk Present	In-water Works Timing Window*
401-6-23 Unnamed	16-Mar-21	None (AECOM, 2018; MNRF, 2021)	N/A	None	Roadside conveyance only
401-6-24 McCrimmons Creek Tributary	16-Mar-21	Blacknose Dace, Bluntnose Minnow, Brook Stickleback, Brook Trout, Brown Trout, Central Mudminnow, Common Shiner, Creek Chub, Fathead Minnow, Rainbow Darter, Rock Bass, White Sucker (MNRF, 2021)-	N/A	None	July 1st- Sept 30th
401-6-25 McCrimmons Creek	16-Mar-21	Blacknose Dace, Bluntnose Minnow, Brook Stickleback, Brook Trout, Brown Trout, Central Mudminnow, Common Shiner, Creek Chub, Fathead Minnow, Rainbow Darter, Rock Bass, White Sucker (MNRF, 2021)	All	None	July 1st- Sept 30th
401-6-26 McCrimmons Creek Tributary	16-Mar-21	Central Mudminnow (AECOM, 2018)	Adult	None	July 1 – March 31
401-6-27 McCrimmons Creek Tributary	16-Mar-21	Blacknose Dace, Bluntnose Minnow, Brook Stickleback, Brook Trout, Brown Trout, Central Mudminnow, Common Shiner, Creek Chub, Fathead Minnow, Rainbow Darter, Rock Bass, White Sucker (MNRF, 2021) Brook Trout, Brown Trout (AECOM, 2018)	All	None	July 1st- Sept 30th
401-6-30 McCrimmons Creek Tributary	16-Mar-21	Blacknose Dace, Bluntnose Minnow, Brook Stickleback, Brook Trout, Brown Trout, Central Mudminnow, Common Shiner, Creek Chub, Fathead Minnow, Rainbow Darter, Rock Bass, White Sucker (MNRF, 2021)	N/A	None	July 1st- Sept 30th

Pathway of Effects (PoE)

Table 1. PoE for the Ministry of Transportation Hanlon Expressway / Wellington Road 34 Mid-Block Interchange

Pathway of Effect(s)	Stressor (Potential Impact)	Mitigation/Measures to Avoid Harm	Residual Effects	HADD (Yes/No)
Addition/removal of aquatic vegetation	Removal of aquatic vegetation during the replacement culvert extensions can result in: • Change in water temperature; • Change in dissolved oxygen; • Change in nutrient concentrations; • Change in habitat structure and cover; and • Change in sediment concentrations.	Culvert replacements will be completed in the dry to reduce potential for sediment releases. Replacement of existing CSP culverts with open-bottom culverts and natural substrate will allow for groundwater connectivity and recolonization of certain aquatic vegetation species such as watercress. Replacement culvert extensions will increase the length of the watercourses being shaded contributing to decreasing the water temperature.	Low	No
Excavation	Excavation to remove existing culverts and prepare the channel for the replacement culverts can result in: • Change in baseflow; • Change in water temperature; and • Change in sediment concentrations.	Replacement of existing CSP culverts with open-bottom culverts will allow for groundwater upwelling to contribute to the maintenance of baseflow and the cool/cold water temperature conditions. Utilization of standard erosion and sediment control (ESC) measures (silt fence).	Net positive	No
Change in timing, duration and frequency of flow	Alteration in flow timing, duration and frequency from the resized replacement culverts can result in: • Displacement or stranding of fish; • Change in sediment concentrations;	The replacement culvert will be appropriately resized to provide a natural flow regime over natural substrates and maintain low flow passage to avoid stranding of fish based on HEC-RAS assessment and natural channel design approaches. Replacement of existing CSP culverts with open-bottom culverts will allow for groundwater connectivity and natural	Net positive	No

Pathway of Effect(s)	Stressor (Potential Impact)	Mitigation/Measures to Avoid Harm	Residual Effects	HADD (Yes/No)
	• Change in in habitat structure and cover; • Change in food supply; • Change in water temperature; and • Change in nutrient/contaminant concentrations.	substrates that can improve habitat structure and cover, food supply, and contribute to maintaining the cold water thermal regime of the watercourses.		
Fish passage issues	Resizing and extension of the culvert crossings can result in: • Incidental entrainment, impingement, or mortality of resident fish species; • Change in access to habitats; • Changes in thermal cues or temperature barriers; and • Interbasin transfer of species.	The replacement culverts will be appropriately resized to provide a natural flow regime over natural substrates and maintain low flow passage to avoid stranding of fish based on HEC-RAS assessment and natural channel design approaches. Replacement of existing CSP culverts with open-bottom culverts will allow for groundwater upwelling that can improve cold water habitat for resident Brook and Brown Trout and avoid disruption of thermal cues and establishment of temperature barriers. No documented presence of non-native/invasive aquatic species in the Project area identified for which improving fish passage will facilitate interbasin transfer of species.	Net positive	No
Grading	Grading requiring a change to landscape slope, exposing soils, and removal of organic material can result in: • Change in habitat structure and cover; and • Change in sediment concentrations.	Grading to be limited to above the high-water mark and isolated, dry channel. Utilization of standard ESC measures (silt fence). Re-stabilize exposed soils and slope before removal of ESC.	Low	No

Pathway of Effect(s)	Stressor (Potential Impact)	Mitigation/Measures to Avoid Harm	Residual Effects	HADD (Yes/No)
Placement of material or structures in water	Placement of replacement culverts can result in: • Change in sediment concentrations; • Change in habitat structure and cover; • Change in food supply; and • Change in nutrient concentrations.	The replacement open-bottom culverts will be appropriately resized to provide a natural flow regime over natural substrates and maintain hydraulics based on HEC-RAS assessment and natural channel design approaches that can improve sediment concentrations, habitat, and food supply.	Net positive	No
Structure removal	Removal of the existing CSP culverts can result in: • Change in sediment concentrations; • Change in habitat structure and cover; • Change in food supply; and • Change in nutrient concentrations.	The replacement open-bottom culverts will be appropriately resized to provide a natural flow regime over natural substrates and maintain hydraulics based on HEC-RAS assessment and natural channel design approaches that can improve sediment concentrations, habitat, and food supply.	Net positive	No
Use of Industrial Equipment	Use of mobile and/or immobile industrial equipment to transport supplies, excavate the existing culverts, and regrade and backfill the replacement culverts can result in: • Change in contaminant concentrations; • Change in sediment concentrations; and	Machinery shall arrive on site in a clean condition and will be maintained free of fluid leaks, invasive species, and noxious weeds. It is recommended that construction equipment and materials be staged at the top of the valley wall or a minimum of 30 m away from the watercourse. Machinery refueling and servicing, including washing, is to be conducted more than 30 m away from the watercourse.	None	No

Pathway of Effect(s)	Stressor (Potential Impact)	Mitigation/Measures to Avoid Harm	Residual Effects	HADD (Yes/No)
	• Introduction of invasive species.	There will be no vehicles or machinery entering or fording the watercourse at any time and no equipment will work within the wetted channel. A spill kit containing suitable commercially available absorbent material will be stored on-site and accessible to all construction personnel in the event of a spill. Spills are to be reported to the Ministry of the Environment Spills Action Centre, 1-800-268-6060 and DFO Fisheries Protection Program, 1-855-852-8320.		
Vegetation Clearing	Clearing of riparian vegetation can result in: • Change in habitat structure and cover; • Change in food supply; • Change in sediment concentrations; • Change in water temperature; and • Change in nutrient/contaminant concentrations (herbicide).	Vegetation clearing to be limited to above the high-water mark. Extent of vegetation clearing limited to the area needed to access and extend the replacement culverts; the existing roadway will be used to avoid need for additional vegetation removal to facilitate equipment access to site. Tree protection will be installed around trees outside the regrading area not identified for removal to prevent damage and incidental loss of tree cover. Utilize standard sediment and ESC measures.	Low	No

AECOM Imagine it. Delivered.

PHOTOGRAPHIC LOG

Client Name:	Site Location	Project No.
Ministry of Transportation Ontario	Hanlon Expressway – Wellington Road 34, Wellington County	60541071

Photo No.	Date
1	7/25/2017

Direction Photo Taken

South

Description

Overview of Site 401-6-25 downstream of Wellington Road 34.

Photo No.	Date
2	7/25/2017

Direction Photo Taken

South

Description

Substrate in Site 401-6-25 downstream of Wellington Road 34.

AECOM Imagine it. Delivered.

PHOTOGRAPHIC LOG

Client Name:	Site Location	Project No.
Ministry of Transportation Ontario	Hanlon Expressway – Wellington Road 34, Wellington County	60541071

Photo No.	Date
3	7/25/2017

Direction Photo Taken

North

Description

Overview of Site 401-6-25 upstream of Wellington Road 34.

Photo No.	Date
4	7/25/2017

Direction Photo Taken

North

Description

Watercress in Site 401-6-25 upstream of Wellington Road 34.

AECOM Imagine it. Delivered.

PHOTOGRAPHIC LOG

Client Name:	Site Location	Project No.
Ministry of Transportation Ontario	Hanlon Expressway – Wellington Road 34, Wellington County	60541071

Photo No.	Date
5	7/26/2017

Direction Photo Taken

South

Description

Overview of Site 401-6-26 downstream of County Road 34.

Photo No.	Date
6	7/26/2017

Direction Photo Taken

South

Description

Iron staining in Site 401-6-26 downstream of County of Road 34.

Client Name:	Site Location	Project No.
Ministry of Transportation Ontario	Hanlon Expressway – Wellington Road 34, Wellington County	60541071

Photo No.	Date
7	5/17/2018

Direction Photo Taken: North

Description: Overview of Site 401-6-26 upstream of County Road 34 with iron staining.

Photo No.	Date
8	5/17/2018

Direction Photo Taken: North

Description: Natural sheen in Site 401-6-26 upstream of County Road 34.

AECOM Imagine it. Delivered.

PHOTOGRAPHIC LOG

Client Name:	Site Location	Project No.
Ministry of Transportation Ontario	Hanlon Expressway – Wellington Road 34, Wellington County	60541071

Photo No.	Date
9	5/17/2018

Direction Photo Taken

South

Description

Overview of Site 401-6-27 downstream.

Photo No.	Date
10	5/17/2018

Direction Photo Taken

South

Description

Spawning substrate in Site 401-6-27 downstream.

AECOM Imagine it. Delivered.

PHOTOGRAPHIC LOG

Client Name:	Site Location	Project No.
Ministry of Transportation Ontario	Hanlon Expressway – Wellington Road 34, Wellington County	60541071

Photo No.	Date
11	4/23/2021

Direction Photo Taken

South

Description

Overview of Site 401-6-27 upstream.

Photo No.	Date
12	4/23/2021

Direction Photo Taken

South

Description

Substrate in Site 401-6-27 upstream.

AECOM Imagine it. Delivered.

PHOTOGRAPHIC LOG

Client Name:	Site Location	Project No.
Ministry of Transportation Ontario	Hanlon Expressway – Wellington Road 34, Wellington County	60541071

Photo No.	Date
13	7/27/2017

Direction Photo Taken

West

Description

Overview of Site 401-6-30 downstream of Concession Road 07.

Photo No.	Date
14	7/27/2017

Direction Photo Taken

East

Description

Overview of Site 401-6-30 upstream of Concession Road 7.

AECOM Imagine it. Delivered.

Appendix D

Field Notes

GENERAL INFORMATION

PROJECT #:	PROJECT DESCRIPTION:	DAY:	MONTH:	YEAR:
60541071	401-6	25	07	2017

Is STREAM REALIGNMENT required for this section:

O Yes O No Ø Unknown

COLLECTORS:	WEATHER CONDITIONS:	TIME STARTED:	TIME FINISHED:
A.O. CB.	Mainly Clear	1245	1315

AIR TEMP:	WATER TEMP:	CONDUCTIVITY (µS/cm):
21°C	12.5	701

PHOTO NUMBERS AND DESCRIPTIONS: 58-83

LOCATION

NAME OF WATERBODY:	DRAINAGE SYSTEM:	CROSSING #:	STATION #:
Unnamed	/	/	401-6-25415

LOCATION OF CROSSING: north of R.R. 34 and west of hwy 6 South.

GPS COORDINATES:	MTO CHAINAGE:
17T 0566254 4811925	/
TOWNSHIP: Guelph	**MNR DISTRICT:** Aurora

LAND USE AND POLLUTION

SURROUNDING LAND USE:	SOURCES OF POLLUTION:
Hwy, Mixed woodlot.	Hwy runoff

EXISTING STRUCTURE TYPE

Bridge O	Box CulvertO	Open Foot Culvert O	CSP Ø	N/A O

Other O Describe: Size (w x h) m^2

SECTION TYPE AND MORPHOLOGY

SECTION IDENTIFIER:	SECTION LOCATION: (include on habitat map)
/	/

TYPE:	Stream / river	Channelized	Permanent	Intermittent	Ephemeral	ASSOCIATED WETLAND:
	Ø	O	Ø	O	O	

TOTAL SECTION LENGTH (m):	CURRENT VELOCITY (m/s):
50.	Slow/moderate

SUB-SECTION(S)	Run Ø	Pool O	Riffle O	Flats Ø	Inside culvert O	Other
Percentage of area	10	/	5	85	/	/
Mean depth wetted (m)	0.30	/	0.70	0.14	/	/
Mean width wetted (m)	1.20	/	0.8	1.40	/	/
Mean bankfull width (m)	1.50	/	1.0	1.60	/	/
Mean bankfull depth(m)	0.50	/	0.40	0.40	/	/
Substrate	50% D, Sa 30%, Si 10%	/	30% Co, 20% Gr, 50% D	80% D, 20% Si	/	/

Bedrock Br	Boulder Bo	Cobble Co	Gravel Gr	Sand Sa	Silt Si	Clay Cl	Muck Mu	Detritus D
	5		5	30	15%			55%

BANK STABILITY

	Stable	Slightly Unstable	Moderately Unstable	Unstable
Left Upstream Bank	O	⊗	O	O
Right Upstream Bank	O	⊗	O	O

HABITAT

IN-STREAM COVER (% surface area):	Undercut banks	Boulders	Cobble	Woody Debris	Organic debris	Vascular Macrophytes	None
	25	10	/	Instream 30 Overhanging 20	35	Instream / Overhanging	/

SHORE COVER (% stream shaded):	100 – 90 %	90 – 60%	60- 30%	30 – 1%	None
	O	⊗	O	⊗	O

VEGETATION TYPE (%):	Submergent	Floating	Emergent	None
	100			
Predominant Species	watercress	/	/	/

MIGRATORY OBSTRUCTIONS:	None	Seasonal	Permanent

POTENTIAL CRITICAL HABITAT LIMITING:	Spawning	Evidence of Groundwater	Other
		upwelling + watercress	

POTENTIAL ENHANCEMENT OPPORTUNITIES:

None

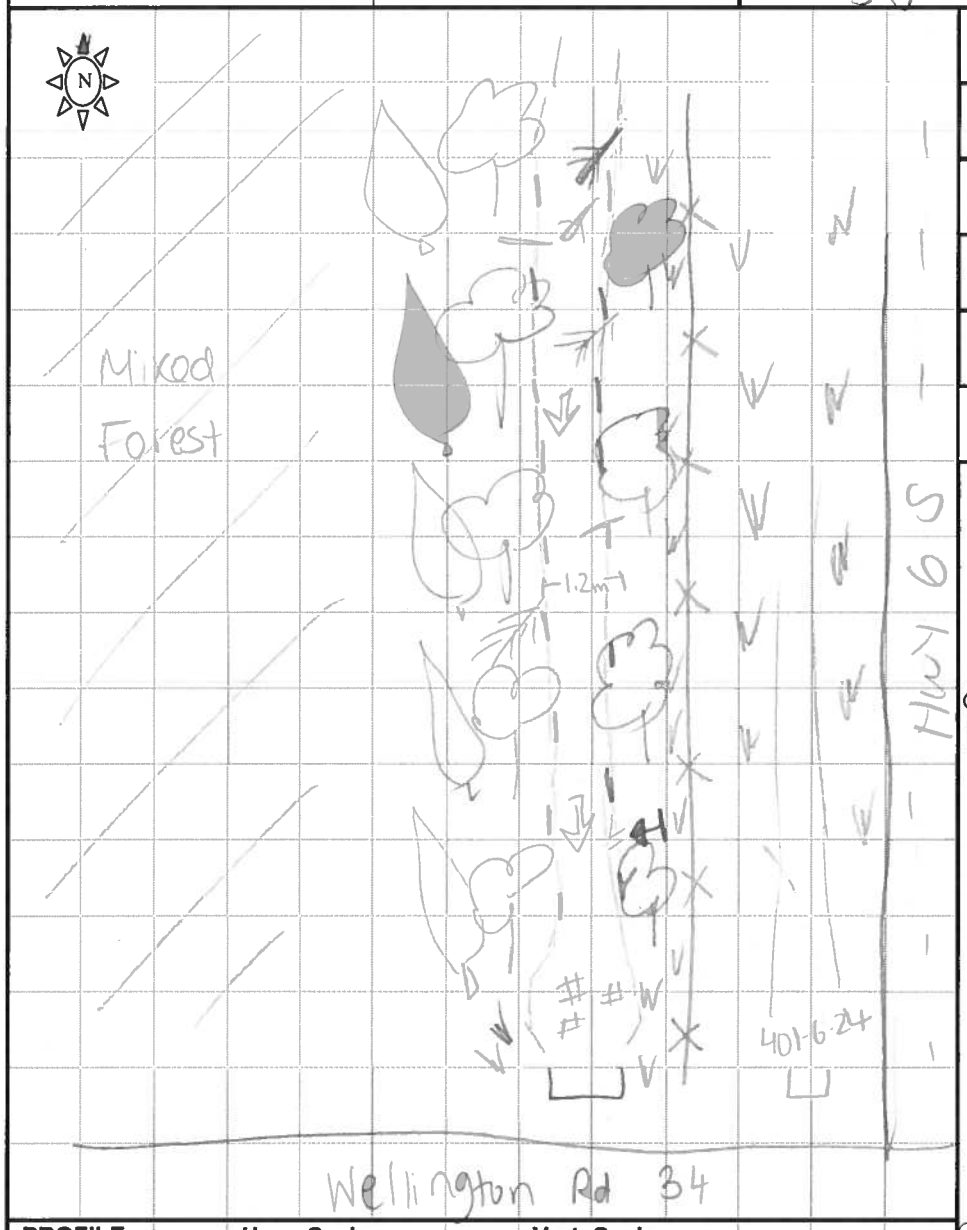
COMMENTS:

Permanent Stream North of R.R. 34 and West of Hwy 6 South. The Stream is slow flowing with substrate of coarse sand and gravel covered in detritus. Little vegetation stabilizes the banks which are undercut and supported mainly by surrounding canopy root structure. Groundwater upwelling was observed east of the channel. Watercress was observed in the channel just upstream of the culvert. This study area would be considered fish habitat with woody debris and undercut banks as supporting cover. Upwelling of groundwater flowed into channel. Bird breeding habitat present.

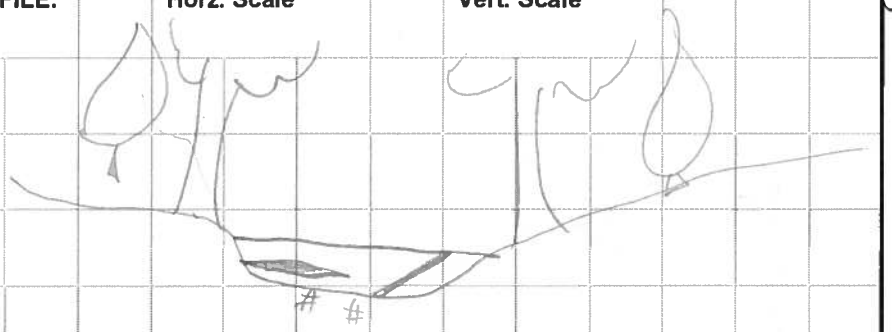
Additional Notes Appended? O No O Yes **number of pages** _____

pics 58 –

SECTION IDENTIFIER:	SECTION LOCATION:	SECTION LENGTH (m):	SCALE (cm / m):
—	—	50	



PROFILE: Horz. Scale: Vert. Scale:



PROJECT #:	60541171
MAPPER:	CBuff
NAME OF WATERBODY:	Unnamed.
CROSSING #:	—
STATION #:	401-6-25 us
DATE: DD-MMM-YY	25-Jul-17

LEGEND

10d depth (cm)
6w width

➡ Riffle
⇨ Run/Glide
⬭ Pool
▮ Island/Bar

⁘ Fine Substrate
Gravel Substrate

oOooO Cobble /Boulder
*** * *** Debris

CT Cattail
SV/FV Submerg/Float Veg

EV Emergent Vegetation
W Watercress

Fe Iron Staining
/////// Eroded Bank

XXX Riprap / Other Stabilization

⊂⬭ Instream Log/Tree
^^^ Dam/Weir/Obstruction

® Riparian Tree

⊢► Seep/Spring
-------- Undercut Bank

— Barrier to Fish Movement
-S- Seasonal Barrier

-x--x- Fence line
⌴ Culvert

GENERAL INFORMATION

PROJECT #:	PROJECT DESCRIPTION:	DAY:	MONTH:	YEAR:
60541071		25	07	2017

Is STREAM REALIGNMENT required for this section:

O Yes O No ☒ Unknown

COLLECTORS:	WEATHER CONDITIONS:	TIME STARTED:	TIME FINISHED:
A.O, O.B.	Sunny	1400	1430

AIR TEMP:	WATER TEMP:	CONDUCTIVITY (µS/cm):
23°C	13.1	703

PHOTO NUMBERS AND DESCRIPTIONS: 102-121

LOCATION

NAME OF WATERBODY:	DRAINAGE SYSTEM:	CROSSING #:	STATION #:
Unnamed	/	/	401-6-25 D/S

LOCATION OF CROSSING: South of RR34 and west of Hwy 6 South

GPS COORDINATES:	MTO CHAINAGE:
17T 0566269 4811903	/
TOWNSHIP: Guelph	**MNR DISTRICT:** Aurora

LAND USE AND POLLUTION

SURROUNDING LAND USE:	SOURCES OF POLLUTION:
Hwy 6,	Hwy runoff

EXISTING STRUCTURE TYPE

Bridge O	Box CulvertO	Open Foot Culvert O	CSP ☒	N/A O

Other O Describe: Size (w x h) m^2

SECTION TYPE AND MORPHOLOGY

SECTION IDENTIFIER:	SECTION LOCATION: (include on habitat map)
/	/

TYPE:	Stream / river	Channelized	Permanent	Intermittent	Ephemeral	ASSOCIATED WETLAND:
	☒	O	☒	O	O	

TOTAL SECTION LENGTH (m):	CURRENT VELOCITY (m/s):
200	/

SUB-SECTION(S)	Run O	Pool O	Riffle O	Flats O	Inside culvert O	Other
Percentage of area	85	/	15	/	—	—
Mean depth wetted (m)	0.18	/	0.13	/	—	—
Mean width wetted (m)	1.1	/	0.80	/	—	—
Mean bankfull width (m)	1.4	/	0.15	/	—	—
Mean bankfull depth(m)	0.8	/	0.90	/	—	—
Substrate	80% 20% Cl Gr	/	60% Cl 40% Gr	/	—	—

Bedrock Br	Boulder Bo	Cobble Co	Gravel Gr	Sand Sa	Silt Si	Clay Cl	Muck Mu	Detritus D

80

BANK STABILITY

	Stable	Slightly Unstable	Moderately Unstable	Unstable
Left Upstream Bank	O	O	Ø	O
Right Upstream Bank	O	O	Ø	O

HABITAT

IN-STREAM COVER (% surface area):	Undercut banks	Boulders	Cobble	Woody Debris	Organic debris	Vascular Macrophytes	None
	40	/	/	Instream 20 Overhanging 15	35	Instream / Overhanging /	/

SHORE COVER (% stream shaded):	100 – 90 %	90 – 60%	60- 30%	30 – 1%	None
	O	Ø	O	O	O

VEGETATION TYPE (%):	Submergent	Floating	Emergent	None
Predominant Species	/	/	/	

MIGRATORY OBSTRUCTIONS:	None	Seasonal	Permanent
	/	/	/

POTENTIAL CRITICAL HABITAT LIMITING:	Spawning	Evidence of Groundwater	Other
	/	/	/

POTENTIAL ENHANCEMENT OPPORTUNITIES:

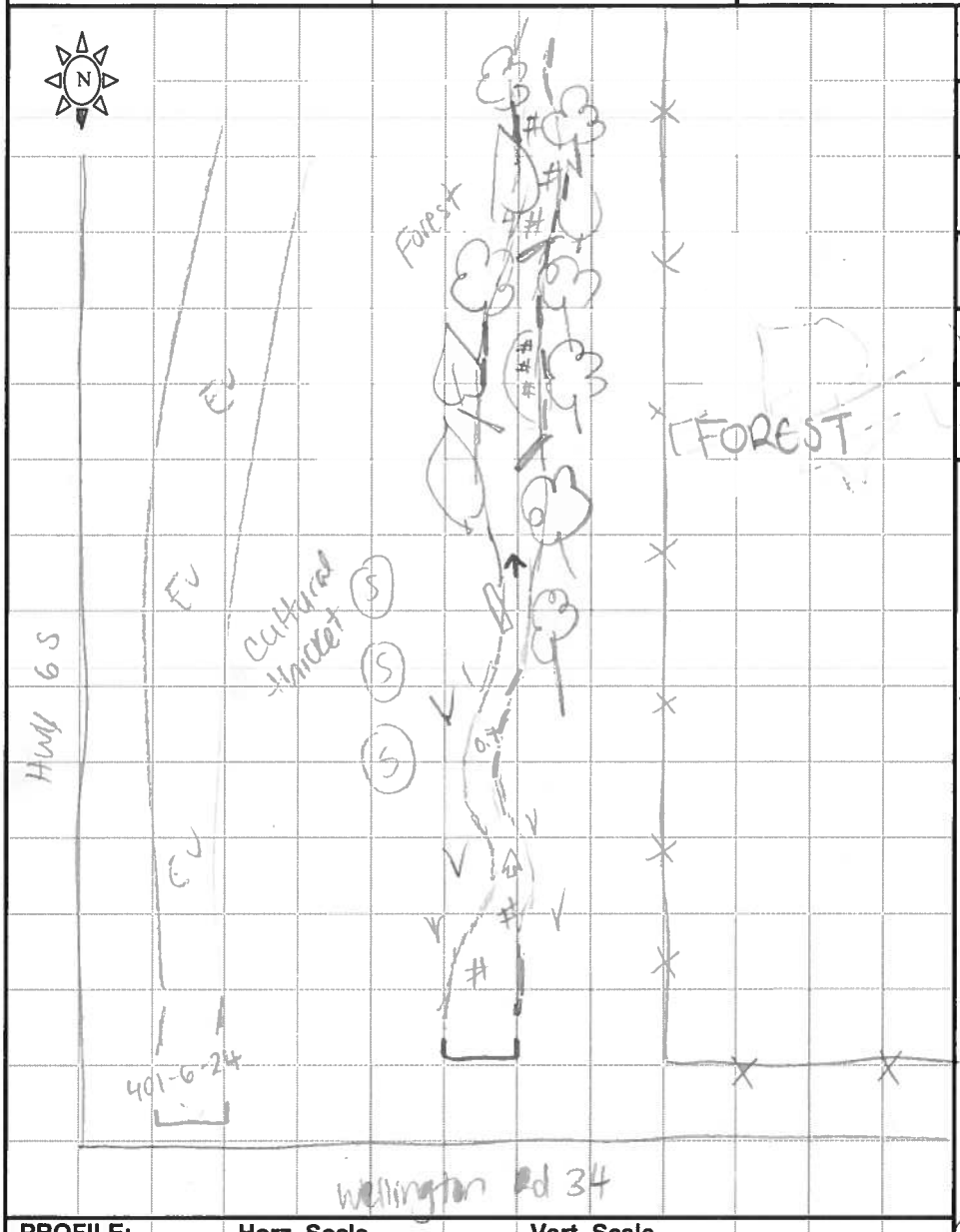
Bank Stabilization

COMMENTS:

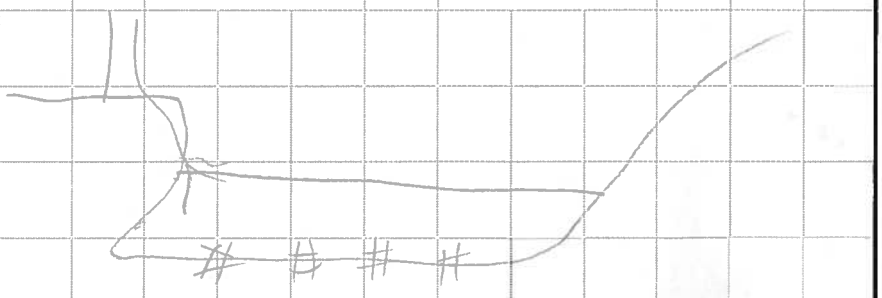
Permanent stream South of RR34 and west of hwy6 south. Stream has consolidated clay substrate with gravel and sand deposits throughout the study area. No aquatic vegetation was observed. Woody debris and smaller riparian trees that had fallen across the stream provide fish habitat. Moderate erosion of banks and significant undercuts provide fish habitat. The stream starts to slightly meander ~50m D/S of the culvert. Fish were observed within the study area

Additional Notes Appended? O No O Yes number of pages _____

SECTION IDENTIFIER:	SECTION LOCATION:	SECTION LENGTH (m):	SCALE (cm / m):
		200	



PROFILE: **Horz. Scale** **Vert. Scale**



PROJECT #: 60541071
MAPPER: OB
NAME OF WATERBODY: unnamed
CROSSING #:
STATION #: 401-6-25 ds
DATE: DD-MMM-YY 25-Jul-17

LEGEND

10d depth (cm)
6w width

➡ Riffle
⇨ Run/Glide
⬭ Pool
▮ Island/Bar

▒ Fine Substrate
Gravel Substrate

oOooO Cobble /Boulder
*** * *** Debris

CT Cattail
SV/FV Submerg/Float Veg

EV Emergent Vegetation
W Watercress

Fe Iron Staining
/////// Eroded Bank

XXX Riprap / Other Stabilization

⬭ Instream Log/Tree
^^^ Dam/Weir/Obstruction

® Riparian Tree

├► Seep/Spring
------- Undercut Bank

— Barrier to Fish Movement
-S- Seasonal Barrier

-x--x- Fence line
└┘ Culvert

GENERAL INFORMATION

PROJECT #:	PROJECT DESCRIPTION:	DAY:	MONTH:	YEAR:
60541071	401-6	26	07	2017

Is STREAM REALIGNMENT required for this section:

O Yes O No Ø Unknown

COLLECTORS:	WEATHER CONDITIONS:	TIME STARTED:	TIME FINISHED:
AG. CB.	Cloudy	1110	1130

AIR TEMP:	WATER TEMP:	CONDUCTIVITY (µS/cm):
20°C	18.0 °C	1085

PHOTO NUMBERS AND DESCRIPTIONS: 51-73

LOCATION

NAME OF WATERBODY:	DRAINAGE SYSTEM:	CROSSING #:	STATION #:
Unnamed	—	—	401-6-26015

LOCATION OF CROSSING: C.R. 34 west of Hwy 6 South

GPS COORDINATES:	MTO CHAINAGE:
17T 0565740 4811777	—

TOWNSHIP:	MNR DISTRICT:
	Aurora

LAND USE AND POLLUTION

SURROUNDING LAND USE:	SOURCES OF POLLUTION:
Mixed forest/wetland	Road runoff

EXISTING STRUCTURE TYPE

Bridge O	Box Culvert O	Open Foot Culvert O	CSP Ø	N/A O

Other O Describe: Size (w x h) m^2

SECTION TYPE AND MORPHOLOGY

SECTION IDENTIFIER:	SECTION LOCATION: (include on habitat map)
—	—

TYPE:	Stream / river	Channelized	Permanent	Intermittent	Ephemeral	ASSOCIATED WETLAND:
	O	O	Ø	O	O	—

TOTAL SECTION LENGTH (m): 200	CURRENT VELOCITY (m/s):

SUB-SECTION(S)	Run	Pool	Riffle	Flats	Inside culvert	Other
	O	O	O	Ø	O	wetland
Percentage of area	—	—	—	10	—	90
Mean depth wetted (m)	—	—	—	0.06	—	0.05
Mean width wetted (m)	—	—	—	undefined	—	undefined
Mean bankfull width (m)	—	—	—	undefined	—	undefined
Mean bankfull depth(m)	—	—	—	undefined	—	undefined
Substrate	—	—	—	Mu 50% D 50%	—	Mu 50% D 50%

Bedrock Br	Boulder Bo	Cobble Co	Gravel Gr	Sand Sa	Silt Si	Clay Cl	Muck Mu	Detritus D

BANK STABILITY

	Stable	Slightly Unstable	Moderately Unstable	Unstable
Left Upstream Bank	Ø	O	O	O
Right Upstream Bank	Ø	O	O	O

HABITAT

IN-STREAM COVER (% surface area):	Undercut banks	Boulders	Cobble	Woody Debris	Organic debris	Vascular Macrophytes	None
	/	/	/	Instream 20 Overhanging	/	Instream 90 Overhanging 70	/

SHORE COVER (% stream shaded):	100 – 90 %	90 – 60%	60- 30%	30 – 1%	None
	O	Ø	O	O	O

VEGETATION TYPE (%):	Submergent	Floating	Emergent	None
			100	
Predominant Species	/	/	cattails, grasses	

MIGRATORY OBSTRUCTIONS:	None	Seasonal	Permanent
	(None)		

POTENTIAL CRITICAL HABITAT LIMITING:	Spawning	Evidence of Groundwater	Other
	/	upwelling GW + Iron staining	/

POTENTIAL ENHANCEMENT OPPORTUNITIES:

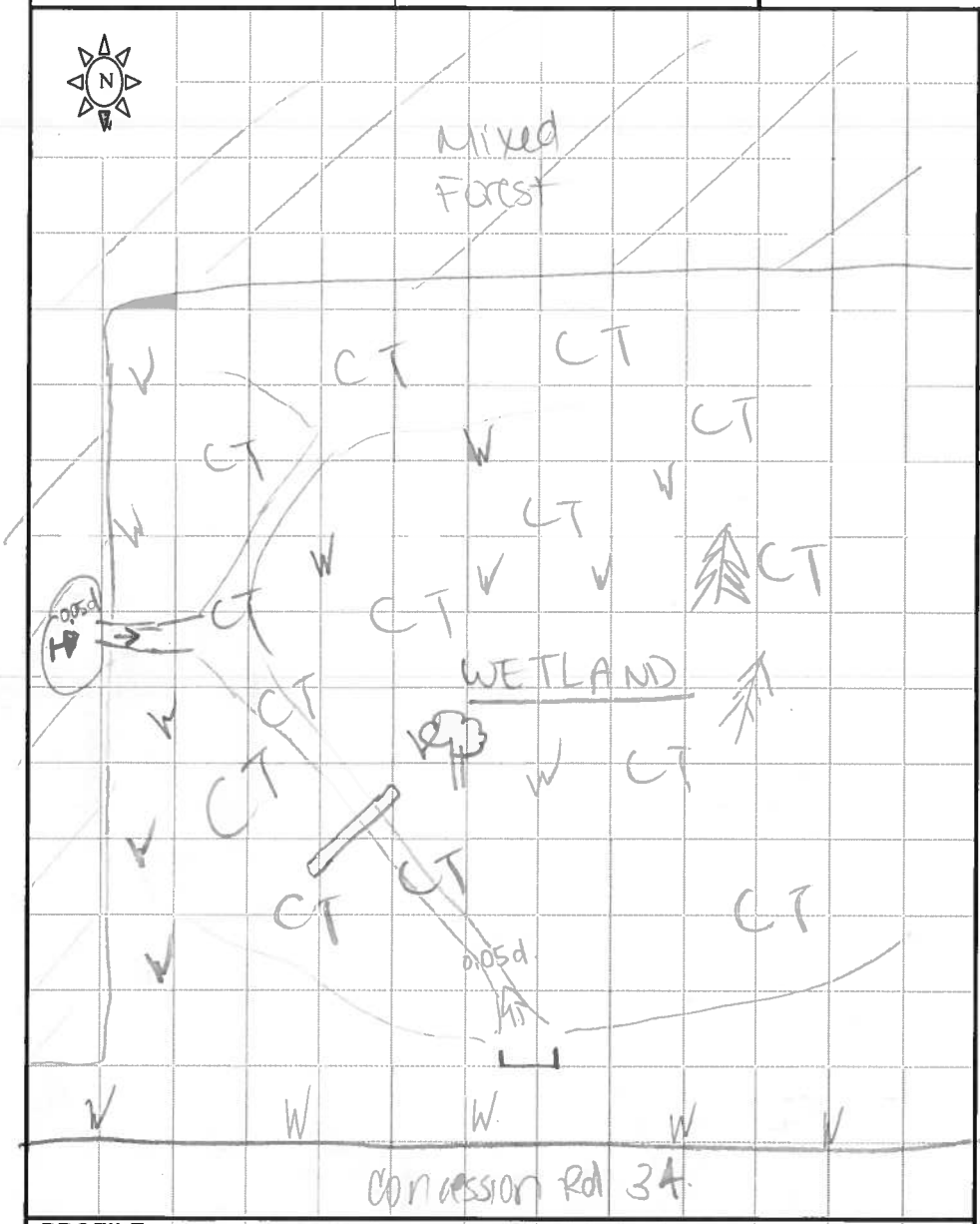
None.

COMMENTS:

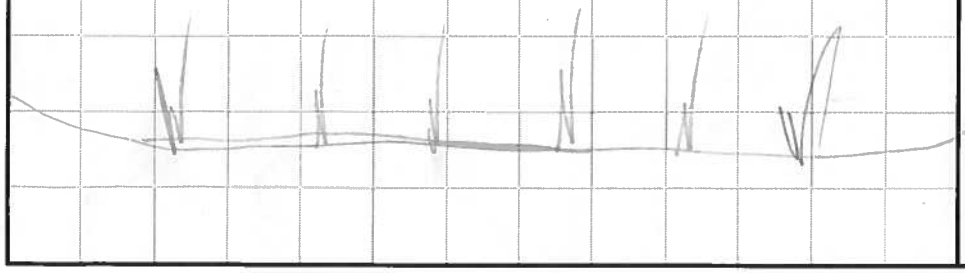
Permanent wetland drainage feature south of C.R. 34 and west of Hwy 6 south. Small amounts of flow observed within undefined wetland into mixed woodlot. Upwelling from spring in woodlot with significant iron staining noted, contributing flow. Bird breeding habitat present. Potential fish habitat.

Additional Notes Appended? O No O Yes **number of pages** _____

SECTION IDENTIFIER:	SECTION LOCATION:	SECTION LENGTH (m):	SCALE (cm / m):



PROFILE: **Horz. Scale** **Vert. Scale**



PROJECT #: 6054107l

MAPPER: OB

NAME OF WATERBODY: unnamed

CROSSING #: —

STATION #: 401-6-26 ds

DATE: DD-MMM-YY 26-Jul-17

LEGEND

10d depth (cm)
6w width

➡ Riffle
⇨ Run/Glide
⬭ Pool
▮ Island/Bar

⁘ Fine Substrate
Gravel Substrate

oOooO Cobble /Boulder
*** Debris

CT Cattail
SV/FV Submerg/Float Veg

EV Emergent Vegetation
W Watercress

Fe Iron Staining
/////// Eroded Bank

XXX Riprap / Other Stabilization

⊂⬭ Instream Log/Tree
^^^ Dam/Weir/Obstruction

® Riparian Tree

├► Seep/Spring
------- Undercut Bank

— Barrier to Fish Movement
-S- Seasonal Barrier

-x--x- Fence line
└┘ Culvert

GENERAL INFORMATION

PROJECT #:	PROJECT DESCRIPTION:	DAY:	MONTH:	YEAR:
60541071	401-6	25	07	2017

Is STREAM REALIGNMENT required for this section:

O Yes O No Ø Unknown

COLLECTORS:	WEATHER CONDITIONS:	TIME STARTED:	TIME FINISHED:
A.O, O.B.	Sunny	1445	1515

AIR TEMP:	WATER TEMP:	CONDUCTIVITY (µS/cm):
23°C	18.7	976.

PHOTO NUMBERS AND DESCRIPTIONS: 1-14

LOCATION

NAME OF WATERBODY:	DRAINAGE SYSTEM:	CROSSING #:	STATION #:
Unnamed	—	—	401-6-26 US

LOCATION OF CROSSING: west on RR34

GPS COORDINATES:	MTO CHAINAGE:
17T 565736 4811800	—
TOWNSHIP: Guelph	**MNR DISTRICT:** Aurora

LAND USE AND POLLUTION

SURROUNDING LAND USE:	SOURCES OF POLLUTION:
coniferous woodlot	runoff from roadway

EXISTING STRUCTURE TYPE

Bridge O	Box CulvertO	Open Foot Culvert O	CSP Ø	N/A O

Other O Describe: Size (w x h) m^2

SECTION TYPE AND MORPHOLOGY

SECTION IDENTIFIER:	SECTION LOCATION: (include on habitat map)
—	—

TYPE:	Stream / river	Channelized	Permanent	Intermittent	Ephemeral	ASSOCIATED WETLAND:
	O	O	Ø	O	O	—

TOTAL SECTION LENGTH (m):	CURRENT VELOCITY (m/s):
50	—

SUB-SECTION(S)	Run	Pool	Riffle	Flats	Inside culvert	Other
	Ø	O	O	O	O	Standing water
Percentage of area	15	—	—	—	—	95%
Mean depth wetted (m)	0.05	—	—	—	—	0.10
Mean width wetted (m)	0.30	—	—	—	—	undefined
Mean bankfull width (m)	undefined	—	—	—	—	undefined
Mean bankfull depth(m)	undefined.	—	—	—	—	undefined.
Substrate	Mu 100%	—	—	—	—	D50 Mu50

Bedrock Br	Boulder Bo	Cobble Co	Gravel Gr	Sand Sa	Silt Si	Clay Cl	Muck Mu	Detritus D

BANK STABILITY

	Stable	Slightly Unstable	Moderately Unstable	Unstable
Left Upstream Bank	Ø	O	O	O
Right Upstream Bank	Ø	O	O	O

HABITAT

IN-STREAM COVER (% surface area): 130	Undercut banks	Boulders	Cobble	Woody Debris — Instream 25 — Overhanging	Organic debris 35	Vascular Macrophytes — Instream 70% — Overhanging	None
	/	/	/				

SHORE COVER (% stream shaded):	100 – 90 %	90 – 60%	60- 30%	30 – 1%	None
	O	O	O	Ø	O

VEGETATION TYPE (%):	Submergent	Floating	Emergent 100%	None
Predominant Species	/	/	Cattails	

MIGRATORY OBSTRUCTIONS:	None	Seasonal	Permanent Cattails
	/	/	

POTENTIAL CRITICAL HABITAT LIMITING:	Spawning	Evidence of Groundwater Iron Staining	Other
	/		/

POTENTIAL ENHANCEMENT OPPORTUNITIES:

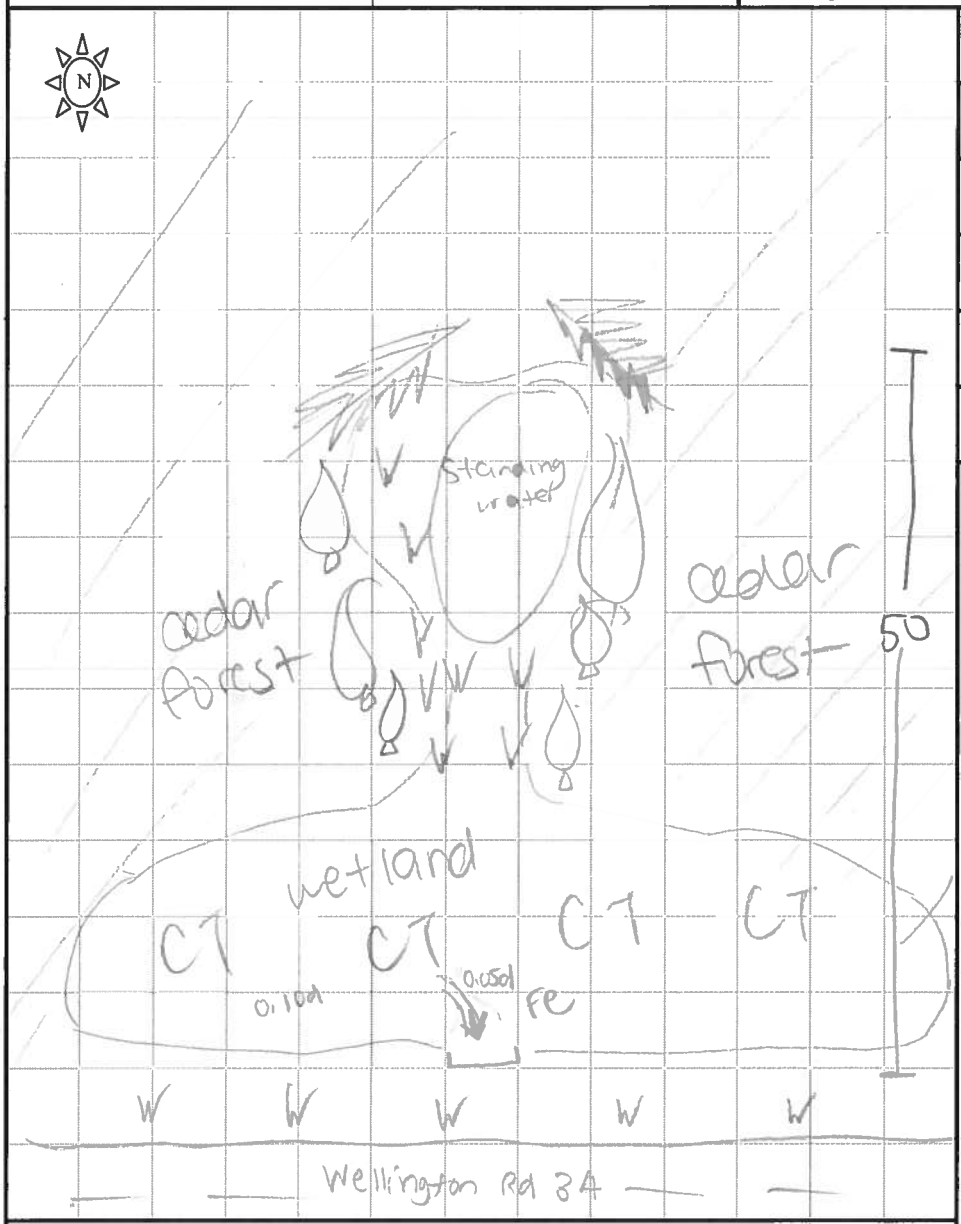
None

COMMENTS:

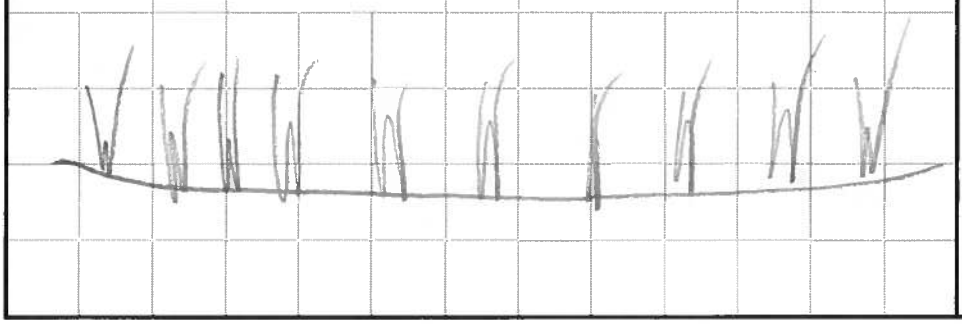
Wetland pocket north of RR34 receiving water draining from upstream through a coniferous woodlot. The majority of the wetland consists of standing water choked by cattails. Two small runs flow through the study area flowing into the culvert. The upstream area of the study site hass aquatic grasses and then no aquatic vegetation at the U/S extent. There is potential for fish habitat.

Additional Notes Appended? O No O Yes number of pages _____

SECTION IDENTIFIER:	SECTION LOCATION:	SECTION LENGTH (m):	SCALE (cm / m):
—	—	50	—



PROFILE: **Horz. Scale** **Vert. Scale**



PROJECT #: 60541071
MAPPER: OButh
NAME OF WATERBODY: unnamed
CROSSING #: —
STATION #: 401-6-26 US
DATE: DD-MMM-YY 25-Jul-17

LEGEND

10d depth (cm)
6w width

➡ Riffle
⇨ Run/Glide
⬭ Pool
▮ Island/Bar

⁘ Fine Substrate
Gravel Substrate

oOooO Cobble /Boulder
*** Debris

CT Cattail
SV/FV Submerg/Float Veg

EV Emergent Vegetation
W Watercress

Fe Iron Staining
////// Eroded Bank

XXX Riprap / Other Stabilization

⊂⊃ Instream Log/Tree
^^^ Dam/Weir/Obstruction

® Riparian Tree

├► Seep/Spring
------- Undercut Bank

— Barrier to Fish Movement
-S- Seasonal Barrier

-x--x- Fence line
⌴ Culvert

GENERAL INFORMATION

PROJECT #:	PROJECT DESCRIPTION:	DAY:	MONTH:	YEAR:
60541071	401-6	27	07	2017

Is STREAM REALIGNMENT required for this section:

O Yes O No Ø Unknown

COLLECTORS:	WEATHER CONDITIONS:	TIME STARTED:	TIME FINISHED:
A.D. OB	Cloudy, Drizzle	1000	1630

AIR TEMP:	WATER TEMP:	CONDUCTIVITY (µS/cm):
20°C	17.4°C	761

PHOTO NUMBERS AND DESCRIPTIONS: 167 - 179

LOCATION

NAME OF WATERBODY:	DRAINAGE SYSTEM:	CROSSING #:	STATION #:
Unnamed	—	—	401-6-30 u/s

LOCATION OF CROSSING: South of Concession Rd 7, at lot 4507

GPS COORDINATES:	MTO CHAINAGE:
NAD 0566627 4812728	—

TOWNSHIP:	MNR DISTRICT:
Guelph	Aurora

LAND USE AND POLLUTION

SURROUNDING LAND USE:	SOURCES OF POLLUTION:
Residential, Wetland.	Road runoff

EXISTING STRUCTURE TYPE

Bridge O	Box CulvertO	Open Foot Culvert O	CSP Ø	N/A O

Other O Describe: Size (w x h) m^2

SECTION TYPE AND MORPHOLOGY

SECTION IDENTIFIER:	SECTION LOCATION: (include on habitat map)
—	—

TYPE:	Stream / river	Channelized	Permanent	Intermittent	Ephemeral	ASSOCIATED WETLAND:
	O	O	Ø	O	O	—

TOTAL SECTION LENGTH (m):	CURRENT VELOCITY (m/s):
50	—

SUB-SECTION(S)	Run	Pool	Riffle	Flats	Inside culvert	Other
	O	O	O	Ø	O	Standing water
Percentage of area	—	—	—	80	—	20
Mean depth wetted (m)	—	—	—	0.1	—	0.15
Mean width wetted (m)	—	—	—	0.7	—	0.40
Mean bankfull width (m)	—	—	—	undefined	—	undefined
Mean bankfull depth(m)	—	—	—	undefined	—	undefined
Substrate	—	—	—	Mu 50% Si 20% D30%	—	Mu 50% Si 20% D30%

Bedrock Br	Boulder Bo	Cobble Co	Gravel Gr	Sand Sa	Silt Si	Clay Cl	Muck Mu	Detritus D

BANK STABILITY

	Stable	Slightly Unstable	Moderately Unstable	Unstable
Left Upstream Bank	O	O	O	O
Right Upstream Bank	O	O	O	O

HABITAT

IN-STREAM COVER (% surface area):	Undercut banks	Boulders	Cobble	Woody Debris	Organic debris	Vascular Macrophytes	None
				Instream	30%	Instream 90%	
				Overhanging		Overhanging 40%	

SHORE COVER (% stream shaded):	100 – 90 %	90 – 60%	60- 30%	30 – 1%	None
	O	O	O	O	O

VEGETATION TYPE (%):	Submergent	Floating	Emergent	None
Predominant Species			Cattails	

MIGRATORY OBSTRUCTIONS:	None	Seasonal	Permanent
POTENTIAL CRITICAL HABITAT LIMITING:	Spawning	Evidence of Groundwater: Iron Staining	Other

POTENTIAL ENHANCEMENT OPPORTUNITIES:

None

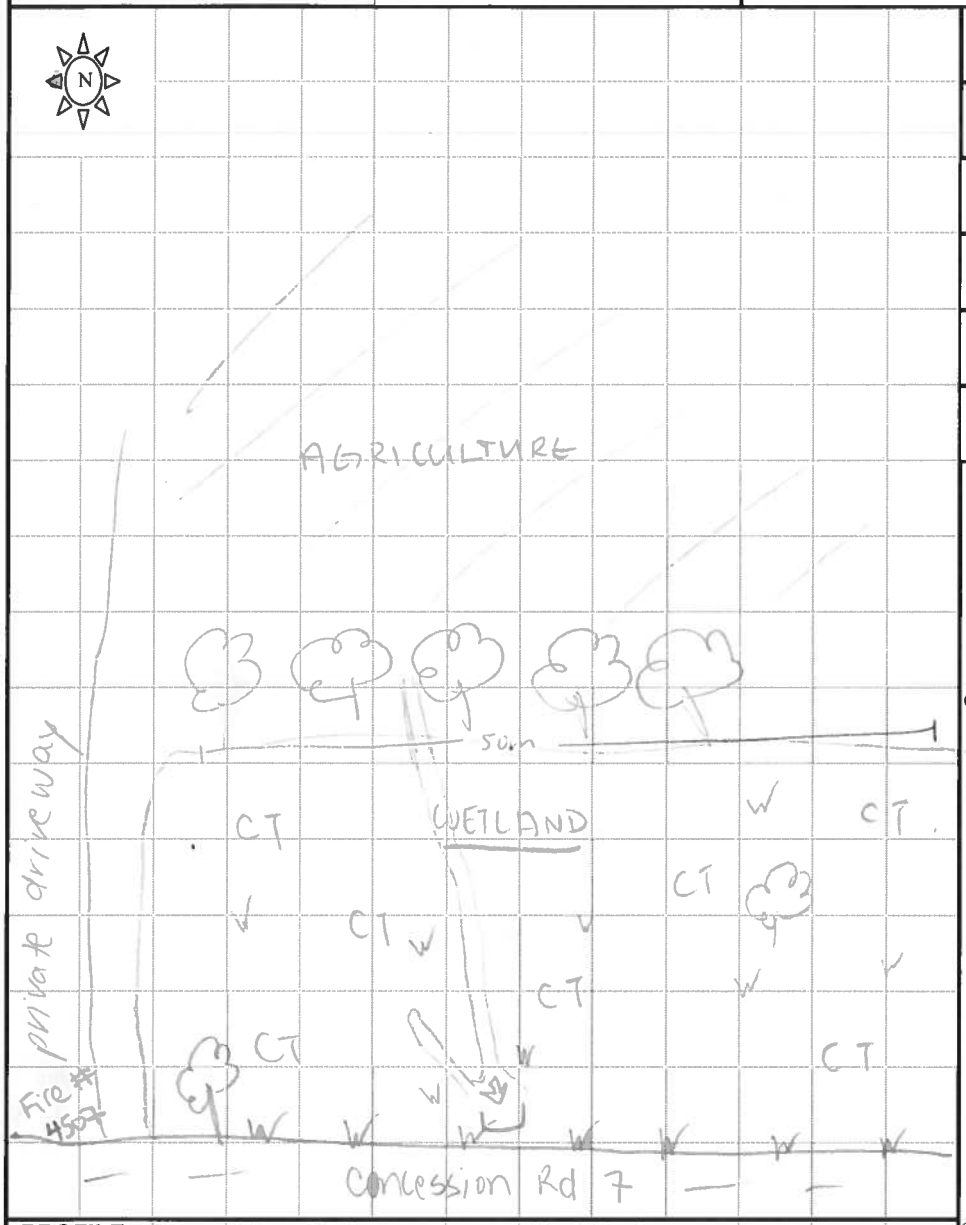
COMMENTS:

Permanent wetland feature South on C.R. 7. Small flow through wetland, though no defined channel. Cattails and overhanging vegetation present. Potential fish habitat. Bird breeding habitat.

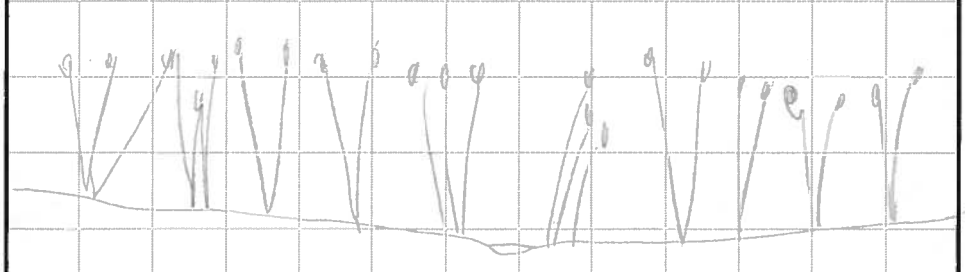
Notes: Provincially Evaluated Wetland.

Additional Notes Appended? O No O Yes number of pages _____

SECTION IDENTIFIER:	SECTION LOCATION:	SECTION LENGTH (m):	SCALE (cm / m):
—	—	50	—



PROFILE: **Horz. Scale** **Vert. Scale**



PROJECT #: 60541071

MAPPER: O. Bilhan

NAME OF WATERBODY: unnamed

CROSSING #: —

STATION #: 401-6-30US

DATE: DD-MMM-YY 27-Jul-17

LEGEND

10d depth (cm)
6w width

➡ Riffle
⇨ Run/Glide
⬭ Pool
▮ Island/Bar

⁘ Fine Substrate
Gravel Substrate

oOooO Cobble /Boulder
*** Debris

CT Cattail
SV/FV Submerg/Float Veg

EV Emergent Vegetation
W Watercress

Fe Iron Staining
/////// Eroded Bank

XXX Riprap / Other Stabilization

⬭ Instream Log/Tree
^^^ Dam/Weir/Obstruction

® Riparian Tree

├► Seep/Spring
------- Undercut Bank

— Barrier to Fish Movement
-S- Seasonal Barrier

-x--x- Fence line
└┘ Culvert

GENERAL INFORMATION

PROJECT #:	PROJECT DESCRIPTION:	DAY:	MONTH:	YEAR:
60541071	401-6	27	Jul	2017

Is STREAM REALIGNMENT required for this section:

O Yes O No O Unknown

COLLECTORS:	WEATHER CONDITIONS:	TIME STARTED:	TIME FINISHED:
AO, DB	light rain	10:30	10:45

AIR TEMP:	WATER TEMP:	CONDUCTIVITY (µS/cm):
17	17.4	761

PHOTO NUMBERS AND DESCRIPTIONS: 180 - 186

LOCATION

NAME OF WATERBODY:	DRAINAGE SYSTEM:	CROSSING #:	STATION #:
unnamed wetland	—		401-6-30ds

LOCATION OF CROSSING: Concession Rd 7 @ File number 4507

GPS COORDINATES:	MTO CHAINAGE:
0566619 4812720	—
TOWNSHIP: Guelph	**MNR DISTRICT:** —

LAND USE AND POLLUTION

SURROUNDING LAND USE:	SOURCES OF POLLUTION:
Forest, wetland, road	overland flow

EXISTING STRUCTURE TYPE

Bridge O	Box Culvert O	Open Foot Culvert O	CSP X	N/A O

Other O Describe: Size (w x h) m^2 —

SECTION TYPE AND MORPHOLOGY

SECTION IDENTIFIER:	SECTION LOCATION: (include on habitat map)
—	—

TYPE:	Stream / river	Channelized	Permanent	Intermittent	Ephemeral	ASSOCIATED WETLAND:
	O	O	X	O	O	site is wetland.

TOTAL SECTION LENGTH (m):	CURRENT VELOCITY (m/s):
200	—

SUB-SECTION(S)	Run	Pool	Riffle	Flats	Inside culvert	Other
	O	O	O	O	O	
Percentage of area				100		
Mean depth wetted (m)				0.25		
Mean width wetted (m)				0.3		
Mean bankfull width (m)						
Mean bankfull depth(m)				UNDEFINED		
Substrate				100 Mu		

Bedrock Br	Boulder Bo	Cobble Co	Gravel Gr	Sand Sa	Silt Si	Clay Cl	Muck Mu	Detritus D

BANK STABILITY

	Stable	Slightly Unstable	Moderately Unstable	Unstable
Left Upstream Bank	X	O	O	O
Right Upstream Bank	X	O	O	O

HABITAT

IN-STREAM COVER (% surface area):	Undercut banks	Boulders	Cobble	Woody Debris	Organic debris	Vascular Macrophytes	None
	—	—	—	Instream — Overhanging —	—	Instream 40 Overhanging 50	10

SHORE COVER (% stream shaded):	100 – 90 %	90 – 60%	60- 30%	30 – 1%	None
	O	X	O	O	O

VEGETATION TYPE (%):	Submergent	Floating	Emergent	None
	—	—	100	
Predominant Species	—	—	Cat tails	—

MIGRATORY OBSTRUCTIONS:	None	Seasonal	Permanent
		—	—

POTENTIAL CRITICAL HABITAT LIMITING:	Spawning	Evidence of Groundwater	Other
	—	—	—

POTENTIAL ENHANCEMENT OPPORTUNITIES:

None

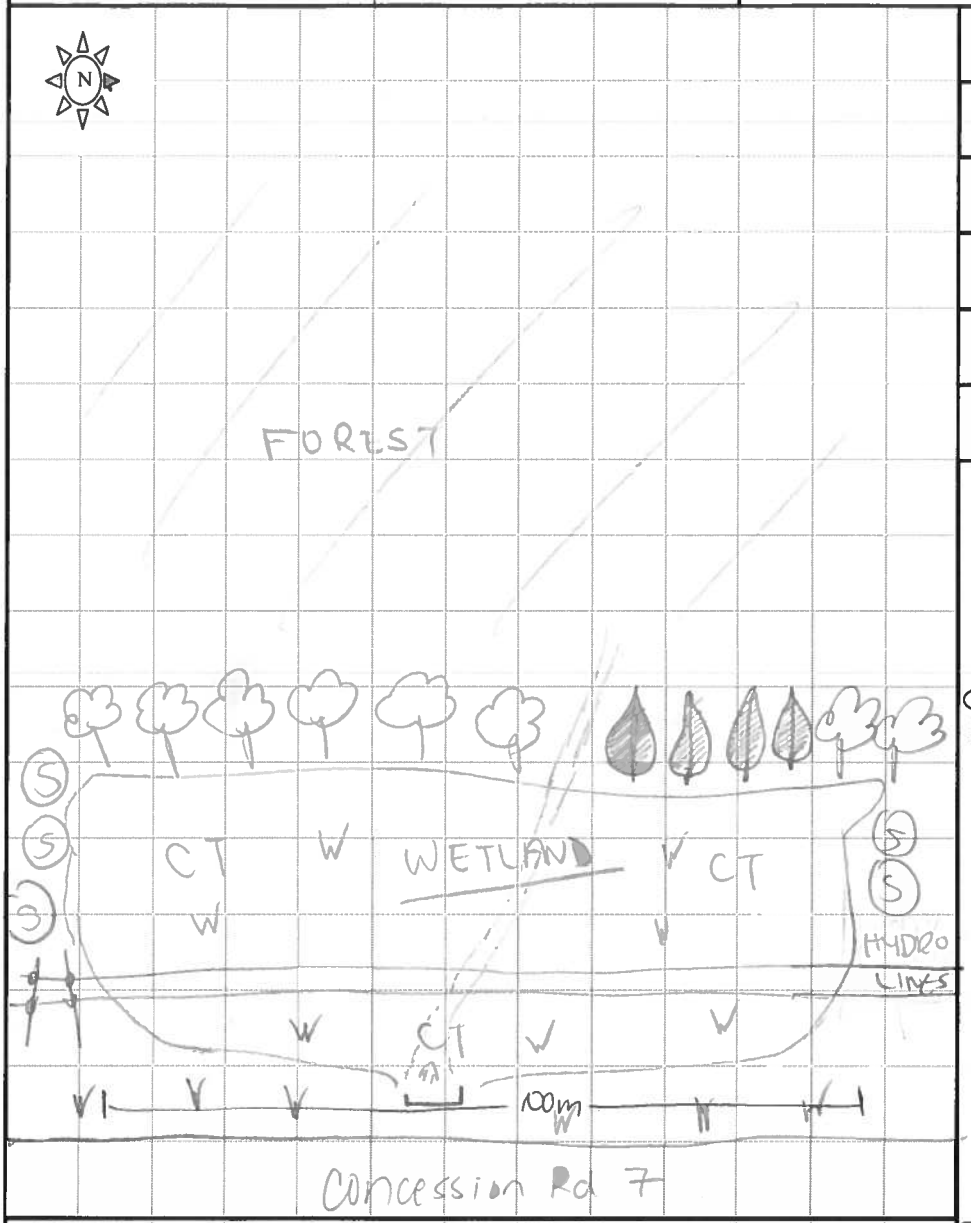
COMMENTS:

- permanent wetland feature crossing concession Rd 7 with flowing water through mixed forest
- potential fish habitat
- breeding bird + amphibian habitat
- soft substrate, narrow channel, abundant aquatic + terrestrial vegetation

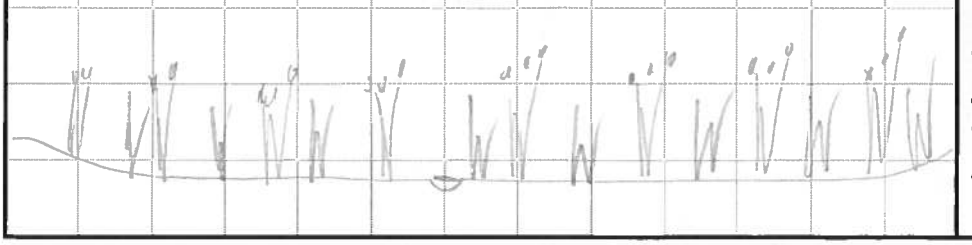
Note: Provincially Evaluated Wetland

Additional Notes Appended? O No O Yes number of pages _____

SECTION IDENTIFIER:	SECTION LOCATION:	SECTION LENGTH (m):	SCALE (cm / m):
—	—	200	—



PROFILE: **Horz. Scale** **Vert. Scale**



PROJECT #: 60541071

MAPPER: CB

NAME OF WATERBODY: unnamed

CROSSING #: —

STATION #: 401-6-30ds

DATE: DD-MMM-YY 27 Jul-17

LEGEND

10d depth (cm)
6w width

➡ Riffle
⇨ Run/Glide
⬭ Pool
▮ Island/Bar

⁘ Fine Substrate
Gravel Substrate
oOooO Cobble /Boulder
*** Debris

CT Cattail
SV/FV Submerg/Float Veg

EV Emergent Vegetation
W Watercress

Fe Iron Staining
/////// Eroded Bank

XXX Riprap / Other Stabilization

⊂⊃ Instream Log/Tree
^^^ Dam/Weir/Obstruction

® Riparian Tree

├► Seep/Spring
------- Undercut Bank

— Barrier to Fish Movement
-S- Seasonal Barrier

-x--x- Fence line
└┘ Culvert

GENERAL INFORMATION

PROJECT #:	PROJECT DESCRIPTION:	DAY:	MONTH:	YEAR:
60541071	401-6	26	07	2017

Is STREAM REALIGNMENT required for this section:

O Yes O No ⊗ Unknown

COLLECTORS:	WEATHER CONDITIONS:	TIME STARTED:	TIME FINISHED:
AO. OB.	Cloudy	1300	1330

AIR TEMP:	WATER TEMP:	CONDUCTIVITY (µS/cm):
21°C	14.1	881

PHOTO NUMBERS AND DESCRIPTIONS: 74 - 95

LOCATION

NAME OF WATERBODY:	DRAINAGE SYSTEM:	CROSSING #:	STATION #:
	/	/	401-6-3175

LOCATION OF CROSSING: Hwy 6 South, South of C.R. 34

GPS COORDINATES:	MTO CHAINAGE:
17T 0566345 4811690	/
TOWNSHIP: Guelph	**MNR DISTRICT:** Aurora

LAND USE AND POLLUTION

SURROUNDING LAND USE:	SOURCES OF POLLUTION:
Mixed forest, private property, hwy	Hwy runoff

EXISTING STRUCTURE TYPE

Bridge O	Box Culvert O	Open Foot Culvert O	CSP ⊗	N/A O

Other O Describe: Size (w x h) m^2

SECTION TYPE AND MORPHOLOGY

SECTION IDENTIFIER:	SECTION LOCATION: (include on habitat map)
/	/

TYPE:	Stream / river	Channelized	Permanent	Intermittent	Ephemeral	ASSOCIATED WETLAND:
	⊗	O	⊗	O	O	/

TOTAL SECTION LENGTH (m):	CURRENT VELOCITY (m/s):
	/

SUB-SECTION(S)	Run O	Pool O	Riffle O	Flats O	Inside culvert O	Other
Percentage of area	50	—	10	40	—	—
Mean depth wetted (m)	0.30	—	0.12	0.15	—	—
Mean width wetted (m)	1.3	—	1.0	1.4	—	—
Mean bankfull width (m)	1.5	—	1.2	1.5	—	—
Mean bankfull depth(m)	0.70	—	0.24	0.95	—	—
Substrate	80% Sa, 20% Cl	—	90% Cl 10%	90% Sa 10% D	—	—

Bedrock Br	Boulder Bo	Cobble Co	Gravel Gr	Sand Sa	Silt Si	Clay Cl	Muck Mu	Detritus D

GENERAL INFORMATION

PROJECT #:	PROJECT DESCRIPTION:	DAY:	MONTH:	YEAR:
60541071	401-6	17	May	2018

Is STREAM REALIGNMENT required for this section:

O Yes ☒ No O Unknown

COLLECTORS:	WEATHER CONDITIONS:	TIME STARTED:	TIME FINISHED:
MG.OB, AA, ER	20 sunny no wind	09.50	

AIR TEMP:	WATER TEMP:	CONDUCTIVITY ~~(µS/cm)~~:
20°	13°C	0.84 ms/cm

PHOTO NUMBERS AND DESCRIPTIONS:

LOCATION

NAME OF WATERBODY:	DRAINAGE SYSTEM:	CROSSING #:	STATION #:
unnamed	Mill Creek		

LOCATION OF CROSSING: 401-6-26 US

County Rd 34, unnamed watercourse

GPS COORDINATES:	MTO CHAINAGE:
17T 0561633 4815062	
TOWNSHIP: Guelph	**MNR DISTRICT:** Guelph

LAND USE AND POLLUTION

SURROUNDING LAND USE:	SOURCES OF POLLUTION:
wetland, surrounding mixed coniferous forest.	Road runoff. Agricultural runoff u/s

EXISTING STRUCTURE TYPE

Bridge O	Box CulvertO	Open Foot Culvert O	CSP ☒	N/A O

Other O Describe: Size (w x h) m^2 .50 x .50

SECTION TYPE AND MORPHOLOGY

SECTION IDENTIFIER:	SECTION LOCATION: (include on habitat map)
50m u/s	N. of County Road 34

TYPE:	Stream / river	Channelized	Permanent	Intermittent	Ephemeral	ASSOCIATED WETLAND:
	O	O	☒	☒	O	

TOTAL SECTION LENGTH (m):	CURRENT VELOCITY (m/s):
50	—

SUB-SECTION(S)	Run	Pool	Riffle	Flats	Inside culvert	Other
	O	O	O	O	O	wetland
Percentage of area	10	30	10			50
Mean depth wetted (m)	0.18	0.05	0.04, 0.11, avg =			—
Mean width wetted (m)	0.3	44	0.25, 0.32, avg.			—
Mean bankfull width (m)	within	greater	wetland			—
Mean bankfull depth(m)	—					—
Substrate	66 33 D>Mu	D>Mu	D>Mu			507 507 Mu ≥ D

Bedrock Br	Boulder Bo	Cobble Co	Gravel Gr	Sand Sa	Silt Si	Clay Cl	Muck Mu	Detritus D

undefined (wetland)

BANK STABILITY	Stable	Slightly Unstable	Moderately Unstable	Unstable
Left Upstream Bank	O	O	O	O
Right Upstream Bank	O	O	O	O

HABITAT								
IN-STREAM COVER (% surface area): 80	Undercut banks	Boulders	Cobble	Woody Debris: Instream / Overhanging	Organic debris: 10	Vascular Macrophytes: Instream 90 / Overhanging 10	None

SHORE COVER (% stream shaded):	100 – 90 %	90 – 60%	60- 30%	30 – 1%	None
	O	O	O	O	O

VEGETATION TYPE (%):	Submergent	Floating	Emergent	None
	—	—	100	
Predominant Species	—	—	Typha sp.	

MIGRATORY OBSTRUCTIONS:	None —	Seasonal ✓ Ephemeral u/s (dry)	Permanent —
POTENTIAL CRITICAL HABITAT LIMITING:	Spawning ✓ gravid Central mudminnow observed	Evidence of Groundwater ✓ upwelling, oil, Fe	Other —

POTENTIAL ENHANCEMENT OPPORTUNITIES:

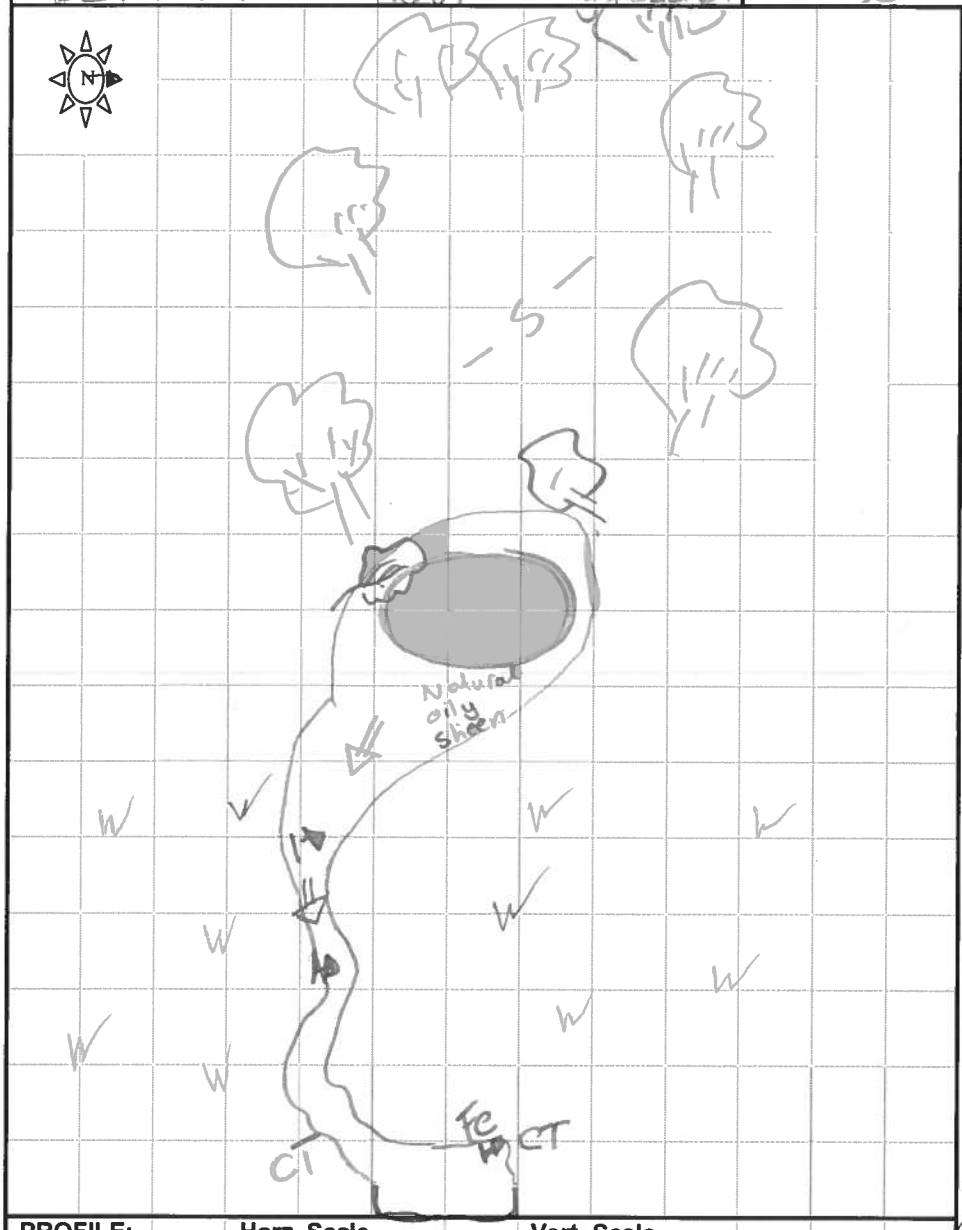
- groundwater upwelling immediatly u/s of culvert; open bottom box culvert to maintain gw flow.
-

COMMENTS:

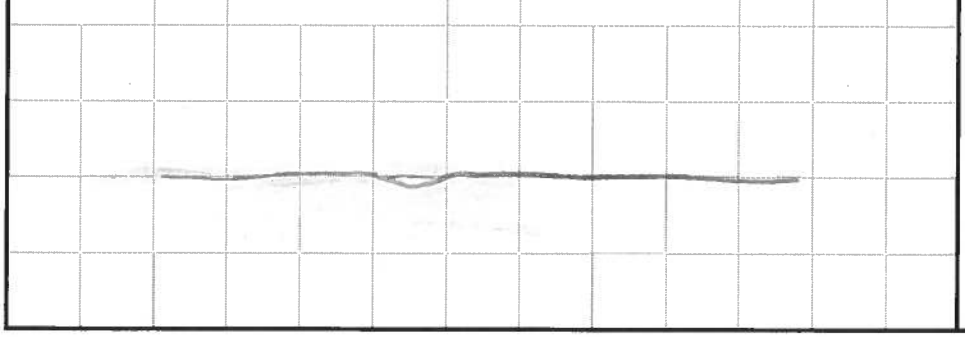
- Central Mudminnow, female gravid
- Green Frog
- Groundwater upwelling, evidence oil sheen (natural), iron staining ↳ headwater area.
- Channel unconfined, wetland extends ~30 m @ roadway; undefined dry channel ~25 m u/s of culvert (ephemeral flow – evidence of veg bent by surface flow) intermittently draining from u/s wetland.

Additional Notes Appended? O No O Yes **number of pages** _____

SECTION IDENTIFIER:	SECTION LOCATION:	SECTION LENGTH (m):	SCALE (cm / m):
50m U/S	N of County Road 34	50	



PROFILE: **Horz. Scale** **Vert. Scale**



PROJECT #: 605 41071

MAPPER: E. Patainude

NAME OF WATERBODY: 401-6-26US

CROSSING #:

STATION #:

DATE: DD-MMM-YY 17-May-18

LEGEND

10d depth (cm)
6w width

➡ Riffle
⇨ Run/Glide
⬭ Pool
▮ Island/Bar

⁘ Fine Substrate
Gravel Substrate

oOooO Cobble /Boulder
*** * *** Debris

CT Cattail
SV/FV Submerg/Float Veg

EV Emergent Vegetation
W Watercress

Fe Iron Staining
/////// Eroded Bank

XXX Riprap / Other Stabilization

⊂⬭ Instream Log/Tree
^^^ Dam/Weir/Obstruction

® Riparian Tree

├► Seep/Spring
-------- Undercut Bank

— Barrier to Fish Movement
-S- Seasonal Barrier

-x--x- Fence line
└┘ Culvert

GENERAL INFORMATION

PROJECT #:	PROJECT DESCRIPTION:	DAY:	MONTH:	YEAR:
60541071	401-6	26	07	2017

Is STREAM REALIGNMENT required for this section:

O Yes O No ⊗ Unknown

COLLECTORS:	WEATHER CONDITIONS:	TIME STARTED:	TIME FINISHED:
AO. OB.	Cloudy	1300	1330

AIR TEMP:	WATER TEMP:	CONDUCTIVITY (µS/cm):
21°C	14.1	881

PHOTO NUMBERS AND DESCRIPTIONS: 74 - 95

LOCATION

NAME OF WATERBODY:	DRAINAGE SYSTEM:	CROSSING #:	STATION #:
	/	/	401-6-3175

LOCATION OF CROSSING: Hwy 6 South, South of C.R. 34

GPS COORDINATES:	MTO CHAINAGE:
17T 0566345 4811690	/
TOWNSHIP: Guelph	**MNR DISTRICT:** Aurora

LAND USE AND POLLUTION

SURROUNDING LAND USE:	SOURCES OF POLLUTION:
Mixed forest, private property, hwy	Hwy runoff

EXISTING STRUCTURE TYPE

Bridge O	Box Culvert O	Open Foot Culvert O	CSP ⊗	N/A O

Other O Describe: Size (w x h) m^2

SECTION TYPE AND MORPHOLOGY

SECTION IDENTIFIER:	SECTION LOCATION: (include on habitat map)
/	/

TYPE:	Stream / river	Channelized	Permanent	Intermittent	Ephemeral	ASSOCIATED WETLAND:
	⊗	O	⊗	O	O	/

TOTAL SECTION LENGTH (m):	CURRENT VELOCITY (m/s):
	/

SUB-SECTION(S)	Run O	Pool O	Riffle O	Flats O	Inside culvert O	Other
Percentage of area	50	—	10	40	—	—
Mean depth wetted (m)	0.30	—	0.12	0.15	—	—
Mean width wetted (m)	1.3	—	1.0	1.4	—	—
Mean bankfull width (m)	1.5	—	1.2	1.5	—	—
Mean bankfull depth(m)	0.70	—	0.24	0.95	—	—
Substrate	80% Sa, 20% Cl	—	90% Cl 10%	90% Sa 10% D	—	—

Bedrock Br	Boulder Bo	Cobble Co	Gravel Gr	Sand Sa	Silt Si	Clay Cl	Muck Mu	Detritus D

BANK STABILITY

	Stable	Slightly Unstable	Moderately Unstable	Unstable
Left Upstream Bank	O	Ø	O	O
Right Upstream Bank	O	Ø	O	O

HABITAT

IN-STREAM COVER (% surface area):	Undercut banks	Boulders	Cobble	Woody Debris	Organic debris	Vascular Macrophytes	None
	40%	/	/	Instream 20% / Overhanging /	80%	Instream 50% / Overhanging	/

SHORE COVER (% stream shaded):	100 – 90 %	90 – 60%	60- 30%	30 – 1%	None
	O	O	Ø	O	O

VEGETATION TYPE (%):	Submergent	Floating	Emergent	None
	20%	/	80%	/
Predominant Species	Watercress	/	Watercress	

MIGRATORY OBSTRUCTIONS:	None	Seasonal	Permanent
		/	/

POTENTIAL CRITICAL HABITAT LIMITING:	Spawning	Evidence of Groundwater	Other
	/	Watercress	/

POTENTIAL ENHANCEMENT OPPORTUNITIES:

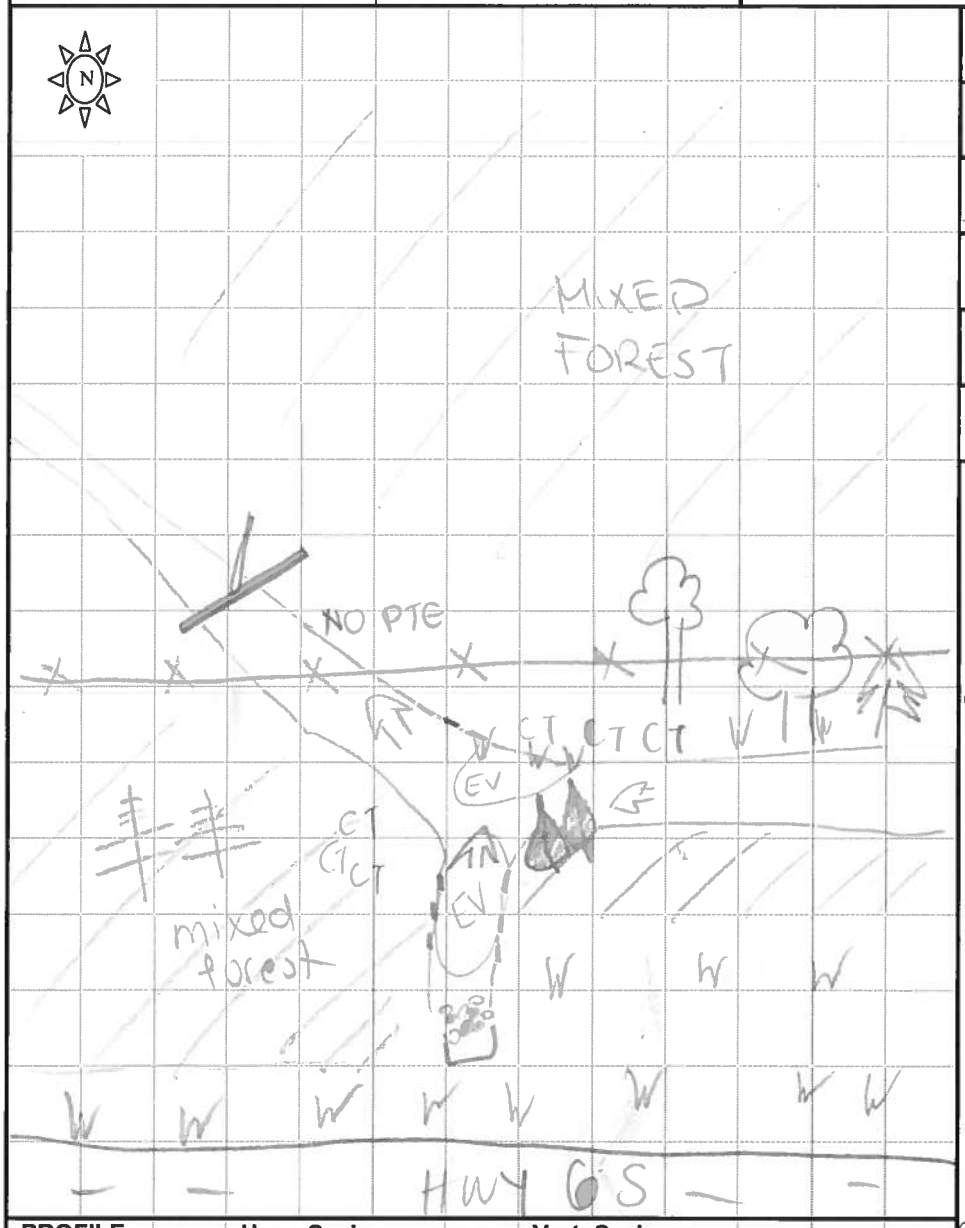
None.

COMMENTS:

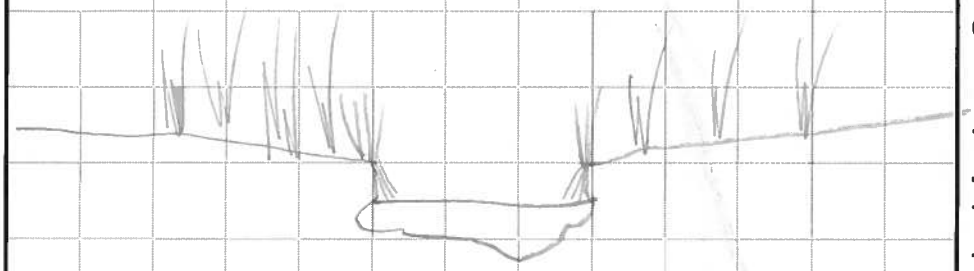
Permanent stream that has a confluence w 401-6-25015. Could only access 10m of watercourse without PTE. Fish observed in watercourse. Noted abundance of caddisflies. Large patches of watercress. Cobble, a few boulders, sand and gravel at wing-walled CSP. Majority of substrate was sand.

Additional Notes Appended? O No O Yes number of pages _____

SECTION IDENTIFIER:	SECTION LOCATION:	SECTION LENGTH (m):	SCALE (cm / m):



PROFILE: **Horz. Scale** **Vert. Scale**



PROJECT #: 60541071

MAPPER: FB

NAME OF WATERBODY: trib of McCrimmons Ck

CROSSING #: —

STATION #: 401-6-31ds

DATE: DD-MMM-YY 26-07-2017

LEGEND

10d depth (cm)
6w width

➡ Riffle
⇨ Run/Glide
⬭ Pool
▮ Island/Bar

⁘ Fine Substrate
Gravel Substrate

oOooO Cobble /Boulder
*** * *** Debris

CT Cattail
SV/FV Submerg/Float Veg

EV Emergent Vegetation
W Watercress

Fe Iron Staining
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XXX Riprap / Other Stabilization

⬭ Instream Log/Tree
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® Riparian Tree

├► Seep/Spring
------- Undercut Bank

— Barrier to Fish Movement
-S- Seasonal Barrier

-x--x- Fence line
⌴ Culvert

AECOM Imagine it. Delivered.

Appendix E

Aquatic Effects Assessment Table (Template D3)

Ministry of Transportation

TEMPLATE D3: AQUATIC EFFECTS ASSESSMENT SUMMARY TABLE FOR ALL FISH BEARING WATERCOURSE CROSSINGS

Pathway of Effect(s)	Stressor (Potential Impact)	Mitigation Measures (MTO 2020)	Residual Effects
B2 – Use of Industrial Equipment	▪ Use of mobile industrial equipment may promote changes to bank stability/exposed soils, re-suspension and entrainment of sediment and oil/grease/fuel leaks that can result in: – potential for mortality of fish/egg/ova from equipment; – change in sediment concentration; and – change in contaminant concentration.	**R-1 – Waterbody Bank** • Minimize the removal of natural woody debris, rocks or other materials from the banks or the shoreline of the waterbody. • Stabilize and reinforce banks of waterbody to pre-disturbance condition (or better) using properly designed and installed stabilization measures: • − Avoid hard engineering (sheet pile or other vertical walls). • − May include vegetation (e.g. tree and shrub plantings, bioengineering), rock/stone material (e.g. rip-rap, boulders). • − If rock reinforcement/armouring is required, ensure that appropriately-sized material is used and is installed at a similar slope to the existing, maintains a uniform bank/shoreline and maintains a natural bank/shoreline alignment such that it does not interfere with fish passage or alter the bankfull channel profile. − May incorporate temporary measures (e.g. biodegradable materials, 'nurse'-crop vegetation) to provide interim stabilization until vegetation fully established. **R-3 - Exposed Soils/Surfaces** ▪ Stabilize and re-vegetate (or use other materials appropriate to site conditions) all areas of disturbed/exposed soil that drain to a waterbody using: ▪ − Targeted planting of appropriate vegetation. ▪ − Rolled erosion control blankets, topsoil, seed, mulch etc. ▪ − Installation of appropriately designed structural materials and vegetation if feasible on steep slopes to maintain slope stability for the long term. Direct drainage away [=] from slopes unless structure provided to take drainage into valley without erosion and risk of sedimentation. **M-2 – Dewatering Discharge** • Manage and treat dewatering (or other) discharge water to prevent erosion and/or release of sediment-laden or contaminated water to the waterbody. Considerations: − Use of appropriately designed and sited temporary settling basin, filter bag, etc. such that sediment is filtered out prior to the water entering a waterbody. − Use of energy dissipation measures to prevent bank or bed erosion. **M-3 – Equipment** • Whenever possible, operate machinery on land above the high-water level, on ice, or from a floating barge in a manner that minimizes disturbance to the banks and bed of the waterbody. • Operate, store and maintain (e.g. refuel, lubricate) all equipment, vehicles and associated materials in a manner that prevents the entry of any deleterious substance from entering the water. • Any part of equipment entering the water or operating on the bank shall be free of fluid leaks, invasive species and noxious weeds and externally cleaned/degreased to prevent any deleterious substance from entering the water. **M-4 - Erosion and Sediment Controls** ▪ Design and implement erosion and sediment controls to contain/isolate the construction zone, manage site drainage/runoff and prevent erosion of exposed soils and migration of sediment to adjacent waterbody during all phases of the project. ▪ Erosion and sediment control measures should be 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. The plan should, where applicable, include: ▪ − Installation of effective erosion and sediment control measures before starting work to prevent sediment from entering the waterbody. ▪ − Regular inspection and maintenance of erosion and sediment control measures and structures during construction. ▪ − Repairs to erosion and sediment control measures and structures if damage occurs. ▪ − Removal of non-biodegradable erosion and sediment control materials once site is stabilized. **M-9 – Spills** • Ensure Spill Management Plan (including spill kit materials, instructions regarding their use, education of contract personnel, emergency contact numbers) on-site at all times for immediate implementation in event of accidental spill. **M-10 – Temporary Flow** ▪ Design and implement isolation/containment plan to isolate temporary in-water work zones to maintain clean flow downstream/around the work zone at all times. The design should: − Use only clean materials free of particulate matter for temporary coffer dams. − Situate or otherwise manage flow withdrawal and discharge (e.g. see dewatering discharge) to prevent erosion and sediment release to the waterbody.	None.

Pathway of Effect(s)	Stressor (Potential Impact)	Mitigation Measures (MTO 2020)	Residual Effects
		− Ensure the work zone is stabilized against the impacts of high flow events during the work period. − Remove fish from isolated in-water work zones if necessary. **O-1 – Access** ▪ Prohibit or limit access to banks or areas adjacent to waterbodies, to the extent required to protect the structural integrity of banks or shorelines. ▪ Limit machinery fording of the watercourse to a one-time event (i.e. over and back), and only if no alternative crossing method is available. ▪ If repeated crossings of the watercourse are required, construct a temporary crossing structure. ▪ Use temporary crossing structures or other practices to cross streams or waterbodies with steep and highly erodible (e.g. dominated by organic materials and silts) banks and beds. ▪ For fording equipment without a temporary crossing structure, use stream bank and bed protection methods (e.g. swamp mats, pads) if minor rutting is likely to occur during fording. **O-3 – Timing of In-water Works** • Implement timing restrictions for in-water work to protect sensitive life stages/processes of migratory and resident fish. • Additional timing considerations: • − Minimize duration of in-water work. − Conduct in-stream work during periods of low flow to allow work in water to be isolated from flows.	
L1 – Vegetation Clearing	▪ Alteration of riparian vegetation, changes in shading, and changes to bank stability/exposed soils and the addition or removal of in-stream organic structure can result in: – changes in habitat structure and cover; – change in water temperature; – changes in sediment concentration; – changes in food supply; and – changes in nutrient concentrations.	**M-11 – Vegetation** ▪ Flow management (e.g. minimum flows, seasonal flow augmentation, flushing flows) for specific aquatic habitat management goals or to mitigate other effects of flow management (e.g. fish passage, fish stranding). **M-1 - Chemicals** ▪ Use only specified amounts and types of fertilizer in areas draining to waterbodies. ▪ Avoid use of chemical dust suppressants, pesticides and herbicides in areas near or draining to waterbodies. ▪ Ensure that building material used in a watercourse has been handled and treated in a manner to prevent the release or leaching of substances into the water that may be deleterious to fish. **M-4 - Erosion and Sediment Controls** ▪ Design and implement erosion and sediment controls to contain/isolate the construction zone, manage site drainage/runoff and prevent erosion of exposed soils and migration of sediment to adjacent waterbody during all phases of the project. ▪ Erosion and sediment control measures should be 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. The plan should, where applicable, include: ▪ − Installation of effective erosion and sediment control measures before starting work to prevent sediment from entering the waterbody. ▪ − Regular inspection and maintenance of erosion and sediment control measures and structures during construction. ▪ − Repairs to erosion and sediment control measures and structures if damage occurs. ▪ − Removal of non-biodegradable erosion and sediment control materials once site is stabilized. **R-3 - Exposed Soils/Surfaces** ▪ Stabilize and re-vegetate (or use other materials appropriate to site conditions) all areas of disturbed/exposed soil that drain to a waterbody using: ▪ − Targeted planting of appropriate vegetation. ▪ − Rolled erosion control blankets, topsoil, seed, mulch etc. ▪ − Installation of appropriately designed structural materials and vegetation if feasible on steep slopes to maintain slope stability for the long term. Direct drainage away [=] from slopes unless structure provided to take drainage into valley without erosion and risk of sedimentation. **R-4 - Instream Cover** ▪ Minimize the removal of natural woody debris, rocks or other materials from below the high-water level. ▪ Add/re-establish appropriate in-stream structure and cover for habitat, in such a way as to not destabilize the channel through negative impacts to hydraulics. Where possible, match structure/substrate type with previous or adjacent types removed, altered or disturbed during construction. ▪ This may include salvage and re-instatement of existing in-stream structure such as large woody debris, boulders or in-stream aquatic vegetation. **R-5 - Riparian Vegetation Plantings** ▪ Design and implement vegetation rehabilitation plan following construction to replant riparian vegetation to pre-construction or better condition (e.g. trees for shade to cool water and provide overhead cover).	No – site will be restored to existing condition or better. At 401-6-25, a riparian planting plan will be developed such that total riparian vegetation cover will be restored to 75% immediately after grading, with it eventually reaching 100% cover in a few years.

Pathway of Effect(s)	Stressor (Potential Impact)	Mitigation Measures (MTO 2020)	Residual Effects
		▪ Considerations: − Design and install riparian plantings to avoid or minimize encroachment into and/or alteration of bank and bed profile. ▪ − Usually includes re-instatement of native soils or replacement with topsoil/suitable planting medium. ▪ − May include local seed bank or root mass/mat salvage, vegetation transplant or bioengineering (e.g. live stakes, cuttings) techniques. ▪ − Use native species compatible with site conditions. ▪ − Integrate provision of fish cover where feasible. − Integrate appropriate techniques for interim stabilization measures such as biodegradable blanket, tackifier to maintain soil stability until vegetation becomes established.	
L2 – Grading	▪ Alteration to bank stability/ exposed soils and slope that can change landscape patterns, increase erosion potential and sediment deposition that can result in: – change in habitat cover and structure; – change in slope and land drainage patterns; and – change in sediment concentrations.	**O-1 – Access** ▪ Prohibit or limit access to banks or areas adjacent to waterbodies, to the extent required to protect the structural integrity of banks or shorelines. ▪ Limit machinery fording of the watercourse to a one-time event (i.e. over and back), and only if no alternative crossing method is available. ▪ If repeated crossings of the watercourse are required, construct a temporary crossing structure. ▪ Use temporary crossing structures or other practices to cross streams or waterbodies with steep and highly erodible (e.g. dominated by organic materials and silts) banks and beds. ▪ For fording equipment without a temporary crossing structure, use stream bank and bed protection methods (e.g. swamp mats, pads) if minor rutting is likely to occur during fording. **M-4 - Erosion and Sediment Controls** ▪ Design and implement erosion and sediment controls to contain/isolate the construction zone, manage site drainage/runoff and prevent erosion of exposed soils and migration of sediment to adjacent waterbody during all phases of the project. ▪ Erosion and sediment control measures should be 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. The plan should, where applicable, include: ▪ − Installation of effective erosion and sediment control measures before starting work to prevent sediment from entering the waterbody. ▪ − Regular inspection and maintenance of erosion and sediment control measures and structures during construction. ▪ − Repairs to erosion and sediment control measures and structures if damage occurs. ▪ − Removal of non-biodegradable erosion and sediment control materials once site is stabilized. **R-1 – Waterbody Bank** • Minimize the removal of natural woody debris, rocks or other materials from the banks or the shoreline of the waterbody. • Stabilize and reinforce banks of waterbody to pre-disturbance condition (or better) using properly designed and installed stabilization measures: • − Avoid hard engineering (sheet pile or other vertical walls). • − May include vegetation (e.g. tree and shrub plantings, bioengineering), rock/stone material (e.g. rip-rap, boulders). • − If rock reinforcement/armouring is required, ensure that appropriately-sized material is used and is installed at a similar slope to the existing, maintains a uniform bank/shoreline and maintains a natural bank/shoreline alignment such that it does not interfere with fish passage or alter the bankfull channel profile. − May incorporate temporary measures (e.g. biodegradable materials, 'nurse'-crop vegetation) to provide interim stabilization until vegetation fully established. **R-3 - Exposed Soils/Surfaces** ▪ Stabilize and re-vegetate (or use other materials appropriate to site conditions) all areas of disturbed/exposed soil that drain to a waterbody using: ▪ − Targeted planting of appropriate vegetation. ▪ − Rolled erosion control blankets, topsoil, seed, mulch etc. ▪ − Installation of appropriately designed structural materials and vegetation if feasible on steep slopes to maintain slope stability for the long term. Direct drainage away [=] from slopes unless structure provided to take drainage into valley without erosion and risk of sedimentation. **R-4 - Instream Cover** ▪ Minimize the removal of natural woody debris, rocks or other materials from below the high-water level. ▪ Add/re-establish appropriate in-stream structure and cover for habitat, in such a way as to not destabilize the channel through negative impacts to hydraulics. Where possible, match structure/substrate type with previous or adjacent types removed, altered or disturbed during construction.	None

Pathway of Effect(s)	Stressor (Potential Impact)	Mitigation Measures (MTO 2020)	Residual Effects
		▪ This may include salvage and re-instatement of existing in-stream structure such as large woody debris, boulders or in-stream aquatic vegetation. **D-2 – Drainage System** ▪ Design drainage system to avoid diversion of or otherwise minimize changes in drainage to or from a waterbody (do not divert across watershed boundaries).	
L4 – Riparian Planting	Riparian planting that can involve site preparation, use of fertilizers, an increase in riparian and bank vegetation, and a change in vegetation species composition can result in: ▪ Change in sediment concentrations ▪ Change in contaminant concentrations ▪ Change in nutrient concentrations ▪ Change in water temperature ▪ Change in habitat structure and cover ▪ Change in food supply	**M-1 - Chemicals** ▪ Use only specified amounts and types of fertilizer in areas draining to waterbodies. ▪ Avoid use of chemical dust suppressants, pesticides and herbicides in areas near or draining to waterbodies. ▪ Ensure that building material used in a watercourse has been handled and treated in a manner to prevent the release or leaching of substances into the water that may be deleterious to fish. **M-4 - Erosion and Sediment Controls** ▪ Design and implement erosion and sediment controls to contain/isolate the construction zone, manage site drainage/runoff and prevent erosion of exposed soils and migration of sediment to adjacent waterbody during all phases of the project. ▪ Erosion and sediment control measures should be 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. The plan should, where applicable, include: ▪ − Installation of effective erosion and sediment control measures before starting work to prevent sediment from entering the waterbody. ▪ − Regular inspection and maintenance of erosion and sediment control measures and structures during construction. ▪ − Repairs to erosion and sediment control measures and structures if damage occurs. ▪ − Removal of non-biodegradable erosion and sediment control materials once site is stabilized. **R-1 – Waterbody Bank** • Minimize the removal of natural woody debris, rocks or other materials from the banks or the shoreline of the waterbody. • Stabilize and reinforce banks of waterbody to pre-disturbance condition (or better) using properly designed and installed stabilization measures: • − Avoid hard engineering (sheet pile or other vertical walls). • − May include vegetation (e.g. tree and shrub plantings, bioengineering), rock/stone material (e.g. rip-rap, boulders). • − If rock reinforcement/armouring is required, ensure that appropriately-sized material is used and is installed at a similar slope to the existing, maintains a uniform bank/shoreline and maintains a natural bank/shoreline alignment such that it does not interfere with fish passage or alter the bankfull channel profile. − May incorporate temporary measures (e.g. biodegradable materials, 'nurse'-crop vegetation) to provide interim stabilization until vegetation fully established. **R-3 - Exposed Soils/Surfaces** ▪ Stabilize and re-vegetate (or use other materials appropriate to site conditions) all areas of disturbed/exposed soil that drain to a waterbody using: ▪ − Targeted planting of appropriate vegetation. ▪ − Rolled erosion control blankets, topsoil, seed, mulch etc. ▪ − Installation of appropriately designed structural materials and vegetation if feasible on steep slopes to maintain slope stability for the long term. Direct drainage away [=] from slopes unless structure provided to take drainage into valley without erosion and risk of sedimentation. **R-5 - Riparian Vegetation Plantings** ▪ Design and implement vegetation rehabilitation plan following construction to replant riparian vegetation to pre-construction or better condition (e.g. trees for shade to cool water and provide overhead cover). ▪ Considerations: − Design and install riparian plantings to avoid or minimize encroachment into and/or alteration of bank and bed profile. ▪ − Usually includes re-instatement of native soils or replacement with topsoil/suitable planting medium. ▪ − May include local seed bank or root mass/mat salvage, vegetation transplant or bioengineering (e.g. live stakes, cuttings) techniques. ▪ − Use native species compatible with site conditions. ▪ − Integrate provision of fish cover where feasible. ▪ − Integrate appropriate techniques for interim stabilization measures such as biodegradable blanket, tackifier to maintain soil stability until vegetation becomes established.	None

Pathway of Effect(s)	Stressor (Potential Impact)	Mitigation Measures (MTO 2020)	Residual Effects
W1 – Placement of material or structures in water	▪ Changes in channel or shoreline morphology, hydraulics, aquatic macrophytes, and substrate composition can result in: – change in sediment concentrations; – change in habitat structure and cover; – change in food supply; and – change in nutrient concentration.	**D1- Bridge, Culvert or Other In-water Structures** • Reduce or eliminate constriction of flow through structure design. Design and site piers, abutments and other structures to avoid or otherwise minimize encroachment into waterbody and avoid sensitive habitats. Design structure to avoid or minimize effects on existing or natural flow regimes. Avoid building structures on meander bends, braided streams, alluvial fans, active floodplains or any other area that is inherently unstable and may result in erosion and scouring of the waterbody bed or the built structures. Additional considerations for bridges and culverts: − Design deck drainage to avoid direct discharge into waterbody. − Design and construct approaches to the waterbody such that they are perpendicular to the watercourse to minimize loss or disturbance to riparian vegetation. − Consider access requirements in siting structures (e.g. need to access floodplain of deep pristine valley for construction). − Design and install culverts to prevent creation of barriers to fish movement, and maintain bankfull channel functions and habitat functions to the extent possible, including proper sizing, embedment, re-instatement of low flow channel and properly designed and sized substrates to stay in place under full range of flow conditions, compatible with existing native substrate, maintaining channel slope, etc. **M-10 – Temporary Flow** ▪ Design and implement isolation/containment plan to isolate temporary in-water work zones to maintain clean flow downstream/around the work zone at all times. The design should: − Use only clean materials free of particulate matter for temporary coffer dams. − Situate or otherwise manage flow withdrawal and discharge (e.g. see dewatering discharge) to prevent erosion and sediment release to the waterbody. − Ensure the work zone is stabilized against the impacts of high flow events during the work period. − Remove fish from isolated in-water work zones if necessary. **R-1 – Waterbody Bank** • Minimize the removal of natural woody debris, rocks or other materials from the banks or the shoreline of the waterbody. • Stabilize and reinforce banks of waterbody to pre-disturbance condition (or better) using properly designed and installed stabilization measures: • − Avoid hard engineering (sheet pile or other vertical walls). • − May include vegetation (e.g. tree and shrub plantings, bioengineering), rock/stone material (e.g. rip-rap, boulders). • − If rock reinforcement/armouring is required, ensure that appropriately-sized material is used and is installed at a similar slope to the existing, maintains a uniform bank/shoreline and maintains a natural bank/shoreline alignment such that it does not interfere with fish passage or alter the bankfull channel profile. − May incorporate temporary measures (e.g. biodegradable materials, 'nurse'-crop vegetation) to provide interim stabilization until vegetation fully established. **R2 - Waterbody Bed and Substrate** • Restore and re-stabilize any portion of the waterbody bed disturbed during construction to preconstruction (or better) condition, including: − Restoration of the original contour and gradient − Morphological elements, e.g. pools and riffles − Substrates, which may include salvage and re-instatement of native materials **R-4 - Instream Cover** ▪ Minimize the removal of natural woody debris, rocks or other materials from below the high-water level. ▪ Add/re-establish appropriate in-stream structure and cover for habitat, in such a way as to not destabilize the channel through negative impacts to hydraulics. Where possible, match structure/substrate type with previous or adjacent types removed, altered or disturbed during construction. ▪ This may include salvage and re-instatement of existing in-stream structure such as large woody debris, boulders or in-stream aquatic vegetation.	No - while the extended replacement culverts enclose more of the watercourses, there will be a net gain of fish habitat within the existing wetted channel at all crossings by widening the culvert to match at least bankedfull, restoring groundwater connectivity, and restoring native substrates for spawning.
W4 – Addition or Removal of Aquatic Vegetation	▪ Addition or removal of aquatic vegetation by hand, with herbicides, or with mechanical equipment can involve changes in light penetration, primary productivity, nutrient input, and resuspension or entrainment of sediment that can result in:	**M-3 – Equipment** • Whenever possible, operate machinery on land above the high-water level, on ice, or from a floating barge in a manner that minimizes disturbance to the banks and bed of the waterbody. • Operate, store and maintain (e.g. refuel, lubricate) all equipment, vehicles and associated materials in a manner that prevents the entry of any deleterious substance from entering the water. • Any part of equipment entering the water or operating on the bank shall be free of fluid leaks, invasive species and noxious weeds and externally cleaned/degreased to prevent any deleterious substance from entering the water. **M-4 - Erosion and Sediment Controls**	None

Pathway of Effect(s)	Stressor (Potential Impact)	Mitigation Measures (MTO 2020)	Residual Effects
	– change in water temperature; – change in dissolved oxygen; – change in food supply; – change in nutrient concentrations; – change in habitat cover and structure; – change in sediment concentrations; and – change in contaminant concentrations.	▪ Design and implement erosion and sediment controls to contain/isolate the construction zone, manage site drainage/runoff and prevent erosion of exposed soils and migration of sediment to adjacent waterbody during all phases of the project. ▪ Erosion and sediment control measures should be 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. The plan should, where applicable, include: ▪ − Installation of effective erosion and sediment control measures before starting work to prevent sediment from entering the waterbody. ▪ − Regular inspection and maintenance of erosion and sediment control measures and structures during construction. ▪ − Repairs to erosion and sediment control measures and structures if damage occurs. ▪ − Removal of non-biodegradable erosion and sediment control materials once site is stabilized. **M-8 - In-water Turbidity Curtains or Other Appropriate Measures** ▪ Use properly sized, anchored and maintained in-water silt boom, turbidity curtains or other effective measures to contain suspended sediments. **R-3 - Exposed Soils/Surfaces** ▪ Stabilize and re-vegetate (or use other materials appropriate to site conditions) all areas of disturbed/exposed soil that drain to a waterbody using: ▪ − Targeted planting of appropriate vegetation. ▪ − Rolled erosion control blankets, topsoil, seed, mulch etc. ▪ − Installation of appropriately designed structural materials and vegetation if feasible on steep slopes to maintain slope stability for the long term. Direct drainage away [=] from slopes unless structure provided to take drainage into valley without erosion and risk of sedimentation. **R-4 - Instream Cover** ▪ Minimize the removal of natural woody debris, rocks or other materials from below the high-water level. ▪ Add/re-establish appropriate in-stream structure and cover for habitat, in such a way as to not destabilize the channel through negative impacts to hydraulics. Where possible, match structure/substrate type with previous or adjacent types removed, altered or disturbed during construction. This may include salvage and re-instatement of existing in-stream structure such as large woody debris, boulders or in-stream aquatic vegetation.	
W5 – Change in timing, duration and frequency of flow	▪ Dewatering, bank erosion and channel scour can result in: – change in sediment concentration; – change in habitat structure and cover; – change in food supply; – change in nutrient concentration; – displacement or stranding of fish; – change in migration / access to habitats; – change in water temperature; and – change in contaminant concentrations.	**D1- Bridge, Culvert or Other In-water Structures** • Reduce or eliminate constriction of flow through structure design. Design and site piers, abutments and other structures to avoid or otherwise minimize encroachment into waterbody and avoid sensitive habitats. Design structure to avoid or minimize effects on existing or natural flow regimes. Avoid building structures on meander bends, braided streams, alluvial fans, active floodplains or any other area that is inherently unstable and may result in erosion and scouring of the waterbody bed or the built structures. Additional considerations for bridges and culverts: − Design deck drainage to avoid direct discharge into waterbody. − Design and construct approaches to the waterbody such that they are perpendicular to the watercourse to minimize loss or disturbance to riparian vegetation. − Consider access requirements in siting structures (e.g. need to access floodplain of deep pristine valley for construction). − Design and install culverts to prevent creation of barriers to fish movement, and maintain bankfull channel functions and habitat functions to the extent possible, including proper sizing, embedment, re-instatement of low flow channel and properly designed and sized substrates to stay in place under full range of flow conditions, compatible with existing native substrate, maintaining channel slope, etc. **D-2 – Drainage System** Design drainage system to avoid diversion of or otherwise minimize changes in drainage to or from a waterbody (do not divert across watershed boundaries). **D-5 – Stormwater Management Measures** • Design stormwater management (SWM) measures to manage runoff to waterbody considering discharge (e.g. velocities to avoid erosion) as well as quality (e.g. formal SWM ponds, enhanced ditches, and filtration). **M-7 – Fish Transfer** • Avoid impacts to fishes by excluding, moving, or frightening fishes downstream or away from work area. Retain a qualified environmental professional to ensure applicable permits for relocating fish are obtained.	No - site isolation for construction and works on the banks will be temporary, and dewatering/bypass setup isolate work areas and divert flow around the work area. All works are to be completed during the appropriate in-water timing window. during construction within the warmwater timing window.

Pathway of Effect(s)	Stressor (Potential Impact)	Mitigation Measures (MTO 2020)	Residual Effects
		• 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 using appropriate capture, handling and release techniques to prevent harm and minimize stress. Fish may need to be relocated again, should flooding occur on the site. **M-10 – Temporary Flow** ▪ Design and implement isolation/containment plan to isolate temporary in-water work zones to maintain clean flow downstream/around the work zone at all times. The design should: − Use only clean materials free of particulate matter for temporary coffer dams. − Situate or otherwise manage flow withdrawal and discharge (e.g. see dewatering discharge) to prevent erosion and sediment release to the waterbody. − Ensure the work zone is stabilized against the impacts of high flow events during the work period. − Remove fish from isolated in-water work zones if necessary. **M-12 – Water Flow** Flow management (e.g. minimum flows, seasonal flow augmentation, flushing flows) for specific aquatic habitat management goals or to mitigate other effects of flow management (e.g. fish passage, fish stranding). **R-1 – Waterbody Bank** • Minimize the removal of natural woody debris, rocks or other materials from the banks or the shoreline of the waterbody. • Stabilize and reinforce banks of waterbody to pre-disturbance condition (or better) using properly designed and installed stabilization measures: • − Avoid hard engineering (sheet pile or other vertical walls). • − May include vegetation (e.g. tree and shrub plantings, bioengineering), rock/stone material (e.g. rip-rap, boulders). • − If rock reinforcement/armouring is required, ensure that appropriately-sized material is used and is installed at a similar slope to the existing, maintains a uniform bank/shoreline and maintains a natural bank/shoreline alignment such that it does not interfere with fish passage or alter the bankfull channel profile. − May incorporate temporary measures (e.g. biodegradable materials, 'nurse'-crop vegetation) to provide interim stabilization until vegetation fully established. **R2 - Waterbody Bed and Substrate** • Restore and re-stabilize any portion of the waterbody bed disturbed during construction to preconstruction (or better) condition, including: − Restoration of the original contour and gradient − Morphological elements, e.g. pools and riffles − Substrates, which may include salvage and re-instatement of native materials **R-4 - Instream Cover** ▪ Minimize the removal of natural woody debris, rocks or other materials from below the high-water level. ▪ Add/re-establish appropriate in-stream structure and cover for habitat, in such a way as to not destabilize the channel through negative impacts to hydraulics. Where possible, match structure/substrate type with previous or adjacent types removed, altered or disturbed during construction. ▪ This may include salvage and re-instatement of existing in-stream structure such as large woody debris, boulders or in-stream aquatic vegetation. **R-5 - Riparian Vegetation Plantings** ▪ Design and implement vegetation rehabilitation plan following construction to replant riparian vegetation to pre-construction or better condition (e.g. trees for shade to cool water and provide overhead cover). ▪ Considerations: − Design and install riparian plantings to avoid or minimize encroachment into and/or alteration of bank and bed profile. ▪ − Usually includes re-instatement of native soils or replacement with topsoil/suitable planting medium. ▪ − May include local seed bank or root mass/mat salvage, vegetation transplant or bioengineering (e.g. live stakes, cuttings) techniques. ▪ − Use native species compatible with site conditions. ▪ − Integrate provision of fish cover where feasible. − Integrate appropriate techniques for interim stabilization measures such as biodegradable blanket, tackifier to maintain soil stability until vegetation becomes established. **O-3 – Timing of In-water Works** • Implement timing restrictions for in-water work to protect sensitive life stages/processes of migratory and resident fish. • Additional timing considerations: • − Minimize duration of in-water work. − Conduct in-stream work during periods of low flow to allow work in water to be isolated from flows.	

Pathway of Effect(s)	Stressor (Potential Impact)	Mitigation Measures (MTO 2020)	Residual Effects
W6 – Fish Passage	▪ Flow alteration may cause an attraction to flow and barriers which can alter migrations patterns that can result in: – change in access to habitats; and – incidental entrainment, impingement or mortality of resident fish species.	**D1- Bridge, Culvert or Other In-water Structures** • Reduce or eliminate constriction of flow through structure design. Design and site piers, abutments and other structures to avoid or otherwise minimize encroachment into waterbody and avoid sensitive habitats. Design structure to avoid or minimize effects on existing or natural flow regimes. Avoid building structures on meander bends, braided streams, alluvial fans, active floodplains or any other area that is inherently unstable and may result in erosion and scouring of the waterbody bed or the built structures. Additional considerations for bridges and culverts: − Design deck drainage to avoid direct discharge into waterbody. − Design and construct approaches to the waterbody such that they are perpendicular to the watercourse to minimize loss or disturbance to riparian vegetation. − Consider access requirements in siting structures (e.g. need to access floodplain of deep pristine valley for construction). − Design and install culverts to prevent creation of barriers to fish movement, and maintain bankfull channel functions and habitat functions to the extent possible, including proper sizing, embedment, re-instatement of low flow channel and properly designed and sized substrates to stay in place under full range of flow conditions, compatible with existing native substrate, maintaining channel slope, etc. **D-2 – Drainage System** Design drainage system to avoid diversion of or otherwise minimize changes in drainage to or from a waterbody (do not divert across watershed boundaries). **D-3 – Fish Passage** • Design to maintain fish passage and minimize risk for fish passing upstream or downstream of an obstruction (e.g. downstream migration diversion methods, upstream migration via fish ladders, bypass channels). **D-5 – Stormwater Management Measures** • Design stormwater management (SWM) measures to manage runoff to waterbody considering discharge (e.g. velocities to avoid erosion) as well as quality (e.g. formal SWM ponds, enhanced ditches, and filtration). **M-6 – Fish Screens** • Use fish screens to avoid entrainment and impingement of fish at water intakes. Refer to DFO fish protection measures for design, installation and operation of fish screens DFO Code of Practice: End-of-Pipe Fish Protection Screens for Small Water Intakes in Freshwater **M-10 – Temporary Flow** • Design and implement isolation/containment plan to isolate temporary in-water work zones to maintain clean flow downstream/around the work zone at all times. The design should: − Use only clean materials free of particulate matter for temporary coffer dams. − Situate or otherwise manage flow withdrawal and discharge (e.g. see dewatering discharge) to prevent erosion and sediment release to the waterbody. − Ensure the work zone is stabilized against the impacts of high flow events during the work period. − Remove fish from isolated in-water work zones if necessary. **M-12 – Water Flow** • Flow management (e.g. minimum flows, seasonal flow augmentation, flushing flows) for specific aquatic habitat management goals or to mitigate other effects of flow management (e.g. fish passage, fish stranding). **O-3 – Timing of In-water Works** • Implement timing restrictions for in-water work to protect sensitive life stages/processes of migratory and resident fish. • Additional timing considerations: • − Minimize duration of in-water work. − Conduct in-stream work during periods of low flow to allow work in water to be isolated from flows.	No - temporary disruption of fish use at in-water work areas. Construction to be conducted within the permissible in-water timing window, of any given year, or as otherwise amended with agreement from MNRF.

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Appendix F

Fisheries and Oceans Canada (DFO) Letter of Advice (LOA)

Fisheries and Oceans Canada
Pêches et Océans Canada

Ontario and Prairie Region
Fish and Fish Habitat Protection Program
867 Lakeshore Rd.
Burlington, ON
L7S 1A1

Région de l'Ontario et des Prairies
Programme de protection du poisson et de son habitat
867 chemin Lakeshore
Burlington, ON
L7S 1A1

Your file *Votre référence*

June 14 2021

Our file *Notre référence*
21-HCAA-00889

Sarah Jewell
Ministry of Transportation
659 Exeter Road
London, ON
N6E 1L3

Subject: Culvert Replacements, McCrimmins Creek, Wellington (21-HCAA-00889) – Implementation of Measures to Avoid and Mitigate the Potential for Prohibited Effects to Fish and Fish Habitat

Dear Sarah Jewell:

The Fish and Fish Habitat Protection Program (the Program) of Fisheries and Oceans Canada (DFO) received your proposal on May 4 2021. We understand that you propose to:

- Remove (2) existing structure on an Unnamed Tributary to McCrimmons Creek and replace with (2) 24m long by 1800mm wide and 1200mm tall open-bottom culvert;
- Remove existing structure on the main branch of McCrimmons Creek and replace with 40m long by 2930mm wide open-bottom culvert;
- Remove existing structure on a Tributary to McCrimmons Creek and replace with 54m long by 2500mm wide open-bottom culvert;
- Remove existing structure on an Unnamed Tributary to McCrimmons Creek and replace with 30m long by 1800mm wide and 1200mm tall concrete box culvert;
- Embed culvert to allow for fish passage; and
- Work in isolation of flow to avoid sedimentation of the watercourse.

We understand that no aquatic species listed under the *Species at Risk Act* use the area in the vicinity of where your proposal is to be located.

Our review considered the following information:

- Request for Review form and associated documents.

Your proposal has been reviewed to determine whether it is likely to result in:

- the death of fish by means other than fishing and the harmful alteration, disruption or destruction of fish habitat which are prohibited under subsections 34.4(1) and 35(1) of the *Fisheries Act*;
- effects to listed aquatic species at risk, any part of their critical habitat or the residences of their individuals in a manner which is prohibited under sections 32, 33 and subsection 58(1) of the *Species at Risk Act*;

The aforementioned impacts are prohibited unless authorized under their respective legislation and regulations.

To avoid and mitigate the potential for prohibited effects to fish and fish habitat (as listed above), we recommend implementing the measures listed below:

- Plan in-water works, undertakings and activities to respect timing windows to protect fish, including their eggs, juveniles, spawning adults
  - No in-water work October 1st to July 15th
- Capture, relocate and monitor for fish trapped within isolated, enclosed, or dewatered areas;
  - Dewater gradually to reduce the potential for stranding fish
- Screen intake pipes to prevent entrainment or impingement of fish;
  - Use the code of practice for water intake screens
- Limit impacts on riparian vegetation to those approved for the work, undertaking or activity;
  - Limit access to banks or areas adjacent to waterbodies
  - Construct access points and approaches perpendicular to the watercourse or waterbody
  - Re-vegetate the disturbed area with native species suitable for the site
- Restore stream geomorphology (i.e., restore the bed and banks, gradient and contour of the waterbody) to its initial state;
- Develop and implement an erosion and sediment control plan to avoid or minimize the introduction of sediment into any waterbody during all phases of the work, undertaking or activity; and
  - Conduct all in-water works, undertakings or activities in isolation of open or flowing water to reduce the introduction of sediment into the watercourse
  - Monitor the watercourse to observe signs of sedimentation during all phases of the work, undertaking or activity and take corrective action
- Develop and implement a response plan to avoid a spill of deleterious substances.

Provided that you incorporate these measures into your plans, the Program is of the view that your proposal will not require an authorization under the *Fisheries Act* or the *Species at Risk Act*.

Should your plans change or if you have omitted some information in your proposal, further review by the Program may be required. Consult our website (http://www.dfo-mpo.gc.ca/pnw-ppe/index-eng.html) or consult with a qualified environmental consultant

.../3

to determine if further review may be necessary. It remains your responsibility to remain in compliance with the *Fisheries Act* and the *Species at Risk Act.*

It is also your *Duty to Notify* DFO if you have caused, or are about to cause, the death of fish by means other than fishing and/or the harmful alteration, disruption or destruction of fish habitat. Such notifications should be directed to (http://www.dfo-mpo.gc.ca/pnw-ppe/CONTACT-eng.html).

We recommend that you notify this office at least 10 days before starting your project and that a copy of this letter be kept on site while the work is in progress. It remains your responsibility to meet all other federal, territorial, provincial and municipal requirements that apply to your proposal.

If you have any questions with the content of this letter, please contact Lilia Schoot Uiterkamp at our Burlington office by email at lilia.schootuiterkamp@dfo-mpo.gc.ca. Please refer to the file number referenced above when corresponding with the Program.

Yours sincerely,

Lilia Schoot Uiterkamp
Biologist, Triage and Planning
Fish and Fish Habitat Protection Program

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Appendix G

Fish and Fish Habitat Impact Documentation (Template D4)

TEMPLATE D4: AQUATIC EFFECTS ASSESSMENT SUMMARY TABLE

Project W.P No	Project Title	Waterbody Name
3042-14-00	Hanlon Expressway / Wellington Road 34 MidBlock Interchange	McCrimmons Creek and Tributaries
Fisheries Assessment Specialist		**Date**
Katie Easterling		May 18, 2021

PROPOSED WORKS, ENVIRONMENTAL AND MANAGEMENT CONTEXT	
Proposed Works	The purpose of the project is the construction of a new interchange on the Hanlon Expressway between Wellington Road 34 and Maltby Road with new access roads to the interchange from Wellington Road 34 and Concession Road 7. The roadway widening of Wellington Road 34 and widening/relocation of Concession Road 7 requires culvert replacement and extension – with channel re-alignments/tie-ins to accommodate the extended replacement culverts – including of five culverts in watercourses that provide fish habitat. The widening of the Hanlon Expressway requires relocation of where the drainage channels on either side of the highway tie-in to the receiving watercourse at the southern limit.
Fish and Fish Habitat	McCrimmons Creek and its tributaries within the Study Area are permanently flowing, coldwater (401-6-25, 401-6-27, 401-6-30, and 401-6-31) and warmwater (401-6-26) features that support a diverse fish community including sensitive spawning habitat for Brook Trout and Brown Trout. Groundwater upwellings were observed at each watercourse crossing and the Provincially Significant Mill Creek Puslinch Wetland Complex was present immediately east of the crossings at station 401-6-30. No Critical Habitat (SARA) or aquatic SAR that are afforded protection under SARA or ESA are known to occur in the Study Area.

Fish Passage	No existing impediments to fish passage were identified at the proposed work locations that would negate the need to provide fish passage at the crossings. Fish passage is required at stations 401-6-25, 401-6-27, and 401-6-30 for Brook Trout and Brown Trout to access spawning habitat and fulfill their life history requirements. Fish passage at station 401-6-26 is required for access to general use fish habitat for warmwater fish species. Replacement culverts sized to bankfull width and according to hydraulic requirements with inputs from both drainage engineers and a fluvial geomorphologist to ensure the maintenance of low-flow channels. The open-footed or perforated replacement culverts at the coldwater crossings (401-6-25 [SR-7A], 401-6-27 [SR-5], and 401-6-30 [CR7-1 and CR72]) will restore natural substrate within the crossing, while the box culvert the warmwater crossing (401-6-26 [SR-10]) will be countersunk to embed 10% of the culvert height and backfilled with native substrate. The relocation of the existing tie-ins at station 401-6-31 will not influence fish passage as no culvert work is proposed at this location.
Fisheries Management Objectives (FMO)/In-Water Work Timing Window	No Fisheries Management Objectives are applicable to the proposed works. The timing windows provided by MNRF when in-water work can occur is July 1st – September 30th for the coldwater crossings (401-6-25 [SR-7A], 401-6-27 [SR-5], 401-6-30 [CR7-1 and CR72], and 401-6-31 [H6-1]) and July 1st – March 31st for the warmwater crossing (401-6-26 [SR-10]).
RESIDUAL EFFECTS ASSESSMENT	
Negative residual effects:	

1. Negative residual effects are not anticipated - refer to Table D3 for details

Although a permanent alteration of fish habitat is anticipated from the proposed works at the replacement culvert locations, the open-bottom or perforated replacement culverts will restore groundwater connectivity, add natural streambed material, and provide an overall net improvement of Brook Trout and Brown Trout habitat, while the box culvert replacement was designed to maintain fish passage and will be countersunk and backfilled with native substrate. The Hanlon Expressway drainage channel tie-ins relocation will require a temporary disruption to divert flows and connect the drainage channels at their new locations.

2.

Spatial Scale	N/A
Duration	N/A
Intensity	N/A

DOCUMENTATION OF FISH AND FISH HABITAT IMPACT - Rationale and Conclusions

Considering that the severity (spatial scale, duration, intensity) of all negative residual effects, taken together, are used to determine, provide a brief rationale for why is or is not likely to occur by addressing the following questions below:

1.0 Will the project result in the death of fish? In-water works will be conducted in the dry, in isolated work areas. Fish within the isolated work areas for the proposed culvert replacements with extension will be captured and relocated out of the isolated work area and live released downstream prior to commence of construction.	**YES** ☐	**NO** ☒

2.0 Will the project result in harmful alteration, disruption or destruction of fish habitat? While the proposed works will result in a permanent alteration of habitat at culvert crossings stations 401-6-25, 401-6-27, and 401-6-30. The existing CSP culverts will be replaced with open-bottom or perforated concrete box culverts, which will restore groundwater connectivity, add natural streambed material, and provide an overall improvement of Brook Trout and Brown Trout habitat. Fish within the isolated work areas for the proposed culvert replacements with extension will be captured and relocated out of the isolated work area and live released downstream prior to commence of construction. Natural channel design will be used to tie-in the existing watercourse to new culvert inlets and outlets to provide long-term stability. Culverts have been sized with inputs from both drainage engineers and a fluvial geomorphologist to ensure the maintenance of a low-flow channel. Where shifting of the culvert locations is required (Station 401-6-30), the area will be restored following natural channel design principles.	**YES** ☐	**NO** ☒

Provide a brief over
all concluding statement about whether the death of fish or HADD of fish habitat is likely/not likely.
Provided environmental protection and mitigation measures are properly implemented, monitored, and are maintained for effectiveness for the duration of construction, it is anticipated that the death of fish or the harmful alteration, disruption or destruction of fish habitat is unlikely. In-water works will be conducted in the dry in isolated work areas with fish relocated prior to construction and the proposed works is anticipated to provide an overall improvement of fish habitat.

Fisheries Assessment Specialist Recommendation:

Check one of the boxes based on the summary of findings.

☐ Proceed with project with identified mitigation measures (Complete MTO Project Notification Form)

☒ Recommendation to send project for review by DFO

MTO Review of the Fisheries Assessment Specialist's Recommendation (to be completed by MTO):

All projects identified by the Fisheries Assessment Specialist as likely to result in the death of fish or HADD of fish habitat require a review by MTO prior to completion of any forms or submission to DFO. Only once advised by MTO should the Fisheries Assessment Specialist complete a DFO Request for Review Form to submit to MTO for signature and submission to DFO.

NOTE:

- The grey text in the table should be replaced with the appropriate project specific details.
-