

# **Basic Impact Analysis**

Black Rapids and Lower Nicholsons Wharf Replacements – Ottawa and  
Merrickville, ON

October 2017

## 1. PROJECT TITLE & LOCATION

Black Rapids and Lower Nicholson's Wharf Replacements – Ottawa and Merrickville, ON.

- Black Rapids Lock 13 is located at 2453 Prince of Wales Drive, Ottawa, ON. Lat/Long coordinates are N 45°19'17.23" W 75°41'53.28"
- Lower Nicholson's Lock 18 is located at 45 Nicholson's Lane, Merrickville, ON. Lat/Long coordinates are N 44°57'19.12" W 75°48'56.55"

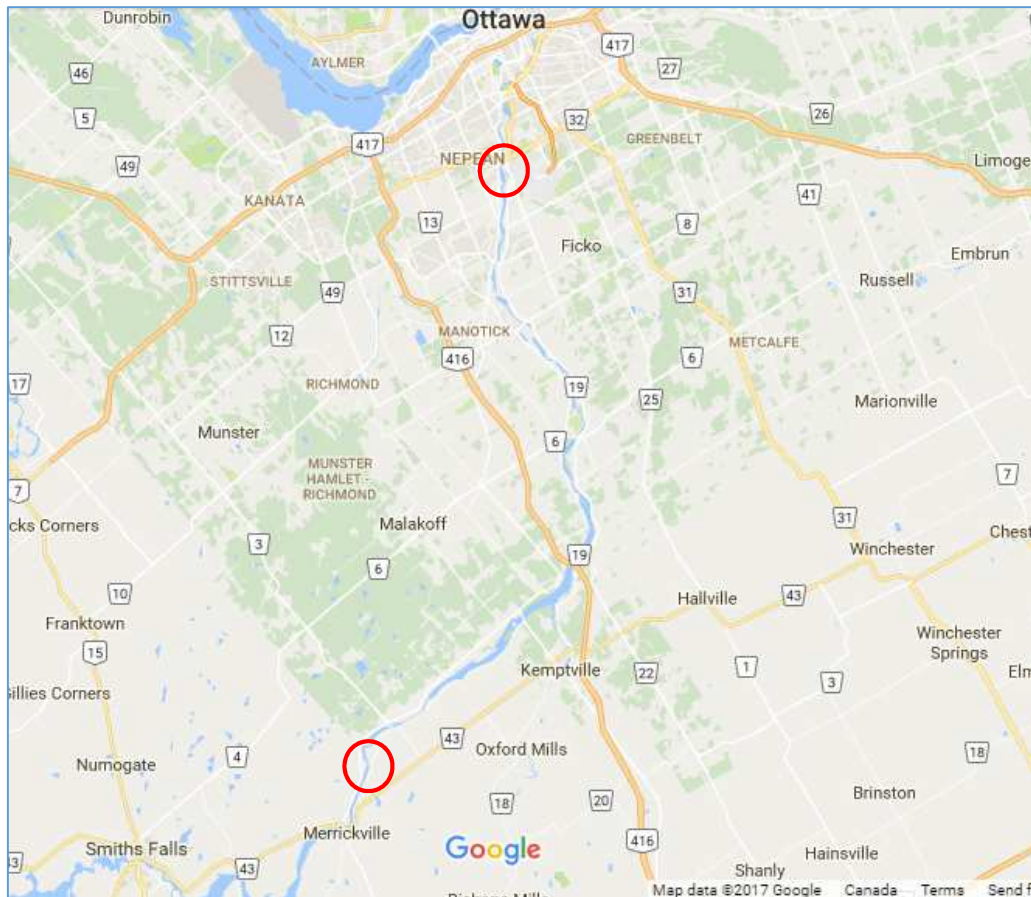
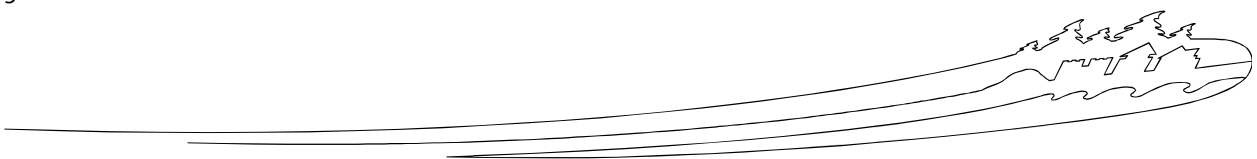


Figure 1: General location map Black Rapids Lock 13 and Lower Nicholson's Lock 18 (red circles).



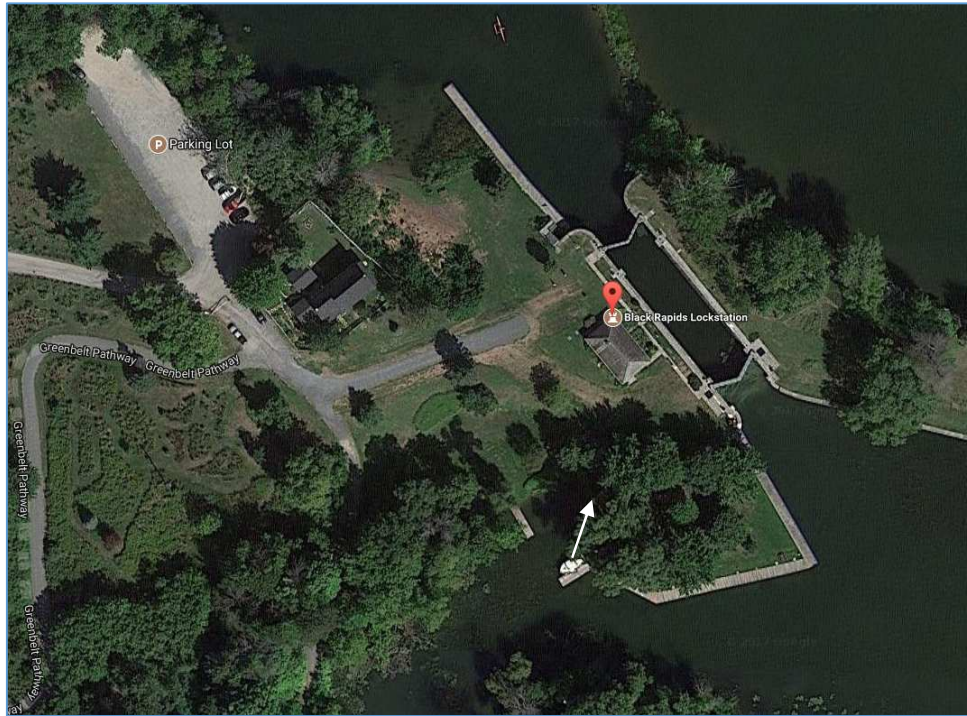


Figure 2: Black Rapids Lock 13.

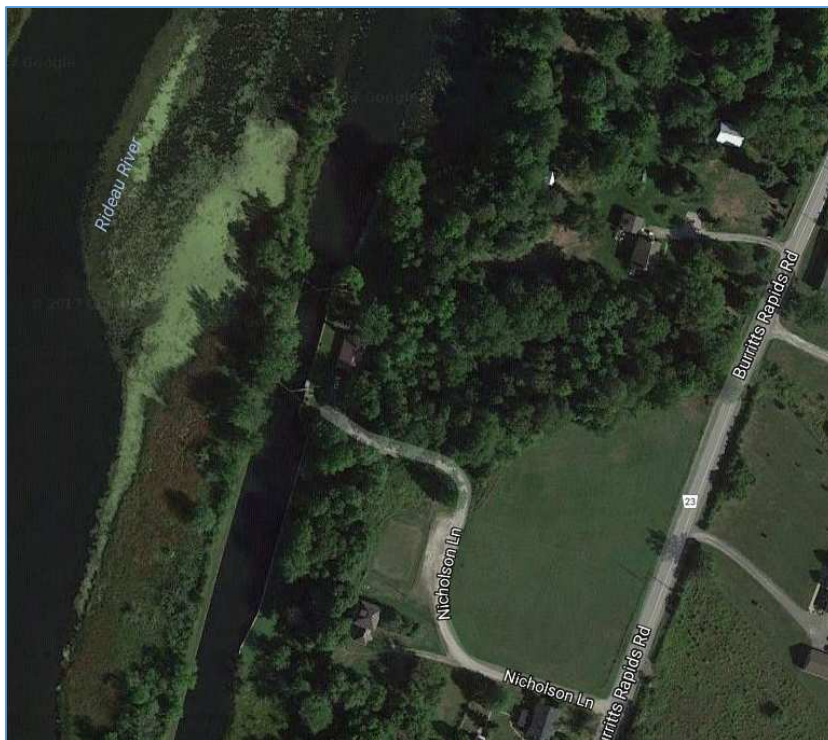
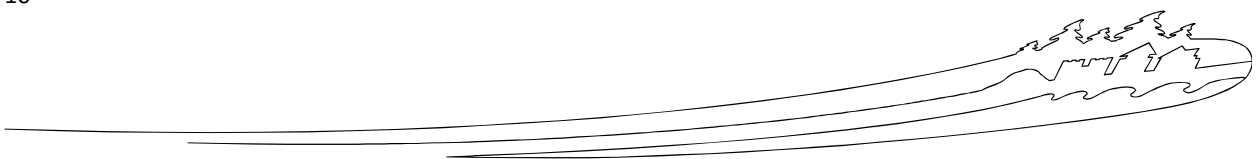


Figure 3: Lower Nicholson's Lock 18.



## 2. PROPONENT INFORMATION

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## 3. PROPOSED PROJECT DATES

Planned commencement: 2017-10-10  
Planned completion: 2018-05-11

## 4. INTERNAL PROJECT FILE # 30029240

## 5. NOTE ON BASIC IMPACT ASSESSMENT DOCUMENT

*The environmental constraints, best management practices and mitigation measures outlined within this Basic Impact Analysis (BIA) shall be adhered to and implemented accordingly. The information presented within this document may be appended to subsequent future BIA(s) for similarly-scoped projects, or for possible future amendments to this BIA to address changes in the scope of work of this project. Additional prescribed mitigation within the future BIA(s) are to be adhered to and implemented in conjunction with that of this (the Initial) BIA, with the exception of mitigation measures which are detailed to supersede specific mitigative measure outlined within the Initial BIA*

## 6. PROJECT DESCRIPTION

### 6 a) Location:

#### *Black Rapids*

Black Rapids Lockstation located along the Rideau Canal, situated roughly midway between Hog's Back and Long Island Lockstations, approximately 1.5 km south of the Hunt Club Road/Prince of Wales Drive intersection.

#### *Lower Nicholsons*

Lower Nicholsons Lockstation is also located along the Rideau Canal, situated between Burrits Rapids lockstation and Clowes lockstation.

### 6 b) Background:

Water management and the requirement to satisfy the Parks Canada Agency (PCA) Directive for Dam Safety are a part of Parks Canada's mandate. The implementation of this project will support the achievement of these requirements and will upgrade the overall asset condition of the Rideau Canal.

#### *Black Rapids*

There are three wharves located at Black Rapids which are to be replaced. Two main wharves, one downstream

(Lower Main Wharf) and the other upstream of the lock (Upper Main Wharf) that adjoins the lock. These are oriented parallel to the lock and serve a primary purpose of allowing boaters to moor their boats prior



to entering and passing through the lock. The third wharf is the Upstream Bay Wharf (Upper Secondary Wharf) that is perpendicular to the upper main wharf and allows users of the Canal to moor their boats there while visiting the site.

The two main wharves are constructed of rock filled timber crib structures with concrete deck. The secondary upstream bay wharf is constructed in a less rigid fashion than the main wharves with gabions and round concrete footings supporting the timber structure and to some degree the wharf resembles a boardwalk.

The Upper Main Wharf is relatively consistent in construction with uniformly a thick concrete deck and aging worn-out timber of the crib. The deck is sloping to the south west corner by approximately 150 mm from its original elevation.

The Lower Main Wharf is in much worse condition than that of the Upper Main Wharf. The deck varies in thickness and construction (in some degree) and may have been rehabilitated in the past. Some infill concrete sections are visible at low water level in proximity of the walls of the lock. The wharf is bowing, sloughing towards waterway and settling towards the free far end.

The third Secondary Bay Wharf is constructed of timber supported by gabions wrapped in geotextile and a series of round concrete footings possibly bearing on bedrock. The structure is in very poor condition with wood rot, some leaning of the structure, questionable structural integrity and adequacy, potential instabilities and open gabions that allow spillage of gabion infill stones. The deck of the wharf is leaning towards the water.

The depth of the water in front of the lower wharf varies between 0.43 to 0.73 metres during the winter season. The depth of the free standing water in front of the upper wharves varies between 0.0 to 0.2 metres during the winter season. This is the depth of free standing water that will be present during construction. These are the depths of free water that is anticipated to be present during construction.

#### *Lower Nicholsons*

The existing wharf at Lower Nicholsons is a filled timber crib structure approximately 42 metres long and 2.4 metres wide with a concrete deck. In some exposed areas it appears that fill used for the crib was composed of mix of rock pieces and smaller granular particles. The structure is in very poor condition with some leaning associated with wood rot at the north and south ends of the structure and splitting and displacement of section of timbers under the water in the central portion of the structure.

The depth of the water in front of the wharf varies between 0.7 to 1.75 metres at the Deepest during the winter season. This is the depth of water that anticipated to be present during construction.

#### **6 c) Land Ownership:**

All work will be undertaken on Federal Lands under the jurisdiction of Parks Canada Agency – Rideau Canal Waterway.

#### **6 d) Schedule:**

Navigation on the canal closes on October 12<sup>th</sup>, 2017. The project will start in Mid-October, at the end of navigation season and in-water works will be completed before March 15<sup>th</sup> of the respective year before Navigation Season starts to protect spring spawning fish, and land-based works shall be completed by the



end of May, prior to Navigation Season Opening Weekend. The total projected project timeframe is from October 2017 to May, 2018. The Construction Manager shall ultimately determine the construction scheduling timeline.

#### **6 e) Scope:**

The objective of this project is to address safety issues related to deterioration of the wharves and to extend the service life of these assets by renewing them. There are three wharves located at Black Rapids which are to be replaced; the Lower main wharf, the Upper Main Wharf, and the Upper Secondary Wharf. The single existing wharf present at Lower Nicholson's is also to be replaced.

The existing wharves are currently 2.4 m wide, and will be expanded to 3.0 m in their reconstruction. The existing footprint of the upper wharves at Black Rapids is currently 201 m<sup>2</sup>, and will be expanded to 239 m<sup>2</sup>, for an increase in footprint of 38 m<sup>2</sup>. The existing footprint of the Lower Main Wharf is currently 107 m<sup>2</sup>, and will be expanded to 137 m<sup>2</sup>, for an increase in footprint of 30 m<sup>2</sup>.

The existing footprint of the wharf at Lower Nicholson is currently 101 m<sup>2</sup>, and will be expanded to 161 m<sup>2</sup>, for an increase in footprint of 60 m<sup>2</sup>.

The total increase of footprint for the project is 128 m<sup>2</sup>. This increase in area is into the area along the shore line and into the area immediately adjacent of the existing footprints.

Cofferdams are to be installed to isolate the work areas along the Upper and Lower Wharves at Black Rapids. Poly-wrapped meter bags will likely be used to construct the cofferdams. A turbidity curtain will be installed in the water outside of the cofferdams. These are to be in place from mid-October 2017 to March 2018.

No tremie concrete is planned for reconstruction of the wharf at Lower Nicholson's. The work area is to be isolated with a turbidity curtain (or multiple) to contain turbid water generated from the wharves demolition and reconstruction. The new wharf is to be constructed with timber cribbage and granular infill, with a concrete cap. The cap is to be constructed above the water line using tightly sealed, leak-proof forms. An O<sub>2</sub> air bubbler should be installed in the water adjacent to the forms at the time of the pour to immediately treat any impacted water resultant of concrete leaks from the forms.

The work area isolated by the cofferdams will be de-watered, and excavation and removal of the existing structures will initiate, likely requiring about a week to complete. Preparation of the foundations of the wharves will be required prior to placement of the new cribbing as pre-built units. Forms will be built in order to place concrete for the deck surfaces. Forms will be removed once the concrete has cured. This may be completed by the end of December (on an optimistic schedule). If this occurs, removal of cofferdams could then take place in late-December or January.

Additional mitigation will be implemented to prevent migration of sediments outside of containment and upon removal of the selected containment method. Adaptive management principles will be followed for all works. Should additional areas of work be identified impacting public and infrastructure safety during the entire project duration, scope of work will be altered accordingly, which is not limited to addressing additional approach wall works as needed. Work will not occur outside of the non-navigation season, mitigation measures contained in the Environmental Review will be adhered to, and regulatory agencies will be consulted as required.



Reaches above and below the project sites during construction will be maintained at a water level within the annual winter drawdown levels specified for the location. There will be no residual change in bed composition or structure below the high water mark.

Vegetation and trees may require removal to widen/expand routes to make way for large equipment. Trees will be protected where possible and surfaces will be restored upon removal of access routes and staging areas.

Site staging areas and temporary access routes are identified on the site plan. Temporary access routes are to be selected based on path of least impact.

#### **6 f) Project Components:**

##### *Lower Nicholsons*

- Provision of access to site area, including all winter snow removal and maintenance;
- Construction of access roads;
- Installation of erosion and sediment control measures;
- Installation of turbidity curtains;
- Removal of trapped fish;
- Installation of cofferdams;
- Implementation of tree protection system and measures;
- Stripping of grass and top soil as required from removals and new construction;
- Removal of fixtures (BBQs, benches, etc.) for reinstatement;
- Excavation for structure removal and reconstruction;
- Construction of new wharves;
- Replacement of outlet pipes from catchbasin and repair catchbasin;
- Placement of rip rap in front of wharves;
- Backfilling of wharves;
- Installation of top soil and sod;
- Installation of Bollards on wharves;
- Removal of access roads and reinstate
- Reinstatement of all areas used for construction

##### *Black Rapids*

- Provision of access to site area, including all winter snow removal and maintenance;
- Construction of access roads;
- Installation of erosion and sediment control measures;
- Installation of turbidity curtains;
- Removal of trapped fish;
- Installation of cofferdams;
- Installation of dewatering system of excavation;
- Inventory of wood staircase and adjacent retaining walls at lower wharf for reconstruction;
- Implementation of tree protection system and measures;
- Excavation for structure removal and reconstruction;
- Construction of new wharves;
- Placement of rip rap in front of wharves;
- Reconstruction of electrical system at upper wharf;
- Backfilling of wharves;
- Reconstruction of wooden staircase and adjoining retaining walls at the upper wharf;





- Installation of top soil and sod;
- Installation of Bollards on wharves;
- Removal of access roads and reinstate
- Reinstatement of all areas used for construction

See Appendix C and D for detailed design plans.

#### **6 g) Navigability and Public Safety:**

The Rideau Canal and River is a designated navigable waterway pursuant to the List of Scheduled Waters as defined by the *Navigation Protection Act (NPA)*. Navigation is thereby managed and regulated by Parks Canada as part of the TSW in accordance with the *Historical Canals Regulations (HCR)*.

No effects to navigability are expected during the basin walls concrete rehabilitation works, the construction of the temporary cofferdams or any other in-water works associated with the project. Work is not being undertaken within the navigation season of the Rideau Waterway. No effects to the navigability of the Rideau Canal are predicted post-construction. Repairs to this asset ensure that safe navigation continues on the Rideau Waterway. Safety of both water based and land based visitors is a priority.

### **7. VALUED COMPONENTS LIKELY TO BE AFFECTED**

#### **7 a) Water Quality:**

Although the in-water work area for these sites will be isolated and/or dewatered for the construction season, some water, resultant from leakage of isolation barrier may pass through this area. By this, there is potential for contamination of water from spills and/or leaks from equipment. Also, potential of reduced water quality and clarity due to increased erosion, sedimentation and transport of debris, (e.g. discharge of waters).

Baseline water quality measures have been taken in the project areas prior to initiation of construction in order to get an accurate picture of background levels. This information will form the baseline for the mitigations measures outlined in this assessment.

Table 1: Baseline Water Quality for Black Rapids Lock 13

Quality Component	Downstream Lock 13	Inside Lock 13 Chamber	Upstream Lock 13
Temperature	19.508	18.548	19.315
pH	7.91	7.89	7.65
Turbidity	17.03	24.38	16.82
Dissolved Oxygen	8.64	8.29	7.79
Conductivity	345.8	349.5	342.2

\*Data Collected July 25<sup>th</sup> 2017





Table 2: Baseline Water Quality for Lower Nicholsons Lock 18

Quality Component	Downstream Lock 18	Inside Lock 18 Chamber	Upstream Lock 18
Temperature	22.021	21.951	21.995
pH	8.05	8.19	8.12
Turbidity	1.16	1.33	0.73
Dissolved Oxygen	7.63	8.25	8.21
Conductivity	251.7	251.2	251.2

\* Data Collected August 9<sup>th</sup> 2017

Furthermore, there is intent to utilize treated wood for the construction of the wharf cribbing. The chemical components of the preservatives present within the treated wood material, may potentially seep into the water, thereby adversely impacting water quality, and subsequently potentially adversely impacting fish health and fish habitat.

### 7 b) Fish and Fish Habitat:

Habitat surrounding the lockstations likely provide spawning, nursery, rearing, migration and feeding habitat for a variety of bait and sport fish species; however, the habitat is not rare or limited in the Rideau system.

A variety of aquatic plants are found in the Rideau River (Canadian Museum of Nature, 2001). The most common species include fragrant water lily (*Nymphaea odorata*), Common waterweed (*Elodea Canadensis*), Northern Water Milfoil (*Myriophyllum sibiricum*) and Eurasian Water Milfoil (*Myriophyllum spicatum*) (Canadian Museum of Nature, 2001).

The Rideau River has a diverse coolwater fish community. During fish community sampling as part of the Rideau River biodiversity project conducted in 1999-2000, thirty-five fish species were identified within the river (Canadian Museum of Nature, 2001), twenty-two species in the section from Smiths Falls to Burritts Rapids, which includes Edmonds Lockstation. Species found in this reach include:

- Northern Pike (*Esox lucius*)
- Largemouth Bass (*Micropterus salmoides*)
- Smallmouth Bass (*Micropterus dolomieu*)
- Common Carp (*Cyprinus carpio*)
- Yellow Perch (*Perca flavescens*)
- Greater Redhorse (*Moxostoma valenciennesi*)
- Silver Redhorse (*Moxostoma anisurum*)
- Brown Bullhead (*Ameiurus nebulosus*)
- Black Crappie (*Pomoxis nigromaculatus*)
- Central Mudminnow (*Umbra limi*)
- Brassy Minnow (*Hybognathus hakinsoni*)
- Golden Shiner (*Notemigonus crysoleucas*)
- Blacknose Shiner (*Notropis heterolepis*)
- Mimic Shiner (*Notropis volucellus*)
- Bluntnose Minnow (*Pimephales notatus*)
- Banded Killifish (*Fundulus diaphanus*)
- Brook Silverside (*Labidesthes sicculus*)
- Rock Bass (*Ambloplites rupestris*)
- Pumpkinseed (*Lepomis gibbosus*)
- Bluegill (*Lepomis macrochirus*)
- Tessellated Darter (*Etheostoma olmstedii*)
- Logperch (*Percina caprodes*)



Freshwater mussels found in the Smiths Falls to Burritts Rapids reach include:

- Eastern Elliptio (*Elliptio complanata*)
- Eastern Lampmussel (*Lampsilis radiata*)
- Floater (*Pyganodon sp.*)
- Fluted Shell (*Lasmigona costata*)
- Black Sandshell (*Ligumia recta*)
- Elktoe (*Alasmidonta marginata*)

**7 c) Erosion and Sediment Control:**

This section of the Rideau Canal passes through the Smiths Falls Limestone Plain, characterized by shallow soil and exposed limestone. Soils and landforms surrounding the lockstations have been historically disturbed by development including the building of the original canal infrastructure, municipal infrastructure and commercial and residential development. The Geotechnical Investigation Report for Black Rapids confirmed that the site's substrate consisted mainly of silty sand, silty clay, sandy silt, gravel, and limestone. The Geotechnical Investigation Report for Lower Nicholsons confirmed that the site's substrate consisted mainly of topsoil, silty clay, silty sand, gravel, sand, silt, clayey silt, and limestone.

There is potential for contamination of soil from spills and/or leaks from equipment; depending on winter conditions/snow cover, there is potential for soil exposure resulting in erosion, sedimentation and slope instability.

**7 d) Vegetation:**

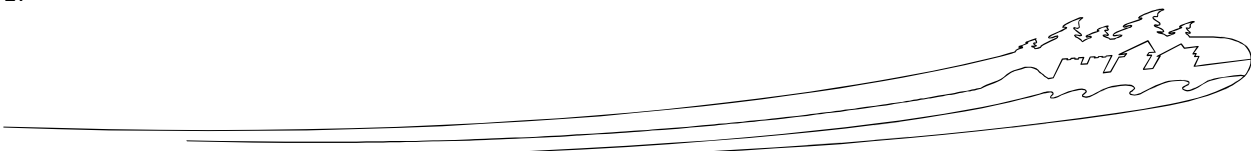
The lock areas are heavily influenced by past and present human development and activities. The lock areas designated for construction are mostly devoid of wild vegetation, and consists mainly of a manicured lawn, perennial and annual garden beds of planted native and exotic species, with some mature trees such as Cedar (*Thuja sp.*), Maple (*Acer sp.*) and Oak (*Quercus sp.*) specimens.

**7 e) Wildlife:**

The area surrounding the Black Rapids and Lower Nicholsons Lockstations is likely used by a variety of aquatic wildlife including frogs, beaver (*Castor canadensis*), muskrat *Ondatra zibethicus*), mink (*Neovison vison*), Eastern Musk Turtle (*Sternotherus odoratus*), Snapping Turtle (*Chelydra serpentina*), Midland Painted Turtle (*Chrysemys picta*) and Blanding's Turtle (*Emydoidea blandingii*) (Ontario Nature Reptile and Amphibian Atlas, 2015). However, the majority of the river embankments within proximity to these sites have been highly modified, with little-to-no wetland habitat available immediately adjacent to the wharves and Lockstations; use in this area would be transient.

Migratory birds also utilize the vegetation adjacent to the lockstations and waterfowl can be found on the water as well and on the lockstations grounds. It is possible that there is turtle overwintering habitat both within vicinity of the project sites.

Due to that vegetation will be disturbed (however minor), there is potential to affect birds and other wildlife species, both aquatic and terrestrial. Migratory birds, their nests and eggs are protected under the Migratory Birds Convention Act (1994). Project works that are potentially disruptive activities to nesting birds, such as vegetation clearing, should be avoided during the nesting period.



#### **7 f) Species at Risk:**

The Federal *Species at Risk Act* (SARA) provides protection to all species at risk (SAR) listed under Schedule 1 of the Act. Species at risk which may be found within the project areas, both federally listed species and species listed under the *Ontario Endangered Species Act* (ESA), 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 can be found in Table 1.

Basic habitat characteristics for each species have been included in Table 1 and an assessment given as to the likelihood of that species using habitat within the study area. For SAR that do not have critical habitat described in a recovery strategy, mitigation measures will be employed to ensure that individuals and their habitat are protected.

Lower Nicholson's Lockstation lies within zones of identified Critical Habitat for two species classified as Threatened under the SARA; the Eastern Musk Turtle (*Sternotherus odoratus*) the Eastern Whip-poor-will (*Caprimulgus vociferus*). Blanding's Turtle (*Emydoidea blandingii*) also has identified Critical habitat within very close proximity to Lower Nicholson's Lockstation (within 1 km).

No critical habitat for SAR has been identified at Black Rapids Lockstation, however Snapping Turtles (*Chelydra serpentina*) have also been previously observed at Black Rapids Lockstation.



Table 3: Species at Risk with Potential to be Found Within the Project Area.

Common Name	Scientific Name	COSEWIC	SARA Status	ESA Status	Habitat Potential on Project Site	Preferred Habitat
<b>BIRDS</b>						
Eastern Whip-poor-will <sup>1</sup>	<i>Caprimulgus vociferus</i>	Threatened	Threatened	Threatened	Not likely	Semi-open forests or patchy forests with clearings, such as barrens or forests that are regenerating following major disturbances. Eastern Whip-poor-wills migrate to Mexico and Central America for the winter
Least Bittern	<i>Ixobrychus exilis</i>	Threatened	Threatened	Threatened	Not likely	The Least Bittern breeds strictly in marshes dominated by emergent vegetation surrounded by areas of open water. Most breeding grounds in Canada are dominated by cattails, but breeding also occurs in areas with other robust emergent plants and in shrubby swamps. Breeding habitats are occupied from mid-May to mid-September. In winter months Least bitterns migrate to the southern United States, Mexico and Central America.
Golden-winged Warbler <sup>3</sup>	<i>Vermivora chrysoptera</i>	Threatened	Threatened	Special Concern	No	Regeneration areas (old fields, hydro right-of-ways) surrounded by mature forest
Red-shouldered Hawk <sup>3</sup>	<i>Buteo lineatus</i>	Not at Risk	Special Concern	Not at Risk	No	Deciduous or mixed-wood forests containing shade-tolerant hardwood trees close to wetland areas. Large woodlots (10 to 100 hectares) can sustain viable Red-shouldered Hawk populations.
Black Tern <sup>3</sup>	<i>Chlidonias niger</i>	Not at Risk	No Status	Special Concern	Not likely	Shallow marshes, generally comprised of cattails. In winter months Black Tern migrate south to

Common Name	Scientific Name	COSEWIC	SARA Status	ESA Status	Habitat Potential on Project Site	Preferred Habitat
						central-America, the Atlantic coast and Mexico.
Common Nighthawk <sup>3</sup>	<i>Chordeiles minor</i>	Threatened	Threatened	Special Concern	Not likely	Open, vegetation-free habitats (dunes, beaches, recently harvested forests, burnt-over areas, rocky outcrops, rocky barrens, grasslands, pastures, peat bogs, marshes, lakeshores, and river banks)
Barn Swallow <sup>3</sup>	<i>Hirundo rustica</i>	Threatened	No Status	Threatened	No	Nest almost exclusively on man-made structures (bridges, culverts, barns)
Eastern Wood-pewee <sup>3</sup>	<i>Contopus virens</i>	Special Concern	No Status	Special Concern	No	Edges of mixed or deciduous forests, intermediate-aged mature forests. The Eastern Wood-pewee is a long distance migrant, wintering in the tropics.
Wood Thrush <sup>3</sup>	<i>Hylocichla mustelina</i>	Threatened	No Status	Special Concern	No	Mature mixed or deciduous forests, often moist, well-developed undergrowth, large forest stands. The Wood Thrush is a long-distance migrant, wintering in southern America and Mexico.
Bobolink <sup>3</sup>	<i>Dolichonyx oryzivorus</i>	Threatened	No Status	Threatened	No	Bobolink nest in tallgrass prairie and other open meadows, including hayfields.
Eastern Meadowlark <sup>3</sup>	<i>Sturnella magna</i>	Threatened	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.
<b>Reptiles and Amphibians</b>						
Eastern Musk Turtle <sup>1</sup>	<i>Sternotherus odoratus</i>	Special Concern	Threatened	Special Concern	Possible	Eastern Musk Turtle require shallow water with little or no current, and soft earth to bury into when they



Common Name	Scientific Name	COSEWIC	SARA Status	ESA Status	Habitat Potential on Project Site	Preferred Habitat
						hibernate. Nesting habitat is variable, but it must be close to the water and exposed to direct sunlight.
Blanding's Turtle <sup>4</sup>	<i>Emydoidea blandingii</i>	Threatened	Threatened	Threatened	Possible	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.
Snapping Turtle <sup>2</sup>	<i>Chelydra serpentina</i>	Special Concern	Special Concern	Special Concern	Likely	Has been recorded in the area previously. Usually found in large bodies of water, but will sometimes inhabit small ponds. Rarely leave water except to nest and migrate to overwintering habitat.
Northern Map Turtle <sup>5</sup>	<i>Graptemys geographica</i>	Special Concern	Special Concern	Special Concern	Possible	The Northern Map Turtle inhabits both lakes and rivers, showing a preference for slow moving currents, muddy bottoms, and abundant aquatic vegetation.
Eastern Milksnake <sup>4</sup>	<i>Lampropeltis triangulum</i>	Special Concern	Special Concern	Special Concern	Not likely	Found in a wide variety of habitats, from prairies, pastures, and hayfields, to rocky hillsides and a wide variety of forest types. Often in close proximity to water.
Gray Ratsnake <sup>2</sup>	<i>Pantherophis spiloides</i>	Threatened	Threatened	Threatened	Not likely	Gray Ratsnake inhabit a wide variety of habitats, with a preference for a mosaic of forest and open habitats, such as fields and rocky outcrops. In winter, they hibernate underground in communal hibernation sites which provide protection against freezing

Common Name	Scientific Name	COSEWIC	SARA Status	ESA Status	Habitat Potential on Project Site	Preferred Habitat
						and dehydration. Individuals show strong fidelity to hibernacula. During summer, snakes seek refuge in snags, hollow logs, rock crevices and under rocks to shed and to escape from extreme heat and predators.
<b>Insects</b>						
Monarch <sup>5</sup>	<i>Danaus plexippus</i>	Special Concern	Special Concern	Special Concern	Not likely	Monarchs can be found wherever milkweed and wildflowers grow. This includes abandoned farmland, along roadsides, and other open spaces.
<b>Mammals</b>						
Little Brown Myotis <sup>5</sup>	<i>Myotis lucifugus</i>	Endangered	Endangered	Endangered	Not likely	Little Brown Myotis 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.
Northern Myotis <sup>5</sup>	<i>Myotis septentrionalis</i>	Endangered	Endangered	Endangered	Not likely	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.
Tri-coloured Bat <sup>5</sup>	<i>Perimyotis subflavus</i>	Endangered	Endangered	Endangered	Not likely	Often found hibernating in same locations as Little Brown Myotis and Northern Myotis – abandoned mines and caves. Relatively rare species in Canada.



Common Name	Scientific Name	COSEWIC	SARA Status	ESA Status	Habitat Potential on Project Site	Preferred Habitat
Eastern Small-footed Bat <sup>5</sup>	<i>Myotis leibii</i>	Not Assessed	Not Assessed	Endangered	Not likely	Often found hibernating in same locations as Little Brown Myotis and Northern Myotis, but they tend to occupy cooler, drier areas of the cave. In summer they forage at night and roost in a variety of habitats, including in or under rocks, in rock outcrops, in buildings, under bridges, or in caves, mines, or hollow trees.

<sup>1</sup>COSEWIC Draft Critical Habitat Mapping

<sup>2</sup>NHIC

<sup>3</sup>Atlas of Breeding Birds of Ontario

<sup>4</sup>Ontario Reptile and Amphibian Atlas

<sup>5</sup>Field Observation

Critical Habitat identified in 10km x 10km square surrounding site



Due to the nature and the location of the project and the environmental setting, the species identified as having the most potential to be in the vicinity of the project site and possibly affected by the work are, Eastern Whip-poor-will, Eastern Musk Turtle, Blanding's Turtle, Snapping Turtle and Northern Map Turtle.

**7 g) Air Quality and Noise:**

The use of diesel-powered machinery and concrete may result in temporary, localized effects on air quality around the project site. Noise from construction may be disruptive for property owners adjacent to the project sites, as well as recreational users of the surrounding walking trails.

**7 h) Invasive Species:**

As the project involves soil excavation and vegetation removal activities, there is a possibility for invasive species to be accidentally introduced into and/or spread throughout the project sites.

The following invasive species have been recorded and confirmed within the Canal system and/or within proximity of the project site locations:

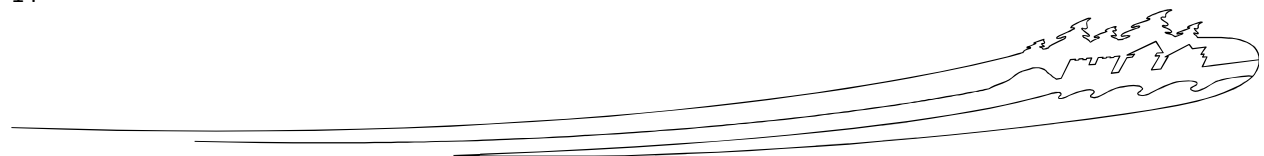
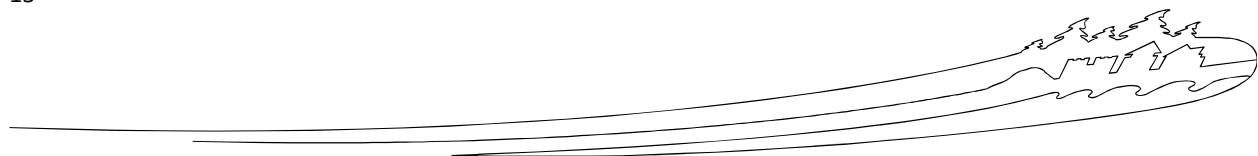




Table 4: Invasive Species within proximity of Project Site Locations

Species	Location	EDDmaps Record ID
Common St. Johnswort <i>Hypericum perforatum</i> L.	Township of Montague, Ontario, Canada	2942295, 3954008
European Buckthorn - <i>Rhamnus cathartica</i> L.	Township of Montague, Ontario, Canada	2942126, 2942127, 2942128, 2942129, 2942130, 2942131, 2942132, 2942133, 2942134, 2942140, 2942141, 2942212, 3953894, 3953931, 3953932, 3953933, 3953934, 3953935, 3953936, 3953937, 3953938, 3953939, 3953940, 3953941, 3953942
European Frog-bit <i>Hydrocharis morsus-ranae</i> L.	Township of Montague, Ontario, Canada	2942145, 2942152, 2942153, 2942154
European water chestnut <i>Trapa natans</i> L.	City of Ottawa, Ontario, Canada	4202637
Flowering-rush <i>Butomus umbellatus</i> L.	Township of Montague, Ontario, Canada	2942120, 3954105
Glossy Buckthorn <i>Frangula alnus</i> Mill	Township of Montague, Ontario, Canada	2942142
Himalayan balsam <i>Impatiens glandulifera</i> Royle	City of Ottawa, Ontario, Canada	3943080
Rusty Crayfish <i>Orconectes rusticus</i> (Girard, 1852)	Village of Merrickville-Wolford, Ontario, Canada AND City of Ottawa, Ontario, Canada	2952132, 2952134, 2952136
Tatarian Honeysuckle <i>Lonicera tatarica</i> L.	Township of Montague, Ontario, Canada	2941972, 2941973, 2942143, 3953944, 3953945, 3953946, 4455391, 4455392, 4455393
Wild Parsnip <i>Pastinaca sativa</i> L.	Township of Montague, Ontario, Canada AND City of Ottawa, Ontario, Canada	4253015, 4746028
Zebra Mussel <i>Dreissena polymorpha</i> (Pallas)	Village of Merrickville-Wolford, Ontario, Canada AND City of Ottawa, Ontario, Canada	2936371, 2951618, 2951621, 2951628

See <https://www.eddmaps.org/ontario/> for further information on invasive species sightings



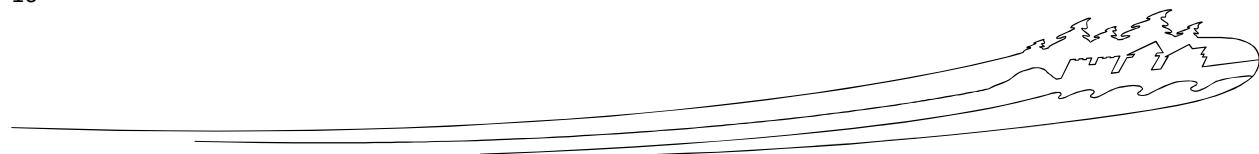


### 7 i) Cultural Resources:

Black Rapids lock was constructed in 1831 and measured at 33 feet wide and 134 feet long with seven feet of water on the lower sill and six feet on the upper. The original lock walls were constructed of limestone and each wall is 5 feet thick at the top and 8 feet at the bottom with a batter on each side. This lock was mechanized in 1969. The wharves at Black Rapids Lockstation are a later intervention to the lock station, they are not depicted in the historic documents (fig 1: a historic sketch of the Black Rapids and the 1831 map). Also, no record of the construction of the original wharves were found. In the Rideau Canal National Historic Site of Canada: Submerged Cultural Resource Inventory Report, J. Moore stated that three wharves were constructed in 1851. Other reports and historic maps documents the first existence of the wharves in 1909 with 1919 repairs. The 1986 diving inspection report explains that the wharves were built with rock filled timber structure covered with a plank deck which later got replaced or covered with concrete cap.

Prior to the construction of the Rideau Canal, Black Rapids was situated in the midst of wilderness at the junction of the Rideau River and Black Rapids Creek. The area was named after a series of boulder-strewn rapids situated above the mouth of the creek, which were eventually flooded out by the construction of a stone dam by 1830 (Passfield 1982:69). Surrounding lands were also inundated, creating a basin at the mouth of Black Rapids Creek. With no road access at the time of construction, Black Rapids lockstation did not require loading wharfs, and the sheltered waters of the entrance bay above and below the lock rendered stand-by piers unnecessary (AOA - Figures 8 to 10; DIAND 1976:61). The natural shoreline was retained at the site, with the exception of the stone retaining walls set downstream of the locks (AOA - Figures 8 and 9). By 1851, three wharves were situated upstream and downstream of the lock. The furthest upstream wharf serviced the stone quarry, likely opened by contractors Phillips and White on the east shore of the Rideau River during the construction of the lockstation (Moore et al. 2005:201). The first mention of the wharves extending from the lock approaches was in a 1919 report, which stated that repairs were being made to the lay-by piers (DIAND 1976:62). A 1925 aerial of Black Rapids lockstation illustrates the lay-by piers (or wharves) extending straight from the outer edge of the western lock wing walls (Figure 12). The northern (downstream) pier was approximately 30 m in length and 2.5 m in width, and the southern (upstream) pier was slightly wider and some 6 m longer (DIAND 1976:62). An additional wooden crib was observed extending into the basin (Figures 13 and 15). The upper pier was capped in concrete in 1965, and the lower pier was capped a year later (DIAND 1976:44). Although it is not known when these wharves were first constructed, the use of timber cribbing is reminiscent of that employed in the construction of the waste weir in 1862 and its replacement in 1909. Additionally, given that the period from the mid-1850s to the late 1880s was the heyday of steamer freight haulage on the Rideau system, the wharves may have been constructed shortly after 1860 (DIAND 1976:62).

The wrap-around wooden deck was constructed sometime between 1950 and 1977 (AOA - Figures 12 to 14). According to the Preliminary Site Study report for Black Rapids: "when the [wooden] dock was built around the edge of the bay it was continued at an angle until it met the end of the pier. The triangular area of water enclosed by the pier and the new dock was then filled in with earth. The dock consists of a rock filled timber crib with a plank deck. The heavy timbers of the crib are 12" x 12" to match the lay-by pier. The deck is constructed of 3" x 8" planks spiked cross-ways on the crib." (DIAND 1976:44).





An addition to the wharves, several buildings and features (e.g. a garden) were scattered across the site through the years (AOA - Figure 15).

Nicholsons' Lockstation includes two locks, lock 18 (Lower Nicholsons) and lock 19 (Upper Nicholsons), situated 385 metres apart along an excavated channel, a unique configuration on the canal designed to bypass the Rideau River's rapids and shallows. The two locks have a lift of seven feet (Lower Nicholsons), and the other of eight feet and two inches (Upper Nicholsons). The lower lock is at the eastern entrance of the channel, and the upper lock is located near its middle.

Nicholsons locks were constructed to circumvent an extensive set of rapids, 915 m in length with a 4.4 m drop, and named after James Nicholson, a Loyalist who served with Jessup's Rangers in the American Revolution (Watson 2007:26). In 1838, a defensible lockmaster's house was erected on the site. By the 1840s, several buildings stood above the upper lock, which housed canal workers during the construction period, and one served as the lock labourer's house (Passfield 1982:82).

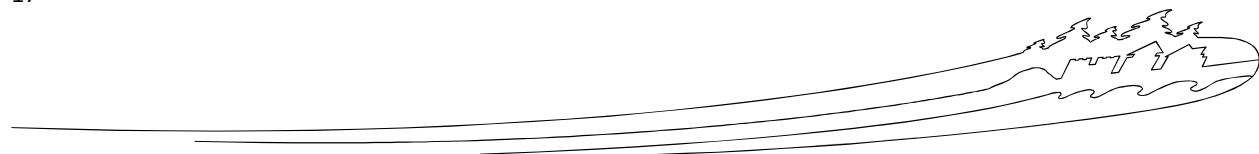
In 1861, Rufus Andrews constructed a flour mill at the site, later known as Andrewsvilles, and three years later, Andrews had a swing bridge erected across the canal cut to complete the road crossing (Passfield 1982:82). The sawmill changed hands and in 1899 became the property of Alonzo Bowen, a member of the Bowen family that owned Kemptville Milling Co (DIAND 1976:10). Bowen modified the sawmill and developed a hydroelectric station, which supplied Kemptville. The mill was demolished in 1917 and the hydrostation was destroyed by powerful spring floods in 1930 (DIAND 1976:10-11). Many structures and features, including a midden were scattered across the site (Figures 5, 6 and 9). A timber-cribbed wharf was erected on the east mainland below the lock, possibly during the heyday of steamer freight haulage on the Rideau system between the mid-1850s and the late 1880s. Originally built with a wood-plank surface, this wharf was capped with concrete between 1964 and 1974 (DIAND 1976:26).

Recent investigations suggest the lands behind the wharf are an old swamp-like area that was left in place and covered with imported material (Email correspondence between WSP and Charron, 1 January 2017). However, historical imagery suggests that these lands and the shoreline have been little altered through the years (AOA - Figures 5 to 8).

## **7 j) Archaeology:**

### ***Black Rapids***

In 1984, archaeological monitoring of the excavation for a septic tank and weeping tile bed north of the lockmaster's house revealed masonry foundations, possibly belonging to the original lockmaster's house, a 20th-century drainage feature and several 19th-century artifacts (Lane 1984a, 1984b). In 1998, PCA's Terrestrial Archaeology team returned to the site for two projects: tree planting, and test excavations on the road embankment west of the lock office. The tree hole situated within the fenced area, northwest of the lock master's house, revealed late 19th-century and early 20th-century artifacts, and the test excavations completed on the road embankment uncovered hundreds of artifacts dating between the 1880s and the 1920s (Phillips 1998). Between 2003 and 2004, Parks Canada monitored borehole drilling for and construction of a recreational pathway proposed by the National Capital Commission (Leskovec 2005). The archaeological monitoring activities indicated that the area by Black Rapids Creek has been little altered through the years, whereas the northern half of the trench uncovered deposits of





landscaping fill, large slabs of limestone, remnants of structural concrete as well as a large number of glass soda pop bottles. A retaining wall, comprising dry-laid limestone slabs, was uncovered along the river's edge to the south of the former tenant cottage. Now demolished, the retaining wall stretched approximately 8.5 m in length and approximately 1.0 m in height. Two black PVC pipes and a metal rod were built into this section of the wall suggesting that it was a modern feature. In later years, two additions were added to further stabilize the slope: a 0.85 m high, 0.80 m wide, and 3.0 m long section of cemented concrete blocks, and a stone gabion, rock wrapped in wire mesh.

PCA's Underwater Archaeology Team carried out a series of underwater archaeological surveys along the Rideau Canal that revealed a wealth of information on submerged cultural resources present at various lockstations along the canal (Moore et al. 2005). At Black Rapids, a side scan sonar survey recorded the foundations of a wharf, built prior to 1851, south of the lock as well as the remains of two ice breaker cribs above the waste weir (Moore et al. 2005:202). A visual assessment revealed a chord of the stone arch spillway dam, approximately 30 m in length, projecting above both the river bed and water (Moore et al. 2005:203). Constructed between 1827 and 1830, some of the stones observed retained their original vertical alignment. PCA's Underwater Archaeology Team also conducted a visual inspection for a wharf likely affiliated with the quarry (Moore et al. 2005:201). No obvious signs were observed.

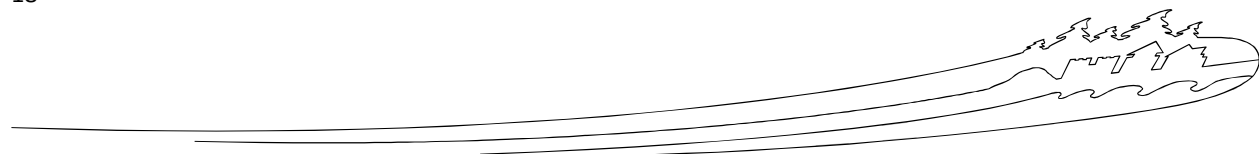
#### *Lower Nicholsons*

With the exception of PCA's Terrestrial Archaeology section recording the excavation for a natural gas line to the Defensible Lockmaster's House in 2004, no terrestrial archaeological assessments have been conducted at Lower Nicholsons lockstation. The site retains archaeological potential for evidence of historical features such as early buildings and a midden affiliated with the construction and/or operation of the canal (Figure 9).

PCA's Underwater Archaeology team have not conducted any fieldwork in the reach between Nicholsons and Clowes and no confirmed or potential submerged cultural resources are known to exist in this section, apart from the canal structures (Moore et al. 2005:176). At Andrewsville, PCA's Underwater Archaeology team observed and recorded two ice breaker cribs, concrete and stone piers from the mill dam in the waste channel, and the stone foundation of the grist mill projecting from the riverbank into the Rideau River (Moore et al. 2005:177-179). Side scan sonar also identified a target measuring approximately 6 m in length, which could be the remains of the historical footbridge that crossed the Nicholsons Locks waste channel in the 1840s (Moore et. al 2005:179).

#### **7 k) Health and Safety:**

The health and safety of on-site workers and members of the general public within vicinity of the work areas must be ensured throughout the duration of construction. This may be enforced by restricting public accessibility of the project sites and ensuring proper compliance with Health and Safety procedures and mitigation by work personnel.





## 8. EFFECTS ANALYSIS

The following section outlines the potential impact of the proposed works on valued components in the study area.

This project takes place within close proximity to urban and agricultural properties and lands maintained and utilized for the Rideau Lock system. The locks and associated park areas are heavily influenced by past and present human development and activities. See Figures 2 and 3 above for satellite imagery of the general project site areas and their surrounding environmental conditions.

### 8 a) Water Quality, Fish and Fish Habitat:

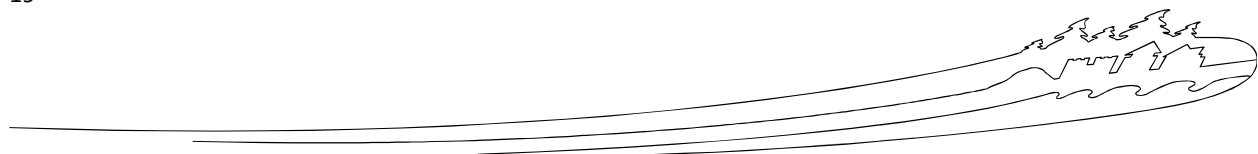
Sensitive fish habitat is not anticipated at the project site as the work is restricted directly adjacent to the existing wharves. Generally lacking perennial aquatic vegetation, the area or work would not likely be utilized for spawning in spring. In-water work restrictions will protect the potential for nesting species in downstream areas.

As stated above in section 6(e), the total increase of footprint for the project is 128 m<sup>2</sup>. This area of impact is along the shoreline, directly adjacent to the existing wharves. Of this 128 m<sup>2</sup>, approximately 65.25 m<sup>2</sup> is an expansion of footprint into the watered area (27 m<sup>2</sup> of the Lower Wharf at Black Rapids, 3.45 m<sup>2</sup> of the Upper Wharf at Black Rapids, and 34.8 m<sup>2</sup> of the Main Wharf at Lower Nicholsons respectively). The remaining footprint (approximately 62.75 m<sup>2</sup>) is an expansion of footprint into the current existing shore-line and lawn-area adjacent to the current existing wharves.

This in-water shoreline area in question is not considered to be of high-quality aquatic habitat for fish and other aquatic-based species (i.e. turtles, crayfish, etc.), however the timber-cribbed wharves to be established in this area, with time, may improve the quality of the habitat for fish and other aquatic-based wildlife, by providing sheltered refuge areas, nesting habitat, and/or overwintering habitat. The design plans for the new wharves illustrate the timber cribbage to be quite tightly set against one another, with the interior of the timber cribbed area to be in-filled with rock material. With time, settling and recession of the rock-fill and timber cribs may provide this shelter/refuge habitat. Over-all, the loss of aquatic habitat is considered to be a small/negligible amount of low-quality habitat when compared to the amount of potential habitat available adjacent to the project sites. Furthermore, other, more suitable, habitat is widely available in close proximity to the project sites.

The potential environmental effects of project activities on fish and fish habitat include interference with biological time periods (i.e., migration or spawning), the addition of suspended solids to the water column through erosion and sedimentation, potential stranding of fish during dewatering and direct mortality of fish. The dewatered work area will be altered during construction but it will be restored to pre-construction conditions before being re-watered.

Erosion and sedimentation events may occur as a result of project activities, potentially increasing the amount of suspended solids in the water column. Such events can cause increased sediment loads potentially harming fish by altering foraging behaviour and causing physical damage to gills and scales.







Increased sediment loads can also smother benthic invertebrates (a primary food source for many fish species) and cover/infill coarse spawning habitat as silt settles.

Spills of fuels or hydraulic fluid from construction equipment could negatively impact surface water quality.

There is potential for fish to be present between lock gates and within the basin area to become stranded in the dewatered area; with this, any stranded fish in the dewatered area must be live captured and released.

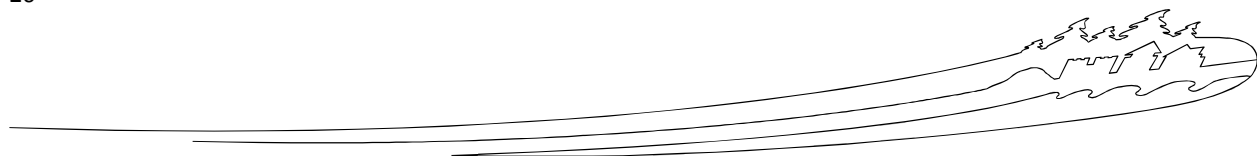
The planned work in these locations can be conducted with the proper and efficient implementation of the appropriate BMPs and mitigation measures, and timing phases of in-water works, such that there are minimal adverse impacts to the environment. Adverse impacts should furthermore be minimized and mitigated through the strict adherence to environmental scheduling constraints with regards to in-water works (March 15 – June 30).

There is potential effect of release of toxins into the water column due to the use of treated wood. While alternatives were considered to not use treated wood, it was determined that in order to maintain the heritage value of the site and prevent significantly reducing the life expectancy of repairs, treated wood would be required.

Utilizing PCA guidance and Policy procedures, the treated wood material selected for the construction of the wharf cribbage should be a material which has the least long and short-term adverse environmental impact upon water quality, fish health and fish habitat quality, without compromising the structural and cultural integrity of the wharf structures.

Nine wood preservatives are currently registered in Canada: 1- Alkaline copper quaternary (ACQ), 2 - Ammoniacal copper zinc arsenate (ACZA), 3 - Copper azole (CA [CA-B]), 4 - Copper Naphthenate (CuN), 5 - Creosote (PAH), 6 - Chromated Copper Arsenate (CCA), 7 - Pentachlorophenol (PCP), 8 - Borate, and 9 - Zinc Naphthenate (CuN). The active ingredients of four of these nine legally registered in Canada as wood preservatives under the *Pest Control Products Act (2006)* (PCPA 2006) are also listed as toxic substances under Schedule 1 of the *Canadian Environmental Protection Act (1999)* (CEPA 1999): CCA, ACZA, PAH and PCP. **Use of wood treated with these four preservatives is consequently not recommended within lands and waters administered by Parks Canada as they can pose significant risk to human health and the environment.** In cases where there is no viable alternative (other material, non-Treated Wood or wood treated with other preservatives) the sampling must be conducted within three years of installation and again at the end of the products service life to ensure no contamination is present.

According to the project's construction designs, the wooden staircase at the Lower Wharf of Lower Nicholson's shall be constructed of Pressure Treated SS/No.1 SPF, with the exception of handrails (and other components which shall come into contact with the hands of the public) which shall be comprised on Western Red Cedar.





The timber cribbing shall be comprised of SS or No.1 Coastal Douglas Fir, and will be graded according to the NLGA Standard Grading Rules for Canadian Timber. All wood utilized for the timber cribs shall be pressure treated and the type of preservative and the net retentions shall be as per CSA 080 for category UCA4.2 which is the classification provided for Wood used in ground contact and is considered a critical structural component or is difficult to replace.

All wood utilized in the project shall be marked using a grade stamp or an association of an independent grading agency according to CAN/CSA C141.

Ammoniacal copper zinc arsenate (ACZA), Creosote (PAH), Chromated Copper Arsenate (CCA), and Pentachlorophenol (PCP) are considered toxic substances under Schedule 1 of CEPA 1999 (this includes ACZA, CCA, Creosote, or PCP-based). Any release or spills of these preservatives onsite should be treated as toxic spills and remediated immediately. The spill response mitigations identified in this document must be followed.

The use of treated wood should always be managed so that the resulting water and sediment concentrations of preservative active ingredients (including background concentrations) remain below water quality criteria and sediment benchmarks or quality criteria, where they exist. See Section 9 Below for further specific mitigation measures for use of Treated Wood.

Despite the potential effects of project activities, with the proper implementation of mitigation measures to protect against sedimentation, to protect against spills, and to ensure work does not occur during sensitive timing windows, it is not anticipated that there will be residual negative impacts to aquatic resources.

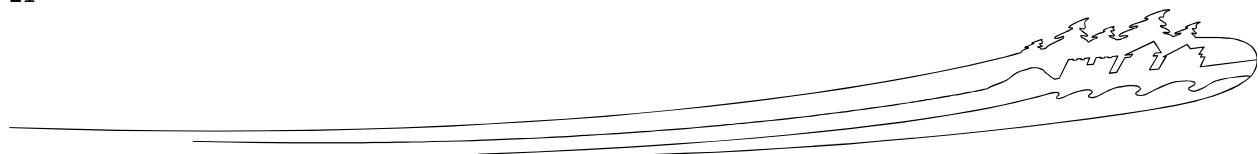
#### **8 b) Erosion and Sediment Control:**

The use of heavy machinery, removal of vegetation, use of concrete, and the dewatering of water bodies increases the risk of soil disturbance and sediment movement. Vegetation removal and excavation activities will be kept to an absolute minimum, and will be appropriately managed through the installation and maintenance of effective erosion and sediment control measures. Identifying and keeping work activities within areas identified in approved site plans and to previously disturbed areas, in addition to employing best practices, mitigation and monitoring, will further minimize this impact (see Section 9).

#### **8 c) Vegetation:**

Tree and shrub removal which may occur is essentially limited to vegetated areas which have been heavily influenced and maintained by human activity, and would thereby not be considered significant or specialized habitat. The project involves clearing of very little vegetation and no real disturbance to the wild-vegetation and forest areas. Single tree removal may be required for site access. Vegetation loss will be minimal and short-term in nature, since the area will be replanted and revegetated after construction. A revegetation planting plan will developed to replace trees removed for the project.

There is currently no plan to remove a sizable amount of terrestrial vegetation, but project activities will likely require the removal of a small amount of vegetation. The vegetation to be removed may include a





variety of trees, shrubs and forbs common to the area, both native and exotic invasive species. No species at risk vegetation is located in the study area. Manicured grass within the work area will be impacted by construction. Any exotic invasive species found within the construction area where activities are disturbing the site or ground, must be removed and disposed of appropriately. A tree planting plan will be developed to replace trees removed for the project and will be carried out by Parks Canada post-construction.

It is possible that a minor amount of aquatic vegetation will be lost due to the installation of cofferdams; however, aquatic vegetation generally re-establishes during the next growing season so the loss will be temporary

#### **8 d) Wildlife:**

The project's activities will take place outside of reptile and amphibian nesting season. However, reptiles and amphibians may still be found on site as they migrate to overwintering habitat in the case of turtles, or as they forage in the case of snakes. Mitigation measures that will be employed to reduce the risk of turtles from entering the site will also work to reduce the risk of snakes from entering the site.

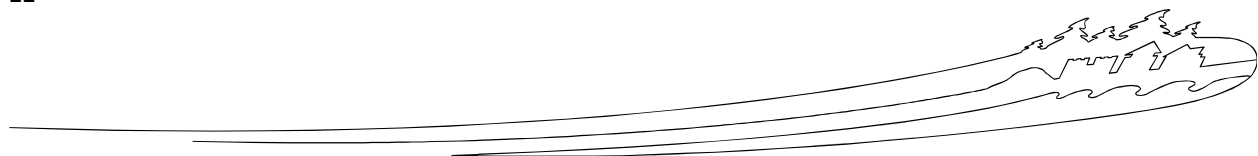
Construction is to take place during the winter months, outside of bird breeding and migratory windows. Because the extent of vegetation removal is minimal – primarily individual tree selection - effects on birds (and other wildlife) are also expected to be minor. Of those bird species found to be residing in and around the project site during construction, they are likely to be hardier, winterized species which are well adapted to utilize diverse and/or common-spread habitat during this time of year. It is unlikely that the habitat present at the project sites would be critical or essential for local bird species during this time. Vegetation removal to prepare for project start-up is scheduled to occur outside of the nesting season. Construction activities will be largely completed prior to the subsequent year nesting season. Therefore, effects on birds will be considered to be minor.

Foraging opportunities for wildlife will be limited by the disturbance on site during construction, but the disturbance will be temporary and the habitat type being disturbed is widespread on the landscape outside the area of disturbance.

With the proper implementation of mitigation measures, there should be no residual negative impact to wildlife.

#### **8 e) Species at Risk:**

As identified in Table 1, four Species at Risk have the potential to be present within the project areas; Eastern Whippoorwill, Eastern Musk Turtle, Blanding's Turtle and Snapping Turtle. For those species which do not have critical habitat identified through a recovery strategy, either the planned works will not impact their habitat of individuals, or mitigation measures will be employed to protect individuals and their habitat. The timing of the work (Fall/Winter) will greatly reduce the risk to individuals for most species at risk – birds, reptiles and amphibian will have all completed nesting, hatching, fledging and migration.





- *Eastern Whip-poor-will:*

The recovery strategy for Eastern Whip-poor-will (Environment Canada, 2015) identifies both nesting and foraging critical habitat. Nesting habitat includes 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), rock or sand barrens with scattered trees, savannahs, old burns, as well as sparse conifer plantations. Foraging habitat include prairies, wetlands with shrubs, regenerating clear-cuts as well as agricultural fields and other habitats with low tree cover and availability of foraging perches as these conditions favor the localization of prey by lunar light as well as foraging efficiency.

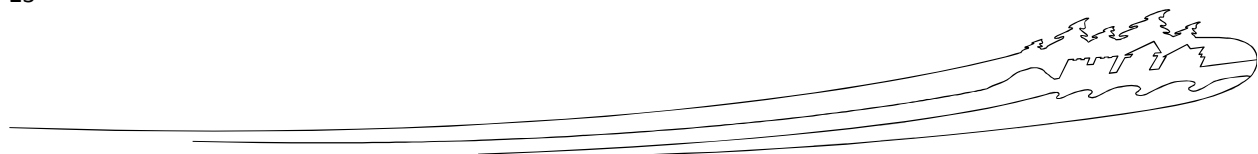
However, given the project's location(s) and degree of past human-induced impact and development of the project sites and surrounding areas, the project's activities are not anticipated to have significant adverse impacts to individual specimens, nor is it likely to give rise to the destruction of critical nesting and/or foraging habitat. Additionally, the Eastern Whip-poor-will is not anticipated to be present during the time of work due to southern migration activity. Nonetheless, appropriate mitigation will be advised should individual specimens be observed in, or within proximity to, the project sites. A full assessment can be found in Appendix B.

- *Eastern Musk Turtle:*

The proposed recovery strategy for the Eastern Musk Turtle (Environment Canada, 2016) describes Eastern Musk Turtle habitat as stagnant or slow-moving shallow wetlands that are connected to larger permanent waterbodies or shallow bays of lakes and rivers. In Canada, Eastern Musk Turtles have been found in different types of waterbodies, such as lakes, ponds, marshes, rivers and streams; however, Eastern Musk Turtle seems to require water with abundant emergent, floating, and submerged aquatic vegetation that provides surface cover, which may be important for foraging, adult and juvenile refuge, and thermoregulation. Furthermore, they are often found in areas with a soft substrate such as sand or organic mud where they can readily bury themselves, and also areas with gravel bottoms (Environment Canada, 2016). The bounding polygon of critical habitat stretches along the Rideau River from Merrickville to just north of Burritt's Rapids. Aquatic habitat in the vicinity of Upper Nicholson's Lockstation exhibits the biophysical attributes of foraging/thermoregulation/mating and commuting/dispersal critical habitat as defined in the recovery strategy, and the terrestrial habitat exhibits the biophysical attributes of commuting critical habitat (COSEWIC, 2016).

Although the area of impact meets the biophysical attributes for terrestrial and aquatic critical habitat of Eastern Musk Turtle for the purpose of commuting and dispersal movements, given the high-degree of past, present and on-going human-influence upon the area, the sub-par quality of the habitat in relation to less-disturbed (and more-ideal) habitat adjacent to the area, and the lack of historical observations and documentation of the species in the area, it is unlikely that the impacted area would be/is utilized for movement purposes.

The Ecological Relevant Area (ERA) for assessing destruction for Eastern Musk Turtle habitat is three (3) linear kilometres of aquatic habitat (1.5 km upstream and 1.5 km downstream) from





Upper Nicholson's Lockstation. Critical habitat mapping identified in the recovery strategy identifies a bounding polygon of critical habitat stretches along the Rideau River from Merrickville to just north of Burritt's Rapids, an area of 516 ha, or 5.16 km<sup>2</sup>

The impact to Eastern Musk Turtle critical habitat will be caused by a loss of habitat resultant of the expansion of the wharves' footprints at Lower Nicholson's Lockstation by 60 m<sup>2</sup>. Further temporary impacts to Eastern Musk Turtle may be caused by the placement of a temporary meter-bag cofferdams and/or turbidity curtains around the wharves in the areas to be isolated/dewatered, restricting access to potential over-wintering habitat. The placement of cofferdams and/or turbidity curtains is to facilitate the decommissioning and replacement of the wharves.

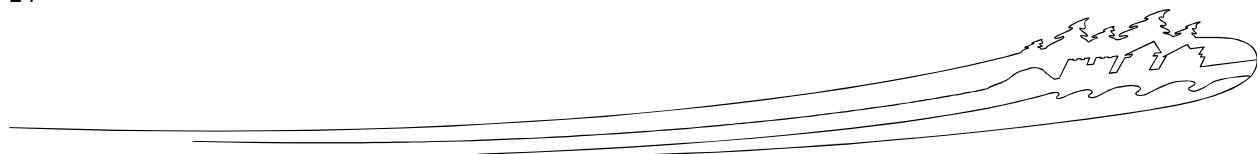
Compared to the 516 ha of similar riverine habitat in the bounding critical habitat polygon (1 ha = 10 000 m<sup>2</sup>), the amount of habitat that will be lost due to the expansion of the wharf footprint at Lower Nicholson is negligible (0.0000116%). Additionally, the amount of habitat that will be temporarily unavailable due to the placement of a temporary meter-bag cofferdams and/or turbidity curtains around the wharves in the areas to be isolated/dewatered is negligible/non-existent.

Overall, the project does not impact the ability of critical habitat in the ERA to support the life processes of the Eastern Musk Turtle, nor does it jeopardize the survival and/or recovery of the species. The size of the impact upon habitat is negligible when compared to the amount of habitat available. Furthermore, other, more suitable, habitat is widely available in close proximity to the project site. Also taken into account that Eastern Musk Turtle is scheduled by Environment Canada to be downgraded to SARA in the fall, and that critical habitat has not been formally protected in the Rideau Canal, a destruction of critical habitat permit or harm to individuals under SARA will not be issued. A full assessment can be found in Appendix B.

- *Blanding's Turtle:*

Suitable Blanding's Turtle overwintering habitat typically includes permanent bogs, fens, marshes, ponds, channels or other habitats with free (unfrozen) shallow water. Blanding's Turtles studied in Algonquin Provincial park overwintered in wetlands with free water depths of 7 cm - 50 cm. This species may also hibernate within graminoid shallow marsh areas of larger marsh complexes by burying into substrates in areas of pooled water. Blanding's Turtle's may also overwinter in seasonal pools or small excavated areas with standing water (MNR, 2014). Although the project location is outside of the designated critical habitat for Blandings, it is still within very close proximity of this area, and thereby there is some potential for this species to reside within the project area.

Impacts to Blanding's Turtles may be caused by the placement of a temporary meter-bag cofferdams and/or turbidity curtains around the wharves in the areas to be isolated/dewatered, restricting access to potential over-wintering habitat. The amount of habitat that will be temporarily unavailable due to the cofferdams is negligible/non-existent.





A loss of habitat may occur at both sites due to the expansion of the wharves' footprints (68 m<sup>2</sup> at Black Rapids Lockstation and 60 m<sup>2</sup> at Lower Nicholsons Lockstation respectively). Of this 128 m<sup>2</sup>, approximately 65.25 m<sup>2</sup> is an expansion of footprint into the watered area (27 m<sup>2</sup> of the Lower Wharf at Black Rapids, 3.45 m<sup>2</sup> of the Upper Wharf at Black Rapids, and 34.8 m<sup>2</sup> of the Main Wharf at Lower Nicholsons respectively). The remaining footprint (approximately 62.75 m<sup>2</sup>) is an expansion of footprint into the current existing shore-line and lawn-area adjacent to the current existing wharves.

This in-water shoreline area in question is not considered to be of high-quality aquatic habitat for fish and other aquatic-based species (i.e. turtles, crayfish, etc.), however the timber-cribbed wharves to be established in this area, with time, may improve the quality of the habitat for fish and other aquatic-based wildlife, by providing sheltered refuge areas, nesting habitat, and/or overwintering habitat. The design plans for the new wharves illustrate the timber cribbage to be quite tightly set against one another, with the interior of the timber cribbed area to be in-filled with rock material. With time, settling and recession of the rock-fill and timber cribs may provide this shelter/refuge habitat.

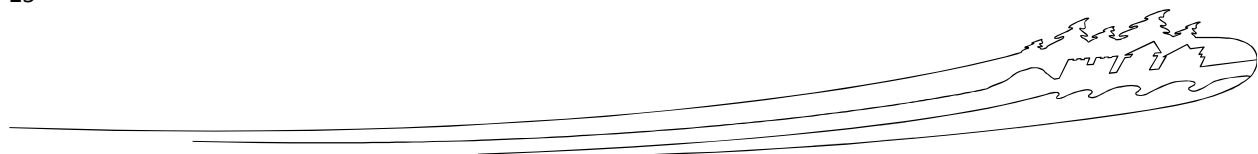
Of the remaining 62.75 m<sup>2</sup> footprint expansion, which impacts the current existing shore-line and lawn-area adjacent to the current existing wharves, 3.45 m<sup>2</sup> of this is of the expansion in footprint of the Black Rapids Upper wharves, 27 m<sup>2</sup> of this is of the expansion in footprint of the Black Rapids Lower Main Wharf, and 25.2 m<sup>2</sup> of this is of the expansion in footprint of the Lower Nicholsons Main wharf. This impacted area may result in the loss of potential nesting habitat for Blanding's Turtles, however there has been no record of nesting within this area.

Over-all, the loss of habitat is considered to be a small/negligible amount of low-quality habitat when compared to the amount of potential habitat available adjacent to the project sites and when taking into consideration the quality and suitability of the footprint in question as turtle habitat. Furthermore, other, more suitable, habitat is widely available in close proximity to the project sites.

- *Snapping Turtle:*

As described in the Management Plan, Snapping Turtles overwintering habitat includes lotic, lentic and mud environments (Brown and Brooks, 1994; Paterson et al., 2012). Within these habitats, the turtles appear to prefer the following characteristics for their hibernacula: water shallow enough to let the turtle reach the surface to breathe, but deep enough so the water will not freeze to the bottom; a location that is likely to freeze over later in the season and thaw earlier in the spring; a thick layer of mud in which the turtle can bury itself; and additional submerged cover, such as a floating mat of vegetation, roots, stumps, branches or logs, a muskrat dwelling or an overhanging bank (Meeks and Ultsch, 1990).

The eggs are generally laid on sand or gravel banks near the water, in locations where vegetation is absent or sparse. Although a wide range of other sites that are easy to dig into are also used, including beaver and muskrat lodges, roadsides, artificial dam and railway embankments, cracks





in rocky banks, sawdust piles, disturbed soil, gardens, lawns, forest clearings and farm fields, nesting success at these sites is unknown (Obbard and Brooks, 1980; Congdon et al., 2008; Ernst and Lovich, 2009).

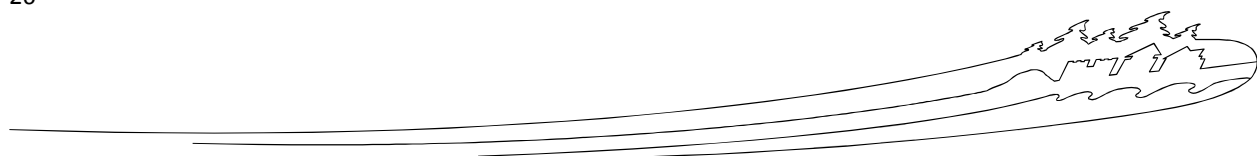
Impacts to Snapping Turtles may be caused by the placement of a temporary meter-bag cofferdams and/or turbidity curtains around the wharves in the areas to be isolated/dewatered, restricting access to potential over-wintering habitat. The amount of habitat that will be temporarily unavailable due to the cofferdams is negligible/non-existent. There is potential for there to be overwintering nests in the project area, as Snapping Turtles have been spotted at Black Rapids during the nesting season, however, no nests were observed onsite during site visits.

A loss of habitat may occur at both sites due to the expansion of the wharves' footprints (68 m<sup>2</sup> at Black Rapids Lockstation and 60 m<sup>2</sup> at Lower Nicholsons Lockstation respectively). Of this 128 m<sup>2</sup>, approximately 65.25 m<sup>2</sup> is an expansion of footprint into the watered area (27 m<sup>2</sup> of the Lower Wharf at Black Rapids, 3.45 m<sup>2</sup> of the Upper Wharf at Black Rapids, and 34.8 m<sup>2</sup> of the Main Wharf at Lower Nicholsons respectively). The remaining footprint (approximately 62.75 m<sup>2</sup>) is an expansion of footprint into the current existing shore-line and lawn-area adjacent to the current existing wharves.

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Of the remaining 62.75 m<sup>2</sup> footprint expansion, which impacts the current existing shore-line and lawn-area adjacent to the current existing wharves, 3.45 m<sup>2</sup> of this is of the expansion in footprint of the Black Rapids Upper wharves, 27 m<sup>2</sup> of this is of the expansion in footprint of the Black Rapids Lower Main Wharf, and 25.2 m<sup>2</sup> of this is of the expansion in footprint of the Lower Nicholsons Main wharf. This impacted area may result in the loss of potential nesting habitat for Snapping Turtles, however, as mentioned above, there has been no record of nesting within this area.

Over-all, the loss of habitat is considered to be a small/negligible amount of low-quality habitat when compared to the amount of potential habitat available adjacent to the project sites and when taking into consideration the quality and suitability of the footprint in question as turtle habitat. Furthermore, other, more suitable, habitat is widely available in close proximity to the project sites.







- **Northern Map Turtle:**

As described in the Management Plan: Overwintering sites for the Northern Map Turtle are typically deep, oxygen-rich lake or river bottoms that are sheltered from ice, with sand or gravel substrate and varied bottom features, such as exposed ledges, boulders, and tree trunks (Flaherty 1982; Bonin 1998; Graham et al. 2000; Ultsch 2006; Carrière 2007). Graham et al. (2000) describe the overwintering site at their study area as having very slow current; however, the presence of current has been observed at other overwintering sites (Bernier and Rouleau 2010). Northern Map Turtles have been recorded hibernating at depths between 0.3 m and 11.3 m (Bernier and Rouleau 2010; Harrison 2011; Rouleau and Bernier 2011). This species requires an oxygen-rich environment for over-wintering as they are relatively intolerant of anoxic environments (Ultsch 2006).

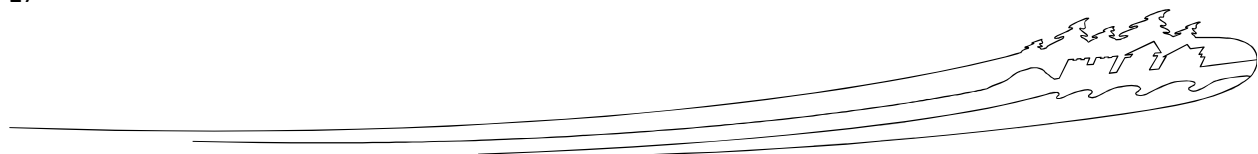
Northern Map Turtles prefer to nest in open locations receiving full sun, generally occurs within 3 to 35 m of the water's edge on a variety of habitat types, including (but not limited to) sand beaches and dunes, gravel piers and old quarries, rocky outcrops with thin soil deposits, as well as maintained sites.

Impacts to Map Turtles may be caused by the placement of a temporary meter-bag cofferdams and/or turbidity curtains around the wharves in the areas to be isolated/dewatered, restricting access to potential over-wintering habitat. The amount of habitat that will be temporarily unavailable due to the cofferdams is negligible/non-existent.

A loss of habitat may occur at both sites due to the expansion of the wharves' footprints (68 m<sup>2</sup> at Black Rapids Lockstation and 60 m<sup>2</sup> at Lower Nicholsons Lockstation respectively). Of this 128 m<sup>2</sup>, approximately 65.25 m<sup>2</sup> is an expansion of footprint into the watered area (27 m<sup>2</sup> of the Lower Wharf at Black Rapids, 3.45 m<sup>2</sup> of the Upper Wharf at Black Rapids, and 34.8 m<sup>2</sup> of the Main Wharf at Lower Nicholsons respectively). The remaining footprint (approximately 62.75 m<sup>2</sup>) is an expansion of footprint into the current existing shore-line and lawn-area adjacent to the current existing wharves.

This in-water shoreline area in question is not considered to be of high-quality aquatic habitat for fish and other aquatic-based species (i.e. turtles, crayfish, etc.), however the timber-cribbed wharves to be established in this area, with time, may improve the quality of the habitat for fish and other aquatic-based wildlife, by providing sheltered refuge areas, nesting habitat, and/or overwintering habitat. The design plans for the new wharves illustrate the timber cribbage to be quite tightly set against one another, with the interior of the timber cribbed area to be in-filled with rock material. With time, settling and recession of the rock-fill and timber cribs may provide this shelter/refuge habitat.

Of the remaining 62.75 m<sup>2</sup> footprint expansion, which impacts the current existing shore-line and lawn-area adjacent to the current existing wharves, 3.45 m<sup>2</sup> of this is of the expansion in footprint of the Black Rapids Upper wharves, 27 m<sup>2</sup> of this is of the expansion in footprint of the Black Rapids Lower Main Wharf, and 25.2 m<sup>2</sup> of this is of the expansion in footprint of the Lower





Nicholsons Main wharf. This impacted area may result in the loss of potential nesting habitat for Northern Map Turtles, however there has been no record of nesting within this area.

Over-all, the loss of habitat is considered to be a small/negligible amount of low-quality habitat when compared to the amount of potential habitat available adjacent to the project sites and when taking into consideration the quality and suitability of the footprint in question as turtle habitat. Furthermore, other, more suitable, habitat is widely available in close proximity to the project sites.

#### **8 f) Air Quality and Noise:**

The short-term use of machinery/equipment will generate exhaust and smoke emissions that could affect air quality. However, these types of disturbances are temporary and not foreseen to be a threat to local flora, fauna, and people with appropriate mitigation measures in place. Parks Canada will monitor public complaints and address any issues raised by the public.

#### **8 g) Invasive Species:**

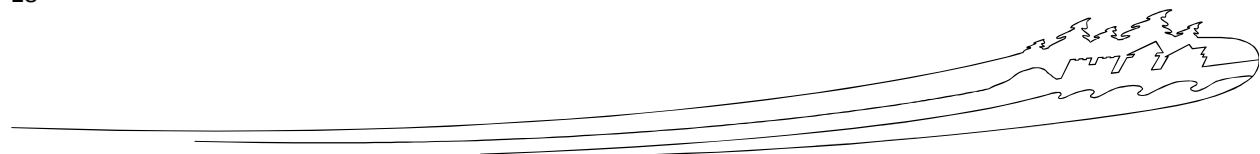
Given that the project's activities are scheduled to take place during the winter months, and that all near/in- water works are to be operated in the dry, there is a limited potential to bring in new, or further spread presently existing invasive species as the contractor moves equipment into and out of the site. Appropriate mitigation measures will be applied to reduce the risk of moving invasive species by means of proper identification and documentation of species, taking precaution when handling potentially contaminated/infested soils and vegetation, and effective cleaning of clothing, equipment and vehicles (see Section 9 below).

#### **8 h) Cultural Resources:**

The proposed project involves locks and landscape that are cultural resources of "National Significance" (NS, formerly known as Level I cultural resources, Cultural Resource Inventory, 1994-95, rev. Nov. 2015) and part of the Canal Rideau World Heritage Site and National Historic Site. The Parks Canada Cultural Resource Management Policy identifies a cultural landscape as "any geographical area that has been modified, influenced, or given special cultural meaning by people".

The heritage value of the Black Rapids and Lower Nicholson Lockstation and associated cultural resources of national historic significance is justified by their:

- Associative and physical connection with the construction and early operation of the Canal;
- Contribution to the unique historical environment of the Canal system;
- Visual and historic associations with heritage communities along the Canal system such as Chaffey's Lock, Newboro, Merrickville, Burritt's Rapids and Ottawa;
- Role as landmarks and providing a sense of continuity along the Canal system;
- Surviving historic layout and configuration including their open spaces and circulation patterns;
- Surviving historic views both within and beyond the station boundaries; and
- Contextual and heritage settings for the stations' buildings and engineering works.





The heritage value ascribed to cultural resources, guides conservation efforts and investments. Under the Cultural Resource Management (CRM) Policy, conservation of heritage value must be a primary consideration in any intervention directed at a cultural resource. Therefore, the primary recommended conservation approach based on the Standards and Guidelines for the Conservation of Historic Places in Canada is *rehabilitation* with an emphasis on minimal intervention. *Rehabilitation* involves the sensitive adaptation of an historic place or individual component for a continuing or compatible contemporary use, while protecting its heritage value. *Minimal intervention* in the context of heritage conservation is defined as the approach that allows functional goals to be met with the least physical intervention.

All components at Lower Nicholson and Black Rapids Lockstations are formally recognised as being cultural resources in a NHS and WHS; preservation would normally be the primary recommendation to retain the heritage value. However, the condition of the wharves has redirected the project into the rehabilitation of the engineering works. Therefore, the replacement of the wharves is the preferred actions to ensure that their significance is retained.

In principle, the proposed rehabilitation of the wharves conforms to the Standards and Guidelines by preserving the character-defining elements of the engineering work and landscape. Also, the project is based on detailed surveys and investigations of the existing assets condition, an approach promoted by the Standards and Guidelines (Standard 7). If the recommendations and conservation approach provided are applied, the rehabilitation of the wharves will help to ensure that Black Rapids and Lower Nicholson Lockstations will retain their heritage value and that the historic canal's physical life will be extended.

Although the Blacks Rapids and Lower Nicholson Lockstation are considered to be a cultural resource of national significance, it is not anticipated that the project of rehabilitating the wharves will negatively impact the site if appropriate mitigation measures are employed. In principle, the proposed interventions are recommended as they conform to the "minimal intervention" approach of the Standards and Guidelines. As such, the primary treatment is that of *rehabilitation* and Standards 1-12 are applicable along with the relevant Guidelines on Cultural Landscapes (Section 4.1), Engineering Structures (Section 4.4) and Materials (Section 4.5).

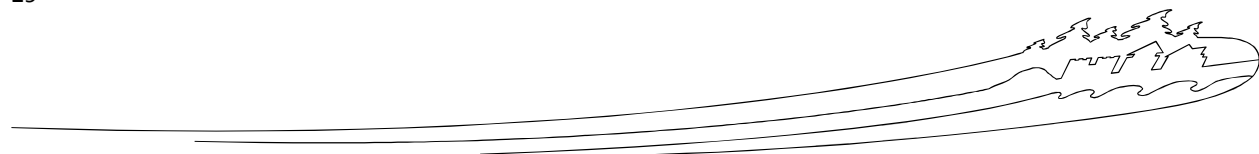
## **8 i) Archaeology**

### *Black Rapids*

The proposed Project will impact the three wharves at Black Rapids lockstation and surrounding areas. As the construction date for the timber cribbing beneath the upstream and downstream lay-by piers is unknown, archaeological recording of the cribbing is required. Additionally, archaeological monitoring of the demolition of the wooden deck is required to assess for evidence of the former cribbing that extended into the basin at the mouth of Black Rapids Creek. Activities related to the staging areas and access routes could impact potential archaeological resources, therefore, mitigation measures are also required to minimize Project impacts (provided in the AOA).

### *Lower Nicholson*

The proposed Project will impact the single wharf at Lower Nicholson lockstation and surrounding lands. As a construction date for the timber cribbing beneath the wharf is unknown, archaeological recording of





the cribbing is required. Activities related to the staging areas and access routes could impact potential archaeological resources, therefore, mitigation measures are also required to minimize Project impacts (provided in the AOA).

#### **8 j) Health and Safety:**

A Health and Safety Plan will be submitted by the Contractor to PCA for review and approval as part of the permitting agreement. The Canadian Occupational & Safety Regulations and all approved Parks Canada Safe Work Practices will be strictly adhered to during all stages of work perform, in order to ensure safety of staff and others at all times. Additionally, Health and safety measures must be taken according to the *Occupational Health and Safety Act* during decommissioning, and construction activities.

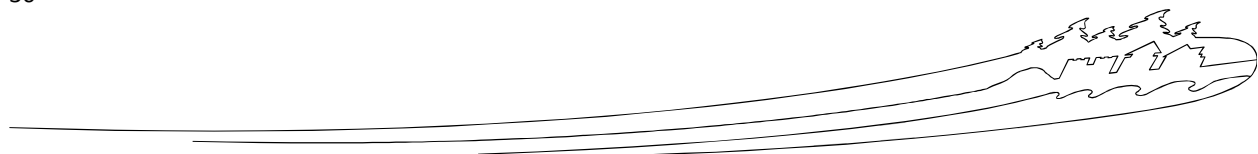
***Possible adverse effects upon Valued Components will not be considered significant once the mitigation measures outlined in Section 9 of this document have been implemented.***

### **9. MITIGATION MEASURES**

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

#### **A. General:**

- A.1** Inform the Departmental Representative and PCA's Environmental Authority (Environmental Officer, Rideau Canal in Smiths Falls) regarding any changes to project plans and/or scheduling. Any changes not assessed under this BIA will require approval from PCA and may require further mitigation measures.
- A.2** Project commencement only upon submission and **Parks Canada's acceptance** of an Environmental Management Plan (EMP) that outlines all the measures to be implemented by the contractor on the project site to eliminate or reduce environmental effects. The EMP will be submitted in writing, at least five (5) working days prior to commencing work. The Contractor's plan will be required to be submitted to the Departmental Representative and Parks Canada's Environmental Authority (Environmental Officer, Rideau Canal in Smiths Falls), reviewed and accepted by Parks Canada prior to the commencement of work and mobilization to site.
- A.3** It is required that the qualified environmental professional(s) prepare the EMP or its component plans in accordance with PCA's Environmental Standards and Guidelines - Ontario Waterways (2017). The EMP will detail frequency of monitoring and list high-risk construction activities where a qualified environmental professional must be onsite. The EMP will include a list of key project activities and identify the actual and potential environmental impacts associated with each activity.
- A.4** Parks Canada Environmental Authority (Environmental Officer, Rideau Waterway) will outline all the prescribed mitigation measures, including those found in Best Management Practices (BMPs), in a construction start-up meeting with the project manager and the contractor, to ensure awareness and understanding of these measures.

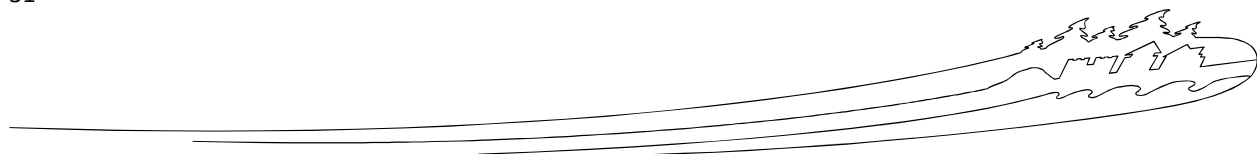




- A.5** The contractor is to ensure that all on-site personnel are aware of, and comply with the prescribed mitigation measures within this BIA and any measures outlined within subsequent amendments to this BIA.
- A.6** Should conditions at the work site indicate that there are negative impacts to fish, fish habitat, wildlife, cultural or visitor experience resources, all works shall cease until the problem has been corrected and Parks Canada's Environmental Authority staff have been consulted. The Parks Canada has the right to require that work be altered or ceased immediately.
- A.7** As per the *Historic Canal Regulations* applicable to lands administered by the Rideau Canal National Historic Site of Canada, a permit signed by Parks Canada's Ontario Waterways Director will be required to authorize the project work prior to commencement of project activities and mobilization to site (to be facilitated by Parks Canada).

**B. Equipment and Site Condition:**

- B.1** All machinery and equipment shall be clean, free of leaks, in optimal working condition.
- B.2** Maintain equipment to avoid leakage of fuels and liquids. Ensure measures are in place to minimize impacts of accidental spills.
- B.3** 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.
- B.4** Any stockpiled materials, or concrete debris shall be stored and stabilized a safe distance away from any watercourse, drainage course or swales to prevent erosion and subsequent entry into the Rideau Canal OR removed from the site, in accordance with all federal, municipal and provincial regulations.
- B.5** Store all oils, lubricants, fuels and chemicals in secure areas on impermeable pads.
- B.6** Vehicle and equipment re-fueling and/or maintenance shall be conducted on permeable pad to allow full containment of spill, off of slopes and away from the water at a recommended distance of 30 m if possible. If not possible this, should be reviewed by the Departmental Representative and approved by PCA.
- B.7** 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.
- B.8** Drip trays shall be placed under all fuel-powered equipment.
- B.9** 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
- B.10** Any part of a vehicle and/or equipment entering the water shall be free of fluid leaks and externally degreased to prevent any deleterious substance from entering the water.
- B.11** 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.
- B.12** The spills kit will be maintained on site and the contractor will ensure that adequate additional resources are available.
- B.13** In the event of a spill, Parks Canada and the Ontario Spill Action Centre (1-800-268-6060) shall be notified immediately; remediation will be conducted immediately to contain and clean up in accordance with federal and provincial regulatory requirements **AND to the**





**satisfaction of Parks Canada;** documentation of remediation, testing and results will be provided to Parks Canada.

**B.14** 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.

**B.15** Operate machinery from stable location.

**B.16** Only the working end of machinery shall directly enter the water. The working end of machinery will be clean and maintained free of leaks. 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.

#### **C. Water Quality:**

**C.1** Ontario Drinking Water Quality Guidelines cannot be exceeded (beyond parameters that currently exist) due to project activities.

**C.2** Ensure that sediment settling basins are of adequate size to compensate for excess sediment run-off and erosion (i.e. storm water run-off, misdirected drainage).

**C.3** Only washed and clean material free of fine particulate matter shall be placed in or near water where it has been previously planned and authorized.

**C.4** Salt and other road chemicals should be properly stored in designated areas only, preferably in dry sheds to prevent infiltration of leachate to the water table and surface runoff.

**C.5** Accumulated snow that may be contaminated with salt should be disposed of only at approved dumpsites or designated areas.

**C.6** Snow containing salt or sand should never be dumped in, or allowed to melt and run off into watercourses.

#### **D. Fish and Fish Habitat:**

**D.1** All in-water work should be completed before March 15<sup>th</sup> to protect fish populations during their spawning and nursery periods. Should work be required beyond this date, additional mitigation measures may be required based on site specific characteristics. Work beyond March 15<sup>th</sup> must be approved by the Departmental Representative and PCA prior to work occurring, and may not be granted if site conditions do not allow it.

**D.2** A de-watering Plan shall be submitted, as part of an EMP, to Parks Canada for review.

**D.3** All lock and approach wall work shall be completed in the dry by de-watering the work area and diverting and/or pumping flows around cofferdams placed at the limits of the work area.

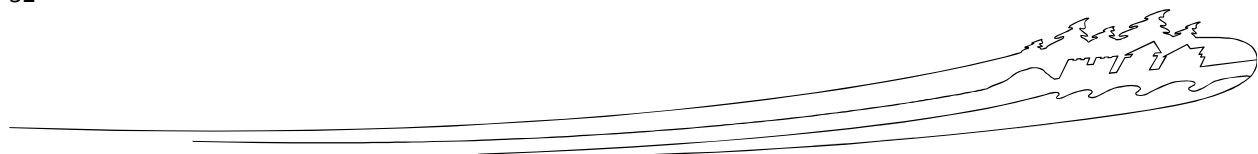
**D.4** Existing river flows shall be maintained downstream of the dewatered work area without interruption, as per operational guidelines, during all stages of the work.

**D.5** All debris on bed (including unused aggregate/concrete rubble) shall be completely removed and area restored to original state upon completion of work.

**D.6** Fish shall be removed from the work area prior to complete dewatering and released alive downstream into the river.

**D.6.1** Parks Canada's Environmental Authority shall be advised 24 hours prior to fish rescue.

**D.6.2** Minimize the length of time fish are out of the water.

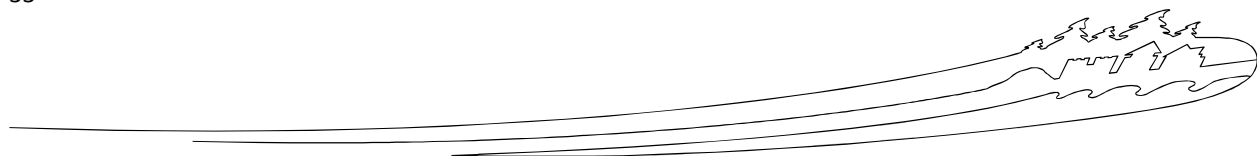




- D.6.3** Use appropriate equipment to remove any stranded fish in the dewatered area. As water levels drop in the work area monitor the deeper pool areas where fish are congregating. If safe to do so, Seine nets or Dip nets can be operated by field staff to remove the fish.
- D.6.4** Contact PCA EA staff should there be any issues with fish removal.
- D.6.5** 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.
- D.6.6** 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.
- D.6.7** 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.
- D.7** 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>).
- D.8** At the discharge point into the watercourse – i.e. the interface between the work site and the natural waterbody – a maximum increase of 8 NTU caused by suspended sediment from background levels for a short-term exposure (< 24-h period). Maximum average increase of 2 NTU from background levels for a longer term exposure. If elevated turbidity is observed Parks Canada will stop work and assess potential impact to the aquatic environment. Additional mitigation measures may be required.
- D.9** At the discharge point into the watercourse, a Maximum increase of suspended sediment concentrations by more than 25 mg/L over background levels during any short-term exposure period (e.g., 24-h). For longer term exposure (e.g., > 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.
- D.10** The proponent is advised to abide by those mitigation measures and best management practices outlined within DFO's online guidance materials: Measures to Avoid Causing Harm to Fish and Fish Habitat (<http://www.dfo-mpo.gc.ca/pnw-ppe/measures-mesures/measures-mesures-eng.html>).
- D.11** Ensure that there is a fish screen that complies with DFO *Freshwater Intake End-of-Pipe Fish Screen* Guideline when pumping in fish-bearing water to prevent impingement or entrainment of fish.

## **E. Erosion and Sediment Control:**

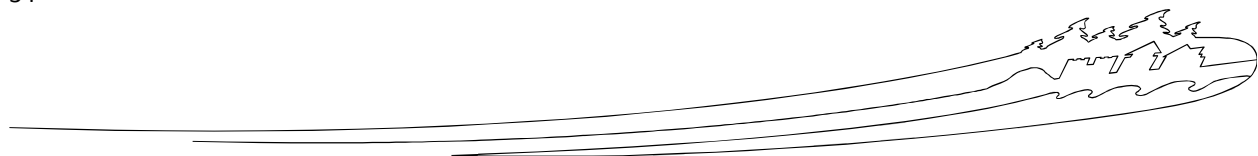
- E.1** Mandatory submission – **and acceptance by Parks Canada** – of an Erosion and Sediment Control Plan, prepared by a qualified individual, as stand-alone or part of the EMP, demonstrating:
  - E.1.1** A focus on erosion control primarily and sediment control secondary;





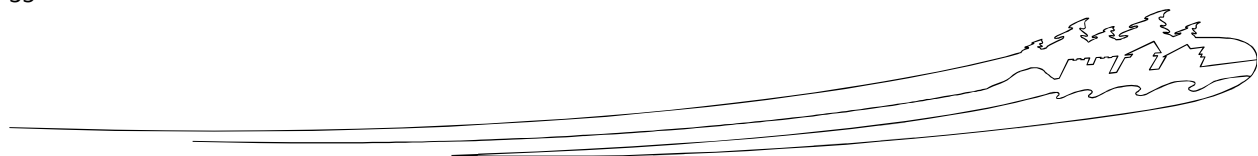


- E.1.2** Erosion and sediment controls will be tailored to the type of sediment found onsite (e.g. if clay is present, additional controls are necessary).
  - E.1.3** The area to be controlled. In addition to the construction site, it is necessary to identify adjacent areas that could be negatively impacted by construction activities;
  - E.1.4** Drainage areas and patterns based on pre-construction topography and construction design;
  - E.1.5** The EMP will have, as a principal to reduce the amount of sediment laden water produced, a focus on separating offsite and infiltrating water into the construction site from construction activities and sediment sources.
  - E.1.6** How clean storm run-on will be diverted around the site and away from exposed areas;
  - E.1.7** How sediment-laden run-off will be directed to detention or retention facilities on-site. Large drainage areas can produce a significant amount of run-off, resulting in a need for large detention or retention structures;
  - E.1.8** Channels that are designed and constructed to the necessary design discharge;
  - E.1.9** Temporary and permanent erosion control needs for all drainage channels; and,
  - E.1.10** Consideration of project schedule in selecting, designing and laying out environmental controls.
  - E.1.11** Consideration of seasonal requirements (for longer-term projects); select and design controls and practices for controlling erosion and sedimentation including shutdown periods.
- E.2** Sediment and erosion control measures shall be implemented prior to work and maintained during the work phase, to prevent entry of sediment into the water where site access or other activities cause exposed soil. The following principles should be considered:
- E.2.1** Diversions to limit run-on water;
  - E.2.2** Reduction of erosional forces by surface water velocity reduction;
  - E.2.3** Reduction of sediment development through sediment collection or anchoring;
  - E.2.4** Sedimentation of mobilized sediments;
  - E.2.5** Filtration of sediment-carrying flows;
  - E.2.6** Collection of captured or contained sediments;
  - E.2.7** Treatment of pH (hydronium and hydroxide).
- E.3** The size of particles present in the sediment is a key consideration for selecting the appropriate sediment treatment option(s):
- E.3.1** If the sediment consists primarily of gravel or sand, which are relatively large particles, a single treatment using a more basic technology, such as a sediment trap or sediment bag, may be adequate.
  - E.3.2** If the sediment consists of silt and/or clay, which are relatively small particles, the effluent will most likely need a more advanced technology, such as a filter press or chemical treatment with anionic flocculent and a filtration method.
  - E.3.3** If the sediment consists of a large spectrum of particle sizes, the water may need primary treatment to remove larger particles, followed by secondary treatment to remove finer particles.





- E.4** Filter material will consider the grain size characteristics of the concrete sediment and shall be designed around the principals of maintaining sufficient hydraulic flow and prevention of particle movement through the material.
- E.5** Eliminating unnecessary sources of sediment to the dewatering area will improve dewatering outcomes. This can be achieved by ensuring surface water flow is prevented from entering the project site.
- E.6** In-water work shall be performed in a manner that minimizes the disturbance of the watercourse bottom and dispersion of sediment. Restricted in-water activities between March 15<sup>th</sup> and June 30<sup>th</sup> are in-water excavation, in-filling, rock/armour stone placement, transfer/movement of granular material or aggregates.
- E.7** Sediment control measures shall be implemented 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.
- E.8** Monitor water quality for unacceptable suspended sediment levels during in water activities.
- E.9** Design and construct coffer dams to minimize sediment inputs to the water course; coffer dams shall not be composed of loose aggregate/granular material.
- E.10** All sediment and erosion 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.
- E.11** Environmental protection measures shall be checked after each extreme weather event.
- E.12** If sediment and erosion 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.
- E.13** 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.
- E.14** Sediment and erosion control measures shall be left in place until all areas of the work site have been stabilized.
- E.15** Upon completion of the work all debris shall be completely removed and the area restored to its original state or better. Repair all damages to property due to project activities.
- E.16** Sediment control measures and exclusion fencing must be removed in a way that prevents the escape or re-suspension of sediments.
- E.17** A turbidity curtain will be used during installation and removal of the cofferdams. It will be maintained in the water around all working areas during construction to contain and control the suspension of fines. If water levels/conditions do not permit the flotation of a turbidity curtain, other measures as approved will be implemented.
- E.18** Turbidity curtains should be placed according to OPSD specifications as close to the coffer dam as possible to minimize area of potential impact of sedimentation.
- E.19** Turbidity curtains should not be used as a primary or secondary 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.

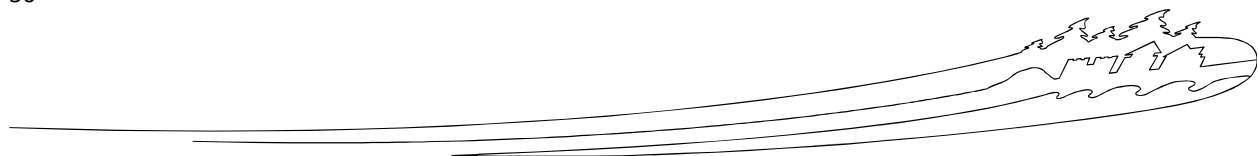




- E.20** The contractor will provide a marine grade turbidity curtain across all areas where sediments can enter the watercourse. Turbidity curtains are to be anchored or weighted down along its length to form a continuous seal on the river bed with adequate flotation at water surface to prevent over spills of turbid water.
- E.21** Flow dissipaters and/or filter bags, or equivalent, shall be placed at water discharge points to prevent erosion and sediment release.
- E.22** Silt or debris that has accumulated around the temporary cofferdams shall be removed prior to their withdrawal. All cofferdam material will be removed from the watercourse upon decommissioning.
- E.23** Fine materials such as limestone-based aggregates, unwashed rocks or materials that have the possibility of being suspended or transported downstream will not be used.
- E.24** No acid-generating rock (containing sulphides) will be used.
- E.25** 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.
- E.26** The contractor will maintain a standby supply of pre-fabricated sediment fence barriers, or an equivalent ready-to install sediment control devices.
- E.27** Avoid activities that could lead to erosion during excessively wet weather conditions; monitor forecasts for heavy rainfall watches & warnings.

**F. Concrete:**

- F.1** Concrete leachate is alkaline and highly toxic to fish and aquatic life. Measures must be taken to prevent the incidence of concrete or concrete leachate from entering the watercourse. Maintain complete isolation of all cast-in-place concrete and grouting from fish-bearing waters for a minimum of 48 hours if ambient air temperature is above 0°C and for a minimum of 72 hours if ambient air temperature is below 0°C or until significantly cured to allow the pH to reach neutral levels. Avoid project activity during wet weather conditions.
- F.2** All concrete, sealants, or other compounds used for this project shall be utilized according to the appropriate Product Technical Data Sheet, stating guidelines and methods for proper use, and provided by the manufacturer of the product.
- F.3** Ensure that all works involving the use of concrete, cement, mortars, and other Portland cement or lime-containing construction materials (concrete) will not deposit, directly or indirectly, sediments, debris, concrete, concrete fines, wash or contact water into or about any watercourse.
- F.4** Concrete debris and dust generated as a result of various concrete work shall be removed in a way that will ensure material does not enter the waterway. All debris including unused aggregate/concrete rubble shall be completely removed and area restored to original state upon completion of work.
- F.5** Concrete debris shall be placed into an enclosed container daily, or more frequently if required, in order to ensure that no debris escape or remain at the site.
- F.6** Completely isolate all work from the watercourse and any water that enters the watercourse or storm water system.

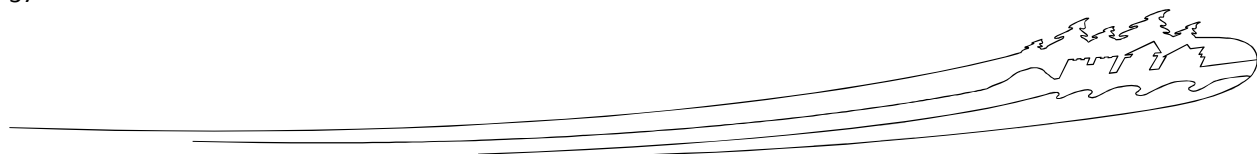




- F.7** Any concrete wash water shall be directed to a collection and treated to effectively remove all suspended solids, dissipate velocity and prevent deleterious substances from entering the watercourse.
- F.8** At the discharge point into the watercourse, pH will be maintained between 6.5 and 9.0. Water with pH > 9 cannot be released directly back into the watercourse, but must be treated prior to release. Water with a pH  $\geq$  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.
- F.9** Control turbidity of all water released to watercourse during work.
- F.10** In the event of silting or turbidity caused by construction activity, contractor shall stop all work and install additional silt barriers as necessary to ensure watercourse is protected.
- F.11** Additional Environmental Mitigation Measures For Placement Of Tremie Concrete:
- F.11.1** Ensure concrete forms are tight and no flow is occurring.
  - F.11.2** Isolate area with curtain or impermeable material specified for concrete particulates; ensure fish exclusion is followed.
  - F.11.3** Isolated area should be the minimum size required to complete task.
  - F.11.4** For tremie pours, CO<sub>2</sub> 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.
  - F.11.5** Workers shall be trained in the use of the system.
  - F.11.6** Use of neutralizing acids is not permitted.
  - F.11.7** pH monitoring conducted inside and outside the containment area
- F.12** In the event of a release of concrete or grout, 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 federal and provincial regulatory requirements **AND to the satisfaction of Parks Canada**. Documentation of remediation, testing and results will be provided to Parks Canada.
- F.13** Wash equipment away from water and provide containment facilities for the washdown water from concrete delivery trucks, concrete pumping equipment, and other tools and equipment.

**G. Dewatering and Pumping Activities:**

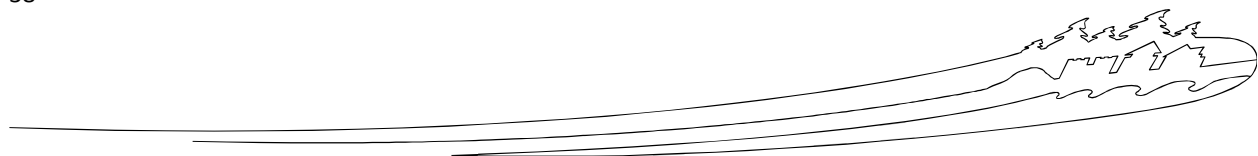
- G.1** Typically, submersible pumps are used for dewatering and they should be placed in the low point of the work site. If there is high turbidity, consider pre-filtering water that goes to the pump by placing it in a perforated drum with clear stone around the outside or other similarly designed approach.
- G.2** If the area is likely to contain a large number of fish ensure that there is a fish screen that complies with DFO guidelines to prevent impingement or entrainment of fish.
- G.3** Discharged water should be filtered by means of an appropriately designed sediment basin, anionic flocculation or by physical means such as a filter press.
- G.4** Discharge of pumped water must be a manner that does not cause additional erosion.





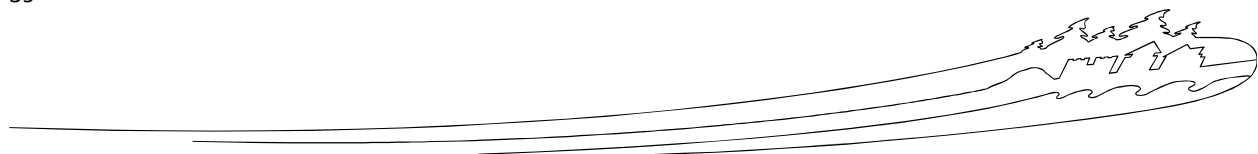
## H. Vegetation:

- H.1** 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.
- H.2** Where it is necessary to remove mature vegetation at any time of year, an inventory of species to be removed, coupled with a replanting plan using native species shall be submitted to EA staff for approval.
- H.3** Trees, shrubs and vegetation which are to remain throughout construction should be properly identified and delineated.
- H.4** Where practical, the branches of the large trees should be trimmed back as the first option rather than cutting the entire tree.
- H.5** Disturbance of vegetation along the shoreline must be limited to what is required for
- H.6** Should any vegetation require chipping/mulching, the after product will be stored onsite for the duration of the project to supplement erosion and sediment control methods when required.
- H.7** Minimize clearing as much as possible to maintain riparian vegetative cover and windbreaks, where possible maintain vegetated buffer at shoreline and minimize clearing near water bodies. If buffers cannot be maintained, avoid grubbing of vegetation root mass in proximity to shorelines and stream banks.
- H.8** When feasible, alter riparian vegetation by hand. If machinery must be used, operate machinery on land and in a manner that minimizes disturbance to the banks of the water body.
- H.9** Grubbing should not be conducted unless a suitable planting plan and Erosion and Sediment Controls are in place. Discuss with EA officer for suitable plans.
- H.10** Whenever possible, vegetation should be trimmed in early spring, late fall or winter. Trimming when the plant is actively growing (i.e. late spring summer and early fall) can further stimulate growth, weakening the plant and making it susceptible to disease.
- H.11** Prune limbs close to the tree trunk. For a clean cut, make a shallow undercut first, then follow with the top cut. This prevents the limb from peeling bark off the tree as it falls. Do not use an axe for pruning.
- H.12** If over half of a tree needs pruning, in most circumstances it will be best to cut it down instead of pruning. Cut trees off at ground level and do not leave pointed stumps.
- H.13** Vegetation should be selectively cut to allow a diversity of vegetation types to persist within the immediate area.
- H.14** Special attention should be paid to maintain fruit bearing shrubs.
- H.15** In larger areas to be cleared attempts should be made to keep trees >15 cm DBH intact and instead remove lower limbs (< 2.5 m high).
- H.16** Cluster of young trees should be selectively cut to allow some to continue to grow maintaining diversity in age structure and genetics.
- H.17** Delineate areas to be avoided with flagging tape or temporary fences
- H.18** Ensure appropriate handling procedures are followed for noxious weeds such as Giant Hogweed or Wild Parsnip.





- H.19** Native species are to be used for tree planting and/or ground cover with mulch to prevent erosion and to help seeds germinate.
- H.20** 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. Frost can occur as early as August 31<sup>st</sup> and late as June 25<sup>th</sup>.
- H.21** Root systems of trees identified to remain should be properly delineated and fenced off, so as to protect the root systems from being crushed and impacted by machinery.
- H.22** 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.
- H.22.1** For areas of light-to-medium levels of traffic activity, a geotextile cloth shall be placed over the area of protection and covered with an 8 inch (at minimum) thick layer of mulch material.
- Pins or staples must be used to secure the geotextile material to the ground.
- H.22.2** For areas of medium-to-high levels of traffic activity, a geotextile cloth shall be placed over the area of protection and covered with an 8 inch (at minimum) thick layer of mulch material. The mulch material shall then be covered with 3/4 inch sheets of plywood.
- The plywood will break down over time, and shall be replaced periodically to retain its effectiveness.
  - ¾ inch laminated large sheets of plywood are recommended for use.
- H.22.3** Overtime, mulch material can degrade, move, or wash away. Mulch must be replenished as necessary in order to maintain a layer of 8 inch thickness at all times.
- H.22.4** Mulch material should not be permitted to pile against the trunk(s) or root flare(s) the tree(s), as this may lead to unwanted bark rot and oxygen deprivation, subsequently leading to the death of the tree(s).
- H.22.5** Alternative methodology for soil-compaction prevention may be utilized (ex. blast mats), as reviewed and approved by PCA.
- H.23** 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.
- H.24** Native grasses, shrubs, etc. should be planted to match existing species growing on the sites.





## I. Wildlife:

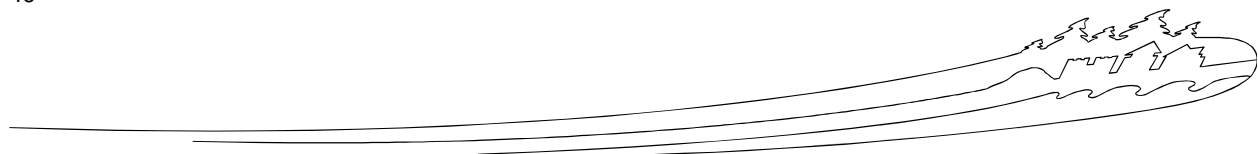
- I.1 Migratory birds, their nests and eggs are protected under the *Migratory Birds Convention Act* (1994). Project works or activities are potentially disruptive activities to birds and should be avoided during breeding times. No vegetation shall be removed from April 1<sup>st</sup> to August 31<sup>st</sup> to protect nesting birds.
- I.2 To protect Turtle species during hibernation, water drawdown/dewatering should occur either before or as soon after boating navigation season as possible and not be lowered below normal winter operating levels.
- I.3 The EMP must detail procedures (e.g. exclusion fencing) for preventing turtle entry/nesting within disturbed project gravels/soils during all stages of project activity.
- I.4 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 Species at Risk Branch, Best Practices Technical Note, Reptile and Amphibian Fencing, Ver. 1.1, developed by the Ontario Ministry of Natural Resources and Forestry: [http://files.ontario.ca/environment-and-energy/species-at-risk/mnr\\_sar\\_tx\\_rptl\\_amp\\_fnc\\_en.pdf](http://files.ontario.ca/environment-and-energy/species-at-risk/mnr_sar_tx_rptl_amp_fnc_en.pdf)
- I.5 The EMP must demonstrate procedures for avoiding disturbance/harm to wildlife and nesting birds.
- I.6 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.

## J. Species At Risk:

Eastern Whip-poor-will have potential to reside within 1 km of the general project area; however, Eastern Whip-poor-will is not anticipated to be present during the time of work due to southern migration.

Eastern Musk Turtle, Blanding's Turtle, Snapping Turtle, and Northern Map Turtle have potential to reside within 1 km of the general project area.

- J.1 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.
- J.2 If a Species at Risk is observed or suspected on or near the worksite (this includes snakes, turtles and/or eggs), the species must not be harmed or harassed. If the species does not leave or cannot leave the site, the contractor must immediately stop the works and contact PCA's EA staff on how to proceed. Additional measures to avoid impacts may be required before work can restart. Stand back and allow the animal to leave the site.
- J.3 Temporary reptile exclusion fencing, such as polythene/ woven geotextile secured with timber stakes, or material of a similar nature/function, should be installed to prevent turtles from entering the construction area. Exclusion fencing should also be installed completely





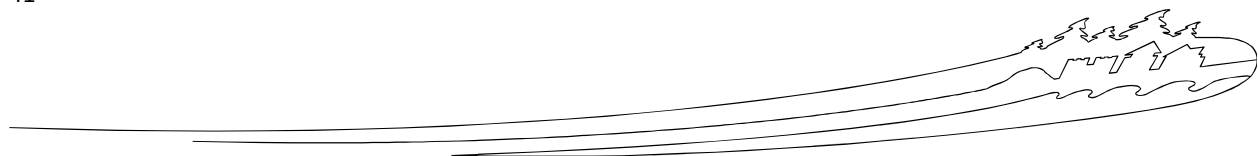
around stockpiled material (wood chips, gravel, earth, etc.) to prevent turtle nesting in the project area. For guidance on how to plan and install exclusion fencing, refer to the document titled Species at Risk Branch, Best Practices Technical Note, Reptile and Amphibian Fencing, Ver. 1.1, developed by the Ontario Ministry of Natural Resources and Forestry: [http://files.ontario.ca/environment-and-energy/species-at-risk/mnr\\_sar\\_tx\\_rptl\\_amp\\_fnc\\_en.pdf](http://files.ontario.ca/environment-and-energy/species-at-risk/mnr_sar_tx_rptl_amp_fnc_en.pdf)

- J.4** A sweep of the work area should be completed at the start of every work day to ensure that there are no turtles within the work area.
- J.5** Minimize the disturbed area; clearly mark the work space.
- J.6** Park on roads or disturbed area only.

By following these specific mitigation measures, the federal *Species at Risk Act* (SARA) and the provincial *Endangered Species Act* will not be contravened.

#### **K. Invasive Species:**

- K.1** To reduce the risk of introducing invasive species, all equipment must be thoroughly cleaned prior to coming to the site. Any machinery that appears to have not been cleaned will not be permitted on site. For additional information or guidance on how to properly clean equipment, see the Clean Equipment Protocol for Industry developed by the Ontario Invasive Plant Council and found here: [http://www.ontarioinvasiveplants.ca/wp-content/uploads/2016/07/Clean-Equipment-Protocol\\_June2016\\_D3\\_WEB-1.pdf](http://www.ontarioinvasiveplants.ca/wp-content/uploads/2016/07/Clean-Equipment-Protocol_June2016_D3_WEB-1.pdf)
- K.2** 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.:
  - K.2.1** Vessels/equipment should be drained of standing water.
  - K.2.2** Vessels/equipment should ideally be cleaned with hot water (> 50 °C) at high pressure water (> 250 psi).
  - K.2.3** Vessels/equipment should be dried for 2 – 7 days in sunlight before transported between waterbodies.
  - K.2.4** Cleaning of vessels/equipment should be conducted away from waterbodies at a recommended distance of at least 30 m from the shoreline.
- K.3** Mud, dirt and vegetation should be cleaned from clothing and footwear prior to entering the work site, and prior to leaving the work site.
- K.4** Should an invasive species be encountered (or at least suspected) not identified in this BIA, a photo and report of the specimen should be sent to Parks Canada's EA staff and the Invading Species Hotline at 1-800-563-7711 or online at EDDMapS Ontario: <https://www.eddmaps.org/ontario/>.
- K.5** Conduct a site assessment for invasive plant infestations prior to carrying out field activities.
- K.6** Use weed-free material (i.e. sand, gravel, etc.) for erosion control and stabilization.
- K.7** Use weed-free seed and confirm that seed mix to be used for revegetation purposes does not (potentially) contain invasive plants.
- K.8** Seed purchased commercially should have a label that states the following:
  - K.8.1** Species;



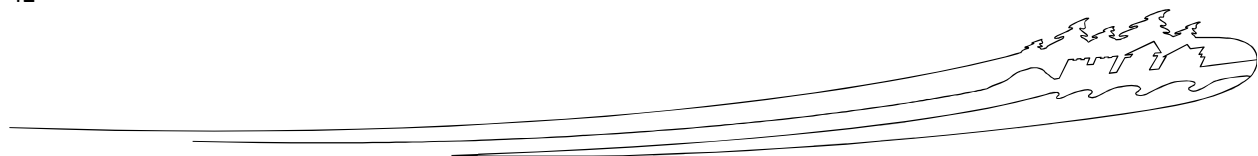




- K.8.2** Purity: Most seed should be no less than 75 % pure and preferably over 85 % pure. The rest is inert matter or other seed;
- K.8.3** Weed seed content: The tag should state NO invasive plants are present. Only certified weed-free seed should be used; and
- K.8.4** Germination of desired seed: Germination generally should not be less than 50 % for most species, although some shrubs and forbs will have lower percentages.
- K.9** Move only weed/contaminate-free materials into non-infested areas. Moving materials from one infested location to another within a particular zone may not cause contamination, but moving materials from infested to non-infested areas could lead to the introduction and spread of invasive plants.
- K.10** If removal of invasive species occurs, individuals will be disposed of appropriately, offsite to ensure no further propagation.
- K.11** Workers should familiarize themselves with invasive species potentially present within the work site areas:
  - K.11.1** Common St. Johnswort  
<https://www.eddmaps.org/Species/subject.cfm?sub=4411>
  - K.11.2** European Buckthorn:  
<http://www.eddmaps.org/ontario/species/subject.cfm?sub=3070>
  - K.11.3** European Frog-bit  
<https://www.eddmaps.org/Species/subject.cfm?sub=12792>
  - K.11.4** European Waterchestnut  
<https://www.eddmaps.org/Species/subject.cfm?sub=3499>
  - K.11.5** Flowering-rush  
<https://www.eddmaps.org/Species/subject.cfm?sub=5219>
  - K.11.6** Glossy Buckthorn  
<https://www.eddmaps.org/Species/subject.cfm?sub=5649>
  - K.11.7** Himalayan Balsam  
<https://www.eddmaps.org/Species/subject.cfm?sub=12794>
  - K.11.8** Rusty Crayfish  
<https://www.eddmaps.org/Species/subject.cfm?sub=15170>
  - K.11.9** Tatarian Honeysuckle  
<https://www.eddmaps.org/Species/subject.cfm?sub=3043>
  - K.11.10** Wild Parsnip  
<https://www.eddmaps.org/Species/subject.cfm?sub=6147>
  - K.11.11** Zebra Mussel:  
<http://www.eddmaps.org/ontario/species/subject.cfm?sub=10567>

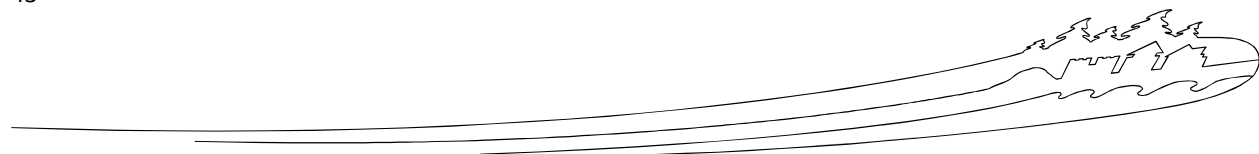
## **L. Cultural Resources and Archaeology**

- L.1** Document the existing features that will be impacted by the project prior to their removal and rehabilitation.





- L.2** 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).
- L.3** Identify heritage components in the project area to ensure that inadvertent impacts do not occur.
- L.4** When removing work for the purposes of replacement or repair, it is possible to uncover unanticipated materials or construction that may have historic significance or provide important evidence of previous construction techniques or materials. If unanticipated material or construction is discovered during work, the project lead should stop the work, take photos, and consult with CRM or BH immediately for advice on how to proceed.
- L.5** When temporary structures and machinery are installed on a site, the contractor must safeguard the character-defining elements of the site (including landscape features). The contractor should bear in mind that at National Historic Sites, the recommended practice is to employ a minimal intervention approach, as defined in the Standards and Guidelines for the Conservation of Historic Places in Canada.
- L.6** Archaeological recording of the cribbing is required at Black Rapids and Lower Nicholsons Lockstations.
- L.7** Archaeological monitoring of the demolition of the wooden deck is required at Black Rapids Lockstation
- L.8** Vehicular access routes and staging areas will be restricted to present-day roadways, parking lots, exposed bedrock areas and significantly disturbed areas. If this is not possible, the use of protective covering such as geotextile protective mats with a wood chip lift or granular "A" gravel is required. All protective measures employed must be removed following construction and the area restored to a pre-construction state. Excavation is not permitted during installation or removal of protective covering.
- L.9** If significant features (e.g., structural remains and/or high artifact concentrations) are encountered during construction activities, excavation should cease in the immediate area, and the Parks Canada Project Manager be informed. The Project Manager should then contact Parks Canada's Terrestrial Archaeology section for advice and assessment of significance, which will in turn determine the requirements to mitigate the find.
- L.10** If archaeological, cultural resources, or character-defining elements (e.g. structural features or artifact concentrations) are encountered or damaged during construction activities, work will cease in the immediate area and the Parks Canada Project Manager informed. The Project Manager should then contact Parks Canada's Terrestrial Archaeology section for advice and assessment of significance, and if necessary, any further mitigation measures.
- L.11** Landscaping which involves excavation, is not permitted. Should landscaping be required, plans should be provided to Parks Canada's Terrestrial Archaeology section for review. Based on the results of the review, an Archaeological Impact Assessment and/or additional mitigation measures may be required, prior to construction activities.
- L.12** Inform the CRM Advisor, Ontario Waterway regarding any changes to project plans and/or scheduling. Any changes not assessed under this BIA will require approval from PCA and may require further mitigation measures.





- L.13** During construction, if an opportunity arises to address or correct past repairs that are no longer considered best conservation practices, or that seriously impacted heritage value, CRM advice should be sought to determine whether it makes sense to address this as a part of this project.

**M. Air Quality and Noise:**

- M.1** 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.
- M.2** Monitor and mitigate public complaints by keeping a record of complaints and addressing any issues raised by the public.
- M.3** Use well-maintained heavy equipment and machinery, preferably fitted with fully functional emission control systems/muffler/exhaust baffles, engine covers, etc.
- M.4** Machines shall not be left to unnecessarily idle in order to avoid emissions.
- M.5** Adhere to local noise by-laws. Notify residents of planned activities that may cause disturbance and schedule them to avoid sensitive time periods.
- M.6** Notify residents of planned activities that may cause disturbance and schedule them to avoid sensitive time periods.
- M.7** Keep idling of construction equipment to a minimum.
- M.8** Maintain equipment in good working order.
- M.9** The contractor is to be available to address any concerns that may arise.
- M.10** Minimize the noise levels from construction activities by using proper muffling devices, in addition to appropriate timing and location of these activities to reduce or minimize the effect of noise on nearby residents, recreational users, and wildlife.

**N. Waste Disposal**

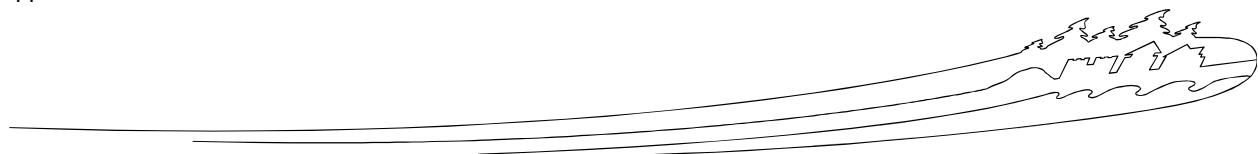
- N.1** Recyclable material and waste shall be removed from the site, in accordance with all federal, provincial and municipal regulations, to disposal facilities licensed to receive them.
- N.2** Waste generated will be disposed according to regulations (i.e., O. Reg. 102/94 and O. Reg. 558/00, R.R.O. 1990, 347).

**O. Work Area Commissioning:**

- O.1** If elevated turbidity beyond 8 NTU from background levels for a short-term exposure (e.g., 24 hr. 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.
- O.2** The area inside of cofferdams, 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.

**P. Floods, Extreme or Inclement Weather, and Ice Formation:**

- P.1** Undertake construction under normal weather conditions, to the extent possible, and design the project worksite to withstand variable weather conditions.

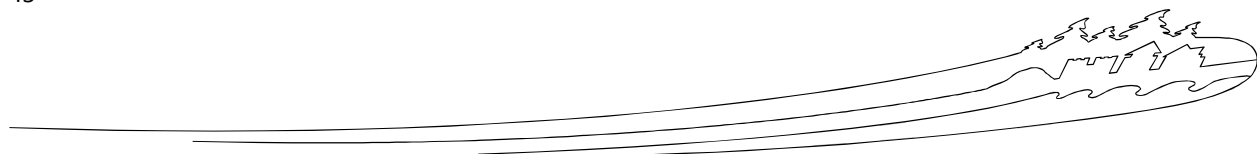




- P.2** Apply wet weather restrictions on construction activities to reduce surface run-off from exposed work areas and to minimize the risk of inundation.
- P.3** The work area shall be stabilized against the impacts of high flow/heavy rainfall events at the end of each workday.
- P.4** Work shall be suspended and the work area stabilized when there is a high probability of a rainfall event.

#### **Q. Treated Wood**

- Q.1** Wood must not be treated with preservative onsite with the exception of small spot treatments. If spot treatments are required they are to be conducted on an impermeable surface and to be completely dry before installation.
- Q.2** Ensure that any Treated Wood purchased is marked with an End Tag to certify that it has been treated to the applicable CSA treatment standard. The end tag should show the preservative used, the use category, the product group and a plant identification number.
- Q.3** Use of Treated Wood must be in accordance to the CSA O80 Standard Product Group and Use Category system that corresponds to the planned context-specific use.
- Q.4** To mitigate risk of leaching, a sealer or coating may be used. Penetrating sealers are recommended due to that in addition to waterproofing the wood, the application of such sealers reduces the release of chemicals contained in CCA-Treated Wood by 80% to 95%.
- Q.5** To reduce leaching, wood treated with borate preservatives should not be used in locations where it will be subject to heavy rains or ground contact.
- Q.6** If the Treated Wood will be subject to a wet environment after installation it is recommended to allow time to dry or “age” the wood prior to installation, as the leaching of pesticides from Treated Wood decreases exponentially with time. With in-water installations, most metal leaching from CCA-Treated Wood occurs in the first 90 days following. In above water structures, most CCA leaching is thought to occur in the first year.
- Q.7** The use of cleaning and bleaching products containing sodium hypochlorite, sodium hydroxide, sodium percarbonate, citric or oxalic acid on Treated Wood should be avoided as these products can cause the wood to release toxic chemicals.
- Q.8** To minimize the need for in-field treatment it is recommended that framing, sawing, cutting and drilling be done before treatment to the maximum degree possible, preferably in a contained area to collect and remove sawdust and a minimum of 30 m from water.
- Q.9** Treated wood must be visually inspected before use to ensure that it appears clean and its surface is free of preservative residues. Otherwise, the lumber should not be used and should be disposed of in accordance with the manufacturer’s guidelines and with local and provincial regulations.
- Q.10** Exposed cut ends and drill holes should be field-treated<sup>1</sup> with a preservative (along with a sealer) in accordance with the manufacturer’s and the Pesticide Label instructions, preferably a minimum of 30 m from water and in a protected cutting area prior to the assembly of the wooden structure.





**Q.11** Workers must always cut and work with Treated Wood outdoors or in an adequately ventilated area and ensure that cut ends and sawdust from Treated Wood are collected and disposed appropriately as specified in the Treated Wood Pesticide Label.

**Q.12** If Treated Wood is to be stored on site, the following table provides recommended instructions:

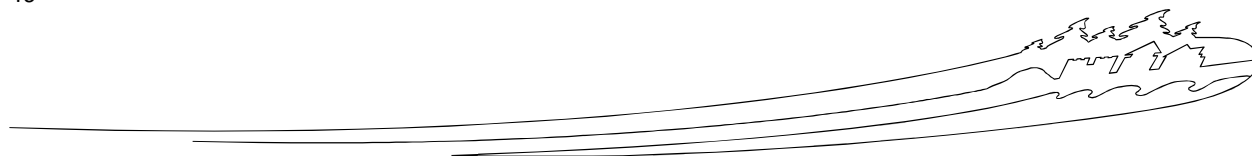
Table 5: Storage Recommendations (modified from Environment Canada, 2004)

Time Period	Volume of Storage	Factors
90 Days or Less	55 m <sup>3</sup> or less	<ul style="list-style-type: none"> <li>- Store on flat ground (slope less than 10%) and a minimum of 10 m from environmentally sensitive area</li> <li>- Elevate to avoid contact with water runoff</li> <li>- Provide absorbent (ex. wood chips) or limited permeability (ex. Concrete) base</li> <li>- Minimize on site storage time</li> <li>- Inspect wood upon delivery to ensure it meets ordering specifications</li> <li>- Place tarpaulin or weather resistant material over wood</li> <li>- Inspect storage area for evidence of leaching treatment chemicals</li> </ul>
	More than 55 m <sup>3</sup> <b>(Additional factors)</b>	<ul style="list-style-type: none"> <li>- Store a minimum of 30 m from environmentally sensitive area</li> </ul>
More than 90 days	55 m <sup>3</sup> or less <b>(Additional factors)</b>	<ul style="list-style-type: none"> <li>- Store a minimum of 3 m from drainage ditches</li> <li>- Provide emergency response information and fire protection equipment</li> <li>- Limit access to the storage area</li> </ul>
	More than 55 m <sup>3</sup> <b>(Additional factors)</b>	<ul style="list-style-type: none"> <li>- Store a minimum of 30 m from environmentally sensitive area and a minimum of 3 m from drainage ditches</li> <li>- Store at least 30 m from potable water supply and outside of 100-year flood plain where possible</li> <li>- Store at least 30 m from forested area and clear storage area of combustible ground vegetation.</li> <li>- Choose a storage area where runoff can be captured/managed</li> <li>- Provide fencing and/or signage around area</li> </ul>

**Q.13** If the chemical solution is accidentally spilled while ends are being field-treated, the spill should be managed in accordance with site-specific spill control and response plan or other prescriptive mitigation measures. Alternatively, the spill should be contained with a disposable absorbent substance (soil, sawdust, forest litter or rags), cleaned up immediately and disposed of safely as per the Pesticide Label directions.

**Q.14** Due to the toxic chemicals that may be produced in the smoke and ashes, Treated Wood should never be burned.

**Q.15** Collect all remaining scraps, cuttings, wood chips and sawdust in a timely manner and dispose of them appropriately as specified in the Pesticide Label. Do not compost waste material.





## 10. PUBLIC/STAKEHOLDER ENGAGEMENT & ABORIGINAL CONSULTATION

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

☒ No

☐ Yes (describe the process to involve relevant parties and indicate how comments were taken into consideration).

Comments: Public participation was not sought on this project as the proposed work is considered maintenance of an existing asset. It does not have the potential to general conflict between the environmental, social or economic values of concern to the public.

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

☒ No

☐ Yes (describe the process to involve relevant parties and how the results were taken into consideration).

Comments: Parks Canada is engaged with the Algonquins of Ontario (AOO) in ensuring Aboriginal and Treaty Rights issues are properly addressed and where warranted accommodation made on all projects and activities within the Rideau Canal under the management of Parks Canada. Given the nature of the works (maintenance of an existing structure), with the appropriate mitigation measures in place, and taking into account engagement on similar matters to date specific Aboriginal Consultation was not undertaken. The AOO will be updated regularly on the status of the project and if needed further engagement may be undertaken.

## 11. SIGNIFICANCE OF RESIDUAL ADVERSE EFFECTS

No residual adverse effects following mitigation and adverse effects on ecological integrity (EI), commemorative integrity (CI), and visitor experience (VE) objectives are anticipated.

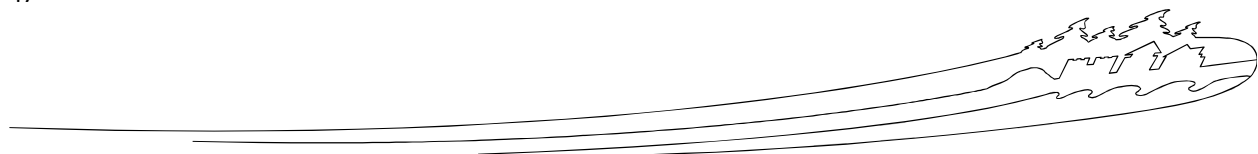
## 12. SURVEILLANCE

☐ Surveillance is not required

☒ Surveillance is required (provide details such as the proposed schedule and the focus of inspections)

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

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





### 13. 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*

### 14. SARA NOTIFICATION

Notification is:

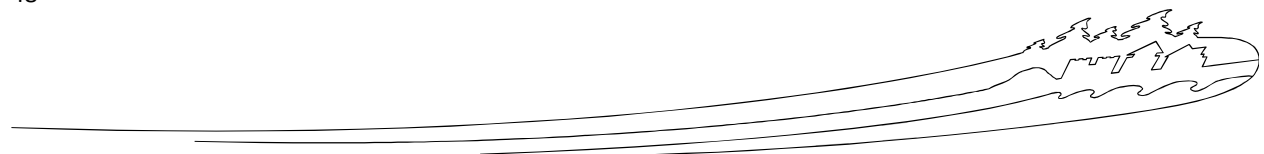
- ☒ not required
- ☐ required under the *Species at Risk Act* (outline the nature of and response to any notification).

### 15. EXPERTS CONSULTED

*Include Parks Canada experts. Add as many entries as necessary for the project.*

Department/Agency/Institution: Parks Canada Agency	Date of Request: March 28, 2017
Expert's Name & Contact Information: Barbara Leskovec	Title: Federal Infrastructure Investments Archaeologist
Expertise Requested: Archaeological assessment of the work area at Black Rapids Lock 13 and Lower Nicholsons Lock 18.	
Response: Recommendations and mitigation measures provided. See Appendix F and G	

Department/Agency/Institution: Parks Canada Agency	Date of Request: June 23, 2017
Expert's Name & Contact Information: Nathalie Desrosiers	Title: Policy Advisor, Cultural Resources Management
Expertise Requested: Cultural Resource Assessment and Statement of Heritage Value	
Response: Recommendations and mitigation measures provided	





Department/Agency/Institution: Parks Canada Agency	Date of Request: June 13, 2017
Expert's Name & Contact Information: Jean-Francois Charron	Title: Project engineer, Strategic Policy and Investment Directorate
Expertise Requested: Project overview and construction process details	
Response: Site visit tour and Project Description Document provided	

Department/Agency/Institution: Parks Canada Agency	Date of Request: September 6, 2017
Expert's Name & Contact Information: Joanne Tuckwell	Title: Species Conservation Specialist, Species Conservation and Management, Natural Resource Conservation
Expertise Requested: Discussion regarding impacts to Species at Risk, particularly Eastern Must Turtle	
Response: Recommendations and mitigation measures provided – see SAR assessment	

## 16. DECISION

Taking into account implementation of mitigation measures outlined in the analysis, the project is:

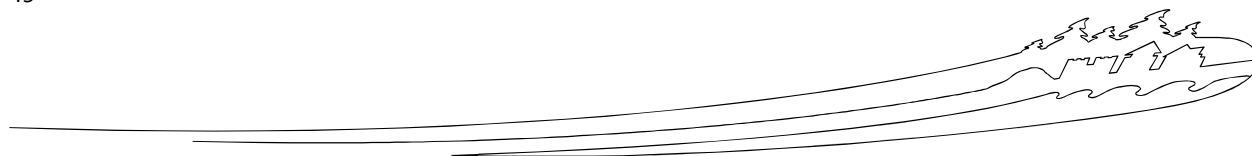
- ☒ not likely to cause significant adverse environmental effects.  
☐ likely to cause significant adverse environmental effects.

### FOR SARA REQUIREMENTS:

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

**OR**, the SARA-Compliant Authorization Decision Tool was used and determined:




- ☐ There is no contravention of SARA prohibitions  
☐ Project activities contravene a SARA prohibition and CAN be authorized under SARA  
☐ Project activities contravene a SARA prohibition and CANNOT be authorized







## 17. RECOMMENDATION AND APPROVAL

<b>Prepared by (EIA Author):</b> Sarah Bunting, Environmental Assessment Officer	<b>Date:</b>
<b>Signature:</b> 	<b>Date:</b> Oct 5 <sup>th</sup> 2017
<b>Recommended by:</b> Valerie Minelga, Environmental Assessment Scientist	<b>Date:</b> Oct 5 <sup>th</sup> , 2017
<b>Signature:</b> 	
<b>Approved by (Director of Ontario Waterways):</b> Jewel Cunningham, Director, Ontario Waterways	<b>Date:</b> Oct 5 / 17
<b>Signature:</b> 	

## 18. ATTACHMENTS

Appendix A: Environmental Impact Analysis Tool: Effects Identification Matrix

Appendix B: SARA-Compliant Authorization Decision Tool for Lower Nicholson's Lockstation - Wharf Replacement

Appendix C: Black Rapids Lockstation – Wharf Replacement – Construction Drawings 99% - 10-07-2017

Appendix D: Lower Nicholson's Lockstation - Wharf Replacement – Construction Drawings 99% - 10-07-2017

Appendix E: Site Photos

Appendix F: Archaeological Overview Assessment – Black Rapids Lockstation - Wharf Replacement

Appendix G: Archaeological Overview Assessment – Lower Nicholson's Lockstation - Wharf Replacement

## 19. NATIONAL IMPACT ASSESSMENT TRACKING SYSTEM

☐ Project registered in [tracking system](#)

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

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

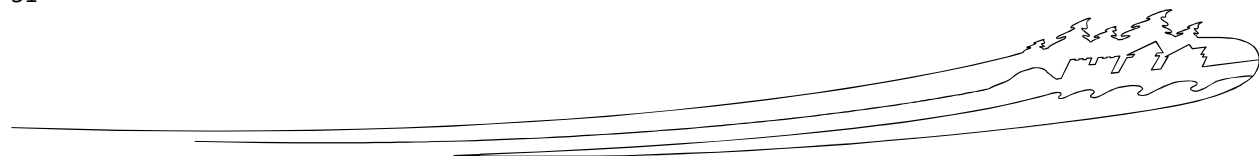




## Appendix A: Environmental Impact Analysis Tools - Effects Identification Matrix

**Section A** focuses on direct effects of the project and **Section B** on indirect effects that are caused by changes to the environment.

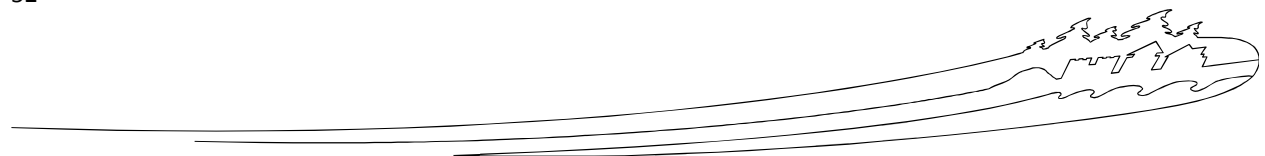
A. Direct Effects									
			Valued components potentially directly affected by the proposed project						
			Natural Resources					Cultural Resources	
			Air	Soil & landforms	Water (surface, ground, crossings, etc.)	Flora (specify, including SAR)	Fauna (specify, including SAR)	B.L. and L.N. Landscape	B.R. and L. N. Cultural Resources of National Significance
Phase	Examples of Associated Activities								
Project Components	Preparation / Construction / Operation / Decommissioning	Supply and storage of materials	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
		Burning	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
		Clearing	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
		Demolition	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
		Disposal of waste	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
		Blasting/ Drilling	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
		Dredging	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
		Drainage	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
		Excavation	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
		Grading	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
		Backfilling	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
		Use of machinery	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
		Transport of materials/ equipment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
		Building of fire breaks	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
		Use of Chemicals	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
		Set up of temporary facilities	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

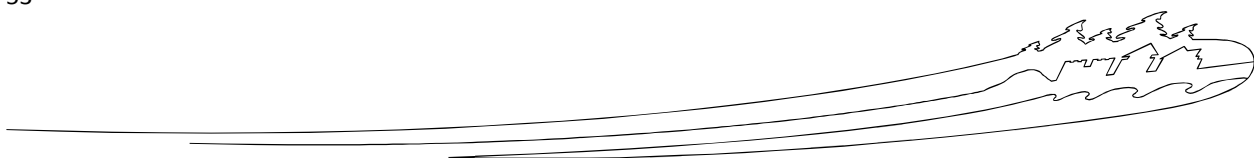




		Other...	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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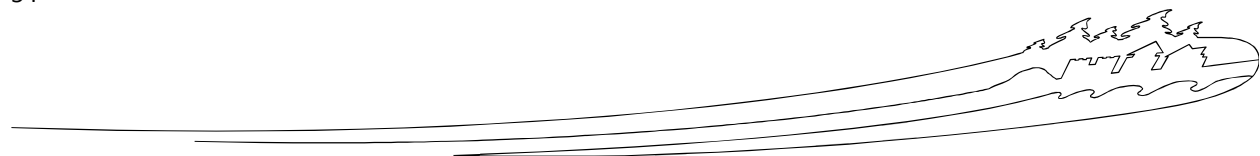
A. Direct effects continued								
			Valued components potentially affected by the proposed project					
			Natural Resources				Cultural Resources	
			Air	Soil & landforms	Water (surface, ground, crossings, etc.)	Flora (specify, including SAR)	Fauna (specify, including SAR)	Combined 29A Cultural Resources of National Significance
	Phase	Examples of Associated Activities						
Project Components	Preparation / Construction / Operation / Decommissioning	Waste disposal	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
		Wastewater disposal	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
		Maintenance	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
		Use	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
		Use/Removal of temporary facilities	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
		Use of Chemicals	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
		Active fire stage	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
		Prescribed burn cleanup	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
		Planting	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
		Culling	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
		Vehicle Traffic	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>







B. Indirect Effects (all phases)							
		Impacts as a result of changes to the environment					
		With respect to non-Aboriginal peoples:	With respect to Aboriginal peoples:		With respect to visitor experience		
		Health and socio-economic conditions	Health & socio-economic conditions	Current use of lands and resources for traditional purposes	Access & services	Recreation & accommod'n opportunities	Safety
Phase	Natural resource components affected by the project						
Preparation /construction operation/implementation/decommissioning	Could impacts to <u>air</u> lead to adverse effects on...	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
	Could impacts to <u>soils and landforms</u> lead to adverse effects on...	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
	Could impacts to <u>water</u> (e.g. surface, ground water and water crossings) lead to adverse effects on...	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Could impacts to <u>flora</u> (including SAR) lead to adverse effects on...	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Could impacts to <u>fauna</u> (including SAR) lead to adverse effects on...	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

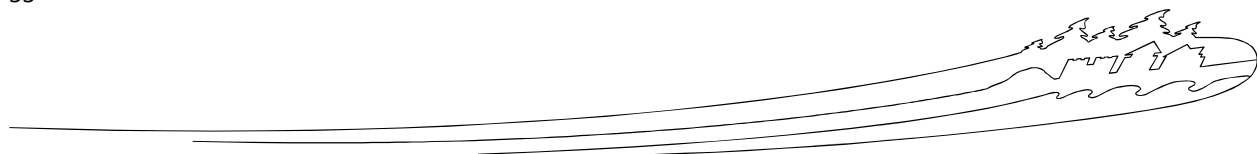




## **Appendix B: SARA-Compliant Authorization Decision Tool**

<b>Part A – Does a SARA authorization need to be considered for this activity?</b>
<b>1. Will the activity lead to residual adverse effects that contravene a SARA prohibition for a listed endangered (En), threatened (Th) or extirpated (Ex) species at risk, its residence or its critical habitat? (Clearly indicate if the activity will affect one/or more listed species).</b>
SARA prohibitions: s.32 - Cannot: kill, harm, harass, capture, or take individuals; possess, collect, buy, sell or trade individuals or parts of individuals; s.33 – Cannot damage or destroy residences; s.58 – Cannot destroy any part of critical habitat; s.80 - Cannot carry out an activity that is prohibited under a protection order.
<input type="checkbox"/> <b>Yes. Residual adverse effects of the activity will contravene a SARA prohibition.</b> <input checked="" type="checkbox"/> <b>No, all residual adverse effects have been mitigated (see below)</b>
<b>2. Is the activity authorized under S. 83 of SARA?</b>
<input type="checkbox"/> <b>Yes. A SARA authorization is NOT required.</b> The activity is authorized in a recovery strategy or action plan; <b>OR</b> <input type="checkbox"/> <b>Yes. A SARA authorization is NOT required.</b> The activity is required for public safety, health or national security <b>AND</b> authorized by or under another Act of Parliament. If all activities that would contravene a SARA prohibition are already authorized under SARA s.83, <b>check the first box in Part D and submit for approval.</b>
<input type="checkbox"/> <b>No. A SARA authorization is required. Continue to Part B.</b>

<b>Part B – Is the activity eligible for authorization under SARA?</b>
****Complete ONLY if you have answered <b><u>NO</u></b> to Question 2, above****
<b>3. Does the activity fall into one of the following three categories?</b>
Select the appropriate box (check only one) and <b>continue to Question 4</b> OR, If the proposed activity DOES NOT fit in any of the three categories below the activity CANNOT be authorized, and you can check the second box in <b>Part D and submit for approval.</b> <input type="checkbox"/> The activity is scientific research related to the conservation of the species and conducted by qualified persons; <b>OR</b> <input type="checkbox"/> The activity benefits the species or is required to enhance its chance of survival in the wild ;OR <input checked="" type="checkbox"/> Affecting the species is incidental to the activity (i.e. the purpose of the activity is not to engage in an activity that is prohibited under SARA (e.g., kill, harm, harass...an individual; destroy a residence or critical habitat). For example, fishing for a listed species cannot be permitted, but accidental by-catch may be.
<b>4. Alternatives that would reduce the impact(s) on the species have been considered and the best solution adopted</b>





The existing wharf structure at Lower Nicholson's Lock 18 is in very poor condition with some leaning associated with wood rot at the north and south ends of the structure and splitting and displacement of section of timbers under the water in the central portion of the structure. The consistent rotation of the concrete deck towards the water is thought to be construed as an indication of some degree of rot in the timber within the splash zone of the exposed face of the structure.

The existing footprint of the wharf at Lower Nicholson is currently 101 m<sup>2</sup>, and will be expanded to 161 m<sup>2</sup>, for an increase in footprint/loss of critical habitat of 60 m<sup>2</sup>. Of this 60 m<sup>2</sup>, approximately 34.8 m<sup>2</sup> is an expansion of footprint into the watered area. The remaining footprint (approximately 25.2 m<sup>2</sup>) is an expansion of footprint into the current existing shore-line and lawn-area adjacent to the current existing wharf.

The expansion of the length of the wharf on the north and south ends is thought to increase the structural stability and durability wharf structure (less prone to wave and ice abrasion) as well as reduce erosion and destabilization of the existing shoreline. Furthermore, the expansion of the wharf structure along the shore-line edge to the lock-gate abutment is to improve the continuity of the structure, accessibility and safety, thereby making the wharf structure potentially more boater and visitor-friendly.

This structural addition should improve and extend the life expectancy of the wharf structure from that of the existing design. It is also more economical and efficient to incorporate these additions at this time of the wharf replacement, thereby reducing unnecessary invasive in-water work and potential disturbance.

#### 5. All feasible measures must be taken to minimize the impact of the activity

See Section 9 (above) of the BIA.

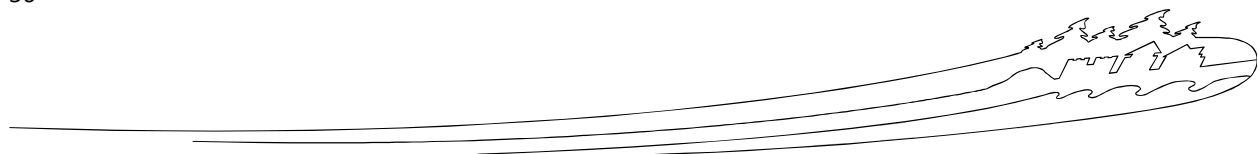
#### 6. Will the activity jeopardize the survival or recovery of the species?

Document here your analysis of whether the activity will jeopardize survival or recovery of the species. The analysis must consider and refer to relevant SARA recovery documents (e.g. COSEWIC status reports, recovery strategies, action plans), and/or Parks Canada Detailed Assessments for the species, if available. In particular, refer to the population and distribution objectives, the threats to the species, and the identification of critical habitat (including the location, amount - if available, biophysical attributes, and the activities likely to destroy).

**NOTE:** If the BIA determines there are no alternatives or mitigation measures that can prevent destruction of critical habitat or non-compliance with a protection order, you **MUST** consult a member of the [SCM team](#) for further advice.

#### Eastern Whip-poor-will:

The recovery strategy for Eastern Whip-poor-will (Environment Canada, 2015) identifies both nesting and foraging critical habitat. Nesting habitat includes 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), rock

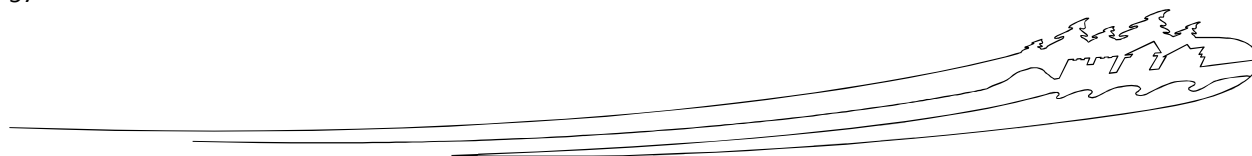




or sand barrens with scattered trees, savannahs, old burns, as well as sparse conifer plantations. Foraging habitat include prairies, wetlands with shrubs, regenerating clear-cuts as well as agricultural fields and other habitats with low tree cover and availability of foraging perches as these conditions favor the localization of prey by lunar light as well as foraging efficiency.

**Table 1:** Biophysical Habitat Assessment of footprint of 'Critical Habitat' to be Impacted by Project for Eastern Whip-poor-will (see Photos 15 – 20 in Appendix E)

Components of Habitat Suitability	Biophysical Attributes	Biophysical Attribute Met?
Regional context	Forests (e.g., deciduous, mixedwood, coniferous, treed wetlands) and open habitats (e.g., shrublands, fallow fields, regeneration following fires or clear-cuts, rock and sand outcrops; shrubby wetlands) form a mosaic	No
Habitats suitable for both nesting and foraging	<p>– Forests with sparse to moderate <sup>a</sup> a tree cover or open habitats</p> <p><b>AND</b>– Sparse to moderate shrub and herbaceous cover</p> <p><b>AND</b>– Well-drained soils (e.g., sand, sandy-loam)</p> <ul style="list-style-type: none"> <li>• <i>Within an atlas square, includes all corresponding areas of 3 ha <sup>b</sup> or more</i></li> </ul>	No
Habitats suitable for nesting [must be adjacent to foraging habitats]	<p>– Forests with a dense tree cover</p> <p><b>AND</b>– Sparse to moderate shrub and herbaceous cover</p> <p><b>AND</b>– Well-drained soils (e.g., sand, sandy-loam)</p> <ul style="list-style-type: none"> <li>• <i>Within an atlas square, includes all corresponding areas up to 30 m on the interior side of the forest edge</i></li> </ul>	No







<p>Habitats suitable for foraging only [must be adjacent to nesting habitats]</p>	<p>– Forests with sparse tree cover or open habitats <b>AND</b>– Dense shrub cover <b>AND</b>– Soil drainage is deficient</p> <ul style="list-style-type: none"> <li>• Within an atlas square, includes all corresponding areas up to 1,250 m from the edge with suitable nesting habitat</li> </ul> <p><b>OR</b></p> <p>– Agricultural land with scattered shrubs or trees (e.g., hedgerows) that can be used as perches</p> <ul style="list-style-type: none"> <li>• Within an atlas square, includes all corresponding areas up to 1,250 m from the edge with suitable nesting habitat</li> </ul>	<p>No</p>
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<sup>a</sup> Sparse : <25% ; Moderate : 25-75% ; Dense : >75%

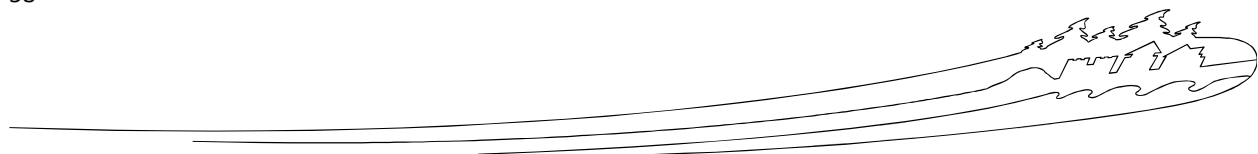
<sup>b</sup> Minimum territory size for the Eastern Whip-poor-will (Cink 2002).

Source: [http://www.registrelep-sararegistry.gc.ca/default.asp?lang=En&n=A9F67B2C-1#\\_07](http://www.registrelep-sararegistry.gc.ca/default.asp?lang=En&n=A9F67B2C-1#_07)

However, given the project's location(s) and degree of past human-induced impact and development of the project sites and surrounding areas, the project's activities are not anticipated to have significant adverse impacts to individual specimens, nor is it likely to give rise to the destruction of critical nesting and/or foraging habitat as the project location does not accurately meet the biophysical attributes of defined Critical Habitat for Eastern Whip-poor-will. Additionally, the Eastern Whip-poor-will is not anticipated to be present during the time of work due to southern migration activity. None-the-less, appropriate mitigation will be advised should individual specimens be observed in, or within proximity to, the project sites.

#### Eastern Musk Turtle:

The proposed recovery strategy for the Eastern Musk Turtle (Environment Canada, 2016) describes Eastern Musk Turtle habitat as stagnant or slow-moving shallow wetlands that are connected to larger permanent waterbodies or shallow bays of lakes and rivers. In Canada, Eastern Musk Turtles have been found in different types of waterbodies, such as lakes, ponds, marshes, rivers and streams; however,

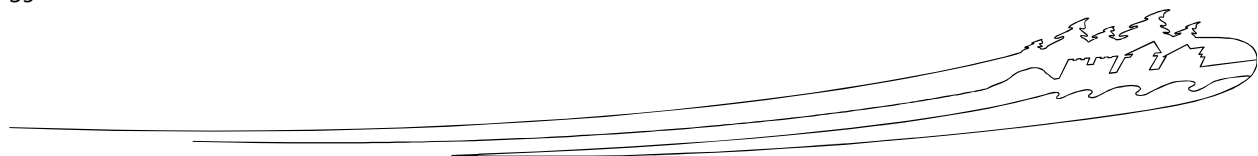




Eastern Musk Turtle seems to require water with abundant emergent, floating, and submerged aquatic vegetation that provides surface cover, which may be important for foraging, adult and juvenile refuge, and thermoregulation. Furthermore, they are often found in areas with a soft substrate such as sand or organic mud where they can readily bury themselves, and also areas with gravel bottoms (Environment Canada, 2016). The bounding polygon of critical habitat stretches along the Rideau River from Merrickville to just north of Burritt's Rapids. Aquatic habitat in the vicinity of Upper Nicholson's Lockstation exhibits the biophysical attributes of foraging/thermoregulation/mating and commuting/dispersal critical habitat as defined in the recovery strategy, and the terrestrial habitat exhibits the biophysical attributes of commuting critical habitat (COSEWIC, 2016).

**Table 2:** Biophysical Habitat Assessment of footprint of 'Critical Habitat' to be Impacted by Project for Eastern Musk Turtle (see Photos 15 – 20 in Appendix E)

Components of Habitat Suitability	Biophysical Attributes	Biophysical Attribute Met?
Aquatic Habitats suitable for Foraging/ Thermoregulation/ Mating: Watercourses (e.g., rivers, streams), or waterbodies (e.g., lakes, bays, ponds, canals), or wetlands (e.g., shallow water, marsh)	<ul style="list-style-type: none"> <li>• presence of water up to 9 m in depth; AND</li> <li>• well-oxygenated; AND</li> <li>• does not freeze to the bottom</li> </ul>	No - The Depth of the water in the summer months in front of the wharf varies between 1.11 to 2.14 metres. The depth of the water in front of the wharf varies between 0.7 to 1.75 metres at the Deepest during the winter season. This is the depth of water that anticipated to be present during construction. Thereby the area of impact is likely exposed land, and/or freezes (assuming with average winter temperatures that ice depth will reach 0.3 – 0.7 m)
Aquatic Habitats suitable for Overwintering/ Mating: Watercourses (e.g., rivers, streams), or waterbodies (e.g., lakes, bays, ponds, canals), or wetlands (e.g., shallow water, marsh)	<ul style="list-style-type: none"> <li>• presence of water up to 9 m in depth; AND</li> <li>• well-oxygenated; AND</li> <li>• does not freeze to the bottom</li> </ul>	No/Unlikely - The Depth of the water in the summer months in front of the wharf varies between 1.11 to 2.14 metres. The depth of the water in front of the wharf varies between 0.7 to 1.75 metres at the Deepest during the winter season. This is the depth of water that anticipated to be present during construction.

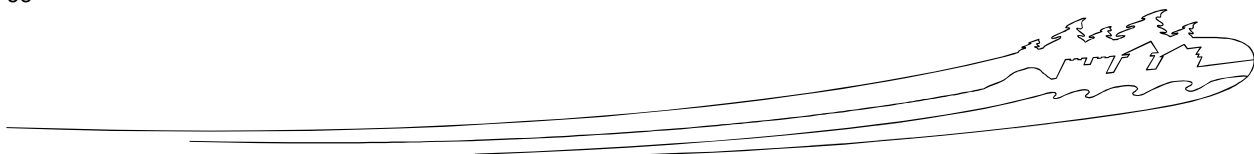




		Thereby the area of impact is likely exposed land, and/or freezes (assuming with average winter temperatures that ice depth will reach 0.3 – 0.7 m)
Aquatic Habitats suitable for Commuting and dispersal movements: Watercourses (e.g., rivers, streams), or waterbodies (e.g., lakes, bays, ponds, canals), or wetlands (e.g., shallow water, marsh)	<ul style="list-style-type: none"> <li>• presence of water up to 9 m depth; AND</li> <li>• permeable to Eastern Musk Turtle (no barriers to movement)</li> </ul>	Yes
Terrestrial Habitats suitable for Nesting: Open shoreline areas (e.g., river banks, mudflats, sandbars, beaches, rocky outcrops, islands)	<ul style="list-style-type: none"> <li>• exposed to full or partial sunlight; AND</li> <li>• exposed soil or sand; OR</li> <li>• soil or gravel filled rock crevices close to the shoreline; OR</li> <li>• areas with decaying vegetable matter, tufts of grass, leaf mold, rotting wood e.g. stumps or fallen logs; OR</li> <li>• Muskrat lodges, Beaver lodges</li> </ul>	No – terrestrial shore-line area consist of a manicured lawn and some longer unkempt grasses.
Terrestrial Habitats suitable for Commuting Movements: Shoreline and terrestrial habitat (e.g., river banks, forest, grassland)	<ul style="list-style-type: none"> <li>• permeable to Eastern Musk Turtle (no barriers to movement)</li> </ul>	Yes

Source : <http://www.registrelep-sararegistry.gc.ca/default.asp?lang=En&n=3430C13C-1>

Although the area of impact meets the biophysical attributes for terrestrial and aquatic critical habitat of Eastern Musk Turtle for the purpose of commuting and dispersal movements, given the high-degree of past, present and on-going human-influence upon the area, the sub-par quality of the habitat in relation to less-disturbed (and more-ideal) habitat adjacent to the area, and the lack of historical observations and documentation of the species in the area, it is unlikely that the impacted area would be/is utilized for movement purposes.





The Ecological Relevant Area (ERA) for assessing destruction for Eastern Musk Turtle habitat is three (3) linear kilometres of aquatic habitat (1.5 km upstream and 1.5 km downstream) from Upper Nicholson's Lockstation. Critical habitat mapping identified in the recovery strategy identifies a bounding polygon of critical habitat stretches along the Rideau River from Merrickville to just north of Burritt's Rapids, an area of 516 ha, or 5.16 km<sup>2</sup>

The impact to Eastern Musk Turtle critical habitat will be caused by a loss of habitat resultant of the expansion of the wharves' footprints at Lower Nicholson's Lockstation by 60 m<sup>2</sup>. Further temporary impacts to Eastern Musk Turtle may be caused by the placement of a temporary meter-bag cofferdams and/or turbidity curtains around the wharves in the areas to be isolated/dewatered, restricting access to potential over-wintering habitat. The placement of cofferdams and/or turbidity curtains is to facilitate the decommissioning and replacement of the wharves.

Compared to the 516 ha of similar riverine habitat in the bounding critical habitat polygon (1 ha = 10 000 m<sup>2</sup>), the amount of habitat that will be lost due to the expansion of the wharf footprint at Lower Nicholson is negligible (0.0000116%). Additionally, the amount of habitat that will be temporarily unavailable due to the placement of a temporary meter-bag cofferdams and/or turbidity curtains around the wharves in the areas to be isolated/dewatered is negligible/non-existent.

Overall, the project does not impact the ability of critical habitat in the ERA to support the life processes of the Eastern Musk Turtle, nor does it jeopardize the survival and/or recovery of the species. The size of the impact upon habitat is negligible when compared to the amount of habitat available. Furthermore, other, more suitable, habitat is widely available in close proximity to the project site. As such no authorization is required.

☒ **Yes. The activity CANNOT be authorized.**

☐ **No. The activity CAN be authorized.** Continue to **Part C**.

## Part C - Prepare the SARA authorization and posting explanation

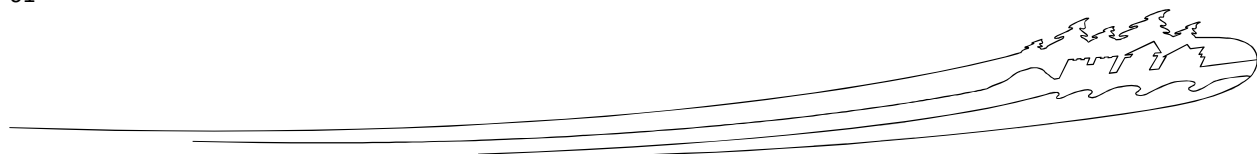
### 7. Prepare the authorization

The authorization will be issued using the EIA process and SARA s.74

Issue the SARA authorization using the [template on the intranet](#) and complete Question 8 to prepare the posting for the [SAR Public Registry](#).

### 8. Provide description for posting

*SARA requires that an explanation of why a SARA authorization is issued be posted in the SARA Public Registry in both official languages within 30 days of the authorization being issued. Prepare the explanation, using the information you entered in the BIA and previous sections of this Appendix. Your regional SCM representative will have the explanation translated and will publish it on the SARA registry.*



**Regional or Local Number:**

*Provide the authorization number issued by Parks Canada (in this instance, the file number of the EIA)*

**Purpose – select the answer indicated in Section 3 of this Appendix:**

- Affecting the species is incidental to the activity; OR
- The activity is necessary or beneficial to the species, OR
- The activity is scientific research related to the conservation of the species and conducted by qualified persons

**Description of the Activity**

*Provide a one-paragraph summary of the activity and how it will affect the listed species (using the information in sections 5 & 10 of the BIA template)*

- Start Date of Authorization: XXX End Date of Authorization: XXX
- Issuing Authority: Parks Canada Agency
- Authority Used: *(see section 7 of this Appendix)*
- Location of Activity (province, territory or ocean): XXX
- Affected Species: *Limit your list to potentially affected species that are listed under SARA as Extirpated, Endangered or Threatened*

**Pre-Conditions - limit your explanation to species for which the authorization will be issued:**

*Provide a half-page summary of proposed mitigation measures and the significance of residual effects (from the BIA) and provide summary of sections 4, 5 and 6 of this Appendix.*

**Contact Person(s)**

*Provide name and coordinates of a PCA contact.*

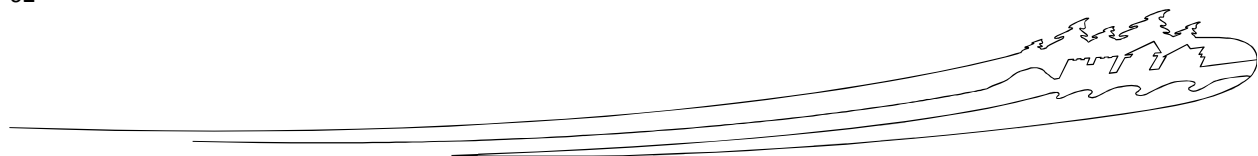
## Part D – SARA Authorization Decision

**Select the appropriate answer and continue to Part E.**

- ☐ This activity does not require a SARA authorization, as indicated in Questions 1 and 2.
- ☐ This activity requires a SARA authorization but CANNOT be authorized because it does not fit into one of the three required categories (see response to Question 3) OR it does not meet one of the SARA pre-conditions (see responses to Questions 4-6).

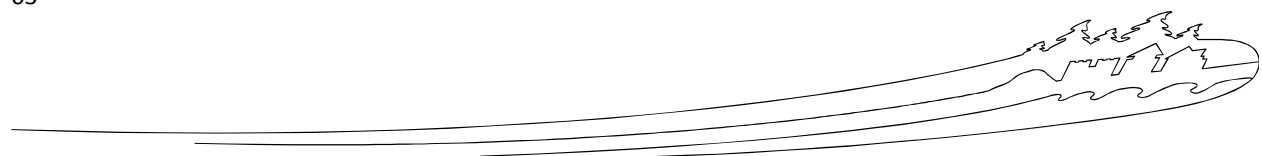
This activity meets the SARA authorization requirements; an authorization may be issued (see response to Questions 3-6). The residual adverse effects (effects remaining after mitigations have been applied) MAY contravene the following SARA prohibition:

- ☐ s.32 - Cannot: kill, harm, harass, capture, or take individuals; possess, collect, buy, sell or trade individuals or parts of individuals;
- ☐ s.33 – Cannot damage or destroy residences;
- ☐ s.58 – Cannot destroy any part of critical habitat;
- ☐ s.80 - Cannot carry out an activity that is prohibited under a protection order



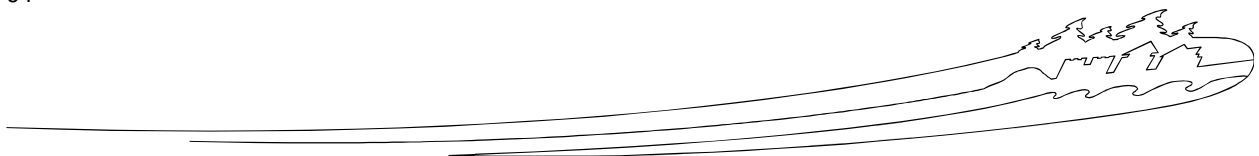


Part E – SARA Authorization Recommendation and Approval	
<b>Prepared by</b> ( <i>add additional blocks as required</i> ) Name & position of author:	Date: YYYY-MM-DD
Name & position of additional collaborator(s) & reviewer(s):	Date: YYYY-MM-DD
<b>Recommended by:</b> Name & Position:	Date: YYYY-MM-DD
<b>Decision Approval</b>	
Name & Position ( <i>FUS/Director of a Waterway, or Delegate</i> ):	
Signature:	Date: YYYY-MM-DD



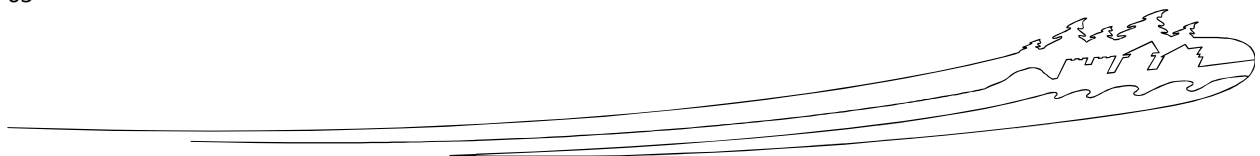


**Appendix C: Black Rapids Lockstation – Wharf Replacement – Construction  
Drawings 99% - 10-07-2017**





**Appendix D: Lower Nicholson's Lockstation - Wharf Replacement –  
Construction Drawings 99% - 10-07-2017**







## **Appendix E: Site Photos**

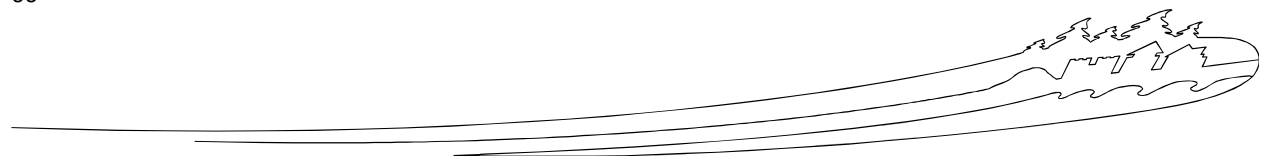
### ***Black Rapids***



**Photo 1:** Access route to construction area, already disturbed from previous year's work at Lockstation (facing North-east). Photo taken by Environmental Officer, Sarah Bunting June 14<sup>th</sup>, 2017.

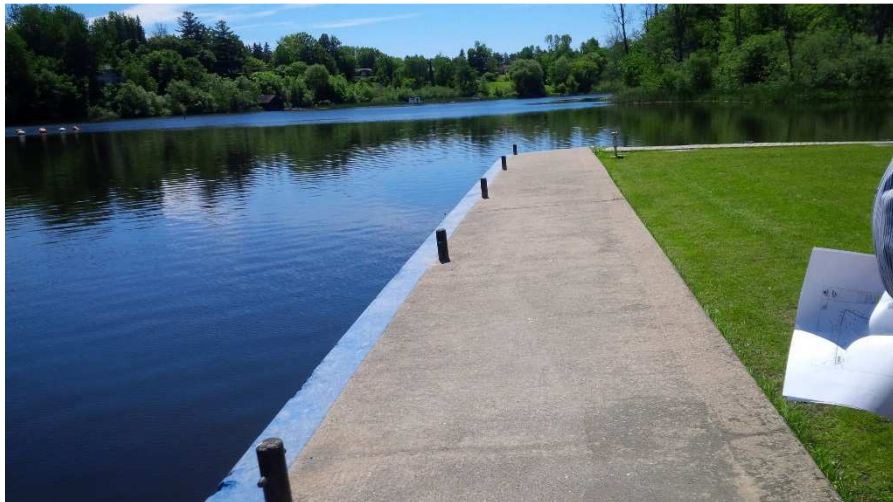


**Photo 2:** Area adjacent to Upper Main and Secondary Wharves (facing South-east). Photo taken by Environmental Officer, Sarah Bunting June 14<sup>th</sup>, 2017.

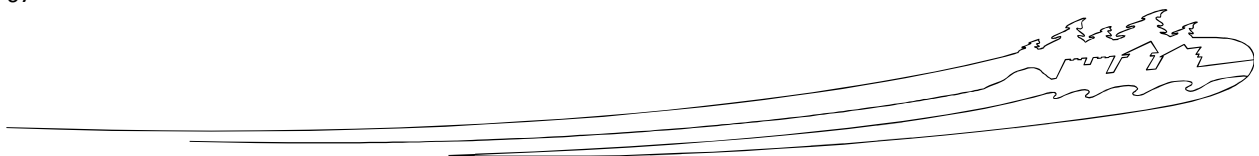




**Photo 3:** Upper Main Wharf (facing North-west). Photo taken by Environmental Officer, Sarah Bunting June 14<sup>th</sup>, 2017.



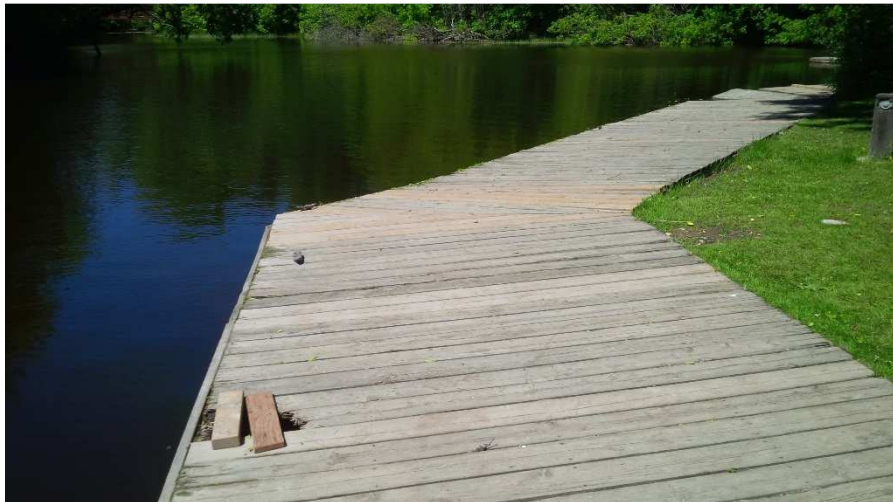
**Photo 4:** Upper Main Wharf (facing South-east). Photo taken by Environmental Officer, Sarah Bunting June 14<sup>th</sup>, 2017.



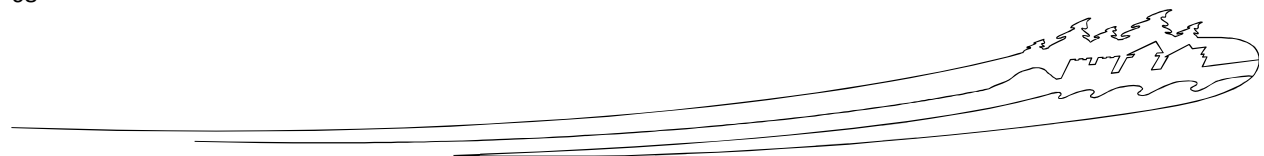




**Photo 5:** Upper Secondary Wharf (facing West). Photo taken by Environmental Officer, Sarah Bunting June 14<sup>th</sup>, 2017.



**Photo 6:** Upper Secondary Wharf (facing West). Photo taken by Environmental Officer, Sarah Bunting June 14<sup>th</sup>, 2017.

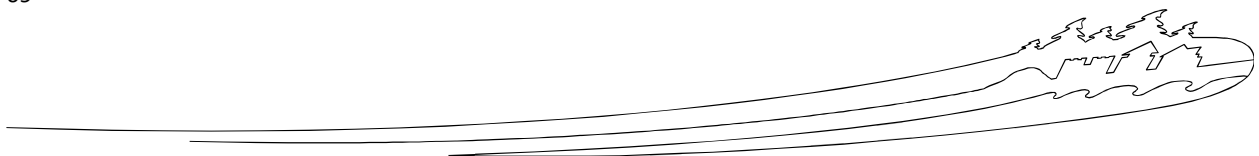




**Photo 7:** Large trees adjacent to Upper Secondary Wharf requiring protection throughout construction (facing North-west). Photo taken by Environmental Officer, Sarah Bunting June 14<sup>th</sup>, 2017.

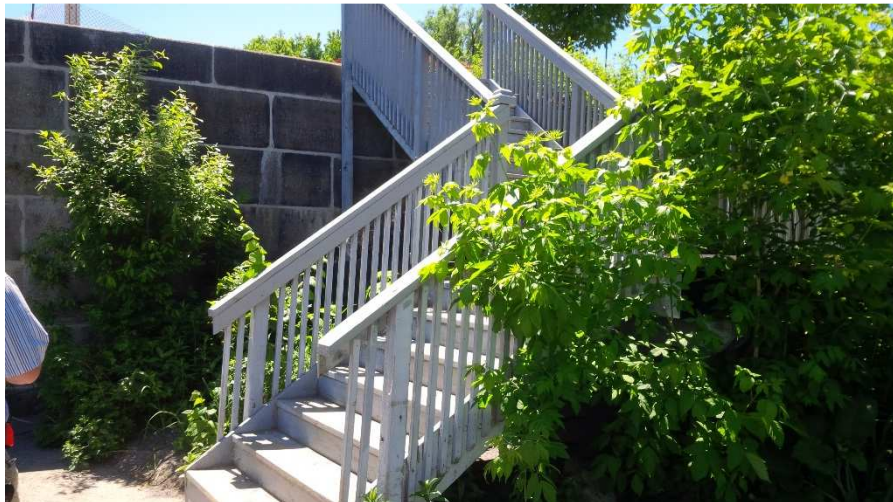


**Photo 8:** Snapping Turtle observed within Lock Chamber. Photo taken by Environmental Officer, Sarah Bunting June 14<sup>th</sup>, 2017.

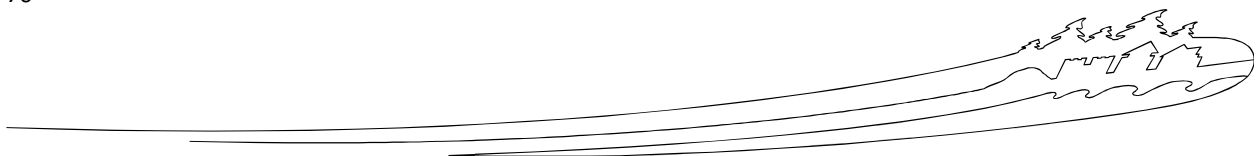




**Photo 9:** Lower Main Wharf (facing North-west). Photo taken by Environmental Officer, Sarah Bunting June 14<sup>th</sup>, 2017.



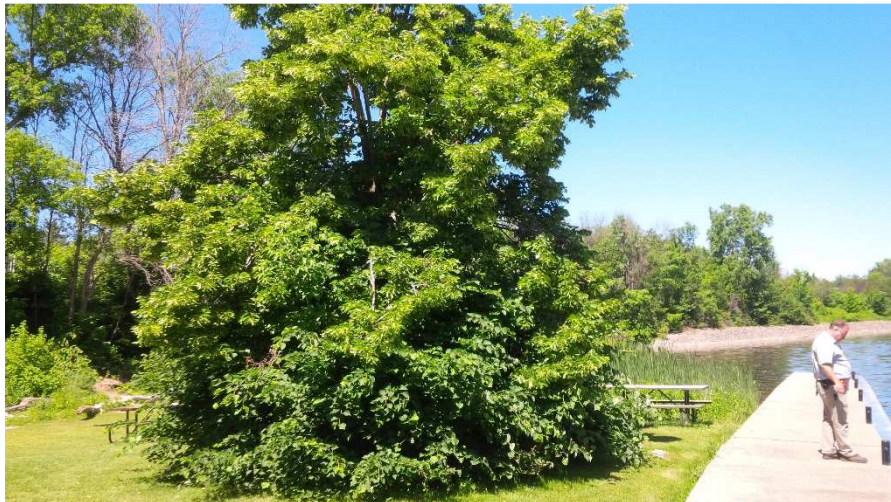
**Photo 10:** Wooden staircase to be replaced, downstream of Lock Chamber (facing South-east). Photo taken by Environmental Officer, Sarah Bunting June 14<sup>th</sup>, 2017.



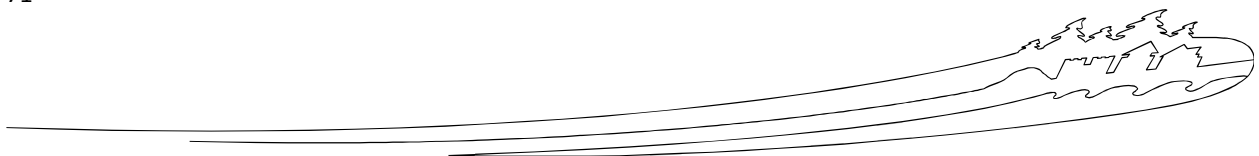




**Photo 11:** Area of access route to Lower Main Wharf (facing South-west). Photo taken by Environmental Officer, Sarah Bunting June 14<sup>th</sup>, 2017.



**Photo 12:** Large tree requiring protection during construction adjacent to Lower Main Wharf (facing North-west). Photo taken by Environmental Officer, Sarah Bunting June 14<sup>th</sup>, 2017.



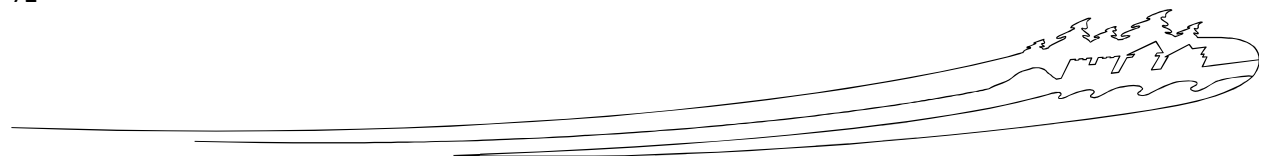


**Photo 13:** Beach area adjacent to Lower Main Wharf (facing South). Photo taken by Environmental Officer, Sarah Bunting June 14<sup>th</sup>, 2017.

**Lower Nicholsons**



**Photo 14:** Access route to construction area (facing North-west). Photo taken by Environmental Officer, Sarah Bunting June 14<sup>th</sup>, 2017.



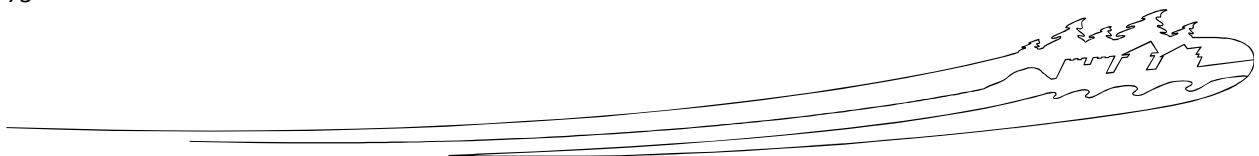




**Photo 15:** Area adjacent to the existing wharf (facing North-east). Photo taken by Environmental Officer, Sarah Bunting June 14<sup>th</sup>, 2017.



**Photo 16:** Shoreline area south-west to the existing wharf where new wharf's footprint will be expanded into (facing North-east). Photo taken by Environmental Officer, Sarah Bunting June 14<sup>th</sup>, 2017.



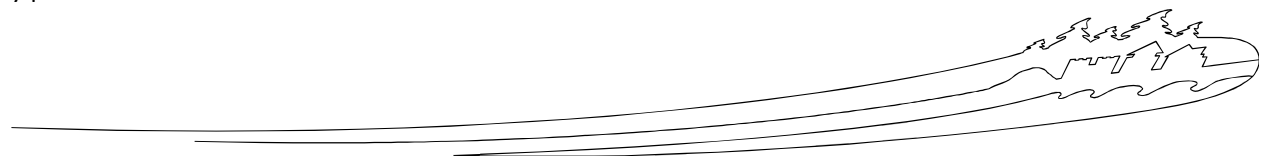




**Photo 17:** Shoreline area South-west of the existing wharf where new wharf's footprint will be expanded into (facing South-west). Photo taken by Environmental Officer, Sarah Bunting June 14<sup>th</sup>, 2017.

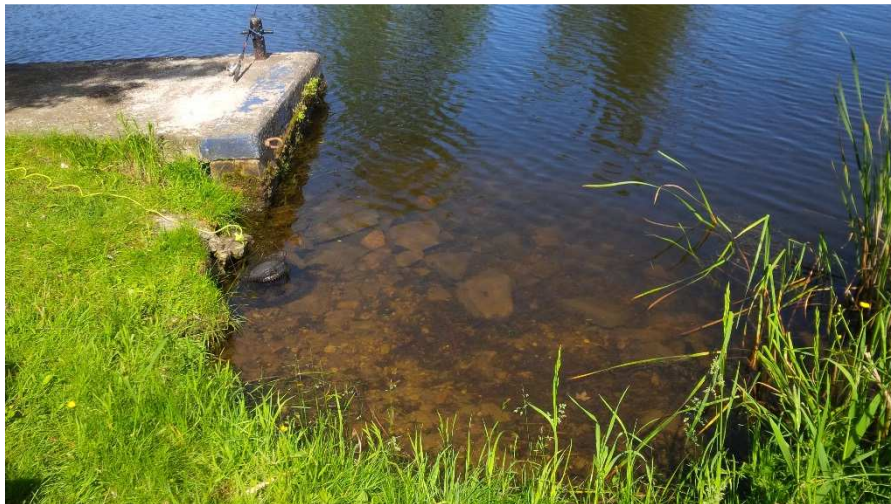


**Photo 18:** The existing wharf (facing North-east). Photo taken by Environmental Officer, Sarah Bunting June 14<sup>th</sup>, 2017.

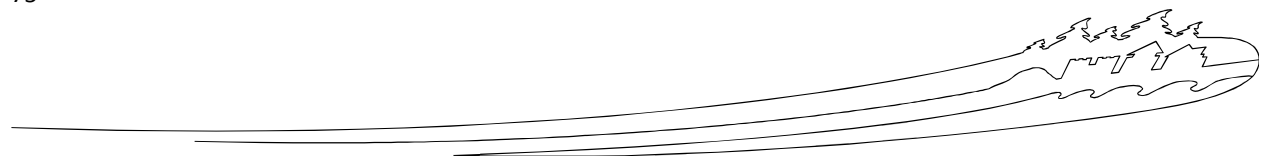




**Photo 19:** Area adjacent to the existing wharf (facing North-east). Note exposed tree roots of tree on right. Photo taken by Environmental Officer, Sarah Bunting June 14<sup>th</sup>, 2017.



**Photo 20:** Shoreline area North-east to the existing wharf where new wharf's footprint will be expanded into (facing North-west). Photo taken by Environmental Officer, Sarah Bunting June 14<sup>th</sup>, 2017.



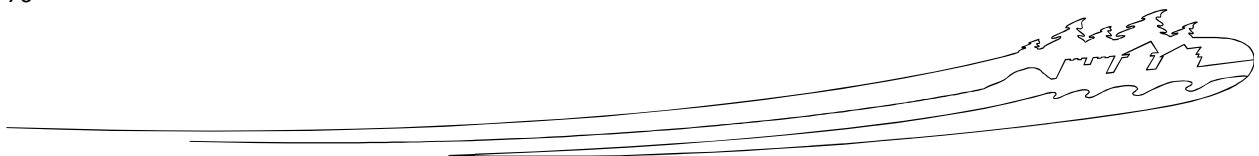




**Photo 21:** Shoreline habitat East to the existing wharf and construction area (facing North-east). Photo taken by Environmental Officer, Sarah Bunting June 14<sup>th</sup>, 2017.

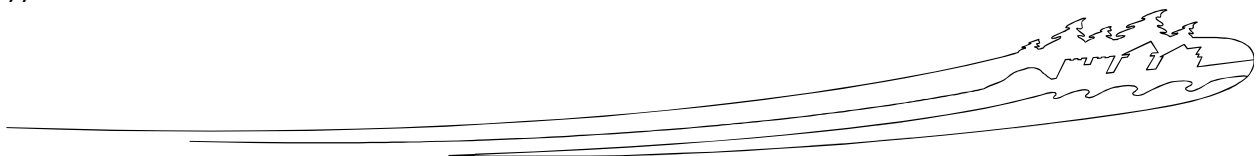


**Photo 22:** Shoreline area North-east to the existing wharf where new wharf's footprint will be expanded into (facing North-east). Photo taken by Environmental Officer, Sarah Bunting June 14<sup>th</sup>, 2017.



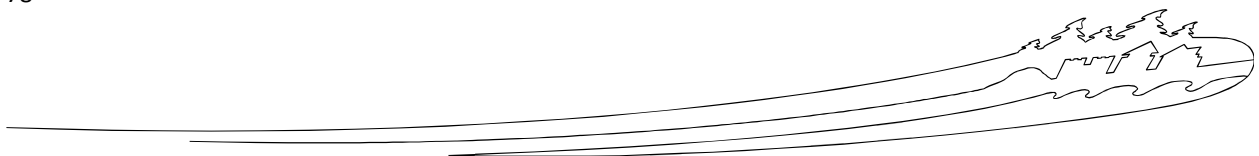


**Photo 23:** Shoreline habitat on western side of canal cut, West to the existing wharf and construction area (facing North-west). Photo taken by Environmental Officer, Sarah Bunting June 14<sup>th</sup>, 2017.





## **Appendix F: Archaeological Overview Assessment – Black Rapids Lockstation - Wharf Replacement**





**Appendix G: Archaeological Overview Assessment – Lower Nicholson's  
Lockstation - Wharf Replacement**

