Basic Impact Analysis

Burritts Rapids Swing Bridge Rehabilitation

Burritts Rapids, ON

August 2017
The Burritts Rapids Swing Bridge crosses the Rideau River within the Village of Burritts Rapids. The swing bridge is one of two bridges that connects the island of Burritts Rapids to the mainland. Grenville Street crosses the bridge and connects to Burritts Avenue in the northwest to Burritts Rapids Road in the southeast. Latitude/Longitude coordinates are N 44° 58'48” W 75° 47'31”.

Figure 1. General location of Burritts Rapids.
2. **PROPOSENT INFORMATION**
Jean-Francois Charron  
Project Engineer  
Parks Canada Agency, Ontario Waterways  
Email: jean-francois.charron@pc.gc.ca  
Tel: 613-713-2199 ext. 248  
Cell: 613-284-7832

3. **PROPOSED PROJECT DATES**
Planned commencement: 2017-10-10  
Planned completion: 2018-05-15

4. **INTERNAL PROJECT FILE #**
30029204

Figure 2. Location of the Swing Bridge.
5. PROJECT DESCRIPTION

The Burritts Rapids Swing Bridge is an historic single-lane bridge over the Rideau Canal UNESCO World Heritage Site, adjacent to the Village of Burritts Rapids, Ontario. The bridge is in need of rehabilitation and is a capital project under the FII program.

The structure is a steel through-truss bridge constructed in 1897 to replace the previous wooden swing bridge. The stone foundations are believed to have been installed in the 1850’s (See Photos 1 through 5). While all or a large portion of the lower structure has previously been replaced, most of the upper structure shows signs of being original. Some of the members of the upper structure are labelled as originating from the Carnegie steel mills and one would suspect that these members are original. There have been a series of rehabilitation efforts, with the last taking place in 2004.

“The bridge consists of a steel King Post truss, steel through trusses, supporting steel floor beams, steel sway bracing, timber stringers and a timber deck. The timber deck has a timber wearing surface consisting of timber running boards placed with the grain parallel to the direction of travel. The long arm of the bridge has four bays and the short arm of the bridge has three bays. The abutments are mass concrete supporting steel bearing pads sloped to accommodate the wheel supports required for the swing bridge operations” (J.L Richards & Associates Limited, 2008).

The existing bridge is a single-lane bridge with alternating traffic that currently has a load limit of 5 tonnes. The project will include an up-graded design to improve the load capacity of the bridge to 10 tonnes, however the bridge will maintain a load limit of 5 tonnes in order to deter overweight/oversized vehicles from using the bridge.

The project will require the full closure of the Burritts Rapids swing bridge for a period of time that will be determined by construction progress. Traffic will be re-routed and the appropriate temporary signage installed. A tree on private property adjacent to the construction zone on the northwest side of the bridge will be trimmed in order improve the visibility of signage (contact with the landowner has been made).

A pedestrian thoroughfare will be maintained throughout the construction period via a temporary walkway set on floats. The walkway will be located approximately 25 m to the northeast of the bridge and will have connecting access ramps on each end.

There is no de-watering required for this project. In-water work involves underwater masonry repairs on both the north and south bridge abutments which will be undertaken by divers skilled in this form of repair work. The voids will be filled with lead wool, which is a common practice on bridge piers where there are continuous water flows. It is anticipated that this aspect of the project will occur as soon as possible after the start of construction, in order to avoid complications due to winter conditions and fish spawning in spring 2018. The perimeter of the north and south abutments will be surrounded with turbidity curtains and the in-water work will be located inside the curtains.

The work on the steel members of the bridge will be conducted with the bridge swung to the open position. Hoarding will be established around the bridge to facilitate winter work and encapsulate the work area.

The construction staging area will be located on the southern side of the Rideau River, adjacent to an unofficial boat launch on Parks Canada property (see Figure 3 and Photo 7). The staging area is currently
mown grass, bordered on the north side by deciduous trees. There is a planted Sugar Maple (*Acer Saccharum*) on the northern perimeter of the staging area. Access to the staging areas is by use of Grenville Street and Burritts Rapids Road. No temporary access roads are required.

The planned scope of work includes:

- Install environmental protection measures including those indicated in the specifications and the environmental screening report (i.e. this Basic Impact Analysis).
- Complete masonry repointing of canal wall and abutments (both above water and underwater).
- Once the swing bridge is closed to vehicular traffic, swing the bridge to the open position and provide necessary supports and blocking to allow for the bridge decks to be disassembled and bridge members replaced.
- Repoint the bearing seats and abutment area and install new ramp assemblies. Remove and replace deteriorated section of concrete for north rail.
- Replace the existing wheels at the north abutment, south abutment and center pivot. Replace the north load track.
- Fabricate and install new steel members.
- Blast clean all existing and new steel members once in place and paint all steel in strict conformance with specification.
- Replace new wood decking, stringers and running boards.
- Complete site clean-up and restoration.
6. VALUED COMPONENTS LIKELY TO BE AFFECTED

The following section identifies valued components in the study area that will potentially be impacted by the proposed works.

Soil and Landforms

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 swing bridge have been historically disturbed by development including the building of canal infrastructure, residential development, road infrastructure and manicured parkland. It is understood that a geotechnical report has not been conducted to date. Local soil conditions will need to be ascertained in advance of project commencement in order to tailor appropriate sediment and erosion control measures.

Terrestrial Vegetation

The Burritts Rapids swing bridge is located in the St. Lawrence Lowlands Ecoregion of Ontario and has a vegetation community that is representative of disturbed sites in this region. Trees observed in the area surrounding the bridge includes: Basswood (Tilia americana), American Elm (Ulmus americana), Manitoba Maple (Acer negundo), Black Locust (Robinia pseudoacacia), and White Cedar (Thuja occidentalis). Bridge abutment slopes have been planted with Daylillies (Hemerocallis sp.) and a variety of ornamental exotic plants. The site is highly manicured and very little vegetation remains within the project area.

A survey of the Project area did not indicate the presence of common invasive species, such as Wild Parsnip, however invasive species have been identified as present in the region and may be found on the periphery of the site (EDDMapS, 2016). Non-native species identified include Glossy Buckthorn (Frangula alnus) and Bird Vetch (Vicia cracca).

Water Quality

Although the majority of the bridge work that will occur does not involve in-water work, some in-water masonry work will occur in-water, and bridge work will be conducted above water. By this, there is potential for contamination of water from spills and/or leaks from equipment and/or materials. Also, potential of reduced water quality and clarity due to increased erosion, sedimentation and transport of debris and/or materials (e.g. discharge of waters, pH increases from concrete/masonry grout).

Baseline water quality measures were taken in the area adjacent to the swing bridge on August 3, 2017. Additional readings should be taken prior to construction to establish a baseline. The water quality measures obtained are:

Water Temperature: 26.4 degrees
pH: 8.05
Turbidity: 3.05 NTU
DO: 8.01
Conductivity: 286.3
The project will utilize treated wood for the construction of the Swing Bridge. 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. It is understood the wood is to be treated off-site, however it is possible that small spot treatments may be necessary protect drill holes etc.

**Fish and Fish Habitat**

The Rideau River has a diverse warm and 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 of which were found in the section from Smiths Falls to Burritts Rapids including:

- 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 olmstedi*)
- Logperch (*Percina caprodes*)

Habitat adjacent to the swing bridge likely provides 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. Habitat adjacent to the swing bridge is is dominated by a mudsilt/cobble substrate that offers 5% cover for fish. Other types of cover features such as woody debris, aquatic vegetation and overhanging banks provide approximately 50% cover. Fish habitat adjacent to the swing bridge is considered marginal to suboptimal for supporting all life stages for most warmwater/coolwater fish species (Public Works and Government Services Canada, 2017). No critical habitat for at-risk fish has been identified adjacent to the Burritts Rapids swing bridge.


Native 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*), and Elktoe (*Alasmidonta marginata*). The primary non-native mussel known to inhabit the Rideau River is the zebra mussel (*Dreissena polymorpha*).
**Wildlife**

The area surrounding the Burritts Rapids Swing Bridge is likely used by a variety of terrestrial and aquatic wildlife including frogs, beaver, muskrat, mink and turtles (Ontario Nature Reptile and Amphibian Atlas, 2016). Migratory birds including waterfowl also likely utilize the vegetation in the region surrounding the swing bridge.

**Species at Risk**

The study area for this project lies within zones of identified Critical Habitat for three species classified as Threatened under the Species at Risk Act (SARA), the Eastern Musk Turtle (*Sternotherus odoratus*), Blanding’s Turtle (*Emydoidea blandingii*) and the Eastern Whip-poor-will (*Caprimulgus vociferus*).

Additional species at risk that may be found in the study area, 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 species at risk 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. It should be noted that while a species may have a high likelihood of being found in the study area, the project footprint is small and effects to the overall habitat or population will be minimal.
Table 1. Species at Risk with potential to be found within the study area.

<table>
<thead>
<tr>
<th>Common Name</th>
<th>Scientific Name</th>
<th>COSEWIC</th>
<th>SARA Status</th>
<th>ESA Status</th>
<th>Habitat Potential on Project Site</th>
<th>Preferred Habitat</th>
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<tbody>
<tr>
<td><strong>BIRDS</strong></td>
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<tr>
<td>Eastern Whip-poor-will¹,²</td>
<td><em>Caprimulgus vociferus</em></td>
<td>Threatened</td>
<td>Threatened</td>
<td>Threatened</td>
<td>No</td>
<td>Semi-open forests or patchy forests with clearings, such as barrens or forests that are regenerating following major disturbances</td>
</tr>
<tr>
<td>Red-shouldered Hawk³</td>
<td><em>Buteo lineatus</em></td>
<td>Not at Risk</td>
<td>Special Concern</td>
<td>Not at Risk</td>
<td>No</td>
<td>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.</td>
</tr>
<tr>
<td>Least Bittern³</td>
<td><em>Ixobrychus exilis</em></td>
<td>Threatened</td>
<td>Threatened</td>
<td>Threatened</td>
<td>No</td>
<td>Can be found in a variety of wetland habitats, but most commonly found in cattail marshes with a mix of open pools and channels.</td>
</tr>
<tr>
<td>Common Nighthawk³</td>
<td><em>Chordeiles minor</em></td>
<td>Threatened</td>
<td>Threatened</td>
<td>Special Concern</td>
<td>Not likely</td>
<td>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)</td>
</tr>
<tr>
<td>Barn Swallow³</td>
<td><em>Hirundo rustica</em></td>
<td>Threatened</td>
<td>No Status</td>
<td>Threatened</td>
<td>No historical nests observed.</td>
<td>Nest almost exclusively on man-made structures (bridges, culverts, barns)</td>
</tr>
<tr>
<td>Eastern Wood-pewee³</td>
<td><em>Contopus virens</em></td>
<td>Special Concern</td>
<td>No Status</td>
<td>Special Concern</td>
<td>No</td>
<td>Edges of mixed or deciduous forests, intermediate-aged mature forests</td>
</tr>
<tr>
<td>Wood Thrush³</td>
<td><em>Hylocichla mustelina</em></td>
<td>Threatened</td>
<td>No Status</td>
<td>Special Concern</td>
<td>No</td>
<td>Mature mixed or deciduous forests, often moist, wet-</td>
</tr>
<tr>
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<tr>
<td>Bobolink</td>
<td>Dolichonyx oryzivorus</td>
<td>Threatened</td>
<td>No Status</td>
<td>Threatened</td>
<td>No</td>
<td>Bobolink nest in tallgrass prairie and other open meadows, including hayfields.</td>
</tr>
<tr>
<td>Eastern Meadowlark</td>
<td>Sturnella magna</td>
<td>Threatened</td>
<td>No Status</td>
<td>Threatened</td>
<td>No</td>
<td>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.</td>
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**Reptiles and Amphibians**

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<tr>
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</thead>
<tbody>
<tr>
<td>Eastern Musk Turtle</td>
<td>Sternotherus odoratus</td>
<td>Special Concern</td>
<td>Threatened</td>
<td>Special Concern</td>
<td>Yes</td>
<td>Eastern Musk Turtle require shallow water with little or no current, and soft earth to bury into when they hibernate. Nesting habitat is variable, but it must be close to the water and exposed to direct sunlight.</td>
</tr>
<tr>
<td>Blanding’s Turtle</td>
<td>Emydoidea blandingii</td>
<td>Threatened</td>
<td>Threatened</td>
<td>Threatened</td>
<td>Possible</td>
<td>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 (&gt;410m) for basking and nesting sites.</td>
</tr>
<tr>
<td>Snapping Turtle</td>
<td>Chelydra serpentina</td>
<td>Special Concern</td>
<td>Special Concern</td>
<td>Special Concern</td>
<td>Yes</td>
<td>Usually found in large bodies of water, but will sometimes inhabit small ponds. Rarely leave water except to nest and migrate to overwintering habitat.</td>
</tr>
<tr>
<td>Common Name</td>
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<td>ESA Status</td>
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</tr>
<tr>
<td>Western Chorus Frog</td>
<td><em>Pseudacris triseriata</em></td>
<td>Threatened</td>
<td>Threatened</td>
<td>Not at Risk</td>
<td>Not likely</td>
<td>Forest openings around woodland ponds, damp meadows, marshes, bottomland swamps and temporary ponds in open country. Western Chorus Frog breeds in almost any fishless pond with at least 10 centimetres of water, including quiet, shallow, usually temporary waterbodies with vegetation that is submerged or protrudes from the water, and especially in rain-flooded meadows and ditches. The Western Chorus Frog overwinters underground or under surface cover, such as fallen logs.</td>
</tr>
</tbody>
</table>

### Insects

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<thead>
<tr>
<th>Common Name</th>
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</thead>
<tbody>
<tr>
<td>Monarch $^5$</td>
<td><em>Danaus plexippus</em></td>
<td>Special Concern</td>
<td>Special Concern</td>
<td>Special Concern</td>
<td>Yes</td>
<td>Monarchs can be found wherever milkweed and wildflowers grow. This includes abandoned farmland, along roadsiders, and other open spaces.</td>
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### Mammals

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<th>Common Name</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Little Brown Myotis $^5$</td>
<td><em>Myotis lucifugus</em></td>
<td>Endangered</td>
<td>Endangered</td>
<td>Endangered</td>
<td>Not likely</td>
<td>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.</td>
</tr>
<tr>
<td>Northern Myotis $^5$</td>
<td><em>Myotis septentrionalis</em></td>
<td>Endangered</td>
<td>Endangered</td>
<td>Endangered</td>
<td>Not likely</td>
<td>Similar habitat preferences to Little Brown Myotis - they bats hibernate from October or</td>
</tr>
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<tr>
<td>Tri-coloured Bat</td>
<td><em>Perimyotis subflavus</em></td>
<td>Endangered</td>
<td>Endangered</td>
<td>Endangered</td>
<td>November to March or April, most often in caves or abandoned mines. Northern Myotis often roost under loose bark or in tree cavities.</td>
<td>Often found hibernating in same locations as Little Brown Myotis and Northern Myotis – abandoned mines and caves. Relatively rare species in Canada.</td>
</tr>
<tr>
<td>Eastern Small-footed Bat</td>
<td><em>Myotis leibii</em></td>
<td>Not Assessed</td>
<td>Not Assessed</td>
<td>Endangered</td>
<td>Not likely</td>
<td>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.</td>
</tr>
</tbody>
</table>

1COSEWIC Draft Critical Habitat Mapping  
2NHIC  
3Atlas of Breeding Birds of Ontario  
4Ontario Reptile and Amphibian Atlas  
5Field Observation  

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

Eight hundred meters from the lock station on the canal is the Burritt’s Rapids single lane swing bridge. The bridge is an asymmetrical truss design, which combines a Pratt and a Fink truss that is unique on the Rideau Canal. The Fink portion being the taller section on the north side of the bridge. The bridge is a combination of a steel structure, and a wooden deck, and masonry base. The site contained an earlier timber swing bridge that was built to accommodate the newly constructed canal.

The original bridge was built in 1824, and subsequently replaced in the early 1850s with a timber swing bridge. The current bridge was built to replace the previous in 1897. The pivot point of the swing bridge is on the north side of the shore, and swings to the west. It is noted for being one of the few examples of a hand-turned swing bridge along the Rideau Canal. Annual reports from the Department of Railways and Canals, between 1900-1925, note that only minor repairs have been done on the swing bridge, referring to a majority of them as sundry repairs. More specific repairs include: painting of the swing bridge and approach between 1901 and 1902, sandblasting and repainting between 1913 and 1914.

The swing bridge sits on masonry abutments and walls. The masonry that the bridge sits on is thought to be a leftover of the early timber bridge from the 1850s. A survey from August, 2016 states that the masonry and abutments seem to be in good order, given that there is no bulging or misaligned stone. It is assumed that the masonry foundation lies on bedrock, and would contribute to the lack of shifting or movement.

Socio-economic

The Burritts Rapids Swing Bridge is located within the Village of Burritts Rapids (population 400), and is one of two bridges that connects the island to the mainland. On a regional scale, the bridge provides a means to cross the Rideau Canal, connecting the Donnelly Drive thoroughfare on the northern side of the canal and County Road 23 (Burritts Rapids Road) on the southern side. The island supports a residential development.

Burritts Rapids has multiple uses as a recreation area. The Rideau River is a popular passage for boaters, canoeists and kayakers. Pedestrians and cyclists pass through the Village and along Parks Canada’s Tip-to-Tip trail which follows the shoreline on the southern side of the island. The unofficial boat launch on Parks Canada land adjacent to the bridge is used by boaters and anglers.

Archaeology

No archaeological investigations have been conducted within the Project Area(s). Historical research has indicated that several different types of bridges existed at the site of the present-day Burritts Rapids Swing Bridge, or within proximity. Remains of these bridges or evidence of their construction may exist below surface within the Project Area(s).

7. EFFECTS ANALYSIS

The following section outlines the potential impact of the proposed works on valued components in the study area.
**Soil, Landforms and Air**

The use of heavy machinery increases the risk of soil contamination if there is a spill or leak of a hazardous material (i.e. fuels, hydraulic fluids); however, this risk will be minimized through the implementation of appropriate mitigation measures.

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.

**Terrestrial Vegetation**

Project activities are not expected to lead to the removal of terrestrial vegetation. There is a tree on private land that will require trimming in order to facilitate construction activities (communication with the landowner has been established). The species is not at-risk and the trimming activity is not expected to influence the overall health of the tree.

**Aquatic Resources and Fish and Fish Habitat**

The potential environmental effects of project activities on fish and fish habitat includes interference in seasonal lifecycle activities (i.e. spawning) and addition of suspended solids to the water column through erosion and sedimentation.

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 course spawning habitat as silt settles.

Spills of fuels or hydraulic fluid from construction equipment, accidental releases of concrete or masonry grout could negatively impact surface water quality through the introduction of contaminants.

Treated Wood should only be used when it is important that the wood be protected (risk of decay, attack by insects or contact with damp soil). While reviewing the viable alternatives for Treated Wood, it is also important to consider if it may be necessary under the National Building Code of Canada 2010 (NBCC 2010) or to maintain the heritage and aesthetic value for a historic place or asset.

Utilizing PCA guidance and Policy procedures, the treated wood material selected for the construction of the swing bridge 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.

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.

Some native trees of North America produce wood that is naturally more durable than others. The hardwood of white oak (Quercus alba) or burr oak (Quercus macrocarpa), and the softwood of Northern white cedar (Thuja occidentalis) and Tamarak (Larix laricina) may naturally resist decay and pests for 5 to 15 years (International Mountain Biking Association, 2004). The softwood of the Eastern red cedar (Juniperus virginiana), the Western red cedar (Thuja plicata) and the redwood (Sequoia spp.) may exhibit such resistance for 10 to 30 years (Hoffman et al., 2002). Redwood, in addition to being aesthetically pleasing, does not usually need sealing or staining and is easy to nail and saw. However, the worldwide supply of Redwood is depleting, bringing the price even higher and raising sustainability concerns, aside from being vulnerable to scratching and denting (U.S. EPA 2005a). It is recommended that native tree species such as White Oak, Burr Oak, Northern White Cedar, Tamarak, Eastern Red Cedar, or Western Red Cedar is utilized for the project.

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 Appendix 3 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.

Wildlife

Birds

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 trimming, should be avoided during the nesting period. The Burritts Rapids project site is located within Environment Canada nesting zone C2. For open habitats within this zone, the nesting period may begin as early as the end of March and last as long as until the end of August. However, the majority of nesting takes place between early May and late July. This project will occur during the fall, winter and early spring, outside the core migratory bird nesting period.

Tree trimming will result in direct reduction of habitat for migratory birds; however the amount is negligible. Construction activity/disturbance also has the potential to displace foraging birds from around the project site, but the displacement will be temporary in duration and will cover a very small footprint.
Other Wildlife

Project 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 Eastern Musk Turtle and Blanding’s Turtles from entering the site will also work to reduce the risk of the other turtle and snake species from entering the site. With the proper implementation of mitigation measures, there should be no residual negative impact to reptiles and amphibians. Since dewatering is not part of the project description it will not be necessary to rescue turtles during dewatering.

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

Species at Risk

As identified in Table 1, a number of species at risk have the potential to be present in the project area. For species that do not have critical habitat identified through a recovery strategy, either the planned works will not impact their habitat or individuals, for example the bat species, or mitigation measures will be employed to protect individuals and their habitat.

Barn Swallow

Although there is no evidence of Barn Swallow nesting under the bridge, it is possible that the species uses the underside of the bridge on which to nest. Barn Swallows will be protected by respecting the migratory bird nesting timing window of April 1st to August 1st. Birds will not have access to the bridge until the hording is removed (projected to be the beginning of May). If Barn Swallow’s do initiate nesting after this time it is not anticipated that the work will disrupt the birds more than the typical level of disturbance (due to vehicles passing over the bridge and the swinging of the bridge).

Turtles and Snakes

Species at Risk turtles (other than the Blanding’s Turtle and Eastern Musk Turtle, which are discussed separately below) and snakes (Milksnake) may be encountered on site during construction. The possible use of exclusionary fencing was discussed however it was decided it would not provide value at the time of year the project is planned for (October 10 – May 15). If Species at Risk turtles and snakes are encountered, work in the area will cease and the Parks Canada Project Manager will be contacted to provide guidance.

Monarch

The Monarch butterfly is relatively widespread and common on the landscape of Eastern Ontario. It may be observed in the early part of the construction period. There is little to no risk of construction activities harming individual butterflies. The possible loss of milkweed along the northern shoreline, a plant which Monarchs rely on for reproduction, will be temporary in nature. Grubbing is not expected to occur during project activities, thus protecting Milkweed rhizomes.

Bats

Species at risk bats (Little Brown Myotis, Northern Myotis, Tri-coloured Bat and Eastern Small-footed Bat) have the potential to be present on the Burritts Rapids site, most likely associated with use of tree cavities.
No dead-standing trees were observed within the Project Area and none are designated for removal so it is unlikely for bats to be affected by this project.

**Critical Habitat**

The Species at Risk Act (SARA) provides protection to all species at risk listed under Schedule 1 of the Act. Under SARA, critical habitat is defined as “the habitat that is necessary for the survival or recovery of a listed wildlife species and that is identified as the species’ critical habitat in the recovery strategy or in an action plan for the species”. Section 41 (1)(c) of SARA requires that recovery strategies include an identification of the species’ critical habitat to the extent possible, as well as examples of activities that are likely to result in its destruction. As outlined in Table 1, the project area lies in zones of critical habitat identified in the recovery strategy of three threatened species – Eastern Whip-poor-will, Blanding’s Turtle and Eastern Musk Turtle. Although the project is taking place within critical habitat zones for the above-mentioned species, the project will not impact any habitat that meets the biophysical attributes for these species. Therefore critical habitat will not be affected by this project. Further detail is provided below.

*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. Since the 10 km x 10 km grid square that contains Burritts Rapids was identified as potential Eastern Whip-poor-will habitat in the recovery strategy, it is understood that the habitat occupancy requirement for the identification of critical habitat is satisfied. While much of the forest surrounding the Project Area meets the physical attributes for nesting and foraging habitat (moderate tree cover, moderate shrub cover and well-drained soils), the planned construction works will not lead to the destruction of critical habitat. The only direct impact is the tree trimming of one tree, which is estimated to be negligible impact to their habitat. Direct effects to individuals is unlikely due to the timing of construction (October-May).

*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 Rideau River in the vicinity of the Project Area likely provides critical habitat for Eastern Musk Turtle. Aquatic habitat will not be removed as no de-watering is planned. Movement is not restricted as the turbidity curtains will hug the abutments as opposed to creating a barrier across the channel. The terrestrial habitat within the Project Area does not meet the biophysical attributes of critical terrestrial habitat because it is generally hard-surfaced and/or manicured lawn. The exception is the shoreline on the northern side of the river that has a buffer of vegetation (approx. 5 m wide). This area will not be disturbed except a narrow band to provide access to the temporary pedestrian bridge. It is unlikely that
migrating individuals will be encountered given the timing of construction however mitigation measures will be employed to protect individual Eastern Musk Turtles should they be found within the Project Area.

Blanding’s Turtle

The proposed recovery strategy for the Blanding’s Turtle (Environment Canada, 2016) has two criteria for identifying critical habitat: habitat occupancy and habitat suitability. Since the 10 km x 10 km grid square that includes Burritts Rapids was identified as potentially having critical habitat in the proposed recovery strategy, it is assumed that Blanding’s Turtles could be in the general area of the project. The proposed recovery strategy states that active roads and shoulders, which is what will be affected in this project, are presumed to be ecological traps and thus, unsuitable habitat. There are no known sightings or nesting locations in proximity to the swing bridge. It is unlikely that migrating individuals will be encountered given the timing of construction however mitigation measures will be employed to protect individual Blanding’s Turtles.

A SARA compliant Basic Impact Analysis is not required as detailed above, there will be no residual impact to species at risk.

Cultural Resources

The landscapes of the Rideau Canal are fundamental resources of the canal system and integral to the Rideau’s unique historical environment. The Canal landscapes were evaluated in terms of the retention of historic circulation patterns, the spatial inter-relationships of buildings, engineering works, open spaces and other landscape features, plus the overall impact of new features on or near the stations. The proposed project involves a cultural landscape that is a cultural resource of “National Significance” (NS, formerly known as Level I cultural resource, Cultural Resource Inventory, 1994-95, rev. Nov. 2015) and part of the Canal Rideau World Heritage Site and National Historic Site.

The heritage value of the landscape 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 swing bridge at Burritts Rapids is considered a cultural resource of other heritage value. These engineering works of other heritage value on the Rideau Canal are valued for their:

- association with the commercial and recreational use of the canal;
• association with corridor communities and expansion of the canal system;
• role in the continuing operation of the canal;
• evidence of changing construction technologies;
• manual mode of operation;
• surviving physical attributes of form and material.

The heritage value ascribed to cultural resources guides conservation efforts and investments. Under the CRM Policy, conservation of heritage values 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 and character-defining elements. 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.

In principle, the proposed rehabilitation of the swing bridge 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 bridge and restoration of the masonry will help to ensure that Burritts Rapids Swing Bridge and landscape will retain their heritage value and that the historic canal’s physical life will be extended.

Although the Burritts Rapids Swing Bridge and landscape are designated cultural resources (OHV and NS), it is not anticipated that the project will negatively impact the site if appropriate mitigation measures and conservation approach are followed. As such, the application of Standards 1-12 from the Standards and Guidelines is recommended, including the relevant Guidelines on Cultural Landscapes (Section 4.1), Archeological Sites (4.2), Engineering Works (Section 4.4) and Materials (Section 4.5).

However, the project involves the removal of the wood deck, the replacement of multiple truss members and the addition of several components for codes compliance. These interventions will impact the original design of the bridge built in 1897. Impacts to the cultural landscape will also be generated by the project. These impacts will affect the setting and architectural fabrics. If the project proceeds, mitigation strategies that reduce these impact are to be implemented. Refer to the Mitigation Measures section below.

Archaeology

The archaeological assessment was completed based on the 99% construction drawings for the Burritts Rapids Swing Bridge Rehabilitation Project (WSP 2017). Given that project activities may adversely impact archaeological resources that exist below the surface, including evidence of the historical bridges, mitigation measures are required to minimize the project’s impacts on these resources.

8. MITIGATION MEASURES

See Appendix 3 for Mitigation Measures.
9. **PUBLIC/STAKEHOLDER ENGAGEMENT & ABORIGINAL CONSULTATION**

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

☐ No
☒ Yes (describe the process to involve relevant parties and indicate how comments were taken into consideration).

There have been four town hall meetings at the Burritts Rapids community centre, dating back to November 2015. The swing bridge project has been discussed at all of these meetings, with it playing a key role for two of the meetings.

There have also been a number of site visits with the community executive and members of the "greening committee". In consultation with the community the project includes plans to protect / re-locate plants that may be temporarily affected by the placement of the pedestrian bridge and to protect planted trees in proximity to the staging area.

9 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).

The proposed works are simply the maintenance and rehabilitation of existing assets. There will be no substantial change to the asset. For this reason public and Indigenous consultation was not conducted.

10. **SIGNIFICANCE OF RESIDUAL ADVERSE EFFECTS**

With the proper implementation of mitigation measures, residual adverse effects are anticipated to be negligible. The negligible residual adverse effects will be caused by temporary disturbance of the Project Area due to construction activities.

11. **SURVEILLANCE**

☐ Surveillance is not required
☒ Surveillance is required (provide details such as the proposed schedule and the focus of inspections)

An Environmental Assessment Officer 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.

12. **FOLLOW-UP MONITORING**

Follow-up monitoring is:

☒ not required
☐ legally required (e.g. under the *Species at Risk Act* or *Fisheries Act*)
☐ required in accordance with the *Parks Canada Cultural Resource Management Policy*
Notification is:
☒ not required
☐ required under the Species at Risk Act (outline the nature of and response to any notification).

### 14. EXPERTS CONSULTED
Include Parks Canada experts. Add as many entries as necessary for the project.

<table>
<thead>
<tr>
<th>Department/Agency/Institution</th>
<th>Date of Request</th>
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<tr>
<td>Parks Canada, Species Conservation and Management, Natural Resource Conservation</td>
<td>August 3, 2017</td>
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</table>

**Expert’s Name & Contact Information:**
Joanne Tuckwell

**Title:**
Species Conservation Specialist

**Expertise Requested:**
Approach to assessing SAR Critical Habitat

**Response:**
Provided clarity to assessing critical habitat in general, and the potential for spring Barn Swallow nesting in particular. Agreed that bridge work would not have a negative impact on critical habitat and that possible spring nesting underneath the swing bridge will not pose a danger to the birds.

<table>
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<th>Department/Agency/Institution</th>
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<tr>
<td>Parks Canada, Archaeology and History Branch</td>
<td>February 27, 2017</td>
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**Expert’s Name & Contact Information:**
Barbara Leskovec

**Title:**
Federal Infrastructure Investments Archaeologist

**Expertise Requested:**
Archaeological assessment of the Burritts Rapids Swing Bridge area

**Response:**
Provided an overview of the history and archaeological potential of the Burritts Rapids Swing Bridge.

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<th>Date of Request</th>
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<tr>
<td>Parks Canada, Underwater Archaeology Team</td>
<td>February 27, 2017</td>
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**Expert’s Name & Contact Information:**
Jonathan Moore

**Title:**
Senior Underwater Archaeologist

**Expertise Requested:**
Underwater archaeological assessment of the Burritts Rapids Swing Bridge area

**Response:**
Provided an overview of the submerged archaeological potential of the Burritts Rapids Swing Bridge.

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<tbody>
<tr>
<td>Parks Canada, Cultural Heritage Policies Branch</td>
<td>February 27, 2017</td>
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**Expert’s Name & Contact Information:**
Nathalie Desrosiers

**Title:**
Senior Policy Advisor, Cultural Resource Management

**Expertise Requested:**
Cultural Resource Impact Assessment of the Burritts Rapids Swing Bridge area
Response: Provided an overview of the Cultural Resources related to the Burritts Rapids Swing Bridge.

Department/Agency/Institution: Parks Canada Agency Strategic Policy and Investment Directorate, Waterways Project Delivery
Date of Request: August, 2017

Expert’s Name & Contact Information: Jean-Francois Charron
Title: Project Engineer

Response: Provided clarification with interpreting engineered drawings, construction staging, project timelines, etc.

15. 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.

16. RECOMMENDATION AND APPROVAL

Prepared by (EIA Author): Date: 2017-08-31
Hillary Knack, Environmental Assessment Officer

Recommended by: Date: 2017-08-31
Valerie Minelga, Environmental Assessment Scientist

Recommended by (Functional Manager of Project): Date:
Jean-Francois Charron, Project Engineer

Approved by (Director of Ontario Waterways): Date:
Jewel Cunningham, Director, Ontario Waterways

17. ATTACHMENTS

Appendix 1 - Environmental Impact Analysis Tool: Effects Identification Matrix
Appendix 2 – Mitigation Measures
Appendix 3 – Site Photos
Appendix 4 – Archaeological Overview Assessment, Burritts Rapids Swing Bridge Rehabilitation
Appendix 5 – Statement of Cultural Resource Impact Analysis

18. **NATIONAL IMPACT ASSESSMENT TRACKING SYSTEM**

- Project registered in [tracking system](#)
- Not yet registered *(CEAA 2012 requires PCA submit a report to Parliament annually. EIAs must be entered in the tracking system by the end of April to enable reporting.)*
References


Appendix 1 - 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.

<table>
<thead>
<tr>
<th>Phase</th>
<th>Examples of Associated Activities</th>
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<tbody>
<tr>
<td></td>
<td>Natural Resources</td>
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<td>Air</td>
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<tr>
<td></td>
<td>Water (surface, ground, crossings, etc.)</td>
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<td></td>
<td>Fauna (specify, including SAR)</td>
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<th>Project Components</th>
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<tr>
<td>Supply and storage of materials</td>
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<tr>
<td>Burning</td>
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<tr>
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<tr>
<td>Blasting/ Drilling</td>
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<td>Use of Chemicals</td>
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<td>Set up of temporary facilities</td>
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<td>Other...</td>
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### A. Direct effects continued

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<td></td>
<td>Vehicle Traffic</td>
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<td>Other...</td>
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Appendix 2: Mitigation Measures

General
1. Inform the Departmental Representative and PCA’s Environmental Authority (Environmental Assessment Officer, Rideau Canal in Smiths Falls (613) 283-7199 (ext. 222)) regarding any changes to project plans and/or scheduling. Any changes not assessed under this Basic Impact Analysis will require approval from PCA and may require further mitigation measures.
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.
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.
4. The project manager/contractor shall convene a preconstruction meeting to identify all concerns/mitigation measures to all staff working on the project. Parks Canada Environmental Authority (Environmental Officer, Rideau Waterway) will outline all the prescribed mitigation measures, the construction start-up meeting to ensure awareness and understanding of these measures.
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.
6. Should conditions at the work site indicate that there are unforeseen negative impacts to fish, wildlife or cultural resources at any time, all works shall cease and Parks Canada shall be contacted immediately (Hillary Knack, Environmental Assessment Officer, 613-283-7199 ext. 222). The Rideau Canal has the right to require that work be altered or ceased immediately.
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).

Species at Risk
8. Should any suspected species at risk – specifically snakes or turtles and their nests - be encountered during project staging, construction or demobilization, contact the Parks Canada Environmental Assessment Officer at 613-283-7199 (ext. 222) or hillary.knack@pc.gc.ca for guidance on how to proceed;
9. Species at risk training shall be provided to all employees before they begin work on site (materials can be part of the Environmental Management 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.

Blanding’s Turtle, Eastern Musk Turtle, and other reptiles

10. 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. If individuals are encountered, the Parks Canada Environmental Assessment Officer must be contacted at 613-283-7199 (ext. 222) or hillary.knack@pc.gc.ca for guidance on how to proceed;

All Species

11. Minimize the disturbed area; clearly mark the work space;
12. Park on roads or disturbed areas;

Tree Trimming

13. 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 1st to August 1st to protect nesting birds.
14. If bird nests (other than pigeon), are found on the bridge structure, the Parks Canada Environmental Assessment Officer must be contacted at 613-283-7199 (ext. 222) or hillary.knack@pc.gc.ca for guidance on how to proceed;

Water Quality and Fish Habitat

15. No in-water work is permitted between March 15th and June 30th to protect spawning fish.
16. Ontario Drinking Water Quality Guidelines cannot be exceeded (beyond parameters that currently exist) due to project activities.
18. All 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.
19. Ensure that all works involving the use of concrete, cement, mortars, and other Portland cement or lime-containing construction materials, its’ dust or debris are not deposited, directly or indirectly into any watercourse. Concrete materials cast-in-place must remain inside the formed structure. Containment facilities shall be provided for the wash-down of concrete equipment including concrete delivery trucks, concrete pumping equipment and hand tools. All concrete wash water will be captured and disposed of off-site in a location where it will not enter subsurface drains, waterbodies or storm drains. Water that contacts uncured or partly cured concrete shall be prevented from entering any watercourse or stormwater system. 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. Use only non-toxic biodegradable form stripping agents.
20. At the discharge point into the watercourse, pH will be maintained between 6.5 and 9.0. Water with pH > 9 cannot be released directly back into the watercourse, but must be treated prior to release. Water with a pH ≥ 12.5 is considered toxic and treated as a hazardous waste under Ontario Regulation 347 of the Environmental Protection Act and wastewater in this condition must be removed from the site.

21. 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.

22. Additional Environmental Mitigation Measures for in-water grout placement:
   - Ensure no significant flow is occurring through project site.
   - Isolate area with curtain or impermeable material specified for grout particulates; ensure fish exclusion is followed.
   - Isolated area should be the minimum size required to complete task.
   - A CO₂ system must be onsite for use in the event of a release of grout or concrete into the watercourse. In such an event, the tank shall be used to release carbon dioxide gas into the affected area to neutralize pH levels. Ensure sufficiently sized tanks for the concrete volumes used.
   - Workers shall be trained in the use of the system.
   - Use of neutralizing acids is not permitted.
   - pH monitoring conducted inside and outside the containment area

23. 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 provincial and federal regulatory requirements AND to the satisfaction of Parks Canada. Documentation of remediation, testing and results will be provided to Parks Canada.

24. 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.

25. 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.

26. All debris on bed (including excess grout, masonry rubble) shall be completely removed and area restored to original state upon completion of work.

27. 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. If entrapment
occurs then turbidity curtained will be repositioned to exclude fish or fish shall be removed as describe below:

- Fish shall be removed from the work and released alive into the river.
- Parks Canada's Environmental Authority shall be advised 24 hours prior to fish rescue.
- Minimize the length of time fish are out of the water.
- Use appropriate equipment to remove any stranded fish. If safe to do so, Seine nets or Dip nets can be operated by field staff to remove the fish.
- Contact PCA EA staff should there be any issues with fish removal.
- Any fish removed will be documented by species, counted and removed and placed downstream if found in the downstream coffer dam and upstream if found upstream.
- Round gobies or other invasive species found during dewatering activities shall be euthanized and not returned to the water system; this shall be reported to Parks Canada.

### Erosion and Sediment Control

28. 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:

- A focus on erosion control primarily and sediment control secondary;
- Erosion and sediment controls will be tailored to the type of sediment found onsite (e.g. if clay is present, additional controls are necessary).
- The area to be controlled. In addition to the construction site, it is necessary to identify adjacent areas that could be negatively impacted by construction activities;
- Drainage areas and patterns based on pre-construction topography and construction design;
- 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.
- How clean storm run-on will be diverted around the site and away from exposed areas;
- How sediment-laden run-off will be directed to detention or retention facilities on-site. Large drainage areas can produce a significant amount of run-off, resulting in a need for large detention or retention structures;
- Consideration of project schedule in selecting, designing and laying out environmental controls.
- Consideration of seasonal requirements (for longer-term projects); select and design controls and practices for controlling erosion and sedimentation including shutdown periods.

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

- Diversion to limit run-on water;
- Reduction of erosional forces by surface water velocity reduction;
- Reduction of sediment development through sediment collection or anchoring;
- Sedimentation of mobilized sediments;
- Filtration of sediment-carrying flows;
- Collection of captured or contained sediments;
Treatment of pH (hydronium and hydroxide).

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

- If the sediment consists primarily of gravel or sand, which are relatively large particles, a single treatment using a more basic technology, such as a sediment trap or sediment bag, may be adequate.
- If the sediment consists of silt and/or clay, which are relatively small particles, the effluent will most likely need a more advanced technology, such as a filter press or chemical treatment with anionic flocculent and a filtration method.
- If the sediment consists of a large spectrum of particle sizes, the water may need primary treatment to remove larger particles, followed by secondary treatment to remove finer particles.

31. All sediment and erosion control measures shall be inspected daily to ensure they are functioning properly and must be maintained and/or upgraded as required to prevent entry of sediment into the water;

32. 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.

33. Any stockpiled materials shall be stored and stabilized a safe distance away from any watercourse, drainage course or swales to prevent erosion and subsequent entry into the water body OR removed from the site, in accordance with all federal, municipal and provincial regulations.

34. If sediment and erosion control measures are not functioning properly, no further work shall occur until the sediment and/or erosion problem is addressed;

35. All disturbed areas of the work site shall be stabilized immediately with erosion protection. All exposed areas should be covered with erosion control blankets or other measures such as mulch to keep the soil in place and prevent erosion until vegetated in the spring;

36. Avoid activity during excessively wet weather conditions; monitor forecasts for heavy rainfall watches & warnings. Sediment and erosion control measures must be able to deal with inclement weather conditions.

37. The contractor will provide a marine grade turbidity curtain across all areas where sediments and materials can enter the watercourse. Turbidity curtain to be anchored or weighted down along its length to form a continuous seal on the canal bed with adequate flotation at water surface to prevent over spills of turbid water.

38. 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.

39. The contractor will maintain a standby supply of pre-fabricated silt fence barrier, or an equivalent ready-to install sediment control device.

Staging/Work Area

40. Keep the worksite clean; with daily garbage removal (including cigarette butts).

41. Maintain equipment to avoid leakage of fuels and liquids. Ensure measures are in place to minimize impacts of accidental spills.

42. Drip trays shall be placed under all fuel-powered equipment.
43. 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.

44. 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.

45. The spills kit will be maintained on site and the contractor will ensure that adequate additional resources are available.

46. 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 provincial regulatory requirements AND to the satisfaction of Parks Canada; documentation of remediation, testing and results will be provided to Parks Canada.

47. Store all oils, lubricants, fuels and chemicals in a secure designated area on impermeable pads;

48. Refuelling of equipment and maintenance shall be conducted off slopes and away from water bodies on impermeable pads at a recommended distance of 30 meters from any watercourse to allow full containment of spills. In the event that the recommended distance is not feasible or practical, proper storage/re-fuelling mats will be employed at the project site;

49. 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;

50. 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.

**Invasive Species**

51. 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)

52. 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.

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

**Cultural Resources**

54. Document the existing features that will be impacted by the project prior to their removal and rehabilitation.

55. Any removals where profiles, sizes, or materials finishes are to be replicated, the material being removed must be documented and templated accurately.

56. All removals are to be done in conformance with the drawings and specification documents.

57. Any modification to the proposed scope of work and/or conservation measures must be submitted to CRM for review and approval for compliance with the Standards and Guidelines for the Conservation of Historic Places in Canada.

58. Ensure plans are clear and concise. Review plans and specifications to ensure all information is appropriately coordinated and aligned with the Standards and Guidelines for the Conservation of
Historic Places in Canada. Finally ensure plans are updated during work to ensure accurate tracking of the type and extent of repairs.

59. 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).

60. Identify heritage components in the project area to ensure that inadvertent impacts do not occur.

61. If, in the course of work, a cultural resource or character-defining element is damaged, the project lead should take photos and consult with CRM immediately for advice on how to proceed.

62. 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.

63. 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.

64. Consider holding a pre-construction conference for the concrete repairs similar to that used for masonry repairs. The work should conform to the recommendations provided in the Concrete Guidance – Appendix to the Conservation Guidance 2016-2021 Capital Works Program (PCA, Draft Version to be provided by BH, 2017).

Archeology

65. No excavation is permitted during the installation and removal of the pedestrian pathways and floating pedestrian bridge with affiliated bridge deck. The bridge should be aligned so as to avoid the archeological remains (both terrestrial and underwater) of the wharf and warehouse northeast of the swing bridge’s eastern abutment.

66. All parking, staging and access roads will be restricted to present-day roadways, parking lots and previously 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 covering must be removed following construction and the area restored to pre-construction state. Excavation is not permitted during installation or removal of protective covering.

67. Should vegetation clearing be required, excavation or grubbing of the ground surface is not permitted.

68. If archaeological resources (e.g. structural features and/or artifact concentrations) are encountered during construction activities, work will cease in the immediate area and the Parks Canada Project Manager informed. The Project Manager will contact Parks Canada’s Terrestrial Archaeology section for advice and assessment of significance, which will in turn determine the requirements to mitigate the find.

Air/Noise

69. 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. Environmental Assessment 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.

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

71. Use well-maintained heavy equipment and machinery, preferably fitted with fully functional emission control systems/muffler/exhaust baffles, engine covers, etc.; machines shall not be left to unnecessarily idle in order to avoid emissions;

**Waste Disposal**

72. 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;

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

**Floods, Extreme or Inclement Weather, and Ice Formation**

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

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

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

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

**Site Restoration**

78. Other than sod, only native species will be used for site restoration activities.

79. 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 31st and late as June 25th.

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

**Treated Wood**

81. 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.

82. 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. 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.

83. To mitigate risk of leaching, a sealer or coating may be used. Penetrating sealers are recommended due 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%.

84. 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.

85. 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.

86. 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.

87. 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.

88. 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.

89. Exposed cut ends and drill holes should be field-treated 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.

90. 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.

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

<table>
<thead>
<tr>
<th>Time Period</th>
<th>Volume of Storage</th>
<th>Factors</th>
</tr>
</thead>
</table>
| 90 Days or Less | 55 m³ or less    | - Store on flat ground (slope less than 10%) and a minimum of 10 m from environmentally sensitive area  
- Elevate to avoid contact with water runoff  
- Provide absorbent (ex. wood chips) or limited permeability (ex. Concrete) base  
- Minimize on site storage time  
- Inspect wood upon delivery to ensure it meets ordering specifications  
- Place tarpaulin or weather resistant material over wood  
- Inspect storage area for evidence of leaching treatment chemicals |
<table>
<thead>
<tr>
<th>More than 55 m³ (Additional factors)</th>
<th>Store a minimum of 30 m from environmentally sensitive area</th>
</tr>
</thead>
<tbody>
<tr>
<td>More than 90 days 55 m³ or less (Additional factors)</td>
<td>Store a minimum of 3 m from drainage ditches - Provide emergency response information and fire protection equipment - Limit access to the storage area</td>
</tr>
<tr>
<td>More than 55 m³ (Additional factors)</td>
<td>Store a minimum of 30 m from environmentally sensitive area and a minimum of 3 m from drainage ditches - Store at least 30 m from potable water supply and outside of 100-year flood plain where possible - Store at least 30 m from forested area and clear storage area of combustible ground vegetation. - Choose a storage area where runoff can be captured/managed - Provide fencing and/or signage around area</td>
</tr>
</tbody>
</table>

92. 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.

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

94. Collect all remaining scraps, cuttings, wood chips and sawdust in a timely manner and dispose of them appropriately at an appropriate disposal facility and as specified in the Pesticide Label. Do not compost waste material.
Appendix 3 – Site Photos

Photo 1. Swing bridge in its closed position (August 2017).

Photo 2. Swing bridge in its open position (August 2017).
Photo 3. Eastern side of North abutment, showing the existing concrete footing for the north rail (August 2017).

Photo 5. South Abutment (August 2017).

Photo 6. Staging area. Planted Sugar Maple is on the far side of the clearing (August 2017).
Photo 7. Existing access to boat launch and proposed staging area (August 2017).

Photo 8. Location of the temporary pedestrian bridge (August 2017).
Appendix 4

PARKS CANADA AGENCY
ARCHAEOLOGY AND HISTORY BRANCH
INDIGENOUS AFFAIRS AND CULTURAL HERITAGE DIRECTORATE

ARCHAEOLOGICAL OVERVIEW ASSESSMENT
BURRITTS RAPIDS SWING BRIDGE REHABILITATION - RIDEAU CANAL NATIONAL HISTORIC SITE
III PROJECT RPA n° 1372

Barbara LESKOVEC
Terrestrial Archaeologist, IACHD
National Office, Gatineau

Jonathan MOORE
Senior Underwater Archaeologist, IACHD
Underwater Archaeology Team, Parks Canada

ABSTRACT

Parks Canada Agency has proposed to rehabilitate the swing bridge at Burritts Rapids, Rideau Canal National Historic Site of Canada. This Archaeological Overview Assessment will evaluate the potential impacts of the proposed work on known or potential archaeological resources and determine if an Archaeological Impact Assessment and/or mitigation measures are required for the Project.

PROJECT OVERVIEW

The Burritts Rapids Swing Bridge was constructed in 1897 replacing a wooden swing bridge built in the 1850s. As a single lane bridge, the Swing Bridge is now the oldest bridge crossing the Rideau Canal. Although several rehabilitation efforts

In spite of previous rehabilitation efforts, including the latest in 2004, some of the steel frame of the structure is original. The bridge is in need of rehabilitation.

Parks Canada Agency (PCA) has proposed to rehabilitate Burritts Rapids Swing Bridge (Figure 1). Work will include masonry repointing, bridge deck resurfacing, improvements to safety signage, installation of a floating pedestrian bridge with bridge deck approaches and tree trimming (WSP 2017). Turbidity curtains will be employed to dewater in-water Project Areas. The staging area will be located northeast of the swing bridge and a floating bridge will be installed downstream (Figure 2).

HISTORICAL BACKGROUND AND ARCHAEOLOGICAL POTENTIAL

Settled in 1793 by Colonel Stephen Burritt and his brother Daniel, United Empire Loyalists from Vermont, Burritts Rapids developed into a thriving village by 1831 when it became part of the navigational route for the Rideau Canal. In 1824, the Burritts Brothers and a Mr. Hurd raised a subscription for a bridge, and coupled with a grant received from the Quarter session, erected a substantial wooden bridge over the Rideau River, at the same location as the present-day fixed bridge (DIAND 1976:28). Historical records suggest this was the first bridge constructed over the Rideau River (DIAND 1976:28).

When the canal cut was excavated at Burritts Rapids, a continuous span high level timber bridge was erected over the navigational channel to maintain a crossing (DIAND 1976:28). This bridge was located approximately 900 m above the lock, and was the first of its kind constructed on the Rideau Canal (Figure 3; DIAND 1976:28-29). In 1851, this fixed wooden high level bridge was replaced with a rim-bearing king post truss swing bridge (DIAND 1976:30). The swing bridge was approximately 20 m long and 3 m wide, with an “unequal arm…[or bobtail] span supported and swung upon a pivot pier located on the west bank

28 July 2017
of the canal cut" (DIAND 1976:30). Both abutments were constructed of cut stone. Through the years, the swing bridge may have been rebuilt every 12 years or less (DIAND 1976:31). If so, the first swing bridge may have been replaced around 1861-63, followed by an improved model probably around 1871-73. In 1883, a new wooden king post swing bridge was erected, replaced by the present-day steel-truss swing bridge in 1897. The existing steel truss bridge was constructed by the Central Bridge Company of Peterborough, Ontario, and has an unsymmetrical truss design combining a Pratt and Fink truss. It is a design not found on any other Canadian canal (DIAND 1976:21).

Over the years, minor repairs have been carried out on the swing bridge and its approaches. In 1947, the swing bridge was reinforced with heavier stringers (DIAND 1976:21). Despite the last rehabilitation undertaken in 2004, some structural members of the bridge are likely still original (PCA 2016).

An 1848-1851 ordnance map of Burritts Rapids shows a wharf and storehouse adjacent to the swing bridge on its northeast side. A November 1919 map of Burritts Rapids shows what is probably a wharf and small building on the south bank of the Burritts Rapids cut, immediately east of the swing bridge. A 1925 air photograph shows an L-shaped wharf and store house at this location (Figure 4), and a similar structure is suggested by a 1950 vertical air photo. During a walking inspection of the Burritts Rapids cut on May 14, 2002 a concentration of stone was observed on the southeast bank, approximately 40 meters downstream from the swing bridge. Upon closer inspection, and from evidence provided by Jack Arnold, this appeared to be the remains of the landing and wharf. Horizontal crib timbers and rubble fill project from the eroding shoreline. There is one large cut stone block with an iron hook embedded in it lying on the shore. At normal navigation levels the wood and crib fill are submerged. A number of artifacts, including glass and an iron ringbolt were observed among the rubble fill (Moore 2005:180-181).

Historical research has indicated that several different types of bridges existed at the site of the present-day Burritts Rapids Swing Bridge, or within its proximity. Remains of these bridges or evidence of their construction may exist below surface within the Project Area(s). A landing, wharf and warehouse were located immediately to the northeast of the bridge and archaeological remains of these structures are extant.

ASSessment of Proposed Development Impacts and Archaeological Mitigation Measures

The following assessment was completed based on the 99% construction drawings for the Burritts Rapids Swing Bridge Rehabilitation Project (WSP 2017). Given that project activities may adversely impact archaeological resources that exist below the surface, including evidence of the historical bridges, the following mitigation measures are required to minimize the project’s impacts on these resources:

1. No excavation is permitted during the installation and removal of the pedestrian pathways and floating pedestrian bridge with affiliated bridge deck. The bridge should be aligned so as to avoid the archaeological remains (both terrestrial and underwater) of the wharf and warehouse northeast of the swing bridge's eastern abutment.

2. All parking, staging and access roads will be restricted to present-day roadways, parking lots and previously 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 covering must be removed following construction and the area restored to pre-construction state. Excavation is not permitted during installation or removal of protective covering.

3. Should vegetation clearing be required, excavation or grubbing of the ground surface is not permitted.

4. If archaeological resources (e.g. structural features and/or artifact concentrations) are encountered during construction activities, work will cease in the immediate area and the Parks Canada Project Manager informed. The Project Manager will contact Parks Canada’s Terrestrial Archaeology section for advice and assessment of significance, which will in turn determine the requirements to mitigate the find.
REFERENCES


Figure 1. Burritts Rapids Swing Bridge (PCA Digital Files).
Figure 2. Proposed Staging Area and Floating Pedestrian Bridge at Burritts Rapids Lockstation (WSP 2017).
Figure 3. Burritts Rapids, ca 1840s. Note continuous span high level bridge in background (Watercolour by John Burrows, PCA Digital Files).
Figure 4. Wharf, warehouse and road approach situated to the northeast of the Burritts Rapids swing bridge (Air photo: National Air Photo Library, HA40-9, 1925).
Appendix 5

Statement of Cultural Resource Impact Analysis

RECOMMENDATION to the FUS
We recommend that you approve the implementation of these mitigation measures.
___ I concur
___ I do not concur
___ for discussion

Jewel Cunningham, Director, Ontario Waterways Unit, Trent-Severn Waterway National Historic Site & Rideau Canal National Historic Site, jewel.cunningham@pc.gc.ca, T: 705-750-4919 (TSW) / 613-283-7199, ext. 234 (Rideau)
For: Burritts Rapids Swing Bridge, Rideau Canal, Ontario Waterways Field Unit
Project Title: Burritts Rapids Swing Bridge Rehabilitation, Rideau Canal, Village of Burritt’s Rapids, ON
Project Number: RPA 1372
Date: August 4th 2017
Prepared by:
Nathalie Desrosiers, Policy Advisor, Cultural Heritage Policies Branch, IACH, T: 705.313.3179 nathalie.desrosiers@pc.gc.ca
Jim Wagner, Built Heritage Advisor, Built Heritage Branch, IACH, T: 204-983-2624, Jim.wagner@pc.gc.ca
Lydia Miller, Built Heritage Advisor, Built Heritage Branch, IACH, T: 819-420-9748, Lydia.miller@pc.gc.ca

Description
800 meters from the lock station on the canal is the Burritts Rapids single lane swing bridge. The bridge is located at the south end of Grenville Street. The bridge is an asymmetrical truss design, which combines a Pratt and a Fink truss that is unique on the Rideau Canal. The Fink portion being the taller section on the north side of the bridge. The bridge is a combination of a steel structure, and a wooden deck, and masonry base. The site contained an earlier timber swing bridge that was built to accommodate the newly constructed canal.

The original bridge was built in 1824, and subsequently replaced in the early 1850s with a timber swing bridge. The current bridge was built to replace the previous in 1897. The pivot point of the swing bridge is on the north side of the shore, and swings to the west. It is noted for being one of the few examples of a hand-turned swing bridge along the Rideau Canal. Annual reports from the Department of Railways and Canals, between 1900-1925, note that only minor repairs have been done on the swing bridge, referring to a majority of them as sundry repairs. More specific repairs include: painting of the swing bridge and approach between 1901 and 1902, sandblasting and repainting between 1913 and 1914. Burritts Rapids Swing Bridge is considered as being the oldest swing bridge on Rideau Canal.

The swing bridge sits on masonry abutments and walls. The masonry that the bridge sits on is thought to be a leftover of the early timber bridge from the 1850s. A survey from August, 2016 states that the masonry and abutments seem to be in good order, given that there is no bulging or misaligned stone. It is assumed that the masonry foundation lies on bedrock, and would contribute to the lack of shifting or movement.

Heritage Value
The landscapes of the Rideau Canal are fundamental resources of the canal system and integral to the Rideau’s unique historical environment. The Canal landscapes were evaluated in terms of the retention of historic circulation patterns, the spatial inter-relationships of buildings, engineering works, open spaces and other landscape features, plus the overall impact of new features on or near the stations. The proposed project involves a cultural landscape that is a cultural resource of “National Significance” (NS, formerly known as Level I cultural resource, Cultural Resource Inventory, 1994-95, rev. Nov. 2015) and part of the Canal
Rideau World Heritage Site and National Historic Site.

The heritage value of the landscape 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 swing bridge at Burritts Rapids is considered a cultural resource of other heritage value. These engineering works of other heritage value on the Rideau Canal are valued for their:
• association with the commercial and recreational use of the canal;
• association with corridor communities and expansion of the canal system;
• role in the continuing operation of the canal;
• evidence of changing construction technologies;
• manual mode of operation;
• surviving physical attributes of form and material.

The heritage value ascribed to cultural resources guides conservation efforts and investments. Under the CRM Policy, conservation of heritage values 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 and character-defining elements. 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.

Project overview
The intent of this project is to rehabilitate the Burritts Rapids Swing Bridge and abutment to address multiple issues while preserving its heritage value and character-defining elements. The issues are related to the deterioration of the paint, the corrosion of the steel members, the deterioration of the masonry (from 1850s), the non-compliance of the bridge and approaches with current codes, deficiency in the signage, the problems associated with dirt and salt, and the deterioration of the track, wheels, axles and rotation stop.

The following aspects of the proposal respect or enhance the heritage value of the cultural resource for the following reasons:
All components of the Burritts Rapids Swing Bridge 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 components, fabrics and the new requirements for the bridge has redirected the project into the rehabilitation of the engineering work. Therefore, the replacement of some parts of the bridge in order to increase its load capacity is the preferred actions to ensure that its significance is retained. In principle, the proposed rehabilitation of the swing bridge 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 bridge and restoration of the masonry will help to ensure that Burritts Rapids Swing Bridge and landscape will retain their heritage value and that the historic canal’s physical life will be extended.

The following aspects of the proposal could detrimentally impact on heritage significance. The reasons are explained as well as the mitigation measures to be taken to minimise impacts:

The impacts on the cultural resources have been assessed using the directions on the CIS, Parks Canada’s Cultural Resource Management Policy as well as the Standards and Guidelines for the Conservation of Historic.

Although the Burritts Rapids Swing Bridge and landscape are designated cultural resources (OHV and NS), it is not anticipated that the project will negatively impact the site if appropriate mitigation measures and conservation approach are followed. As such, the application of Standards 1-12 from the Standards and Guidelines is recommended, including the relevant Guidelines on Cultural Landscapes (Section 4.1), Archeological Sites (4.2), Engineering Works (Section 4.4) and Materials (Section 4.5).

However, the project involves the removal of the wood deck, the replacement of multiple truss members and the addition of several components for codes compliance. These interventions will impact the original design of the bridge built in 1897. If the project proceeds, mitigation strategies that reduce these impact are to be implemented. Refer to the Recommendations section below.

Impacts to the cultural landscape will also be generated by the project. These impacts will affect the setting and architectural fabrics. The measures below have been formulated to reduce the overall impacts to the Burritts Rapids cultural landscape. Ensure that the replacement (in kind) bridge is designed to minimise visual impact to the landscape (color, texture, details in the concrete, etc.).

- Ensure that the landscape scheme for the Burritts Rapids Swing Bridge area retains its informal character by minimising the addition of signage and railing / barriers.
- Investigate opportunities to relocate equipment so that they do not pose a visual impediment to the resulting cultural landscape.
- Include the existing cultural landscape in all archival recording activities undertaken for the project.
- Use of construction equipment has the potential to displace, impact, damage or destroy submerged and/or terrestrial archaeological resources (known or potential).

The following solutions have been considered and discounted for the following reasons:

The complete restoration of the Burritts Rapids Swing Bridge is not feasible due to the advanced deterioration of some parts of the bridges.

**Recommendations & Mitigation Measures**

**General Recommendations:**

These recommendations and mitigation measures have been developed, in part, using Parks Canada’s Cultural Resource Management Policy and the Standards and Guidelines for the Conservation of Historic Places in Canada, to ensure that the guidance provided represents best practice in heritage conservation.

- Document the existing features that will be impacted by the project prior to their removal and rehabilitation.
- Repair rather than replace character-defining elements, if possible. Where character-defining elements are too severely deteriorated to repair, and where sufficient physical evidence exists, replace them with new elements that match the forms, materials and detailing of sound versions of the same elements. Where there is insufficient physical evidence, make the form, material and detailing of the new
elements compatible with the character of the landscape.

- Any removals where profiles, sizes, or materials finishes are to be replicated, the material being removed must be documented and templated accurately.

- All removals are to be done in conformance with the drawings and specification documents.

- Replacing character-defining materials with compatible substitute materials, when the original is found to accelerate deterioration and only after thorough analysis and monitoring confirms that the material or construction detail is problematic. Substitute materials should be as durable as the overall assembly to maintain its expected service life.

- Replace in kind any extensively deteriorated or missing parts of the character-defining elements where there are surviving prototypes or based on the original drawings and contracts. The character-defining elements to be preserved are: overall form, materials, massing, design, architectural signature and architectonic details.

- Conserve the heritage value and character-defining elements when creating any new additions to the bridge or any related new construction.

- Make the new work physically and visually compatible with, subordinate to and distinguishable from the historic place.

- Add new features to meet health, safety or security requirements, in a manner that conserves the constructed elements and minimizes impact on the heritage value of the engineering work and the landscape.

- Any modification to the proposed scope of work and/or conservation measures must be submitted to CRM for review and approval for compliance with the Standards and Guidelines for the Conservation of Historic Places in Canada. Finally ensure plans are updated during work to ensure accurate tracking of the type and extent of repairs.

- Show the locations, dimensions, materials and details of the mechanical and electrical components on the drawings.

- Show the locations, dimensions, materials and details of the replacement stairs and railings on the drawings.

- Show the locations, dimensions, materials and details of the concrete and masonry repairs on the drawings.

- The set of drawings would benefit of having clearer definition between existing and new with the integration of survey drawings, demolition drawings and new construction drawings.

- If an opportunity arises to address or correct past repairs that are no longer considered best conservation practice or that seriously impact heritage value, CRM advice should be sought to determine whether it makes sense to address this as a part of this project.

- To satisfy concerns about public understanding and visitor experience, the project should provide opportunities for an enhanced visitor experience that: conveys and respects the heritage values of the canal; increases public understanding of the Rideau Canal National Historic Site and World Heritage Site; and provides public outreach education.

- 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).

- Identify heritage components in the project area to ensure that inadvertent impacts do not occur.
If, in the course of work, a cultural resource or character-defining element is damaged, the project lead should take photos and consult with CRM immediately for advice on how to proceed.

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.

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.

Specific recommendations
- The project involves the rehabilitation of the existing bridge, leaving it in place with the ability to carry modern loads while preserving its heritage value: the old components of the bridge should be replaced in kind (same color, location, materials, design, height, etc.).
- Concrete: specifications call for standard forming and finishing procedures. The new concrete should match the surface texture, form marks, colour and edge profiles of the existing. Avoid the use of chamfered edges unless the historic concrete is detailed in that way. Ensure joints between new and existing concrete are straight and squared off.
- Study the concrete colour, finishes and details prior to removal. Replicate these finishes and details in the new work based on the original drawings or/and specific recommendations provided by CRM and BH.
- Concrete color and finish: Analyse aggregates, form marks and texture of existing concrete to inform design of repair concrete. Aggregate colour has strong correlation to aged concrete colour.
- Concrete joints between new and existing: Minimize joint width, ensure cuts are straight and plumb.
- Group repairs and when re-facing, find closes physical change in the barrier which be created by control joint, formwork line, butting into another wall, etc. Respect the existing formwork pattern, texture and color so repair is well integrate into the engineering work.
- Concrete: Avoid random geometrical repairs in the concrete. Avoid introducing new details such as changing radius of edge. Whenever possible, avoid epoxy fillers.
- Spalling and cracking of the concrete will require repair. Finishes of the concrete are to match adjacent original finishes as closely as possible in colour, texture, and aggregate.
- Mock-ups: Use mock-ups to assess quality of workmanship for concrete finish, colour, edge treatment, etc.
- Consider holding a pre-construction conference for the concrete repairs similar to that used for masonry repairs. The work should conform to the recommendations provided in the Concrete Guidance – Appendix to the Conservation Guidance 2016-2021 Capital Works Program (PCA, Draft Version to be provided by BH, 2017)
- Masonry patching material is proposed to replace a failed masonry patch on the northwest canal wall. Consider using a Dutchman repair with matching stone instead of using patching material again. The work should conform to the recommendations provided in the Section on Masonry in the Conservation Guidance for the Rideau Canal National Historic Site (PCA, Draft Version to be provided by BH, 2017)
- The wood deck assembly includes a plywood base layer with a waterproof membrane below.
the new wood deck boards. The plywood edge and the membrane edge will be exposed along the length of the bridge. The plywood surface on the bridge’s underside will also be exposed. Both conditions change the appearance of the wood deck assembly. The option of using plank instead of plywood is recommended.

- The new wood deck should be installed in a configuration to match existing elevation. Therefore, retain existing wood deck elevation unless it is functionally problematic as it currently exists.

- Railings: The railings on the sides of the bridge are to be replaced, and will be increased in height to meet current code requirements for guard height. It is recommended that the detailing of the horizontal rails remain the same as the original design, which included two horizontal boards, inset into the vertical posts. The spacing of the rails should be as close to the existing proportions as possible given that it will be new guard height. Maximize the post spacing as much as possible to follow the existing arrangement more closely.

- Bridge finishes: Finish the railings and exposed stringers to match the existing.

- Signage: Signage should be carefully considered, consolidated, and minimized wherever possible.

- Wood species and treatments: It is recommended that all new wood is not pressure treated, as it greatly detracts from the heritage aesthetic of the bridge.

- Wood finishes: An opaque finish is preferred for finished surfaces. Surfaces currently painted should be painted, and surfaces currently exposed should be exposed.

- Steel members: Match the dimensions, materials and finishes of the existing.

- Shop drawings: Use shop drawings to ensure design conformance in metal railings, wood deck, bridge details, etc.
  - Samples: Use samples to verify quality of materials.

- Paint: Apply a paint finish to the principal structural wood components, reflecting the approach used on the existing bridges of the Rideau Canal. Make use of samples and mock-ups during construction to better control quality, workmanship and appearance of the work. Consider masonry repairs, concrete repairs and painting.

- Study the moisture conditions created at the underside of each deck board where water may be trapped between the membrane and the boards. Develop an alternate solution for the deck assembly. If plywood is retained, develop methods to protect the edges and underside of the plywood from moisture.

- Consider painting the existing steel pipe rail along the west side of the south approach road.

- Consider painting the bridge steel light grey to match existing.

Cultural Landscape

- The bridge should respond to the significance of the Rideau Canal by achieving a landmark quality that is aesthetically pleasing for all users (pedestrian, boater, cyclist, etc.). In more particular terms, it should be an honest representation of its past history and be compatible with its surroundings. The use of modern materials / non-noble materials (other than wood, metal, and stone) should be carefully assessed and evaluated in term of their visual impact on the historic site.

- Blend the new bridge deck and landscape grades with the existing grades in a smooth transition – avoid abrupt changes.

- Maintain landscape features and supporting elements of the bridge as much as possible.

- Minimize additions and intrusions to the landscape, and ensure colours chosen blend with the historic setting and landscape. Each element added to the site should be assessed and integrated (colour, form, texture and
material) as much as possible to the different structures in the landscape. Cohesion, consistency and visual relationship between each structure and equipment should dictate all interventions.

- Ensure that the landscape plan retains the informal scheme that characterises the Burritts Rapids Swing Bridge site.
- Ensure that the landscaping (if applicable) plan are integrated with the Indigenous, historical, terrestrial and underwater archaeological assessments.

Archaeological Resources

- No excavation is permitted during the installation and removal of the pedestrian pathways and floating pedestrian bridge with affiliated bridge deck.
- All parking, staging and access roads will be restricted to present-day roadways, parking lots and previously 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 covering must be removed following construction and the area restored to pre-construction state. Excavation is not permitted during installation or removal of protective covering.
- Should vegetation clearing be required, excavation or grubbing of the ground surface is not permitted.
- If archaeological resources (e.g. structural features and/or artifact concentrations) are encountered during construction activities, work will cease in the immediate area and the Parks Canada Project Manager informed. The Project Manager will contact Parks Canada’s Terrestrial Archaeology section for advice and assessment of significance, which will in turn determine the requirements to mitigate the find.

Appendices:

Appendix II – Built Heritage Overview Assessment
Appendix III - Archeological Overview Assessment (AOA)

References:
Draft Heritage Value Statement, prepared by Parks Canada CRM, dated July 17, 2017
Context

What is a Statement of Heritage Value?
A Statement of Heritage Value is a record that confirms that a Parks Canada asset, or collection of assets, meets the Agency’s requirements to be a cultural resource. It provides a summary history of the cultural resource, its heritage value (why it is important), and its character-defining elements (aspects of the resource that express its heritage value).

Approvals
The statement of heritage value requires approval by the Field Unit Superintendent and the Director of Cultural Heritage Policies and is designed to support decision-making about management of a cultural resource.

Interpretation
Assistance to interpret the Statement of Heritage Value can be sought from a Cultural Resource Management (CRM) Advisor or a CRM specialist.

Assessments of Impacts
When changes or interventions are proposed to cultural resources, the proposed changes and interventions are subject to an assessment of impacts using the Standards and Guidelines for the Conservation of Historic Places in Canada. This is not to preclude changes or interventions, but rather to reduce possible negative impacts to the heritage value of the cultural resources.

Flexibility of Implementation of Changes and Interventions
Sustainable conservation calls for a flexible and integrated approach that balances CRM with other Agency objectives. If negative impacts are expected to the heritage value of a cultural resource, these can often be reduced or eliminated through mitigations developed in consultation with the CRM Advisor. If mitigation is not possible, alternate approaches to certain aspects of a project, or alternative means of preserving heritage value, can be recommended (for example, preservation through heritage recording and subsequent interpretation).

Responsibility for Decision-Making
Decision-making about an intervention on the cultural resource remains with the Field Unit Superintendent.
Description

Landscape
The lockstation comprises lock 17 and much of the shores of the channel to the South of the island of Burritts Rapids. Burritts Rapids lock station is between Long Island Locks 14-16 to the north, and Lower Nicholson, Lock Station 18, to the south. The lockstation site is accessible by road on the south shore, along 673 River Road, west of Kemptville north east of Merrickville (coordinates: 44°58'56.6"N 75°47'11.4"W). The site includes: a lockstation, three earth embankments, dam and weir, and a swing bridge, all of which are spread across the island. The lock site is on the east end of the island that the village of Burritts Rapids also sits on. The dam and weir sit on the other side of the island, and the swing bridge lies in the center of the island. The lock station is forested and the surrounding area is mostly rural.

Burritts Rapids was one of the first settlements on the Rideau River, predating the Canal. Colonel By arrived in 1826, and Burritts Rapids was thriving with trade. The townsite and post office were established in the 1830’s. The village, however, lost its commercial importance in the early 20th century.

The fixed bridge north of the town is in the same location as one of the earliest bridges across the Rideau, built in 1824 (and rebuilt in 1920 and 1983). Some time after 1845, a mill dam was erected slightly upstream and crossed the entire channel, with a waste weir, serving the saw and grist mills (south side). The remains of this dam are extant.

In approximately 1832, a timber high level fixed bridge was constructed across the channel of the canal (south end of town), just upstream of the present day swing bridge. By the early 1850s, it was replaced by a timber swing bridge in the location of the present 1897 steel truss swing bridge.

To the north of island, on Donnelly Drive is the historic Christ Church, completed in 1832 and one of the earliest churches on the Rideau River, on land donated by Daniel Burritt in 1830 for a church and burying ground.
**Lock and Channel**

The site is comprised of a single lock chamber. The lock chamber is 70 meters long and is 11 meters wide, and has a lift of 2.7 meters. The lock sits on the east end of the 2.5km canal cut created the thin island that Burritts Rapids resides on. The contract for the construction of the lock site was signed with Philermon Wright and Sons. The canal and lock were completed in 1830. The walls, wing walls, gate monoliths, and coping are made of stone, while the lock invert is a combination of timber and concrete. There is a lockhouse on the south side of the canal by the lock. The first lockhouse was a small designed to be a blockhouse, a small military structure, but it did not come to fruition. A history of buildings on the Rideau Canal suggests that the lockhouse was completed in 1836. The lockhouse was eventually demolished during the 1914-1915 season and a frame structure replaced it. During the period between 1905 and 1906, one pair of the lock gates were renewed. Between 1909 and 1910, major repairs were done to the lock chamber. The south chamber wall and both upper wings were removed and rebuilt. The lower lock gates were also renewed.

**Swing Bridge**

800 meters from the lock station on the canal is the Burritts Rapids single lane swing bridge (coordinates: 44°58'48.4"N 75°47'45.9"W). The bridge is located at the south end of Grenville Street. The bridge is an asymmetrical truss design, which combines a Pratt and a Fink truss that is unique on the Rideau Canal. The Fink portion being the taller section on the north side of the bridge. The bridge is a combination of a steel structure, and a wooden deck, and masonry base. The site contained an earlier timber swing bridge that was built to accommodate the newly constructed canal. The original bridge was built in 1824, and subsequently replaced in the early 1850s with a timber swing bridge. The current bridge was built to replace the previous in 1897. The pivot point of the swing bridge is on the north side of the shore, and swings to the west. It is noted for being one of the few examples of a hand-turned swing bridge along the Rideau Canal. Annual reports from the Department of Railways and Canals, between 1900-1925, note that only minor repairs have been done on the swing bridge, referring to a majority of them as sundry repairs. More specific repairs include: painting of the swing bridge and approach between 1901 and 1902, sandblasting and repainting between 1913 and 1914. The swing bridge sits on masonry abutments and walls. The masonry that the bridge sits on is thought to be a leftover of the early timber bridge from the 1850s. A survey from August, 2016 states that the masonry and abutments seem to be in good order, given that there is no bulging or misaligned stone. It is assumed that the masonry foundation lies on bedrock, and would contribute to the lack of shifting or movement.
In 1925-1926, a bridgehouse was constructed for the bridge master, which replaced a house that was constructed in 1851.\(^\text{18}\) It is located 35 meters north of the swing bridge on the east side of the road. The house still stands at 1 Grenville Street, and has been repurposed as a public library.

### Weir and Spillway Dam

On the west end of the island a combination weir and dam on the Rideau River (coordinates: 44°58'41.2"N 75°48'27.9"W). The weir contains two bays and has a length of 20 meters, and the dam likewise has two bays and is 6.4 meters long.\(^\text{19}\) The original weir-dam combination were built between 1827-1831. It was subsequently destroyed in 1847, and rebuilt with an oak timber crib dam and rock fill later that year.\(^\text{20}\) During the winter of 1903-1904, ice had built up and damaged the icebreaker on the weir and the far side of the dam.\(^\text{21}\) The east pier of the dam was rebuilt, and the dam and weir repaired and sheeted with 3-inch planks between 1906 and 1907.\(^\text{22}\) The timber waste weir was removed and rebuilt, and the top of the dam was concreted to carry flashboards during the 1913-1914 season.\(^\text{23}\) The weir was rebuilt with concrete in 1930 and the dam was rebuilt with concrete in 1951.\(^\text{24}\)

#### Bridgemaster’s House

The Burritts Rapids Bridgehouse or Bridgemaster’s House is located in the village of Burritts Rapids, which occupies an island between the Rideau River, and the Rideau Canal. The house is a two-storey, gable roofed structure clad with cove woodsiding. An open, gable-fronted porch protects the front door. The main road through the village crosses the canal adjacent to the Bridgehouse on a steel swing bridge. The designation is confined to the footprint of the building.

The house, which provided accommodation for those operating the swing bridge, is associated with the Post-Confederation use of the Rideau Canal for transportation purposes. The current swing bridge, combining Fink and Pratt truss design and dating from 1897, is associated with the bridgemasters who lived in the house. The bridge continues to be used as a means of crossing the canal to the town of Burritts Rapids, a Loyalist settlement of the 1790s. Although the house is now used as a library, knowledge of its original function makes it a local landmark to residents of the area.

The house is a good example of vernacular frame construction from the period -- a rectangular side-hall plan, two storeys in height clad with cove siding, with a cedar-shingled gable roof. The house retains its small front entrance porch, while the single-storey frame addition at the rear, dating from 1898, is clad in cove siding like that of the main structure. The house retains its interior layout, much of the woodwork and, apparently, the original windows. The functional residential design of the building reflects the early twentieth-century commercial and recreational use of the canal system and exhibits the competent craftsmanship of the period. Inspection and maintenance of the building fabric should be carried out routinely.

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\(^\text{18}\) 1991-072, page 147  
\(^\text{19}\) Burritts Rapids History, page 2. 
\(^\text{20}\) Underwater Archeological survey, page 203  
\(^\text{21}\) DRCAW 1905, page 273, page 209 
\(^\text{22}\) DRCAW 1908, page 283, page 167  
\(^\text{23}\) DRCAW 1915, page 333  
\(^\text{24}\) Underwater Archeological Survey, page 203  

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The Bridgemaster’s House and its setting remain essentially unchanged since the 1920s. The house forms part of the streetscape of the town, while the lawn extends down to the water and bridge as it did historically.

**Earth Dam**
Along the site is three earthen dams which were built in 1830 along with the rest of the site. There is a the Trial Earth Dam, which spans 500 meters from the swing bridge to lock 17, along the north side of the canal. The second earth dam, Access Road Earth Dam, which runs 400 meters, spans from the swing bridge to the concrete dam, along the north side of the canal. The final earth dam, the North Earth dam, sits on the Rideau River near the concrete dam. It runs north-south and is 50 meters long. Between 1908 and 1909, high water levels as a result of the spring thaw caused some washouts of the north side embankment. Repairs were completed with stone and portions of the embankment was raised.

**Heritage Value**

**Landscape**
The Burritt’s Rapids Lockstation landscape is a cultural resource of national historic significance that is a fundamental resource of the Canal system and integral to the Rideau’s unique historical environment.

The lockstation landscapes of the Rideau Canal are fundamental resources of the canal system and integral to the Rideau’s unique historical environment. The Canal landscapes were evaluated in terms of the retention of historic circulation patterns, the spatial inter-relationships of buildings, engineering works, open spaces and other landscape features, plus the overall impact of new features on or near the stations.

The lockstation landscapes of national significance are valued for 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 Chaffeys Locks, Newboro, Merrickville, Burritts 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;
- contextual and heritage settings for the stations’ buildings and engineering works.

**Lock and Channel**
The lock and channel through the Snye are considered cultural resources of national historic significance.

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25 AOA – Burritts Rapids Earth Dam, page 1
26 DRCAW 1910, page 260, page 260
Engineering works of national significance on the Rideau Canal are valued for their:

- direct relationship to the original construction achievement;
- contribution to the unique historical environment of the canal system;
- integral role in the continuing operation of the navigation system;
- surviving physical attributes of form, material and function;
- manual mode of operation; and
- contribution to knowledge relating to early 19th century engineering and construction techniques.

Swing Bridge

The swing bridge at Burritt’s Rapids is considered a cultural resource of other heritage value.

These engineering works of other heritage value on the Rideau Canal are valued for their:

- association with the commercial and recreational use of the canal;
- association with corridor communities and expansion of the canal system;
- role in the continuing operation of the canal;
- evidence of changing construction technologies;
- manual mode of operation;
- surviving physical attributes of form and material.

Weir and Spillway Dam

The weir and spillway dam at Burritt’s Rapids are considered cultural resources of other heritage value, as per the values described above for the swing bridge.

Bridgemaster’s House

The Burritt’s Rapids Bridgemaster’s House is considered a cultural resource of other heritage value for its:

- direct association with the construction, operation and maintenance of the canal during the military period;
- direct association with the defence of colonial Canada;
- physical evidence of the original purpose of the canal;
- functional design qualities;
- surviving physical attributes of form and material;
- contribution to the unique historical environment of the canal system;
- contribution to the historic character of the lockstation.

The Burritts Rapids Lockstation “Bridgehouse” is also a Recognized Federal Heritage Building because of its historical associations, and its architectural and environmental values.

Historical Value: The Burritts Rapids Lockstation, Bridgehouse, which provided accommodation for those operating the swing bridge, is associated with the post-Confederation use of the Rideau Canal for
transportation purposes. The Bridgehouse was built as a residence for the bridgemaster, and replaced an earlier one from the 1850s. The bridge continues to be used as a means of crossing the canal to the town of Burritts Rapids, a Loyalist settlement of the 1790s. The house is now used as a library.

Architectural Value: The Burritts Rapids Lockstation, Bridgehouse is valued for its good aesthetic design and is a good example of vernacular frame construction from the period. The functional residential design of the building reflects the early twentieth-century commercial and recreational use of the canal system, and is evidenced in the interior’s side hall plan. Good craftsmanship can be seen in the woodwork; overall this exhibits the competent craftsmanship of the period.

Environmental Value: The Burritts Rapids Lockstation, Bridgehouse maintains an unchanged relationship to its site and is compatible the historic character of its streetscape setting in Burritts Rapids. It is a familiar landmark to local residents and visitors.

Character-Defining Elements

**Landscape**

The elements of the cultural landscape at Burritt’s Rapids that contribute to its heritage value are its:

- Current historic layout and circulation pattern, including open spaces and circulation routes and pathways, such as:
  - The pathways crossing the locks onto the island embankment toward the wharf, and
  - The pathway along the island from the lock to the township.
- Functional arrangement, and the relationships and views between lockstation components, such as:
  - The direct relationship and views between the swing bridge and Bridgemaster’s House,
  - The relationship of the lock to the township of Burritts Rapids;
- Landforms in the landscape, such as:
  - The island embankment, on which Burritts Rapids Township is located;
  - The earth dams, including their locations, general massing, and purpose.
- Design, dimensions, materials, architectural features, and finishes of the lockstation buildings and engineering works, and their footprints and profiles in the landscape, for example, the:
  - Earth Dam
  - Lock office, shed, and lockmaster buildings and outbuildings (garage)
  - Locks
  - Channel
  - Waster Weir and Dam
  - Swing bridge, and its masonry abutments and walls;
  - Wharves east and west of the lock and on the opposite side of the island from the lock;
- Visual and historic associations with Burritts Rapids as a heritage community along the canal system, such as:
The location and close relationship of the bridge and Bridgemaster’s house in relation to the town,
- The location and relationship of the lockstation to the town,
- Submerged remains of the early timber dam, and
- Potential submerged remains of an earlier bridge.

**Historic views within the lockstation grounds, such as:**
- Views of the historic stone swing bridge abutments upon exiting the locks to the west (to Nicholson’s)
- Views of the historic stone swing bridge abutments upon approaching the locks from the west (from Nicholson’s)
- Views of the rugged, natural shoreline east and west of the swing bridge, and the lock;

**Known and potential terrestrial and submerged archaeological resources pertaining to both indigenous and historical occupations, and evidence of construction and early operation of the canal.**

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**Lock and Channel (Canal Cut)**

Key elements contributing to the heritage value of the Burritts Rapids Lock includes:

- its contribution to the integrity of the landscape and the unique historical environment of the canal system;
- its manual mode of operation; and
- its form, dimensions, design and functional qualities and materials, for example:
  - its masonry construction;
  - its overall arrangement, including angles and connections;
  - the wooden lock gates and assemblies, including the type of timber as evolved over time to address the operational and durability needs of the Canal;
  - the valves and opening mechanisms;
  - the architectural signature and details, including but not limited to:
    - coursing patterns;
    - joints and their profiles; and
    - iron works.

Key elements contributing to the heritage value of the Canal Cut include its:

- form;
- massing;
- composition;
- finish;
- in-situ location on the Rideau Canal;
- continued functional use; and
- contribution to the integrity of the cultural landscape, for example:
  - circulation and land patterns related to this portion of the canal, such as its alignment and access points, and shorelines at the time of designation; and
  - its profile in the landscape.

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Swing Bridge
Key character-defining elements contributing to the heritage value of the Swing Bridge at Burritts Rapids include its:
- strategic location joining Grenville Street on both sides of the canal cut;
- dimensions, design and functional qualities, for example:
  - its unique asymmetrical Pratt and Fink combination truss design, with the pivot point on the north shore, swinging to the west;
  - its wooden decking, steel structure, and masonry base, which is possibly from the 1850s bridge;
  - its manual operation;
  - its general massing and low profile silhouette;
  - the landscape elements such as track and abutments that support the bridge; and
  - the adjacent submerged archaeological resources associated with previous bridge iterations;
- proximity and relationship to the Bridgemaster’s house.

Weir and Spillway Dam
Key character-defining elements contributing to the heritage value of the Dam and weir include their:
- location;
- function for flood and water control;
- surviving physical attributes of scale, design and materials, such as their:
  - length,
  - two-bay design;
  - concrete construction;
  - low profile.
- contribution to the integrity of the landscape and the unique historical environment of the canal system; and
- any adjacent extant remains of previous weirs or dams.

Bridgemaster’s House
The elements of the Bridgemaster’s House that contribute to its heritage value are:
- Its good aesthetic, functional design and quality materials and craftsmanship, for example: the
  - two-storey massing;
  - the cedar-shingled gable roof, and the chimney;
  - the frame construction and the exterior clad with cove woodsiding;
  - the regular placement of the windows and doors;
  - the small front entrance porch and the single-storey frame addition;
  - the interior configuration, including the painted wood-plank floors.
• The manner in which the Burritts Rapids Lockstation, Bridgehouse maintains an unchanged relationship to its site, and is compatible with the historic character of its streetscape setting in Burritts Rapids. It is a familiar landmark, as evidenced by:
  o its ongoing relationship to its grassed site and to the adjacent swing bridge;
  o its overall scale, design and materials that are compatible with its village streetscape surroundings;
  o its familiarity within the area due to its role as a community library;
  o its visibility due to its prominent location on the town’s streetscape adjacent to the water and swing bridge.

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Swing Bridge Diagram

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Lock Station (Downstream entrance)
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APPENDIX II – BUILT HERITAGE OVERVIEW ASSESSMENT
July 24, 2017
Built Heritage Review Comments for input into SCRIA
Burritt’s Rapids Swing Bridge Rehabilitation, 66% documents
Project # RID 1372

Project Description:
Burritt’s Rapids swing bridge is a counter-weighted unequal arm steel truss bridge spanning the Rideau Canal. The intent of the project is to rehabilitate the bridge to ensure its ongoing safe operation and to protect its character-defining elements. The scope of work consists of repair, strengthening and refinishing of the steel trusses, floor beams and stringers; replacement of the wood traffic deck; repair of the operating mechanisms; and masonry and concrete repairs.

The following aspects of the proposal respect or enhance the heritage value of the cultural resource for the following reasons:
Reinforcing the existing steel framing with minimal need for replacement. When replacement is needed it will be like for like.
Replacing the wood deck with a new wood deck of similar layout including a running board wearing surface. Repointing masonry using accepted methods.
Replacing deteriorated concrete where needed.

The following aspects of the proposal could detrimentally impact on heritage significance. The reasons are explained as well as the mitigation measures to be taken to minimise impacts:
Concrete – specifications call for standard forming and finishing procedures. The new concrete should match the surface texture, form marks, colour and edge profiles of the existing. Avoid the use of chamfered edges unless the historic concrete is detailed in that way. Ensure joints between new and existing concrete are straight and squared off.
Masonry – Masonry patching material is proposed to replace a failed masonry patch on the northwest canal wall. Consider using a Dutchman repair with matching stone instead of using patching material again.
The wood deck assembly includes a plywood base layer with a waterproof membrane below the new wood deck boards. The plywood edge and the membrane edge will be exposed along the length of the bridge. The plywood surface on the bridge’s underside will also be exposed. Both conditions change the appearance of the wood deck assembly. Consider other options to achieve objectives.

The following solutions have been considered and discounted for the following reasons:
[List alternatives]

Recommendations:
Make use of samples and mock-ups during construction to better control quality, workmanship and appearance of the work. Consider masonry repairs, concrete repairs and painting.
Consider holding a pre-construction conference for the concrete repairs similar to that used for masonry repairs.
Consider using Dutchmans repairs for masonry instead of patching mortars.
Study the moisture conditions created at the underside of each deck board where water may be trapped between the membrane and the boards. Develop an alternate solution for the deck assembly. If plywood is retained, develop methods to protect the edges and underside of the plywood from moisture.
Consider painting the wood pedestrian rails and wood curb white to match existing.
Consider painting the existing steel pipe rail along the west side of the south approach road.
Consider painting the bridge steel light grey to match existing.

Attachments:
[List: statement of significance, study...]
References:
Burritt’s Rapids Swing Bridge Rehabilitation, Preliminary 66% submission, prepared by WSP, August 2017 – 13 drawings plus specifications
The Standards and Guidelines for the Conservation of Historic Places in Canada, 2nd ed.
Commemorative Integrity Statement, Rideau Canal NHS, September 2000.
ABSTRACT

Parks Canada Agency has proposed to rehabilitate the swing bridge at Burritts Rapids, Rideau Canal National Historic Site of Canada. This Archaeological Overview Assessment will evaluate the potential impacts of the proposed work on known or potential archaeological resources and determine if an Archaeological Impact Assessment and/or mitigation measures are required for the Project.

PROJECT OVERVIEW

The Burritts Rapids Swing Bridge was constructed in 1897 replacing a wooden swing bridge built in the 1850s. As a single lane bridge, the Swing Bridge is now the oldest bridge crossing the Rideau Canal. Although several rehabilitation efforts

Inspite of previous rehabilitation efforts, including the latest in 2004, some of the steel frame of the structure is original. The bridge is in need of rehabilitation.

Parks Canada Agency (PCA) has proposed to rehabilitate Burritts Rapids Swing Bridge (Figure 1). Work will include masonry repointing, bridge deck resurfacing, improvements to safety signage, installation of a floating pedestrian bridge with bridge deck approaches and tree trimming (WSP 2017). Turbidity curtains will be employed to dewater in-water Project Areas. The staging area will be located northeast of the swing bridge (Figure 2).

HISTORICAL BACKGROUND AND ARCHAEOLOGICAL POTENTIAL

Settled in 1793 by Colonel Stephen Burritt and his brother Daniel, United Empire Loyalists from Vermont, Burritts Rapids developed into a thriving village by 1831 when it became part of the navigational route for the Rideau Canal. In 1824, the Burritts Brothers and a Mr. Hurd raised a subscription for a bridge, and coupled with a grant received from the Quarter session, erected a substantial wooden bridge over the Rideau River, at the same location as the present-day fixed bridge (DIAND 1976:28). Historical records suggest this was the first bridge constructed over the Rideau River (DIAND 1976:28).

When the canal cut was excavated at Burritts Rapids, a continuous span high level timber bridge was erected over the navigational channel to maintain a crossing (DIAND 1976:28). This bridge was located approximately 900 m above the lock, and was the first of its kind constructed on the Rideau Canal (Figure 3; DIAND 1976:28-29). In 1851, this fixed wooden high level bridge was replaced with a rim-bearing king post truss swing bridge (DIAND 1976:30). The swing bridge was approximately 20 m long and 3 m wide, with an “unequal arm”...
bobtail] span supported and swung upon a pivot pier located on the west bank of the canal cut” (DIAND 1976:30). Both abutments were constructed of cut stone. Through the years, the swing bridge may have been rebuilt every 12 years or less (DIAND 1976:31). If so, the first swing bridge may have been replaced around 1861-63, followed by an improved model probably around 1871-73. In 1883, a new wooden king post swing bridge was erected, replaced by the present-day steel-truss swing bridge in 1897. The existing steel truss bridge was constructed by the Central Bridge Company of Peterborough, Ontario, and has an unsymmetrical truss design combining a Pratt and Fink truss. It is a design not found on any other Canadian canal (DIAND 1976:21).

Over the years, minor repairs have been carried out on the swing bridge and its approaches. In 1947, the swing bridge was reinforced with heavier stringers (DIAND 1976:21). Despite the last rehabilitation undertaken in 2004, some structural members of the bridge are likely still original (PCA 2016).

No archaeological investigations have been conducted within the Project Area(s). Historical research has indicated that several different types of bridges existed at the site of the present-day Burritts Rapids Swing Bridge, or within proximity. Remains of these bridges or evidence of their construction may exist below surface within the Project Area(s).

**ASSESSMENT OF PROPOSED DEVELOPMENT IMPACTS AND ARCHAEOLOGICAL MITIGATION MEASURES**

The following assessment was completed based on the 99% construction drawings for the Burritts Rapids Swing Bridge Rehabilitation Project (WSP 2017). Given that project activities may adversely impact archaeological resources that exist below the surface, including evidence of the historical bridges, the following mitigation measures are required to minimize the project’s impacts on these resources:

5. No excavation is permitted during the installation and removal of the pedestrian pathways and floating pedestrian bridge with affiliated bridge deck.

6. All parking, staging and access roads will be restricted to present-day roadways, parking lots and previously 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 covering must be removed following construction and the area restored to pre-construction state. Excavation is not permitted during installation or removal of protective covering.

7. Should vegetation clearing be required, excavation or grubbing of the ground surface is not permitted.

8. If archaeological resources (e.g. structural features amd/or artifact concentrations) are encountered during construction activities, work will cease in the immediate area and the Parks Canada Project Manager informed. The Project Manager will contact Parks Canada’s Terrestrial Archaeology section for advice and assessment of significance, which will in turn determine the requirements to mitigate the find.

**REFERENCES**


Figure 1. Burritts Rapids Swing Bridge (PCA Digital Files).
Figure 2. Proposed Staging Area and Floating Pedestrian Bridge at Burritts Rapids Lockstation (WSP 2017).
Figure 3. Burritts Rapids, ca 1840s. Note continuous span high level bridge in background (Watercolour by John Burrows, PCA Digital Files).