Basic Impact Assessment

Project Name:	**Maria Street Swing Bridge – Replacement, TSW, Maria Street, Peterborough, Ontario**
Protected Heritage Place:	Trent Severn Waterway
Parks Canada IA File #:	TS-2023-04
Registry File # and hyperlink to CIAR posting:	88882 https://iaac-aeic.gc.ca/050/evaluations/proj/88882
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Environmental Impact Assessment Version Control

This section serves to control the development and distribution of revisions to the Environmental Assessment.

Document Number	Amendment Number	Date	Brief Description of Change
1	0	2025-01-08	Original

1. PURPOSE OF DOCUMENT

The purpose of this Basic Impact Assessment (BIA) is to assess the Maria Swing Bridge Rehabilitation project on the Trent-Severn Waterway under the Parks Canada Directive on Impact Assessment (2019) to ensure compliance with requirements of federal authorities under s.81 – 91 of the Impact Assessment Act, 2019 (IAA, 2019). The project is a non-designated project on federal lands.

Based on this BIA, Parks Canada has determined that the project is not likely to cause significant adverse environmental effects with implementation of mitigations outlined in this report.

2. PROJECT INFORMATION

2.1. Project Description

Objectives and Rationale

The project aims to replace the Maria St. swing bridge superstructure and rehabilitate the abutments and centre pier with a 75-year life and full highway rating. Additionally, all mechanical and electrical components will be replaced.

The bridge currently shows varying degrees of local deterioration in some members as well as widespread coating failure and corrosion. Several structural elements, including floor beams, stringers, sub-beams, the concrete deck, and steel deck grating, do not meet current bridge code standards. Considering the structures existing condition, the feasibility of repairs, and its historic significance, the choice to replace the bridge superstructure sympathetic to the original structure was made.

Background and Description of Structure

Constructed between 1964 and 1965, the Maria Swing Bridge is categorized as “Other” under Cultural Resources. Its safe and efficient operation and maintenance are crucial for managing the Trent-Severn Waterway (TSW) and supporting associated navigation and transportation needs.

The existing swing bridge is a girder/beam construction with a combination of steel grating and asphalt covered concrete deck. The bridge spans 54.12 m in length from end to end and measures 6.64 m from centre line to centre line of the outermost girders. It is supported by an off-centre concrete pivot pier and concrete abutments, accommodating two lanes of traffic (one lane each way). A steel grating pedestrian walkway is mounted on the south side of the bridge, outside the south girder (Parsons Inc. 2015).

The bridge substructure consists of three elements: the west abutment; the east abutment; and off-centre pivot pier. The west abutment wall forms the side of the waterway and features a stepped bearing seat and a concrete ballast wall that is integral with the sidewalk on the south side and the curb on the north side. The east abutment is similar in design but set back 12-15 m from the waterway. The off-centre pivot pier is situated on the east side of the Trent Canal and forms the canal wall.



Figure 1: Maria Swing Bridge during dewatering (photos 2021-10-21).

Project Scope

The project scope involves replacement of the entire steel structure sympathetic to original design and repair of foundations.

Potential project components

- Submittal and implementation of Health & Safety Plan and Environmental Management Plan.
- Fabricate new bridge off-site. Existing bridge remains, not impacting bridge operation until new bridge onsite.
- Perform minimal removal of shrubs and herbaceous plants within staging area, located southeast of bridge, as needed.
- Environmental monitoring and reporting.
- In-water work site isolation. Possible methods:
    - Temporarily lower water levels between Peterborough Lift Lock 21 to Lock 20 to install cofferdam isolation barrier. Dewater work zone and pipe flow through the site via culvert.
    - Drain canal reach between Lock 20 and Lock 21 for the non-navigation season. Install berm upstream and pump runoff around site.
- Concrete work complete.
    - Remove concrete from the pivot pier to enable the installation of the pile cap.
    - Excavate a minor portion of the previously disturbed area adjacent to the existing foundation.
    - Remove of west abutment and wingwalls as specified in the design limits.
    - Remove of existing east abutment and wingwalls to the design limits while protecting the existing canal wall.
    - Cast new concrete pivot pier pile cap, east abutment, east wing walls, west abutment and southwest retaining wall, including below winter water level.

- Trench the canal bed to install a utility duct beneath existing canal bed.
- Trench on dry land on both the east and west sides of the canal for new electrical pathways.
- Existing bridge decommissioned and roadway closed upon fabrication of new bridge.
- New bridge delivery and installation.
- Replace mechanical and electrical components.
- Complete roadway work on the approaches, including installation of roadway signage, and line painting.
- Roadway open.
- Perform site clean-up and restoration.
- Commissioning.
- Demobilize.

Project Timeline and Constraints

The project is expected to span a three-year contract. The schedule will be proposed by the Contractor following contract award, anticipated in fall 2025, and will consider the following timing constraints:

- **Navigation Season**: No interference with navigation season (Victoria Day to Thanksgiving).
- **Kawartha Voyageur Canal Navigation**: Work must accommodate the canal's navigation activities, typically a two-week window before and after the navigation season.
- **Under the Lock Fishing Derby**: No work is to occur during the event, held on the last Saturday in April within the canal reach.
- **Restricted Activity Windows for Fish and Habitat Protection**: In-water work is restricted from April 15 to June 30, including the settling period for rewatering.

Construction is anticipated to begin in fall 2025 and is expected to continue through to commissioning in spring 2028. The warranty period will extend 365 days from substantial completion.

In-water work may be conducted during three non-navigation seasons to comply with the above constraints.

Location & Map

The existing bridge is situated directly upstream of Ashburnham Lock 20, spanning the Trent-Severn Waterway canal at 173 Maria Street, Peterborough, Ontario - 44°18'03.4"N Latitude; 78°18'12.8"W Longitude (Figure 2).



Figure 2: Maria Street swing bridge location at 173 Maria Street, Peterborough, ON.

Land Ownership

The work will take place on Federal Lands under the jurisdiction of Parks Canada Agency (PCA) – TSW (Figure 3). There may be a need to use City of Peterborough municipal land, located immediately east of TSW land, for construction access and staging on the manicured field southeast of Maria Swing Bridge (**Error! Reference source not found.**).



Figure 3: Aerial image of the general proposed project area (PCA property shaded in yellow).



Figure 4: Anticipated access and laydown area for Maris Swing Bridge.

2.2. Participation and Engagement

Indigenous Participation

Were Indigenous peoples engaged and consulted during project design/planning and/or impact assessment processes?

☒ YES ☐ NO

The potential for the project to affect use of lands or resources by aboriginal persons, potential effects on treaty rights, impact of activities on land, historic presence and use and spiritual significance will be considered.

[redacted]

As part of the agreed-to process, the community consultation representatives will receive updates throughout the construction phases. As is PCA Ontario Waterway practice, community consultation representatives have been, and will be, offered the opportunity for a site visit and can be accompanied by senior project staff should it be requested. In the event of an accident on site, contamination due to construction, or the discovery of archaeological material, stop work order provisions in the contract will allow work to be temporarily halted around the impacted area and the community consultation representatives will be notified. If required, the community consultation representatives shall be invited to participate in any monitoring of the site.

[redacted]

Was <u>Indigenous Knowledge</u> provided concerning the project or impact assessment?

☐ YES ☒ NO

Public and Stakeholder Input

Were comments received from the public or stakeholders in response to the Canadian Impact Assessment Registry posting?
☐ YES ☒ NO
Was community knowledge provided with respect to the project or impact assessment?
☐ YES ☒ NO

3. IMPACT ANALYSIS

3.1. Valued Component Likely to be Affected.

A desktop review was conducted to identify valued components (VCs) likely present in the project area and to assess their potential for meaningful interaction with the project activities. The following sources were reviewed:

- Angler's Atlas online database.
- eBird Hotspot online database.
- EDDmapS online database.
- Fish Habitat Assessment Report (ARCADIS, 2017).
- Fish-ON-Line database (OMNRF).
- National Heritage Information Center database (GIS database).
- Ontario Breeding Bird Atlas online database.
- Ontario Reptile and Amphibian Atlas online database.
- Parks Canada SAR field observations (GIS database).
- Sediment, Soil and Surface Water Assessment – Factual Report: Peterborough Earth Dams – Lift Lock to Lock 20 on the Trent-Severn Waterway, Peterborough, ON REPORT (SNC-Lavalin Inc., August 16, 2021)
- Species at Risk public registry (Environment and Climate Change Canada, 2016)
- Verification of Environmental Performance Objectives: Peterborough Earth Dams – Lift Lock to Lock 20 on the TRENT-Severn Waterway, Peterborough, Ontario report (SNC-Lavalin Inc., 2021)

To evaluate the potential for Species at Risk (SAR) occurrences on-site, an examination of habitat requirements for each species identified in the desktop assessment was completed. These habitat preferences were then compared to the current site conditions, considering the site's biophysical characteristics, to determine the likelihood of SAR habitat utilization near the project area (see Appendix C for the full review).

The rationale for including or excluding VCs for further assessment in the Effects Analysis of this BIA has been detailed below in Table 1.

Table 1: Valued Components considered in this Basic Impact Analysis and rationale for inclusion in the Effects Analysis.

Valued Components	Project Activity	Rationale for consideration in Effects Analysis	Level of Analysis
Air Quality and Noise	• Use of machinery / generators • Concrete removals • Road repairs • Working in enclosed spaces	• **Impact:** Localized impacts on air quality due to use of diesel-powered machinery/equipment and dispersion of fine particulate matter. **Rationale:** The project will utilize well-maintained machinery/equipment, all fitted with emission control systems, mufflers, exhaust baffles, etc. All on-site vehicles will possess a Drive Clean Emissions Report in compliance with O. Reg. 361/98: Motor Vehicles under the Environmental Protection Act, R.S.O. 1990, c. E.19. • **Impact:** Noise and vibrations from construction work disruptive to property owners (e.g., sleep disturbance, hearing loss) and recreational users of adjacent lands (e.g., high annoyance, reduced enjoyment of outdoor experiences). **Rationale:** Construction activities will be limited to daylight hours to minimize noise disturbances for residents and wildlife in the project vicinity. The project will adhere to all relevant local and municipal bylaws to avoid disturbance of nearby residence including City of Peterborough bylaw 691.3.8 limiting working hours from 7:00am to 9:00pm. Any work proposed outside of daylight hours will require additional review for environmental impacts and approval from PCA and City of Peterborough. Urban residential and park area users identified as noise receptors in area, but no high sensitivity noise receptors will be impacted (hospitals, schools, nursing homes, daycare centres). Project works will be short-term (<1 year of continuous work) and during winter period (building windows typically closed and park areas less frequented) limiting potential health risks from noise and vibrations. Staging area to be situated on east side of canal, away from residential buildings limiting noise and vibration exposure. • **Impact:** Potential exposure of workers to controlled products (particularly TCE) via vapour inhalation in enclosed workspaces, as vapour concentrations may accumulate to unacceptable levels. **Rationale:** SNC-Lavalin (2021a and 2021b) assessed the potential risk of worker exposure to COPC via vapor inhalation and recommended that the contractor develop a site-specific exposure plan to mitigate the risk. The plan will ensure worker safety by preventing the creation of enclosed spaces in the work area. The contractor will monitor COPC concentrations in ambient air using a photo-ionization detector (PID) to ensure vapor levels remain below occupational exposure limits. The plan will also outline actions to take if these limits are exceeded. Given that air quality and noise disturbances are expected to be temporary and mitigable through implementation of an exposure plan, standard measures and best management practices, no further analysis is required.	PRIA/BMP/ Standard mitigations

Navigation	• Bridge decommissioning / replacement	• **Impact:** Interference with TSW navigable waterway (pursuant to the List of Scheduled Waters as defined by the *Navigation Protection Act.* **Rationale:** Navigation is managed and regulated by Parks Canada as part of the TSW in accordance with the *Historical Canals Regulations* (*HCR*). Any project activities during the navigation period are not to be conducted within the canal and therefore will not impact navigation. As the bridge substructure and superstructure are to replicate the original structure, no effects to the navigability of the TSW are predicted post-construction. No further assessment required.	PRIA/BMP/ Standard mitigations
Surface Water Quality	• Demolition • Excavation • Trenching • Concrete repairs below HWM • Paving • Dewatering	• **Impact:** Potential for concrete fines and concrete leachate to enter waterway impacting downstream water quality from increased turbidity and pH toxicity. **Rationale:** Unknown outcomes to VC. Further assessment required. • **Impact:** Increased TSS/turbidity associated with excavation and in canal trenching work. **Rationale:** Unknown outcomes to VC. Further assessment required. • **Impact:** Small scale fuel and oil spills in water are possible related to machinery operations below HWM and near waters edge. **Rationale:** Predictable outcomes can be mitigated with standard BMP, mitigations. • **Impact:** Small scale releases of chemicals from runoff into surrounding waterbodies. **Rationale:** Predictable outcomes can be mitigated with standard BMP, mitigations. • **Impact:** Mobilization of contaminants of potential concern (COPC) in soils, substrates, surface water, and groundwater from upstream sources; and • **Impact:** Potential for chlorinated volatile compounds (CVOCs) in groundwater immediately upgradient from site to migrate onto Project Site and potentially discharge at canal walls. **Rationale:** Unknown outcomes to VC given COPCs identified upgradient of project site. Further assessment required. • **Impact:** Excavated soils and sediment stored on site has potential to erode and reintroduced/distribute COPC into the watercourse. • **Rationale:** Unknown outcomes to VC given COPCs in soils and sediment. Further assessment required.	**Effects Analysis**

Fish and Fish Habitat	• Partial dewatering • Full canal dewatering • Demolition • Excavation • Trenching • Concrete repairs below HWM	• **Impact:** Reducing water levels below typical winter levels has potential to strand fish and deplete dissolved oxygen concentration in ponded water which may result in fish hypoxia. **Rationale:** Uncertain outcomes to VC given large size of reach, unknown fish communities present, and unknown habitat suitability. Further assessment required. • **Impact:** Fish mortality from changes in water chemistry associated with concrete leachate and fines. **Rationale:** Uncertain outcomes to VC given unknown fish communities present, unknown habitat suitability, and potential downstream effects. Further assessment required. • **Impact:** Increased suspended sediment introduced to the water column during trenching and excavation work can impact fish health and behaviour. **Rationale:** Uncertain outcomes to VC given unknown fish communities present, unknown habitat suitability, and potential downstream effects. Further assessment required. • **Impact:** Fish mortality from releases of deleterious substances from leaks and spills associated with construction equipment. **Rationale:** Uncertain outcomes to VC given unknown fish communities present, unknown habitat suitability, and potential downstream effects. Further assessment required. • **Impact:** Alteration of substrate and bed characteristics from trenching and machinery working in canal cut. **Rationale:** Uncertain outcomes to VC given unknown fish communities present, unknown habitat suitability, and potential downstream effects. Further assessment required.	**Effects Analysis**
Vegetation	• Staging • Excavation • Dryland trenching	• **Impact:** Removal of native vegetation for access and staging. **Rationale:** Project site is heavily influenced by past and present human disturbances including manicured lawns, access road maintenance and operational grounds of the bridge. The footprint of the replacement bridge is principally the same as existing bridge and not anticipated to encroach on unmanicured vegetated areas. Limited vegetation disturbance associated with staging equipment is anticipated to be restricted primarily to manicured lawned areas and minimal vegetation removal is expected as part of the project. No further assessment required. • **Impact:** Introduction of invasive species. **Rationale:** Standard BMP and mitigations will be applied with known outcomes. No further assessment required.	PRIA/BMP/ Standard mitigations
Migratory Birds	• Staging • Excavation • Bridge decommissioning / replacement	• **Impact**: Removal of vegetation used for critical life stages such as nesting, roosting, etc. **Rationale**: Migratory birds, their nests and eggs are protected under the Migratory Bird Convention Act (1994) and Migratory Bird Regulations (2022). As a primary mitigation measure, relevant construction activities are to be timed to avoid migratory bird windows including minor vegetation removals, and disturbance/removal of the bridge superstructure/substructures. • **Impact:** Destruction of potential nesting habitat on bridge superstructure.	PRIA/BMP/ Standard mitigations

		Rationale: Prior to any removal or disturbances of the bridge superstructure and substructures during the migratory breeding bird period of April 1 to August 31, screening for birds and/or their nest must be undertaken by a Qualified Environmental Professional. No further assessment required. • **Impact:** Noise and vibration disturbances from machinery. **Rationale:** Project timing will occur primarily outside of the migratory bird window. Poor habitat in vicinity of project, with limited risk of nesting. No further assessment required.	
Species at Risk Birds (Barn Swallow)	• Bridge decommissioning / replacement	• **Impact:** Removal of vegetation used for critical life stages such as nesting, roosting, etc. **Rationale:** Limited vegetation removal anticipated for project works in highly disturbed area of low habitat quality. No further assessment required. • **Impact:** Demolition/removal of the bridge will cause temporary loss of potential habitat. If nests present, direct harm to nests, eggs, or individuals possible. **Rationale:** Of the confirmed SAR bird observations near the Project Site, Barn Swallow (*Hirunda rustica)* is the only species with habitat potential on the Project Site and possible impacts will be considered further in the Effects Analysis section of this BIA. Specifically, Barn Swallows nest almost exclusively on man-made structures, including bridges where they can build nests on ledges and are often re-used year to year. As the bridge superstructure represents a potential nesting habitat for Barn Swallows this VC will be assessed further in the Effects Analysis.	**Effects Analysis**
Species at Risk Snakes (Eastern Milksnake)	• Staging • Use of machinery • Demolition • Excavation • Grading	• **Impact:** Destruction of hibernacula and basking habitat during demolitions and equipment operation. **Rationale:** Land to be impacted by the anticipated Project activities are restricted to areas that do not match the general habitat requirements for overwintering of snakes (i.e. hibernacula-suitable structures; fallen logs, wood debris piles, rock piles, etc.), the overwintering survivability of snakes (SAR and non-SAR) should not be impacted due to lack of or destruction of viable habitat. No further assessment required. • **Impact**: Injury or death from heavy duty vehicles and deterrence from transient habitat. **Rationale:** Given the high level of traffic and associated disruption associated with regular vehicular traffic over the bridge, Eastern Milksnake are not anticipated to utilize the site. As such, project activities are not expected to negatively impact species at risk snakes and will not be assessed further in the Effects Analysis.	PRIA/BMP/ Standard mitigations
Species at Risk Turtles (Midland Painted Turtle and Snapping Turtle)	• Use of machinery • Demolition • Excavation • Trenching	• **Impact:** Turtle entanglement or entrapment in ESC materials. **Rationale:** Geotextile fencing with nylon mesh lining will not be permitted for ESC to reduce potential for entanglement. Daily 'sweeps' of the project area will be undertaken to maintain ESC in good working condition and no wildlife entangled. Standard BMPs and mitigations outlined in this document can be applied with known outcomes. No further assessment required.	**Effects Analysis**

	• Grading • Use of concrete • Cofferdam installation • Dewatering	• **Impact:** Loss of access to habitat from temporary turtle exclusion fencing. **Rationale:** Uncertain habitat usage and interaction with project activities. Further assessment required. • **Impact:** Release of concrete during pouring operations into surrounding waterbody has potential to directly harm individuals due to reduced water quality. **Rationale:** Uncertain habitat usage and interaction with project activities. Further assessment required. • **Impact:** Incidental destruction of turtle nests and eggs from machinery operation and demolitions. **Rationale:** Uncertain habitat usage and interaction with project activities. Further assessment required. • **Impact:** Increased concentrations of contaminants of potential concern, exceeding guidelines for aquatic life, due to sediment/soil disturbances. **Rationale:** Uncertain habitat usage and interaction with project activities. Further assessment required. • **Impact:** Heavy duty equipment use in area of staging may result in encounters and direct harm to individuals and nests due to SAR turtle movement overland associated with proximity to Little Lake. **Rationale:** Uncertain habitat usage and interaction with project activities. Further assessment required. • **Impact**: Disturbance to hibernating turtles during de-watering and in-canal works. **Rationale:** Uncertain habitat usage and interaction with project activities. Further assessment required. The Project Site has been identified as having limited habitat potential for Midland Painted Turtle and Snapping Turtle. However, since a portion of the canal will be isolated for in-water works and presence of turtle downstream in Little Lake, potential impacts of the project to these two species will be evaluated further in the Effects Analysis section of this BIA to ensure compliance with the Species at Risk Act.	
Species at Risk Insects	• Staging • Use of machinery • Excavation • Grading	• **Impact:** Destruction of habitat including vegetation during staging and excavation around existing footings. **Rationale:** NHIC has reported Monarch Butterflies (*Danaus plexippus*), American Bumble Bee and Yellow-Banded Bumble Bee present near the project site. Given that the land within and adjacent to the site has been historically mowed and limited vegetation will be removed, no further assessment required. • **Impact:** Disturbances due to noise and vibrations from machinery. **Rationale:** There is a low potential for SAR insect occurrences on site due to poor habitat conditions limiting the risk of disturbances. No further assessment required.	BMP/ Standard mitigations
Species at Risk Mammals (Tri-coloured Bat)	• Staging • Use of machinery	• **Impact:** Destruction of roosting habitat for staging and disturbance from noise and vibrations from industrial equipment. **Rationale:** Tri-coloured Bat has been reported within [redacted] radius of the Project Site based on NHIC databased observations. Tri-coloured Bats (*Perimyotis subflavus*) primarily prefer forested, natural cavities or loose leaves for roosting. As the Project Site does not	PRIA/BMP/ Standard mitigations

		contain suitable winter hibernation and no tree removal will be required which could affect summer roosting habitat, construction activities are not expected to impact the species and will not be assessed further in this BIA.	
Species at Risk Vegetation (Butternut and Black Ash)	• Staging • Use of machinery	• **Impact:** Damage or removal of SAR trees to establish staging areas and incidental damage or destruction of SAR from heavy duty equipment operation. **Rationale:** NHIC has reported a Butternut Tree (*Juglans cinerea*) and Black Ash (*Fraxinus nigra)* within a [redacted] radius of the Project Site. Butternut and Black Ash have not been recorded or observed to date within the Project Site or immediate surrounding area. Furthermore, no native tree removal is anticipated for the project, and only limited shrub and herbaceous species are expected to be cleared in the staging area. Therefore, any SAR tree specimens unaccounted for shall be protected and unaffected by the project. With application of standard mitigation measured outlined in this BIA, impacts to SAR vegetation can be avoided and will not be assessed further in the Effects Analysis.	PRIA/BMP/ Standard mitigations
Cultural Resources	• Use of machinery • Demolitions • Bridge replacement	• **Impact:** Repairs to substructure may lead to damage along canal walls. **Rationale:** Area of repairs have been established to limited areas of bridge substructure. Standard industry BMP can be applied to avoid impacts to canal infrastructure. No further assessment required. • **Impact:** Demolitions and excavation around bridge substructure could alter key defining features of the landscape. **Rationale:** A Statement of Cultural Resource Impact Analysis (SCRIA) was completed for the project and signed by the Director of Ontario Waterways November 14, 2018. While the bridge itself is not subject to any requirements under the CRM Policy, the landscape is part of the Peterborough Lift Lock and Lock 20 area. The objective of conservation is to preserve the key character-defining elements of this landscape that contributes to the TSW National Historic Site. The bridge also illustrates juxtaposition of transportation technologies on the waterway and evolution of bridge design, construction and use from the later 19th Century to 1960s. The project will implement recommendations in the SCRIA including rehabilitation of the bridge with a sympathetic design to the original maintain the heritage value of the Peterborough Lift Lock area. Replacement of the Maria Swing Bridge ensures continued operation of the Trent-Severn Waterway as an operational system for through-navigation. Walls of the canal will not be impacted by the project. No further assessment required.	PRIA/BMP/ Standard mitigations
Archaeology	• Use of machinery • Demolitions • Trenching • Excavation	• **Impact:** Destruction of archaeological artifacts during demolitions and excavation, both terrestrial and underwater. **Rationale:** No terrestrial archaeological resources were identified in the Stage 1 & 2 Archaeological Impact Assessment (AIA) on both Federal and Provincial lands of the project site. No further terrestrial assessment was deemed necessary for the project with application of standard mitigation measures employed. As trenching of the canal bed will be confined to an area of previous deep disturbance, underwater archaeology has indicated that no further assessment required.	PRIA/BMP/ Standard mitigations

4. EFFECTS ANALYSIS

This section evaluates potential impacts to valued components (VCs) identified as likely to experience significant interactions with the project activities, particularly where outcomes remain uncertain.

4.1. Fish Habitat, Fish, and Water Quality

The following sources were considered for the effects analysis of fish habitat, fish, and water quality:

- Aquatic species at risk map (DFO, 2024).
- Fish Habitat Assessment of Various Sites long the Trent Severn Waterway (TSW) and the Rideau Canal Waterway (RCW) – 19. Warsaw Road Swing Bridge (ARCADIS, 2017).
- Basic Impact Analysis: Aquatic Ecology Canadian Canoe Museum, Peterborough, ON. Cambium Reference No.: 5049-001. 2016-12-15. (Cambium. 2016).
- Land Information Ontario (LIO). Digital Mapping of Aquatic resource area polygon MNRF (2024b).
- Fish Habitat Assessment of Various Sites Along the Trent-Severn Waterway (TSW) & the Rideau Canal Waterway (RCW) (Arcadis, 2017).
- Sediment, Soil and Surface Water Assessment – Factual Report, Peterborough Earth Dams – Lift Lock to Lock 20 on the Trent-Severn Waterway, Peterborough, Ontario (SNC-Lavalin, 2021b).
- Verification of Environmental Performance Objectives: Peterborough Earth Dams – Lift Lock to Lock 20 on the Trent-Severn Waterway, Peterborough, Ontario (SNC-Lavalin, 2021a).

4.1.1. Baseline Conditions:

4.1.1.1. Fish Habitat

General Habitat Conditions:

Maria Swing Bridge is located near the southern end of the canal cut between Lock 20 and Lock 21, which extends approximately 1 km in length. The habitat around Ashburnham Lock 20 & Maria Swing Bridge consists of two primary reaches (Figure 5):

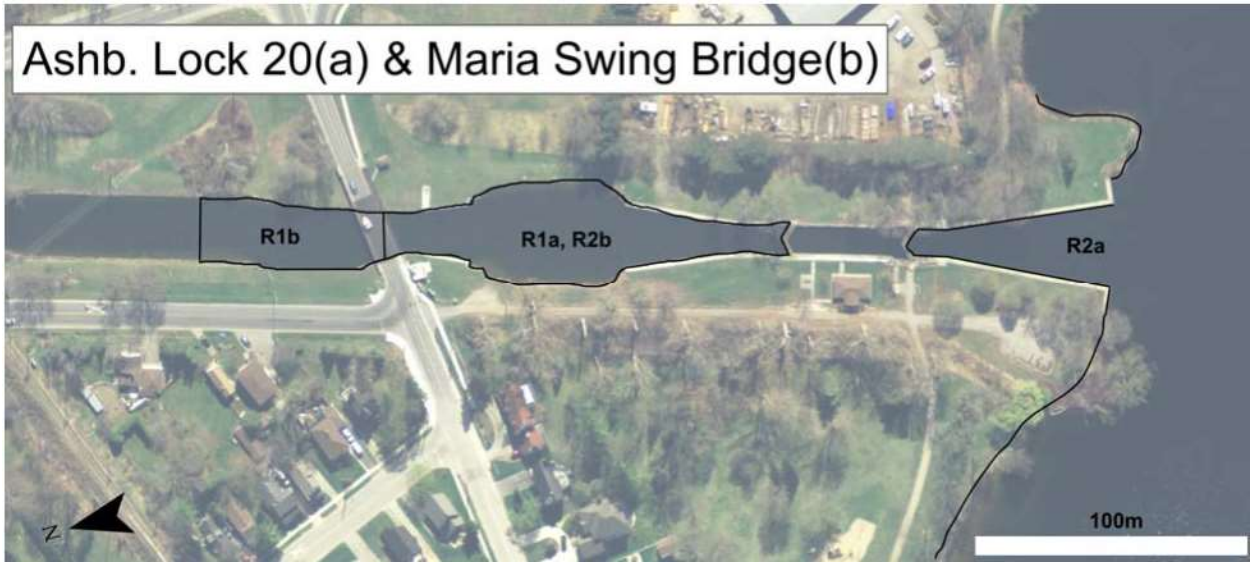


Figure 5: Upstream pool (R1b), downstream pool (R1a, R2b) habitat types (Arcadis, 2017).

- **Reach R1b**: Located north of Maria Swing Bridge, this reach is 60m long, 24 m wide, with a mean depth of 2.2m. It has an organic substrate with some rip rap at the edges, providing moderate cover for fish. The riparian area is narrow and primarily manicured grasses, with minimal overhanging shrubs. The habitat conditions are marginal, with 15-50% cover and extensive sediment deposition. The pool is deep with slow to standing water, and the canal has been altered over many years, lacking natural riffle features (Arcadis, 2017).

- **Reach R2b:** This reach is downstream of Marias Swing Bridge, 80 m long, 17-38 m wide, with a mean depth of 2.5 m. The substrate is organic with some gravel and boulders, offering moderate cover. The riparian area is like R1b, with minimal overhanging vegetation. Like R1b, the habitat is considered marginal, with poor conditions for fish refuge and spawning (Arcadis, 2017).

Aquatic Vegetation:

Aquatic vegetation within the canal cut consists of an abundance of non-native Eurasian Milfoil (*Myriophyllum spicatum)* and native Tape Grass (*Vallisneria americana*), with some Flat-stemmed Pondweed (*Potamogeton zosteriformis)* (PCA, 2024).

Site visits and photographic evidence indicate that aquatic vegetation is less dense between Lock 20 and the CPR bridge compared to the canal section north of the CPR bridge (Appendix A). South of the CPR rail bridge, the aquatic canopy cover generally accounts for less than 50%, while north of the bridge, the cover frequently exceeds 75% of the winter wetted area. The northern section also features significant matting and clumping of aquatic vegetation in certain areas.

Fish Passage:

Fish migration within the canal cut is constrained by the canal lock infrastructure, which acts as a barrier, apart from boat lockage's during the navigation season which permit limited incidental fish passage between Little Lake and/or the canal cut above Peterborough Lift Lock. Between Thanksgiving to Victoria Day (mid-October to mid-May) when the canal is not operated, there is virtually no potential for fish migration in or out of the canal.

Water Levels and Flow:

During the navigation season, the maximum operating water level is 192.69m (CVGD28:78). The approximate winter water levels drop by 1.35m to an elevation of 191.34m (CVGD28:78), though winter levels vary year to year. This winter water level reduction is associated with opening of Lock 20 gates at the end of the navigation operating season and placement of several maintenance logs. In addition, a small amount of leakage is permitted to pass through the guard gates at Warsaw Road locks and through the Peterborough Lift Locks down to Lock 20. The consequence of these changes during non-navigation season is minimal flows (30 L/s estimated) and water concentrated towards the center of the V-shaped canal cut. It is anticipated that at the end of the operating season when the lock 20 gates remain open, and the water is permitted to partially drain from the canal cut, that the majority of resident fish present in the canal cut will migrate out of the canal to Little Lake for suitable overwintering habitat. However, it is probable that some fish will unsuccessfully migrate out of the canal cut and remain confined between the locks for the remainder of the non-navigation season.

4.1.1.2. Fish

Species Occurrences and Provincial Ranking:

Limited fish species lists exist for the canal cut between Lock 20 and Lock 21. Based on available records at nearby locations, including Little Lake and the Otonabee River in the City of Peterborough, 25 fish species occur with warmwater and cool water thermal regimes (Appendix B). On March 31, 2015, electrofishing surveys were completed both within the canal between Lock 20 and Lock 21 and immediately below Lock 20 in Little Lake (Cambium, 2016). Eleven fish species were identified during this survey, with Brook Silverside being the only species not previously observed. The number of species or total individuals counted was not documented during this survey.

Eighteen of the identified species are provincially ranked (sub-national S rank) as Secure (S5) indicating they are common, widespread, and abundant. Four species, Black Crappie, Brook Silverside, Rosyface Shiner, and Muskellunge have a provincial ranking of Apparently Secure (S4) indicating they are uncommon but not rare; some cause for long-term concern due to declines or other factors. Based on habitat requirements for all four species with S4 ranking, the canal cut offers limited habitat potential for critical life stages, due to marginal conditions. Greater Redhorse is listed as Vulnerable (S3), but the canal cut does not provide the preferred habitat for this species. Invasive species including Common Carp and Round Goby are present in the canal cut.

Species at Risk, Critical Habitat, and Species of Interest:

No Species at Risk (SAR) or SAR Critical Habitat (CH) have been identified near Maria Street Swing Bridge.

Walleye are present in Little Lake and Otonabee River which is a species of interest due to its importance to both indigenous and recreational fisheries on the TSW. The canal cut within the project site does not provide suitable habitat for Walleye critical life stages. However, Scotts Mills Dam, situated 1.2 km below Lock 20 at the southern extent of Little Lake, is a significant barrier during spring spawning run for Walleye, and is considered to have the largest population of spawning Walleye migration out of Rice Lake. Walleye spawn soon after ice break up and begin spawning migration when temperatures are above 2◦C, typically from early to mid-April in this region of Ontario. Spawning occurs during the night once the water temperatures are generally between 5.6 and 11.1°C. During these conditions Walleye move from the staging areas into the shallows, and peak spawning activity typically occurs at water temperature between 7 and 8°C (qtd. in Wood, 2019).

4.1.1.3. Water Quality

Contaminants of Potential Concern (COPC)

In 2020 and 2021, SNC-Lavalin (2021b) was retained to evaluate contaminants of potential concern (COPCs) in sediment, soil, surface water, and groundwater at the Peterborough Earth Dams site between Lock 20 and Peterborough Lift 21 on the Trent canal. Several COPCs were identified as exceeding thresholds and presenting risks to aquatic life including lead, manganese, Total Kjeldahl Nitrogen (TKN) and Phosphorus, Polychlorinated Biphenyls (PCBs) – Aroclor 1260, Petroleum Hydrocarbons (PHCs) and Trichloroethylene (TCE).

As a follow-up to the initial investigation (SNC-Lavalin, 2021b), SNC-Lavalin (2021a) was retained to undertake verification of Environmental Performance Objectives (EPOs) for construction works associated

with the Peterborough Earth Dams project. Exceedances of contaminants of potential concern (COPCs) were determined by comparing the measured concentrations in sediment, soil, surface water, and groundwater samples between Lock 20 and Lock 21 to regulatory guidelines and established environmental standards. The investigation evaluated whether concentrations of COPC could pose risks to human health (construction workers and recreational users) and aquatic life during and after construction. Concentrations of COPCs in surface water resulting from the suspension of sediments during construction activities were predicted and compared to ambient water quality guidelines for protection of aquatic life, recreational use, and drinking water. The evaluation verified that a primary EPO of 25 mg/L of Total Suspended Solids (TSS) would be protective of aquatic biota and downstream users, with a maximum upper discharge limit of 75 mg/L of TSS. Additionally, in support of field program monitoring, the investigation concluded that the turbidity associated with the PCA EPO of 25 mg/L of TSS is equivalent to 8.2 Nephelometric turbidity units (NTU), while the Fisheries and Oceans Canada (referred to herein as Department of Fisheries and Oceans [DFO]) upper discharge limit of 75 mg/L is associated with an equivalent turbidity of 23 NTU at the project site. Sediment and soil samples were further analyzed for waste classification and concluded that spoils generated during construction was classified as non-hazardous for off-site landfill disposal.

Trichloroethylene (TCE)

Furthermore, a qualitative risk evaluation of chlorinated volatile organic compounds (CVOC) was included in the SNC-Lavalin (2021a) investigation to evaluate potential risk to human and ecological receptors from an upstream off-Site contaminated groundwater source to migrate onto the Project Site and potentially discharge at canal walls. Based on this evaluation, Trichloroethylene (TCE) was identified in surface water near groundwater seepage as a COPC for both Construction Workers and Freshwater Aquatic Life as it is particularly hazardous when present in elevated concentrations.

TCE tends to volatilize to the atmosphere when released on the surface of soil and is heavier than air. However, if it leaches into the soil before evaporation, it is highly mobile in the soil subsurface and accumulates significantly in saturated and unsaturated zones. Transport will occur through soil via gaseous and liquid diffusion, dispersion, and advection in porous spaces. Its primary transport occurs either as vapor or liquid, with vertical migration until it encounters an impermeable layer. In saturated zones, TCE movement slows, but its limited solubility allows pure TCE droplets to travel within the water phase of aquifers.

Studies reveal that TCE exposure disrupts microbial activity, damages plant health through airborne contamination, and harms terrestrial invertebrates. However, the compound exhibits minimal bioaccumulation in higher organisms. To protect aquatic life, Canadian guidelines recommend limiting TCE concentrations in soil to 0.05 mg/kg for coarse soils and 0.16 mg/kg for fine soils, preventing harmful levels in surface water.

In humans, TCE exposure occurs through ingestion, inhalation, and dermal contact. Once absorbed, it targets organs, including the liver, kidneys, and central nervous system. Health agencies classify TCE as a probable human carcinogen, linking it to cancer risks and developmental issues even at low exposure levels. To protect human health, the Canadian guidelines limit soil TCE concentrations to 0.01 mg/kg across all land uses, ensuring the protection of drinking water and minimizing exposure risks (CCME, 2006).

4.1.2. Predicted Adverse Effects

4.1.2.1. Fish Habitat:

In-water Habitat Features

There is a potential for the project to impact fish habitat due to trenching of the canal bed necessary to install an underwater utility duct. Alternative methods including underwater cabling and horizontal directional drilling (HDD) were considered but deemed incompatible with the site due to navigation interference and existing sheet pile infrastructure. The trench is expected to be approximately 1m wide, disturbing approximately 15 m^2 of the canal bed. Although the canal substrate is primarily organic, sand, and fine substrates, some gravel and boulders may be present, posing a risk of lost habitat cover. Based on site images during previous dewatering (2021), no boulder features were observed in the vicinity of Maria Swing Bridge. Rather, habitat quality is considered low and typically homogenous throughout the reach. Disturbed substrates will be regraded to match existing bed contour conditions with substrates to match existing class size distributions. Fish passage will not be altered following restoration of the trench within the canal.

To mitigate risk:

- Should any habitat cover features be encountered during in-water works, such as boulders or tree logs, they can be temporarily relocated and replaced after excavation to maintain existing habitat cover in the affected area.
- The canal bed profile will be returned to the original conditions following in-water works.
- Where substrate is disturbed from trenching, material shall be replaced with comparable material or enhanced for improved habitat features.

Aquatic Vegetation

The impacts on aquatic vegetation from project works are expected to be negligible due to project works with no significant residual effects.

Aquatic vegetation disturbance from machinery operation and trenching work will be temporary and limited to the non-growing season. Disturbance from equipment operation will be confined to a portion of the canal that exhibits limited vegetation growth. With the presence of non-native Eurasian Milfoil and native Tape Grass, it is expected damaged or removed aquatic vegetation will regenerate in subsequent growing seasons and will resemble pre-construction fish habitat conditions.

To establish a ‘dry’ work zone, the Contractor may select to lower water levels below typical winter settings, either short-term (<1 week) or long-term (>1 week). Lowering water levels will concentrate the wetted perimeter of the canal toward the center of canal. Photographic evidence from a previous dewatering event shows that the canal width varies along the reach, narrowing significantly (3–4 m) near the southern extent and widening to over 10 m beyond the CPR Rail bridge. This water level adjustment will expose aquatic vegetation beyond typical levels, likely increasing mortality due to prolonged exposure out of water. The canal primarily supports dense Eurasian watermilfoil, a non-native invasive species, along with limited populations of native tape grass and flat-stemmed pondweed. Consequently, the

ecological impacts are expected to be minimal as none of the native species are culturally significant or of conservation concern. These aquatic species are well-adapted to surviving low-water conditions over winter and benefit from an established seed bed. Vegetation within the remaining wetter perimeter of the canal is likely to persist, and the assemblage is expected to return to comparable densities during the next growing season.

If the Contractor selects to lower water levels below typical winter settings for more than one week, a fish salvage will be required. To facilitate this work, the Contractor must harvest aquatic vegetation beforehand to prevent fish from becoming entangled in the dense mats. This undertaking is not expected to alter aquatic vegetation as mechanical harvesters typically leave the root systems intact, ensuring no long-term impact on plant regrowth (Painter, 1986).

Where riprap is used to create an access pad on the canal bed, the bottom substrate layer is to remain in place to avoid disturbance of sediments potentially containing COPC. Changing the bed substrate from sandy silt to cobble-sized material will likely restrict aquatic plant growth. However, aquatic plant density near the Maria Swing Bridge is already low compared to upstream areas, and the impact will only reduce growth potential in 0.7% of available habitat area within the reach.

No species at risk or culturally significant aquatic plants are known to occur in the canal reach.

In-water Footprint and Concrete Debris

Project activities will also involve repair of existing bridge abutments and wingwalls, with no expected changes to the bridge footprint. Concrete demolition debris could alter substrate characteristics if permitted to fall on canal bed and not be cleaned-up. Additionally, riprap aggregate may be placed on the canal bed to create a barrier between sediment and heavy-duty equipment when required to work within the canal. Preliminary discussions of use of aggregate to access the canal have suggested that riprap may be placed along the west side of the canal from the existing access ramp on southwest corner of bridge. Assuming a minimum width of 4.0 m to permit access of a standard excavator, and distance of 40 m between access ramp to bridge, the total area of riprap would cover 160 m^2. It has been proposed to leave the last layer of riprap that is in direct contact with the substrate in place following in-water works to avoid disturbance of sediments containing COPC which will alter the in-water substrate size characteristics of the canal for the impacted area.

Of the 24 species with potential to be found in the canal cut, a change in substrate composition is expected to affect habitat use as follows (Portt, et.al., 1999):

- Species Likely to benefit (higher preference for cobble)
    - Smallmouth Bass
    - Rock Bass
    - Round Goby

- Species likely to be negatively affected (higher preference for sand)
    - Black Crappie
    - Bluntnose Minnow
    - **Brown Bullhead***
    - Golden Shiner
    - Bluegill
    - Brook Silverside
    - Common Shiner
    - Johnny Darter

- Largemouth Bass
- Mottled Sculpin
- Pumpkinseed
- **Spottail Shiner***
- Walleye
- Yellow Perch
- Logperch
- **Northern Pike***
- **Rosyface Shiner***
- Trout-Perch
- White Sucker

Note: **Bold*** denotes species that do not use cobble substrate.

The above details highlight that most fish species in the canal exhibit a stronger general habitat preference for sand substrates over cobble. This shift has the most significant impact on Brown Bullhead, Northern Pike, Rosyface Shiner, and Spottail Shiner, which do not use cobble substrates. While the alteration represents a direct loss of preferred habitat for many fish, it affects only 0.7% of the 2.15 hectares of available habitat within the canal. The remaining area will continue to provide suitable alternative habitats. Additionally, it is anticipated that remnant riprap material will be filled in with sand, organics, and fines overtime as parent substrates are mobilized from lockage's and seasonal water level reductions/increases for navigation related water management.

Conversely, the altered substrate will benefit three species: Smallmouth Bass, Rock Bass, and Round Goby. The two native species, Smallmouth Bass and Rock Bass, are aggressive predators with diverse diets that include smaller fish, aquatic insects, crustaceans, amphibians, and turtles. These species exhibit strong nest-guarding behaviors and actively drive other species away from spawning grounds. Furthermore, the non-native invasive Round Goby also prefers cobble and rocky substrates over sand (Portt et al., 1999). This species preys on mollusks, aquatic insects, fish eggs, and small crustaceans and fishes, while consuming large quantities of zebra mussels—though not enough to control their population. Round Goby outcompetes native fish for food, aided by a highly developed sensory system for detecting movement (Holm et al., 2009). While the presence of these three species can influence fish community composition due to predation and spawning behaviour, existing riprap along the canal walls is present in notable quantities. Increasing the preferred habitat of these three species by 0.7% in the canal reach is not expected to result in a notable increase in their abundance compared to existing community composition.

To mitigate risk:

- An adequate catchment system will be required to capture concrete waste materials generated during demolitions and avoid deposition on the canal bed.
- Riprap and debris shall be removed from the canal at the end of construction. To avoid significant disturbance of contaminated sediments, the bottom layer of aggregate in direct contact with sediment can remain within the canal post-construction.

With the potential for changes to fish species community composition associated with altered substrate, the extent of residual adverse effects has been further assessed in *Section 6* of this BIA.

4.1.2.2. Fish:

Altered Water Levels and Dewatering:

Project activities include dewatering a section of the canal at Maria Swing Bridge to repair bridge substructures and facilitate underwater trenching. There is potential for the project to be undertaken concurrently with Phase II of the Peterborough Earth Dams (PED) canal wall rehabilitation project

necessitating coordination with dewatering activities. As such, two methodologies are being considered to permit work in the “dry”.

Proposed Method 1 (Short term water level reduction and cofferdam install):
The first proposed method to establish a dry work zone entails a short-term (<1 week) lowering of water levels in the entire canal cut from Lock 20 to Lock 21 below typical winter settings to enable the installation of a cofferdam at the upstream extent of the Maria Street Swing Bridge work area. The cofferdam installation is expected to take no more than one week, after which water levels will be restored to typical winter settings.

Lowering water levels in the fall may strand or displace fish within the canal cut, potentially causing hypoxia stress due to low dissolved oxygen (DO) levels. This is particularly concerning due to the presence of dense aquatic vegetation growth in the canal, including Eurasian watermilfoil, that will begin to die off and decay in the fall, reducing oxygen levels in the water. Photographic evidence from a previous instance of reduced water elevations below typical winter settings shows that the wetted channel becomes confined to the canal's center, forming a V-shaped cross-section. While water depths during these conditions were not directly measured, photographic observations suggest depths of approximately 10 cm near the Maria Swing Bridge. Topographic surveys of the canal reveal multiple depressions occurring roughly every 100 meters along the 1-km reach, ranging from 10 to 20 cm deeper than the typical canal bed elevation. These depressions are anticipated to serve as temporary fish refuges during reduced water levels.

To ensure adequate conditions for target fish species, refuge pools should maintain a minimum depth of 20 cm or 1.5 times the body thickness of the target species, as recommended by the Maine Department of Transportation (2004). However, there remains a risk of refuge pools becoming disconnected from the main canal and failing to meet minimum depth requirements. In such cases, a fish rescue will be necessary to prevent fish mortality and health impacts in isolated pools with depths below 20 cm or 1.5 times the body thickness of the target species.

Additionally, there is a risk of fish mortality if water freezes to the canal bottom when temperatures drop below 0°C while water levels remain low. To mitigate this risk, the proposed work must be completed in the fall, prior to the onset of ice formation.

To mitigate risk:

- Water levels should not be lowered for more than one week below typical winter settings.
- Visual sweeps shall be undertaken of the canal reach to ensure no pockets of water contain stranded fish and fish salvages should be undertaken when fish are observed in distress or water quality diminishes below acceptable levels for fish survival.
    - Pools less than a water depth of 0.20 m or 1.5 times the body thickness of the present species (whichever is greater) shall be de-fished.
- Attempts shall be made to flush out trapped fish from aquatic vegetational along canal margins. Alternatively, harvesting aquatic vegetation prior to reducing water levels, will substantially reduce the biomass within the canal, limiting the potential for entangling fish and DO deprivation during reduced water levels.

- Water levels shall be returned to typical winter settings once isolation barriers have been installed to maintain winter fish refuge. Once the isolation barriers have been installed, a fish rescue must be conducted in the isolation work zone prior to full de-watering.

To establish a dry work zone at the Maria Swing Bridge after the upstream cofferdam is installed, dewatering will commence by allowing water to flow passively through the downstream extent. A fish rescue must be completed within the work zone, as the remaining pool of water may contain stranded fish unable to escape the canal during dewatering. This fish salvage must occur before ice formation to prevent fish mortality caused by ice freezing to the bottom.

The presence of ice, such as edge ice, frazil ice, or surface ice, may hinder fish salvage operations by reducing accessibility and complicating equipment deployment. Additionally, ice formation could isolate fish behind ice dams. Consequently, conducting fish salvage in winter would require removing ice cover, likely causing significant substrate disturbance, compromising fish health, and mobilizing COPC. Such activities will therefore not be permitted due to their high impact and the anticipated low success rate of winter de-fishing.

Once the fish rescue is complete, dewatering will continue to create a dry work zone. Water leakage through the Warsaw Road guard gate is expected to contribute approximately 30 L/s of flow. This flow will be bypassed through the work site using a culvert positioned at the canal's center. Outlet points for pumps or the culvert may erode the canal substrate and mobilize COPCs. To prevent scouring, energy dissipation measures such as riprap or blast mats must be installed at the outlet points.

To mitigate risk:

- Fish salvage and dewatering must be undertaken in the fall prior to ice development.
- As some minor flow (30 L/s estimated) will be permitted to pass through the Warsaw Road guard gates and Peterborough Lift Lock, a flow bypass method such as piping or pumping the equivalent inflow past the dewatered area will be necessary and must incorporate appropriate screening to protect fish.
- Flow energy dissipation should be placed at water discharge points to prevent erosion and sediment release.

Proposed Method 2 (Long term water level reduction and de-fish entire canal reach):

An alternative proposed methodology for creating a "dry" work zone in the canal cut, involves de-watering the canal reach between Lock 20 and Lock 21 below typical winter settings for longer term (> 1 week). This method can expect to result in high fish mortality due to fish stranding within the confined canal, if not mitigated. Limited pool habitat features are observed within the canal cut, rendering most typical winter refuge areas as unusable. It is anticipated that if the canal reach between Lock 20 and Lock 21 is permitted to drain and create "dry" conditions, any remnant pools would likely freeze during the winter due to insufficient depth and flow input. The only feasible approach to avoid a significant fish kill for this de-watering methodology would require de-fishing the entire in-water work area.

Timing fish salvage and subsequent de-watering of the canal reach in the fall, prior to ice development, will present the least potential risk to resident fish. During this period, water levels will be lowered, concentrating fish towards the centre of the canal. De-fishing can then be implemented without interference from ice development. Attempting fish rescues in the winter will require substantial efforts

to remove ice cover from the canal, potentially creating significant disturbance to contaminated substrates. Additionally, winter de-fishing operations, involving lowered water levels, increase the risk of ice freezing to bottom prior to fish rescues resulting in fish kills. Dense aquatic vegetation growth within the canal will also limit the effectiveness of fish capture techniques, such as seine netting and/or electrofishing as the aquatic vegetation can interfere with accessing all areas and provides cover that may entrap fish.

To mitigate risks:

- If altering water levels in the canal reach between Lock 20 and Lock 21 below typical winter settings for greater than one week to establish a 'dry' work zone (i.e. Maria Swing Bridge work undertaken concurrently with Site A of PED construction), a fish rescue shall be conducted along the entire length of canal prior to ice formation.
- The fish recue shall be conducted with a minimum of three passes of the entire canal reach. Additionally, passes shall be made until two consecutive collection efforts (i.e. electrofishing, seining, etc.) result in zero catch.
- Pre-treatment of aquatic vegetation, such as use of an aquatic vegetation harvester, may be necessary to ensure successful fish salvage efforts.
- Water levels cannot be dropped below typical winter levels if ice formation is present, unless fish salvage has been completed along the entire canal reach. This applies to both cofferdam install and removal timing.

Given the large habitat size of the canal reach, the potential residual effects of fish mortality among remaining individuals following fish removal efforts will be further evaluated in Section 6: Significance of Residual Adverse Effects.

Water Infiltration and Sediment-Laden Water:

During construction activities within the canal, there is a potential for water from precipitation, runoff, and/or groundwater infiltration to enter the dry work zone, leading to the development of sediment-laden water that could exceed EPO standards, impacting fish health.

To mitigate risk:

- In-water work will be timed to avoid fish spawning periods.
- Sediment-laden water must be captured and treated before it leaves the work zone.
- In the event of an escape, secondary containment or treatment of sediment-laden water will be required.
- A contingency curtain shall be established below Lock 20 and sediment removal in lock if significant build-up (>1cm depth).
- Any sediment collected from the dewatering device, potentially contaminated with COPCs, must be tested, and disposed of at an approved disposal site.

Concrete Repairs

Project activities will also include concrete repairs of bridge abutments and wing walls both above and below the high-water mark. Concrete repairs within the cofferdam area pose a risk of uncured concrete

contaminating infiltrated water, which can degrade pH levels and harm aquatic life. Specifically, uncured concrete may encounter groundwater entering the canal walls through seepage in addition to leaks through the upstream cofferdam, and/or overland flow potentially during precipitation events, or variable winter conditions.

To mitigate risk:

- All attempts should be made to minimize potential water infiltration sources into the dewatered area by maintaining an impermeable liner at the upstream cofferdam barrier and managing runoff above the canal walls to redirect away from the work area.
- Capture clean water entering the work area prior to mobilizing sediments or encountering uncured concrete. Clean water can then be pumped back into the waterbody to maintain the dry dewatered zone.
- Monitor and maintain water pH between 6.5 and 9.0, with treatment required for any water exceeding these limits. Water with pH > 9 cannot be released directly back into the watercourse but must be treated prior to release. Aqueous substances with a pH ≥ 12.5 are corrosive and considered a hazardous waste under Ontario Regulation 347 of the Environmental Protection Act and wastewater in this condition must be removed from the site.
- To further minimize this risk, following the installation of cast-in-place concrete, all fresh concrete should be allowed to dry and cure properly for 48 hours in tight joints to prevent leakage. A CO2 bubbler system will also be required on site to neutralize high pH levels, should water infiltration occur, and dry conditions not maintained.

Trenching and Excavation

Trenching and the potential need for excavation of excess sediment along the canal margins will disturb canal substrate. Should water be permitted to enter the dewatered work area, disturbed sediments may become suspended in water and allowed to flow out of site or be pumped directly into the receiving environment without treatment. Suspended sediments degrade water quality and ultimately settle downstream, resulting in sedimentation of downstream fish habitat and/or smothering fish eggs or larvae and result in mortality. Of particular concern for the project site is the presence of COPC observed in soils, sediments, and waters from upstream sources as outlined in SNC-Lavalin's investigation (2021a and 2021b). As the receiving environment in Little Lake provides suitable habitat for a variety of fish species, such a release of a deleterious substance may be in contravention of the Fisheries Act as it could directly or indirectly harm fish and/or fish habitat.

To mitigate risk:

- All excavated sediment must be taken off site for disposal and cannot be replaced in the canal.
- Heavy duty equipment should be operated from above the canal walls when possible and only the working end of the equipment is to enter the canal.
    - Where not practical, heavy-duty equipment that enters the canal should be limited to blast mats or suitable aggregate placed on sediment and fully isolated from water to reduce the potential for disturbance and mobilization of sediments containing COPC.

- If using an aggregate barrier, such as gravels, consideration must be given to clean up efforts, as sediments must not be disturbed when removing aggregate barrier. Operating above sediments within the canal will also prevent sediments containing COPC from attaching to equipment and transporting out the canal onto surrounding soils.
- To limit disturbance of contaminated sediments, the base layer of aggregate barrier can remain on the bed of canal but must not impact navigation depth requirements.

Workers and Small Equipment Entering Canal

As workers and small equipment entering the canal may disturb substrates, there is potential for mobilization of COPC within the canal and transport onto surrounding soils from PPE and equipment.

To mitigate risk:

- Worker and small equipment will only be permitted to work on ice, or a barrier placed on the substrate.
- Wash stations should be established away from the canal to clean off sediment debris stuck on PPE and other light duty equipment used within the canal cut.
- Any turbid water within the work area is to be treated away from the canal in a self-contained treatment system that will not be permitted to discharge into the surrounding environment.
    - As sediment removed from the system has potential to contain contaminants of potential concern, sediment sampling must be undertaken prior to disposal, as per SNC-Lavalin (2021a) recommendations and those outlined in mitigation measures of this BIA.
    - Further review of the risks to water quality and aquatic life from contaminants of potential concern are provided in the Water Quality subsection of this report.

Rewatering

With disturbance of sediments containing COPC in the canal anticipated during construction works, rewatering may pose a heightened risk of releasing a sediment plume downstream, if isolation mitigations fail. The potential for a significant plume to negatively impact downstream aquatic life will be limited as the Lock 20 gates will be closed during rewatering. Regardless, some leakage occurs through the closed gates that may permit turbid water to escape impacting downstream aquatic life. Additionally, following rewatering, sediments may be transported downstream into Lock 20 and be released as a plume during the initial lockage's.

To mitigate risk:

- As accumulation of sediment is high risk in Lock 20, sediment thickness will be assessed within Lock 20 pre and post construction. Should construction activities result in increased sediment depths (>1cm), material will be removed prior to rewatering.
- A turbidity curtain will be placed at the downstream extent of Lock 20 as a contingency to capture released sediment plumes during rewatering efforts.

Project Timing

To further reduce potential impacts from project activities, site-specific scheduling restrictions will be implemented to protect fish and fish habitat. The restricted in-water construction timing window for Centrarchid spawning in the canal extends from May 1 to June 30. Additional timing restrictions will be necessary to accommodate the Under the Lock Fishing Derby, which starts on the last Saturday in April within the canal reach. Consequently, rewatering to navigation levels must occur prior to this event.

To mitigate risk:

- Rewatering must occur before April 15th to allow sufficient settling time for suspended sediments to return to typical concentrations.

4.1.2.3. Water Quality:

Disturbance of Soil Containing COPC from Construction Activities

The operation of heavy machinery, concrete repairs, excavation, and in/near-water trenching increases the risk of soil disturbance and sediment movement, potentially impacting water quality and aquatic life. Of particular concern, Trichloroethylene (TCE) has been identified as a COPC in groundwater seepage and surface water, posing a risk for both construction workers and aquatic life. However, the maximum TCE concentration in soil samples remain below acute and chronic toxicity level for aquatic life and human receptors, suggesting that water discharged into the canal from excavation activities will not cause toxicity issues (SNC-Lavalin, 2021a).

To mitigate risk:

- Maintain site-specific EPOs (see mitigations and SNC-Lavalin, 2021a).
- Soil testing for COPC will be undertaken prior to disposal offsite. As a minimum, samples should be analyzed for metals (lead), nutrients, PCBs, and PHCs.
- To address uncertainties in TCE concentrations entering the work area during construction, the Contractor must establish a contamination work plan. This plan will mitigate risks associated with the transportation, storage, use, disposal, and emergency response to spills of controlled products.
- When creating enclosed spaces in work zone, monitor the work area for COPC in ambient air (particularly TCE) to ensure vapour concentrations do not exceed current occupational exposure limits for Ontario workplaces required under regulation 833 (OLTSD, 2020).

Disturbance of Sediment Containing COPC from Heavy Duty Equipment and Workers Entering Canal

The use of heavy-duty equipment within the dewatered canal cut, along with worker entry, may disturb sediments containing COPC. If water entering the site elevates TSS levels beyond the established EPOs of 25 mg/L, COPCs, including TCE, may exceed safe concentrations for aquatic biota and downstream users.

To mitigate risk:

- Heavy duty equipment will be operated from above the canal walls, when possible, with only the working end of machinery permitted in the isolated dry work area.
    - Where this is not feasible, heady duty equipment that must enter the canal must be isolated from sediments to prevent disturbance.

- Barriers such as traffic mats or aggregate (riprap) placed on substrate can provide suitable isolation of equipment from sediments. The following requirements apply:
    - If aggregate barrier is placed directly on the canal bed, it shall be removed in a manner that limits disturbance to sediments. The layer of aggregate in direct contact with substrate is permitted to remain on the canal bed post-construction but shall not obstruct minimum navigation depths.
    - When traffic mats are used, a shallow layer of rip rap shall be installed beneath them on sediment. This rip rap layer in contact with the canal bed must remain post-construction and shall not obstruct navigation depths.

- Workers and lightweight equipment will only enter the dewatered work area on frozen or ice-covered sediment. If the canal bed is unfrozen or lack ice cover, a barrier will be placed to separate workers and equipment from the sediment.
- The Contractor must provide wash stations to remove adhered sediments from personal protective equipment (PPE) and machinery, ensuring that wash water does not enter the canal directly or through a storm sewer.
- All equipment and machinery must be in good condition, free of leaks, and serviced or fueled at least 30 meters from any watercourse or waterbody to avoid chemical spills within the canal.
    - Application of standard BMPs and mitigations outlined in this BIA can mitigate this risk.

Project-Specific EPO Requirements and Exceedances

Construction activities below the high-water mark will require specific monitoring and mitigation measures to protect aquatic life, habitat, and water quality. To ensure compliance with the Project-specific EPO of <25 mg/L (equivalent turbidity of 8.2 NTU) for short-term exposure (<24 hours) and 5 mg/L (1.9 NTU) on average for long-term exposure (i.e. 30 days), *in situ* turbidity or TSS monitoring will be undertaken. During periods of active discharge, turbidity or TSS of the discharge will be measured on an hourly basis using a hand-held turbidity meter to an accuracy of +/- 0.05 NTU. For the receiving environment, turbidity or TSS will be measured on a regular basis (at least daily) during dewatering and rewatering at a minimum of one sampling locations both upstream and downstream of the discharge point. Sampling frequency should increase if sediment plume is observed. This monitoring will ensure compliance with project EPOs and allow for corrective actions if exceedances occur.

In the event of an EPO exceedance at the **point of discharge**, the following corrective actions are necessary to mitigate impacts:

- The **point of discharge** is the point at which the Contractor loses control over the discharge, such as the end of pipe for dewatering effluent from a cofferdam-enclosed area or within 5 m downstream of an area enclosed with a turbidity curtain, or in the process of being enclosed with a turbidity curtain.
- For a <24-hour exceedance of 25 mg/L (8.2 NTU) **irrespective of background** (when an absolute maximum TSS of 75 mg/L (23 NTU) at the **point of discharge** has not been exceeded) the work area and methods should be reviewed to determine appropriate mitigations to manage TSS.

- If the maximum TSS value of 75 mg/L (23 NTU) is exceeded at the **point of discharge** (**irrespective of background**), or TSS is <75 mg/L (23 NTU) but more than 25 mg/L (8.2 NTU) above background for > 24 hours, the work should be stopped, and the Work Area and methods reviewed to determine appropriate mitigations to reduce TSS. Once the mitigations are implemented, work can resume.

In the event of an EPO exceedance for the **receiving environment**, the following corrective actions are recommended to mitigate impacts:

- The **receiving environment** is defined as the wetted area of the canal beginning at the initial dilution area outside of the work area and/or point of discharge.
- In the **receiving environment**, if the TSS value is > 25 mg/L (8.2 NTU) (**irrespective of background**) for < 24 hours (and an absolute maximum of 75 mg/L (23 NTU) at the point of discharge has not been exceeded), the construction work should be stopped, and the work area and methods reviewed to determine appropriate mitigation measures to reduce TSS. Once the mitigations are implemented, work can resume.
- If TSS in the **receiving environment** is on average >5 mg/L (1.2 NTU) above background during a 30-day period, the contractor should inspect the work area and review their work procedures to determine appropriate mitigation actions.
- In the event that the WQG for drinking water quality has been exceeded downstream of the work area, work should be stopped, and the work area and methods reviewed to determine appropriate mitigation measures to reduce TSS. Once the mitigations are implemented, work can resume.

Surface Water Sampling and Analysis

There is potential for water quality predictions for COPCs in sediments to exceed guidelines for aquatic life and downstream users at the established EPO levels.

To mitigate risk:

- Surface water samples will be collected during construction for laboratory analysis to verify water quality predictions as follows:
    - Once at each work area from the point of discharge during active dewatering, and concurrently upstream and downstream of the work area to verify that WQGs for chemical parameters are being met in the receiving environment and to provide information that can be used to verify the water quality predictions made in this document. Surface water samples should be analyzed for cyanide, total and dissolved metals, PHC F1 to F4, PAHs, CVOCs, pH, TSS, turbidity, water hardness, nutrients (nitrogen and phosphorus), and dissolved organic carbon to verify the water quality predictions made in the SNC-Lavalin 2021a investigation.
        - Should surface water sample analysis fall within predicted COPC acceptable limits, work can proceed with established mitigations. Should COPC concentrations exceed predicted levels, further review by PCA will be conducted and additional mitigation measures may be required.

- In the event of an accidental release of sediment-laden water with a TSS concentration of 75 mg/L or greater (unless a lower concentration is specified based on evaluation of site-specific sediment chemistry), samples should be collected as follows:
    - Samples of the discharge water, upstream and downstream, should be submitted for concurrent chemical analysis of, at a minimum:
        - Cyanide, total and dissolved metals, PHC F1 to F4, PAHs, CVOCs, pH, TSS, turbidity, water hardness, nutrients (nitrogen and phosphorus), and dissolved organic carbon.
        - Acute toxicity testing for Rainbow Trout or Fathead Minnow should also be conducted (Environment Canada 1990, 2011).
        - In situ measurements of temperature and pH should be collected at the time of sampling for use in interpreting the laboratory results.
        - It may also be necessary to collect other types (e.g., matrices, parameters) of samples depending on the site-specific contaminants of concern as well as the nature of the accidental release (e.g., dewatering effluent, fuel, cementitious material). Additional sampling requirements should be discussed with PCA and/or other agencies as necessary (e.g., the provincial Ministry of the Environment and Climate Change or ECCC).

4.2. Species at Risk

As identified in Appendix C, SAR that have the potential to be present within the project area includes:

- **Barn Swallow**
- **Midland Painted Turtle**
- **Snapping Turtle.**

4.2.1. *SAR (Barn Swallow)*

4.2.2. Baseline Conditions:

Of the confirmed SAR bird observations near the Project Site, Barn Swallow (*Hirunda rustica)* is the only species with habitat potential on the Project Site. These birds typically nest on man-made structures, such as bridges, where they can build nests on ledges that are often reused yearly. Although no Barn Swallows are currently known to nest on the Maria Swing Bridge superstructure, substructure, or utility buildings, there remains a low potential of occurrence at this location.

Barn Swallow in Ontario lay eggs earlier than other swallows, with laying dates ranging from early May to the end of August. Roosts begin forming in July, peak in early to mid-August, and are minimal by September. The species may reuse nests from previous years, and second broods are common in Ontario and usually occur in the same nest. Swallows often repair and rebuild old or previously used nests (Heagy, et. al., 2014).

4.2.3. Predicted Adverse Effects

The Maria Swing Bridge is in a high-traffic area, experiencing significant vibrations from vehicle traffic and disturbances due to its operational use during the navigation season. These factors lower the potential for Barn Swallow nesting. However, the project scope includes the removal and replacement of the superstructure, which will be stored in the staging area until the replacement is completed. This could create an additional nesting opportunity, as the structure will experience reduced disturbances while not in use, potentially promoting nesting by Barn Swallow.

To mitigate risk:

- If the bridge superstructure or substructure removal or disturbance is to occur during active Barn Swallow breeding and nesting periods (May 1 to August 31), nesting surveys by a Qualified Environmental Professional will be required to confirm the absence or presence of Barn Swallow nests.
- If nests are observed, the Project Environmental Officer must be contacted for further guidance.
    - Should a nest structure reach 50% completion or greater (general formation of base and cup-structure), the nest is considered active and is not to be removed or disturbed.

Given the ample variety of nesting habitat within the surrounding vicinity of the Maria Swing Bridge and the mitigations to pre-screen for nesting activity, the temporary removal and replacement of the bridge structure is not expected to adversely impact Barn Swallow nesting and presence in the area. As the replacement bridge will be sympathetic to the original bridge, there will be negligible change in habitat potential on site. No residual effects are anticipated as the bridge structure is unlikely to be utilized for nesting and can be mitigated if nesting attempts occur.

4.2.4. *SAR (Midland Painted Turtle and Snapping Turtle)*

4.2.4.1. Baseline Conditions:

A review of background information including the NHIC database (MNRF, 2024) and Parks Canada SAR observation records within a 2.5 km radius of the project site indicated recent Midland Painted Turtle and Snapping Turtle observations. The iNaturalist database also reported a Midland Painted Turtle observation within a 250m radius of Maria Swing Bridge. Below is an assessment of the site's habitat conditions and biophysical characteristics to evaluate potential risks to these two SAR turtles from project activities.

Active Season:

The active season for Midland Painted Turtle begins as ice cover retreats, usually April to May, with the onset of hibernation typically mid-September to mid-October. During the active season, Midland Painted Turtles prefer slow moving, shallow, well-vegetated waterbodies, such as ponds, marshes, wetlands, lakes, and slow-moving creeks. These habitats feature soft bottoms, abundant basking sites, and aquatic vegetation. Midland Painted Turtles often bask on shorelines, logs and/or rocks that protrude from the water and are semi-tolerant of human-altered landscapes (COSEWIC, 2018).

Snapping Turtles favor slow-moving freshwater habitats with soft mud substrates and dense aquatic vegetation. They typically inhabit ponds, sloughs, shallow bays or river edges, and slow-flowing streams,

or areas combining these wetland habitats. Snapping Turtles commonly bask on offshore logs and protruding rocks, depending on environmental temperature. This species is primarily diurnal and tend to remain inactive for most of the day, retreating to shallow water. Although they are capable of swimming through deeper waters, snapping turtles prefer to move within 5 m of the lake periphery and 2 m depth (COSEWIC, 2008).

Situated at the lower extent of the canal cut between Lock 20 and Lock 21, turtle habitat conditions within the human-made canal are highly disturbed. Conditions during the active season include stagnant to slow-moving water, with 15-30% cover, and soft substrates containing organics muck, silts, and sand. Generally, submerged aquatic vegetation growth consists of an abundance of non-native Eurasian Milfoil and native Tape Grass, with some Flat-stemmed Pondweed. Significant portions of the channel reach are defined by vertical banks limiting movement between the terrestrial and aquatic environment. Furthermore, basking habitat features are limited to sporadic, exposed riprap along the banks. It is anticipated that with the high level of disturbance near the Maria Swing Bridge and limited basking sites along the exposed canal margins, Snapping Turtle and Midland Painted Turtle presence is expected to be very low within the canal cut. However, both species are capable of surviving conditions within the canal cut during the active season and may inadvertently migrate into the section of canal during boater lockage's.

Nesting:

Midland Painted Turtle nest in open canopy areas, often with southern exposure, such as the shorelines of lakes and wetlands, beaver dams, and sand dunes. They prefer sloped sites with substrate such as sand, loam, clay, or gravel and utilize human-modified habitat, including railway embankments and unpaved road should for nesting. Nesting distances from aquatic habitats range from less than 100 meter to over 1200 meters (COSEWIC, 2018).

Snapping Turtles typically nest on sand or gravel banks along waterways in late May and June but have also been found to utilize abandoned beaver lodges, road shoulders, rocky fissures, freshly dug soils, gardens, lawns and forest clearings with unknown success. Females show strong nest site fidelity, with movement of up to 0.5 km overland and 8.0 km in waterbodies (COSEWIC, 2008).

Although the Project Site is highly disturbed, it may still offer potential nesting habitat for both species that are semi-tolerant of human presence. While vertical concrete canal walls restrict bank access near the Maria Swing Bridge, approximately 25 meters downstream, the banks feature sloped soil, riprap, and a narrow-vegetated buffer. A gravel boat launch and a maintenance road leading to Little Lake prove additional potential nesting sites. The railway line approximately 150 meters north of the bridge could also serve as nesting habitat, though the extensive road network around the Project Site may limit access to more distant nesting locations.

Hibernation:

Midland Painted Turtles typically overwinter in wetlands and shallow bays of lakes. They select sites in shallow water (average = 0.32 m ± 0.08 m) with deep sediment (average = 0.79 m ± 0.15 m), and cold sediment temperatures (average = 4.1°C ± 0.75°C). Hibernation typically starts between mid-September and mid-October, ending with ice retreat between early April and May (ECCC, 2018).

Adult snapping turtles overwinter underwater typically buried in deep mud in marshy areas or beneath floating mats of vegetation. Hatchlings usually move to water upon emergence from the nest in early fall after which they bury themselves under leaf litter or debris (COSEWIC, 2008). They prefer water depths that are shallow enough to reach the surface to breathe, while also sufficiently deep to avoid water freezing to the bed of waterbody (TLB, 2022). Overwintering sites are generally located within 5m of the shoreline, at a depth of less than 2m. In the Great Lakes Region, Snapping Turtles generally hibernate from October to April (ECCC, 2016).

Due to reduced winter water levels, both species likely avoid hibernating in the canal, given the significant water level fluctuations and suitable habitat in Little Lake. There remains a low potential for Midland Painted Turtles to attempt to overwinter in the canal cut when suitable water depths and substrate conditions exist. Snapping turtles are expected to entirely avoid the canal, as they prefer stable waters that do not freeze to the bed. Regardless, Little Lake sustains both species and appears to have desirable hibernation habitat. With the proximity of Little Lake turtle habitat potential near the project site, there is an increased potential for incidental encounters with project activities due to overland travel or within the canal cut.

4.2.4.2. Predicted Adverse Effects

Active Season:

As the project will involve dewatering of the work zone, there is a potential for encounters with turtles that may be present in the canal cut. As in-water work shall not be permitted to interfere with boater navigation, dewatering cannot occur during the navigation season from Victoria Day long weekend to Thanksgiving (second Monday in October). This will substantially limit the potential for impacts to turtles from project activities during the active season. Following the navigation season, it is expected that during the typical reduction in water levels to winter settings, any potential turtles that may be found in the canal cut will likely vacate to Little Lake. In addition, the limited suitability of the canal cut for both turtle species further limits the likelihood to encounter within the canal cut during dewatering.

With operation of heavy-duty equipment in the work area, there is a potential for vehicle collisions with turtles entering the work area. This threat is greatest during the reproductive season as females tend to cross overland more frequently in search of nesting sites (COSEWIC, 2008). Given the proximity to potential hibernation sites on Little Lake, turtles may be encountered while travelling overland across the large, manicured lawn directly connected to the project site. This potential is considered low given the limited use of the canal area by turtles historically.

To mitigate risk:

- Daily visual sweeps of the work areas should be undertaken to identify if turtles have moved into work areas.
- In the event turtles are encountered in the dewatered area during the fall, a turtle rescue by a Qualified Environmental Professional will be required to remove them from the dewatered area and relocated immediately downstream to Little Lake in an area of acceptable habitat conditions for turtle overwintering of the target species.

Given the limited habitat suitability of the canal cut and surrounding terrestrial areas, the seasonal timing of in-water work during winter, and the use of exclusion fencing around stockpiled materials, project activities are not expected to result in significant adverse or residual effects during the active season.

Nesting:

Due to the proximity of the project site to Little Lake located approximately 260m below the bridge, there is potential for turtles to enter the work area in search of nesting sites. Specifically, soil excavation, stock piling and other forms of landscape modification has the potential to attract turtles to the area during the nesting period. In the event exclusion nesting is not installed at appropriate times or adequately maintained during the active season, turtle nests/eggs may be destroyed due to heavy duty vehicle equipment impacts while working near the waterbody. The threat of injury or mortality from vehicle collisions is greatest for adult female turtles during the reproductive season due to increased overland movement in search of suitable nesting sites (COSEWIC, 2008).

To mitigate risk:

- Installation and maintenance of reptile and amphibian exclusion fencing will be required to ensure individuals cannot access stockpile materials.
    - Exclusion fencing should be installed prior to the nesting and active season from May 15 to September 30.
- Should evidence of nesting or a turtle be discovered, all work within the immediate vicinity of the nest/individual is to cease, and PCA EA staff are to be notified for further guidance.
- If found in the project area, turtles that are unable to leave on their own will need to be relocated prior to commencing work (with permits required from Ontario Ministry of Natural Resources Forestry (MNR) for relocation).

Following project works, the Site is expected to be returned to pre-construction conditions therefore offering comparable nesting habitat potential. Overall, the area represents limited nesting habitat value to both species and is not expected to result in negative outcomes to either species recovery. With preferred alternative habitat on Little Lake and surrounding waterbodies the project is not expected to result in residual effects to either species.

Hibernation:

Due to reduced winter water levels, lack of substrate cover, and thicker ice formation, the canal is unlikely to support turtle hibernation near the Maria Swing Bridge. Regardless, a low potential exists for Midland Painted Turtle to attempt to overwinter in the pool under the bridge. If such a scenario occurs, a turtle attempting to hibernate would likely be disturbed during the initial dewatering phase of the project in the fall season following closure of navigation. This timing is expected to permit turtles, attempting to seek overwinter sites, opportunity to locate to alternative sites outside of the area of disturbance.

To mitigate risk:

- Should a turtle be found attempting to hibernate or unable to relocate outside of the work zone, PCA departmental representative is to be contacted for further direction. If individual attempting to hibernate is uncovered after October 1, the Ontario Turtle Conservation Centre is to be contacted and sent to facility for overwintering care and released in the spring.

As turtle overwintering is not expected at the Project Site, construction activities are not anticipated to adversely impact Midland Painted Turtle or Snapping Turtle and no residual effects are anticipated.

5. MITIGATION MEASURES

To mitigate for the potential harmful effects of the project, the following measures shall be implemented:

5.1. General

5.1.1. It is the responsibility of the Contractor to seek and obtain acceptance from Parks Canada on submittals or changes in scope of work or methodologies that may affects archaeological resources, cultural resources, or the environment. Changes to the project scope of work not assessed under this Impact Assessment will require review and may require additional mitigation measures.

5.1.2. The Owner, Parks Canada Agency (PCA) is the main Environmental Authority for Trent-Severn Waterway (TSW) projects. Issues pertaining to Federal and Provincial Legislation (i.e. Historic Canal Regulations, Species at Risk Act, Fisheries Act, Impact Assessment Act, Endangered Species Act, Migratory Bird Convention Act, etc.), such as that pertaining to Species at Risk (SAR), invasive species, spills, water quality, etc., shall be directly reported to PCA.

5.1.3. As per the Historic Canal Regulations (HCR) applicable to lands administered by the TSW National Historic Site of Canada, a permit signed by PCA's Ontario Waterways Director (or delegate) will be required to authorize the project work prior to commencement of the project (to be facilitated by PCA).

5.1.4. The Contractor is required to submit an Environmental Management Plan (EMP) to the Department Representative and PCA's EA which outlines all the measures to be implemented by the contractor on the project site to eliminate or reduce environmental effects and address mitigation measures outlined in this BIA. To allow for the timely commencement of project activities, the EMP can be submitted as separate components as project details become available. The EMP, or its components, will be submitted in writing prior to implementation of project activities and must be accepted by Parks Canada.

5.1.4.1. The EMP and its component plans, must be prepared by a QEP in accordance with Parks Canada Agency's Environmental Standards and Guidelines Document (ESG) - Ontario Waterways, July 2017, this BIA, and applicable PCA Best Management Plans (BMPs).

5.1.4.2. PCA will not issue permit to authorize start of Work, under Historic Canal Regulations, prior to the review and acceptance of EMP.

5.1.4.3. The contractor is to ensure that all on-site personnel are aware of, and comply with the contents of the PCA-accepted EMP and any measures outlined within subsequent PCA-accepted amendments to the EMP.

5.1.4.4. A copy of the EMP shall be kept on site for the duration of the project and all works, as applicable, shall be completed in compliance with the EMP.

5.1.5. The EMP will detail frequency of monitoring and list high-risk construction activities where an environmental professional must be onsite. Monitoring and testing should be adaptable to changing site conditions and will capture any event/incident for the length and scope of that event.

5.1.6. PCA EA will outline all the prescribed mitigation measures, including those found in BMPs, in a construction start-up meeting with the project manager and the contractor, to ensure that all onsite personnel are aware of these mitigation measures.

5.1.7. The contractor is to ensure that all on-site personnel are aware of and comply with the prescribed mitigation measures within this BIA and any measures outlined within subsequent amendments to this BIA.

5.1.8. A copy of this BIA shall be kept on site for the duration of the project and all works, as applicable shall be completed in compliance with the EMP.

5.1.9. The Contractor shall adhere to all federal, provincial, and municipal legislation, by-laws, regulations, guidelines, safety standards, and codes governing construction activities. In cases of overlap, the most stringent will apply.

5.1.10. Should conditions at the work site indicate that there are negative impacts to fish, fish habitat, wildlife, cultural or visitor experience resources, all associated works shall cease until the problem has been corrected and PCA's ES staff have been consulted/notified. PCA has the right to require that work be altered or ceased immediately. Any death of fish or harmful alteration, disruption, or destruction of fish habitat must be reported to PCA and the Department of Fisheries and Oceans (DFO).

5.2. Equipment and Site Conditions

5.2.1. All machinery and equipment shall be clean, free of leaks and maintained in optimal working condition to avoid leakage of fuels and liquids. Ensure measures are in place to minimize impacts of accidental spills. All materials and equipment used for the purpose of site preparation and project completion shall be operated and stored in a manner that prevents any deleterious substance (e.g. petroleum productions, debris etc.) from entering the water.

5.2.2. All stockpiled materials and concrete debris shall be stored and stabilized a safe distance (minimum of 30 m) away from any watercourse, drainage course or swales to prevent erosion and subsequent entry into the TSW or removed from the site, in accordance with all federal, municipal, and provincial regulations.

5.2.3. Store all oils, lubricants, fuels, and chemicals within sealed, impermeable containers, within secure areas a minimum of 30 m away from the watercourse and upon impermeable-lined drip/spill trays.

5.2.4. Vehicle and equipment re-fueling and/or maintenance shall be conducted over an impermeable-lined drip/spill tray to allow full containment of spills, conducted off slopes and away from the water at a minimum distance of 30 m. If not possible, fueling sites shall be as per the EMP and mitigations to prevent substances from entering the watercourse shall be applied.

5.2.5. Drip/spill trays shall be placed under all fuel-powered equipment. Drip trays shall be sized appropriately to encompass the outer perimeter of the equipment/machinery, providing adequate spacing for refueling activities.

5.2.6. All compressed air/fuel tanks shall be stored off to the side, away from on-going activity, and be adequately protected with an impact-protection barrier.

5.2.7. Self-contained fuel tanks, or fuel tanks so large where sizing a drip/spill tray to be placed underneath said tank would be impractical, at minimum, a spill tray is to be placed at the nozzle/hose end and utilized for all refueling activities.

5.2.8. There shall be no discharge of chemicals and cleaning agents in or near aquatic habitats including the canal cut; all such substances shall be disposed of at a facility licensed to receive them.

5.2.9. Spills Management and Emergency Response Plans will be developed and implemented by the Contractor, including posting the plan in an accessible location on-Site. All workers shall be fully aware of the spill prevention and response procedures including notification of applicable authorities including the MOECC Spills Action Centre. The Spills Management and Emergency Response Plan will include stop work and reporting requirements should the reporting threshold value for suspended sediment be exceeded.

5.2.10. In the event of a spill, the Ontario Spill Action Centre (1-800-268-6060) shall be notified immediately. Remediation will be conducted immediately to contain and clean up in accordance with federal and provincial regulatory requirements AND to the satisfaction of PCA. Documentation of remediation, testing and results will be provided to PCA. Spills shall be reported directly to the PCA Environmental Services generic email (environmentalservices-servicesenvironnementaux@pc.gc.ca)

5.2.11. Spill-related environmental incidents or emergencies include (but is not limited to):

5.2.11.1. Chemical spill or petroleum spill.

5.2.11.2. Poisonous or caustic gas emission.

5.2.11.3. Biological or chemical explosion.

5.2.11.4. Hazardous material spill.

5.2.11.5. Sewage spill.

5.2.11.6. Contaminated water into waterways.

5.2.11.7. Release of turbidity into the waterway; and

5.2.11.8. Release of water with pH <6 or >9 into the waterway.

5.2.12. Only the working end of machinery shall directly enter the water unless approved by PCA. Any part of a machine or equipment entering the water shall be free of fluid leaks and externally degreased to prevent any deleterious material from entering the water. Complete the in-water activity as quickly as possible to minimize the time equipment is in the water. Do not leave equipment in water during breaks in work activity.

5.2.13. No heavy equipment shall be driven on the canal bed. All heavy equipment must be operated from above the canal walls and only the working end of machinery is permitted to enter the canal unless approved by PCA. If permitted to operate heavy duty equipment within the canal cut:

5.2.13.1. Sediments shall be protected by placing a protective barrier on the canal bed such as traffic mats or laying a suitable depth of riprap aggregate (minimum 250 mm) to prevent fluidized sediment (i.e. mud) as reviewed and approved by PCA. Where fluidized sediment (i.e. mud) is created, additional control of the potential for sediment release may be needed.

5.2.13.1.1. If aggregate barrier is placed directly on the canal bed, it shall be removed in a manner that limits disturbance to sediments. The layer of aggregate in direct contact with substrate is permitted to remain on the canal bed post-construction but shall not obstruct minimum navigation depths.

5.2.13.1.2. When traffic mats are used, a shallow layer of rip rap shall be installed beneath them on sediment. The rip rap layer in contact with the canal bed must remain post-construction and shall not obstruct navigation depths.

5.2.13.2. Equipment shall be fully isolated from clean water.

5.2.14. Workers are only permitted to enter the PCA approved dewatered work area of the canal bed. Workers shall not walk directly on canal bed unless the sediment is frozen, or ice covered to prevent potential sediment disturbance and mobilization. If the canal bed is unfrozen or lacks ice cover, a suitable barrier shall be placed on the bed to separate workers from sediment. The barrier must be approved by PCA.

5.2.15. Use plant-based readily biodegradable hydraulic fluids (OECD 301 standards or equivalent) with no heavy metal additives for machinery that will be working in or around a waterbody.

5.2.16. The Material Safety Data Sheet (MSDS) of any unapproved substances to be utilized onsite (particularly that of substances to be in use in/adjacent to water) shall be provided to PCA ES for review and acceptance. MSDS information of known products to be utilized in/adjacent to water throughout the duration of the project should be incorporated as part of the EMP.

5.2.17. For any activities that have the potential to result in Lead paint debris detaching from the bridge superstructure and falling into the canal, including but not limited to grinding of bridge components or paint removals, an adequate containment system shall be placed underneath the affected section of swing bridge to capture any debris that could potentially become detached during the removals.

5.2.17.1. All debris collected within the containment system shall be carefully emptied into an enclosed container daily, or more frequently if required, to ensure that no paint chips or debris escape into the surrounding environment or remain at the site. All paint chips and debris shall be recovered, collected, and taken to a landfill site licensed to receive it for disposal in accordance with all applicable federal, provincial, and municipal laws, regulations, and guidelines.

5.2.17.2. While not mandatory, it is preferred to have the bridge superstructure in the “open” position overland during activities that have potential to result in Lead paint debris detaching from the bridge.

5.3. Water Quality

5.3.1. Ontario Drinking Water Quality Guidelines cannot be exceeded (beyond parameters that currently exist) due to project activities.

5.3.2. If required, ensure that sediment settling basins are of adequate size to compensate for excess sediment run-off and erosion (i.e. storm water run-off, misdirected drainage).

5.3.3. Only clean material free of fine particulate matter shall be placed in or near water where it has been previously planned and authorized.

5.3.4. Accumulated snow that may be contaminated with salt shall be disposed of only at approved dumpsites or designated areas.

5.3.5. Snow containing salt or sand should never be dumped in or allowed to melt and run off into watercourses. Minimize use of salt where possible.

5.3.6. Ice laden with sediment shall be removed from the project site or stored within an isolated area, with meltwater being treated for turbidity as necessary.

5.4. Fish and Fish Habitat

5.4.1. All in-water work shall be started after June 30th and completed before April 15th to protect fish populations during their spawning and nursery periods.

5.4.2. All works shall be completed in the dry (unless otherwise approved by PCA). This may entail de-watering the work area and diverting and/or pumping flows around isolation barriers placed at the upper and lower limits of the work area. Should dewatering be a required, a Dewatering Plan shall be submitted as part of an EMP to PCA for review and acceptance prior to any dewatering.

5.4.2.1. Approved in-water works must be adequately isolated (i.e. cofferdam, isolation barriers, turbidity curtains, etc.) and/or mitigated for.

5.4.3. All debris on bed (including unused aggregate/concrete rubble) which accumulated throughout the duration of construction (and is a direct or indirect result of construction) shall be completely removed and area restored to original state upon completion of work, unless approved by PCA.

5.4.4. Fish rescue/removal shall be completed within isolated work areas prior to complete dewatering, as directed by the Departmental Representative.

5.4.5. Canal cut water level manipulation below typical winter water levels will not occur during ice presence (i.e. prior to ice formation and after ice melt) unless the canal reach has been fully de-fished prior to ice formation.

5.4.5.1. Should **long term de-watering** (greater than 1 week) of the canal cut be required below the typical winter setting of 191.34m to permit dry work conditions, the entire canal reach is to be de-fished prior to draining.

5.4.5.1.1. Pre-treatment of aquatic vegetation, such as use of an aquatic vegetation harvester, shall be undertaken in areas of dense growth prior to de-fishing efforts to reduce the biomass within the canal and avoid fish entanglement.

5.4.5.2. Should **short term de-watering** (less than 1 week) of the canal cut be required below the typical winter setting of 191.34m for installation/removal of an isolation barrier and/or turbidity containment:

5.4.5.2.1. PCA will permit water levels to be lowered for not more than one (1) working week.

5.4.5.2.2. Visual surveys must be conducted along the entire length between Lock 20 to Peterborough Lift Lock to ensure fish are not stranded in small pools or within aquatic vegetation mats at margins of canal.

5.4.5.2.3. Pools less than a water depth of 0.20 m or 1.5 times the body thickness of the present species (whichever is greater) shall be de-fished.

5.4.5.2.4. Water levels shall be returned to typical winter settings once isolation barriers have been installed to maintain winter fish refuge. Once the isolation barriers have been installed, a fish rescue must be conducted in the isolation work zone prior to full de-watering.

5.4.6. Any de-fishing activities will also adhere to the following:

5.4.6.1. When conducting fish rescues between Lock 20 and Lock 21, workers are expected to wear appropriate personal protective equipment (PPE) to minimize potential exposure to COPC in sediment, soil, groundwater, and surface water in project area. Appropriate PPE is considered to include, at a minimum: gloves, long-sleeved shirts, long pants, waterproof/chemical-resistant footwear, safety glasses and hard hat. If divers are used (e.g., to anchor turbidity curtains), the equipment used (e.g., wetsuit, face mask) should minimize bare skin exposure to the work zone. The Contractor must provide appropriate wash stations to remove adhered sediments from PPE and equipment, as well as hand-wash stations. The wash-off material must be contained and disposed of offsite. Wash water must not be allowed to enter the canal either directly or through a storm sewer. Contractors are also expected to be familiar with applicable health and safety requirements for workers regarding the contaminants identified.

5.4.6.2. Fish salvages will be employed in a manner to minimize or eliminate sediment disturbance.

5.4.6.3. A Licence to Collect Fish for Scientific Purposes shall be obtained from the Ontario Ministry of Natural Resources and Forestry (MNRF) to conduct fish salvage prior to any in-water works.

5.4.6.4. Fish salvages shall be conducted by a QEP in areas isolated from flows prior to construction, under applicable permit(s).

5.4.6.5. PCA ES shall be advised 24 hours prior to fish rescue.

5.4.6.6. Minimize the length of time fish are out of the water.

5.4.6.7. Collect and remove stranded fish from the isolated work areas using gear suitable for the project site, habitat complexity, fish species likely to be encountered, and fish

activity as determined by the Qualified Professional(s). Typical gear includes seine nets, dip nets, enmeshing nets, and fish traps, and/ or electrofishing. Other equipment includes buckets, holding tanks, fish transportation tanks. A combination of methods will usually be required.

5.4.6.7.1. A minimum of three (3) passes is required. Larger work areas and salvage undertaken at greater depths will require more passes.

5.4.6.7.1.1. Additional passes shall be made until two consecutive collection efforts (i.e. electrofishing, seining, etc.) result in zero catch.

5.4.6.7.2. Fish traps (bated or unbated) must be deployed for a minimum of 24 hours. More traps (typically more than two) are required for larger work areas.

5.4.6.7.3. Following initial salvage operations, the presence of residual fish should be anticipated. Additional efforts to safely remove stranded individuals should continue throughout the duration of in-water works.

5.4.6.8. Contact PCA ES staff should there be any issues with fish removal.

5.4.6.9. Any fish found within the dewatered areas will be documented by species, counted, and removed and placed downstream.

5.4.6.10. Round Gobies (Neogobius melanostomus) or other invasive species found during dewatering activities shall be euthanized humanely and not returned to the water system; this shall be reported to PCA.

5.4.6.11. Should flooding or breach of isolation barrier occur on site, fish salvages will once again be conducted by a qualified professional, as necessary.

5.4.7. The Canadian Council of Ministers of the Environment (CCME) Canadian Water Quality Guidelines for the Protection of Aquatic Life will form the baseline for water and streambed quality (see http://ceqg-rcqe.ccme.ca/en/index.html#void).

5.4.8. Activities causing turbidity or release of sediment shall comply with the Canadian Council of Ministers of the Environment (CCME) Canadian Water Quality Guidelines for the Protection of Aquatic Life - Total Particulate Matter (see http://ceqg-rcqe.ccme.ca/download/en/217).

5.4.9. The contactor shall abide by those mitigation measures and best management practices outlined within Fisheries and Oceans Canada's (DFO's) online guidance materials: Measures to protect fish and fish habitat (https://www.dfo-mpo.gc.ca/pnw-ppe/measures-mesures-eng.html).

5.4.10. If water pumping/piping is required, ensure that there is a fish screen that complies with DFO Freshwater Intake End-of-Pipe Fish Screen Guideline when pumping in fish-bearing water to prevent impingement or entrainment of fish.

5.4.11. As per Section 38(4) of the Fisheries Act, any death of or injury to fish because of the work will be reported without delay to Department of Fisheries and Oceans (DFO).

5.5. Contaminants Management

5.5.1. Due to the presence of contaminated sediments, Environmental Performance Objectives (EPO) have been developed for construction activities along the canal between Lock 21 (Peterborough Lift Lock) and Lock 20 (Ashburnham) of the Trent-Severn Waterway (TSW) and will form the baseline for Project water and sediment quality. The EMP shall address the potential for water, sediment, and soil contaminants to be found onsite as outlined in the August 17, 2021 SNC Lavalin Report *Verification of Environmental Performance Objectives: Peterborough Earth Dams - Lift Lock to Lock 20 on the Trent-Severn Waterway, Peterborough, Ontario*; and August 16, 2021 SNC Lavalin Report *Sediment, Soil and Surface Water Assessment - Factual Report: Peterborough Earth Dams - Lift Lock to Lock 20 on the Trent-Severn Waterway, Peterborough, ON*.

5.5.2. There is a potential for construction workers to be exposed to contaminants through direct contact (i.e., dermal contact and incidental ingestion) during construction activities. Construction workers are expected to wear appropriate PPE, including at a minimum long pants, long sleeves, gloves, and waterproof/chemical-resistant footwear to mitigate exposure to contaminants in groundwater/surface water.

5.5.3. To address the potential risk associated with Contaminants of Potential Concern (COPC), including Trichloroethylene (TCE), concentrations entering the work area during construction activities via groundwater/surface water discharge, the Contractor(s) shall develop, implement, and maintain an accepted health and safety work plan which effectively addresses controlled products as defined in the Federal Hazards Products Act - R.S.C, 1985, c. H-3 and reflected in the Ontario Health and Safety Act -RRO 1990, Reg 833 Control of Exposure to Biological or Chemical Agents. This work plan, developed by the Contractor(s), shall address the hazards, and provide a plan to mitigate the risk of their operations regarding the transportation, storage, use, disposal, and potential emergency response clean-up in the event of an incident and as may be relevant to construction activities. A key element of the Contractor(s) work plan shall be an exposure control plan, which shall address the actual and potential exposures to workers engaged in construction activities, any overlapping hazards that may develop which have the potential to effect other workers in the work area, potential exposures to construction workers, employees engaged in construction activities and trespassers or visitors to the site, and finally a measure to protect the public. At a minimum, the exposure control plan will need to:

5.5.3.1. Address the potential exposure to controlled products via vapour inhalation, ensuring that enclosed spaces, including heavy equipment cabins, are monitored, as vapour concentrations may accumulate to unacceptable risk levels within an enclosed space.

5.5.3.2. Monitor the work area for COPC in ambient air (particularly TCE) using a photo-ionization detector (PID) to ensure vapour concentrations do not exceed current occupational exposure limits for Ontario workplaces required under regulation 833 (OLTSD, 2020). For TCE, the short-term exposure limit (STEL) is 25 parts per million (ppm) for 15 minutes, and the time weighted average limit (TWAL) is 10 ppm for eight hours, which are obtained from the American Conference of Governmental Industrial Hygienists; and

5.5.3.3. Provide a plan if occupational limits for Ontario workplaces are exceeded.

5.5.4. The Contractor shall engage a Qualified Environmental Professional to inspect the work site, collect water quality measurements and samples, and notify the Contractor where modification to the work, including stopping the work temporarily, may be necessary to meet the environmental protection objectives for the project. The Contractor must inform the Departmental Representative and Parks Canada's Environmental Authority of recommendations provided. Minimum requirements are outlined below:

For the point of discharge:

5.5.4.1. The point of discharge is the point at which the Contractor loses control over the discharge, such as the end of pipe for dewatering effluent from a cofferdam-enclosed area or within 5 m downstream of an area enclosed with a turbidity curtain, or in the process of being enclosed with a turbidity curtain.

5.5.4.2. For a <24-hour exceedance of 25 mg/L (8.2 NTU) **irrespective of background** (when an absolute maximum TSS of 75 mg/L (23 NTU) at the **point of discharge** has not been exceeded) the work area and methods should be reviewed to determine appropriate mitigations to manage TSS.

5.5.4.3. If the maximum TSS value of 75 mg/L (23 NTU) is exceeded at the **point of discharge** (**irrespective of background**), or TSS is <75 mg/L (23 NTU) but more than 25 mg/L (8.2 NTU) (**irrespective of background**) for > 24 hours, the work should be stopped, and the Work Area and methods reviewed to determine appropriate mitigations to reduce TSS. Once the mitigations are implemented, work can resume.

For the receiving environment:

5.5.4.4. The **receiving environment** is defined as the wetted area of the canal beginning at the initial dilution area outside of the work area and/or point of discharge.

5.5.4.5. In the **receiving environment**, if the TSS value is > 25 mg/L (8.2 NTU) (**irrespective of background**) for < 24 hours (and an absolute maximum of 75 mg/L at the point of discharge has not been exceeded), the construction work should be stopped, and the work area and methods reviewed to determine appropriate mitigation measures to reduce TSS. Once the mitigations are implemented, work can resume.

5.5.4.6. If TSS in the **receiving environment** is on average >5 mg/L (1.2 NTU) above background during a 30-day period, the contractor should inspect the work area and review their work procedures to determine appropriate mitigation actions.

5.5.4.7. If the WQG for drinking water quality has been exceeded downstream of the work area, work should be stopped, and the work area and methods reviewed to determine appropriate mitigation measures to reduces TSS. Once the mitigations are implemented, work can resume.

5.5.4.8. Based on the SNC Lavalin 2021a report, a TSS concentration of 75 mg/L shall be considered a threshold for reporting of a release of sediment-laden water.

5.5.4.9. In the event of an accidental release of sediment-laden water in the **receiving environment** with a TSS concentration of 75 mg/L or greater (unless a lower concentration is specified based on evaluation of site-specific sediment chemistry), a comprehensive spill response must be initiated. To assess the potential impact of such a release, a water sample set consisting of a POD sample, an upstream sample, and a downstream sample collected concurrently will be analyzed as specified:

5.5.4.9.1. Cyanide, total and dissolved metals, PHC F1 to F4, PAHs, CVOCs, pH, TSS, turbidity, water hardness, nutrients (nitrogen and phosphorus), and dissolved organic carbon.

5.5.4.9.2. Acute toxicity testing for Rainbow Trout or Fathead Minnow should also be conducted (Environment Canada 1990, 2011).

5.5.4.9.3. In situ measurements of temperature and pH should be collected at the time of sampling for use in interpreting the laboratory results.

5.5.4.9.4. It may also be necessary to collect other types (e.g., matrices, parameters) of samples depending on the site-specific contaminants of concern as well as the nature of the accidental release (e.g., dewatering effluent, fuel, cementitious material). Additional sampling requirements should be discussed with PCA and/or other agencies as necessary (e.g., the provincial Ministry of the Environment and Climate Change or ECCC).

5.5.5. A means of containing suspended sediments within a given Work Area (e.g., with an impermeable turbidity curtain or cofferdam or other suitable method identified by the Contractor) such that a TSS concentration greater than 25 mg/L and 8.2 NTU (**regardless of background**) does not occur at the point of discharge (i.e., diffuse discharge through the containment system or point of discharge during active dewatering), the receiving environment (wetted portion of canal outside work area), or immediately downstream of turbidity curtains at Lock 20 lower gates in Little Lake. The method selected by the Contractor must be suitable for containing fine particles (e.g., silt and clay).

5.5.5.1. Contaminated water with TSS <75 mg/L but >25 mg/L **regardless of background** levels over a period greater than 24 hours, shall be treated using an active water treatment system prior to discharge. Discharge of wastewater into vegetated areas is not an acceptable treatment option.

5.5.6. If the Contractor's selected methods for control of suspended particulates in discharge waters involves the use of flocculants, the contractor shall provide a toxicity evaluation of the specific commercial formulation intended for use and shall use that flocculent in a manner that does not result in toxicity.

5.5.7. There is a potential for release of hydrocarbon sheens or vapours during the works, in such an event mitigation measure below must be applied:

5.5.7.1. Where sheens occur, they will be addressed in a similar manner as a spill of fuel. The Contractor’s Spills Management and Emergency Response Plan will include provisions for addressing possible sheens including notifying the municipal

authorities and the public following incidents above a pre-determined threshold, such as if a sheen is observed in the receiving environment and the sheen can be linked to the work areas (i.e., via dewatering effluent discharge or leakage outside containment structures).

5.5.7.2. Conditions as encountered at the time of the project is implemented with respect to potential for vapours will need to be planned fore, monitored, and managed. Because reliable predictions of vapours cannot be made with the current level of information available, the Contractor monitor the work area for vapours and other hydrocarbon-related hazards in ambient air (particularly TCE) using a photo-ionization detector (PID) to ensure vapour concentrations do not exceed current occupational exposure limits for Ontario workplaces required under regulation 833 (OLTSD, 2020). For TCE, the short-term exposure limit (STEL) is 25 parts per million (ppm) for 15 minutes, and the time weighted average limit (TWAL) is 10 ppm for eight hours, which are obtained from the American Conference of Governmental Industrial Hygienists.

5.5.7.3. Depending on the configuration of cofferdams, the Work Area could potentially be considered a “confined space”; the Contractor will evaluate this risk in accordance with applicable health and safety regulations.

5.5.8. Flow energy dissipation shall be placed at water discharge points to prevent erosion and sediment release.

5.5.9. Sediment-laden water pumped from isolated areas must be filtered by means of an appropriately designed self-contained treatment system and will not be permitted to be discharged into the surrounding environment. Geotextile filter/sediment bags will not be permitted. Accumulated sediment removed from a dewatering device must be tested and, if necessary, disposed at an approved disposal site.

5.5.10. Sediment control systems must be isolated from native soils/substrates so that any accumulated sediment does not contaminate treatment area.

5.5.11. An alternative means of treatment and disposal of impacted water must be identified prior to commencement of the work in the event the identified discharge requirements cannot be met or water in the enclosed Work Area is found to be acutely lethal to fish. This could include active water treatment (the Contractor is responsible for determining the specific treatment steps that may be required to meet the EPO), or other suitable method to be determined by the Contractor in the EMP.

5.5.12. Water and sediment removed from the waterway, soil removed from land, and material removed during water treatment during construction activities will be separately managed to isolate potentially contaminated material. Prior to removal from the Project Site, soil and water testing will be completed for any materials or water to be removed. As a minimum, samples should be analyzed for metals (lead), nutrients, PCBs, and PHCs. Results of these analyses would govern the acceptance of these materials for re-use within the Project Site and/or its ultimate disposal at an off-Site facility. Do not stockpile onsite where contaminant escape is possible. Any

temporary material removed must be placed in a contained facility to prevent contamination release. Contractor will return the grade to the pre-work elevation.

5.5.13. Samples shall be collected for laboratory analysis as follows:

5.5.13.1. Monitor the work area for Contaminants of Potential Concern (COPC) in ambient air (particularly TCE) using a photo-ionization detector (PID) to ensure vapour concentrations do not exceed current occupational exposure limits for Ontario workplaces required under regulation 833 (OLTSD, 2020). For TCE, the short-term exposure limit (STEL) is 25 parts per million (ppm) for 15 minutes, and the time weighted average limit (TWAL) is 10 ppm for eight hours, which are obtained from the American Conference of Governmental Industrial Hygienists.

5.5.13.2. Once at each work area from the point of discharge during active dewatering, and concurrently upstream and downstream of the work area to verify that WQGs for chemical parameters are being met in the receiving environment and to provide information that can be used to verify the water quality predictions made in this document. Surface water samples should be analyzed for cyanide, total and dissolved metals, PHC F1 to F4, PAHs, CVOCs, pH, TSS, turbidity, water hardness, nutrients (nitrogen and phosphorus), and dissolved organic carbon to verify the water quality predictions made in the SNC-Lavalin 2021a investigation.

5.5.13.2.1. Should surface water sample analysis fall within predicted COPC acceptable limits, work can proceed with established mitigations. Should COPC concentrations exceed predicted levels, further review by PCA will be conducted and additional mitigation measures may be required.

5.5.14. Imported material used to restore the grade of the riverbed to preconstruction elevations shall be tested for a minimum analytical suite consisting of metals, PHCs, BTEX, and PAHs. Additional parameters may be analyzed at the discretion of the Contractor's qualified professional. Imported material will be confirmed to be acceptable if analyzed concentrations satisfy sediment quality guidelines.

5.5.15. If a sheen or other visual evidence of contamination is observed during construction, a minimum of three sediment samples will be collected from the affected area and analyzed for PHC F1 to F4. Analyzed concentrations in sediment will be confirmed acceptable if they do not exceed Site-specific maximum concentrations (refer to Table D1 within the SNC Lavalin 2021 Report).

5.6. Environmental Monitoring and Reporting

5.6.1. Environmental mitigation measures shall be inspected daily, and a daily checklist/log shall be maintained over the duration of the project.

5.6.1.1. Any deficiencies shall be addressed immediately.

5.6.2. Daily Water Quality (NTU, pH, etc.) records shall be maintained by the contractor and shall be provided to PCA on a weekly basis (at minimum).

5.6.2.1. Water Quality monitoring shall be collected using a turbidity meter to an accuracy of +/-0.05 NTU at a minimum frequency of three times per day for regular low-risk activities (unless in-water or dewatering work activities are not occurring on site). High-risk activities shall entail hourly monitoring frequencies/duration and specific monitoring thresholds (PCA will advise). For the receiving environment, turbidity or TSS will be measured on a regular basis (at least daily) during dewatering and rewatering at a minimum of one sampling locations both upstream and downstream of the discharge point. Testing locations and frequency shall be specified within the EMP and may be modified (with PCA acceptance) dependent of site activity and/or downstream effects (i.e. in the event of a plume release into the watercourse [turbidity, concrete fines, etc.] additional testing shall be conducted further downstream to track the movement and dissipation of the plume through the watercourse).

5.6.3. SAR, invasive species, and wildlife sightings, or lack thereof, shall be reported on a daily inspection checklist. For incidental encounters, the following information must be recorded in the field:

5.6.3.1. Locations, dates, and time of day where the species were encountered.

5.6.3.2. Names of species encountered.

5.6.3.3. Photographs of the species, if taken.

5.6.3.4. Condition of the animal.

5.6.4. SAR-related incidences shall be reported immediately to PCA.

5.6.5. Environmental summary reports shall be completed monthly and provide details of monitoring work completed, the findings of all monitoring, and details of how and when issues were resolved.

5.6.6. Any damages shall be repaired immediately, and any accumulation of sediment shall be removed and disposed of as required by all applicable federal, provincial, and municipal laws, regulations, and guidelines.

5.7. Erosion and Sediment Control

5.7.1. An Erosion and Sediment Control Plan, as part of the EMP, shall be prepared by a QEP and submitted for approval to Parks Canada. The document must demonstrate:

5.7.1.1. A focus on erosion control primarily and sediment control secondary.

5.7.1.2. Erosion and sediment controls will be tailored to the type of sediment found onsite (e.g. if clay is present, additional controls are necessary).

5.7.1.3. The area to be controlled. In addition to the construction site, it is necessary to identify adjacent areas that could be negatively impacted by construction activities.

5.7.1.4. Drainage areas and patterns based on pre-construction topography and construction design.

5.7.1.5. The EMP will have, as a principal to reduce the amount of sediment laden water produced, a focus on separating offsite and infiltrating water into the construction site from construction activities and sediment sources.

5.7.1.6. How clean storm run-on will be diverted around the site and away from exposed areas.

5.7.1.7. How sediment-laden run-off will be directed to detention or retention facilities on-site. Large drainage areas can produce a significant amount of run-off, resulting in a need for large detention or retention structures.

5.7.1.8. By-pass channels/culverts that are designed and constructed to the necessary design discharge.

5.7.1.9. Temporary and permanent erosion control needs for all drainage channels.

5.7.1.10. Consideration of project schedule in selecting, designing, and laying out environmental controls.

5.7.1.11. Consideration of seasonal requirements (for longer-term projects); select and design controls and practices for controlling erosion and sedimentation including shutdown periods.

5.7.1.12. The EMP shall provide plans and mitigation for the installation and removal of any temporary structures (i.e. cofferdams, temporary bridges, etc.).

5.7.1.13. The EMP shall include a Construction Traffic Plan which shall include measures to reduce erosion of temporary roadbeds by construction traffic, especially during wet weather. This shall also include measures to minimize the amount of mud transported onto paved public roads by vehicles and/or runoff.

5.7.1.14. Trees and vegetation that are required to be removed shall be clearly identified within the EMP and justification of removal shall be made clear. The EMP shall include a replantation plan which shall outline the replacement and compensation of trees and vegetation which have been removed/impacted.

5.7.1.15. The EMP shall include a Wastewater Management Plan, identifying methods and procedures for management, treatment, and discharge of waste waters.

5.7.2. All areas of the work site prone to erosion which are disturbed by ongoing work shall be stabilized with erosion control blankets, mulch and/or pre-approved alternative methods to keep soil in place.

5.7.3. Prior to starting work that will create dust or debris, install effective mitigation techniques for erosion, sediment, dust, and debris control in accordance with Federal, Provincial and Municipal laws and regulations, and to the satisfaction of the Departmental Representative and PCA's Environmental Authority.

5.7.3.1. Always maintain these protective measures, including during shut down periods.

5.7.3.2. Choose appropriate controls based on particle sizes present in sediments.

5.7.4. Provide 1 m high sediment barrier in areas where, due to construction activities, sediment or debris may enter the waterway.

5.7.5. Maintain stand-by supply of prefabricated sediment barrier, or an equivalent ready-to- install sediment control device.

5.7.6. Maintain effective surface drainage and direct run-off away from work areas and into adequately vegetated areas.

5.7.7. Excavation to cease during periods of heavy rainfall unless run-off is contained from entering the waterway.

5.7.8. Cover or wet down dry materials and rubbish to prevent blowing dust and debris.

5.7.9. Erosion and sediment control measures shall be implemented prior to work and maintained during the work phase, to prevent entry of sediment into the water where site access or other activities cause exposed soil. The following principles must be considered:

5.7.9.1. Diversions to limit run-on water.

5.7.9.2. Reduction of erosional forces by surface water velocity reduction.

5.7.9.3. Reduction of sediment development through sediment collection or anchoring.

5.7.9.4. Sedimentation of mobilized sediments.

5.7.9.5. Filtration of sediment-carrying flows.

5.7.9.6. Collection of captured or contained sediments.

5.7.9.7. Treatment of pH (hydronium and hydroxide).

5.7.10. The size of particles present in the sediment is a key consideration for selecting the appropriate sediment treatment option(s):

5.7.10.1. If the sediment consists primarily of gravel or sand, which are relatively large particles, a single treatment using a more basic technology, such as a sediment trap, may be adequate.

5.7.10.2. If the sediment consists of silt and/or clay, which are relatively small particles, the effluent will most likely need a more advanced technology, such as a filter press or chemical treatment with anionic flocculent and a filtration method.

5.7.10.3. If the sediment consists of a large spectrum of particle sizes, the water may need primary treatment to remove larger particles, followed by secondary treatment to remove finer particles.

5.7.11. All in-water work shall be performed in a manner that minimizes the disturbance of the watercourse bottom and dispersion of sediment.

5.7.12. Sediment control measures shall be implemented during any in-water work to control turbidity levels. Sediment/turbidity curtains, or other appropriate measures, shall be implemented prior

to any in-water work that may result in sedimentation. These shall remain in place until all suspended sediments have settled.

5.7.13. All erosion and sediment control measures shall be inspected daily to ensure they are functioning properly and are maintained and/or upgraded as required to prevent entry of sediment into the water. No further work shall occur until the sediment and/or erosion problem is addressed to the satisfaction of PCA.

5.7.14. Environmental protection measures shall be checked after each extreme weather event. Avoid activities that could lead to erosion during excessively wet conditions, monitor forecasts for heavy rainfall watches and warnings.

5.7.15. All disturbed areas of the work site shall be stabilized immediately and re-vegetated as soon as conditions allow. All exposed areas shall be covered with erosion control blankets or other measures to keep the soil in place and prevent erosion until vegetated.

5.7.16. Soils shall be protected by laying geotextile and covering with a suitable depth of gravel, >100mm to prevent crushing/compaction of existing soils; alternative methodology for soil-compaction prevention may be utilized (ex. blast mats), as reviewed and approved by PCA.

5.7.17. Sediment and erosion control measures shall be left in place until all areas of the work site have been stabilized.

5.7.18. Upon completion of the work all debris shall be completely removed, and the area restored to its original state or better. Repair all damages to property due to project activities.

5.7.19. Sediment control measures and exclusion fencing must be removed in a way that prevents the escape or re-suspension of sediments.

5.7.20. Erosion and Sediment controls shall not be removed without acceptance from PCA.

5.7.21. A US Dot II Marine Grade turbidity curtain will be maintained in the water below Lock 20 during construction to contain and control the suspension of fines. If necessary or appropriate, a turbidity curtain shall be used during installation and removal of all cofferdams and/or dewatering process.

5.7.22. With respect to turbidity curtain installation:

- **5.7.22.1.** Perform an initial sweep of the work area to drive fish out prior to completely closing off turbidity curtains surrounding the work area.
- **5.7.22.2.** Deployed turbidity curtains in a manner – i.e. moved in a direction from close to shore/structures outward – that prevent entrapment of fish inside the curtain.
- **5.7.22.3.** Turbidity curtains shall not be deployed fully across the watercourse to serve as a barrier to fish migration.
- **5.7.22.4.** Curtains shall be deployed in a manner that minimizes sediment disturbance (e.g. no dragging).

5.7.23. Turbidity curtains shall not be used as a primary or secondary settling area for dewatering activities. Supplementary sediment and erosion control measures shall be installed prior to construction activities and shall be added upon/reinforced as necessary.

5.7.24. Turbidity curtains are to be anchored or weighted down across its length to form a continuous seal on the substrate bed, with adequate floatation at the water's surface to prevent over spills of water.

5.7.25. Sediment or debris that has accumulated around the temporary cofferdams shall be removed prior to their withdrawal in a way that does not generate turbidity in the receiving environment. All cofferdam material will be removed from the watercourse upon decommissioning.

5.7.26. Design and construct cofferdams to minimize sediment inputs to the water course; cofferdams shall not be composed of loose aggregate/granular/earth materials and must be approved by PCA. If using bulk bags or sandbags with granular material, granular material to be clan/neat/washed stone.

5.7.27. No acid-generating rock (containing sulphides) will be used.

5.7.28. In the event of a significant sedimentation or debris caused by construction activities, the contractor will take appropriate measures to contain and mitigate the problem including the installation of additional turbidity curtain or removal of accumulated sediment

5.7.28.1. As accumulation of sediment is high risk in Lock 20, sediment thickness within Lock 20 will be assessed pre and post construction. Should construction activities result in increased sediment depths (>1cm), material will be removed.

5.7.29. The contractor will maintain a standby supply of prefabricated sediment fence barriers, or an equivalent ready-to install sediment control devices.

5.7.30. Filter material will consider the grain size characteristics of the sediment and shall be designed around the principals of maintaining sufficient hydraulic flow and prevention of particle movement through the material.

5.7.31. Sediment fences shall not have mesh or netted backing and shall be installed as per Ontario Provincial Standards Drawing (OPSD) 219.130.

5.7.32. Fine materials such as limestone-based aggregates, unwashed rocks or materials that have the possibility of being suspended or transported downstream should not be used.

5.8. Concrete

5.8.1. Concrete leachate is alkaline and highly toxic to fish and aquatic life. Measures must be taken to prevent the incidence of concrete or concrete leachate from entering the watercourse. Maintain complete isolation of all cast-in-place concrete and grouting from fish-bearing waters for a minimum of 48 hours if ambient air temperature is above 0°C and for a minimum of 72 hours if ambient air temperature is below 0°C or until significantly cured to allow the pH to reach neutral levels. Avoid project activity during wet weather conditions.

5.8.2. Ensure that all works involving the use of concrete, cement, mortars, and other Portland cement or lime-containing construction materials (concrete) will not deposit, directly or indirectly, sediments, debris, concrete, concrete fines, wash or contact water into or about any watercourse. A containment structure shall be used within the canal to capture concrete material during removals.

5.8.3. All concrete debris and dust generated because of various concrete work shall be removed in a way that will ensure material does not enter the waterway. All debris including unused aggregate or concrete rubble shall be completely removed and area restored to original state upon completion of work.

5.8.4. Should dewatering be required, at the discharge point into the watercourse, pH will be maintained between 6.5 and 9.0. Water with pH > 9 cannot be released directly back into the watercourse but must be treated prior to release. Water with a pH ≥ 12.5 is considered toxic and treated as a hazardous waste under Ontario Regulation 347 of the Environmental Protection Act and wastewater in this condition must be removed from the site.

5.8.5. Mitigation Measures for concrete pour operations in or over water:

5.8.5.1. All water that contacts uncured or partly uncured concrete, all leachates or wastewater with pH >9 shall be captured in a wastewater containment area.

5.8.5.2. The wastewater containment area shall be lined with impermeable materials and sized to hold twice the volume of anticipated water run-off, leachate, or wastewater.

5.8.5.3. Use CO_2 to neutralize waters with pH >9.

5.8.5.4. CO2 bubbler hose must be placed around the work areas contained within turbidity curtains. CO2 bubbler system must be situated in place prior to the initiation of the pour and ready to operate if there are issues. The tank shall be used to release carbon dioxide gas into an affected area to neutralize pH levels should a concrete spill or seepage from the concrete form occur. Workers shall be trained in the use of the system. If activated, the system will continue to operate up to and until the source of pH is below 9.

5.8.6. Wash-down areas:

5.8.6.1. Concrete wash-down areas should be at a designated location, located at least 30 m away from the waterbody, if feasible. Wash-out locations will be previously identified in a site plan.

5.8.6.2. Provide appropriately sized containment facilities for the wash-down water from concrete delivery trucks and concrete pumping equipment.

5.8.6.3. Containment structure area should be emptied/changed once it reaches 50% of its capacity.

5.8.6.4. The wash-down area should be located at least 30 m away from a storm water drain, ditch, or street gutter.

5.8.6.5. All wash-down water is to be contained within impermeable and sealed container.

5.8.6.6. Excess concrete waste should be returned to the local batching plant for treatment and re-use or placed in a site receptable designated for concrete and masonry and allowed to set.

5.8.7. In the event of a release of concrete or grout, PCA and the Ontario Spill Action Centre (1-800-268-6060) shall be notified immediately; remediation will be conducted immediately contain and clean up in accordance with federal and provincial regulatory requirements AND to the satisfaction of PCA. Documentation of remediation, testing and results will be provided to Parks Canada.

5.8.8. Monitor downstream surface water turbidity and pH of all concrete pours in or near water; use a digital pH meter with an accuracy of +/-0.2 pH units when monitoring water pH:

5.8.8.1. Near-water concrete pours: every half-hour at a minimum and when sediment plume is visible. Frequency may be reduced once confirmation of efficacy of controls is established, and levels of turbidity have been recorded as falling within the acceptable range.

5.8.8.2. Visual monitoring for releases and spills should be ongoing.

5.8.9. Implement corrective measures if downstream pH has changed more than 1.0 pH unit from background, or is below 6.5 or above 9.0 pH units.

5.8.10. All concrete debris and slurry shall be placed into an enclosed container daily, or more frequently if required, to ensure that no debris escape or remain at the site.

5.8.10.1. The discharge of concrete wastewater leachate or slurries into a waterbody is prohibited.

5.8.11. For disposal, all containment basins must be covered for transportation/disposal. Containment basins which contain liquids must also be sealed for transportation/disposal to ensure no spills or leakages occur.

5.9. Dewatering and Pumping Activities

5.9.1. A Dewatering Plan shall be submitted, as part of the EMP, to the Departmental Representatives for review and accepted by PCA prior to any dewatering.

5.9.2. Submersible pumps or pump intakes used for dewatering shall be placed in the low point of the work site. If there is high turbidity, water should be pre-filtered prior to the pump. (e.g. placing it in a perforated drum with clear stone around the outside or other similarly designed approach).

5.9.3. Dewatering, demolition, and construction is staged such that clean infiltrating water is kept isolated from turbid construction water. Clean water is pumped back to the system and turbid water is managed through a wastewater system.

5.10. Vegetation

5.10.1. Phase vegetation removal to reflect construction activity; grubbing shall not be conducted unnecessarily early in the schedule, and/or over an area that is larger than realistically required, to be properly mitigated with Erosion and Sediment controls.

5.10.2. Identify vegetation clearing zones in Environmental Management Plan; EMP to demarcate all construction sites and laydown areas; identify and keep work activities confined to planned areas and within previously disturbed areas. Trees, shrubs, and vegetation which are to remain throughout construction shall be properly identified and delineated and protected.

5.10.3. Restore the site and to a specific future condition – i.e. as per restoration plan; ensure re-planting success. Native grasses, shrubs, etc. shall be planted to match existing species growing on the sites. Common milkweed shall be actively restored.

5.10.4. Where it is necessary to remove mature vegetation at any time of year, an inventory of species to be removed, coupled with a replanting plan using native species shall be submitted to PCA staff for approval.

5.10.5. Trees (and associated root systems), shrubs and vegetation which are to remain throughout construction shall be properly identified and delineated with flagging tape or temporary fences.

5.10.5.1. Tree protection shall be set in place at least 1.5 m from the dripline of the tree.

5.10.6. Tree protection fencing should be made of orange plastic web snow fencing or equivalent at a minimum of 1.2 m high, braced on either side 2" x 4" wooden framing or on steel T-bar posts with a top support wire between posts to prevent the fence from slumping. T-bars should be driven to a minimum depth of 45 cm, on 2.0 centres.

5.10.7. Where practical, the branches of the large trees shall be trimmed back as the first option rather than cutting the entire tree.

5.10.8. Minimize clearing as much as possible to maintain riparian vegetative cover and windbreaks, where possible maintain vegetated buffer at shoreline and minimize clearing near water bodies. If buffers cannot be maintained, avoid grubbing of vegetation root mass in proximity to shorelines and stream banks.

5.10.9. Clear vegetation from unstable or erodible banks by hand, and where possible, avoid the use of heavy machinery. If machinery must be used, operate machinery on land and in a manner that minimizes disturbance to the banks of the water body.

5.10.10. Only cut trees using tools designed for tree cutting activities (e.g. chainsaw, brush saw).

5.10.11. Grubbing shall not be conducted unless a suitable planting plan and Erosion and Sediment Controls are in place.

5.10.12. Whenever possible, vegetation shall be trimmed in early spring, late fall, or winter. Trimming when the plant is actively growing (i.e. late spring summer and early fall) can further stimulate growth, weakening the plant and making it susceptible to disease.

5.10.13. Prune limbs close to the tree trunk. For a clean cut, make a shallow undercut first, then follow with the top cut. This prevents the limb from peeling bark off the tree as it falls. Do not use an axe for pruning.

5.10.14. If over half of a tree needs pruning, in most circumstances it will be best to cut it down instead of pruning. Cut trees off at ground level and do not leave pointed stumps.

5.10.15. In larger areas to be cleared attempts shall be made to keep trees >15 cm DBH intact and instead remove lower limbs (< 2.5 m high).

5.10.16. Delineate areas to be avoided with flagging tape or temporary fences.

5.10.17. In disturbed areas not designated for sodding, native species are to be used for tree planting and/or ground cover with mulch to prevent erosion and to help seeds germinate.

5.10.18. If there is insufficient time (at least four weeks) in the growing season remaining for the seeds to germinate, or at risk of germinating and being damaged by frost, the site shall be stabilized (e.g., cover exposed areas with erosion control blankets to keep the soil in place and prevent erosion) and vegetated the following spring.

5.10.19. Root systems of trees identified to remain shall be properly delineated and fenced off at a minimum of 1.5 m beyond the dripline of the tree, to protect the root systems from being crushed and impacted by machinery.

5.10.20. If the installation of root-protectant fencing is not possible and/or ideal, alternative measures, as approved by PCA, must then be implemented. Such measures must provide enough soil compaction prevention with regards to the highest level of activity to occur within the immediate area of protection.

5.10.21. The success of all vegetative plantings shall be assessed through visual site inspections conducted at least once each spring and each fall for the first two growing seasons following planting. If at any time during the monitoring period any plantings are found dead or failing, mitigation measures shall be implemented to reduce the risk of future failure and the plants shall be replaced and monitored accordingly.

5.10.22. Burning of cleared vegetation is not permitted.

5.10.23. Transplanting of trees or vegetation on site it not permitted without approval from PCA.

5.10.24. Brush and mulch piles, which may attract snakes, will not be stored on site, or shall be isolated with exclusion fencing (i.e. sediment fencing).

5.10.25. Native grasses, shrubs, etc. should be planted to match existing species growing o the sites. Common milkweed should be actively restored.

5.11. Wildlife

5.11.1. The EMP must demonstrate procedures for avoiding disturbance/harm to wildlife and nesting birds.

5.11.2. If an animal is found within the limits of the work area, it must be left alone to leave the area if possible. If found in the project area, turtles may need to be relocated prior to commencing work (with permits required from Ontario Ministry of Natural Resources [MNR] for relocation). Do not handle wildlife. First contact PCA ES for guidance on how to proceed.

5.11.3. The EMP must detail procedures (e.g. exclusion fencing) for preventing turtle entry/nesting within disturbed project gravels/soils during all stages of project activity.

5.11.4. As due diligence, isolation barriers (i.e. turbidity curtains, sediment fences, etc.) shall be installed as early in the fall season as possible, to prevent individuals from entering the work area and establishing over-wintering sites.

5.11.5. Once cleared and before staging set-up, temporary reptile fencing, such as polythene/ woven geotextile secured with timber stakes, or material of a similar nature/function, shall be installed

completely around gravel stockpiles to prevent turtle nesting in the project area. Exclusion fencing shall also be installed completely around stockpiled material (wood chips, gravel, earth, etc.) to prevent turtle nesting in the project area. Fencing shall not have mesh or netted backing. For guidance on how to plan and install exclusion fencing, refer to the Reptile and Amphibian Exclusion Fencing guidance developed by Ontario Ministry of the Environment Conservation and Parks (MECP): https://www.ontario.ca/page/reptile-and-amphibian-exclusion-fencing

5.11.6. Synthetic plastic Erosion Control Blankets/Mats shall not be utilized, particularly during nesting season, as they pose as an entrapment hazard to turtles. Fibre-based bio-degradable Erosion Control Blankets/Mats are only to be utilized.

5.11.7. If recommended by a QEP and approved by PCA, exclusion zones or "no go" areas will be established to protect areas with known residences (e.g., hibernacula, dens, nests).

5.11.8. If recommended by a QEP and approved by PCA, conduct "Pre-stressing" activities within a few days prior to the onset of site preparation (vegetation clearing and grubbing) to encourage wildlife to move away from a site.

5.11.9. The contractor shall ensure that all vehicles and equipment used by project personnel will follow any construction zone speed limits to reduce the risk of hitting wildlife, as enforced by the site supervisor.

5.11.10. Work areas will be kept clean and free of potential hazards to wildlife such as wire, cable, tubing, plastic, antifreeze, or other materials that wildlife may eat or become entangled in.

5.11.11. Waste will be stored, handled, and transported in accordance with the Waste Management Plan, including storage of all solid waste in sealed, bear-proof containers.

5.11.12. Feeding of wildlife is prohibited.

5.11.13. Daily, an inspection or "sweep" of the work area shall be performed prior to commencement of project works and activities to ensure wildlife are not present in the work area (include in daily environmental site monitoring checklist).

5.11.14. Migratory birds, their eggs and nests are protected under the Migratory Birds Convention Act (1994) and associated Migratory Bird Regulations (2022), by prohibiting activities that can cause them harm. Unless a person has a permit, or the regulations authorize them to do so, they are prohibited from doing the following activities:

- **5.11.14.1.** Capture, kill, take, injure, or harass a migratory bird or attempt to do so.
- **5.11.14.2.** destroy, take, or disturb an egg; and
- **5.11.14.3.** damage, destroy, remove, or disturb a nest, nest shelter, eider duck shelter or duck box, unless the following exceptions apply:
  - **5.11.14.3.1.** the nest does not contain a live migratory bird or a viable egg; and
  - **5.11.14.3.2.** the nest was not built by a species that is listed in the MBR 2022 Schedule 1.
- **5.11.14.4.** The nests of species listed in Schedule 1 are protected at all times, unless notification of the unoccupied nest has been submitted/received through the Environment and Climate Change Canada Abandoned Nest Registry (https://www.permis-permits.ec.gc.ca/en/AbandonedNests); and the wait

time designated in the regulations has passed, and during this time the nest was not occupied by a migratory bird.

5.11.15. Project works or activities are potentially disruptive activities to birds and should be avoided during breeding times. No vegetation shall be removed from April 1st to August 31st to protect nesting birds.

5.11.16. A Qualified Environmental Professional shall inspect the bridge structure daily to check for the presence of nesting birds (resident or migratory) and other wildlife. If a nest structure is found that is less than 50% complete on the bridge structure, a QEP shall remove the nest.

5.11.16.1. Bird droppings may pose a health hazard to workers if removing nests due to a variety of associated diseases. Follow all health and safety guidelines if inspecting or removing nests.

5.11.17. If an occupied (i.e. contains a live bird or viable egg) migratory bird's nest structure is discovered during project activities that has reached 50% completion or greater (general formation of base and cup-structure), the nest is considered active and is not to be removed or disturbed.

5.11.17.1. halt all disruptive activities in the nesting area.

5.11.17.2. inform PCA's Environmental Officer of the occupied migratory bird nest, without delay.

5.11.17.3. protect the nest with a buffer zone and appropriate setback distances determined by a QEP and approved by PCA.

5.11.17.4. avoid disturbing the surrounding vegetation.

5.11.17.5. minimize construction related noise in the vicinity of nest no greater than 50 decibels (dB) or 10 dB above ambient noise levels.

5.11.17.6. avoid the immediate area until the young have naturally left the vicinity of the nest.

5.11.17.7. Consider rescheduling work activities outside of the residence period (typically May 1st to August 31st for Barn Swallow) to avoid disruptions.

5.11.18. If storing the bridge superstructure in the staging area during the migratory bird nesting period between April 1st to August 31st, a QEP shall inspect the bridge daily to check for nesting attempts and exclusionary mitigations shall be employed to prevent nesting attempts.

5.11.18.1. Exclusionary mitigations may include solid barriers (e.g. plywood sheets, corner slope panels, etc.), flexible barriers (e.g. wire mesh, tarps, geotextile fabric, etc.), and/or deterrents (flash tape, predator decoys, etc.).

5.11.18.1.1. Exclusion netting with nylon mesh will not be permitted due to the risk of entanglement.

5.11.18.1.2. Exclusion barriers and deterrents must be inspected daily and maintained.

5.12. Species at Risk

5.12.1. The EMP must detail procedures for preventing turtle entry/nesting within disturbed project gravel/soils during all stages of project activity.

5.12.2. The contractor is to ensure that SAR training is provided to all employees before they begin work on site (materials can be part of the EMP). Employees must be able to identify potential SAR and know the proper procedures to follow when they encounter a SAR.

5.12.3. If a SAR is observed or suspected on or near the worksite (this includes snakes, turtles, nests, dens, young, and/or eggs), the species must not be harmed or harassed. If the species does not leave or cannot leave the site, the contractor must immediately stop all works within the SAR's vicinity and contact PCA's ES staff on how to proceed. Additional measures to avoid impacts may be required before work can restart. Stand back and allow the animal to leave the site.

5.12.4. Minimize the disturbed area; clearly mark the workspace.

5.12.5. Park on roads or disturbed area only.

5.12.6. Rehabilitation and replantation efforts shall include the planation of milkweed and butterfly-friendly flowers, where suitable.

5.12.7. If a turtle is found attempting to hibernate in the disturbed area, immediately halt work to prevent any impact on the individual. Contact PCA's ES staff for guidance on how to proceed. Coordination with the Ontario Turtle Conservation Centre will be required to oversee the turtle's winter hibernation and determine suitable overwintering options.

5.13. Invasive Species

5.13.1. To reduce the risk of introducing invasive species, all equipment, clothing, and footwear must be thoroughly cleaned prior to coming to the site. Any machinery that appears to have not been cleaned will not be permitted on site. For additional information or guidance on how to properly clean equipment, see the Clean Equipment Protocol for Industry developed by the Ontario Invasive Plant Council and found here: https://www.ontarioinvasiveplants.ca/wp-content/uploads/2016/07/Clean-Equipment-Protocol_June2016_D3_WEB-1.pdf

5.13.2. Any equipment or vehicles which are to be used in water shall be thoroughly cleaned before and after use of any visible mud, vegetation, mussels, etc.

- **5.13.2.1.** Vessels/equipment must be drained of standing water.
- **5.13.2.2.** Vessels/equipment should ideally be cleaned with high pressure water (> 250 psi).
- **5.13.2.3.** Vessels/equipment must be dried for 2 – 7 days in sunlight before transported between waterbodies.
- **5.13.2.4.** Cleaning of vessels/equipment shall be conducted away from waterbodies at a recommended distance of at least 30 m from the shoreline.

5.13.3. Mud, dirt and vegetation shall be cleaned from clothing and footwear prior to entering the work site, and prior to leaving the work site.

5.13.4. Should an invasive species be encountered (or at least suspected), a photo and report of the specimen shall be sent to PCA's EA staff and the Invading Species Hotline at 1-800-563-7711 or online at EDDMapS Ontario: https://www.eddmaps.org/ontario/.

5.13.5. Sod can be used at lock stations where areas are expected to be mowed. Any areas where plants will be left to go to seed, then Ontario native species must be used.

5.13.6. Use weed-free material (i.e. sand, gravel, etc.) for erosion control and stabilization and weed-free seed and confirm that seed mix to be used for revegetation purposes does not (potentially) contain invasive plants.

5.13.7. Seed mixes must be included in the replantation plan and accepted by PCA prior to application.

5.13.8. Seed purchased commercially shall have a label that states the following:

5.13.8.1. Species.

5.13.8.2. Purity: Most seed must be no less than 75 % pure and preferably over 85 % pure. The rest is inert matter or other seed.

5.13.8.3. Weed seed content: The tag shall state NO invasive plants are present. Only certified weed-free seed must be used; and

5.13.8.4. Germination of desired seed: Germination generally shall not be less than 50 % for most species, although some shrubs and forbs will have lower percentages.

5.13.9. Move only weed/contaminate-free materials into non-infested areas. Moving materials from one infested location to another within a particular zone may not cause contamination, but moving materials from infested to non-infested areas could lead to the introduction and spread of invasive plants.

5.13.10. If removal of invasive species occurs, individuals will be disposed of appropriately, offsite to ensure no further propagation.

5.13.11. Workers must familiarize themselves with invasive species potentially present within the work sit areas:

5.13.11.1. Dog-strangling Vine:
http://www.eddmaps.org/ontario/Species/subject.cfm?sub=4260

5.13.11.2. Eurasian watermilfoil:
https://www.eddmaps.org/species/subject.cfm?sub=3055

5.13.11.3. European Buckthorn:
http://www.eddmaps.org/ontario/Species/subject.cfm?sub=3070

5.13.11.4. Round Goby:
http://www.eddmaps.org/ontario/Species/subject.cfm?sub=12252

5.13.11.5. Rusty Crayfish:
http://www.eddmaps.org/ontario/Species/subject.cfm?sub=15170

5.13.11.6. Wild Parsnip:
http://www.eddmaps.org/ontario/Species/subject.cfm?sub=6147

5.13.11.7. Zebra Mussel:
http://www.eddmaps.org/ontario/species/subject.cfm?sub=10567

5.14. Cultural Resources and Archaeology

5.14.1. Before any on-site mobilisation/construction work commences, PCA staff will clearly delineate any archaeologically sensitive areas and photo-document this activity for PCA records. These areas will be deemed no-go zones for staging, vehicular traffic, and machinery.

5.14.2. The contractor is to ensure that all personnel working on site undergo a heritage induction to clearly identify the value of the place and how to avoid inadvertent impacts on cultural and archeological resources (known and unknown).

5.14.3. Vehicular access routes and staging areas will be restricted to present-day roadways, parking lots, exposed bedrock areas and significantly disturbed areas. If this is not possible, the use of protective covering is required. All protective measures employed must be removed following construction and the area restored to a pre-construction state. Excavation is not permitted outside of cleared/reviewed areas in the Archaeological Overview Assessment during installation or removal of protective covering.

5.14.4. If archaeological resources (e.g. features, Indigenous artifacts, structural remains, etc.) are encountered during the work activities, work should cease in the immediate area and the Parks Canada Departmental Representative (PCDR) be informed. The PCDR will contact Parks Canada's Terrestrial Archaeology section for advice and assessment of significance, which will in turn determine what will be required to mitigate the chance find.

5.14.5. Ensure that all exposed underwater cultural materials are kept submerged and/or wet while waiting direction.

5.14.6. Inform the Cultural Resource Management Advisor, Ontario Waterway regarding any changes to project plans and/or scheduling. Any changes not assessed under this BIA will require approval from PCA and may require further mitigation measures.

5.15. Air Quality and Noise

5.15.1. All on-site heavy-duty commercial vehicles are expected to have a vehicle emissions report in compliance with O. Reg. 457/19: Vehicle Emissions, enacted under the Environmental Protection Act, R.S.O. 1990, c. E.19. EA Officers may stop a vehicle if they believe the vehicle is emitting excessive exhaust smoke or suspect that emission control equipment has been tampered with or removed.

5.15.2. Use well-maintained heavy equipment and machinery, preferably fitted with fully functional emission control systems/muffler/exhaust baffles, engine covers, etc. In addition, employ timing and location of construction activities to reduce or minimize the effect of noise on nearby residents, recreational users, and wildlife.

5.15.3. Machines shall not be left to unnecessarily idle to avoid emissions.

5.15.4. Adhere to local and municipal noise by-laws.

5.15.5. Notify residents of planned activities that may cause disturbance and schedule them to avoid sensitive time periods.

5.15.6. Minimize the noise levels from construction activities by using proper muffling devices, in addition to appropriate timing and location of these activities to reduce or minimize the effect of noise on nearby residents, recreational users, and wildlife.

5.15.7. Fugitive dust levels measured as total suspended particulate at the property boundary shall not exceed the Ontario Ambient Air Quality Criteria of 120 micrograms per cubic metre (µg/m3) over 24 hours or 60µg/m3 averaged over a year. For measuring methods, refer to the Canada-wide Standards for Particulate Matter and Ozone Ambient Air Monitoring Protocol.

5.15.8. Due to the proximity of the work site to water, calcium chloride shall not be used to suppress concrete dust.

5.15.9. Monitor and mitigate public complaints by keeping a record of complaints and addressing any issues raised by the public.

5.15.10. The stabilized site entrance should be designed in combination with other erosion and sediment control measures and in combination with vehicle wash facilities (as required).

5.16. Waste Management

5.16.1. Littering is prohibited. Garbage and waste material onsite is to be collected daily and stored in appropriate containers/bins.

5.16.2. Burning or burying of waste is prohibited.

5.16.3. Recyclable material and waste shall be removed from the site, in accordance with all federal, provincial, and municipal regulations, to disposal facilities licensed to receive them.

5.16.4. Waste containers shall be sealed or lined to prevent leakage of liquid wastes.

5.16.5. Waste generated will be disposed according to regulations (i.e., O. Reg. 102/94 and O. Reg. 558/00, R.R.O. 1990, 347).

5.17. Work Area Commissioning and Site Restoration

5.17.1. Sediment and Erosion control measures are to only be removed with approval from PCA.

5.17.2. Upon completion of work there shall be a final clean-up of the site. No tools, equipment, temporary structures, or parts thereof, used or maintained for the purpose of this project shall be permitted to remain at the site or enter the water after completion of the project.

5.17.3. Ensure that all construction debris is removed from the work area prior to rewatering. This may involve sweeping and hosing down the bottom of work area. All wash water is to be collected and treated.

5.17.4. Ensure that all construction debris and waste is removed from the work area prior to demobilization.

5.18. Floods, Extreme or Inclement Weather, and Ice Formation

5.18.1. Undertake construction under normal weather conditions, to the extent possible, and design the project worksite to withstand variable weather conditions.

5.18.2. When there is a high probability of a rainfall event, apply wet weather restrictions on construction activities to reduce surface run-off from exposed work areas and to minimize the risk of inundation.

5.18.3. The work area shall be stabilized against the impacts of high flow/heavy rainfall events at the end of each workday.

5.18.4. In the event of a pending cofferdam breach/flood, all vehicles, pumps, generators, fuel tanks, tools, equipment, temporary structures, or parts thereof used for the project, shall be removed from within and from on top of, the cofferdams and outside identified potential flood zones at each site.

6. SIGNIFICANCE OF RESIDUAL ADVERSE EFFECTS

Based on the evaluation presented below (Table 2), Parks Canada has determined that the project is not likely to cause significant residual effects with implementation of mitigations outlined in this report.

The significance of the Project's residual effects—those that remain after all mitigation measures have been put in place, and which may or may not persist beyond the completion of the Project—has been assessed using five key factors: magnitude, reversibility, geographic extent, duration, and frequency (Table 2). These factors help to evaluate how the impacts will affect the environment both spatially and over time, and ultimately determine their significance. Each factor is explained and scaled in Appendix D, which defines assessment criteria for determination of significance of residual effects. Additionally, the criteria for characterizing extent of significance of adverse residual effects is presented in Appendix E.

Table 2: Residual effects determination of significance

Values Component	Potential Residual Effects	Significance Criteria / Rationale	Significance Determination
Fish	Fish mortality among remnant individuals in the canal due to fish stranding following removal/salvage efforts.	Magnitude: **Low** Reversibility: **Reversible** Geographic Extent: **Immediate** Duration: **Medium Term** Frequency: **Intermittent** Timing: **Independent**	Residual Impact: **Negligible** Fish rescues will follow standards for minimum removal efforts of at least 95% of population. Success of rescue will depend on factors like aquatic vegetation, substrate, water quality, and salvage equipment. While 100% removal is unlikely, implementing two consecutive zero-catch passes will minimize stranding, with anticipated mortality affecting less than 5% of the fish community during dewatering. As this multi-year project spans up to two in-water work seasons (October to April), intermittent fish salvages (at start of each in-water work period) and dewatering may cause minor residual impacts. However, the canal's fish community is composed of species that are secure, apparently secure, or invasive species. Dominant species, such as those in the Centrarchidae family, have strong reproductive success and annual recruitment, making impacts minimal in magnitude and reversible.
Fish Habitat	Alteration of spawning habitat due to modified channel bed and substrate types.	Magnitude: **Low** Reversibility: **Reversible** Geographic Extent: **Immediate** Duration: **Long term** Frequency: **Rarely** Timing: **Independent**	Residual Impact: **Negligible** Riprap will be placed on the canal bed to permit heavy duty equipment access without disturbance of sediment containing COPC. It is estimated that up to 160 m^2 area of the bed will be covered with riprap to access the canal from the existing maintenance access on the southwest corner of Maria Swing Bridge. To avoid disturbance of COPC, the bottom layer of riprap in contact with sediment will be left on the channel bed. The magnitude of this impact is assessed as low since this represent a change of less than 0.7% of the canal reach between Lock 20 and Lock 21, which is currently considered poor fish habitat. This change in substrate is expected to occur only once during the project but duration will be long term as it will remain after construction is complete. The altered substrate is expected to provide additional habitat complexity to support existing fish species utilizing the canal. Given the

			substantial amount of habitat that will remain unaltered within the canal (>99%), and the generalist fish species capable of surviving in the canal cut, the impacts to fish habitat are expected to be negligible. It is expected that the changes are reversible as sedimentation can be expected to deposit over the new substrate overtime, returning to pre-construction conditions.
Water Quality	Disturbance of sediments potentially containing Contaminants of Potential Concern (COPC) during trenching.	Magnitude: **Low** Reversibility: **Reversible** Geographic Extent: **Local** Duration: **Short term** Frequency: **Rarely** Timing: **Independent**	Residual Impact: **Negligible** Trenching an area of 15 m^2 across the width of the canal bed will be undertaken to permit installation of a utility duct. With presence of known COPC observed in the canal reach upstream, disturbance of sediments has the potential to result in mobilization downstream. As substrate is primarily composed of sand, silt, and organics, it is expected that ongoing lockage's at Lock 20 and Lock 21 likely generate turbid flow conditions, mobilizing existing substrates. As trenching will be controlled by working in the dry and capturing/treating turbid water if EPOs are exceeded, the disturbance caused from trenching is not expected to increase impacts beyond existing conditions. Additionally, uncharacterized sediments will be tested for a suite of COPC prior to disturbance. Sediments that contain COPC in exceedance of regulatory guidelines and standards outlined in SNC-Lavalin (2021a and 2021b) EPO reports will be removed and disposed of accordingly. Trenching is to occur during a single in-water work season to avoid cumulative impacts. The geographic extent is considered local as it has the potential to extend beyond the project site into Little Lake. Use of downstream turbidity curtain and self-contained water treatment systems will act as a redundancy to limit the risk of mobilizing COPC into Little Lake.

7. SURVEILLANCE

☐ Surveillance is not required
☒ Surveillance is required
☐ Required in accordance with the *Parks Canada Cultural Resource Management Policy*

Parks Canada's Environmental Authority will visit the site regularly during construction to ensure that mitigation measures are in place, functioning as anticipated, and are effective at preventing adverse effects to natural and cultural heritage features.

Surveillance by Cultural Resource Management Staff is also recommended to ensure effectiveness of proposed mitigation measures.

8. FOLLOW-UP MONITORING

Follow-up monitoring is:

☒ Not required
☐ Legally required (e.g. under the *Species at Risk Act* or *Fisheries Act)*
☐ Required in accordance with the *Parks Canada Cultural Resource Management Policy*

9. SARA NOTIFICATION

Notification is:

☒ Not required
☐ Required under the *Species at Risk Act* (outline the nature of and response to any notification).

10. EXPERTS CONSULTED

Department/Agency/Institution: Parks Canada Agency	Date of Request: April 25, 2023
Expert's Name & Contact Information: Scott Gauthier	Title: Project Engineer, Trent Severn Waterway
Expertise Requested: Project overview and construction process details	
Response: Teams discussion and review of 99% designs.	

Department/Agency/Institution: Parks Canada Agency	Date of Request: May-June, 2023
Expert's Name & Contact Information: Valerie Minelga	Title: Manager Environmental Services, Trent Severn Waterway
Expertise Requested: Environmental scoping and mitigation measure/99% design review	
Response: Provided comments for 99% design specs/drawings and for draft mitigation measures.	

Department/Agency/Institution: Parks Canada Agency	Date of Request: June 6, 2023
Expert's Name & Contact Information: Greg Stencell	Title: Kawartha Area Operations Manager, Trent Severn Waterway
Expertise Requested: Typical winter flows through canal and rewatering timing surrounding Under the Lock fishing tournament.	
Response: Timing of event is last weekend in April annually, rewatering takes place on the Wednesday prior to starting. Typical winter flows <0.5m3/s that passes through the guard gates at Warsaw Road and down though the Peterborough Lift Lock.	

Department/Agency/Institution: Parks Canada Agency	Date of Request: June 29, 2023
Expert's Name & Contact Information: Jeffrey Dillane	Title: Terrestrial Archaeologist, Terrestrial Archaeology East
Expertise Requested: Scott Gauthier requested confirmation that the Peterborough Earth Dams Project (PRO 2153) AIA covered the Maria Swing Bridge project limits.	
Response: Previous Golder AIAs and stage 1 and 2 assessments cover the indicated Maria Swing Bridge project limits. No archaeological resources identified in the study area and therefore no further assessment is required on terrestrial PCA or Provincial components of the project. For terrestrial components only the following chance find clause applies: “In the event that archaeological resources (e.g. features, Indigenous artifacts, structural remains, etc.) are encountered during the work activities, work should cease in the immediate area and the Parks Canada Departmental Representative (PCDR) be informed. The PCDR will contact Parks Canada's Terrestrial Archaeology section for advice and assessment of significance, which will in turn determine what will be required to mitigate the chance find.”	

Department/Agency/Institution: Parks Canada Agency	Date of Request: December 18, 2024
Expert's Name & Contact Information: Jennifer Drew	Title: Cultural Heritage Conservation Advisor and Field Unit Liaison
Expertise Requested: Joel MacDonald (Environmental Officer) requested confirmation that no CRM follow-up monitoring required for project under CRM.	
Response: Monitoring is not necessary, however, if any unanticipated finds or circumstances arise during the project implementation phase, the PM should reach out to CRM.	

11. DECISION

With implementation of prescribed mitigation measures, the project is:

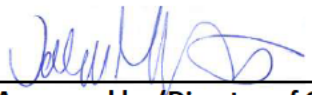
☒ **Not likely to cause significant adverse environmental effects.**

☐ Likely to cause significant adverse environmental effects.

FOR SARA REQUIREMENTS:

☒ **There are no residual adverse effects to species at risk and therefore the SARA-Compliant Authorization Decision Tool was not required**

12. RECOMMENDATION AND APPROVAL

Prepared by (IA Author): Joel MacDonald, Resource Management Officer	Date: 2024-12-19
Signature: 	
Recommended by: Valerie Minelga, Manager Environmental Services	Date: 2024-05-06
Signature: 	
Approved by (Director of Ontario Waterways): David Britton	Date: May 7, 2025
Signature: 	

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14. NATIONAL IMPACT ASSESSMENT TRACKING SYSTEM

☒ Project registered in tracking system

☐ Not yet registered *(CEAA 2012 requires PCA submit a report to Parliament annually. EIAs must be entered in the tracking system* ***by the end of April*** *to enable reporting*.

*****Ensure that all required mitigation measures and conditions (e.g. follow-up monitoring requirements) are included in project permits and authorizations*****

APPENDIX A: SITE PHOTOS



Maria Swing Bridge looking at downstream side of west bank.



Maria Swing Bridge looking at downstream side of east bank during dewatering (2021-10-21.



Pool habitat and sediment deposition at immediate downstream extent of Maria Swing Bridge during dewatering (2021-10-21)

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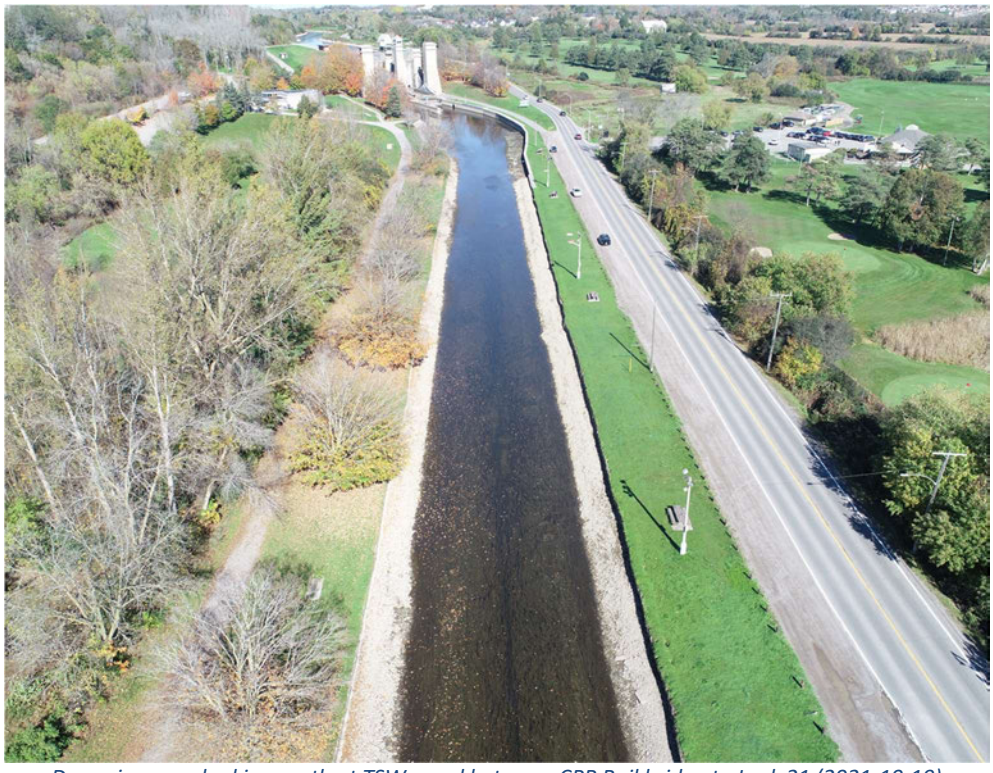
Canal cut looking upstream (north) immediately upstream of Maria Swing Bridge during dewatering (2021-10-21).



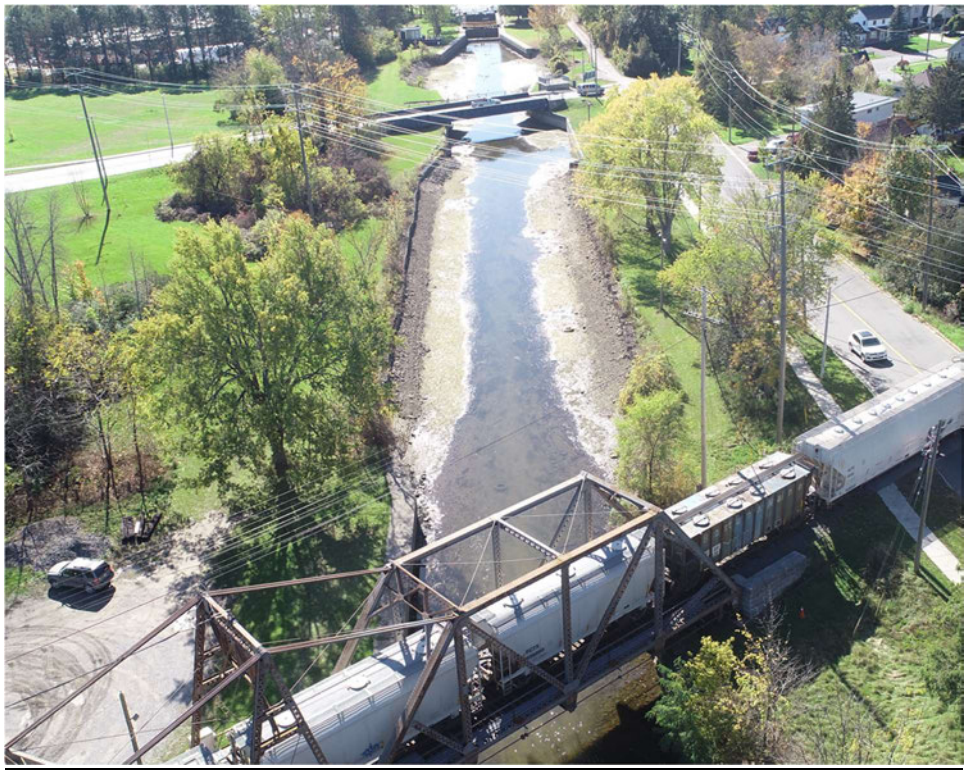
Looking upstream (north) at Lock 20 winter maintenance logs during dewatering (2021-10-21).



Looking downstream (south) at upstream side of Maria Swing Bridge (2021-10-21).



Drone imagery looking north at TSW canal between CPR Rail bridge to Lock 21 (2021-10-19)



Drone imagery looking south at TSW canal reach between CPR Rail bridge to Lock 20 (2021-10-19)

APPENDIX B: SPECIES INDEX FOR MARIA SWING BRIDGE AND SURROUNDING AREA

Common Name	Scientific Name	Sp. Note	Source
ANIMALS			
BIRDS			
Alder Flycatcher	*Empidonax alnorum*		ABBO
American Bittern	*Botaurus lentiginosus*		ABBO
American Crow	*Corvus brachyrhynchos*		ABBO
American Goldfinch	*Spinus tristis*		ABBO
American Kestrel	*Falco sparverius*		ABBO
American Redstart	*Setophaga ruticilla*		ABBO
American Robin	*Turdus migratorius*		ABBO
American Woodcock	*Scolopax minor*		ABBO
Bald Eagle	*Haliaeetus leucocephalus*		2023-03, NHIC
Baltimore Oriole	*Icterus galbula*		ABBO
Bank Swallow	*Riparia*	SAR	ABBO, NHIC
Barn Swallow	*Hirundo rustica*	SAR	ABBO, NHIC
Belted Kingfisher	*Megaceryle alcyon*		ABBO
Black Tern	*Chlidonias niger*	SAR	NHIC
Black-and-white Warbler	*Mniotilta varia*		ABBO
Black-billed Cuckoo	*Coccyzus erythropthalmus*		ABBO
Blackburnian Warbler	*Setophaga fusca*		ABBO
Black-capped Chickadee	*Poecile atricapillus*		ABBO
Black-crowned Night-heron	*Nycticorax nycticorax*		NHIC
Black-throated Green Warbler	*Setophaga virens*		ABB0
Blue Jay	*Cyanocitta cristata*		ABBO
Blue-gray Gnatcatcher	*Polioptila caerulea*		ABBO
Blue-headed Vireo	*Vireo solitarius*		ABBO
Bobolink	*Dolichonyx oryzivorus*	SAR	ABBO, NHIC
Broad-winged Hawk	*Buteo platypterus*		ABBO
Brown Creeper	*Certhia americana*		ABBO
Brown Thrasher	*Toxostoma rufum*		ABBO
Brown-headed Cowbird	*Molothrus ater*		ABBO
Canada Goose	*Branta canadensis*		ABBO
Canada Warbler	*Cardellina canadensis*	SAR	ABBO, NHIC
Caspian Tern	*Hydroprogne caspia*		NHIC
Cedar Waxwing	*Bombycilla cedrorum*		ABBO
Chestnut-sided Warbler	*Setophaga pensylvanica*		ABBO
Chimney Swift	*Chaetura pelagica*	SAR	ABBO, NHIC
Chipping Sparrow	*Spizella passerina*		ABBO

Cliff Swallow	*Petrochelidon pyrrhonota*		ABBO
Common Grackle	*Quiscalus quiscula*		ABBO
Common Loon	*Gavia immer*		ABBO
Common Nighthawk	*Chordeiles minor*		ABBO, NHIC
Common Raven	*Corvus corax*		ABBO
Common Yellowthroat	*Geothlypis trichas*		ABBO
Cooper's Hawk	*Accipiter cooperii*		ABBO
Downy Woodpecker	*Picoides pubescens*		ABBO
Eastern Kingbird	*Tyrannus*		ABBO
Eastern Meadowlark	*Sturnella magna*	SAR	ABBO, NHIC
Eastern Phoebe	*Sayornis phoebe*		ABBO
Eastern Screech Owl	*Megascops asio*		ABBO
Eastern Towhee	*Pipilo erythrophthalmus*		ABBO
Eastern Wood-pewee	*Contopus virens*	SAR	ABBO, NHIC
European Starling	*Sturnus vulgaris*	INV	ABBO
Field Sparrow	*Spizella pusilla*		ABBO
Grasshopper Sparrow	*Ammodramus savannarum*	SAR	ABBO
Gray Catbird	*Dumetella carolinensis*		ABBO
Great Blue Heron	*Ardea herodias*		ABBO
Great Crested Flycatcher	*Myiarchus crinitus*		ABBO
Great Egret	*Ardea alba*		NHIC
Green Heron	*Butorides virescens*		ABBO
Hairy Woodpecker	*Leuconotopicus villosus*		ABBO
Hooded Merganser	*Lophodytes cucullatus*		ABBO
Horned Grebe	*Podiceps auritus*	SAR	NHIC
Horned Lark	*Eremophila alpestris*		ABBO
House Finch	*Haemorhous mexicanus*		ABBO
House Sparrow	*Passer domesticus*		ABBO
House Wren	*Troglodytes aedon*		ABBO
Indigo Bunting	*Passerina cyanea*		ABBO
Killdeer	*Charadrius vociferus*		ABBO
Least Bittern	*Ixobrychus exilis*	SAR	ABBO, NHIC
Least Flycatcher	*Empidonax minimus*		ABBO
Lesser Yellowlegs	*Tringa flavipes*		NHIC
Mallard	*Anas platyrhynchos*		ABBO
Marsh Wren	*Cistothorus palustris*		ABBO
Merlin	*Falco columbarius*		ABBO, EB
Mourning Dove	*Zenaida macroura*		ABBO
Mourning Warbler	*Geothlypis philadelphia*		ABBO
Nashville Warbler	*Leiothlypis ruficapilla*		ABBO
Northern Cardinal	*Cardinalis*		ABBO
Northern Flicker	*Colaptes auratus*		ABBO
Northern Harrier	*Circus cyaneus*		ABBO

Northern Rough-winged Swallow	*Stelgidopteryx serripennis*		ABBO
Northern Waterthrush	*Parkesia noveboracensis*		ABBO
Olive-sided Flycatcher	*Contopus cooperi*	SAR	NHIC
Orchard Oriole	*Icterus spurius*		ABBO
Osprey	*Pandion haliaetus*		ABBO
Ovenbird	*Seiurus aurocapilla*		ABBO
Peregrine Falcone	*Falco peregrinus*	SAR	NHIC
Pileated Woodpecker	*Hylatomus pileatus*		ABBO
Pine Warbler	*Setophaga pinus*		ABBO
Purple Finch	*Haemorhous purpureus*		ABBO
Purple Martin	*Population stable*		ABBO, NHIC
Red-bellied Woodpecker	*Melanerpes carolinus*		ABBO
Red-breasted Nuthatch	*Sitta canadensis*		ABBO
Red-eyed Vireo	*Vireo olivaceus*		ABBO
Red-necked Grebe	*Podiceps grisegena*		NHIC
Red-tailed Hawk	*Buteo jamaicensis*		ABBO
Red-throated Loon	*Gavia stellata*	SAR	NHIC
Red-winged Blackbird	*Agelaius phoeniceus*		ABBO
Rose-breasted Grosbeak	*Pheucticus ludovicianus*		ABBO
Ruby-throated Hummingbird	*Archilochus colubris*		ABBO
Ruffed Grouse	*Bonasa umbellus*		ABBO
Savannah Sparrow	*Passerculus sandwichensis*		ABBO
Scarlet Tanager	*Piranga olivacea*		ABBO
Sharp-shinned Hawk	*Accipiter striatus*		ABBO
Short-eared Owl	*Asio flammeus*	SAR	NHIC
Song Sparrow	*Melospiza melodia*		ABBO
Sora	*Porzana carolina*		ABBO
Spotted Sandpiper	*Actitis macularius*		ABBO
Swamp Sparrow	*Melospiza georgiana*		ABBO
Tree Swallow	*Tachycineta bicolor*		ABBO
Turkey Vulture	*Cathartes aura*		ABBO
Upland Sandpiper	*Bartramia longicauda*		NHIC
Veery	*Catharus fuscescens*		ABBO
Vesper Sparrow	*Pooecetes gramineus*		ABBO
Virginia Rail	*Rallus limicola*		ABBO
Warbling Vireo	*Vireo gilvus*		ABBO
White-breasted Nuthatch	*Sitta carolinensis*		ABBO
White-throated Sparrow	*Zonotrichia albicollis*		ABBO
Wild Turkey	*Meleagris gallopavo*		ABBO
Willow Flycatcher	*Empidonax traillii*		ABBO
Wilson's Snipe	*Gallinago delicata*		ABBO
Winter Wren	*Troglodytes hiemalis*		ABBO

Wood Duck	*Aix sponsa*		ABBO
Wood Thrush	*Hylocichla mustelina*	SAR	ABBO, NHIC
Yellow Warbler	*Setophaga petechia*		ABBO
Yellow-bellied Sapsucker	*Sphyrapicus varius*		ABBO
Yellow-billed Cuckoo	*Coccyzus americanus*		ABBO
Yellow-rumped Warbler	*Setophaga coronata*		ABBO
HERPETILES			
American Bullfrog	*Lithobates catesbeianus*		ORAA
American Toad	*Anaxyrus americanus*		ORAA
Blanding's Turtle	*Emydoidea blandingii*	SAR	ORAA, NHIC
Blue-spotted Salamander	*Ambystoma laterale*		ORAA
Eastern Gartersnake	*Thamnophis sirtalis*		ORAA
Eastern Milksnake	*Lampropeltis triangulum*	SAR	ORAA, NHIC
Eastern Musk Turtle	*Sternotherus odoratus*	SAR	ORAA, NHIC
Eastern Red-backed Salamander			ORAA
Gray Treefrog	*Hyla versicolor*		ORAA
Green Frog	*Rana clamitans*		ORAA, PCA
Midland Painted Turtle	*Chrysemys picta*	SAR	ORAA, NHIC, iNaturalist
Northern Map Turtle	*Graptemys geographica*	SAR	ORAA, NHIC
Red-bellied Snake	*Storeria occipitomaculata*		ORAA
Red-eared Slider	*Trachemys scripta elegans*		ORAA
Snapping Turtle	*Chelydra serpentina*	SAR	ORAA, NHIC
Spotted Salamander			ORAA
Spring Peeper	*Pseudacris crucifer*		ORAA
Western Chorus Frog	*Pseudacris triseriata*	SAR	ORAA, NHIC
Wood Frog	*Lithobates sylvaticus*		ORAA
MAMMALS			
Tricolored Bat	***Perimyotis subflavus***	SAR	NHIC
INSECTS			
American Bumble Bee	*Bombus pensylvanicus*	SAR	NHIC
Monarch Butterfly	*Danaus plexippus*	SAR	NHIC, SFO
Yellow-banded Bumble Bee	*Bombus terricola*	SAR	NHIC
AQUATIC INVERTEBRATE			
Rusty Crayfish	*Orconectes rusticus*	INV	EDM
Zebra Mussel	*Dreissena polymorpha (Pallas)*	INV	EDM
FISH			
Black Crappie	*Pomoxis nigromaculatus*	S4	AA, MNRF, FHA, NS, TU
Bluegill	*Lepomis macrochirus*	S5	AA, MNRF, FHA, NS, TU
Bluntnose Minnow	*Pimephales notatus*	S5	FHA, NS, MNRF
Brook Silverside	*Labidesthes sicculus*	S4	NS, TU
Brown Bullhead	*Ameiurus nebulosus*	S5	AA, MNRF, FHA, NS, TU
Common Carp	*Cyprinus carpio*	INV, SNA	MNRF, FHA, NS

Common Shiner	*Luxilus cornutus*	S5	INaturalist, NS, TU
Golden Shiner	*Notemigonus crysoleucas*	S5	MNRF, NS, TU
Greater Redhorse	*Moxostoma valenciennesi*	S3	NHIC, NS, MNRF
Johnny Darter	*Etheostoma nigrum*	S5	MNRF, NS
Largemouth Bass	*Micropterus salmoides*	S5	AA, MNRF, FHA, NS, TU
Logperch	*Percina sp.*	S5	FHA, NS, MNRF
Mottled Sculpin	*Cottus bairdii*	S5	FHA, NS, MNRF
Muskellunge	*Esox masquinongy*	S4	MNRF, FHA, NS, TU
Northern Pike	*Esox lucius*	S5	AA, NS
Pumpkinseed	*Lepomis gibbosus*	S5	AA, MNRF, FHA, NS, TU
Rock Bass	*Ambloplites rupestris*	S5	AA, MNRF, FHA, NS, TU
Rosyface Shiner	*Notropis rubellus*	S4	MNRF, NS
Round Goby	*Neogobius melanostomus*	INV, SNA	EDM, NS, MNRF
Smallmouth Bass	*Micropterus dolomieu*	S5	FHA, NS, MNRF
Spottail Shiner	*Notropis hudsonius*	S5	FHA, NS, MNRF
Trout-Perch	*Percopsis omiscomaycus*	S5	MNRF, NS
Walleye	*Sander vitreus*	S5	MNRF, FHA, NS
White Sucker	*Catostomus commersonii*	S5	MNRF, FHA, NS
Yellow Perch	*Perca flavescens*	S5	AA, MNRF, FHA, NS, TU
VEGETATION			
TREES/SHRUBS			
Black Ash	*Fraxinus nigra*	SAR	NHIC
Black Locust	*Robinia pseudoacacia*	INV	2018-05 P
Butternut	*Juglans nigra*	SAR	NHIC
Choke Cherry	*Prunus virginiana*		2018-05 P
Common Lilac	*Syringa vulgaris*	INV	2018-05 P
European Buckthorn	*Rhamnus cathartica* L.	INV	2018-05 P, 2023-06-01 SV
European Mountain Ash	*Sorbys aucuparia* L.	INV	2023-06-01 SV
Eastern Red Cedar	*Thuja plicata*		2018-05 P
Green Ash	*Fraxinus pennsylvanica*		2023-06-01 SV
Larch sp.	*Larix sp.*		2018-05 P
Manitoba Maple	*Acer negundo*	INV	2018-05 P, 2023-06-01 SV
Poplar sp.	*Populus sp.*		2018-05 P
Sugar Maple	*Acer saccharum*		2018-05 P
Staghorn Sumac	*Rhus typhina*		2018-05 P, 2023-06-01 SV
Tatarian Honeysuckle	*Lonicera tatarica*	INV	2018-05 P, 2023-06-01 SV
OTHER TERRESTRIAL VEGETATION			
Canada Goldenrod	*Solidago canadensis*		2018-05 P, 2023-06-01 SV
Thistle Sp.	*Cirsium sp.*	?	2023-06-01 SV
Common Milkweed	*Asclepias syriaca*		2018-05 P, 2023-06-01 SV
Common Mullein	*Verbascum Thapsus* L.		2023-06-01 SV
Crown Vetch	*Securigera varia*		2018-05 P
Dandelion sp.	*Taraxacum sp.*		2018-05 P, 2023-06-01 SV

Dames Rocket	*Hesperis matronalis*	INV	2018-05 P, 2023-06-01 SV
Dog Strangling Vine	*Vincetoxicum rossicum*	INV	2018-05 P
Purple Cow Vetch	*Vicia cracca*		2018-05 P
Red Osier Dogwood	*Cornus sericea*		2018-05 P
Virginia Creeper	*Parthenocissus quinquefolia*		2017-06 SV, 2023-06-01 SV
White Clover	*Trifolium repens*		2018-05 P
Wild Carrot	*Daucus carota*		2018-05 P, 2023-06-01 SV
Wild Catnip	*Nepeta cataria*		2018-05 P, 2023-06-01 SV
Wild Grape Vine	*Vitis vinifera*		2018-05 P, 2023-06-01 SV
Wild Parsnip	*Pastinaca sativa*	INV	2018-05 P
AQUATIC VEGETATION			
Curley-leaf Pondweed	*Potamogeton crispus*	INV	EDM
Eurasian Watermilfoil	*Myriophyllum spicatum*	INV	EDM
Purple Loosestrife	*Lythrum salicaria*	INV	EDM

AA = Angler's Atlas
ABBO = Atlas of Breeding Birds of Ontario
CH = Critical Habitat (within proximity of site)
COSEWIC = Committee on the Status of Endangered Wildlife in Canada
EDM = EDDmaps
EX = Exotic
FHA = Fish Habitat Assessment Report 2017
HX = Hybrid
INV = Invasive Species
MNRF = Ontario Ministry of Natural Resources and Forestry
NHIC = National heritage Information Centre
NPS = Noxious/ Pest Species
NS = Nature Serve
ORAA = Ontario Reptile and Amphibian Atlas
SAR = Species at Risk
SFO = SAR Field Observation
P = PCA Site Visit Photos
SV = PCA Site Visit
TU = Trent University

APPENDIX C: FEDERALLY AND PROVINICALLY RANKED SPECIES WITH POTENTIAL TO BE FOUND WITHIN THE PROJECT AREA

Common Name	Scientific Name	COSEWIC	SARA Status	ESA Status	Preferred Habitat	Habitat Potential on Project Site	Likelihood to be Found on Project Site
				BIRDS			
Bald Eagle[2]	***Haliaeetus leucocephalus***	Not at Risk	No Status	Special Concern	Bald Eagles nest in a variety of habitats and forest types, almost always near a major lake or river where they do most of their hunting. While fish are their main source of food, Bald Eagles can easily catch prey up to the size of ducks, and frequently feed on dead animals, including White-tailed Deer. They usually nest in large trees such as pine and poplar. During the winter, Bald Eagles sometimes congregate near open water such as the St. Lawrence River, or in places with a high deer population where carcasses might be found. https://www.ontario.ca/page/bald-eagle	**No**	**Unlikely – low potential to migrate through site.**
Bank Swallow[2,3,6]	***Riparia riparia***	Threatened	Threatened	Threatened	Bank swallows' nest in burrows in natural and human-made settings where there are vertical faces in silt and sand deposits. Many nests are on banks of rivers and lakes, but they are also found in active sand and gravel pits or former ones where the banks remain suitable. The bank swallow migrates south for the winter, primarily to South America. Migration in U.S. and Canada peaks early-Aug/late-Sept. Spring return typically occurs between mid-March to June. Breeding activity typically occurs between April and August. Map: http://files.ontario.ca/environment-and-energy/species-at-risk/bank_swallow_map_eng.pdf	**No**	**No**
Barn Swallow[2,3,6]	***Hirundo rustica***	Special Concern	Threatened	Threatened	Nest almost exclusively on man-made structures (bridges, culverts, barns). The species is attracted to open structures that include ledges where they can build their nests, which are often re-used from year to year. They prefer unpainted, rough-cut wood since the mud does not adhere as well to smooth surfaces. Barn Swallows are long-distance migrants and fly from North American breeding grounds to wintering areas in Central and South America. Migration has been recorded third week of Jul, peaking mid-August, through early Oct, with stragglers through late Oct or early Nov. In southern Canada, adults start to return in the spring by the end of April and the first week of May, but the main influx occurs in mid-May, tailing off in early June. Breeding in Ontario typically takes place between May and August, with Nest construction starting in mid-May in Ontario. Map (Figure 1): https://www.ontario.ca/page/barn-swallow-recovery-strategy	**Yes**	**Low Possibility – high traffic bridge likely dissuades use of bridge structure for nesting. Storing bridge structure in staging area may provide opportunity to nest.**
Black Tern[3]	***Chlidonias niger***	Not at Risk	No Status	Special Concern	Shallow marshes generally comprised of cattails. In Ontario, Black Terns are found scattered throughout the province, but breed mainly in the marshes along the edges of the Great Lakes. Breeding in Ontario typically takes place between early May and mid-August. Black Tern migrates south to central America, the Atlantic coast and Mexico typically between mid-August and September, returning between mid-to-late April to mid—to-late May. Map: http://files.ontario.ca/environment-and-energy/species-at-risk/black_tern_map_eng.pdf	**No**	**No**
Bobolink[2,3,6]	***Dolichonyx oryzivorus***	Special Concern	Threatened	Threatened	Bobolink nest in tallgrass prairie and other open meadows, including hayfields. In Ontario, it is widely distributed throughout most of the province south of the boreal forest, although it may be found in the north where suitable habitat exists. Fall migration initiates Late July – early August, returning in spring around mid-May. Breeding in Ontario typically takes place between mid-May and mid-July. Map: http://files.ontario.ca/environment-and-energy/species-at-risk/mnr_sar_bblink_eo_map_eng.pdf	**No**	**No**
Canada Warbler[2]	***Cardellina canadensis***	Special Concern	Threatened	Special Concern	The Canada Warbler breeds in a range of deciduous and coniferous, usually wet forest types, all with a well- developed, dense shrub layer. Dense shrub and understory vegetation help conceal Canada Warbler nests that are usually located on or near the ground on mossy logs or roots, along stream banks or on hummocks. In Ontario, it is most abundant along the Southern Shield. It winters in South America, departing Canada in August, to return in late-April/early-May for breeding. Breeding activity typically takes place between late-May and early-August. Map: https://wildlife-species.canada.ca/bird-status/dist-disteng.aspx?sY=2014&sL=e&sB=CAWA&sM=p1&sD=3240	**No**	**No**
Chimney Swift[2,6]	***Chaetura pelagica***	Threatened	Threatened	Threatened	Likely to be found in and around urban settlements where they nest and roost (rest or sleep) in chimneys and other manmade structures. They also tend to stay close to water as this is where the flying insects, they eat congregate. Migrants move south in the late summer/ early-fall (August – September), returning to Ontario in late-April, early-May. Breeding activity typically takes place between May and August.	**No**	**No**

Common Name	Scientific Name	COSEWIC	SARA Status	ESA Status	Preferred Habitat	Habitat Potential on Project Site	Likelihood to be Found on Project Site
					Map: http://files.ontario.ca/environment-and-energy/species-at-risk/chimney_swift_map_eng.pdf		
Common Nighthawk[2]	***Chordeiles minor***	Special Concern	Special Concern	Special Concern	Common Nighthawk breeds in a range of open and partially open habitats, including forest openings and post-fire habitats, prairies, bogs, and rocky or sandy natural habitats as well as disturbed areas. It is also found in settled areas that meet its habitat needs, those with open areas for foraging and bare or short-cropped surfaces for nesting. The species' use of a wide range of habitats makes it difficult to estimate trends in habitat availability except in urban habitats, where their main nesting sites – flat graveled roofs – are disappearing. Common Nighthawk appears to be an opportunistic generalist in its choice of foraging habitats, often aggregating in areas that attract concentrations of flying insects, such as waterways and lighted areas.	**No**	**Unlikely due to ongoing mowing of surrounding landscape**
Eastern Meadowlark[2,3]	***Sturnella magna***	Threatened	Threatened	Threatened	Nest in moderately tall grasslands, such as pastures and Nest in moderately tall grasslands, such as pastures and hayfields, but also nest in alfalfa fields, weedy borders of croplands, roadsides, orchards, shrubby overgrown fields, or other open areas. Small trees, shrubs or fence posts are used as elevated song perches. In Ontario, the Eastern Meadowlark is primarily found south of the Canadian Shield, but it also inhabits the Lake Nipissing, Timiskaming, and Lake of the Woods areas. The peak period of fall migration extends from about 21 September through to about 10 November. In southern Ontario, spring migration extends from late March through much of May. Breeding activity typically occurs between May and August. Map: http://files.ontario.ca/environment-and-energy/species-at-risk/mnr_sar_es_me_lrk_map_en.pdf	**No**	**No**
Eastern Wood-pewee[2,3,6]	***Contopus virens***	Special Concern	Special Concern	Special Concern	Edges of mixed or deciduous forests, intermediate-aged mature forests. It is most abundant in intermediate-age mature forest stands with little understory vegetation. The Eastern Wood-pewee is a long-distance migrant, wintering in the tropics. Fall migration begins mid to late August and peaks in early to mid-September. Birds typically return to northern breeding grounds in mid-May. Breeding activity typically occurs between mid-May to September. Map (Figure 5): https://www.canada.ca/en/environment-climate-change/services/species-risk-public-registry/cosewic-assessments-status-reports/eastern-wood-pewee-2012.html	**No**	**No**
Grasshopper Sparrow[3]	***Ammodramus savannarum pratensis***	Special Concern	Special Concern	Special Concern	It lives in open grassland areas with well-drained, sandy soil. It will also nest in hayfields and pasture, as well as alvars, prairies and occasionally grain crops such as barley. It prefers areas that are sparsely vegetated. Its nests are well-hidden in the field and woven from grasses in a small cup-like shape. The Grasshopper Sparrow can be found throughout southern Ontario, but only occasionally on the Canadian Shield. It is most common where grasslands, hay or pasture dominate the landscape. The Grasshopper Sparrow is a short-distance migrant and leaves Ontario in the late-summer/fall (mid-August – September) to migrate to the southeastern United States and Central America for the winter, returning in May. Breeding activities typically occur between June and early-August. Map (Figure 1): http://cossaroagency.ca/wp-content/uploads/2017/06/COSSARO-Grasshopper-Sparrow-Final-Evaluation-with-FR-FINAL-s.pdf	**No**	**No**
Horned Grebe[2]	***Podiceps auritus***	Not at Risk	No Status	Special Concern	The Horned Grebe usually nests in small ponds, marshes and shallow bays that contain areas of open water and emergent vegetation. Nests are usually located within a few metres of open water. This vegetation provides adults with nest materials, concealment, and protection for their young. The Horned Grebe occupies natural habitat more often than man-made reservoirs and artificial ponds. https://www.ontario.ca/page/horned-grebe	**No**	**No**
Least Bittern[2,3,5]	***Ixobrychus exilis***	Threatened	Threatened	Threatened	The Least Bittern breeds strictly in marshes dominated by emergent vegetation surrounded by areas of open water. Most breeding grounds in Canada are dominated by cattails, but breeding also occurs in areas with other robust emergent plants and in shrubby swamps. Breeding habitats are occupied from mid-May to mid-September. For winter months, Least Bitterns migrate between late-August to early-October to the southern United States, Mexico, and Central America. Migrants return to Ontario typically between April – mid-May. Map: http://files.ontario.ca/environment-and-energy/species-at-risk/least_bittern_map_eng.pdf	**No**	**No**
Olive-sided Flycatcher[2]	***Contopus cooperi***	Special Concern	Special Concern	Special Concern	Olive-sided Flycatcher is most often associated with edges of coniferous or mixed forests with tall trees or snags for perching, alongside open areas, or in burned forest with standing trees and snags. In natural conditions, these habitats may include open to semi-open mature forest stands, as well as mature stands with edges near wet areas (such as rivers, muskeg, bogs, or swamps), burned forests, openings created by insect outbreaks, or other gaps. The species also uses forest stands adjacent to human-created openings (such as clear-cuts, thinned stands, and prescribed burns). Egg and nesting stages can last from late May/mid-June to	**No**	**No – NHIC observation indicated single observation likely only transient observation.**

Common Name	Scientific Name	COSEWIC	SARA Status	ESA Status	Preferred Habitat	Habitat Potential on Project Site	Likelihood to be Found on Project Site
					early/mid-August and arrive to breeding grounds between April and June, but predominantly around mid-May. Fall migration begins in late July, with most departing between mid-August and early September.		
Peregrine Falcone[2]	***Falco peregrinus (anatum/tundrius)***	Not at Risk	Not Status	Special Concern	Peregrine Falcons usually nest on tall, steep cliff ledges close to large bodies of water. Although most people associate Peregrine Falcons with rugged wilderness, some of these birds have adapted well to city life. Urban peregrines raise their young on ledges of tall buildings, even in busy downtown areas. Cities offer peregrines a good year-round supply of pigeons and starlings to feed on. https://www.ontario.ca/page/peregrine-falcon	**No**	**No**
Short-eared Owl[2]	***Asio flammeus***	Threatened	Special Concern	Special Concern	Favours open habitats throughout the year, including grasslands, tundra, and wetlands. Breeding typically occurs in open landscapes at least 50-100 ha in area, and nests are preferentially located on the ground near clumps of taller vegetation that provide concealment. In winter, Short-eared Owl's roost in conifers adjacent to open areas used for hunting or on the ground in the shelter of tall grasses or forbes. Species tend to be nomadic, often moving relatively long distances through the year to areas with high rodent abundance. https://www.canada.ca/en/environment-climate-change/services/species-risk-public-registry/cosewic-assessments-status-reports/short-eared-owl-2021.html	**No**	**No**
Wood Thrush[2,3]	***Hylocichla mustelina***	Threatened	Threatened	Special Concern	The wood thrush lives in mature deciduous and mixed (conifer-deciduous) forests. They seek moist stands of trees with well-developed undergrowth and tall trees for singing perches. These birds prefer large forests but will also use smaller stands of trees. They build their nests in living saplings, trees, or shrubs, usually in sugar maple or American beech. The Wood Thrush is a long-distance migrant, wintering in southern America and Mexico. Individuals depart northern breeding areas mid-Aug to mid- Sep. Spring migrants typically arrive mid to late May. Breeding Activity occurs between late-May and August. Map (Figure 7): https://www.canada.ca/en/environment-climate-change/services/species-risk-public-registry/cosewic-assessments-status-reports/wood-thrush-2012.html	**No**	**No**
FISH							
River Redhorse	***Moxostoma carinatum***	Special Concern	Special Concern	Special Concern	The river redhorse has been captured in both river and lake environments. However, its persistence is dependent on access to suitable riverine spawning habitat: moderate to swift current, riffle-run habitat, and clean coarse substrates. Outside of the spawning period, reduced abundance in these habitats suggests that deeper run/pool habitats are used during other periods of the year https://www.sararegistry.gc.ca/virtual_sara/files/cosewic/sr_river_redhorse_e.pdf	**No**	**No**
HERPETILES							
Blanding's Turtle[2,4]	***Emydoidea blandingii***	Endangered	Endangered	Threatened	Blanding's Turtles can be found in several types of freshwater environments, including lakes, permanent or temporary pools, slow-flowing streams, marshes, and swamps. They will travel long distances overland (>410m) for basking and nesting sites. Blanding's Turtles are spring nesters, laying eggs anywhere from May to late June-early July. They may use sand and gravel banks along waterways, road shoulders, fissures in rocky shorelines and freshly dug gravel and soil. Eggs generally hatch between late August and late October. Blanding's Turtles hibernate in the mud at the bottom of permanent water bodies from late October until the end of April. Map: http://files.ontario.ca/environment-and-energy/species-at-risk/mnr_sar_bla_tur_map_eng.pdf	**No**	**No**
Eastern Milksnake[2, 4]	***Lampropeltis triangulum***	Special Concern	Special Concern	No Status	Found in a wide variety of habitats, from prairies, pastures, and hayfields to rocky hillsides and a wide variety of forest types. Often near water. The Milksnake hibernates communally underground, in rotting logs or in the foundations of old buildings from late-October/November to early-April. Females lay their eggs in late-June or early-July, with eggs hatching in late-August or early-September. Maps (Figure 4 and 6): https://www.canada.ca/en/environment-climate-change/services/species-risk-public-registry/cosewic-assessments-status-reports/eastern-milksnake-2014.html	**Yes – Limited available hibernation.**	**Low possibility – High traffic bridge likely dissuade use of substructure.**
Eastern Musk Turtle[2] (Stinkpot)	***Sternotherus odoratus***	Special Concern	Special Concern	Special Concern	Eastern Musk Turtle require shallow water with little or no current, and soft earth to bury into when they hibernate. The species is relatively intolerant of anoxic conditions. It nests from late May to early July, usually within 45 metres of water. Nesting habitat is variable, but it must be close to the water and exposed to direct sunlight. Eastern Musk Turtle prefer to lay eggs in rotting vegetation. Generally, the nests contain from two to five eggs and are quite shallow; sometimes the female lays her eggs under	**No – Intolerant of anoxic conditions.**	**No**

Common Name	Scientific Name	COSEWIC	SARA Status	ESA Status	Preferred Habitat	Habitat Potential on Project Site	Likelihood to be Found on Project Site
					logs or on open ground. Hatchlings emerge in the fall and are approximately two centimetres in length. Hibernation takes place between October and April. Map: http://files.ontario.ca/environment-and-energy/species-at-risk/eastern_musk_turtle_map_eng.pdf		
Midland Painted Turtle[4, 5]	***Chrysemys picta marginata***	Special Concern	Special Concern	No Status	Prefers slow moving rivers, streams, ponds, lakes, and marshes with muddy bottoms, lots of submerged vegetation and exposed rocks, logs, and dead heads; utilized for basking. Females nest from late May to early July, digging their nest in loamy or sandy soil in sunny areas. The clutch contains from three to 14 eggs. Hatchlings may emerge in the fall but sometimes overwinter in the nest and emerge the following spring. Hibernation typically occurs between October to March. Map: https://en.wikipedia.org/wiki/Painted_turtle#/media /File:Painted_Turtle_Distribution_alternate.svg	**Yes - Limited**	**Low possibility – site lacks basking habitat features. Reduced water depths limit hibernation opportunity.**
Northern Map Turtle[4]	***Graptemys geographica***	Special Concern	Special Concern	Special Concern	The Northern Map Turtle inhabits both lakes and rivers, showing a preference for slow moving currents, muddy bottoms, and abundant aquatic vegetation. Their habitat must contain suitable basking sites, such as rocks and deadheads, with an unobstructed view from which a turtle can drop immediately into the water if startled. In winter, the turtles hibernate on the bottom of deep, slow-moving sections of river. Hibernation typically occurs between October and April. This species requires an oxygen-rich environment for over-wintering as they are relatively intolerant of anoxic environments. Northern Map Turtles are spring nesters, laying eggs anywhere from May to late June-early July. They may use sand and gravel banks along waterways, road shoulders, fissures in rocky shorelines and freshly dug gravel and soil. Eggs generally hatch between late August and late October. In some cases, the hatchlings overwinter in the nest in southern Ontario, it lives primarily on the shores of Georgian Bay, Lake St. Clair, Lake Erie and Lake Ontario, and along larger rivers including the Thames, Grand and Ottawa. Map: http://files.ontario.ca/environment-and-energy/species-at-risk/northern_map_turtle_map_eng.pdf	**No – Intolerant of anoxic conditions.**	**No**
Snapping Turtle[2,4]	***Chelydra serpentina***	Special Concern	Special Concern	Special Concern	Usually found in large bodies of water but will sometimes inhabit small ponds. This species may inhabit surprisingly small wetlands, ponds, and ditches. It hibernates in the mud or silt on the bottom of lakes and rivers, usually not too far from the shore. Hibernation typically occurs between October and April. Rarely leave water except to nest and migrate to overwintering habitat. Snapping Turtles are spring nesters, laying eggs anywhere from May to late June-early July. They may use sand and gravel banks along waterways, road shoulders, fissures in rocky shorelines and freshly dug gravel and soil. Females will use almost any area they can excavate. A single clutch usually consists of between 40 and 50 egg. Eggs generally hatch between late August and late October. Map: http://files.ontario.ca/environment-and-energy/species-at-risk/snapping_turtle_map_eng.pdf	**Yes - Limited**	**Low possibility – Reduced water depths limit hibernation opportunity. May migrate through during active period.**
Western Chorus Frog[2,4]	***Pseudacris triseriata***	Threatened	Threatened	No Status	Marshes or wooded wetland areas; it is found on the ground or in low shrubs and grass. The Western Chorus Frog is very rarely found in permanent ponds. The species hibernates in its terrestrial habitat, under rocks, dead trees, or leaves, or in loose soil or animal burrows, even though these sites are sometimes flooded. Hibernation typically occurs between October and March. In Canada, the Western Chorus Frog breeds very early in the spring, often while ice is still present mainly in April, sometimes beginning as early as the end of March, with calling sometimes continuing until mid-May. This frog breeds in almost any fishless pond with at least 10 centimetres of water. The female lays a series of small egg masses, which are attached to vegetation. The eggs hatch within a few weeks, and the tadpoles finish transforming by early summer or midsummer The Western Chorus Frog is among the first species to call in the spring. Maps (Figures A-5, A-6 & A-7): https://www.canada.ca/en/environment-climate-change/services/species-risk-public-registry/recovery-strategies/western-chorus-frog-canadian-shield-population.html	**No**	**No**
INSECTS							
American Bumble Bee	*Bombus pensylvanicus*	Special Concern	Special Concern	No Status	Occurs in a range of open habitats including farmlands, meadows, and grasslands. It has been recorded foraging on flowers for pollen and nectar from a verity of plant genera. It predominantly nests above found in dense mats of long grass but is also known to opportunistically nest in abandoned rodent burrows and abandoned bird nests well above the ground surface. Like all bumble bees, American Bumble Bee queens overwinter underground and in decomposing organic material such as rotting logs and compost. https://www.canada.ca/en/environment-climate-change/services/species-risk-public-registry/cosewic-assessments-status-reports/american-bumble-bee-2018.html	**No**	**Possible migration through area**

Common Name	Scientific Name	COSEWIC	SARA Status	ESA Status	Preferred Habitat	Habitat Potential on Project Site	Likelihood to be Found on Project Site
Monarch Butterfly[5]	*Danaus plexippus*	Endangered	Special Concern	Special Concern	Monarchs can be found wherever milkweed and wildflowers grow. This includes abandoned farmland, along roadsides, and other open spaces. Eggs are laid singly on the underside of a young leaf of a milkweed plant during the spring and summer months. Monarch metamorphosis from egg to adult occurs during the warm summer temperatures in as little as 25 days, extending to as many as seven weeks during cool spring conditions Monarch butterflies are not able to survive the cold winters of Canada and most of the United States so they migrate south and west each autumn to escape the cold weather. The monarch migration usually starts in about September to October but may initiate earlier if the weather turns cold sooner than that. The monarch butterflies will spend their winter hibernation in Mexico and some parts of Southern California. Map 1: http://www.mission-monarch.org/monarch-news/ Map 2 (Figure 5): https://www.canada.ca/en/environment-climate-change/services/species-risk-public-registry/cosewic-assessments-status-reports/monarch-2016.html	**Yes - Very limited individual Common Milkweed plants observed**	**Possible migration through area. Manicured lawn with peripheral individual Common Milkweed plants limit use.**
Yellow-banded Bumble Bee	*Bombus terricola*	Special Concern	Special Concern	Special Concern	Yellow-banded Bumble Bee occurs in a diverse range of habitats, including mixed woodlands, farmlands, urban areas, montane meadows, prairie grasslands and boreal habitats. It has been recorded foraging on flowers for pollen and nectar from a variety of plant genera. Like many bumble bees, it usually nests underground in pre-existing cavities such as abandoned rodent burrows and rotten logs. Yellow-banded Bumble Bee queens overwinter underground and in decomposing organic material such as rotting logs. https://wildlife-species.canada.ca/species-risk-registry/virtual_sara/files/cosewic/sr_Yellow-banded%20Bumble%20Bee_2015_e.pdf	**No**	**Possible migration through area**
MAMMALS							
Tri-coloured[2] Bat	***Perimyotis subflavus***	Endangered	Endangered	Endangered	During the summer, the Tri-colored Bat is found in a variety of forested habitats. It forms day roosts and maternity colonies in older forest and occasionally in barns or other structures. They forage over water and along streams in the forest. Tri-colored Bats eat flying insects and spiders gleaned from webs. At the end of the summer, they travel to a location where they swarm; it is generally near the cave or underground location where they will overwinter. They overwinter in caves where they typically roost by themselves rather than part of a group. https://www.canada.ca/en/environment-climate-change/services/species-risk-public-registry/cosewic-assessments-status-reports/little-brown-myotis-tri-coloured-bat-2013.html	No	No
VEGETATION							
Black Ash[2]	***Fraxinus nigra***	Threatened	No Status	Endangered	Black Ash is predominantly a wetland species found in swamps, floodplains, and fens. It has an intermediate light requirement and a tendency toward greater abundance in more alkaline sites. Most sites in which it is dominant are flood prone, where its high tolerance of seasonal flooding appears to offer a competitive advantage. Black Ash also occurs widely in moist upland forests, but generally at lower densities than in wet areas. https://www.canada.ca/en/environment-climate-change/services/species-risk-public-registry/cosewic-assessments-status-reports/black-ash-2018.html	**Possible**	**No**
Butternut[2]	***Juglans cinerea***	Endangered	Endangered	Endangered	In Ontario, Butternut usually grows alone or in small groups in deciduous forests. It prefers moist, well-drained soil and is often found along streams. It is also found on well-drained gravel sites and rarely on dry rocky soil. This species does not do well in the shade, and often grows in sunny openings and near forest edges. In Ontario, this species is found throughout the southwest, north to the Bruce Peninsula, and south of the Canadian Shield. Map: http://files.ontario.ca/environment-and-energy/species-at-risk/butternut_map_eng.pdf Map 2: https://files.ontario.ca/699-1-1en-map-2.pdf	**Possible**	**No**

[1]COSEWIC Draft Critical Habitat Mapping
[2]NHIC
[3]Atlas of Breeding Birds of Ontario
[4]Ontario Reptile and Amphibian Atlas
[5]SAR Field Observation
[6]eBird Hotspot Database

Potentially found on the site

APPENDIX D: ASSESSMENT CRITERIA FOR DETERMINATION OF SIGNIFICANCE OF RESIDUAL EFFECTS

Magnitude	Magnitude, in general terms, may vary among Issues, but is a factor that accounts for size, intensity, concentration, importance, volume and social or monetary value. It is rated as compared with background conditions, protective standards, or normal variability.	
	Low	Relative to natural or background levels
	Moderate	Relative to natural or background levels
	High	Relative to natural or background levels
Reversibility	Reversible	Effects can be reversed
	Irreversible	Effects are permanent
Geographic Extent	Immediate	Confined to Project Site
	Local	Effects beyond immediate Project Ste but not regional in scale
	Regional	Effects on a wide scale
Duration	Short Term	Between 0 and 6 months in duration
	Medium Term	Between 6 months and 2 years
	Long Term	Beyond 2 years
Frequency	Not applicable	Not expected to occur with mitigation measure applied
	Rarely	Occurs only once
	Intermittent	Occurs occasionally at irregular intervals
	Continuous	Occurs on a regular basis and regular interval
Timing	Independent	Not dependant on timing
	Dependant	Dependant on specific timing

Source: Modified from Non-Basic Project Environmental Effects Evaluation Template (IAAC, 2021)

APPENDIX E: CHARACTERIZING EXTENT OF SIGNIFICANCE OF ADVERSE RESIDUAL EFFECTS

Negligible* or Low	Moderate	High
Effects are likely to be negligible or minor in scale if they are negligible or low in magnitude, of short duration, infrequent, small in spatial extent, reversible or readily avoided, and to generate few or minor impacts in social or ecological contexts. Mitigation measures will allow baseline conditions to remain largely unchanged. * A "negligible" effect does not mean "no effect" but that an effect is sufficiently small to likely not result in a noticeable change to the valued component. However, in the context of cumulative effects, a negligible effect may be important in understanding regional effects as a whole. For example, while an effect may be negligible on its own, it may be amplified if other physical activities affect the same valued component.	Effects are likely to be medium in scale if they are moderate in magnitude, of moderate duration, occasionally frequent, possibly/partially reversible, and to generate a moderate level of impacts in social or ecological contexts. Mitigation measures may not fully eliminate, reduce, control or offset effects but should enable affected communities to maintain economic and social well-being, and should prevent the diminishment or loss of key components of the environment and its ecological functioning.	Effects are likely to be severe in scale if they are high in magnitude, permanent/long term, frequent, irreversible, and over a large spatial extent or within an area of exclusive/preferred Indigenous use or of ecological/environmental sensitivity. High levels of impacts in social or ecological contexts are expected. There is a high degree of uncertainty of the effectiveness of mitigation measures, or mitigation measures are unable to fully address effects such that valued components are diminished or lost.

Source: Impact Assessment Agency of Canada, 2024