

Basic Impact Analysis

Dam at Lock 38 Rehabilitation

Trent-Severn Waterway
1419 Canal Road, #50, Beaverton ON



May 2018

Environmental Impact Assessment Version Control

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

Version Number	Amendment Number	Date	Brief Description of Change
1	0	2017-06-16	Original Draft
		2018-05-31	Draft Update
		2018-06-05	Signed Original



1. PROJECT TITLE & LOCATION

Dam at Lock 38 Rehabilitation

Dam at Lock 38, Trent Severn Waterway, Canal Road

1419 Canal Rd, #50 Beaverton, Ontario

44° 30' 35" N Latitude and 79° 06' 24" W Longitude

The Talbot River structures are part of The Trent-Severn Waterway (TSW), which meanders 386 km along Central Ontario and consists of many locks, bridges and dams. The dams that is the subject of this assessment is located on the Talbot river, which flows from Mitchell Lake to Lake Simcoe and forms the border between Simcoe County (Ramara township) to the north and the Regional Municipality of Durham (Brock township) to the south. The lower section of the river is now part of the TSW, although a new more direct channel was cut at the end of the 19th century, bypassing the original mouth of the river. The Talbot River drains the natural Raven and Talbot Lakes, as well as the man-made Mitchell and Canal Lakes. From the east, the Talbot River is the most important river draining into Lake Simcoe, connecting the lake with the Kawartha Lakes system and Lake Ontario. The lake forms part of the TSW system that links Lake Ontario and Georgian Bay/Lake Huron.

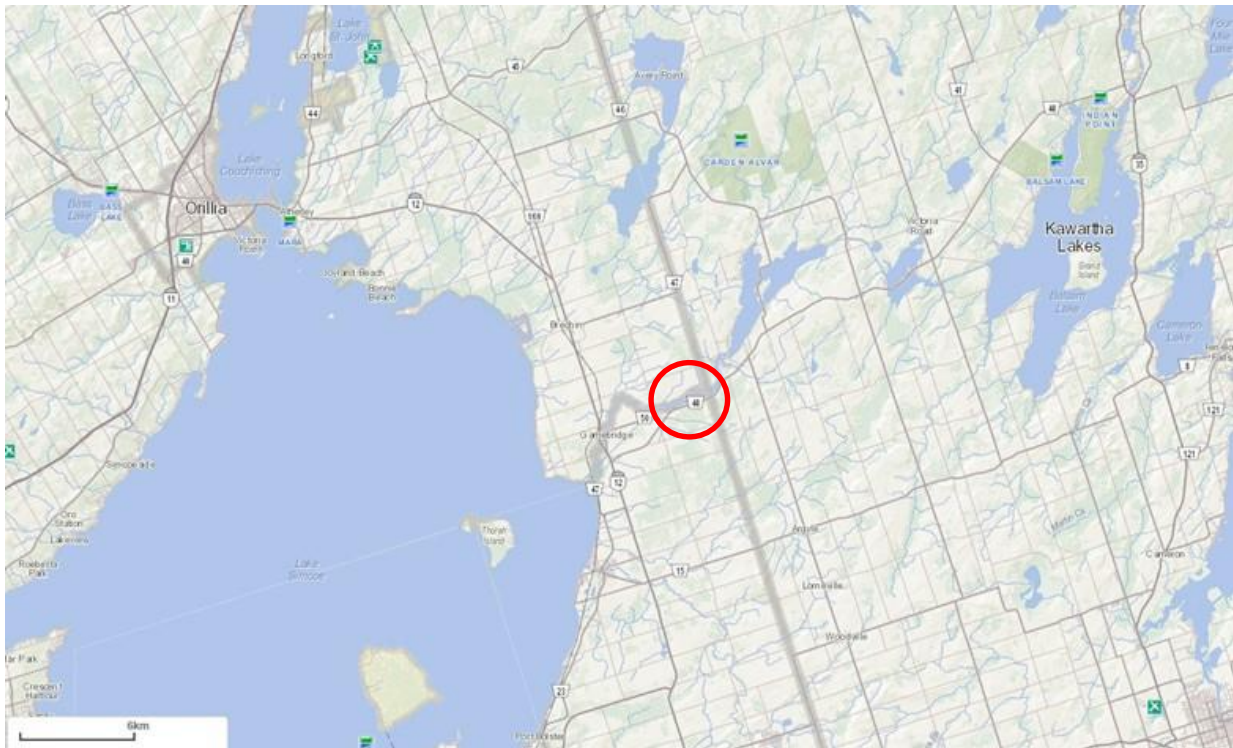


Figure 1. General location of Dam at 38



Figure 2. Google Earth Overview of Dam Location



Figure 3. Flyover photo of Dam at 38 (photo taken November 24 2010)



2. PROPONENT INFORMATION

Parks Canada, Trent-Severn Waterway National Historic Site
P.O. Box 567, 2155 Ashburnham Drive
Peterborough, ON K9J 6Z6

3. PROPOSED PROJECT DATES

Planned commencement: July 2018
Planned completion: March 2021

4. INTERNAL PROJECT FILE # EA: TSW-2018-007 (I)

5. PROJECT DESCRIPTION

The existing dam at Lock 38 has a total length of 75 m and height of 8.1 m retaining a reservoir depth of approximately 7 m. The stoplog sluices are operated with a set of two manually operated crab winches. The dam has two 7.6 m sluices with stop logs and two 6.1 m wide overflow weirs on the north side and one 6.1 m wide overflow weir on the south side. At the south end of south overflow weir and north end of the north overflow weir is a 20.4 m wide and 11.9 m wide concrete bulkhead, respectively. The south bulkhead is tied into the river bank and the north bulkhead is tied to the lock wall through the earth embankment between the dam and the lock.

In 2012, as part of a review by Parks Canada, the current dam condition was identified as poor. Shortly thereafter, a Dam Safety Review (DSR) was conducted in April 2015 with recommendations to address deficiencies as they relate to the Parks Canada Directive for Dam Safety. The DSR report noted that the required discharge capacity is 229 m³/s, while the current discharge capacity with the required freeboard of the dam is only slightly less at 214 m³/s.

Major concerns with the prolonged use of the dam under the existing state were identified:

- Aging equipment;
- Ongoing deterioration of the concrete abutments, spillways, sluiceways and sills;
- Public and operator safety risks associated with access to and across the dam; and
- Structural stability requirements are not met under current Canadian Dam Association (CDA) guidelines.

The project that is the subject of this Environmental Impact Assessment (EIA) is a replacement of the dam to extend the service life and rectify deficiencies identified in the DSR within Cultural Resource Management (CRM) constraints. The project is the construction of a new concrete dam, new stop logs, refurbished machinery, new decks, operator safety features, fencing for public safety, shoreline stabilization and protection, landscape and embankment works, commissioning and site restoration. This work also involves providing temporary installations that facilitate the construction effort, including coffer dams, access road to the work area and staging areas, the salvage of historical operational features and demobilization.

To enable construction to proceed, a major component of the work will be de-watering of the site. This de-watering will be accomplished through the temporary installation of upstream and downstream cofferdams to isolate the work area from the Talbot River. When the work area is de-watered, demolition will commence and the structure restored close to its original configuration.

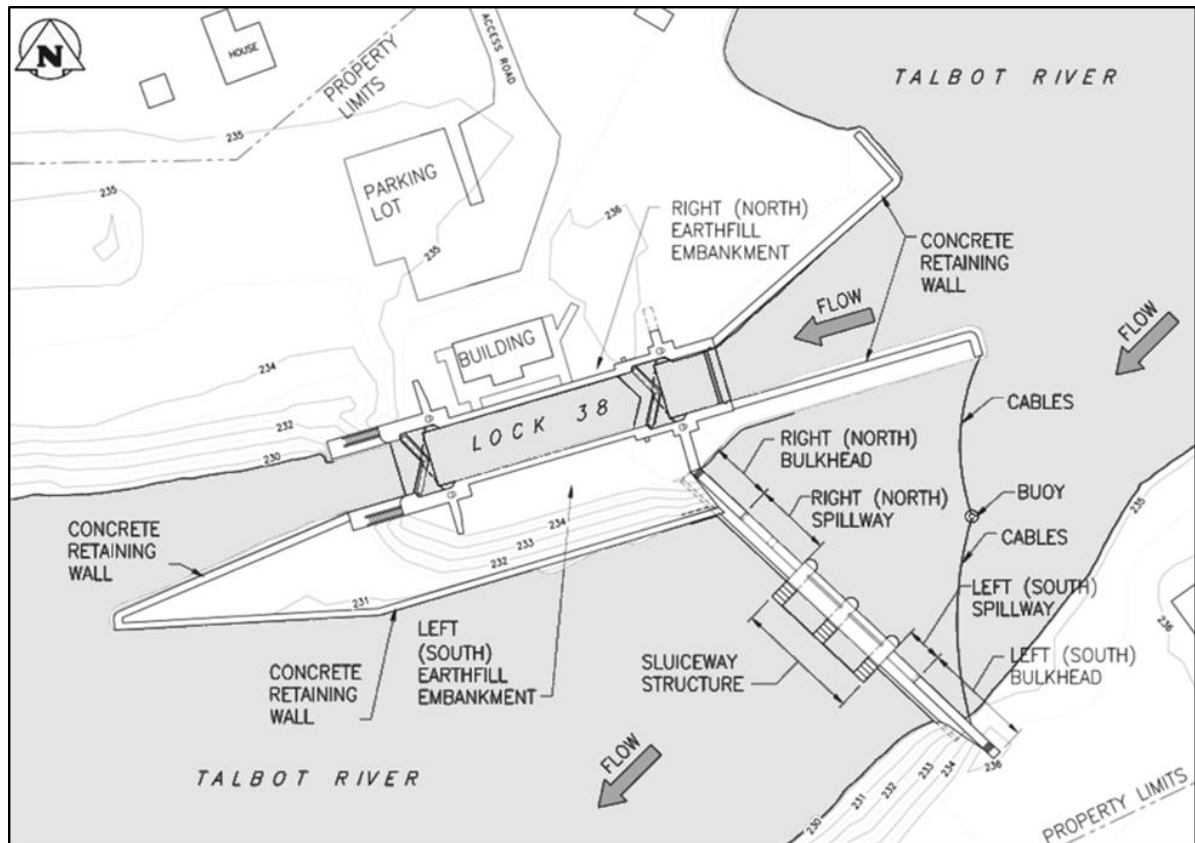


Figure 4 Diagram of site layout and features

A two-phase construction will occur. This method consists of initially isolating half of the dam from either the north or south embankment with cofferdams, building that half of the structure and then relocating the cofferdams to the other half of the dam to replace the second half. During each phase of work, the adjacent sluiceway would be used to pass operational flows and flood condition.

Physical Works and Activities:

- 1) Site preparation/access activities - mobilization, land clearing: laydown area, access to riparian zones immediately upstream and downstream of the dam, site trailers;
- 2) Installation of turbidity curtains;
- 3) Construct upstream and downstream cofferdams on one side; de-watering, some excavation and preparation of the bedrock surface, removal of all overburden and loose rock material; pumping water from areas within;
- 4) Demolition – one side of dam within the coffer dam area;
- 5) Construction of one side of dam and spillway within the de-watered coffer dam area; concrete piers and deck will be formed and poured on site;
- 6) Remove phase 1 coffer dam and construct phase 2 coffer dam on other side; one sluice of the new dam will be commissioned;
- 7) Demolition – 2nd side of dam will be demolished and removed in the dry with the new sluice in operation;



- 8) Construction of second sluice and spillway;
- 9) Cofferdam removal, second sluice commissioned;
- 10) Site restoration, removal of all temporary facilities, site clean-up and restoration activities.

The proposed project staging drawings are included in Attachment to this BIA.

The current dam has a total length of approximately 75m. The width varies along the structure - widest at the sluiceways/piers (9.5m) and narrower along the spillways and bulkheads (3.5m) - for a footprint of roughly 460m². The option selected to enhance stability the new dam is to add extra dam concrete mass (extra width) upstream. The addition of the extra concrete mass would result in a new dam footprint of 730m²; an increase in footprint of 270m² in the upstream area.

The coffer dam design is a supported steel sheet pile design in order to minimize the temporary coffer dam footprint. The north side construction coffer dam area will be slightly larger (60-65% of the total coffer dam area) as the spillway/bulkhead section is longer. A section of coffer dam would be installed after July 15 (2018) and in place until the following summer, when it is removed after July 15 (2019) and the second stage constructed. The second coffer dam removed after July 15 the following year (2020). The stage 1 upstream dewatered area is 620m² and the downstream area is 800m². Stage 2 upstream dewatered area is 510m² and downstream area is 590m². The total coffer dam and dewatered area in year 1 is 1420m². In year 2 the area is 1100m². The total expected project in water footprint is 2520m².

Associated project work (e.g., paving, vegetation removal, excavation, etc.)

- Clearing for work areas/access road/temporary facilities
- Surface water control
- Waste management
- Topsoil and excavated material storage
- Hazardous materials management
- Fueling/fuel storage
- Equipment operation/maintenance/storage
- Equipment cleaning and concrete washout

A complete list of equipment and materials is to be submitted with the Contractor's Environmental Management Plan.



6. VALUED COMPONENTS POTENTIALLY AFFECTED

Fish & fish habitat

Upstream

The area upstream from the dam to the concrete lock approach wall is 58m long and 48 to 71m wide, with a mean depth of 3m and a maximum depth of 7m. It is characterized by a lake-type habitat of impounded water above the dam. Substrate is dominated by a cobble silt/aquatic vegetation substrate that offers some cover for fish. Other cover features such as woody debris, aquatic vegetation and overhanging banks provide additional cover. The riparian area is narrow, open, consisting of trees/open areas and provides marginal streamside habitat. Substrate/cover conditions are considered marginal, representing 15-30% suitable habitat with moderate sediment embeddedness/deposition. The pool habitat is predominantly deep with some shallow areas and is subjected to slow velocity conditions. The channel has been altered for many years and is generally straight, with few riffle features and aquatic vegetation is sparse. Deposits of finer sediments occur at the areas where the dam walls intersect the shoreline.

In addition to Walleye, the upstream hosts White Sucker (*Castostomus commersonii*), Muskellunge (*Esox masquinongy*), Common Carp (*Cyprinus carpio*), Smallmouth Bass (*Micropterus dolomieu*), Pumpkinseed (*Lepomis gibbosus*), Bluegill (*Lepomis macrochirus*), Logperch (*Percina caprodes*), Rock Bass (*Ambloplites rupestris*) and Yellow Perch (*Perca flavescens*). Upstream of the dam on the southern shore of Lock 38, additional fish species observed include Brown Bullhead (*Ameiurus nebulosus*) and Black Crappie (*Pomoxis nigromaculatus*).



Figure 5. Upstream of Dam 38

A pre-construction survey was conducted on May 31 2018 in the reported typical spawning period of late May to July. The north side of the impounded area is a slanted stacked stone that offers little in the way of spawning habitat. The south side was surveyed with use of a remote underwater vehicle (ROV) to determine fish presence, nest presence and the nature of the substrate at typical spawning depths of 1-3m. On this date the water temperature at this depth range already averaged 22°C. The substrate profile from 5-10m from the dam wall is rip rap



boulder and cobble material from surface to 2-2.5m and the bottom sand and silt substrate with scattered submerged aquatic vegetation. Smallmouth Bass, Yellow Perch and various unidentified sunfish were observed there. No nests were observed and fish behaviour and the mixing of species did not indicate expected spawning behaviour such as defending or nest guarding. It is unknown if the survey was too early, too late (as indicated by the temperature), or there is simply lack of suitable substrate available for nesting.

Downstream

The dam represents a barrier to upstream migration of fish residing between this dam and the Talbot Dam downstream. Exceptions are fish that manage to move through the locks during operation and those that move down or that may be swept over the dam. The reach/run downstream of Dam at 38 to the lower Lock approach is 117m long and 66 to 76m wide, with a mean depth of 3.0m and is dominated by a boulder/cobble substrate. There is a deep area scoured by the tailrace immediately below the dam sluices. The water becomes shallower and velocity slows considerably about 25m from the dam. Substrate remains boulder/cobble with areas of cobble/gravel along the lock approach wall.



Figure 6. Downstream of Dam 38



Figure 7. Diagram of site depicting substrates/velocities and depths as relating to fish habitat (Arcadis 2017)

Overall, fish habitat is considered marginal to suboptimal for supporting all life stages for most warmwater/coolwater fish species. Walleye are potentially using the rock rubble shoreline shore areas and a cobble/gravel shoal located downstream of the dam (Figure 8) as spawning habitat. It is uncertain if successful Walleye spawning occurs downstream of the dam, although they have been observed there in April flashlight surveys in low numbers (SLR Env. 2017; Riverstone Env. 2016). There are no known spawning sites upstream of the Dam, although it is suspected that rock bass, smallmouth bass and other warmwater species may use quieter waters towards shore and away from the dam sluices/spillways.



Figure 8 Cobble/gravel shoal located downstream of the dam and outside of the project site (photo taken January 2017 at winter, low water levels)



Water Quality

A major focus during construction will be maintaining water quality in areas upstream and particularly, downstream of the project site. As part of a fish habitat survey, water quality parameters were measured upstream at Dam 38 on August 22, 2016 to assess water quality. Temperature was 24.2°C, pH 8.25, turbidity 0.96 NTU and dissolved oxygen 8.15mg/L. As reference, ideal water quality parameters are: pH 6.5-9.0 and dissolved oxygen >5mg/L. For turbidity there is no guideline however <5 NTU would be considered clear water. Water quality in the Talbot River is considered good and all parameters within ranges that support aquatic life.

There are six residents located on the south shore below the dam, while there are three more situated on the north bank west of the highway bridge. Therefore, there are potential domestic water intakes present. Consumption of potable water sources (surface and/or ground water) and potential impacts of the Project on these sources will be investigated for properties adjacent the Project site. If any changes to water quality are predicted, the potential impacts of these changes will be monitored and addressed if required.

Aquatic Invasive Species

According to the Ontario *Early Detection & Distribution Mapping System*, there are two aquatic invasive species reported for Lake Simcoe: banded mysterysnail- (*Viviparus georgianus*) and round goby (*Neogobius melanostomus*). There is no information for the relevant section of the Talbot River between Dam 38 and Dam 37 upstream and between it and the Talbot Dam downstream.

Soil & Landforms

The area and project site is underlain by Paleozoic limestone belonging to the middle Ordovician Simcoe Group (<http://www.mndm.gov.on.ca>). This bedrock consists of mostly limestone, dolostone, shale, arkose and sandstone. Surface geology (<http://www.mndm.gov.on.ca>) reveals that the area is mostly overlain by coarse-textured deposits of sand, gravel, and minor silt and clay. Previous geotechnical investigations in the Talbot River at Dam 37 upstream identified that native soils are of glacial origin and consisted of sandy silt till overlying bedrock. Native clayey silt to silty clay soil overlying sandy silt till was also encountered.

Flora

Riparian vegetation on the south bank immediately adjacent the dam consists almost entirely of White Cedar (*Thuja occidentalis*) with some Trembling Aspen (*Populus tremuloides*), White Birch (*Betula papyrifera*) and one large White Pine (*Pinus strobus*). The north side is grassed with cedar saplings, dogwood (*Osier* sp.) willow (*Salix* sp.) and juniper (*Juniperus* sp.) shrubs. A large White Spruce (*Picea glauca*) tree is growing between the lock and the dam.

The south side property adjacent to Dam 38 has a low-density tree cover and a sparse to moderate shrub and herbaceous cover on well-drained soil. It hosts mature Hemlock (*Tsuga Canadensis*), White Pine (*Pinus strobus*), Sugar Maple (*Acer saccharum*) and Yellow Birch (*Betula alleghaniensis*) with a mix of young to mature White Cedar (*Thuja occidentalis*), particularly close to the shore. One immature Beech tree (*Fagus grandifolia*) was observed. Two young Butternut (*Juglans cinerea*) grow on the upstream bank. The stand is fairly open, although the canopy is closed, with understory of wood ferns (*Dryopteris* sp. and *Onoclea* sp.), Clintonia (*Clintonia borealis*) Lily-of-the-Valley (*Convallaria majalis*) and cedar and sugar maple saplings. (See additional photos in **Appendix 2**).

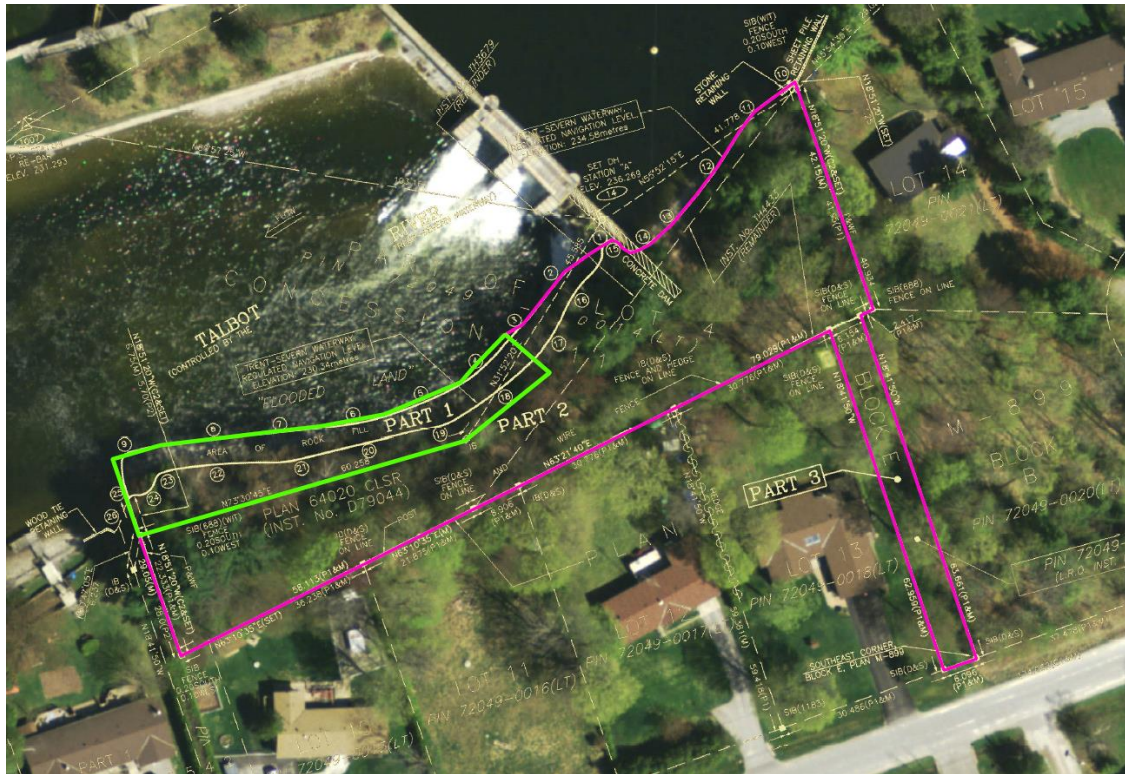


Figure 8. Google Earth image depicting vegetation to be cleared (purple) and that to be protected (green)



Figure 9. Photograph of property on the south shore of the dam. Photo was taken in a northwest direction from the property line looking towards the dam upstream. Picture date May 18 2017



Birds

The Talbot Dams fall within the 10 x 10km grid square 17PK53 for the Atlas of Breeding Birds of Ontario (<http://www.birdsontario.org/atlas/index.jsp>). The list of birds for this square contains 123 species. Because vegetation will be disturbed, there is potential to affect breeding birds. For Environment Canada nesting zone C2, within which the project area lies, there are 84 species known to nest in open habitats and 84 species known to nest in forest habitats. The nesting period may be as early as April 1 and as late as August 31, depending on species. For forest birds, which have the greatest potential to be disturbed, the primary nesting period (60-100% of species) falls between May 22 and July 21. During an early, pre-leaf out spring survey of the property, no remnant nests from the previous year were observed.

SLR Consulting was on site conducting breeding bird surveys on June 21 and July 7, 2017 with additional observations on June 9, June 28, 2017. Common species were recorded there, but no rare or endangered birds.

Species at Risk

Species at Risk (SAR) and any activities within their critical habitat are regulated by the federal *Species at Risk Act* (SARA), providing protection to all SAR listed under Schedule 1 of the Act. The dam and the surrounding property is under Parks Canada jurisdiction, therefore SARA applies. To assess the potential impact on SAR, biologists from SLR Consulting were employed to determine the presence of suitable SAR habitat and to prepare a list of SAR (with emphasis on the Eastern Whip-poor-will), bats and/or breeding birds potentially occurring on the subject site or in immediately adjacent areas. This work included the following: a desktop review to identify and characterize probable SAR species, including breeding birds and bats and their relevant habitat requirements; a preliminary Ecological Land Classification (ELC) analysis from available maps and aerial photography; determination of whether natural habitat suitable for SAR, breeding birds and bats exists on or immediately adjacent to the site; and for existing suitable natural habitat, prepare a list of SAR (listed under Schedule 1 of SARA and under Schedule 1 of the Ontario ESA) whose habitat preferences match the current biophysical conditions of the subject site.

SAR that may be found in the study area, either federally or provincially listed, have been identified using the Natural Heritage Information Centre (NHIC) database, the Atlas of Breeding Birds of Ontario and the Ontario Reptile and Amphibian Atlas. These species are listed in Table 1 along with basic habitat characteristics for each species and an assessment given as to the likelihood of that species using habitat within the area. For species at risk that do not have critical habitat described in a recovery strategy, mitigation measures will be employed to ensure that individuals are protected.

Critical Habitat for Eastern Whip-poor-will

The project lies within a zone of identified proposed Critical Habitat for Eastern Whip-poor-will (*Caprimulgus vociferus*), listed as 'Threatened' under SARA Schedule 1. In forested landscapes, the Whip-poor-will often takes advantage of the open areas created by low-intensity agriculture or forest management for foraging, while relying on adjacent forests for nesting. Nesting habitats of the species include most types of forest at early stages of succession or edges of forests with a dense tree cover but showing a similar structure at the ground level, savannahs, old burns, as well as sparse conifer plantations. All these habitats exhibit characteristics such as well-drained soils, moderate tree cover and moderate to sparse shrub and herbaceous cover. Foraging habitats include prairies, wetlands with shrubs, regenerating clearcuts as well as agricultural fields and other habitats with low tree cover.



The south side property, while small, may offer habitat suitable for both nesting and foraging – it has moderate tree cover and a sparse to moderate shrub and herbaceous cover as well as well-drained soil. Thus it may meet the biophysical attributes described in the proposed *Recovery Strategy for the Eastern Whip-poor-will (Antrostomus vociferus) in Canada*. Potential foraging habitats – wetlands, agricultural fields and other wooded properties, exist adjacent the subject site. There are SARA prohibitions under S.32 – harm to individuals, S.33 – cannot damage or destroy residences and under S.58 – cannot destroy any part of critical habitat. While the critical habitat is not yet formally protected under SARA, Parks Canada includes the assessment of this loss of habitat as harm to individual under SARA. Because there may be residual impact to Whip-poor-will that possibly contravenes a SARA prohibition, a SARA compliant Basic Impact Analysis is required.



Eastern Whip-poor-will (*Caprimulgus vociferus*)

A bird listening survey was conducted in spring 2017 by SLR Consulting (under contract to PCA). As Whip-poor-will have a very distinct and relatively loud call they can be heard across relatively great distances (>500m). For this reason, setting up precise point-count locations at each site for listening and detection was not required, due to the relatively small size of the property at Dam 38. The survey was achieved by visiting the site after confirmation of calling at a reference site that same evening. If birds were detected near or at the project site, the position would be recorded using GPS and the call location refined through auditory triangulation, together with habitat interpretation of the sites and their immediately adjacent lands.

The survey period was initially selected to coincide with the full moon in June (1-9), considered the optimal mid-season breeding period. The site was visited at least twice during the period. Surveys were conducted with favourable weather conditions as weather, and specifically the evening air temperature, greatly influence the bird's activity. An initial listening survey was conducted in early May one evening after abundant Whip-poor-will calling was heard at a reference site (one known to have Whip-poor-wills each year). During that evening, no Whip-poor-will calling was noted at Dam 38. A follow up survey for the species on June 9th also did not detect the species at the dam, lock or surrounding property. A repeat of the listening survey was undertaken by SLR on the night of May 27, 2018, with once more no Whip-poor-will detected.



Species at Risk Bats

The south side property has been identified as habitat suitable for both roosting and foraging for two bat species: Little Brown Bat (*Myotis lucifugus*) and Northern Myotis (*Myotis septentrionalis*). These bats would hunt for insects in the area and potentially roost under loose bark or in tree cavities, if available. Habitat protection of summer roosting and maternity colonies has recently been recognized as a requirement by Environment Canada and OMNRF. This is due to the listing of these species as Endangered attributed to population declines as a result of a fungal disease: white-nose syndrome (WNS), which has accounted for at least 90% mortality rates (COSEWIC 2013). Little Brown Bats are especially susceptible to this fungus. Winter hibernation habitats do not occur on site however, summer roost sites are possibly present under the loose bark of dead trees or the hollows of trees. The Northern Myotis and Tri-coloured bats primarily prefer forested, natural cavities or loose leaves for roosting as opposed to constructed features preferred by the Little Brown Myotis. Importantly, all bats will use forested habitats beneath the canopy and will forage on the forest floor. Proximity to water is also an important habitat requirement (Kunz and Fenton 2003).

The wooded area on the south side adjacent to the dam was identified as having significant potential roost area and use by bats was confirmed. During a one evening listening survey, Little Myotis and Northern Myotis were recorded at the site. Several bats observed emerging from trees within the community. Field bat detection equipment indicated these were Northern Myotis. Maternity roosting was not confirmed at the time; however potential suitable habitat was identified. All three species with normally have a single pup, born after a 44-60 day gestation period, usually in late June or early July. Females form maternity colonies to birth and raise the pups. Pups are weaned at approximately 1 month.



Little Brown Bat (*Myotis lucifugus*)



Northern Myotis (*Myotis septentrionalis*)



Butternut



Two Butternut (*Juglans cinerea*) saplings were discovered on site by SLR Consulting and confirmed by Parks Canada. These trees grow along the water adjacent the dam on the upstream side (orange flagging tape in the photo above). A nearby adult specimen on adjacent private property was also reported by residents.

Table 1. Federally and Provincially-Ranked Species whose range encompasses the Dam at Lock 38 and their potential to be found there.

Common Name	Scientific Name	SARA Status	ESA Status	Habitat Potential on Project Site	Preferred Habitat	Likelihood to be Found on Project Site
Birds						
Eastern Whip-poor-will	<i>Caprimulgus vociferus</i>	Threatened	Threatened	Uncertain	Semi-open forests or patchy forests with clearings, such as barrens or forests that are regenerating following major disturbances	Not detected in 2017
Black Tern	<i>Chlidonias niger</i>	No Status	Special Concern	No	Wet areas with dense vegetation such as freshwater marshes/shallow cattail marshes	No
Cerulean Warbler	<i>Dendroica cerulea</i>	Special Concern	Threatened	Yes	Older, second-growth deciduous forests	Low
Golden-winged Warbler	<i>Vermivora chrysoptera</i>	Threatened	Special Concern	No	Regeneration areas (old fields, hydro right-of-ways) surrounded by mature forest	No
Barn Swallow	<i>Hirundo rustica</i>	No Status	Threatened	No	Nest almost exclusively on man-made structures (bridges, culverts, barns); these swallows nest on dam structures with ledges under the deck.	Low – have not been observed at the dam
Peregrine falcon	<i>Falco peregrinus</i>	Special Concern	Special Concern	No	Cliff ledges or crevices, preferably 50 to 200 m in height; sometimes on the ledges of tall buildings or bridges, always near good foraging areas.	No
Loggerhead Shrike	<i>Lanius ludovicianus</i>	Endangered	Endangered	No	Open areas with some trees and shrubs. Uses pasture areas where the grass is short; breeding has been confirmed in the Talbot area.	No
Louisiana Waterthrush	<i>Seiurus motacilla</i>	Special Concern	Special Concern	No	Strong preference for nesting and wintering along relatively pristine headwater streams and wetlands situated in large tracts of mature forest.	No
Bobolink	<i>Dolichonyx oryzivorus</i>	No Status	Threatened	No	Bobolink nest in tall grass prairie and other open meadows, including hayfields.	No
Eastern Meadowlark	<i>Sturnella magna</i>	No Status	Threatened	No	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.	No

Common Name	Scientific Name	SARA Status	ESA Status	Habitat Potential on Project Site	Preferred Habitat	Likelihood to be Found on Project Site
Red-headed Woodpecker	<i>Melanerpes erythrocephalus</i>	Threatened	Special Concern	Yes	variety of habitats, including oak and beech forests, grasslands, forest edges, orchards, pastures, riparian forests, roadsides, urban parks, golf courses, cemeteries, beaver ponds and burns.	Possible
Henslow's Sparrow	<i>Ammodramus henslowii</i>	Endangered	Endangered	No	It nests in abandoned farm fields, pastures, and wet meadows. It tends to avoid fields that have been grazed or are crowded with trees and shrubs. Open fields, prefers undisturbed areas. Has been recorded in the area.	No
Grasshopper sparrow						
Yellow-breasted Chat	<i>Icteria virens</i>	Special Concern	Endangered	No	Dense thickets around wood edges, riparian areas, and in overgrown clearings.	No
Eastern Woodpewee	<i>Contopus virens</i>	Special Concern	Special Concern	Yes	Mid-canopy layer of forest clearings and edges of deciduous and mixed forests. Most abundant in forest stands of intermediate age and in mature stands with little understory vegetation.	Potential
Mammals						
Little Brown Myotis	<i>Myotis lucifugus</i>	Endangered	Endangered	Yes	Hibernate from October or November to March or April, most often in caves or abandoned mines that are humid and remain above freezing. In summer they forage at night and roost in trees and buildings during the day.	Potentially for foraging/roosting on the south side
Northern Myotis	<i>Myotis septentrionalis</i>	Endangered	Endangered	Yes	Similar habitat preferences to Little Brown Myotis - they bats hibernate from October or November to March or April, most often in caves or abandoned mines. Northern Myotis often roost under loose bark or in tree cavities.	Potentially for foraging/roosting on the south side

Common Name	Scientific Name	SARA Status	ESA Status	Habitat Potential on Project Site	Preferred Habitat	Likelihood to be Found on Project Site
Tri-coloured Bat	<i>Perimyotis subflavus</i>	Endangered	Endangered	Yes	Often found hibernating in same locations as Little Brown Myotis and Northern Myotis – abandoned mines and caves. Relatively rare species in Canada.	Low
Reptiles						
Eastern Musk Turtle	<i>Sternotherus odoratus</i>	Threatened	Special Concern	No	Eastern Musk Turtle require shallow water with little or no current, and soft earth to bury into when they hibernate. Nesting habitat is variable, but it must be close to the water and exposed to direct sunlight.	No
Blanding's Turtle	<i>Emydoidea blandingii</i>	Threatened	Threatened	Yes	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.	Low
Snapping Turtle	<i>Chelydra serpentina</i>	Special Concern	Special Concern	Yes	Usually found in large bodies of water, but will sometimes inhabit small ponds. Rarely leave water except to nest and migrate to overwintering habitat.	Potentially
Northern Map Turtle	<i>Graptemys geographica</i>	Special Concern	Special Concern	Yes	Inhabits both lakes and rivers, showing a preference for slow moving currents, muddy bottoms and abundant aquatic vegetation. Potentially present where the river is slow moving such as canal and impoundments.	Low
Eastern Milksnake	<i>Lampropeltis triangulum triangulum</i>	Special Concern	Special Concern	Yes	Various habitats including rural areas that have suitable locations for basking and egg-laying -prairie, pastures and hayfields, rocky hillsides and a wide variety of forest types. Often in close proximity to water	Potentially
Eastern Ribbonsnake	<i>Thamnophis sauritus</i>	Special Concern	Special Concern	Yes	Along the edges of shallow ponds, streams, marshes, swamps, or bogs bordered by dense vegetation that provides cover.	Low

[illegible]



Air/Noise

The project site is located within a rural residential setting bordered primarily by seasonal and year-round cottages/homes on both sides. There is no industrial land use in close proximity. Air quality in the area is assumed to be good based on the large percentage of natural land cover and limited sources of air pollution.

Cultural Resources Management

The Dam is an important heritage component of the Waterway. This Dam, along with the Talbot River Dam, as well as the canal cut and surrounding landscape are cultural resources of national historic significance located within the 1900-1907 Lake Simcoe – Balsam Lake section of the Waterway. They are valued for their role in in-land water transportation, water management and flood control and the construction and evolutionary development of the Trent-Severn Waterway, as well as their retention of integrity from the early 20th century. This is the only section of the Waterway that has been designated by the Government of Canada, following a recommendation by the Historic Sites and Monuments Board of Canada, as being of national historic and architectural significance. The Dam itself is a 'level one cultural resource' a ranking that makes it one of the most highly valued cultural assets in Parks Canada's inventory.

Key elements contributing to the heritage value of the dam include its:

- Location on the Trent-Severn Waterway;
- Continued functional use and manual mode of operation;
- Form, dimensions, design and functional qualities and materials;
- Overall contribution to the cultural landscape of the Talbot River.

Archeology

An Archaeological Impact Assessment was completed by Parks Canada to determine the existing conditions in the proposed work areas. The recommendations from the assessment are included in the Cultural Resource Impact Assessment for this project.

If significant archeological resources (i.e., Indigenous artifacts, structural remains and/or high artifact concentrations) are encountered during construction, work will cease and Parks Canada contacted for advice and assessment of significance, which will in turn determine what will be required to further mitigate impacts.



7. EFFECTS ANALYSIS

Fish and Fish Habitat/Water Quality

Effects are assessed from three perspectives: first, the potential impact of the construction activity itself on fish. Second, the impact of the footprint of the dam, the coffer dam and de-watered areas on fish habitat. Third, the effect of the staged construction on water flows at the site.

Impact of the construction activity

Effects to fish may occur through the introduction and suspension of sediment to the water column when installing and removing coffer dams and turbidity curtains, from pumping/de-watering activities and from erosion and run-off from land based activities. However, installation of coffer dams will be conducted within the proper timing window (after July 15 and before March 15) to avoid the most sensitive times – i.e. fish spawning, hatching and rearing. Also, the coffer dam is being engineered to minimize the use of loose granular materials. This will reduce sediment inputs into the waterway.

Key mitigation:

- An Erosion and Sediment Control Plan, as part of the Environmental Management Plan, shall be submitted to the Departmental Representative and accepted by Parks Canada;
- Erosion and sediment control measures shall be implemented prior to work and maintained during all work phases; if erosion and sediment control measures are not functioning properly, no further work shall occur until the problem is addressed to the satisfaction of Parks Canada;
- 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;
- All work is to be completed in the dry;
- Installation and removal of coffer dams conducted within the proper in water timing window (after July 15 and before March 15);
- For coffer dams, an engineered design rather than loose aggregate rock berm-style is preferred, to minimize in-water disturbance while they are placed and particularly, while they are removed;
- Cofferd dam de-watering systems and sediment treatment areas must be designed to have sufficient capacity to remove fine sediments from water prior to being released; flocculants for settling fines may be necessary due to the nature of particulates from limestone based rock and clay;
- For de-watering, fish screens must comply with *DFO Freshwater Intake End-of-Pipe Fish Screen Guidelines* when pumping in fish-bearing water to prevent impingement or entrainment of fish;
- Any fish found within the dewatered coffer dam areas will be removed and placed downstream if found in the downstream coffer dam area and upstream if found upstream;
- Monitoring water quality for unacceptable suspended sediment levels during in water activities.



Permanent Dam Footprint

The current dam has a total length of approximately 75m. The width varies along the structure - widest at the sluiceways/piers (9.5m) and narrower along the spillways and bulkheads (3.5m) - for a footprint of roughly 460m². The option selected to enhance stability of the new dam is to add extra concrete mass (extra width) upstream. The addition of extra mass results in a dam footprint of 730m²; an increase of 270m² in the upstream area.

In order to offset the loss of habitat for potential near shore spawning species, littoral zones in the upstream shorelines will be enhanced by improving substrates. Boulder, cobble and gravel substrates will be placed along the shoreline and littoral zones of these areas and extended further down the embankments, to improve areas that previously did not provide these substrates. These improvements will occur in both the upstream areas of Dam at 38, which are presently marginal spawning habitats, and along the banks of the Talbot earth dam in the impounded areas upstream of the Talbot dam, where substrates are currently considered poor for spawning.

Additionally, as nest sites are usually associated with some form of cover like fallen trees, boulders and dense vegetation, large woody debris will be placed and anchored to the shoreline north and south of the Talbot Dam. Large tree root wads have been selected and set aside for this purpose. Root wads will be placed in the banks to protect the slope toe. Root wads offer habitat for insects and fish, as they provide overhead cover, resting areas, and shelter. This enhanced habitat improves fish spawning and rearing habitats. This will provide habitat features that previously did not exist in the area.

By providing improved substrates along with woody shoreline features, it is anticipated that habitat that is currently considered poor to sub-optimal for spawning will provide more opportunities for Bass and other nest building fish. These measure will be put into place during the construction of the dam. Off-setting will enable Parks Canada to mitigate adverse effects on fish.

Temporary Construction Footprint

While placing temporary coffer dams and de-watering activities may directly impact species if they are present within the project site, fish are seldom present immediately upstream or downstream of open dam sluices/spillways. This has been demonstrated on similar TSW dam construction projects, where the live-capture of fish potentially trapped within coffer dams downstream has yielded no results. With respect to river spawners favouring flow, while substrates and water depths meet the requirements for Walleye and Sucker, the spring plunge pool/tailrace effects – high turbulence and deeper depths - make for an environment less suitable immediately below the dam. Velocities in spring and early summer are usually >2 m/s - above that preferred by most species. White Sucker Spawning usually occurs in riffle areas with velocities ranging from 0.3 to 0.9m/s and depths of less than 60cm. However, while they require some amount of current, turbulent areas are generally not preferred. Walleye preferred range is 0.5-1.0 m/s with depths from 0.5 to 2.0 m. For this reason, suitable habitat for Walleye and Sucker occurs farther downstream of the dam, but not in the vicinity of the dam itself. Because spawning activity is most likely to occur away from the dam, and farther downstream, it is unlikely that the construction activities, particularly the installation of temporary coffer dams would significantly impact important habitat for these species. Other species, such as bass, may utilize quieter waters along the water's edge upstream, but again construction activity is scheduled to start place in mid-summer after the spawning period. Cofferdam areas will be limited to the smallest amount of area necessary for construction. The primary mitigation for the cofferdam impact will be the removal of the coffer dams and restoration of substrates within these areas.



The coffer dam design is a supported steel sheet pile design in order to minimize the temporary coffer dam footprint. A section of coffer dam would be installed after July 15 (2018) and in place until the following summer, when it is removed after July 15 (2019) and the second stage constructed. The second coffer dam removed after July 15 the following year (2020). The stage 1 upstream dewatered area is 960m² and the downstream area is 1320m². Stage 2 upstream dewatered area is 640m² and downstream area is 880m². Thus, the maximum total coffer dam and dewatered area in year 1 is 2280m². In year 2 the area is 1520m². The maximum total project in water footprint is 3800m². (Note: the actual impacted areas may be less than these values, but they will not be more).

Each year, an area of upstream littoral zone habitat will be unavailable to spawning Smallmouth and Rock Bass on the south side in 2018 and the north side in 2019. The area of this unavailable littoral zone habitat is estimated as 40% of the upstream coffer dam area (960m²), or 384m² on one side in year 1 and 256m² (40% of 640m²) on the other side in year 2. This would cover an in water area inside the upstream coffer dam, from shoreline to a depth of approximately 3m. It is assumed that 40% is a conservative estimate, as it is expected that littoral zone use by Bass is presently not uniform over the area and certainly not 100%.

In order to offset the potential temporary loss of habitat for the two Bass *spp.*, the spawning littoral zones in the upstream shorelines will be enhanced by improving substrates. Boulder, Cobble and Gravel substrates placed along the shoreline and littoral zones of these areas and extended further down the canal embankments, to improve areas that previously did not provide these substrates. The primary habitat that will be offset is the loss or displacement of nests while the habitat at Dam 38 is unavailable in spring of 2019 and 2020 and the permanent loss due to the increased dam footprint. By providing improved substrates for Bass *spp.*, it is anticipated that habitat that is currently considered poor to sub-optimal for spawning will provide more opportunities for them in the future.

Flows

While a single-phase methodology (complete upper and lower coffer dams and a diversion channel) would be the preferred alternative in terms of efficiency, concerns of negatively affecting potential downstream spring spawning necessitated a different method. Staged construction of the coffer dams will allow for continued downstream flow each spring. The flow will be from one sluice as opposed to 2, as a result in the proposed coffer dam configuration. However, the change is not suspected to be one that would have a negative impact on fish below the dam. The operation of the dams along the Talbot River section of the Trent-Severn Waterway has historically been a single spillway operation. This holds true from the Victoria Road dam upstream to the Talbot Dam downstream. Following a significant flood in 2008, Parks Canada made the decision to operate both spillways on the dams at Lock 37, 38 and the Talbot Dam during winter and spring. This dual mode of operation allows the reaches to build and spill during large inflow events. Confining the river flow into a single spillway is simply replicating historic operations. Similarly, single spillway operation occurs frequently during standard dam operations when the river flow is confined into one spillway when filling the reaches.

Key mitigation:

- Dewatering, demolition and construction is staged such that water can continue to flow through the structure at all times during construction. No changes in flow or lake levels will occur as a result of the project.



Water Quality

Water quality can be reduced due to discharge of cement products, equipment leaks and accidental spills. The Canadian Council of Ministers of the Environment (CCME) *Water Quality Guidelines for the Protection of Aquatic Life* will form the baseline for water and streambed quality monitoring and assessment. Site managers will be required to maintain water pH 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. Aqueous substances with a pH \geq 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.

There are seasonal and year-round residents located on both shorelines around the dam. Therefore, there are potential domestic water intakes present. In the summer of 2017, PCA intends to:

- Identify private wells and surface water intakes in the potential affected area -upstream and downstream of the dam;
- Describe the physical characteristics of the private potable water supplies with raw water samples to be collected for chemical analysis;
- Undertake pre-construction monitoring of select properties identified during the baseline study that are deemed to be potentially most at risk during the dam reconstruction project;
- Develop a monitoring program to be implemented during construction activities.

In the event of a spill, Parks Canada and the Ontario Spill Action Centre (1-800-268-6060) will be notified; containment and remediation will be conducted in accordance with provincial regulatory requirements and to the satisfaction of Parks Canada.

Key mitigation:

- 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>).
- Cofferdam de-watering systems and sediment treatment areas must be designed to have sufficient capacity to remove fine sediments from water prior to being released; flocculants for settling fines may be necessary due to the nature of particulates from limestone based rock and clay.
- At the discharge point into the watercourse, i.e. the interface between the work site and the natural waterbody:
 - maximum increase of suspended sediment concentrations by more than 25 mg/L over background levels during any short-term exposure period (period of 24-h or less). For longer term exposure (chronic, > 24 h), average suspended sediment concentrations shall not be increased by more than 5 mg/L over background levels. If elevated turbidity beyond 25 mg/L from background levels is observed during in-water activity, Parks Canada will assess potential impact to the aquatic environment. Additional mitigation measures may be required.
 - maximum increase of 8 NTU from background levels for a short-term exposure (period of 24-h or less). Maximum increase of 2 NTU from background levels for a longer term exposures (>24 h period). If elevated turbidity beyond 8 NTU (event)/2 NTU (chronic condition) from background levels is observed during in-



water activity, Parks Canada will assess potential impact to the aquatic environment. Additional mitigation measures may be required.

- 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 \geq 12.5 is considered toxic and treated as a hazardous waste and must be removed from the site;
- If elevated turbidity is observed during in-water activity, Parks Canada will assess potential impact to the aquatic environment. Additional mitigation measures may be required;
- Follow the *Ontario Clean Equipment Protocol for Industry* - Inspecting and cleaning equipment for the purposes of aquatic invasive species prevention;
- Ontario Drinking Water Quality Guidelines cannot be exceeded (beyond parameters that currently exist) due to project activities.

Soil & landforms

Activities including the storage of materials, drilling, excavation, grading, backfilling, use of machinery, use of chemicals, set up of temporary facilities and vehicle traffic, all have the potential to negatively affect soils in the project area.

Erosion is the physical process that results in the removal or detachment of soil particles by the action of water or wind while sedimentation is the transport and deposition of soil particles.

As noted, the soils at the project site consist of clay-silt to silty-clay soil overlying sand/silt. This translates into a soil that, if eroded and transported into water, will result in much difficulty in containing and settling. Emphasis must be placed on erosion prevention foremost; sediment control will be a last measure.

Key mitigation:

- Environmental Protection plan to demarcate all construction sites and laydown areas;
- Plan and stage soil-exposing activities to minimize erosion potential;
- Proper and efficient use, monitoring and repair and adjustment of properly selected erosion control methods;
- Managing surface water and directing runoff away from exposed soil;
- Cofferdam de-watering systems and sediment treatment areas must be designed to have sufficient capacity to remove fine sediments from water prior to being released; flocculants for settling fines may be necessary due to the nature of particulates from limestone based rock and clay.

Flora

As with most dam repair/replacement projects, there is a need to remove riparian vegetation immediately upstream and downstream around the dam for construction. On the south side of the dam, vegetation must be removed to support construction site staging and access. Tree and shrub removal will take place along the immediate shorelines upstream and downstream of the dam for access and dam construction. A buffer zone will be left along the banks in areas farther away from the dam.



Key mitigation:

- Environmental Protection plan to demarcate all construction sites and laydown areas;
- Ontario Clean Equipment Protocol for Industry - Inspecting and cleaning equipment for the purposes of invasive species prevention;
- Local soil will be stockpiled and re-used as opposed to bringing in soil from other locales.

Disturbed areas of the staging area will be restored. As the area on the south side of the dam hosts hemlock, which will not naturally regenerate quickly post disturbance, this species will need to be planted as part of site restoration. Natural regeneration will follow. Adverse effects on native flora should be temporary. Native species will be planted to match existing species growing on the sites. Common milkweed will be actively restored.

Key mitigation:

Removal

- Vegetation clearing zones will be identified in the Environmental Management Plan and approved by Parks Canada; the EMP is to demarcate all construction sites and laydown areas; areas to be avoided will be delineated with flagging tape, and temporary protective fences or other suitable protection measures will be employed;
- Keeping work activities confined to planned areas and within previously disturbed areas;
- Riparian vegetation removal will be removed last and will be kept to a minimum;
- Vegetation removal will be phased to reflect construction;
- Local soil will be stockpiled and re-used as opposed to bringing in soil from other locales.

Restoration

- The ground will be stabilized at all disturbed areas;
- soil will be de-compacted after the project to enhance re-seeding/re-planting success;
- Placement of topsoil shall be undertaken to provide a suitable growing medium.
- The site will be restored/re-planted with species to resemble the existing condition as best as possible.

Birds

Migratory birds, their nests and eggs are protected under the *Migratory Birds Convention Act* (1994). Environment Canada recommends rescheduling activities to minimize risks to migratory birds and their habitats – no tree/brush clearing in the period of April 2 to August 30. However, nest surveys can be used in certain circumstances where nests are easily detectable, in order to meet regulatory requirements with respect to migratory birds, including SARA-listed species and other species of concern. Site clearing/commencement of construction is planned to occur outside of sensitive nesting times - April 1 to August 31 - and particularly outside of the primary nesting (61-100% of species) period between May 24th and July 22nd. However there is the potential that vegetation removal could occur in August. If this schedule change occurs, then the site will be inspected by a biologist prior to clearing, to identify any potential for nests.

The relative extent of vegetation removal is small, consisting of individual trees as opposed to any forested/shrub area and when compared to surrounding available forest habitat. It is utilized mainly by edge habitat species, disturbance and restoration of the site may not affect the overall composition of species that use this site. Effects on bird (and other wildlife) are expected to be



negligible. Construction activities (with the exception of site restoration) will be largely completed prior to the subsequent year nesting season.

Key mitigation:

- Site clearing/commencement of construction is planned to occur outside of sensitive nesting times - April 1 to August 31,
- If clearing must take place in the period April 1 to August 31, the site must be inspected by a biologist prior to clearing, to check for the presence of nests. If eggs are found, construction in the immediate area must be delayed until nesting has been completed.

Species at Risk

Reptiles/Amphibians

All work around water needs to consider the potential for turtle habitat at the project site (overwintering, nesting, thermoregulation and foraging) as well as their potential movement through the area. Snapping Turtles, which nest from late May to late June use sand and gravel banks along waterways, including artificial dam and railway embankments, road shoulders, fissures in rocky shorelines, sawdust heaps and freshly dug gravel/soil. Blanding's turtle nest the last week of May to the first week of July, with peak activity throughout June. They use open areas such as beaches, shorelines, meadows, rocky outcrops, and forest clearings; human-altered sites such as gardens, power line rights-of-way, fields, gravel roads, road shoulders and sand/gravel quarries.

It is reasonable to conclude that the area already provides suitable habitat for several species of turtle, regardless of whether their presence can be confirmed. It is further expected that soil excavation, stock piling of materials and other forms of landscape disturbance has the potential to attract turtles to the area for nesting. Therefore, project mitigations will consider all turtles, including at risk species.

The construction timing (mid-to late summer) will avoid negative impacts to turtles and amphibians, mainly as there were no nesting sites identified. In the event that the project continues to the following early spring, temporary reptile exclusion fencing, may be necessary around gravel stockpiles and other disturbed areas, in order to prevent turtles being attracted to and nesting in the project area.

Key mitigation:

- The EMP must detail procedures for preventing turtle entry/nesting within disturbed project gravels/soils during all stages of project activity;
- Species at risk training shall be provided to all employees before they begin work on site (materials can be part of the Environmental Protection Plan). Employees must be able to identify potential species at risk and know the proper procedures to follow when they encounter a species at risk;
- Temporary reptile fencing, such as polythene/ woven geotextile secured with timber stakes, or material of a similar nature/function, should be installed completely around gravel stockpiles to prevent turtle nesting in the project area. For guidance on how to plan and install exclusion fencing, refer to the document titled *Ontario Ministry of Natural Resources and Forestry. April 2016. Best Management Practices for Mitigating the Effects of Roads on Amphibians and Reptile Species at Risk in Ontario*.
- Should any suspected species at risk – snakes or turtles and/or eggs be encountered during construction - project staging, implementation or demobilization - work would halt



immediately and Parks Environmental Assessment Staff would be notified. Additional measures to avoid impacts may be required before work can restart. If applicable, stand back and allow the animal to leave the site.

- Minimize the disturbed area; clearly mark the work space;
- Park on roads and designated areas only.

Effects on Eastern whip-poor-will proposed SARA Critical Habitat

The south side parcel, which is the proposed project staging area, is 0.38 ha (3830m²) or 12.4% of the TSW property at Lock/Dam 38. Clearing of the site will have immediate but short term negative effects (i.e. short term defined as the time it takes for the area to re-grow to a state where it can be used by certain wildlife again), by direct loss of available habitat.

In Ontario, there are only 110, 10x10 km grid squares, representing 11,000 km² of habitat considered critical for Eastern whip-poor-will. Critical Habitat for the species appears aggregated/defined by clusters of populations in key areas of southern Ontario, including the Rideau, the Kawarthas, Algonquin Park, the Bruce Peninsula NP, shore of Lake Erie and the area east of Lake Simcoe. Other grid squares are scattered singly throughout the region. The seven adjoining grid squares in the area east of Lake Simcoe represent 700 km² of critical habitat. The Dam at 38 lies in the SW corner of 10x10 km grid square (17PK53) – 100 km² containing Critical Habitat. Within this area, forest habitat covers 18.643 km² (18.6%) distributed in 36 forest patches. The maximum patch is 2.3 km² and the average patch size is only 0.5 km². Other habitat is made up of wetland habitat (7 km²; 5 patches; 7%. The vast majority of area in the square - 74.409 Km² or 74% - is comprised of residential, waterway, roads and farmland.

According to the recovery strategy, home range size - the area within which birds are expected to be found most of the time as they conduct breeding activities, forage and move between these zones - can vary from 20 to 500 ha (mean 136 ha). This would indicate that many forest patches, including the subject property and the wetlands/disturbed areas in between them, would be considered, and may constitute part of, a territory for any potential breeding pairs or individuals.

The 10x10km grid square of interest, 17PK53, is identified in the species Recovery Strategy as containing Federal Protected Area/Non-federal Land. Therefore the Recovery Strategy considers TSW lands as Protected Federal Land and therefore important to the species. Of the 47 out of 110 Ontario grid squares with federal land, only 2 grid squares fall within lands owned by the TSW. The Talbot area is one of these. Therefore, in the role of providing protected Federal Lands, areas managed by the TSW are important regardless of their size. The conclusion is that due to the clearing of forest land adjacent to Dam 38, the habitat will no longer support Eastern Whip-poor-will until the future when it re-takes the structure of forest that can support it. Therefore, this activity is considered to destroy critical habitat and a SARA Authorization is required. As critical habitat is not yet formally protected under SARA at this site, the authorization will be issued as harm to individuals. A completed SARA-Compliant Authorization Decision Form, will be Appended to the BIA once timing of tree removals is identified.



Figure 10. Google Earth Capture of the Dam 38 Property demarking the south parcel

Direct Effects of the Activity on Eastern Whip-poor-will

Forest harvesting can also have direct negative effects on nesting birds by disrupting breeding activities. Nesting failure could result from disruptive activities and the nests and/or eggs can be inadvertently harmed as a result of clearing trees and other vegetation. As a result, the project area in question, as it meets the habitat requirements for Whip-poor-will, required verification as to whether or not it was currently being used by the bird in spring 2017.

A bird listening survey was conducted in spring 2017 by SLR Consulting (under contract to PCA). As Whip-poor-will have a very distinct and relatively loud call they can be heard across relatively great distances (>500m). For this reason, setting up precise point-count locations at each site for listening and detection was not required, due to the relatively small size of the property at Dam 38. The survey was achieved by visiting the site after confirmation of calling at a reference site that same evening. If birds were detected near or at the project site, the position would be recorded using GPS and the call location refined through auditory triangulation, together with habitat interpretation of the sites and their immediately adjacent lands.

The survey period was initially selected to coincide with the full moon in June (1-9), considered the optimal mid-season breeding period. The site was to be visited at least twice during the period. Surveys were conducted with favourable weather conditions as weather, and specifically the evening air temperature, greatly influence the bird's activity. An initial listening survey was conducted in early May one evening after abundant Whip-poor-will calling was heard at a reference site (one known to have Whip-poor-wills each year). During that evening, no Whip-poor-will calling was noted at Dam 38. A follow up survey for the species on June 9th also did not detect the species at the dam, lock or surrounding property. A repeat of the listening survey was undertaken by SLR on the night of May 27, 2018, with once more no Whip-poor-will detected. Since the species is not presently using the site, there should be no direct impacts on Whip-poor-will, regardless of timing of tree removal.



Species at Risk Bats

The south side property has been identified as hosting habitat suitable for both roosting and foraging for a few bat species: Little Brown Bat and Northern Myotis. As mentioned, these bats would hunt for insects in the area and potentially roost under loose bark or in tree cavities, if available. While removing trees from the site could disrupt bats and could reduce available habitat, it would not greatly impact the species with other foraging and roosting sites available in adjacent properties. Since maternity roosting has not been confirmed onsite, there is some potential to affect maternity roosts during rearing if trees are removed prior to September 1st. While maternity roosts have not been identified within the recovery strategy disturbance of roosts could result in harm to individuals. Additional surveys will be conducted prior to construction in an effort to refine potential impacts, identify if maternity roosting is occurring onsite and to optimize mitigation measures.

Regardless, bat boxes will be installed to offset the loss of habitat. Bat Conservation International (BCI) has available designs for different types of roosts that could be employed on site. Parks Canada will limit the removal of mature trees, where possible. Limits of access and construction will be delineated. With such mitigation, impacts on these bats would be minimized. However, a permit under SARA may be required for removal of this habitat if removal occurs during the maternal roosting window.

Butternut

It is unknown whether the individuals affected by this project are hybrids, thus it is possible that the trees do not require protections outlined under Schedule 1 of SARA. The trees will need to be tested for purity of strain. A nearby adult specimen on adjacent private property will also be assessed to determine genetics and if it will continue to provide a seed source for future trees. If the trees are pure strain then based on expert advice from recovery team specialist, these trees are within the range that would have a higher likelihood of surviving transplant. Suitable habitat will be identified and trees will be transplanted and monitored for survivorship. While trees are within a range that has a higher success to survive transplanting, there is still a high likelihood that the saplings will not survive relocation.

Therefore, the removal/transplanting of these trees will be permitted through a SARA permit, with the assumption that they're pure strain trees. Additionally, the loss of potentially healthy Butternut individuals as a result of Federal Infrastructure Projects across the Ontario Waterways, will be covered in an overall Ontario Waterways Butternut Mitigation Plan to ensure the cumulative impacts of this project and others does not contribute to the overall population loss across both waterways.

Cultural Resources Management

Recommendations and mitigation measures have been developed using Parks Canada's Cultural Resource Management Policy the Standards and Guidelines for the Conservation of Historic Places in Canada and the Conservation Guidance 2016-2021 Capital Works Program on the Trent-Severn Waterway National Historic Site, to ensure that the guidance provided represents best practice in heritage conservation. These measures are outlined in the Cultural Resource Impact Assessment for the project.

Archeology

An Archaeological Overview Assessment was completed by Parks Canada archaeologists to determine the existing conditions in the proposed work areas. Impacts from construction



activities, including staging areas and access roads, are deemed to be significant to adversely impact potential archaeological resources and archaeological mitigation measures are required for the Project. If significant archeological resources (i.e., Indigenous artifacts, structural remains and/or high artifact concentrations) are encountered during construction, work will cease and Parks Canada contacted for advice and assessment of significance, which will in turn determine what will be required to mitigate impacts.

A Heritage Recording of the dam was made to provide as-found posterity record of the dam, lock and surrounding grounds with a focus on the heritage character defining elements of the site and its associated landscape. The recording captured the physical configuration and significant features of this cultural resource. Recording was completed using multiple recording techniques: laser scanning, photogrammetry, record photography, panoramic photography and hand recording from shore, on the structure(s) itself and in some instances from the water.

Air/Noise

Use of diesel-powered machinery may result in temporary, localized effects on air quality around the project site. Noise from construction may be disruptive for local residences and visitors to the lock.

The project is expected to employ well-maintained heavy equipment and machinery, fitted with emission control systems, mufflers, exhaust baffles, engine covers, etc. All on-site vehicles are expected to have 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. Parks Canada will monitor public complaints and address any air quality/noise issues raised by the public.

Other Environmental Considerations

Extreme weather events, which may be no longer considered an uncommon occurrence, are a concern and must be factored into project planning and mitigation. River freeze-up generally occurs at the end of December, whereas ice break-up usually occurs in mid-March. The freeze-up and break-up dates are approximate and will vary according to ambient temperature, channel width and orientation and water flow. March and April are critical months for melting snow and rain. However, thaw/freeze cycles can occur in any winter month. Heavy rainfall and prolonged warm temperatures will cause rivers and lakes to rise suddenly. Greatest flow occurs during the spring freshet – the normal period from March through April. Historical records often show more than one peak in this period. Again, freshet conditions can occur during any winter warm-up from January through March and coincide with snowmelt and/or spring rain from March through May. Elevated water levels, large water volumes and high velocities are the result.

8. MITIGATION MEASURES

Key project mitigations have been presented in the most important and relevant sections. A complete list of project mitigation that addresses all environmental components is found in **Appendix 3**.

9. PUBLIC/STAKEHOLDER ENGAGEMENT & ABORIGINAL CONSULTATION

9 a) Indicate whether public/stakeholder engagement was undertaken in relation to potential adverse effects of the proposed project:

☐ No

☒ Yes



Departments & Agencies

Ontario Ministry of Natural Resources & Forestry (OMNRF)
Fisheries & Oceans Canada -
Lake Simcoe Region Conservation Authority (LSRCA)

Municipal Engagement

The townships of Ramara and Brock, as well as the counties of Durham and Simcoe, receive all community updates. Representatives from these municipalities were invited to participate in a meeting to coordinate work in February 2017. The Township of Brock was in attendance.

Public Communication

- Community bulletins regarding the Talbot area projects were shared with the public through the media in November 2016. 3800 residents received this communication piece through direct mail.
- Follow up community bulletins were issued in February and May 2017.
- Individual letters were hand delivered to residents who would be most affected by various Talbot area works in late 2016 and early 2017.
- Private discussions were held with approximately seven of these directly affected landowners, at their place of residence.
- All community bulletins are shared with First Nation communities.
- On-site meeting was held with cottagers/residents living adjacent to the project site.

9 b) Indicate whether Aboriginal consultation was undertaken in relation to potential adverse effects of the proposed project:

- ☐ No
☐ Yes

There is potential for 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.

On 3 April 2016, a letter was sent to the 7 Williams Treaties First Nations Chiefs advising them of the TSW Federal Infrastructure Projects and their status. To date, the Williams Treaties First Nations consultation officers have identified that consultation is not required as the proposed project activities do not appear to impact Aboriginal or Treaty Rights. However, this BIA and project scope will be shared with community members to ensure all potential impacts have been assessed. Continued information, engagement and monitoring of project activities will occur to ensure the accuracy of proposed mitigation measures and to ensure that no impacts occur to the communities Aboriginal or Treaty Rights. Should such an impact arise, formal consultation to address the impact would be undertaken.

As part of the agreed to process, the community consultation representatives will receive updates through the construction phase. As is Ontario Waterway practice, community consultation representatives have been and will be offered the opportunity for a site visit and will be accompanied by senior project staff should they make that request. In the event of an accident on site, contamination due to construction, or 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 and if needed be invited to participate in any monitoring of the site.

**10. SIGNIFICANCE OF RESIDUAL ADVERSE EFFECTS**

With implementation of project mitigations and offsetting activities, no significant residual adverse effects are expected.

11. SURVEILLANCE

- ☐ Surveillance is not required
☒ Surveillance is required

12. 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*

13. SARA NOTIFICATION

Notification is:

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

The activity will lead to residual adverse effects that contravene a SARA prohibition for a listed species at risk, its residence or its critical habitat.

14. EXPERTS CONSULTED

Department/Agency/Institution: Public Services and Procurement Canada	Date of Request:
Expert's Name & Contact Information: Dave Ness	Title: Project Manager, Kirkfield Bundle
Expertise Requested: Complete Project Description; Analysis of Project on water flow	
Response: Project description + background on historical dam/spillway operations	

Department/Agency/Institution: Ontario Ministry of Natural Resources	Date of Request: 2017
Expert's Name & Contact Information: Melanie Shapiera, Aurora District Office	Title: Management Biologist
Expertise Requested: advice on fish timing windows/for fish species/opinion on project activities on species; data and information for the Talbot River	
Response: fish timing windows/for fish species/opinion on project activities on species; data and information for the Talbot River	

Department/Agency/Institution: Fisheries & Oceans Canada	Date of Request: 2017-05-19
Expert's Name & Contact Information: Adrienne McLean, Fisheries Protection Program	Title: Fisheries Protection Biologist
Expertise Requested: Request for Project Review for analysis of potential effects on fish and fisheries	
Response: Authorization under the Fisheries Act required	



Department/Agency/Institution: Lake Simcoe Region Conservation Authority	Date of Request: 2017-03-01
Expert's Name & Contact Information: Rob Wilson	Title: Aquatic Ecologist
Expertise Requested: Data on fish collection and water quality for the Talbot River	
Response: Data on fish collection and water quality for the Talbot River provided	

Department/Agency/Institution: SLR Consulting Inc.	Date of Request: May 2017
Expert's Name & Contact Information: Michael Roy	Title:
Expertise Requested: Walleye Survey, SAR Survey, Well water surveys	
Response: report - Environmental Support Studies, Talbot River Dams, Lock Approach Walls and Earth, Dam Rehabilitation (Kirkfield Bundle)	

Department/Agency/Institution: Parks Canada Agency	Date of Request: 2017
Expert's Name & Contact Information: Nathalie Desrosiers	Title: Policy Advisor, Cultural Resources Management
Expertise Requested: Cultural Resource Assessment and Recommendations	
Response: Statement of Cultural Resource Impact Analysis	

Department/Agency/Institution: Parks Canada Agency	Date of Request: 2017
Expert's Name & Contact Information: Barbara Leskovec	Title: Federal Infrastructure Investments, Terrestrial Archaeology
Expertise Requested: Archeological Assessment	
Response: Archaeological Overview Assessment, Dam at Lock 38	

May 2018



15. DECISION




Taking into account implementation of mitigation measures the project is:

- ☒ Not likely to cause significant adverse environmental effects.
☐ Likely to cause significant adverse environmental effects.

FOR SARA REQUIREMENTS:

- ☒ Due to potential adverse effects to Species at Risk (Eastern Whip-poor-will), the SARA-Compliant Authorization Decision Tool was required

16. RECOMMENDATION AND APPROVAL

Prepared by: Randy Power, EA Officer	
Signature: 	Date: 2018-06-01
Recommended by: Valerie Minelga, EA Team Leader	
Signature: 	Date: 2018-06-04
Approved by: Jewel Cunningham, Director, Ontario Waterways	
Signature: 	Date: 2018/06/05

17. ATTACHMENTS

Appendices:

- 1 Effects Identification Matrix
- 2 Site Photographs
- 3 Complete List of Project Mitigation
- 4 Consultation Letter to Williams Treaties First Nations
- 5 Fisheries & Oceans Canada Authorization
- 6 SARA-Compliant Authorization Decision Form

Additional Attachments:

Project Drawings

18. 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 1 EFFECTS IDENTIFICATION MATRIX

A. Direct Effects								
			Valued components potentially directly affected by the proposed project					
			Natural Resources					Cultural Resources
			Water (surface, fish habitat)	Fauna (turtles, birds)	Soil & landforms	Flora (riparian vegetation)	Air/Noise	Dam/landscape
Phase	Activities							
Project Components	Preparation / Construction / Operation / Decommissioning	Supply and storage of materials	☒	☐	☒	☐	☐	☐
		Set up Use/Removal of temporary facilities	☒	☐	☐	☐	☐	☐
		Clearing	☒	☒	☐	☒	☐	☐
		Coffer Dam	☒	☐	☐	☐	☐	☐
		Dewatering	☒	☐	☐	☐	☐	☐
		Demolition	☒	☐	☒	☒	☒	☒
		Excavation/Grading/Backfilling	☐	☐	☒	☒	☒	☐
		Construction	☒	☒	☒	☒	☒	☒
		Use of machinery	☒	☐	☒	☒	☒	☐
		Transport of materials/equipment	☐	☐	☐	☐	☒	☐
		Disposal of waste	☐	☐	☐	☐	☐	☐
		Use of Chemicals	☒	☐	☒	☐	☐	☐
		Commissioning	☒	☐	☐	☐	☐	☐
		Use	☒	☐	☐	☐	☐	☐
		Maintenance	☒	☐	☐	☐	☐	☐

APPENDIX 2 SITE PHOTOGRAPHS









APPENDIX 3 COMPLETE LIST OF PROJECT MITIGATION

General

1. Inform the Departmental Representative and PCA's Environmental Authority (EA) (Environmental Officer, TSW in Peterborough) regarding any changes to project plans and/or scheduling. Any changes not assessed under this Basic Impact Assessment (BIA) will require approval from PCA and may require further mitigation measures.
2. Contractor is required to submit an Environmental Management Plan (EMP) to the Department Representative and Parks Canada that 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. In order 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 and the Departmental Representative.
3. It is recommended that an environmental professional(s) (EP) prepare the EMP or its component plans incorporating guidance found in PCA's Environmental Standards and Guidelines - Ontario Waterways (2017). 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.
4. 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. Should conditions at the work site indicate that there are negative impacts to fish, fish habitat, wildlife, cultural or visitor experience resources, all 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.
6. As per the Historic Canal Regulations (HCR) applicable to lands administered by the Trent Severn Waterway National Historic Site of Canada, a permit signed by PCA's Ontario Waterways Director will be required to authorize the work prior to commencement of the project.
7. The Parks Canada Environmental Officer, Trent-Severn Waterway will outline all the following mitigation measures in a construction start-up meeting with the contractor, to ensure awareness and understanding of these measures.
8. Should conditions at the work site indicate that there are unforeseen negative impacts to fish, wildlife, cultural or visitor experience resources, all works shall cease until the problem has been corrected and/or any required input can be obtained by Parks Canada or other relevant authorities. The Trent-Severn Waterway has the right to require that work be altered or ceased immediately.
9. 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. Ensure measures are in place to minimize impacts of accidental spills.

- 10.** Store all oils, lubricants, fuels and chemicals in secure areas on impermeable pads.
- 11.** All machinery and equipment shall be clean, free of leaks, in optimal working condition.
- 12.** Use well-maintained heavy equipment and machinery, preferably fitted with fully functional emission control systems/muffler/exhaust baffles, engine covers, etc.; machines shall not be left to unnecessarily idle in order to avoid emissions.
- 13.** Spill control and emergency plans will be in place prior to initiation of construction; an emergency spill kit shall be kept on-site and employed immediately should a spill occur.
- 14.** Vehicle and equipment re-fueling and/or maintenance shall be conducted off of slopes and away from the water at a recommended distance of 30 m if possible. If not possible this, fuelling sites will be as per Environmental Management Plan and mitigations to prevent substances from entering the water course applied. A designated re-fueling depot will minimize the potential for extensive impacts at the site due to accidental releases of substances; proper spill management equipment shall be in place for fueling. Drip trays shall be placed under fuel-powered equipment.
- 15.** Spill control and emergency plans will be in place prior to initiation of construction. A spills kit will be maintained on site and the contractor will ensure that adequate additional resources are available. Spills shall be reported as soon as possible to the Parks Canada Project Manager. The Ontario Ministry of Environment and Climate Change Spills Action Center, (1-800-268-6060) shall be notified, if spilled volume and location requires.
- 16.** In the event of a spill, Remediation will be conducted immediately to contain and clean up in accordance with federal and provincial regulatory requirements. Documentation of remediation, testing and results will be provided to PCA.
- 17.** There shall be no discharge of chemicals and cleaning agents in or near aquatic habitats; all such substances shall be disposed of at a facility licensed to receive them.
- 18.** 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 after completion of the project.

Erosion and Sediment control

- 19.** An Erosion and Sediment Control Plan, as part of the Environmental Management Plan, should be prepared by an environmental professional and submitted to the Departmental Representative and accepted by Parks Canada. The plan should focus on separating offsite and infiltrating water into the construction site from construction activities and sediment sources:
 - A focus on erosion control primarily and sediment control secondary;
 - 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;
 - Drainage areas and patterns based on pre-construction topography and construction design;
 - How clean storm run-on will be diverted around the site and away from exposed areas;

- 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;
 - Channels that are designed and constructed to the necessary design discharge;
 - Temporary and permanent erosion control needs for all drainage channels;
 - Consideration of project schedule in selecting, designing and laying out environmental controls;
 - Consideration of seasonal requirements (for longer-term projects); select and design controls and practices for controlling erosion and sedimentation including shutdown periods.
- 20.** The size of particles present in the sediment is a key consideration for selecting the appropriate sediment treatment option(s):
- 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 or sediment bag, may be adequate.
 - If the sediment consists of silt and/or clay or concrete fines, 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.
 - 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.
- 21.** Erosion and sediment control measures shall be implemented prior to work and maintained during the work phase, to prevent erosion and the entry of sediment into the water where site access or other activities cause exposed soil.
- 22.** 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.
- 23.** If erosion and sediment control measures are not functioning properly, no further work shall occur until the sediment and/or erosion problem is addressed to the satisfaction of Parks Canada.
- 24.** Erosion and sediment control measures shall be left in place until all areas of the work site have been stabilized.
- 25.** Environmental protection measures shall be checked after each extreme weather event.
- 26.** Any stockpiled materials shall be stored and stabilized a safe distance away from any watercourse, drainage course or swales to prevent erosion and subsequent entry into the water body OR removed from the site, in accordance with all federal, municipal and provincial regulations.
- 27.** All disturbed areas of the work site shall be stabilized immediately and re-vegetated as soon as conditions allow. All exposed areas should be covered with erosion control blankets or other measures to keep the soil in place and prevent erosion until vegetated in the spring. Erosion and sediment control measures shall be left in place until all areas of the work site have been stabilized.

Fish & Fish Habitat/Water Quality

28. All in-water work should be started after July 15th and completed before March 15th. Should in-water work be required beyond this date, additional mitigation measures may be required based on site specific characteristics. Work beyond March 15th must be approved by the Departmental Representative and PCA prior to work occurring, and may not be granted if conditions do not allow it.
29. 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://cegg-rcqe.ccme.ca/en/index.html#void>).
30. Activities causing turbidity or release of sediment will comply with the CCME Guidelines on Total Particulate Matter (see <http://cegg-rcqe.ccme.ca/download/en/217>).
31. The proponent is advised to abide by those mitigation measures and best management practices outlined within Fisheries and Oceans Canada's (DFO's) online guidance materials: Measures to Avoid Causing Harm to Fish and Fish Habitat (<http://www.dfo-mpo.gc.ca/pnw-ppe/ mesures-mesures/measures-mesures-eng.html>).
32. Ontario Drinking Water Quality Guidelines cannot be exceeded (beyond parameters that currently exist) due to project activities.
33. Dewatering, demolition and construction is staged such that water can continue to flow through the structure at all times during construction. No changes in flow or lake levels will occur as a result of the project.
34. All work is to be completed in the dry. A de-watering Plan shall be submitted, as part of an EMP, to Parks Canada for review and acceptance prior to any dewatering.
35. Cofferdam de-watering systems and sediment treatment areas must be designed to have sufficient capacity to remove fine sediments from water prior to being released; flocculants for settling fines may be necessary due to the nature of particulates from limestone based rock and clay.
36. Sediment control measures shall be in place during any in-water work to control turbidity levels. Sediment 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.
37. Sediment/turbidity curtains shall be deployed in a manner – e.g. moved in a direction from close to shore/structures outward – that prevent entrapment of fish inside the curtain.
38. For coffer dams, an engineered design rather than loose aggregate rock berm-style is preferred, to minimize in-water disturbance while they are placed and particularly, while they are removed.
39. For de-watering, fish screens must comply with *DFO Freshwater Intake End-of-Pipe Fish Screen Guidelines* when pumping in fish-bearing water to prevent impingement or entrainment of fish.
40. Any fish found within the dewatered coffer dam areas will be removed and placed downstream if found in the downstream coffer dam area and upstream if found upstream.
 - Parks Canada's shall be advised 24 hours prior to fish rescue;

- Minimize the length of time fish are out of the water;
 - Use appropriate equipment to remove any stranded fish in the dewatered area. As water levels drop in the work area monitor the deeper pool areas where fish are congregating. If safe to do so, Seine nets or Dip nets can be operated by field staff to remove the fish;
 - Contact PCA EA staff should there be any issues with fish removal.
 - Any fish found within the dewatered coffer dam areas will be documented by species, counted and removed and placed downstream if found in the downstream coffer dam and upstream if found upstream.
 - Round gobies or other invasive species found during dewatering activities shall be euthanized and not returned to the water system; this shall be reported to Parks Canada.
41. Only the working part of a machine is to enter the water; any part of a machine or equipment entering the water shall be free of fluid leaks and externally degreased to prevent any deleterious substance 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.
 42. Use biodegradable hydraulic fluids for machinery that will be working in or around the river.
 43. Only clean material free of fine particulate matter shall be placed in or near water where it has been previously planned and authorized.
 44. 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.
 45. No acid-generating rock (containing sulphides) will be used.
 46. Monitor water quality for unacceptable suspended sediment levels during in water activities.
 47. The area inside of coffer dams, if necessary, will be cleaned and restored; alternatively, capped with clean rock, in order to mitigate turbidity from the former construction area as the areas are re-flooded. All debris on bed (including unused aggregate/concrete rubble) shall be completely removed and area restored to original state upon completion of work.
 48. Should conditions at the work site indicate that there are negative impacts to fish or their habitat, all work shall cease until the problem has been corrected and Parks Canada EA staff has been consulted.
 49. A turbidity curtain will be maintained in the water around all working areas during construction to contain and control the suspension of fines. Curtains should be as close to the work area as possible. If water levels/conditions do not permit the flotation of a turbidity curtain, other measures as approved will be implemented.
 50. Turbidity curtains should not be used as a settling area for dewatering activities. Supplementary sediment and erosion control measures should be installed prior to construction activities and should be added upon/reinforced as necessary.

51. The contractor will provide a marine grade turbidity curtain (US DOT Type 2) across all areas where sediments can enter the watercourse. Turbidity curtains are to be anchored or weighted down along its length to form a continuous seal on the river bed with adequate flotation at water surface to prevent over spills of turbid water.
52. Flow dissipaters and/or filter bags, or equivalent, shall be placed at water discharge points to prevent erosion and sediment release.
53. In the event of a significant silting or debris caused by construction activities, the contractor will take appropriate measures to contain and mitigate the problem including the installation of additional downstream turbidity curtains.

Concrete

54. Concrete leachate is alkaline and highly toxic to fish and aquatic life. Measures must be taken to prevent any 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.
55. 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.
56. Ensure that all works involving the use of concrete will not deposit, directly or indirectly, sediments, debris, concrete, concrete fines, wash or contact water into or about any watercourse;
57. Wash equipment away from water and provide containment facilities for the wash-down water from concrete delivery trucks, concrete pumping equipment, and other tools and equipment;
58. In the event of a release of concrete or grout into a water course, Parks Canada and the Ontario Spill Action Centre (1-800-268-6060) shall be notified; remediation will be conducted immediately contain and clean up in accordance with provincial regulatory requirements AND to the satisfaction of Parks Canada; documentation of remediation, testing and results will be provided to Parks Canada.
59. Additional Environmental Mitigation Measures For Placement of Tremie Concrete, concrete where forms are in contact with the water course, or where contaminated water may enter the watercourse:
 - Ensure concrete forms are tight and no flow is occurring.
 - Isolate area with curtain or impermeable material specified for concrete particulates; ensure fish exclusion is followed.
 - Isolated area should be the minimum size required to complete task.
 - For tremie pours or where water comes into contact with the forms, CO₂ system must be installed and operating along the entire length of the isolated area; the tank shall be used to release carbon dioxide gas into an affected area to neutralize pH levels. Ensure sufficiently sized tanks for the concrete volumes used.

- Workers shall be trained in the use of the system.
- Use of neutralizing acids is not permitted unless the system is designed and implemented by a qualified professional.
- pH monitoring shall be conducted inside and outside the containment area.

Invasive Species

60. Follow the Ontario *Clean Equipment Protocol for Industry - Inspecting and cleaning equipment for the purposes of invasive species prevention*.
61. Any equipment or vehicles which are to be used in water, should be thoroughly cleaned before and after use of any visible mud, vegetation, mussels, etc.:
 - Vessels/equipment should be drained of standing water.
 - Vessels/equipment should ideally be cleaned with hot water (>50 °C) at high pressure water (>250 psi).
 - Vessels/equipment should be dried for 2 – 7 days in sunlight before transported between waterbodies.
 - Cleaning of vessels/equipment should be conducted away from waterbodies at a recommended distance of at least 30 m from the shoreline.
62. Mud, dirt and vegetation should be cleaned from clothing and footwear prior to entering the work site, and prior to leaving the work site.
63. Use weed-free seed and confirm that seed mix to be used for re-vegetation purposes does not (potentially) contain invasive plants.
64. Seed purchased commercially should have a label that states the following:
 - Species;
 - Purity: Most seed should be no less than 75% pure and preferably over 85% pure. The rest is inert matter, or other seed;
 - Weed seed content: The tag should state NO invasive plants are present. Only certified weed-free seed should be used; and
 - Germination of desired seed: Germination generally should not be less than 50% for most species, although some shrubs and forbs will have lower percentages.
65. 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.
66. If removal of invasive species occurs, individuals will be disposed of appropriately, offsite to ensure no further propagation.
67. Should an invasive species be encountered (or at least suspected), a photo and report of the specimen should be sent to Parks Canada's EA staff.

Vegetation removal/restoration

68. Phase vegetation removal to reflect construction activity; grubbing should not be conducted too far ahead and too large an area to be properly mitigated with Erosion and Sediment controls.

69. 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 should be properly identified and delineated and protected.
70. In the event that 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 a sufficient amount of soil compaction prevention with regards to the highest level of activity to occur within the immediate area of protection.
71. Where practical, the branches of the large trees should be trimmed back as the first option rather than cutting the entire tree.
72. Disturbance of vegetation along the shoreline must be limited to what is required for allowing reasonable completion of the project with minimal environmental impact; if necessary, riparian vegetation will be removed last and kept to a minimum.
73. Clear vegetation from unstable or erodible banks by hand, and where possible, avoid the use of heavy machinery. Operate machinery on land and in a manner that minimizes disturbance to the banks of the water body.
74. Local soil will be stockpiled and re-used as opposed to bringing in soil from other locales.
75. Stabilize the ground surface at all disturbed areas.
76. De-compact subsoil which has been compacted from the movement of construction equipment and project staging.
77. All disturbed areas of the work site shall be stabilized immediately with erosion protection. All exposed areas should be covered with erosion control blankets or other measures such as mulch to keep the soil in place and prevent erosion until vegetated in the spring.
78. Restore the site and to a specific future condition – i.e. as per restoration plan; ensure re-planting success. Native grasses, shrubs, etc. should be planted to match existing species growing on the sites. Common milkweed should be actively restored.
79. Frost can occur as early as August 31st and late as June 25th. 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.
80. 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.

Species at Risk

- 81.** The EMP must detail procedures for preventing turtle entry/nesting within disturbed project gravels/soils during all stages of project activity.
- 82.** Species at risk training shall be provided to all employees before they begin work on site (materials can be part of the Environmental Protection Plan). Employees must be able to identify potential species at risk and know the proper procedures to follow when they encounter a species at risk. Special emphasis will be made on Blanding's Turtle sightings.
- 83.** Should any suspected species at risk – snakes or turtles and/or eggs be encountered during construction - project staging, implementation or demobilization - work would halt immediately and Parks Environmental Assessment Staff would be notified. The species must not be harmed or harassed. Stand back and allow the animal to leave the site. If the species does not leave or cannot leave the site, the contractor must immediately stop the works and contact the Departmental Representative and PCA's Environmental Assessment Officer (705-761-1634) immediately. Additional measures to avoid impacts may be required before work can restart.
- 84.** Temporary reptile fencing, such as polythene/ woven geotextile secured with timber stakes, or material of a similar nature/function, should be installed completely around gravel stockpiles to prevent turtle nesting in the project area. For guidance on how to plan and install exclusion fencing, refer to the document titled *"Ontario Ministry of Natural Resources and Forestry. April 2016. Best Management Practices for Mitigating the Effects of Roads on Amphibians and Reptile Species at Risk in Ontario."*
- 85.** Synthetic plastic Erosion Control Blankets/Mats should 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.
- 86.** If a turtle is found within the limits of the fencing it should be left alone to leave the area if possible, or the animal should be gently placed outside of the construction site. Typically, animals should be released not more than 250m from the capture site. Release sites should be near water with vegetation cover for shelter.
- 87.** If milkweed has grown by project initiation, then as a precautionary measure, plants should be pulled and moved to non-affected areas where milkweed is growing, if there is the potential for larvae and eggs to be present on the affected plants.
- 88.** Installation of bat boxes to offset the potential loss of day roosts for SAR bats will be required.
- 89.** Minimize the amount of disturbed area and vegetation removal; clearly mark the work space.
- 90.** Park on roads or disturbed areas only.

Wildlife

- 91.** Site clearing/commencement of construction should be planned to occur outside of sensitive nesting times - April 1 to August 31. If this is not feasible, then the site must be inspected by a biologist prior to clearing, to check for the presence of nests.
- 92.** The Site Specific EMP must demonstrate procedures for avoiding disturbance/harm to wildlife.

- 93.** If recommended by a qualified person and approved by PCA, exclusion zones or “no go” areas will be established to protect areas with known residences (e.g., hibernacula, dens, nests).
- 94.** If recommended by a qualified person 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.
- 95.** On a daily basis, 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 site checklist).
- 96.** Field information regarding incidental encounters with wildlife (non-SAR wildlife) shall be compiled and reported on a daily basis.
- 97.** For incidental encounters, the following information should be recorded in the field:
 - a. Locations, dates and time of day where the species were encountered;
 - b. Names of species encountered;
 - c. Photographs of the species, if taken;
 - d. Condition of animal.
- 98.** If injured/dead wildlife are encountered report to PCA immediately. PCA may require retrieval and storage on ice of carcass for laboratory testing
- 99.** 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.
- 100.** 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.
- 101.** 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.
- 102.** Feeding of wildlife is prohibited.

Noise /Air

- 103.** Adhere to local noise by-laws. Notify residents of planned activities that may cause disturbance and schedule them to avoid sensitive time periods.
- 104.** Monitor and mitigate public complaints by keeping a record of complaints and addressing any issues raised by the public.
- 105.** All on-site vehicles are expected to have 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. 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.
- 106.** Use well-maintained heavy equipment and machinery, fitted with fully functional emission control systems/muffler/exhaust baffles, engine covers, etc.
- 107.** Machines shall not be left to unnecessarily idle in order to avoid emissions.

Cultural Resources

- 108.** 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.
- 109.** 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).
- 110.** Main vehicular access routes and staging areas will be restricted to roadways and parking lots. If this is not possible, the use of protective covering such as geotextile protective mats with a wood chip lift or granular "A" gravel is required. All protective covering must be removed following construction and the area restored to pre-construction state. Excavation is not permitted during installation or removal of protective covering.
- 111.** If unrecorded archaeological resources (e.g. structural features or artifact concentrations) are encountered during construction activities, work will cease in the immediate area, the findings photographed, and the Parks Canada Project Manager informed; contact the TSW, Peterborough Office at 705-750-4900. The Project Manager should then 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 find. Ensure that all exposed underwater cultural materials are kept submerged and/or wet while waiting for direction.
- 112.** Should any historical dam(s) be exposed during de-watering activities, it is recommended that archaeological recording of the historical feature(s) be undertaken, in conjunction with provincial and federal archaeological requirements (when applicable). Archaeological recording of the feature(s) will include documenting the location and physical characteristics of the feature(s), and recording the construction techniques through scaled drawings, photographs and archaeological site plan, in an attempt to determine the age of the feature(s) and to contribute to the knowledge of the site.
- 113.** Allow PCA to conduct a heritage recording of the dam and landscape prior to construction. Additional recordings of the submerged components may be required once dewatering occurs but prior to demolition. Such methods may include written descriptions and analyses, photographs (aerial or terrestrial), rectified photography, photogrammetry, geophysical survey, maps, measured plans, drawings and sketches, or other traditional and modern technologies.
- 114.** Inform the CRM Officer (Ontario Waterways) regarding any changes to project plans and/or scheduling. Any changes not assessed under this Basic Impact Analysis will require approval from PCA and may require further mitigation measures.
- 115.** The remnants of the historical dams have historical value and should not be impacted during the Project. This historical value should also be accounted for in any future hydraulic modeling of water flows through these sections to minimize impacts to the resource.

Waste Disposal

- 116.** 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;
- 117.** Waste generated will be disposed according to regulations (i.e., O. Reg. 102/94 and O. Reg. 558/00, R.R.O. 1990, 347).

Dam Commissioning

- 118.** A plan for commissioning of the new dam must be presented and approved by Parks Canada, which may include opening one sluiceway at a time and monitoring effects over several days. Downstream shoreline impacts may result in shoreline protection measures.
- 119.** If elevated turbidity beyond 8 NTU from background levels for a short-term exposure (e.g., 24-h period) is observed Parks Canada will assess potential impact to the aquatic environment. A determination will be made by Parks Canada as to whether subsequent flushing is permitted. If not, additional mitigation measures may be required.
- 120.** The area inside of the downstream coffer dams, if necessary, will be cleaned or alternately capped with clean rock, in order to mitigate turbidity from the former construction area as it is re-flooded.

Floods/Extreme or inclement weather/Ice formation

- 121.** Undertake construction under normal weather conditions, to the extent possible, and design the project worksite to withstand variable weather conditions.
- 122.** Apply wet weather restrictions on construction activities to reduce surface run-off from exposed work areas and to minimize the risk of inundation.
- 123.** The work area shall be stabilized against the impacts of high flow/heavy rainfall events at the end of each workday.
- 124.** Work shall be suspended and the work area stabilized when there is a high probability of a rainfall event.

APPENDIX 4 CONSULTATION LETTERS TO WILLIAMS TREATIES FIRST NATIONS

APPENDIX 5 FISHERIES & OCEANS CANADA AUTHORIZATION

(To be added when received)



Attachment Project Plans/Drawings



