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Detailed Impact Analysis

Bobs Lake Dam Reconstruction

Bolingbroke, Ontario

March 2018

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Detailed Impact Analysis

Bobs Lake Dam Reconstruction

Prepared for: Parks Canada Agency
Prepared by: Parsons

March 2018

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Project Location:	Bolingbroke, Ontario
Lead Federal Authority:	Parks Canada Agency, Ontario Waterways, Rideau Canal
Lead Authority Contact:	Mike McLay, Engineer, Parks Canada Agency Valerie Minelga, Environmental Assessment Scientist
DIA Assessor Contact:	Tisha Doucette, Project Manager, Parsons
PWGSC Project Number:	5P301-15-0001-004
Client Contact:	Mike McLay, Engineer michael.mclay@pc.gc.ca 613-530-3300

Introduction

1.0 Introduction

Parks Canada Agency (herein referred to as “Parks Canada”) has a legal accountability under Section 67 of the *Canadian Environmental Assessment Act* 2012 (CEAA 2012) to ensure that no project on lands or waters it manages is authorized unless a determination is made to ensure that the project does not have the potential to result in significant adverse environmental effects. Parks Canada’s directive (as per the Guide to Parks Canada Environmental Impact Analysis, June 2015) is to fulfill its requirements as a federal land manager under CEAA 2012. The Parks Canada Environmental Impact Analysis (EIA) process examines how a project may lead to adverse effects on natural and cultural resources.

The Bobs Lake Dam (Figure 1) is owned and operated by the Rideau Canal Office of Parks Canada. The works associated with the reconstruction of the dam were determined to require a Detailed Impact Analysis (DIA) since they involve the permanent and substantive modification or reconfiguration of the aquatic environment. As per Parks Canada's EIA policy, in order to assess all potential environmental impacts from the proposed project, this DIA will include the entire project scope including those areas currently not on federal lands. Existing Parks Canada ownership is shown on Figure 2.

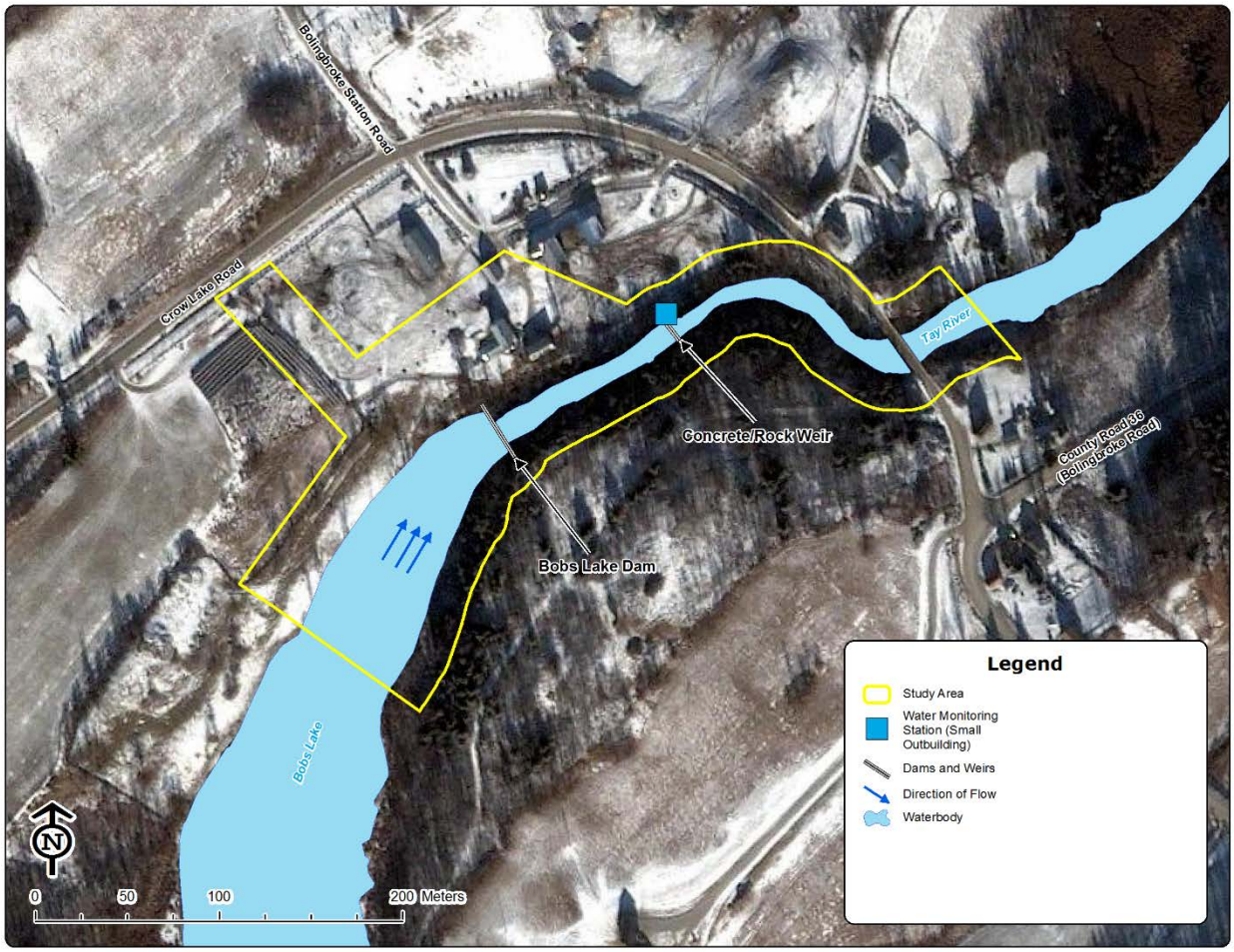

Figure 1 – Project Location

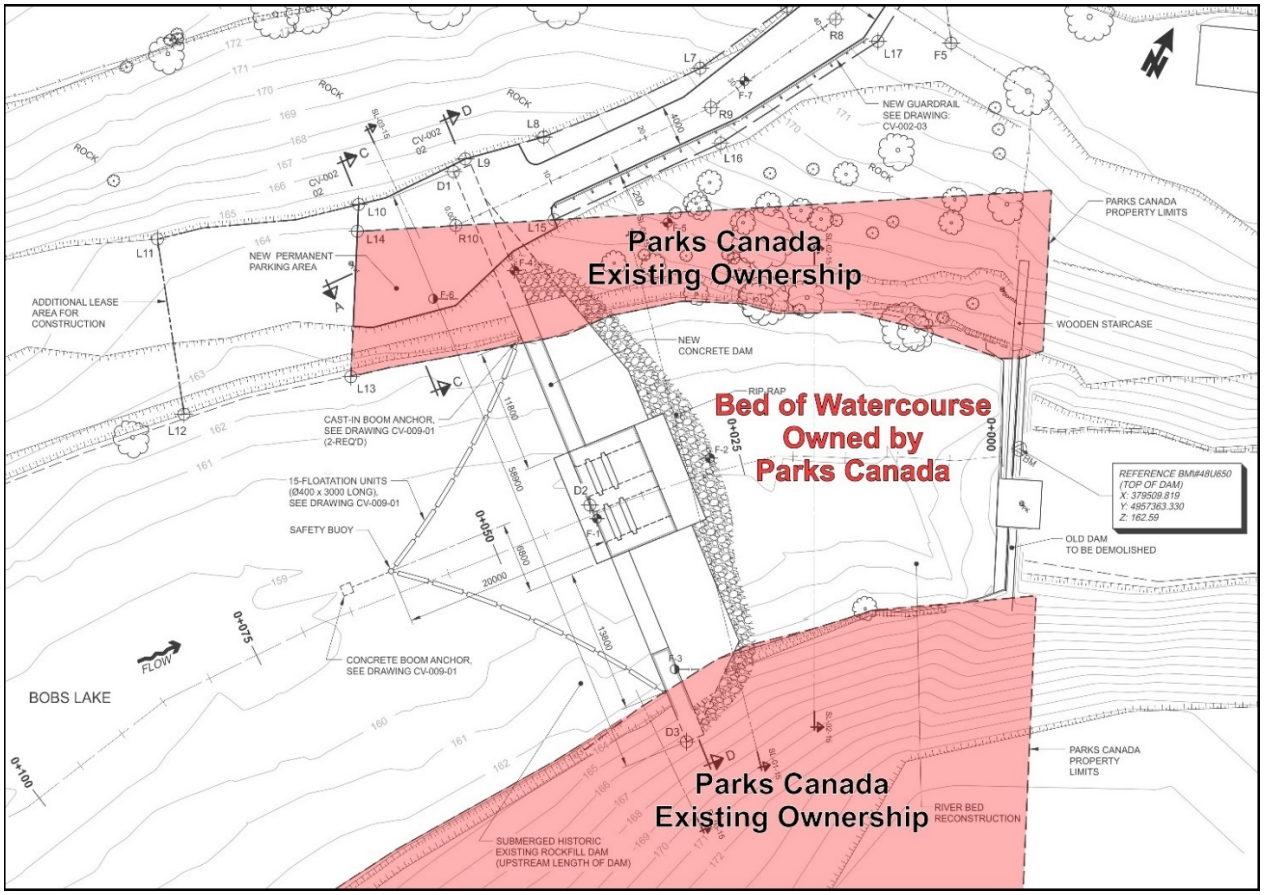

Figure 2: Existing Parks Canada Ownership (Source: Modified from CIMA, 2017)

Project Information

2.0 Project Information

2.1 PROJECT DESCRIPTION

The Bobs Lake Dam is located within the Village of Bolingbroke, approximately 15 km north of Westport, Ontario. The dam is located at the outlet of Bobs Lake, which serves as a reservoir lake for the Rideau Canal system. The DIA study area is shown in Figure 1.

The first dam at this location was constructed in 1820 to provide power to mills at Bolingbroke. The Government of Canada purchased the dam in 1870 and raised the height in 1871, flooding land along the Bobs Lake shoreline (Taylor, 2010). The dam has been located in at least two different locations at the outlet of Bobs Lake, as evidenced by the presence of underwater timber cribs approximately 50 m upstream of the current dam. It is proposed that the Bobs Lake dam be reconstructed in approximately the same location as where the old timber cribs can be found.

The existing dam consists of two overflow sections and a single stop-log controlled spillway with low height permanent flash boards installed on the concrete overflow/wing walls. The abutments consist of limestone and soft marble. The stop-log

sluice's primary purpose is to enable the release of stored water for use in the Rideau Canal System during the navigational period of the year. The Bobs Lake Dam's two free overflow walls are equipped with permanent flashboards to aid in maintaining summertime water levels on Bobs Lake while providing additional stored water (Genivar, 2013). Photos of the dam are included in Appendix A.

The Bobs Lake Dam has a history of problems. In 1966, the dam failed when a large section of the rock foundation washed out underneath the dam. Repairs were undertaken in 1967. Additional repairs were completed in 1987 to fix leaks and stabilize the structure. In 2013, a Dam Safety Review (DSR) completed by Genivar identified deficiencies related to operational and structural components, and concluded that the dam is in generally poor condition. Genivar recommended that a new dam should be built upstream of the existing dam. Parks Canada is proposing to undertake the replacement of the Bobs Lake Dam to address the recommendations in the 2013 DSR.

The selected concept for the replacement of the Bobs Lake Dam is a concrete gravity dam with a stop-log (double) sluice located approximately 45 m upstream of the existing dam (see construction drawings provided in Appendix E). This is a proven design that is durable, low maintenance and reliable. This location was chosen based on the quality of rock for the dam foundation, required easements and environmental constraints. Target operation levels for the new dam are the same as the existing dam operation levels.

Construction of a permanent access will be required for dam construction and operation once it is complete. The access road will connect from the private farm driveway north of the dam, generally following the existing access. A small parking and turnaround area is proposed at the end of the access. A construction staging area for the project will be sited at the end of the access road and proposed turnaround to allow for ease of access to the work area (Figure 3). These features are also illustrated on the construction drawings in Appendix E.

Construction of the new dam (and demolition of the existing) will require dewatering so that all work can be done in the dry. While the exact method of dewatering will be determined by the contractor, it is anticipated that the new dam will be isolated with double wall sheet pile cofferdams lined with a membrane filled with granular; turbidity curtains will also be installed. Overburden and weathered bedrock will be removed to prepare the foundation of the dam.

Sequencing of the demolition of the existing dam will be determined by the contractor. All demolition material will be managed in accordance with the projects Waste Management Plan. Prior to, and potentially in conjunction with the demolition of the existing dam, the riverbed in the area between the dams will require rehabilitation. The riverbed rehabilitation will consist of sediment removal, riparian restoration and channel construction that will incorporate natural channel design principals.

Work site rehabilitation will occur following completion of the project. Grading, planting and seeding will occur in accordance with the project Site Restoration Plan.

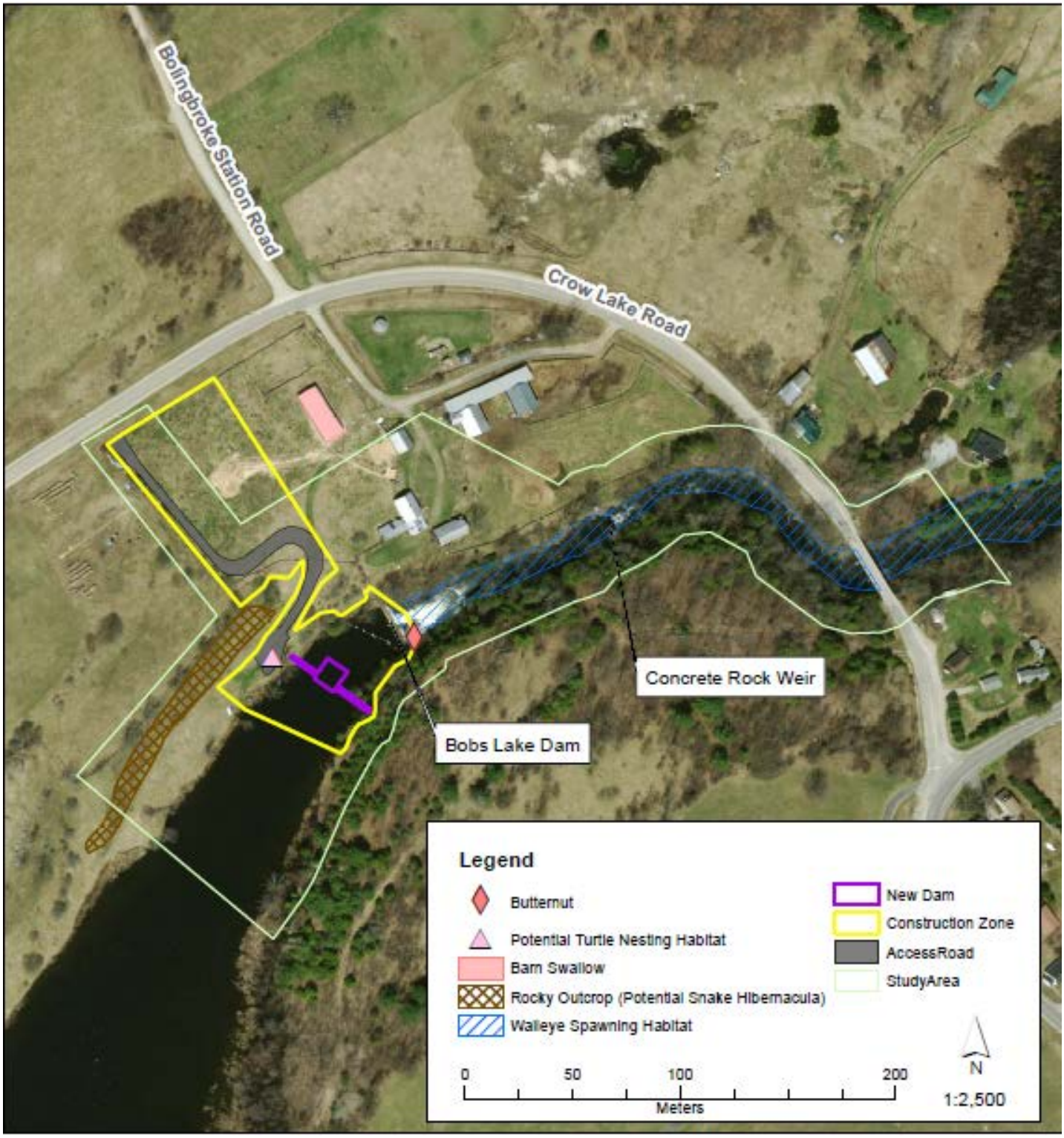

Figure 3: Anticipated Construction Zone

2.2 PROJECT PURPOSE

The purpose of the project is to undertake the reconstruction of the Bobs Lake Dam in order to address the issues identified in the 2013 DSR. In addition to water management, dam safety is part of Parks Canada's mandate and this project will support the achievement of these requirements. Implementation of this project will upgrade the overall asset condition rating from poor to good condition.

2.3 PROJECT AND ASSESSMENT SCOPE

Several construction activities will be required to complete the reconstruction of the dam. The components include minor vegetation clearing, access road construction, construction of staging areas, cofferdam installation, construction of a new dam, sediment removal, demolition of the existing dam, channel reconstruction, and site cleanup/restoration. Please note, as the water management of the reservoir (Bobs Lake) is not changing with the implementation of the new dam, an analysis of potential downstream impacts (i.e. flooding issue) was not completed as part of the scope of this DIA.

It is anticipated that the project will be completed in just over one year, beginning June 1st, 2018. In order to follow in-water work timing restriction the stream bed restoration, dam demolition, and coffer dam removal will commence in July of 2019).

2.4 PROJECT COMPONENTS

Table 1 describes the physical works, both core and ancillary, that will be required to complete the project. These are broken down by project phase including site preparation, construction, and demolition/restoration.

Table 1 – Project Component by Phase

PROJECT PHASE	CORE PROJECT COMPONENT	PHYSICAL WORKS AND ACTIVITIES
Site Preparation	Vegetation clearing	• Clearing and grubbing of vegetation to accommodate staging and storage area, new road, and dam work areas
	Construction staging	• Delineation of the construction site • Implement construction signage • Implement construction site fencing • Implementation of environmental mitigation measures as required (erosion and sediment control, wildlife exclusion fencing) • Preparation of staging and storage area including topsoil removal, granular and geotextile for a work area pad
Construction	Construct access road	• Stripping and excavation of topsoil to prepare for road base • Stockpiling topsoil at least 30 m away from the watercourse • Application of road base
	Install cofferdam(s) and dewater area	• Turbidity curtain(s) installed downstream of proposed dam location around in-water work • Implement dewatering and wastewater mitigation • Install cofferdam(s) • Dewater construction area according to Dewatering and Wastewater Management Plan
	Construction of the new dam	• Excavate, removal of all sediments, topsoil, and highly weathered bedrock to prepare the dam foundation • Clean, drill, and grout bedrock • Build concrete formwork • Pour concrete for dam structure • Place permanent rip rap at end of dam for scour protection • Construct 2nd phase of the coffer dam

PROJECT PHASE	CORE PROJECT COMPONENT	PHYSICAL WORKS AND ACTIVITIES
		• Complete dam construction •
	Construct temporary access platform and temporary culverts to maintain flow into the Tay River	• Construct temporary access platform on bed of watercourse to access existing dam structure. Material must be approved clean material free fines
Demolition / Restoration	Demolition of existing dam	• Removal of existing dam. Waste to be managed in accordance with the projects Waste Management Plan
	Riverbed and worksite rehabilitation	• Rehabilitation of lakebed between the two dams, including the construction of a channel and stabilization of sediment. • Remove cofferdam • Construction site grading and placement of topsoil • Landscape plantings and seeding in accordance with project Site Restoration Plan

Valued Components

3.0 Valued Components

3.1 GENERAL SITE DESCRIPTION

The Bobs Lake Dam Reconstruction study area is located at the downstream end of Bobs Lake, which is located near the top of the Tay River Watershed. The water flowing out of Bobs Lake (to the Tay River) is regulated by the Bobs Lake Dam prior to entering Christie Lake. The drainage area for the watershed is approximately 357 km^2 (Genivar, 2013).

The dam is located near Crow Lake Road and is owned by Parks Canada. There is no road access to the dam and the property is currently accessed through a private farm field. Parks Canada owns both shorelines in the study area and will be purchasing land to develop a permanent access road to the dam.

The dam is a concrete gravity structure founded on rock. The main elements of the dam include a cut-off wall, overflow sections (north and south) and a timber stop-log sluice. The overall width of the dam is 25 m and the height is 3.8 m.

3.2 SOCIAL ENVIRONMENT

3.2.1 HERITAGE, ARCHAEOLOGICAL RESOURCES AND INDIGENOUS INTERESTS

The history of Bobs Lake Dam dates to the early 1800s when a dam and sawmill were operated at the site, and remains of the original 1821 dam structure are still in place, located upstream of the existing dam. In 1870 the federal government purchased the site and has owned and operated the dam since that time. According to Parks Canada, the dam is not classified as a cultural resource of national or other significance; however, the landscape of the Rideau Canal system is considered a cultural resource of national significance and, as such, an assessment regarding the impacts of the project's cultural resources is being carried out by Parks Canada through a Cultural Resource Impact Assessment (CRIA). Although the dam is located within the Rideau Canal system, it is not part of the UNESCO World Heritage Site designation that the Canal (proper) receives.

As part of the project planning for the dam reconstruction, a Stage 1 and Stage 2 Archaeological Assessment was conducted for the portion of the shoreline that will be used as a right-of-way to allow construction access and staging. While Stage 2 test pitting did not identify archaeological resources, a visual inspection revealed a stone-filled crib from 1821. As such, a detailed "Non-Disturbance Underwater Archaeology Survey" was undertaken on December 2nd, 2016 to investigate the original 1821 dam structure and record/map the extents of the timber crib structure. The survey also included a visual inspection of the lakebed within the area of the proposed cofferdam to determine the potential for the presence or absence of further cultural resources.

The results of the underwater archaeological survey revealed a rock-filled timber crib structure constructed of rough logs fastened in place with wrought iron spikes and filled with course granite cobbles (Paterson Group Inc., 2017). Overall, the cribbing on the south shore measures 18.5 m long by 2.5 m wide. Due to the low water levels at the time of the investigation, there was a 4.5 m long section of the dam exposed on the south shore. On the north shore, the cribbing is submerged and extends approximately 2.0 m into the water and is 2.0 m wide (Paterson Group Inc., 2017). The remains of the 1821 dam are located within the area of dewatering as well as partially within the footprint of the new dam.

The visual inspection of the lake bed area to be affected by the proposed cofferdam yielded no evidence of any archaeological resources present.

An analysis of the dam's cultural value (as established by the Standards and Guidelines for Consultant Archaeologists (Ministry of Culture Tourism and Sport [2011]) indicates that the dam demonstrates several factors that elevates its cultural value, including advocating our understanding of local and regional cultural history. It demonstrates historical value; it shows rarity as the site is unique as an early intact timber crib dam; and the dam maintains integrity as it is well preserved and retains a large degree of original material (Paterson Group, 2017). Further, in relation to the Parks Canada Cultural Resource Management Policy, the dam represents a cultural resource of "Other Heritage Value" as it does not have a direct relationship with the reasons for the Rideau Canal National Historic Site designation, but its construction predates the canal while its use relates to the canal period (Paterson Group, 2017).

The First Nations people have a long history of occupation in the Rideau Lakes and Bobs Lake area. Artifacts collected from the Bobs Lake region have been documented in the report titled "An Analysis of Artifacts from the Bobs Lake Region: Jones Collection" (Fox, 1989). The project is located within the land claim area of the Algonquin's of Ontario. Consultation with the Algonquins of Ontario is ongoing and will continue through the duration of the project.

3.2.2 WORKER HEALTH AND SAFETY

A designated substance survey has not been completed for the site. Parks Canada indicated (through email correspondence) that the railings on the existing structure may be coated in lead-based paint. Lead is a known contaminant which has the potential to affect the health of construction workers. Full disclosure regarding the potential designated substance will be included in project specifications. It will be the contractor's responsibility to ensure worker health and safety.

Further, as described in Section 3.2.8, the site has a low potential for contaminants. As such, human health impacts due to the exposure of sediments at the dam is expected to be non-existent (low risk).

3.2.3 LAND USE AND POPULATION

The dam reconstruction study area is located within the Village of Bolingbroke, Ontario, within Tay Valley Township. Land use consists of agriculture (along with associated farm buildings) and forested areas (the forested area is limited to the south side of the study area). The surrounding landscape is forested with a mix of rural land uses including agriculture, farms, and cottages.

Bobs Lake, the Tay River, and Christie Lake are summer destinations for many vacationers, recreational users, and cottagers. Several seasonal businesses operate on Bobs Lake providing services to the public which include: cabin, cottage, and boat rentals; campgrounds and recreational vehicle accommodation; refueling; and convenience items sales. While

there are many year-round residents, the population of the Bolingbroke area increases during the summer months due to seasonal activity.

3.2.4 VISITOR EXPERIENCE

No visitor experience opportunities exist within the dam study area as this site is surrounded by private property and not open to the public.

3.2.5 NOISE

The study area is located within a rural setting adjacent to Bobs Lake and Crow Lake Road. Noise is intermittent and dependent on traffic flow and the use of motor boats on the lake. Noise sensitive land uses are limited to the single farm building on the north side of the dam. Traffic is likely the primary source of noise in the immediate vicinity of the project.

3.2.6 WASTE MANAGEMENT

Construction waste will be generated as part of this project. Parks Canada utilizes waste management policies outlined by Public Works and Government Services Canada (PWGSC) Sustainable Development Strategy as well as the key requirements for a waste management plan as outlined in Parks Canada Environmental Standards and Guidelines Document (Parks Canada, 2017). Construction waste must be dealt with in an environmentally responsible manner, through the reduction of waste generated and increasing waste diversion through reuse and recycling options. The Environmentally Responsible Construction and Renovation Handbook – Edition 2 (PWGSC, 2000) outlines best practices for the management of construction and demolition waste.

3.2.7 DESIGNATED SUBSTANCES

A designated substance survey has not been completed as part of this impact assessment. However, Parks Canada indicated (through email correspondence) that the railings on the existing structure may be coated in lead based paint which could impact the environment and the health of on-site construction workers. Further discussion regarding workers health and safety can be found in Section 3.2.8.

3.2.8 CONTAMINATION

It is expected that due to the undisturbed nature of the area (the vast majority is primarily forested), the risk for contamination at the site is low. A contaminated sediment risk potential assessment (Site Prioritization Tool for Sediment Assessments at Trent-Severn Waterway and Rideau Canal PCA Infrastructure Sites, May 2017) was completed based on numerous factors that include land use, proximity to potential contamination sources, types of known or suspected contaminants, methods of transport, worker exposure, and presence of fish habitat and sensitive aquatic habitat. The assessment ranked the Bobs Lake Dam with 22 of a possible 60 points, which would indicate that the potential for contaminated sediment and impact on the environment is low. In addition, there are no known point sources of contamination and the type of contamination potentially on site would likely be related to general chemistry contamination (i.e. road salts) (Parks Canada, no date). As such, human health impacts due to the exposure of sediments at the dam is expected to be non-existent (low risk). However, if contaminated soils or sediments are encountered during construction, appropriate measures will be taken to ensure that it is addressed in a way to reduce the ecological and human health risks.

3.3 BIOLOGICAL ENVIRONMENT

3.3.1 ECOZONE AND ECOREGION

The study area is located in the Ontario Shield Ecozone, and the Georgian Bay Ecoregion (Ecoregion 5E). This ecoregion is located on the southernmost section of the Precambrian Shield. Furthermore, the study area is located near the southern extent of the ecoregion, and can therefore be expected to contain a mixture of northern and southern biological elements.

Land cover in the Georgian Bay Ecoregion is dominated by forest, and there are numerous lakes, rivers, and wetlands scattered throughout the landscape (Crins *et al.,* 2009).

3.3.2 FISHERIES AND AQUATIC HABITAT

Benthic Invertebrates and Freshwater Mussels

Freshwater benthic invertebrates are organisms (most commonly insects) that live in or on the bottom substrates of rivers, streams, and lakes. As these organisms are largely sedentary, the benthic invertebrate community (i.e., species composition at a site) is strongly affected by its environment, including sediment composition and quality, water quality, and hydrological factors that influence the physical habitat. Because the benthic community is so dependent on its surroundings, it can serve as a biological indicator that reflects the overall condition of the aquatic environment.

As a part of the Ontario Benthic Biomonitoring Network (OBBN), the Rideau Valley Conservation Authority (RVCA) has been collecting benthic invertebrates at one Tay River location (at Crow Lake Road in Bolingbroke) since 2003. Actual data values were only provided for 2007–2014; graphical data was provided for 2005–2010 (RVCA, 2011). Replicate sampling was done in the spring and fall each year. There was no existing information on the benthic invertebrate community in Bobs Lake. Benthic invertebrate sampling was not undertaken as part of this study; therefore, the following information has been summarized from the available existing data for the one Tay River site. This Tay River site represents the downstream limit of the current study area and given the nature of the project (dam reconstruction) much of the ecological impact will likely be experienced downstream, therefore baseline data in this area is presented here.

Three biotic indices are presented in Table 2 for temporal comparison of the water quality at the Tay River site:

- Hilsenhoff Family Biotic Index (FBI): an indicator of organic and nutrient pollution which provides an estimate of water quality conditions using established pollution tolerance values for benthic invertebrates. Water quality is measured from Excellent (organic pollution unlikely) to Very Poor (severe organic pollution likely);
- Ephemeroptera, Plecoptera, Trichoptera Richness Index (% EPT): Ephemeroptera (Mayflies), Plecoptera (Stoneflies), and Trichoptera (Caddisflies) are all species that are considered to be very sensitive to poor water quality conditions, therefore their presence indicates a good water quality sites. Higher proportions of these organisms in a sample typically indicate increased stability of the site. Water quality is measured from Excellent (>80%) to Poor (<27%); and
- Family Richness (FR): indicates the health of the community through its diversity and is equal to the total number of benthic invertebrate families found in a sample. Increased richness indicates increased habitat diversity and water quality. Water quality is measured out of a total 25 from Good (>15) to Poor (<8).

Water quality in the Tay River, approximately 250 m downstream of the existing Bobs Lake Dam, was generally found to range between “Fair” and “Excellent” over the nine-year period. Each biotic index presented indicated a consistent measure of water quality over time. Seasonally, the trend observed showed that water quality tended to be better in the fall than in the spring of any given sampling year (as indicated by FBI and EPT).

Freshwater mussels are a type of benthic macroinvertebrate, of which there are over 40 native species in Ontario. These bivalves spend the majority of their lives burrowed into the streambed, which makes them more susceptible to perturbation and changes in water quality, particularly sedimentation.

There was no background information available regarding freshwater mussels either in Bobs Lake or in the Tay River surrounding the study area. A comprehensive survey for mussels was not completed as a part of this study. However, during Parsons' field investigations at the end of November, a collection of approximately 25 dead mussel shells were discovered in the littoral zone on the north bank, near the proposed new dam location. The shells were clean with nacre in excellent condition, suggesting recent death, however no mussel tissue was observed, and they all exhibited the same chipped beak damage. The mussels were all the same species, Eastern Elliptio (*Elliptio complanata*), which is a common mussel species which inhabits ponds, lakes, rivers and streams throughout the eastern Ontario region.

The north bank littoral zone of the Tay River downstream of the existing dam was also searched for evidence of mussels. One severely worn Eastern Elliptio valve was discovered amidst the rocks on the north bank approximately 110 m downstream of the dam.

Table 2 – Summary of Water Quality in Tay River using Benthic Invertebrates as Biological Indicators

TAY RIVER SITE SAMPLE YEAR	SEASON	WATER QUALITY FAMILY BIOTIC INDEX	% EPT	FAMILY RICHNESS
2014	Spring	Good (4.38)	Good (51.18)	Fair (10.7)
	Fall	Very Good (3.84)	Good (79.72)	Fair (12.7)
2013	Spring	Good (4.96)	Fair (31.51)	Fair (13.3)
	Fall	Excellent (3.69)	Excellent (87.24)	Fair (10.0)
2012	Spring	Very Good (4.00)	Good (65.81)	Fair (12.3)
	Fall	Good (4.81)	Fair (45.69)	Fair (14.0)
2011	Spring	Good (4.52)	Good (55.48)	Fair (13.7)
	Fall	Excellent (3.61)	Good (80.94)	Fair (12.7)
2010	Spring	Fair (5.05)	Good (58.09)	Fair (14.0)
	Fall	Very Good (3.93)	Good (74.32)	Fair (11.0)
2009	Spring	Good (4.63)	Fair (48.92)	Fair (10.7)
	Fall	Very Good (4.04)	Good (69.84)	Fair (14.6)
2008	Spring	*Sample size too small to analyze – invalid results*		
	Fall	Very Good (4.03)	Excellent (81.53)	Fair (13.6)
2007	Spring	Good (4.35)	Good (68.94)	Poor (7.0)
	Fall	Very Good (3.83)	Excellent (89.40)	Fair (11.3)
2006	Spring	Good	Good	Fair
	Fall	Good	Fair	Fair
2005	Spring	Good	Good	Fair
	Fall	Good	Good	Fair

Aquatic Habitat

There are two distinct types of aquatic habitat within the study area which are separated, and inherently formed, by the Bobs Lake Dam: lacustrine and riverine (Bobs Lake and Tay River, respectively).

Upstream of the dam, the retained water forms Bobs Lake. The lake supports a diverse aquatic community through a variety of habitats which include shallow, high-nutrient areas such as Mill and Mud Bay, Buck, Crow and Long Bays, to low-nutrient, deep areas such as Green Bay (Esseltine, 2003). Through the lakes diversity a wide variety of fish are present from baitfish species to large predatory fish. Fisheries is discussed in the following section.

Within the study area, the outlet bay of Bobs Lake narrows to meet the dam. This area of the lake is characteristic of impounded water; fine sediments have built up behind the dam, organic debris has settled and is decomposing, the water surface is flat and unbroken with little flow, and submerged and floating aquatic plants are established in the lakebed. The water level of Bobs Lake is regulated for the management of the Rideau Canal and seasonal water elevation fluctuations can vary as much as 1.5 m at the dam.

A Fish Habitat Assessment (CIMA, 2017) which examined the aquatic habitats surrounding the Bobs Lake Dam was completed in July of 2016. Per this technical report, upstream of the dam, substrate in Bobs Lake consisted of 40% sand, 30% pebbles and cobbles, 15% organic debris, 20% gravel, and some silt and boulders. This corresponds with the geotechnical investigations completed by GHD in November 2015, whereby the lake sediments were characterized at three borehole locations upstream of the dam (F1, F2, and F3 on Figure 3), and found 1–2 m of silty sand with cobble and boulders (GDH, 2015). Fish habitats examined in this section were characterized by: shelter (comprised primarily of boulders and aquatic vegetation), and food supply (fish and invertebrates). Aquatic vegetation noted upstream of the dam consisted of Water Milfoil (*Myriophyllum sp.*), Pondweed (*Potamogeton sp.*), American Eel-grass (*Vallisneria americana*), Narrow-leaved Bur-reed (*Sparganium angustifolium*), and Water Smartweed (*Persicaria amphibia*) (CIMA, 2017).

Downstream of Bobs Lake Dam, the discharge forms the Tay River. This watercourse freely flows for approximately 6.0 km before entering Christie Lake. Since there are no barriers between this "upper" segment of the Tay River and Christie Lake, it is presumed that fish species in the lake may openly migrate into the river, and vice versa. In August 2010, RVCA completed a macro stream survey in the Tay River from the Bolingbroke Road crossing to approximately 100 m downstream of the Bobs Lake Dam. Within the downstream study area, the reach between the dam and Crow Lake Road (approximately 250 m), the survey determined average wetted width of the river to be 11.6 m, with substrate consisting of boulder and cobble, with rare in-stream vegetation (algae). The water flowing out of the dam is turbulent, producing white water for several meters down the channel. The turbulence and high velocities carry down through the study area, which is homogenously characterized by white-capped riffles, and explains the lack of fine sediments.

The CIMA report (2017) assessed the fish habitat in the Tay River for 100 m immediately downstream of Bobs Lake Dam. In this section of the river, the substrate was found to consist of 45% cobbles, 30% boulders, 5% bedrock, 10% pebbles, and some gravel and sand. Fish habitats in this section were not only characterized by shelter (boulders) and food supply (fish and invertebrates), but also included; pools (approx. 10 m in length, 15% of the total morphology), flow threshold, and cascades. During the late November 2015 field investigation, Parsons' biologists noted only algae on the rocks downstream of the dam. By the following July (2016), CIMA noted the following aquatic vegetation in the same stretch of river: Water Milfoil (*Myriophyllum sp.*), Pondweed (*Potamogeton sp.*), American Eel-grass (*Vallisneria americana*), and Narrow-leaved Bur-reed (*Sparganium angustifolium*).

The segment of the Tay River from Bobs Lake to Christie Lake supports a resident Walleye (*Sander vitreus*) population as well as a migratory population from Christie Lake (Esseltine, 2003). Information provided by the Ministry of Natural Resources and Forestry (MNRF) confirms that Walleye are spawning directly below the dam, and in an area approximately 300 m downstream of the dam (approximately 50 m below the bridge at Crow Lake Road). Walleye spawning habitat in rivers consists of rocky areas in white water, often below a barrier (Scott & Crossman 1973). Given the boulder/cobble substrate and turbulent water throughout that stretch of the river (the approximately 300 m downstream of the dam), the entire length should be considered potential spawning habitat.

Access was limited along the southern banks of the lake and river due to the very steep slopes and hazards associated with crossing the dam. Water chemistry data was therefore taken at two locations from the north bank only during Parsons' field investigations in November 2015: one site in Bobs Lake approximately 45 m upstream of the dam (at the approximate new dam location), and one site in the Tay River approximately 100 m downstream of the dam (at the rock/concrete weir near the small monitoring station outbuilding). Water quality conditions recorded during Parsons' field investigations are typical of conditions surrounding an obstruction in a watercourse (Table 3). The gradient change and constriction caused by the dam creates turbulent white water being released into the river channel. The dam slows the flow upstream and pools the water into a reservoir/lake. Given this scenario, as expected, the dissolved oxygen content was higher and the temperature and conductivity were lower downstream of the dam, as opposed to within Bobs Lake. Additional baseline water quality data, including turbidity measurements, will be collected prior to construction to inform environmental management plan monitoring.

Table 3 – Water Quality Conditions on November 30th, 2015

PARAMETER	BOBS LAKE SITE	TAY RIVER SITE
Temperature (°C)	5.70	5.10
pH	8.37	8.19
Dissolved oxygen (mg/L)	10.4	12.5
Conductivity (µS/cm)	89.0	86.1

Fisheries

Fish recorded in Bobs Lake represent a diverse community ranging from warm water species like Pumpkinseed (*Lepomis gibbosus*) and Bluegill (*Lepomis macrochirus*) to cold water species like Lake Trout (*Salvelinus namaycush)*, Burbot (*Lota lota*), and Cisco (*Coregonus artedii*). Christie Lake (Tay River) also supports a relatively diverse fish community, similar to those found in Bobs Lake. Table 4 lists the fish species recorded in Bobs Lake and Christie Lake (Tay River).

Specific fish species of interest for this project include species of conservation concern and those valued for recreational fishing. The American Eel (*Anguilla rostrata*), a provincially Endangered species and classified as a Threatened species by COSEWIC (2012a), but has not yet been listed under SARA. This species has been recorded in the Tay River/Christie Lake system, and historically in Bobs Lake (MNRF, 2015). Further discussion regarding this species has been provided in Section 3.3.6. A healthy sport fishery exists within Bobs Lake. Commonly fished species include: Black Crappie (*Pomoxis nigromaculatus*), Lake Trout, Lake Whitefish (*Coregonus clupeiformis*), Largemouth Bass (*Micropterus salmoides*), Smallmouth Bass (*Micropterus dolomieu*), Northern Pike (*Esox lucius*), Walleye, and Yellow Perch (*Perca flavescens*). While some of these species tend to inhabit the deeper, colder waters (e.g., Green Bay located at the south end of the lake), many of these species prefer warm waters of lakes with abundant vegetation. This habitat is characteristic of many of the shallower bays of Bobs Lake, including the outlet bay within the study area.

Table 4 – Fish Species Recorded in Bobs Lake and Christie Lake

FISH SPECIES	SCIENTIFIC NAMES	BOBS LAKE	TAY RIVER (CHRISTIE LAKE)
American Eel	*Anguilla rostrata*	X	X
Banded Killifish	*Fundulus diaphanus*	X	X
Black Crappie	*Pomoxis nigromaculatus*	X	X
Blacknose Dace	*Rhinichthys atratulus*		[1]
Blacknose Shiner	*Notropis heterolepis*		X
Bluegill	*Lepomis macrochirus*	X	X
Bluntnose Minnow	*Pimephales notatus*	X	X
Brook Stickleback	*Culaea inconstans*		X
Brown Bullhead	*Ameiurus nebulosus*	X	X
Burbot	*Lota*	X	X
Central Mudminnow	*Umbra limi*		X
Cisco	*Coregonus artedi*	X	X
Common Shiner	*Luxilus cornutus*	X	X
Creek Chub	*Semotilus atromaculatus*		X
Fallfish	*Semotilus corporalis*		X
Golden Shiner	*Notemigonus crysoleucas*	X	X
Greater Redhorse	*Moxostoma valenciennesi*		X
Johnny Darter	*Etheostoma nigrum*		X
Lake Trout	*Salvelinus namaycush*	X	X
Lake Whitefish	*Coregonus clupeiformis*	X	X
Largemouth Bass	*Micropterus salmoides*	[1]X	X
Logperch	*Percina caprodes*	X	X
Muskellunge	*Esox masquinongy*		X

FISH SPECIES	SCIENTIFIC NAMES	BOBS LAKE	TAY RIVER (CHRISTIE LAKE)
Northern Pike	*Esox lucius*	X	X
Northern Redbelly Dace	*Chrosomus eos*	X	
Pumpkinseed	*Lepomis gibbosus*	[1]X	X
Rock Bass	*Ambloplites rupestris*	X	X
Shorthead Redhorse	*Moxostoma macrolepidotum*		X
Smallmouth Bass	*Micropterus dolomieu*	X	[1]X
Spotfin Shiner	*Cyprinella spiloptera*		X
Spottail Shiner	*Notropis hudsonius*	X	X
Walleye	*Sander vitreus*	X	X
White Sucker	*Catostomus commersonii*	X	X
Yellow Bullhead	*Ameiurus natalis*	X	X
Yellow Perch	*Perca flavescens*	X	X

Sources: Kemptville MNRF (Bobs Lake records) and Peterborough MNRF (Tay River/Christie Lake records), [1] Indicates species that were observed during fish habitat assessments by CIMA in July 2016.

As previously noted, Walleye are using the area directly below the Bobs Lake Dam to complete some of the most sensitive life stages for fish (spawning to early development). Walleye, which tend to use the same spawning ground from one year to the next, are broadcast spawners, meaning the female releases adhesive eggs into the water, which are immediately fertilized by the males then fall onto and between the rock substrate. The eggs hatch between 12 and 18 days later, and the fry leave spawning area approximately 10 and 15 days after hatching (CIMA, 2017).

3.3.3 TERRESTRIAL VEGETATION

Parsons' field investigations for this assignment were completed at the end of November, which greatly limits the flora species that could be identified on the site. Species were identified based on old stems, seed heads, and other evidence where possible, and the vegetation communities on the site were characterized to the extent possible. However, full classification according to the Ecological Land Classification system (Lee *et al.,* 1998) was not completed due to the limited information available and limited access to the south shore of the lake.

The property north of the dam is an active cattle farm with fenced pastures and storage buildings present. Natural vegetation in these areas is very limited. The lakeshore/riverbank corridor on the north side of the lake, west of the dam and outside of the pasture fencing, is more naturalized although still shows evidence of frequent human traffic and disturbance and would best be described as an Old Field Cultural Meadow (CUM1-1). Vegetation in this area consists of common, weedy species and early successional plants such as Common Burdock (*Arctium minus*), goldenrods (*Solidago* sp.), Wild Red Raspberry (*Rubus sachalinensis*), and various grasses including mainly Reed Canary Grass (*Phalaris arundiancea*) closest to the water. There are few scattered shrubs and willow trees present in this area.

Immediately around the dam and further downstream, the northern lake shore and river corridor is more or less contiguous with the forest habitat found on the south riverbank/lake shore. South of the dam, the lake shore/riverbank is steeply sloped up from the water's edge and is vegetated with forest habitat. Access to this area was limited due to the terrain and the hazards associated with crossing the dam, so observations were made via binoculars from the north shore. Tree species observed in this area include mainly Eastern White Cedar (*Thuja occidentalis*) and ash (*Fraxinus* sp.), with some maple (*Acer* sp.), White Pine (*Pinus strobus*), White Birch (*Betula papyrifera*), and Yellow Birch (*Betula alleghaniensis*). Ground cover on the slopes was very sparse. The community most closely resembles a Fresh-Moist White Cedar – Hardwood Mixed Forest ecosite (FOM7), possibly shading upslope to a Dry-Fresh White Cedar Mixed Forest ecosite (FOM4) towards the crest of the hill.

The MNRF's Natural Heritage Information Center (NHIC) database of rare species occurrence records did not have any past records of rare plant species in the study area. However, two Butternut (*Juglans cinerea*) trees were observed growing very near to the dam on the south side. Butternut is an Endangered species and will be discussed further in Section 3.3.6.

Figure 4 illustrates the environmental features recorded on site.

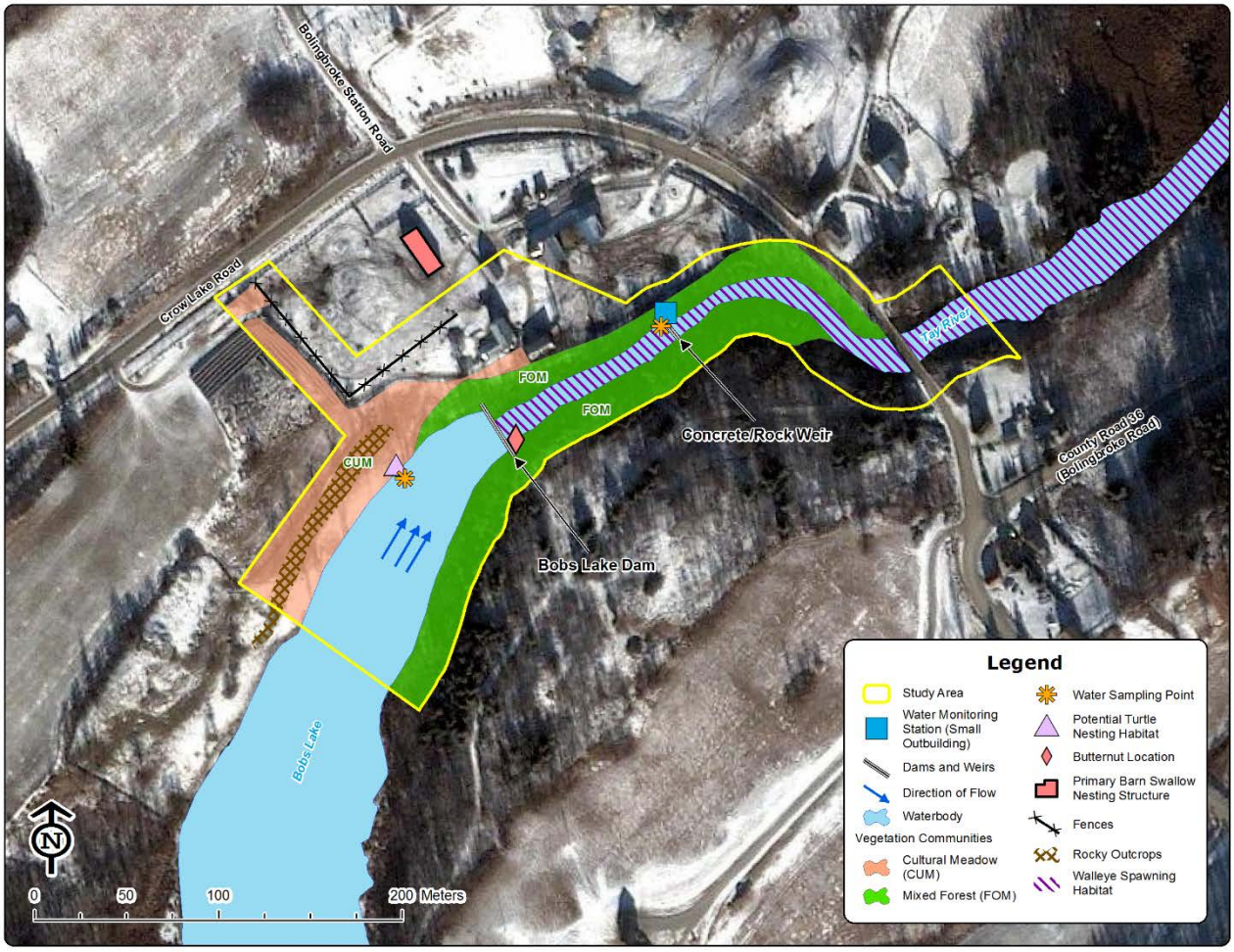

Figure 4 – Environmental Features

A review of online Early Detection and Distribution (EDD) Mapping for invasive species indicated that Dog-strangling Vine (*Vincetoxicum* sp.) is a plant species of concern for the study area. Although this species was not directly observed on the site, the study area was noted to contain many non-native plants (e.g., pasture grasses) that are likely dominant in the seed bank and could interfere with the establishment of native species during post-construction restoration activities.

3.3.4 TERRESTRIAL WILDLIFE

Migratory Birds and Breeding Birds

Parsons' field investigations of the study area were completed outside of the window required for breeding bird surveys in Ontario, and thus the only possible direct observations of birds using the site are those of late migrants and over-winter residents. Parsons' biologists observed Blue Jay (*Cyanocitta cristata*), Black-capped Chickadee (*Poecile atricapillus*), and Belted Kingfisher (*Megaceryle alcyon*) in the vicinity of the dam during their November 2015 site visit.

Additional bird observation records for the vicinity of the study area were obtained via NatureCounts (a website managed by Bird Studies Canada to organize and distribute data from eBird, the Ontario Breeding Bird Atlas [OBBA], and other survey programs), from CIMA's 2017 report, and via discussion with Parks Canada staff who are familiar with the site. A species list compiled from these three sources, using available data within a roughly 2 km radius of the study area, is provided in

Table 5 and expanded upon in Appendix C. The OBBA was also referenced to comment on SAR and other noteworthy species that have been documented as breeding within the larger 10 x 10 km atlas square.

A large number of Barn Swallows (*Hirundo rustica*) was reported by Parks Canada staff to be nesting in one of the farm buildings north of the dam. No Barn Swallow nests were observed on the dam itself. Barn Swallow is a Threatened species and will be discussed further in Section 3.3.6, along with other SAR birds that were associated with the site during the background data review.

Table 5 – Migratory and Breeding Bird Observations Reported within a 2 km Radius of the Study Area

BIRD SPECIES	
• Canada Goose (*Branta canadensis*)	• Barn Swallow (*Hirundo rustica*)
• Mallard (*Anas platyrhynchos*)	• Black-capped Chickadee (*Poecile atricapillus)*
• Ruffed Grouse (*Bonasa umbellus*)	• White-breasted Nuthatch (*Sitta carolinensis)*
• Common Loon (*Gavia immer)*	• House Wren (Troglodytes aedon)
• Great Blue Heron (*Ardea herodias)*	• Eastern Bluebird (*Sialia sialis)*
• Turkey Vulture (*Cathartes aura)*	• Veery (*Catharus fuscescens*)
• Osprey (*Pandion haliaetus*)	• Wood Thrush (*Hylocichla mustelina*)
• Bald Eagle (*Haliaeetus leucocephalus*)	• American Robin (*Turdus migratorius*)
• Red-shouldered Hawk (*Buteo lineatus)*	• Gray Catbird (*Dumetella carolinensis*)
• Broad-winged Hawk (*Buteo platypterus)*	• European Starling (*Sturnus vulgaris)*
• Red-tailed Hawk (*Buteo jamaicensis*)	• Cedar Waxwing (Bombycilla cedrorum)
• Sandhill Crane (*Grus canadensis)*	• Ovenbird (Seiurus aurocapilla)
• Killdeer (*Charadrius vociferous*)	• Golden-winged Warbler (*Vermivora chrysoptera*)
• Mourning Dove (*Zenaida macroura*)	• Black-and-white Warbler (*Mniotilta varia)*
• Barred Owl *(Strix varia)*	• Common Yellowthroat (*Geothlypis trichas)*
• Ruby-throated Hummingbird (*Archilochus colubris)*	• American Redstart (*Setophaga ruticilla*)
• Belted Kingfisher (*Megaceryle alcyon)*	• Cerulean Warbler (*Setophaga cerulea*)
• Yellow-bellied Sapsucker (*Sphyrapicus varius*)	• Yellow Warbler (*Setophaga petechial*)
• Hairy Woodpecker (*Picoides villosus*)	• Chestnut-sided Warbler (*Setophaga pensylvanica*)
• Northern Flicker (*Colaptes auratus)*	• Pine Warbler (*Setophaga pinus*)
• Eastern Wood-pewee (*Contopus virens)*	• Black-throated Green Warbler (*Setophaga virens)*
• Pileated Woodpecker (*Dryocopus pileatus*)	• Canada Warbler (*Cardellina canadensis*)
• Eastern Phoebe (*Sayornis phoebe)*	• Chipping Sparrow (*Spizella passerina*)
• Great Crested Flycatcher (*Myiarchus crinitus)*	• Field Sparrow (*Spizella pusilla*)
• Eastern Kingbird (*Tyrannus tyrannus)*	• Savannah Sparrow (*Passerculus sandwichensis*)
• Warbling Vireo (*Vireo gilvus)*	• Song Sparrow (*Melospiza melodia*)
• Red-eyed Vireo (*Vireo olivaceus)*	• Swamp Sparrow (*Melospiza georgiana*)
• Blue Jay (*Cyanocitta cristata*)	• Rose-breasted Grosbeak (*Pheucticus ludovicianus*)
• American Crow (*Corvus brachyrhynchos*)	• Indigo Bunting (*Passerina cyanea*)
• Tree Swallow (*Tachycineta bicolor*)	• Bobolink (*Dolichonyx oryzivorus*)
• Northern Rough-winged Swallow (*Stelgidopteryx serripennis)*	• Red-winged Blackbird (*Agelaius phoeniceus)*
• Cliff Swallow (*Petrochelidon pyrrhonota)*	• Eastern Meadowlark (*Sturnella magna)*
• American Goldfinch (*Spinus tristis)*	• Common Grackle (*Quiscalus quiscula*)
• Purple Finch (*Haemorhous purpureus*)	• Brown-headed Cowbird (*Molothrus ater)*

Other Terrestrial Wildlife

Parsons' biologists observed a Muskrat (*Ondatra zibethicus*) swimming in the lake a short distance upstream of the dam in November 2015, although there were no visible den sites along the banks near the dam. No other non-avian terrestrial wildlife was observed during that site visit.

Local residents have reported the presence of White-tailed Deer (*Odocoileus virginianus*), Red Squirrel (*Tamiasciurus hudsonicus*), and Northern Map Turtle (*Graptemys geographica*) in the area (BCLA, 2015). The lake likely provides habitat for other turtle species as well; the Ontario Reptile and Amphibian Atlas noted many species of herpetofauna (i.e., reptiles and amphibians) in the area at large with recent (post-1995) observation records present, and the CIMA Fish Habitat Assessment (2017) reported the carcass of an Eastern Musk Turtle (*Sternotherus odoratus*) in the study area (see Section

3.3.6 for further discussion). Other wildlife common to rural Eastern Ontario, such as Raccoon (*Procyon lotor*), Striped Skunk (*Mephitis mephitis*), Eastern Garter Snake (*Thamnophis sirtalis*), and Meadow Vole (*Microtus pennsylvanicus*) can also be reasonably expected to occur in the study area.

A complete list of non-avian wildlife species compiled for the study area is provided in Appendix D. SAR have been discussed separately in Section 3.3.6, below.

3.3.5 SIGNIFICANT WILDLIFE HABITAT

Significant Wildlife Habitat (SWH), as defined in the Significant Wildlife Habitat Criteria Schedules for Ecoregion 5E (MNRF, 2015), includes seasonal concentration areas (e.g., migration stopovers), rare vegetation communities, specialized habitats (e.g., nesting and denning sites), movement corridors, and habitats for species of conservation concern. The indicated habitats are considered to strongly support the life processes of the target or indicator wildlife species and may be the limiting factor(s) for those species' success, and are therefore conferred a certain significance on the provincial scale. Since the SWH criteria schedules are a provincial creation, any protections that would be accorded to the noted wildlife habitats provincially do not necessarily apply to federal lands. However, the categories outlined in the criteria schedules have been used below as a useful means of organizing the information and discussing wildlife habitat on the site.

Waterfowl Stopover and Staging Areas

Flooded fields in the spring can provide important migratory waterfowl habitat, as can watercourses and water bodies. The open fields in the study area are actively used for cattle pasturing, which would discourage use by birds even if flooding occurred in the spring (which is considered unlikely due to the general slope of the land towards the lake which would encourage drainage). The open water habitat on the lake, however, likely provides stopover habitat during the spring and fall migrations, as would the many other lakes in the area at large. Given the very small area affected by this project, and the abundance of open water habitat in the vicinity of the project site, waterfowl stopover and staging habitat is not considered to be a significant factor in this assignment.

Shorebird Migratory Stopover Areas

Shorelines, particularly those with beaches or mud flats, provide important foraging habitat for migrating shorebirds. Bird observation data from the study area is lacking during the migration period; however, the site does not have extensive mud flats or open beaches. While it is not impossible that some shorebirds could be present during migration, it is thought unlikely that the site provides significant habitat for these species.

Raptor Wintering Areas

Significant wintering areas consist of a combination of field and forest habitats that provide roosting, foraging, and resting habitat for raptors over the winter. Key characteristics of good wintering habitat are low levels of disturbance, large field size, and limited snow accumulation due to wind scour. The study area provides only a small area of less disturbed habitat along the shoreline of the lake, intermixed with high-disturbance pasture fields. While it is possible that some raptors will be found in the area, raptor wintering habitat is thought unlikely to be a significant factor in this assessment.

Bat Hibernacula and Maternity Colonies

There are three federally-listed bat species which could occur in the study area (see Section 3.3.6). The study area lacks any caves or mine shafts which are required for hibernation and which would be regulated as critical bat habitat. Maternity colonies can occur in buildings, or in forests with large-diameter dead or dying trees (called "snags") or with a large number of oak trees, preferably with dead or dying branch tips (habitat usage varies depending on the species of bat). Bats may find maternity habitat in the farm buildings north of the dam, and also in the forested areas of the site if a sufficient number of large snag (dead) trees are present there.

Turtle Wintering Areas

Over-wintering turtles generally require areas with water that is deep enough to not freeze solid and soft mud substrates in which turtles can bury themselves. This sort of habitat could be present in the study area due to the accumulation of fine sediment that typically occurs upstream of dams, and also elsewhere in Bobs Lake (particularly in marshy inlets or coves). The utility of this type of habitat in the study area is limited by the normal operations of the dam, which can cause sudden, significant changes in water and sediment depth. It is likely that turtles would seek out other portions of the lake which provide more stable and undisturbed conditions as overwintering sites.

Reptile Hibernacula

Snakes typically hibernate in old animal burrows, rock crevices, etc., which allows them to get below the frost line, and many animals of different species will hibernate communally in these spaces. There is a large rocky outcrop present on the north side of the dam near to the proposed staging/access area, and additional outcrops on the slopes near the existing dam, all of which could potentially be associated with at least one snake hibernaculum.

Colonial Bird Nesting Sites

Colonially nesting birds include species such as Great Blue Heron which uses dead standing trees in wetlands, Cliff Swallows which congregate mostly on buildings, and various gulls which nest on the ground on rocky islands or peninsulas. The only colonial species that is associated with the study area is Barn Swallow which was reported to have a nest colony inside one of the farm buildings on the property north of the dam. While man-made structures do not qualify as SWH, Barn Swallow is a SAR and will be discussed further in Section 3.3.6.

Deer Wintering Yards

MNRF did not identify any deer wintering yards associated with the study area.

Rare Vegetation Communities

The study area was not observed to contain any rare vegetation communities. Although field investigations were completed in November, outside of the preferred survey period for plants, the study area is highly disturbed, and rare plant communities are typically associated with undisturbed landscapes.

Waterfowl Nesting Areas

Significant waterfowl nesting areas are typically associated with upland habitats adjacent to wetlands. The study area does not include wetlands, so significant waterfowl nesting habitat is not a concern for this study.

Bald Eagle and Osprey Habitat

Nesting, foraging, and perching habitats for Bald Eagle and Osprey are typically found in forests directly adjacent to water features. Both Bald Eagle and Osprey have been documented in the area via photographs published by local residents (BCLA, 2015). These photos included one of a Bald Eagle nest with juvenile birds present, which indicates that they are nesting locally. However, no nests were observed in the area around the dam. There is abundant open water habitat in the area for these species to hunt in, so the disturbance of the relatively small area around the dam is unlikely to be a major concern in that regard.

Woodland Raptor Nesting Habitat

Forest habitat around the study area is mostly limited to the south lake shore/riverbank which will not be significantly altered or disturbed by the proposed work, although a narrow strip of forest is also present around the dam and further downstream on the riverbank. No stick nests were observed in any of these areas of forest.

Turtle and Lizard Nesting Areas

Depending on species, ideal turtle nesting sites may consist of loose sandy or gravelly soil away from disturbance in an open, sunny area. During field investigations, the lakeshore area within the study area was observed to contain patches of loose, gravelly soil on a south-facing slope, although this was mostly due to recent disturbance by workers completing geotechnical investigations (see Appendix A, Photo 1). Eastern Musk Turtle, in comparison to other species, will nest in debris or under stumps or fallen logs at water's edge. Suitable nesting habitat could occur along the shoreline for this species also.

Ontario's only native lizard, the Five-lined Skink, nests under logs and inside stumps in forests. Forest habitat around the study area is mostly limited to the south lake shore/riverbank which will not be significantly altered or disturbed by the proposed work, although a narrow strip of forest is found on the north shore near the dam.

Denning Sites for Mink, Otter, Marten, Fisher, and Eastern Wolf

This type of significant habitat is indicated to occur in forest communities, which are largely absent in the parts of the study area which will be subject to construction. Further, the indicated species are noted to prefer undisturbed forested shorelines, areas with abundant downed woody debris, old beaver lodges, and/or large tracts of forest with mature or old-growth tree classes. The study area does not have these characteristics. While it is possible that the indicated species occur in the study area, their significant habitat is not likely to be a factor in this assignment.

Amphibian Breeding Habitat

Significant amphibian breeding habitat includes both wetlands and the associated upland forest habitat for certain species that use uplands outside of the breeding season. There were no wetlands or isolated ponds observed in the study area north of the river/lake. The lake and river themselves likely provide some breeding habitat for non-woodland species such as Green Frog, particularly where vegetation is present in the channel and/or along the shore, but in the vicinity of the dam there is no wetland area that could constitute SWH.

Mast Producing Areas

Mast plants are those that produce nuts and berries, and therefore provide valuable wildlife food sources. Some of the most important of these are oaks and beech trees, especially in mature forests. Few mast plants were identified in the study area; one large Red Oak (*Quercus rubra*) was noted well outside of the proposed development area to the west of the pasture. The largest source of mast in the area is the raspberry plants scattered along fencelines and field edges throughout the area.

Marsh Bird Breeding Habitat

No marsh habitat is present immediately around the existing dam or new proposed dam location. The nearest mapped wetland is a small (approx. 5 ha) area of unevaluated wetland on the lake shore approximately 300 m upstream of the existing dam (NHIC, 2015).

Open Country Bird Breeding Habitat

Open country bird species Savannah Sparrow, Bobolink, and Eastern Meadowlark have all been documented in the area at large during the breeding season, although they were not documented within the dam replacement study area. While it is possible that these species will nest in pastures, the presence of livestock would put any such nests at risk of trampling or other disturbance, and it is thought unlikely that this would be a preferred nest site. Further, active pastures are not considered candidates for SWH, and the remaining area of habitat is not large enough to be considered significant open country habitat (candidate significant habitat typically requires a contiguous tract 30 ha or larger [MNRF, 2015]).

Shrub/Early Successional Bird Breeding Habitat

Indicator species for shrub/early successional habitat include Golden-winged Warbler and Field Sparrow. Golden-winged Warbler was confirmed breeding in the 10 x 10 km square that includes the site by the most recently published (2001-2005) Breeding Bird Atlas of Ontario (OBBA), and Field Sparrow was documented near the site by eBird observation records. Significant early successional habitat typically requires large fields (>30 ha) succeeding to shrub thicket, although any habitat containing breeding Golden-winged Warblers is automatically considered significant regardless of size. Potential habitat includes the shrubby lakeshore and associated open lands upstream of the existing dam. Habitat for Golden-winged Warbler will be discussed further in Section 3.3.6.

Special Concern and Rare Wildlife Species

This category of SWH includes all occurrences classed as Special Concern and provincially rare species (i.e., those given a subnational rank of S1-S3 for the province). Special Concern species are discussed in Section 3.3.6, below. No additional S1-S3 species records came up in the background review and none were observed in the field although the timing of field investigations did limit the observable species.

Animal Movement Corridors

Significant movement corridors for wildlife typically link two or more of the significant habitat features discussed above; for example, connections between aquatic and upland amphibian habitat, around mink denning sites, or within deer wintering areas. While the dam study area is potentially associated with some SWH features, the area's potential for animal movement between and around these features is limited by the prior disturbance of the site and the existing farm property to the north.

3.3.6 SPECIES AT RISK

Species at Risk (SAR) are species that have been designated Extirpated, Endangered, Threatened, or of Special Concern in Ontario and/or Canada. In Ontario, SAR are offered protection under the *Endangered Species Act* (ESA) (2007) which applies to private and provincial lands. Federally, SAR receive protection under the SARA (2002), and this is the legislation which will apply to federal lands such as the study area.

While listed as SAR, Special Concern species are not offered the same level of legal protection as the other SAR categories. However, they may be protected under other Acts, such as the *Fisheries Act* (FA, 1985) and the *Migratory Bird Convention Act* (MBCA, 1994) which provide protection for listed aquatic and migratory bird species, respectively. These apply everywhere in Canada, not just on federal lands.

As this report applies to a federal project, the main focus of this assessment is on federally-listed SAR which could have permitting implications for the proposed work and legal obligations associated with the proposed work will be determined solely by the SARA. However, provincial Species at Risk or those not yet listed under Schedule 1 or SARA have been identified.

Table 6 provides a full list of SAR that have been associated with the study area or the surrounding lands, compiled from the NHIC online database, direct MNRF consultation, DFO SAR mapping, and discussion with Parks Canada staff. The Ontario Reptile and Amphibian Atlas (ORAA) was also consulted regarding occurrences in the vicinity; this resource uses the same 10 x 10 km grid as the OBBA and therefore shares its limitation regarding precision of location for observations. Table 6 also discusses the likelihood of these species occurring within the dam study area and/or being affected by the project.

Table 6 – Species at Risk Review and Assessment

SPECIES	STATUS	HABITAT PREFERENCES	DISCUSSION	REGULATORY IMPLICATIONS
Plants				
Butternut *Juglans cinerea*	SARA - END ESA - END COSEWIC - END	Typically found at forest edges, in clearings, and other open, sunny locations; intolerant of shade (COSEWIC, 2003). The main threat to this species is the canker disease which was observed to affect the two observed specimens onsite. Regulated critical habitat for this species has not been defined (Environment Canada, 2010).	Two Butternut trees were observed just downstream of the existing dam, near the water's edge at the southeast corner, within the mixed forest vegetation unit. Both tree stems were heavily affected by Butternut canker, and one had visibly peeling bark near the top and broken crown branches. Later inspection by MNRF (per correspondence to Parks Canada dated Oct. 13, 2017) confirmed that these two trees are Category 1 ("non-retainable" as a result of advanced stage of disease). However, they also noted at least one Butternut sapling growing in close proximity to the mature trees.	Confirmed presence – **Y** Critical habitat - **N** Removal of or damage to Butternut trees would require a SARA permit. However, per the current design, the trees at the noted location can be retained.
Birds				
Barn Swallow *Hirundo rustica*	SARA - THR ESA - THR COSEWIC - THR	Farmlands or rural areas; cliffs, caves, rock niches; buildings or other man-made structures for nesting; open country near body of water (MNRF, 2000). Provincially, critical habitat for this species includes the area up to 200 m from a nest (MNRF, undated); federally regulated critical habitat for Barn Swallow has not been defined.	Confirmed to occur in farm building on property adjacent to dam by Parks Canada staff. No nests were observed on the dam itself.	Confirmed presence – **Y** Critical habitat - **N** Protection of migratory birds and their nests is required as per the MBCA. However, per the current design, there will be no direct impacts to nesting habitat.
Bobolink *Dolichonyx oryzivorus*	SARA - THR ESA - THR COSEWIC - THR	Large, open expansive grasslands with dense ground cover; hayfields, meadows or fallow fields; marshes; requires tracts of grassland >50 ha (MNRF, 2000). Federally regulated habitat for Bobolink has not been defined.	It is not anticipated that the active pasture or small areas of old field meadow along the lakeshore will provide ideal nest sites for this species. However, the possibility exists that these areas could act as part of a larger territory and that foraging birds could be found in the proposed work area.	Confirmed presence – **N** Critical habitat - **N** Protection of migratory birds and their nests is required as per the MBCA.
Canada Warbler *Cardellina canadensis*	SARA - THR ESA - SC COSEWIC - THR	An interior forest species; dense, mixed coniferous, deciduous forests with closed canopy, wet bottomlands of cedar or alder; shrubby undergrowth in cool moist mature woodlands; riparian habitat; usually requires at least 30 ha (MNRF, 2000). Federally regulated habitat for Canada Warbler has not been defined (Environment Canada, 2016c).	Forest interior habitat is typically defined as forest areas 100 m or more from any edge. This type of habitat is not present in the study area.	Confirmed presence – **N** Critical habitat - **N** Protection of migratory birds and their nests is required as per the MBCA.
Cerulean Warbler *Setophaga cerulea*	SARA - SC ESA - THR COSEWIC - END	Mature deciduous woodland of Great Lakes-St. Lawrence and Carolinian forests, sometimes coniferous; swamps or bottomlands with	While the surrounding landscape may contain large areas of forest, the area immediately around the dam is fragmented by agricultural properties and does not provide ideal habitat for this species.	Confirmed presence – **N** Critical habitat - **N**

SPECIES	STATUS	HABITAT PREFERENCES	DISCUSSION	REGULATORY IMPLICATIONS
		large trees; area sensitive species needing extensive areas of forest (>100 ha) (MNRF, 2000). Federally regulated habitat for Cerulean Warbler has not been defined.		Protection of migratory birds and their nests is required as per the MBCA.
Eastern Meadowlark *Sturnella magna*	SARA - THR ESA - THR COSEWIC - THR	Open, grassy meadows, farmland, pastures, hayfields or grasslands with elevated singing perches; cultivated land and weedy areas with trees; old orchards with adjacent, open grassy areas >10 ha in size (MNRF, 2000). Federally regulated habitat for Eastern Meadowlark has not been defined.	It is not anticipated that the active pasture or small areas of old field meadow along the lake shore will provide ideal nest sites for this species. However, the possibility exists that these areas could act as part of a larger territory and that foraging birds could be found in the proposed work area.	Confirmed presence – **N** Critical habitat - **N** Protection of migratory birds and their nests is required as per the MBCA.
Eastern Whip-poor-will *Antrostomus vociferus*	SARA - THR ESA - THR COSEWIC - THR	Dry, open, deciduous woodlands of small to medium trees; oak or beech with lots of clearings and shaded leaf litter; wooded edges, forest clearings with little herbaceous growth; associated with >100 ha forests; may require 500 to 1000 ha to maintain population (MNRF, 2000).	Critical habitat for this species was confirmed for the study area via correspondence with Environment and Climate Change Canada. It is possible that this species could nest in the forest area to the south of the dam, and use the proposed construction area north of the lake as foraging habitat.	Confirmed presence - **N** Critical habitat – **Y** (Proposed) Protection of migratory birds and their nests is required as per the MBCA. Impacts to critical habitat will require a SARA permit. See Section 3.3.7.
Eastern Wood-pewee *Contopus virens*	SARA - SC ESA - SC COSEWIC - SC	Open, deciduous, mixed, or coniferous forest predominated by oak with little understory; forest clearings, edges; farm woodlots, parks (MNRF, 2000). Federally regulated habitat for Eastern Wood-pewee has not been defined.	Mixed forest habitat is present in the study area, mainly on the south lake shore and along the riverbanks. This species has been observed in the vicinity of the dam according to eBird records.	Confirmed presence – **Y** Critical habitat - **N** Protection of migratory birds and their nests is required as per the MBCA. Special Concern species do not receive SARA regulatory protection.
Golden-winged Warbler *Vermivora chrysoptera*	SARA - THR ESA - SC COSEWIC - THR	Early successional forest types that include extensive patches of dense shrubby growth, interspersed with dense herbaceous growth and are adjacent to a deciduous or mixed forest edge (Environment Canada, 2014).	Some open habitat with scattered shrubby areas is present in patches along field edges and the lake shore/riverbank. The forest habitat on the south side of the lake/river is isolated from the open habitats on the north by water. The forest found along the north riverbank, however, borders an open area and could provide suitable habitat.	Confirmed presence - **N** Critical habitat - **Y** Protection of migratory birds and their nests is required as per the MBCA. Impacts to critical habitat will require a SARA permit. See Section 3.3.7.
Wood Thrush *Hylocichla mustelina*	SARA - THR ESA - SC COSEWIC - THR	Carolinian and Great Lakes-St. Lawrence forest zones; undisturbed moist mature deciduous or mixed forest with deciduous sapling growth; near pond or swamp;	Could occur in the study area but would most likely be found in the forest to the south of the dam if it is present. It is unlikely to be present on the north side of the lake where most impacts will occur.	Confirmed presence – **N** Critical habitat - **N**

SPECIES	STATUS	HABITAT PREFERENCES	DISCUSSION	REGULATORY IMPLICATIONS
		hardwood forest edges; must have some trees higher than 12 m (MNRF, 2000). Federally regulated habitat for Wood Thrush has not been defined as a recovery strategy has not yet been created for this species.		Protection of migratory birds and their nests is required as per the MBCA.
Snakes				
Eastern Milksnake *Lampropeltis triangulum*	SARA - SC ESA – no status COSEWIC - SC	Farmlands, meadows, hardwood or aspen stands; pine forest with brushy or woody cover; river bottoms or bog woods; hides under logs, stones, or boards or in outbuildings; often uses communal nest sites (MNRF, 2000).	This species is a habitat generalist that could utilize the farm buildings, rocky outcrops, and even the dam structure itself as habitat.	Confirmed presence – **N** Critical habitat - **N** Special Concern species do not receive regulatory protection.
Eastern Ribbonsnake *Thamnophis sauritus*	SARA - SC ESA - SC COSEWIC - SC	Sunny grassy areas with low dense vegetation near bodies of shallow permanent quiet water; wet meadows, grassy marshes or sphagnum bogs; borders of ponds, lakes or streams; hibernates in groups (MNRF, 2000).	Riparian areas within the study area are potential habitat for Eastern Ribbonsnake. Rocky outcrops in the study area could provide entrances to underground hibernation sites.	Confirmed presence – **N** Critical habitat - **N** Special Concern species do not receive SARA regulatory protection.
Gray Ratsnake *Pantherophis spiloides* (Great Lakes - St. Lawrence population)	SARA - THR ESA - THR COSEWIC - THR	Shrubby, old field, deciduous or mixed forests, thickets, field edges, rocky hillsides, river bottoms; talus slopes; uses talus slopes, unused wells or cisterns for hibernation; will hibernate in groups with other snakes (MNRF, 2000).	The study area is flagged as critical habitat for this species by Parks Canada, and there are suitable habitat features for Grey Ratsnake present (e.g., rock outcrops and other sheltered areas which could potentially provide openings to hibernacula; old field for foraging). The NHIC has a record of this species occurring south of the Bob's Lake dam dated 2011. Parks Canada will conduct additional surveys in spring 2018 around potential hibernacula to confirm presence.	Confirmed presence – **N** Critical habitat – **Y** (Proposed) Injury or death of an individual of this species would be in contravention of the SARA. Impacts to critical habitat will require a SARA permit (see Section 3.3.7).
Turtles				
Blanding's Turtle *Emydoidea blandingii*	SARA - THR ESA - THR COSEWIC - THR	Shallow water marshes, bogs, ponds or swamps, or coves in larger lakes with soft muddy bottoms and aquatic vegetation; basks on logs, stumps, or banks; surrounding natural habitat is important in summer as they frequently move from aquatic habitat to terrestrial habitats (MNRF, 2000).	Blanding's Turtle is recorded by the ORAA for the 10 x 10 km square in which the dam is located, and Parks Canada staff reported seeing Blanding's Turtle in the general vicinity. However, regulated critical habitat for this species was not identified by Parks Canada. Blanding's Turtle is most likely to be encountered on the site during the active season as it travels in search of nesting and basking locations. The area immediately around the dam has no marshy inlets with abundant aquatic vegetation.	Confirmed presence - **Y** Critical habitat - **N** Injury or death of an individual of this species would be in contravention of the SARA.
Eastern Musk Turtle *Sternotherus odoratus*	SARA - THR ESA - SC COSEWIC – SC	A highly aquatic species except when laying eggs; uses shallow slow-moving water of lakes, streams, marshes and ponds; hibernates in underwater mud, in banks or in muskrat lodges; eggs are laid in debris or under stumps or	This species was flagged by MNRF as potentially occurring in the study area, and a Musk Turtle carcass was documented by CIMA (2017) in the study area upstream of the dam. Although it is possible that the carcass could have been carried by the water from habitats further upstream, this does confirm the presence of this species in the system.	Confirmed presence - **Y** Critical habitat - **N** NB: This species is scheduled to be downlisted on Schedule 1 of the SARA in the near future. Per the instructions of

SPECIES	STATUS	HABITAT PREFERENCES	DISCUSSION	REGULATORY IMPLICATIONS
		fallen logs at water's edge; not readily observed (MNRF, 2000).	This species is considered a habitat specialist which requires abundant emergent, floating, and submerged aquatic vegetation to provide cover (Environment Canada, 2016b). By this standard, the habitat around the dam is not ideal for this species as there is little floating or emergent vegetation present in this zone.	Parks Canada it will be treated as a Special Concern species, as no regulated critical habitat present has been gazetted onsite.
Northern Map Turtle *Graptemys geographica*	SARA - SC ESA - SC COSEWIC - SC	Large bodies of water with soft bottoms, and aquatic vegetation; basks on logs or rocks or on beaches and grassy edges, will bask in groups; uses soft soil or clean dry sand for nest sites; may nest at some distance from water; home range size is larger for females (about 70 ha) than males (about 30 ha) and includes hibernation, basking, nesting and feeding areas; aquatic corridors (e.g. stream) are required for movement; not readily observed (MNRF, 2000)	Confirmed to occur in Bobs and/or Crow Lake by local residents' photos. Recorded by the ORAA for the 10km^2 square in which the dam is located. As with other turtles, exposed substrates during construction could be attractive nesting habitat.	Confirmed presence - **Y** Critical habitat - **N** Special Concern species do not receive regulatory protection.
Snapping Turtle *Chelydra serpentina*	SARA - SC ESA - SC COSEWIC - SC	Permanent, semi-permanent fresh water; marshes, swamps or bogs; rivers and streams with soft muddy banks or bottoms; often uses soft soil or clean dry sand on south-facing slopes for nest sites; may nest at some distance from water; often hibernate together in groups in mud under water; home range size ~28 ha (MNRF, 2000)	Very likely to occur in the study area. Recorded by the ORAA for the 10km^2 square in which the dam is located. Both aquatic and terrestrial areas are potential habitat for this species since it frequently travels over land seeking exposed gravelly or sandy substrates for nesting habitat.	Confirmed presence - **N** Critical habitat - **N** Special Concern species do not receive regulatory protection.
Lizards				
Five-lined Skink *Plestiodon fasciatus* (Great Lakes - St. Lawrence population)	SARA - SC ESA - SC COSEWIC - SC	Moderately dense or open deciduous or mixed woodlands with logs and slash piles; damp spots under logs, leaf litter, or sawdust; open talus slopes, barren rock; sandy beaches of Lake Erie, Lake Ontario; breeds in forest floor litter; lays, protects eggs under rocks, logs; forages in open woodlands, in sandy areas, along shores of lakes, and islands; hibernates under rock piles, in rock crevices, under logs and in stumps (MNRF, 2000)	Forest habitat in the study area is largely limited to the southern lake shore/riverbank areas which will not be significantly impacted by the project. This species could also occur on the forested riverbank area north and northeast of the existing dam.	Confirmed presence - **N** Critical habitat - **N** Special Concern species do not receive regulatory protection.
Amphibians				
Western Chorus Frog *Pseudacris triseriata*	SARA - THR ESA - not at risk COSEWIC - THR	Roadside ditches or temporary ponds in fields; swamps or wet meadows; woodland or open country with cover and moisture;	Vernal pools, temporary ponds, and wetlands are not present in the study area. This species is therefore thought unlikely to be found in the study area.	Confirmed presence - **N** Critical habitat - **N**

SPECIES	STATUS	HABITAT PREFERENCES	DISCUSSION	REGULATORY IMPLICATIONS
(Great Lakes / St. Lawrence - Canadian Shield population)		small ponds and temporary pools (MNRF, 2000)		The species is unlikely to occur in the study area.
Fish				
American Eel *Anguilla rostrata*	SARA - no status ESA - END COSEWIC - THR	Catadromous species migrates from freshwater lakes and tributaries to the Atlantic Ocean and Sargasso Sea to spawn. In Ontario the species prefers cool waters in lakes with gravel, sand and silt bottoms.	Background information provided by MNRF indicate the American Eel records in the Tay River and Christie Lake and historically in Bobs Lake, despite the DFO SAR mapping (2015) only highlighting the upper portion of Bobs Lake, not up to the dam, and not in the Tay River at all. The immediate study area surrounding the dam does not present critical habitat for the species, and the dam itself will have been limiting upstream migration since inception.	Confirmed presence – **Y** Critical habitat - **N** The new dam design will ensure that upstream and downstream passage of the species could be incorporated at a future date should it be required.
Mammals				
Northern Myotis *Myotis septentrionalis*	SARA - END ESA - END COSEWIC - END	Hibernates during winter in mines or caves; during summer males roost alone and females form maternity colonies of up to 60 adults; will roost in houses, manmade structures but prefers hollow trees or under loose bark; hunts within forests, below canopy (MNRF, 2000). Regulated critical habitat for this species includes only confirmed hibernaculum locations (Environment Canada, 2015b).	Could potentially occur in the buildings in the study area (which are used for farm storage and animal shelter but not actively occupied; the house on the site is empty) or in dead/hollow trees during the breeding season. Hibernation habitat (mines/caves) is not present. Some standing dead trees were identified around the existing dam and the access stairway during Parsons' field investigations but vegetation removal in these areas is to be avoided according to the most recent construction drawings.	Confirmed presence - **N** Critical habitat - **N** Injury or death of an individual of this species would be in contravention of the SARA.
Little Brown Myotis *Myotis lucifugus*	SARA - END ESA - END COSEWIC - END	Uses caves, quarries, tunnels, hollow trees or buildings for roosting; winters in humid caves; maternity sites in dark warm areas such as attics and barns; feeds primarily in wetlands, forest edges (MNRF, 2000). Roosts in crevices and cavities in dead or dying trees, or sometimes beneath naturally loose bark on species like Shagbark Hickory (MNRF, 2017). Regulated critical habitat for this species includes only confirmed hibernacula locations (Environment Canada, 2015b).	As for Northern Myotis, above.	Confirmed presence - **N** Critical habitat - **N** Injury or death of an individual of this species would be in contravention of the SARA.
Tri-coloured Bat *Perimyotis subflavus*	SARA – END ESA – END COSEWIC – END	Open woods near water; roosts in trees, cliff crevices, buildings or caves; hibernates in damp, draft-free, warm caves, mines or rock crevices (MNRF, 2000). Prefers roosts in foliage within or below the canopy, mostly in oak species but also sometimes in maples.	Hibernation habitat is not present. Preferred roost tree species do occur in the overall study area but very few trees are found in the proposed work area. Tree and shrub removal for this project (and associated impacts to bat roosting habitat) will be minimal.	Confirmed presence - **N** Critical habitat - **N** Injury or death of an individual of this species would be in contravention of the SARA.

SPECIES	STATUS	HABITAT PREFERENCES	DISCUSSION	REGULATORY IMPLICATIONS
		Clusters of dead or dying leaves on live branches are preferred (MNRF, 2017).		
Insects				
Monarch *Danaus plexippus*	SARA - SC ESA - SC COSEWIC - END	Breeding habitat is restricted to sites where milkweed (the sole food of the caterpillars) grows. Adults feed in areas with abundant fall wildflowers (asters, goldenrods, etc.) before migrating south to overwinter (COSEWIC, 2010b)	Meadow habitats in the study area are primarily grass, and do not provide abundant wildflowers for feeding butterflies. Some milkweed is present, however, and therefore Monarch could also be present.	Confirmed presence – **N** Critical habitat – **N** Special Concern species do not receive regulatory protection.

3.3.7 SARA CRITICAL HABITAT

Three species were confirmed as having critical habitat polygons as defined by a federal Recovery Strategy overlapping the study area: Gray Ratsnake, Eastern Whip-poor-will, and Golden-winged Warbler. While none of these three species yet have critical habitat formally protected on Parks Canada lands (Gray Ratsnake and Eastern Whip-poor-will – proposed Recovery Strategies, Golden-winged Warbler – no protection order in place), this assessment will treat these areas as critical habitat. This section will discuss the project as it relates to federally-identified and regulated critical habitat for these species, whether the study area meets the biophysical attributes identified within the Recovery Strategy, and the potential need for SARA permitting associated with destruction of critical habitat features. SARA requirements apply to all lands owned by Parks Canada.

Gray Ratsnake

The critical habitat definition for this species as identified within the proposed Recovery Strategy for the Gray Ratsnake (*Pantherophis spiloides*), Carolinian and Great Lakes/St. Lawrence populations, in Canada (Environment and Climate Change Canada, 2017) includes the biophysical attributes necessary to support life processes; i.e., foraging, hibernation, oviposition, thermoregulation, and movement features, typically occurring in a mosaic of forest, forest edge, and open habitat. At least some of these habitat features suitable to support Grey Ratsnake likely occur in the area surrounding the Bobs Lake Dam project, including: foraging, potentially hibernation, and thermoregulation (basking/shelter), shedding, and movement habitats.

Destruction of critical habitat would occur "if part of the critical habitat was degraded, either permanently or temporarily, such that it would not serve its function when needed by the species" (Environment and Climate Change Canada, 2017). Activities that are likely to result in the destruction of critical habitat, as noted in the Recovery Strategy for this species, include:

Activities causing habitat fragmentation, such as the creation of roads: There will be a new permanent access road (0.1 ha on leased land) and parking area (.01195 ha on federal land) created from adjacent to the new dam, extending northeast through the existing pasture to Crow Lake Road. This access road will be a private drive used only sporadically (estimated one vehicle per week at most, to access the site for log adjustments at the dam) by Parks Canada employees, and as such there will not be frequent, heavy, and/or high-velocity traffic present that would create a permanent barrier effect for snakes in the area. There may be an increased risk of snake mortality on the new road, due to collisions with vehicles accessing the site. This can be mitigated by requiring vehicles to drive slowly, and requiring drivers to keep watch for snakes as they drive. As the road will be rough, granular A material and will cross adjacent farmland, speeds are likely to be slow. Similarly, the highest frequency of activity is during freshet (spring melt), when flood risk is at its highest and the highest frequency of log changes is required. During this period, temperatures are typically below 10°C (in February/March), when snakes have not yet emerged from their

hibernacula, thus reducing mortality risk. Post-construction monitoring for snake mortality on the new road could be completed to identify any problem areas for future application of additional protection or mitigation measures.

The proposed parking lot and road is currently located in old field and highly disturbed habitat (see photos 1-4 in Appendix A) and meets the biophysical attributes for movement. While a small portion may provide a foraging function, a large portion of the road will overlap with an existing compacted trail currently driven on by the adjacent owner to move equipment. As such, a conversion to a granular A, while reducing the potential for foraging species, will not limit or permanently change the function of the current habitat use. Similarly, it may increase opportunities for basking. Parks Canada also intends to place some of the felled trees and logs around the parking area and surrounding landscape as naturalization/habitat enhancement features. This would provide additional areas for cover and basking opportunities.

Activities resulting in the permanent removal or reduction of habitat features such as forests, wetlands, rock outcrops, etc.: The proposed work does not include any large-scale clearing of forest habitat, destruction of wetlands, removal of rock outcrops, or similar activities that would cause a permanent loss or degradation of suitable habitat features. There will be a very small area of clearing from the forest edge on the south lakeshore to accommodate the end of the new dam (0.004334 ha on federal land). While a small footprint of the wingwall may occupy this area, the remaining area will be restored and there is potential to place removed trees and brush onsite to create basking/oviposition sites.

Removal or alteration of documented nesting sites or hibernacula: Although snake usage of the potential hibernation habitat provided by rocky outcrops in the study area has not been confirmed, these features will not be permanently blocked or removed due to the proposed work. If potential egg-laying sites (e.g., rotting logs, compost piles) are found within the area to be cleared for construction, it is likely possible to relocate or recreate these features outside of the work area, a short distance away (N.B.: oviposition habitat was not documented by Parsons in the field, but field investigations were completed in 2015 so this does not preclude the potential for such features to be present now).

Activities that result in the alteration of water levels at/near documented hibernacula: There will be a permanent alteration of water level in the small area between the new and existing dams. Although no confirmed, documented hibernacula occur in the study area, there is the potential for such features to exist. Lowering of water levels and restoration of riverine habitat will create new foraging, thermoregulation (basking/shelter), shedding and movement habitats, and may provide new opportunities for hibernation if previously flooded voids become available. This is expected to be a positive project impact.

Based on the above, there would be minimal permanent impacts to critical habitat for Gray Ratsnake associated with this project, although these impacts are largely theoretical since there is not a confirmed presence of this species on the site. The potential impacts can typically be mitigated for (e.g., by driver awareness and monitoring to address mortality on the access road) or are of a limited extent (e.g., the small area of conversion from foraging habitat to basking/movement, the small area of vegetation removal on the south bank).

While minimal permanent changes to critical habitat functions will occur, there could be usage/access restrictions to critical habitat during construction. Exclusion fencing capable of excluding Grey Ratsnakes will be installed around the entire construction area and along access road margins in order to protect Gray Ratsnakes from potentially colliding with vehicles. The ends of the fence closest to Crow Lake Road will be hooked back to the south to ensure that any snakes following the fence will not be directed onto the road. Temporary wildlife passage culverts will be installed beneath the access road during construction in order to ensure that fragmentation does not occur between excluded areas and that the potential hibernacula remain accessible. These culverts will be of a suitable design (e.g., with a grated or open top) to ensure appropriate light penetration to encourage use by snakes.

Although these measures are intended to protect snakes on the site, they will result in 1120 m^2 of habitat being unavailable for the summer of 2018 and potentially some of the 2019 active season. As per Parks Canada's SAR permitting policy, a *Species at Risk Act* Authorization will be required for Gray Ratsnake, as harm to individuals could occur due to the temporary exclusion of some of its habitat.

Eastern Whip-poor-will

Critical habitat for Eastern Whip-poor-will as defined in the proposed Recovery Strategy for Eastern Whip-poor-will (*Antrostomus vociferus*) in Canada (Environment and Climate Change Canada, 2015) includes both breeding and foraging sites, which typically form a mosaic on the landscape and can overlap. Nesting occurs in forests, but foraging habitat can include agricultural lands scattered trees and shrubs to be used as perches, occurring adjacent to forests that provide suitable nesting habitat. A distance of 1,250 m from the edge with suitable nesting habitat is suggested for inclusion as a corresponding foraging area. Based on these criteria, the forests within and adjacent to the study area potentially provide nesting and/or foraging habitat for Eastern Whip-poor-will, and the open habitats and agricultural lands provide potential foraging habitat only.

Destruction of critical habitat "would result if part of the critical habitat were degraded, either permanently or temporarily, such that it would not serve its function when needed by the species" (Environment and Climate Change Canada, 2015). Examples given for activities likely to result in critical habitat destruction include: intensification of agricultural practices, construction of urban infrastructure, maintenance of linear infrastructures, and conversion of forests to agricultural lands, all of which are large-scale events resulting in the removal or permanent conversion of areas of suitable habitat.

The proposed work associated with the replacement of the Bobs Lake Dam involves construction activities which will be contained in a previously-disturbed, open area of small geographic extent, heavily frequented by cattle. Vegetation removal will be minimal and will involve approximately 43 m^2 of clearing of forest habitat on the south lakeshore; this sparsely-vegetated area is currently at the edge of the water and therefore exposed to wind effects and water fluctuation, decreasing the likelihood of it being suitable Eastern Whip-poor-will nesting habitat. The new permanent access road and parking area have been sited in locations with previous disturbance, and these features will be subject to a very low level of usage by vehicles during their lifespan. Given these considerations, it is unlikely that the proposed works will alter or disturb the site significantly enough to cause a functional degradation of suitable Eastern Whip-poor-will habitat.

Golden-winged Warbler

Critical habitat for Golden-winged Warbler as identified in the Recovery Strategy for the Golden-winged Warbler (*Vermivora chrysoptera*) in Canada (Environment and Climate Change Canada, 2016) requires both forest and open/shrub vegetation communities to be present, as it is the interface between these two that is particularly important for this species (Environment and Climate Change Canada, 2016). Suitable habitat therefore includes the entire transition between forested and open communities, plus 200 m into suitable forest habitat, plus 50 or 200 m into suitable open/shrub habitat (200 m if the habitat has scattered trees and patches of shrubby growth; 50 m if the habitat is open grassland lacking these features). Within the study area, an open/forest habitat transition is present on the north bank mainly east of the proposed work area. Adjacent open habitat includes mainly pasture and cleared land with few trees and shrubs along fencerows; the 50 m value has therefore been applied to the site, which still encompasses the majority of the work area.

Activities that are likely to result in the destruction of critical habitat, as noted in the Recovery Strategy for this species, include:

- Removal or alteration of necessary habitat attributes (without replacement): the dam replacement should not affect the interface between forest and open habitat, which is the primary Golden-winged Warbler habitat feature present. Approximately 43 m^2 of trees/shrubs will be removed from the site, but replacement plantings will also occur on the site post-construction to offset this loss. The area between the new and existing dam will also be allowed to naturalize, creating a new area of successional vegetation as it establishes.
- Reducing the amount of critical habitat available: The permanent additions to the site affecting terrestrial habitat (i.e., the new parking area and access road) have been sited in locations that are already open and disturbed. There should be no significant change in vegetation community structure from the addition of these features, pre- to post-construction, and the usage of the surrounding lands will not change.
- Compromising the ability of a focal area to be restored to the minimum amount of critical habitat, if required (e.g., large-scale permanent removal of habitat): The project will not result in a large-scale, permanent removal of suitable habitat.

Based on the above points, the proposed work is unlikely to result in significant destruction of critical habitat for Golden-winged Warbler, to the point where the habitat is not useful to the species anymore. The small area of habitat loss (approx. 43 m^2, as noted above) will be directly compensated by post-construction plantings on the site.

3.3.8 ENDANGERED SPECIES ACT

As noted above, SARA requirements apply to all lands owned by Parks Canada. However, the leased lands on which the new access road will be built are not federally-owned and would therefore be subject to the provincial ESA. General habitat as protected under the ESA includes those areas "on which a species depends, directly or indirectly, to carry out its life processes". Specific habitat as protected by regulations under the ESA is not currently present on the site as there are no confirmed sightings of SAR using the potentially suitable habitat.

To date, consultation between Parks Canada and MNRF has indicated that the mitigation/protection and monitoring measures set out in this DIA to ensure compliance with SARA will also ensure compliance with the ESA. Ongoing communication with MNRF is recommended to maintain this agreement, and to provide the results of any monitoring activities or other SAR encounters that occur on non-federal lands.

3.3.9 DESIGNATED AREAS

MNRF natural heritage mapping indicates that the provincially significant Christie Lake Wetland is found downstream of the study area, where the Tay River discharges into Christie Lake. The closest portion of this wetland is approximately 3 km distant from the dam, however, and therefore is extremely unlikely to be affected by this project so long as measures are put in place to protect downstream water quality. Similarly, the regionally-significant Christie Lake Life Science Area of Natural and Scientific Interest (ANSI-LS) is located downstream of the study area near Christie Lake and should be unaffected by the project. There are no provincially significant wetlands or ANSIs mapped upstream on Bobs Lake within 5 km of the dam.

There are small, unevaluated wetland units mapped approximately 300 m upstream and 400 m downstream of the existing dam, along the margins of Bobs Lake and the Tay River. These features are outside of the proposed construction area for the new dam.

3.4 PHYSICAL ENVIRONMENT

3.4.1 SUBSURFACE INVESTIGATIONS

A primary geotechnical investigation was completed for the dam site and access road in August 2015 by GHD Limited. Boreholes (F1-F6) and Rock probes (P1-P6) were used to determine and evaluate subsurface conditions. Borehole locations are shown on Figure 5.

3.4.2 BEDROCK GEOLOGY

The study area is located along the limits of an area called the Frontenac Axis, which is a band of late age late Precambrian bedrock (Wolff, 1982) that joins the Precambrian Shield in Ontario with the Adirondack Mountains to the south (Keddy, 1995). Dominant rock types include granite, marble, gneiss gabbro, syenite, monzonite, gabbro, quartzite, gneiss, and pegmatite (OGS, 1991).

During investigations, highly weathered and intensely fractured coarse grained calcite marble was encountered at the borehole locations. The colour of the marble was found to be white to pale grey becoming grey with depth. Gneiss beddings were observed in borehole F2. The Rock Quality Designation (RQD) values indicated the quality of this rock to be very poor to fair in the upper portion of the bedrock. The rock quality was found to become good to excellent at depth in F4 and F6

locations. Although the rock quality was found to be very poor to fair, the recovery values suggest low probability of cavities within the rock mass (GHD, 2015).

Figure 5 – Borehole and Rock Probe Locations (Source: Modified from GHD, 2015)

3.4.3 SOIL

Surficial geology of the study area according to the Ontario Geological Survey (2010) consists of Ice-contact stratified and glaciolacustrine deposits such as sand and gravel, minor silt and clay and till on the north side of the study area. Bedrock was identified on the south side of the study area.

Surficial investigations at the site were generally consistent with the provincial mapping. Samples taken (within the lake) just upstream of the existing dam consisted of silty sand with cobbles and boulders. Maximum sediment depth is approximately 2.0 m in F1 (GHD, 2015). On the north side of the study area, a layer of native silty sand with cobbles and boulders were found in boreholes F4 and F5. It was noted that the silt and sand content varies across the dam site and changes from silty sand to sandy silt (GHD, 2015). Overburden depth within the dam site ranges from 1.2 m in P2 to 5.4 m in F6.

3.4.4 GROUNDWATER

The shallow groundwater level is considered to be at the same elevation as the lake water level. It should be noted that groundwater levels are subject to seasonal fluctuations and in response to precipitation and snowmelt events, and are anticipated to be at their highest during the thaw in early spring (GHD, 2015).

The Groundwater Information Network (GIN) indicates that water wells are present within the study area and are associated with the private property on the north side of the dam (GIN, 2016). The existing wells located on the property are likely associated with the house and barn.

3.4.5 CLIMATE AND AIR QUALITY

The study area is located within the Ontario Shield Ecozone and Georgian Bay Ecoregion which is in very close proximity to the Mixedwood Plains Ecoregion. The climate of the Georgian Bay Ecoregion is cool-temperate and humid. It is within the Humid High Moderate Temperature Ecoclimate Region. The mean annual temperature range is 2.8 to 6.2˚C, and the mean length of the growing season is between 183 to 219 days. Mean annual precipitation ranges between 771 and 1,134 mm and the mean summer rainfall is between 204 and 304 mm (Crins *et al*., 2009).

The Air Quality Office of the Environmental Monitoring and Reporting Branch continuously obtains near real-time data for criteria pollutants from 40 Air Quality Index (AQI) sites across the Province (it should be noted that the sites are located within urban centers). The closest air quality monitoring site is Kingston (located approximately 50 km to the south) and is not a representative measure of the air quality within the study area. Due to the rural context of the study area and few smog-producing activities, air quality is an unlikely concern.

3.4.6 SURFACE WATER

Two bodies of water are located within the study area: Bobs Lake upstream of the dam, and the Tay River downstream of it.

Bobs Lake is located near the top of the Tay River Watershed and is one of the headwaters of the Rideau Canal System. The surface area of Bobs Lake is approximately 2878 hectares with a shoreline length of 215 km; the average depth of the lake is approximately 25 m. The catchment area draining to the lake is 358.63 km^2 (RVCA, 2012). Bobs Lake is controlled as a reservoir lake providing water for navigation and recreation on the Tay River and Rideau Canal.

Surface water operating levels vary between the navigation and non-navigation season from 162.74 m Canadian Geodetic Datum (CGD) to 161.37 m (CDG) respectively. The active storage within the lake is 47011 (1000 m^3) with a range of 1.45 m (Genivar, 2013).

Downstream of the Bobs Lake Dam, the Tay River freely flows for approximately 6.0 km before entering Christie Lake. Surface water quality was previously discussed in Fisheries and Aquatic Habitat.

Consultation

4.0 Community Engagement

4.1 PUBLIC AND AGENCY ENGAGEMENT

Parks Canada has been in communication with local stakeholders and agencies throughout the project. These include local cottage associations (including the Bobs and Crow Lake Association, Christie Lake Association, and Friends of the Tay River Watershed), the municipality, local residents, the DFO, Transport Canada, the MNRF, and the RVCA.

The project was initially announced to the public in 2015 and expanded funding for replacement was announced in 2016. Numerous media queries have further discussed the project and the state of plans. Five direct presentations to public forums (Friends of the Tay Valley (2), Bobs Lake Association (1), Tay Valley Township (1), Christie Lake Association (1) were undertaken. Indirect presentations where were also made by the presidents of Bobs and Christie Lake Associations at their Annual General Meetings (AGMs) in (2016). In addition, Parks Canada provided updates on the progress of the work through email and telephone to key stakeholder organizations dating back to 2015 (Friends of the Tay, Bobs Lake, Christie Lake, Tay Valley Township); several meetings occurred between adjacent property owners and Parks Canada staff to discuss access and staging. Multiple community updates were also provided related to the investigations and construction timing estimate. A community engagement list of more than 250 contacts including over 150 residents and cottagers has

been developed throughout the public engagement. Parks Canada communications staff responded to dozens of queries submitted via email and social media.

Issues raised through these interactions with the community have been incorporated into the design process and have also helped to identify concerns to be aware of during construction.

Water levels and the risk of flooding has been repeatedly raised as a concern, particularly by residents downstream of the dam on the Tay River and Christie Lake. Concerns have focused on whether upstream water levels will have to be significantly reduced to facilitate construction, whether there will be a heightened flood risk during construction, and whether the new dam will be able to prevent future flooding. As the water management strategy and operations will continue as normal throughout construction, and will continue to make use the existing dam, there will not be any change to the risk of flooding as a result of the process of constructing a new dam. Should there be significant short-term impact on water management - such as temporarily slowing flows to facilitate inspections - notice should be provided for area residents. Overall, however, concerns about water levels are best addressed through discussions with Parks Canada regarding water management and the strategy guiding operational decisions rather than incorporated into this DIA.

Questions from the public have also focused on timing of work, the state of the current dam, the environmental assessment process, the environmental impact of construction, road use and traffic concerns, the possibility of incorporating hydro generation into the design, and on ensuring a process of ongoing updates is created throughout construction. Comments have also been made about preferences for the design of the new dam including the style of the dam, the manner of its operation, and the possibility of additional precision in terms of setting water levels.

Stakeholder feedback is consolidated in greater detail within Appendix K.

In the spring of 2018, Parks Canada plan to offer at least three additional meetings, one each to Friends of the Tay, Bobs Lake Association, and Christie Lake Association.

Public comments and questions that arose during the project development and Parks Canada's response have been included in Appendix K. Comments to date have been centered around dam safety, water management, property ownership and the DIA process.

The DIA was shared with interested stakeholders including Bobs and Christie Lake associations, Friends of the Tay, Tay Valley Township, County of Lanark, Rideau Valley Conservation Authority, and Friends of the Rideau. All comments received during the review period of the DIA are being responded to and summarized in Appendix K. The comment period began the week of January 22, 2018 and lasted approximately 3 weeks.

4.2 INDIGENOUS ENGAGEMENT

Engagement with local First Nations (the Algonquins of Ontario) regarding the Bobs Lake Dam Reconstruction project is ongoing.

On June 7, 2016, a letter was sent to the Sharbot Obaadjiwan First Nation Chief advising him of the Bobs Lake Dam Reconstruction project and its status. The letter was a request to the community on how they would like to be engaged regarding this project, as they were the First Nations community closest to the project area and most likely to have an interest in project activities. Additionally, the Algonquin First Nations Consultation Office (ACO) was contacted in the summer of 2016 in order to engage the wider communities overlapping the Rideau Canal National Historic Site. Some initial meetings took place in late 2016 in order to begin engagement and relationship building with the Algonquins of Ontario representatives. On February 8, 2017 as part of ongoing engagement process with the Algonquins of Ontario, a presentation on the Bobs Lake Dam reconstruction (and other Parks Canada infrastructure projects planned for the Rideau Canal) was given to the Algonquin First Nations Consultation Office in Pembroke Ontario. Issues raised at the meeting concerned high level environmental governance questions regarding American Eel in the system, the use of herbicides, contaminated sediments at other project locations, and impacts to turtles and fish. Some specific questions were also raised regarding purchase of additional lands around the dam, accessibility after project completion, archaeological assessment reports, and the impact to the two identified Butternuts. A commitment was made to determine the protocol

when removing trees that would involve the community and would help mitigate the loss and/or assess the trees for preservation. This discussion occurred, although no formal agreement has been signed to date. At the time of this document's publication, a formal response had not yet been received.

To date, no formal consultation requirement has been identified with the representatives of the Algonquins of Ontario as the proposed project activities do not appear to impact Aboriginal or Treaty Rights. However, the project scope was shared with community members to ensure all potential impacts have been assessed. Continued information, engagement and monitoring of project activities will occur to ensure the accuracy of proposed mitigation measures and to ensure that no impacts occur to the communities' Aboriginal or Treaty Rights. Should such an impact arise, formal consultation to address the impact would be undertaken.

As part of the agreed to process, the community consultation representatives receive updates through the construction phase. As is Ontario Waterway practice, community consultation representatives have been and will be offered the opportunity for a site visit and will be accompanied by senior project staff should they make that request. In the event of an accident on site, contamination due to construction, or discovery of archaeological material, stop work order provisions in the contract will allow work to be temporarily halted around the impacted area and the community consultation representatives will be notified and if needed be invited to participate in any monitoring of the site.

5.0 Project and Environment Interactions

The environmental effects of a project to be considered include, at minimum, those described in Section 5(1) and 5(2) of the *Canadian Environmental Assessment Act* (CEAA, 2012). Additional SAR identified in the 2007 ESA have also been considered in the assessment of the effects. Table 7 identifies the potential effect as it relates to the project component and environmental factors.

Table 7 – Potential Project / Environmental Interaction Matrix

			As per Section 5(1) CEAA 2012				As per Section 5(1c) CEAA 2012				As per Section 5(2) CEAA 2012				Other								
							Indigenous Interest																
			Fish and Fish Habitat	Species at Risk (Terrestrial)	Species at Risk (Aquatic)	Migratory Birds	Health and Socio Economic	Physical and Cultural Heritage	Traditional Land Use	HAPA Significance	Health and Socio Economic	Physical and Cultural Heritage	*HAPA Significance	Soil	Water (Surface, Groundwater)	Terrestrial Species and Habitat	Terrestrial Vegetation	Air Quality/Acoustic Environment	Visitor Experience	Waste Management	Designated Substances	Contamination	Invasive Species
Project Components	Site Preparation	Vegetation Clearing	☒	☒	☐	☒	☐	☐	☐	☐	☐	☒	☒	☒	☒	☒	☒	☐	☐	☐	☐	☐	☒
		Establish Staging Area	☒	☒	☐	☒	☐	☐	☐	☐	☐	☒	☒	☒	☒	☒	☒	☐	☐	☐	☐	☐	☐
	Construction	Access Road Construction	☒	☒	☐	☒	☐	☐	☐	☐	☐	☒	☒	☒	☒	☒	☒	☐	☐	☐	☐	☐	☒
		Install cofferdam	☒	☐	☒	☐	☐	☐	☐	☐	☐	☐	☒	☐	☒	☐	☐	☐	☐	☐	☐	☐	☐
		Dewatering	☒	☐	☒	☐	☐	☐	☐	☐	☐	☐	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
		Construction of the new dam	☒	☐	☐	☐	☐	☐	☐	☐	☐	☒	☒	☐	☒	☐	☐	☒	☐	☐	☒	☐	☐
		Temporary access platform	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☒	☐	☒	☐	☐	☐	☐	☐	☐	☐	☐
	Demolition / Restoration	Demolition of existing dam	☒	☒	☐	☐	☐	☐	☐	☐	☒	☐	☒	☐	☒	☐	☐	☒	☒	☒	☒	☒	☒
		Riverbed Reconstruction	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☒	☐	☒	☐	☐	☐	☐	☐	☐	☐	☐
		Worksite rehabilitation	☒	☒	☐	☒	☐	☐	☐	☐	☐	☐	☒	☐	☐	☒	☒	☐	☐	☐	☐	☐	☒

*HAPA – Historical, archaeological, paleontological or architectural significance

Note: An "X" indicates that there is a potential identified effect of the project on the environment. A blank box indicates no potential effect of the project on the environment.

6.0 Environmental Effects Analysis

6.1 ENVIRONMENTAL EFFECTS ANALYSIS

An assessment was undertaken to describe the potential effects on Valued Components (VCs; identified in Table 7) associated with the construction, operation, and decommissioning of project activities. Impacts on the natural environment are discussed in detail in Appendices F and G, in addition to being summarized in Table 9, below. In particular, Appendix F provides the analysis using the Fisheries and Oceans Canada (DFO) Pathways of Effects (PoE) diagrams.

The prediction of environmental effects considered: the interaction between a project activity and the environment; the effects of the project activities on the VCs; and the combined effects of multiple activities and/or multiple effects. Within this context, consideration was given to: the magnitude, reversibility, geographic extent, duration and frequency of the effect; whether the effect was direct or indirect; the degree to which the effect will respond to mitigation; and the level of uncertainty about the possible effect. Table 8 identifies the significance criteria definitions used in this assessment, namely in the 'Potential Effects Following Mitigation' column of Table 9.

Table 8 – Significance Criteria Definitions

CRITERION	LOW	MODERATE	HIGH
Magnitude	Low, baseline level of disturbance/damage.	Moderate level of disturbance/damage (value or level less than that which may affect quality, quantity, value or use of VC).	High level of disturbance/damage (may measurably affect quality, quantity, value or use of VC).
Reversibility	Effects reversible over short term without active management.	Effects reversible over short term with active management.	Effect reversible over extended term with active management or effects are irreversible.
Geographic Extent	Limited to project site/footprint.	Likely extends to areas adjacent to project site/footprint.	Likely extends into areas beyond the lands adjacent to the project site/footprint.
Duration	Effect is most likely to be evident during site preparation, construction/repair and/or decommissioning only.	Effect is likely to be evident during site preparation, construction/repair, decommissioning, and/or operations phase of the project (or, if no operations phase, for a period of days to weeks).	Effect is likely to be evident beyond the life of the project or longer than one month.
Frequency of Effect	Conditions or phenomena causing the effect to occur only once.	Conditions or phenomena causing the effect may occur more than once, but infrequently.	Conditions or phenomena causing the effect are likely to occur at regular or frequent intervals.

Parks Canada's standard mitigation and management practices are detailed in the 2017 "Environmental Standards and Guidelines Document – Ontario Waterways" document. Where applicable, that document's requirements for Environmental Management Plans and Environmental Standards and Guidelines (ESGs) have been flagged in Table 9 and Appendix H. The Contractor will be responsible for preparing an Environmental Management Plan containing all of the necessary components.

6.2 RESIDUAL ENVIRONMENTAL EFFECTS

Residual environmental effects are defined as changes to the environment caused by the project when compared to existing conditions and taking into account all mitigation measures. Residual environmental effects were assessed as to their potential significance, including spatial and temporal considerations, and were categorized according to the definitions outlined below. Note, these are found in the "Significance of Residual Effects" Column in Table 9.

Significant (S): An effect that may exhibit one or more of the following characteristics: widespread; permanent transcendence or contravention of legislation, standards or environmental guidelines or objectives; permanent reduction of species diversity of population of species; permanent loss of critical/productive habitat; permanent alteration to community characteristics or services, land use or established patterns; and/or permanent loss of archaeological/heritage resources.

Insignificant (I): An effect that may exhibit one or more of the following characteristics: not widespread; temporary or short-term duration (i.e., only during construction); recurring effect lasting for short periods of time during or after project implementation; not permanent, so that once the stimulus is removed, the integrity of the social/environmental components is resumed.

Negligible (N): A nearly zero or hardly discernible effect. A negligible effect would touch a population, an entity or a specific group of individuals at a localized area and/or over a short period in such a way as to be similar in effect to small random changes in the population, entity or group due to environmental irregularities, but would have no measurable effect on the population, entity or group as a whole.

Positive (P): An effect that exhibits a beneficial outcome.

Table 9 – Environmental Effects, Mitigation Measures, and Residual Effects Analysis

VALUED COMPONENT (VC)	POTENTIAL ENVIRONMENTAL EFFECTS	MITIGATION	POTENTIAL EFFECTS FOLLOWING MITIGATION	SIGNIFICANCE OF RESIDUAL EFFECTS	INSPECTION/ MONITORING REQUIREMENTS
Fish and Fish Habitat	Impacts to fish spawning as a result of construction activities: Walleye spawning habitat was identified just downstream of the dam, within the Tay River.	• Respect in-water timing restrictions as per the MNRF Updated In-Water Work Timing Guidelines in the Kemptville District (2017); no in-water work is permitted between October 15th and June 30th unless otherwise authorized by Parks Canada • Isolate in-water work areas from open waterbody • Temporary flow by-pass systems to maintain upstream to downstream flow during construction at all times • Implement Surface Water, Erosion and Sediment Management Plan to prevent sediment from leaving the work site • The old and new dam will follow the same operational procedure - therefore no change in the flows and velocities downstream of the exiting dam	Magnitude: Low Reversibility: Low Geographic Extent: Low Duration: Low Frequency: Low	Negligible effects are anticipated with the implementation of prescribed mitigation.	Walleye spawning monitoring, pre-construction (existing habitat area) and post-construction (existing habitat plus newly constructed habitat)
	Newly installed Walleye spawning habitat features (i.e., boulder clusters, as indicated in the design for habitat rehabilitation) may be used as platforms for poaching.	• Boulder height and in-stream placement will be verified during construction to optimize desired habitat characteristics, also with consideration of this potential effect • Parks Canada will monitor the newly constructed habitat for poaching and	Magnitude: Low Reversibility: Low Geographic Extent: Low Duration: Low Frequency: Low	Negligible effects are anticipated with the implementation of prescribed mitigation. There has been	Parks Canada will conduct additional monitoring of the area during Walleye spawning.

VALUED COMPONENT (VC)	POTENTIAL ENVIRONMENTAL EFFECTS	MITIGATION	POTENTIAL EFFECTS FOLLOWING MITIGATION	SIGNIFICANCE OF RESIDUAL EFFECTS	INSPECTION/ MONITORING REQUIREMENTS
		adjust the boulder configuration as necessary		no documented poaching at the dam to date.	
	Sedimentation of fish habitat: eroded material from stockpiles or disturbed ground surfaces may enter the watercourse during rain events or spring melt.	• Surface Water, Erosion and Sediment Management Plan Store stockpiled material away from the lake/river and steep slopes • Follow Erosion and Sediment Control ESGs (ESG-1-Pre and ESG-2-Pre) • If material is stored for prolonged periods, it should be tarped, or otherwise stabilized, to prevent erosion • All surplus stockpiled material should be removed following construction	Magnitude: Low Reversibility: Low Geographic Extent: Low Duration: Low Frequency: Low	Negligible effects are anticipated with the implementation of prescribed mitigation.	ESC monitoring during construction Habitat survey in known walleye spawning locations to document pre- and post-construction impacts
	Sedimentation of fish habitat: removal of vegetation during construction exposes soils to erosion and increases the likelihood of sediment input to the watercourse.	• Implement Surface Water, Erosion and Sediment Management Plan • Implement Site Restoration Plan to replace woody vegetation removed from the site and stabilize exposed soil with herbaceous seed mix as soon as possible following the conclusion of construction • Follow Vegetation Clearing and Protection ESG (ESG-5-Pre) • Minimize vegetation removals as much as possible, allowing only removals that are necessary to accommodate construction • Protect and retain the surrounding vegetation not intended to be removed via installation of perimeter fencing at the limits of disturbance, and ensuring proper removal techniques to limit collateral damage to surrounding vegetation • Where vegetation has been removed on slopes, the soil surface should be stabilized in the interim with a bonded fibre matrix or erosion blankets • Where feasible, root masses should be left in place for bank stabilization	Magnitude: Low Reversibility: Low Geographic Extent: Low Duration: Low Frequency: Low	Negligible effects are anticipated with the implementation of prescribed mitigation.	ESC monitoring during construction Monitoring health of landscape plantings during the warranty period Habitat survey in known walleye spawning locations to document pre- and post-construction conditions
	Sedimentation of fish habitat: sediment release during cofferdam installation and dewatering works.	• Implement Surface Water, Erosion and Sediment Management Plan • Implement Dewatering and Wastewater Management Plan • Follow Installation and Removal of Coffer Dams and Isolation Structure ESG (ESG-10-C) and Treatment of Discharge Waters ESG (ESG-15-C) during construction • Deploy turbidity curtains, in a manner that prevents the entrapment of fish, prior to cofferdam installation • Ensure cofferdams are sufficient to prevent overtopping during high water events	Magnitude: Low Reversibility: Low Geographic Extent: Low Duration: Low Frequency: Low	Negligible effects are anticipated with the implementation of prescribed mitigation.	ESC monitoring during construction. Habitat survey in known walleye spawning locations to document pre- and post-construction impacts

VALUED COMPONENT (VC)	POTENTIAL ENVIRONMENTAL EFFECTS	MITIGATION	POTENTIAL EFFECTS FOLLOWING MITIGATION	SIGNIFICANCE OF RESIDUAL EFFECTS	INSPECTION/ MONITORING REQUIREMENTS
		• Design and construct cofferdams to minimize sediment inputs to the watercourse; cofferdams shall not be composed of loose aggregate/ granular material, and shall be removed as soon as possible following construction • Use a pump to remove sediment-laden water from the work area inside the cofferdams. This water should be treated by discharging into settling basins, vegetated areas (minimum 30 m away from the water's edge), or sediment traps prior to release into the watercourse • All accumulated sediment, silt or debris that accumulates around a temporary cofferdam must be removed prior to withdrawal of the cofferdam			
	Sedimentation of fish habitat: washout of accumulated sediment behind the existing dam. An estimated 1.0 to 2.0 m of sediment is currently built up behind the existing dam. Failing to remove the sediments prior to the commissioning of the new dam will result in sediment transport to downstream Walleye spawning habitats.	• Surface Water, Erosion and Sediment Management Plan • Implement Dewatering and Wastewater Management Plan • Follow Dredging and Sediment Removal ESG (ESG-6-C) • Existing sediment in the area between the existing and new dam will be removed to avoid transport downstream. This should be done in isolation of the flowing waterbody • Dredged spoils will be either immediately removed from the site or contained such that they do not reenter the waterbody • Riverbed reconstruction and sediment removal should occur in the area between the dams prior to removal of the existing dam. All sediment removed will be removed from site to prevent erosion and release into the water features • Sediment removal via vacuum truck may be the most efficient method, as the sediment is anticipated to be soft and waterlogged. Vacuum truck will prevent the need to settle out the slurry onsite (via settling pond or filter bag). Once the truck is full, the sediment would be immediately removed from the site	Magnitude: Low Reversibility: Low Geographic Extent: Low Duration: Low Frequency: Low	Negligible effects are anticipated with the implementation of prescribed mitigation.	ESC monitoring during construction Prepare and follow a Water Quality Monitoring Plan to address suspended sediment levels during the restoration of flow – adhering to the CCME Canadian Water Guidelines for the Protection of Aquatic Life
	Input of deleterious substances to fish habitat and degradation of water quality: via spills/leaks during construction.	• Follow Refueling and Spill Management ESG (ESG-13-C) • Ensure machinery on the site is clean and in good working condition, free of fluid leaks. Daily inspections should be conducted	Magnitude: Low Reversibility: Low Geographic Extent: Low Duration: Low Frequency: Low	Negligible effects are anticipated with the implementation of prescribed mitigation.	Prepare and follow a Water Quality Monitoring Plan and Spill Response Plan for construction

VALUED COMPONENT (VC)	POTENTIAL ENVIRONMENTAL EFFECTS	MITIGATION	POTENTIAL EFFECTS FOLLOWING MITIGATION	SIGNIFICANCE OF RESIDUAL EFFECTS	INSPECTION/ MONITORING REQUIREMENTS
		• No machinery will be left within 30 m of the watercourse during site closure hours • Refueling and inspections of equipment should be conducted away from bank slopes and at least 30 m from any surface water. A designated refueling area should be identified for the site which will contain an impermeable pad • Implement a Fuel Management Plan • Implement Spill Prevention and Emergency Response Plan • A spill kit, including a floating boom, must be maintained on site • All fuel will be stored at least 30 m away from any surface water on an impermeable surface			
	Input of deleterious substances to fish habitat and degradation of water quality: during concrete pouring, grouting, and related activities.	• Implement Dewatering and Wastewater Management Plan • Implement Spill Prevention and Emergency Response Plan • Follow Concrete Pour Operations and Grouting ESG (ESG-5-C) • Measures must be implemented to ensure all works involving the use of concrete, cement, mortar, or lime-containing construction materials do not enter the watercourse, directly or indirectly, at any time. In-water work areas will be isolated from the open waterbody • All concrete and grout work will occur in the dry • Concrete chutes should be cleaned away from the site to ensure contaminated water does not enter the watercourse • Placement of cement must be carried out in accordance with provincial/federal specification standards	Magnitude: Low Reversibility: Low Geographic Extent: Low Duration: Low Frequency: Low	Negligible effects are anticipated with the implementation of prescribed mitigation.	Prepare and follow a Water Quality Monitoring Plan and Spill Response Plan for construction
	Input of deleterious substances to fish habitat and degradation of water quality: concrete drill/cutting/ demolition waste material entering a watercourse.	• Follow Chipping and Cutting ESG (ESG-4-C) • All concrete debris/cutting waste materials (including dust and slurry) must be contained to prevent accidental release into the waterbody • Dewatering and Wastewater Management Plan During the installation of the new concrete structure and removal of the existing, concrete waste-laden water must be contained, treated and disposed of in accordance with federal and provincial regulation • Remove all debris on the stream/lakebed (including unused	Magnitude: Low Reversibility: Low Geographic Extent: Low Duration: Low Frequency: Low	Negligible effects are anticipated with the implementation of prescribed mitigation.	Prepare and follow Dewatering and Wastewater Management Plan during construction. Parks Canada will measure water quality during higher risk activities to ensure compliance Final inspection of site

VALUED COMPONENT (VC)	POTENTIAL ENVIRONMENTAL EFFECTS	MITIGATION	POTENTIAL EFFECTS FOLLOWING MITIGATION	SIGNIFICANCE OF RESIDUAL EFFECTS	INSPECTION/ MONITORING REQUIREMENTS
		aggregate and concrete rubble) and restore the area to original state upon completion of work			rehabilitation prior to removal of in-water isolation measures
	Direct harm to fish and freshwater mussels: potential entrapment during cofferdam installation and suffocation during dewatering of isolated work areas.	• Follow Fish Exclusion, Salvage and Relocation ESG (ESG-7-C) • Prior to an/or in conjunction with (as appropriate) dewatering of the work areas, all fish must be captured, identified and counted by a qualified biologist, using appropriate equipment and proper animal handling techniques, and relocated upstream of the work area (into Bobs Lake). Construction work should only commence within the isolated area once the area has been cleared of fish • Implement an Aquatic Resources Management Plan • Advise Parks Canada's Environmental Authority 24 hours prior to fish rescue so that a Parks Canada representative can be onsite during fish salvage activities • Screens must be in place at the end of all pump intakes to prevent fish entrainment, in accordance with DFO's "Freshwater Intake End-of-Pipe Fish Screen Guideline" (March 1995)	Magnitude: Low Reversibility: Low Geographic Extent: Low Duration: Low Frequency: Low	Insignificant effects are anticipated with the implementation of prescribed mitigation.	Environmental monitoring during fish and mussel exclusion, salvage and relocation Notification to Parks Canada 24 hours in advance of fish salvage operations
	Direct harm to fish and freshwater mussels: potential to be crushed/displaced as a result of rock fill installation. Potential for rock fill in channel rehabilitation area to sieve the water creating a rock drain which could strand or displace fish.	• To prevent fish from being killed or harmed during the placement of rock fill, all areas of in-water work shall be isolated from the open watercourse • Implement an Aquatic Resources Management Plan • Ensure rock is sufficiently sized to handle the expected flows, is well graded, and that sand and/or small gravel is added so that the water flows over the rock and not through (rock drain) • Limestone based aggregates or acid-generating rock will not be used	Magnitude: Low Reversibility: Low Geographic Extent: Low Duration: Low Frequency: Low	Insignificant effects are anticipated with the implementation of prescribed mitigation. Potential loss of freshwater mussels in areas where dewatering has not occurred.	Environmental monitoring during rock placement to ensure proper grading and filling of interstitial spaces
	Alteration of water flow and fish habitat (e.g., channel morphology, food supply): during construction, cofferdams will restrict water from entering the work area. Changes in flow have the potential to modify channel morphology, affect (fish) food	• Ensure at all times the free flow of water from upstream to downstream of the work areas, and a water supply sufficient to maintain fish habitat functions downstream of the work area. A minimum of 1.5 m^3/s will be maintained for ecological flow during the channel restoration work	Magnitude: Low Reversibility: Low Geographic Extent: Low Duration: Low Frequency: Low	Negligible effects are anticipated with the implementation of prescribed mitigation.	None identified

VALUED COMPONENT (VC)	POTENTIAL ENVIRONMENTAL EFFECTS	MITIGATION	POTENTIAL EFFECTS FOLLOWING MITIGATION	SIGNIFICANCE OF RESIDUAL EFFECTS	INSPECTION/ MONITORING REQUIREMENTS
	supply, and habitat and prevent movement.	• Because existing flows are managed, there is some resiliency in the system			
	Alteration of fish habitat: loss of aquatic vegetation in the area between the new dam and the existing dam, resulting in changes to light penetration, primary productivity, nutrient inputs, cover and food supply for fish.	• No mitigation proposed. While there is a permanent loss of aquatic vegetation, the affected area is extremely small relative to Bobs Lake as a whole and the vegetation and habitat is ubiquitous throughout the outlet bay	Magnitude: Low Reversibility: High Geographic Extent: Low Duration: High Frequency: Low	Insignificant effects - loss of aquatic vegetation as a result of the change in lake to river morphology.	None identified
	Loss and/or change in fish habitat as a result of the new dam and new channel morphology between the dams.	• Lakebed rehabilitation will include natural channel design principals • Specific reconstruction of new wetted area between dams to provide habitat suitable for Walleye spawning	Magnitude: Moderate Reversibility: High Geographic Extent: Low Duration: High Frequency: Low	Insignificant effects – permanent loss of aquatic habitat in pelagic areas between new and old dams associated with change from lake/reservoir to river channel. Small scale habitat loss. Net loss of fish habitat in footprint of new dam.	Walleye spawning monitoring, pre-construction (spring 2018 – in the existing habitat area) and post-construction (existing habitat plus newly constructed habitat)
Species at Risk (Terrestrial)	Direct harm to or disturbance of Species at Risk encountered within the study area.	• Adhere to the Species at Risk Protection Plan, the Wildlife and Species at Risk Protection During Construction ESG (ESG-17-C), and general wildlife protection measures listed elsewhere in this table • All on-site staff should undergo environmental awareness training to be able to identify the potential SAR that could be encountered • Should any SAR be encountered, work in the immediate area shall cease and the Parks Canada representative will be contacted for guidance on how to proceed. No SAR should be handled without agency permission, unless the animal's life is in immediate danger if it is left in place	Magnitude: Low Reversibility: Low Geographic Extent: Low Duration: Low Frequency: Low	Negligible effects are anticipated with the implementation of prescribed protection measures to prevent direct harm to wildlife on the site.	Monitor daily for wildlife in the work area during construction
	Noise impacts: temporary disturbance of SAR wildlife due to increased noise from construction activities.	• Adhere to noise mitigation measures found elsewhere in this table	Magnitude: Low Reversibility: Low Geographic Extent: Low Duration: Low Frequency: Low	Negligible residual impacts anticipated following the implementation of prescribed mitigation. Wildlife should temporarily avoid the area	None identified

VALUED COMPONENT (VC)	POTENTIAL ENVIRONMENTAL EFFECTS	MITIGATION	POTENTIAL EFFECTS FOLLOWING MITIGATION	SIGNIFICANCE OF RESIDUAL EFFECTS	INSPECTION/ MONITORING REQUIREMENTS
				during construction.	
	Loss of potential habitat for Golden-winged Warbler: the study area contains critical habitat which will not be significantly reduced or altered as a result of the project (see Section 3.3.7).	• Adhere to general SAR and migratory bird mitigation measures listed elsewhere in this table • Follow Wildlife and Species at Risk Protection During Construction ESG (ESG-17-C) • Follow Tree Protection and Hording ESG (ESG-4-Pre), Vegetation Clearing and Protection ESG (ESG-5-Pre), and Revegetation ESG (ESG-1-Post) to protect and enhance habitat • Implement the Site Restoration Plan using native shrub species for site restoration providing like-for-like replacement of lost habitat/vegetation • Adhere to current minimal vegetation clearing plan to avoid permit requirements under the SARA for destruction of critical habitat. Any clearing beyond what is shown on the current construction plans may require reevaluation of critical habitat impacts	Magnitude: Moderate Reversibility: Moderate Geographic Extent: Low Duration: Low Frequency: Low	Insignificant residual impacts anticipated following the implementation of prescribed mitigation and the restoration of habitat on the site. Appropriate restoration plantings will require time to establish and grow.	Monitoring health of landscape plantings during the warranty period
	Loss of potential habitat for Eastern Whip-poor-will: the study area contains critical habitat which will not be significantly reduced or altered as a result of the project (see Section 3.3.7).	• Adhere to general SAR and migratory bird mitigation measures listed elsewhere in this table • Follow Tree Protection and Hording ESG (ESG-4-Pre), Vegetation Clearing and Protection ESG (ESG-5-Pre), and Revegetation ESG (ESG-1-Post) to protect and enhance habitat • Adhere to current minimal vegetation clearing plan which impacts only a very small area of forest edge habitat on the south bank, to avoid permit requirements under the SARA for destruction of critical habitat. Any significant change to the existing plans with regards to encroachment on forest habitat may require revaluation of critical habitat impacts	Magnitude: Low Reversibility: Low Geographic Extent: Low Duration: Low Frequency: Low	Negligible residual impacts anticipated following the implementation of prescribed mitigation.	None identified
	Disturbance of nesting habitat or active nests of other SAR birds (e.g., Eastern Meadowlark, Bobolink, Wood Thrush) during construction.	• Adhere to general SAR and migratory bird mitigation measures listed elsewhere in this table • Inspect suitable habitats for the presence of birds or bird nests prior to any clearing, passage of vehicles/equipment, or other disturbance	Magnitude: Low Reversibility: Low Geographic Extent: Low Duration: Low Frequency: Low	Negligible residual impacts anticipated following the implementation of prescribed mitigation.	Monitor for birds and bird nests in the work area during construction
	Removal or damage of Butternut: Butternuts were identified in close proximity to the south side of the dam on Parks Canada land.	• Disturbance or removal of Butternut will be avoided by retaining the adjacent wing wall and completing removal of the existing dam with care from the upstream side	Magnitude: Low Reversibility: Low Geographic Extent: Low Duration: Low	Negligible since trees may be avoided.	Vegetation removal areas to be reviewed prior to clearing to ensure no additional

VALUED COMPONENT (VC)	POTENTIAL ENVIRONMENTAL EFFECTS	MITIGATION	POTENTIAL EFFECTS FOLLOWING MITIGATION	SIGNIFICANCE OF RESIDUAL EFFECTS	INSPECTION/ MONITORING REQUIREMENTS
		• Follow Tree Protection and Hording ESG (ESG-4-Pre) with Butternuts identified as specimen trees to be retained • A permit under Section 73 of the SARA would be required if any Butternut trees need to be removed or will be damaged in order to demolish the existing dam • Vegetation removal areas should be surveyed prior to clearing to ensure no additional Butternut are present (particularly saplings)	Frequency: Low		Butternut are present
	Disturbance of SAR bat species during summer roosting or maternity periods: removal of cavity/snag trees within the mixed forest identified north of the dam.	• Adhere to current minimal vegetation clearing plan which requires removal of only few isolated trees not connected to forest habitat • Removal of trees should take place outside of the maternity period - the breeding bird protection window specified previously (April 1st to August 31st) will also serve to protect bats, as bat summer roosting habitat overlaps spatially and temporally with migratory breeding bird habitat. • Implement the Site Restoration Plan to provide replacement trees for those that are removed	Magnitude: Low Reversibility: Low Geographic Extent: Low Duration: Low Frequency: Low	Negligible residual impacts anticipated following the implementation of prescribed mitigation. Additional roost habitat is present in the surrounding landscape.	None identified
	Disturbance of cultural meadow habitat/pasture: this area could provide some habitat for Monarchs, although the majority of the area was observed to be grass-dominant with limited wildflowers and milkweed.	• Limited Monarch habitat has been observed. Impacts to butterfly habitat associated with the project should be minimal • Implement Site Restoration Plan to restore disturbed soils with a native seed mix containing wildflowers that appeal to nectaring butterflies. Consider including milkweed plants in the seed mix to increase Monarch breeding habitat	Magnitude: Low Reversibility: Low Geographic Extent: Low Duration: Low Frequency: Low	Negligible residual impacts anticipated following the implementation of prescribed mitigation.	None identified
	Impacts to SAR snakes: multiple species have been identified to have the potential to occur within the study area which could be impacted by construction activities.	• Adhere to SAR encounter protocol, discussed elsewhere in this table • Adhere to general snake protection measures (particularly exclusion fencing) listed elsewhere in this table	Magnitude: Low Reversibility: Low Geographic Extent: Low Duration: Low Frequency: Low	Negligible residual impacts anticipated following the implementation of prescribed mitigation.	Monitor for wildlife in the work area during construction. Monitor effectiveness and condition of wildlife exclusion fencing.
	Loss of potential habitat for Gray Ratsnake: the study area contains critical habitat for this species (see Section 3.3.7).	• Adhere to general SAR protection measures discussed elsewhere in this table • Adhere to general snake protection measures (particularly exclusion fencing) listed elsewhere in this table. Exclusion fencing will be specific to Gray Ratsnake heights and requirements to ensure effectiveness	Magnitude: Low Reversibility: Low Geographic Extent: Low Duration: Low Frequency: Low	Negligible residual impacts anticipated following the implementation of prescribed mitigation.	Monitor roadways for the presence of basking snakes and/or roadkill occurrences Post-construction monitoring to

VALUED COMPONENT (VC)	POTENTIAL ENVIRONMENTAL EFFECTS	MITIGATION	POTENTIAL EFFECTS FOLLOWING MITIGATION	SIGNIFICANCE OF RESIDUAL EFFECTS	INSPECTION/ MONITORING REQUIREMENTS
		(i.e., minimum of 1.4 m high and constructed with a smooth surface such as Poly Sheeting sealed tightly to the ground). Fencing will enclose the entire work area and access road, and will hook south at the end near Crow Lake Road to prevent snakes from being directed onto the road • Ensure that potential hibernacula remain outside construction area and remains accessible • Ensure that wildlife crossing culverts are installed to provide access across construction roads, particularly during hibernacula access periods • Require drivers using access roads to drive slowly and scan for the presence of snakes on the road surface • Any oviposition habitat (e.g., compost or debris piles) should be relocated or recreated outside of the work area close by, if they cannot be avoided • Provide basking/cover logs post-construction • If the access road is determined to cause mortality of snakes either during construction or long-term operation, additional mitigation requirements will need to be evaluated to address this issue			determine the long-term impacts of the access road re: snake mortality
	Harm to nesting SAR turtles and eggs: potential Turtle nesting habitat (areas of exposed, loose substrate, sand or gravel) was identified within the study area. In addition, disturbed ground and stockpiled materials may attract turtles looking for a suitable nesting location.	• Adhere to turtle protection measures described elsewhere in this table • Adhere to SAR encounter requirements discussed elsewhere in this table	Magnitude: Low Reversibility: Low Geographic Extent: Low Duration: Low Frequency: Low	Negligible residual impacts anticipated following the implementation of prescribed mitigation.	Monitor for wildlife in the work area during construction. Monitor effectiveness and condition of wildlife exclusion fencing
	Harm to overwintering turtles: in-water construction during the turtle over wintering season (October – April) within wintering habitat could impact turtles.	• Work area should be isolated by cofferdams prior to the turtle over-wintering period • If turtles are found within the work area, SAR reporting measures should be followed (Parks Canada should be contacted and will provide guidance)	Magnitude: Low Reversibility: Low Geographic Extent: Low Duration: Low Frequency: Low	No residual impacts anticipated. Construction to take place outside of turtle overwintering season.	None identified
Species at Risk (Aquatic)	MNRF records indicate the presence of the American Eel in Christie Lake and Tay River and historically in Bobs Lake. All works affecting fish and fish habitat could impact this species.	• Implement Aquatic Resources Management Plan • Follow Wildlife and Species at Risk Protection During Construction ESG (ESG-17-C) • The area surrounding the dam does not provide critical habitat for American Eel. Impacts to this SAR are not anticipated; the Fish and Fish Habitat mitigation measures	Magnitude: Low Reversibility: Low Geographic Extent: Low Duration: Low Frequency: Low	Negligible residual impacts anticipated following the implementation of prescribed mitigation.	None identified

VALUED COMPONENT (VC)	POTENTIAL ENVIRONMENTAL EFFECTS	MITIGATION	POTENTIAL EFFECTS FOLLOWING MITIGATION	SIGNIFICANCE OF RESIDUAL EFFECTS	INSPECTION/ MONITORING REQUIREMENTS
		described above will provide protection for this species should it be found in the project area • Future American Eel upstream and downstream passage across the dam has been considered in the design			
Migratory Birds	Disturbance or destruction of active bird nests due to construction activities, particularly the clearing of vegetation - in contravention of the *Migratory Birds Convention Act*.	• Adhere to the Wildlife Protection and Management Plan and the general measures for wildlife protection listed elsewhere in this table • Minimize or avoid vegetation clearing wherever possible by siting staging areas and access roads away from existing vegetation. The construction area should be clearly marked and be as small as possible • Complete necessary vegetation removals outside of the bird nesting season (specified as April 1st to August 31st by Parks Canada). Removals of isolated trees in areas of low complexity habitat may proceed within the nesting season provided a qualified biologist completes a bird nest survey and confirms the absence of active nests • If an active nest is found at any time, the area will be clearly marked and a buffer established to avoid further disturbance. Appropriate buffer should be determined in consultation with Parks Canada; no vegetation is to be removed until Parks Canada has reviewed and approved of the report from the avian specialist. • Implement the Site Restoration Plan to compensate for removed vegetation and restore bird nesting habitat	Magnitude: Low Reversibility: Low Geographic Extent: Low Duration: Low Frequency: Low	Negligible residual impacts anticipated following the implementation of prescribed mitigation.	Monitoring health of landscape plantings during the warranty period following the construction Vegetation protection monitoring during construction
Indigenous Interests	The construction of the Bobs Lake Dam and associated construction should have regard for Indigenous interests.	• Parks Canada engagement with Algonquin First Nations Consultation Office (ACO) occurred in February 2017; ongoing engagement with ACO is planned by Parks Canada	Magnitude: Low Reversibility: Low Geographic Extent: Low Duration: Low Frequency: Low	Negligible residual impacts anticipated following the implementation of prescribed mitigation.	Walleye spawning habitat monitoring pre- and post-construction to ensure there is no impact to Indigenous interests
	Impacts to previously undiscovered archaeological resources during construction.	• In the event that there is an unexpected discovery of an archaeological resource, work in the area must stop immediately and the Parks Canada Project Manager must be contacted for guidance on how to proceed	Magnitude: Low Reversibility: Low Geographic Extent: Low Duration: Low Frequency: Low	Negligible residual impacts anticipated following the implementation of prescribed mitigation.	None identified
Health and Socio Economic	Although it has not been confirmed, paint used as coating on the structure (such as the railings) may contain	• Adhere to the requirements of the Waste Management Plan	Magnitude: Low Reversibility: Low	Negligible residual impacts anticipated	None identified

VALUED COMPONENT (VC)	POTENTIAL ENVIRONMENTAL EFFECTS	MITIGATION	POTENTIAL EFFECTS FOLLOWING MITIGATION	SIGNIFICANCE OF RESIDUAL EFFECTS	INSPECTION/ MONITORING REQUIREMENTS
	lead, which could be detrimental to worker health and safety.	• The Contractor will be responsible for proper handling and disposal of paint coated material in accordance with contract specifications	Geographic Extent: Low Duration: Low Frequency: Low	following the implementation of prescribed mitigation.	
Physical and Cultural Heritage and HAPA Significance	Disturbance/destruction of the northern portion of the original 1821 dam will occur to accommodate the new dam. The original dam has been identified as having Cultural Heritage Significance	• Preservation and recording of the remains on the south shore and excavation of the north shore remains is recommended. Refer to report by Paterson Group Inc., 2017 • A 5 m buffer should be implemented for cofferdam placement or construction activity prior to dewatering • Should the area be de-watered by cofferdam, the 1821 dam should be carefully covered with geotextile or another suitable covering to keep it wet in order to preserve the structure of the waterlogged wood and should otherwise be protected from any construction related impacts • The archaeologist should be present during any trial and final de-watering of the zone downstream of the coffer dam and have immediate access, when feasible, upon engineering certification of the coffer dam to record in detail the 1821 dam while the cofferdam is in place • Following de-watering and during construction activity, a 5 m archaeological monitoring buffer should be implemented around the 1821 dam. In the event that ground disturbance is to occur within the 5 m buffer zone, a licensed underwater archaeologist should be present to ensure in situ resources are not impacted • Portions of the 1821 dam that cannot be provided long term protection and avoidance through the re-alignment of the proposed dam should be subject to Stage 4 mitigation of development impact via excavation conducted by a licensed archaeologist to determine subsurface extents and construction techniques	Magnitude: Mod Reversibility: High Geographic Extent: Low Duration: High Frequency: Low	Insignificant While there is a permanent disturbance of a cultural resource, there will be detailed excavation and data recording of the resource prior to removal.	Licensed archaeologist to monitor during dewatering activities and any excavation within the 5 m archaeology monitoring zone.
Soil	Potential contamination of soil within the construction area through accidental spills of deleterious substances, machinery and storage of chemicals/petroleum products.	• Follow Use and Maintenance of Heavy Equipment, Vehicle and Equipment Washing and Cleaning, and Refueling and Spill Management ESGs (ESG-15-C, ESG-16-C, and ESG-13-C, respectively) • Maintain equipment to ensure no fluid leaks and that all vehicles entering the site are in clean condition	Magnitude: Low Reversibility: Low Geographic Extent: Low Duration: Low Frequency: Low	Negligible residual impacts anticipated following the implementation of prescribed mitigation.	Daily inspections will be conducted by the contractor and any spills will be reported to MOECC and/or Parks Canada

VALUED COMPONENT (VC)	POTENTIAL ENVIRONMENTAL EFFECTS	MITIGATION	POTENTIAL EFFECTS FOLLOWING MITIGATION	SIGNIFICANCE OF RESIDUAL EFFECTS	INSPECTION/ MONITORING REQUIREMENTS
		• All lubricants, petroleum products, and chemicals should be stored in secure, impermeable areas • Implement Spill Prevention and Emergency Response Plan • Implement a Fuel Management Plan • Implement a Hazardous Materials Management Plan • In the event of a spill it must be cleaned up immediately and the Ministry of the Environment and Climate Change Spill Action Centre and Parks Canada's Project Manager notified • Contaminated soil must be disposed of at an appropriate facility that accepts contaminated soil			
	Risk of landslides caused by excavations in the embankment.	• Maintain appropriate setbacks for heavy machinery where embankments are unstable and during periods where soils are saturated (spring and fall, after heavy rains, etc.)	Magnitude: Low Reversibility: Low Geographic Extent: Low Duration: Low Frequency: Low	Negligible residual impacts anticipated following the implementation of prescribed mitigation.	None identified
	Due to the fine graded nature of the soils (glaciomarine deposits) within the project area, increased risk of erosion and sedimentation. Presence of silt may cause increased suspension and inability to settle fines out of wastewater, and discharge waters.	• The implemented Erosion and Sediment Control Plan should have regard for local condition to ensue sediment is adequately managed • Follow Erosion and Sediment Control ESGs (ESG-1-Pre and ESG-2-Pre) • Follow Treatment of Discharge Waters ESG (ESG-14-C)	Magnitude: Low Reversibility: Low Geographic Extent: Low Duration: Low Frequency: Low	Negligible residual impacts anticipated following the implementation of prescribed mitigation.	ESC monitoring during construction Water Quality Monitoring during construction
Surface Water	Contamination of the watercourse due to transport of debris, point or non-point sources of pollution (e.g. leaks and accidental spills, use of unclean material, inputs of contaminants from construction activities and from surface runoff).	• Mitigation measures described in this table under Fish and Fish Habitat should be implemented and followed. Every action must be taken to ensure deleterious substances do not enter the watercourse • Implement Surface Water, Erosion and Sediment Management Plan • Implement Spill Prevention and Emergency Response Plan • Implement Dewatering and Wastewater Management Plan • In the event of a spill it must be immediately contained and reported by notifying; the Ministry of the Environment and Climate Change Spill Action Centre, the DFO, and the Parks Canada Project Manager	Magnitude: Low Reversibility: Low Geographic Extent: Low Duration: Low Frequency: Low	Negligible residual impacts anticipated following the implementation of prescribed mitigation.	ESC monitoring during construction Water Quality Monitoring during concrete pour, chipping, sediment removal, and other higher risk construction activities
Ground-water	Groundwater contamination through spills from machinery, chemicals and petroleum products stored within the study area.	• Implement Spill Prevention and Emergency Response Plan • Implement a Fuel Management Plan • Implement the mitigation measures described in the Soil section of this table, above	Magnitude: Low Reversibility: Low Geographic Extent: Low Duration: Low	Negligible residual impacts anticipated following the implementation	None identified

VALUED COMPONENT (VC)	POTENTIAL ENVIRONMENTAL EFFECTS	MITIGATION	POTENTIAL EFFECTS FOLLOWING MITIGATION	SIGNIFICANCE OF RESIDUAL EFFECTS	INSPECTION/ MONITORING REQUIREMENTS
		• No drinking water intakes were identified in the vicinity of the dam • Well monitoring will not be undertaken, as per Parks Canada, for this project	Frequency: Low	of prescribed mitigation.	
	Groundwater levels are assumed to be at lake level within the study area. Cofferdam dewatering during construction has the potential to alter groundwater levels.	• The effects on groundwater levels from dewatering are anticipated to be non-existent. The amount of dewatering required relative to the surrounding volume of water is minuscule (GHD 2015). Water taken from the cofferdam area will be treated and returned to the watercourse • For construction dewatering, a Permit to Take Water (PTTW) or Environmental Activity and Sector Registry (EASR) may be required. A qualified professional should assess the potential for impacts due to the taking and propose any mitigation techniques as required.	Magnitude: Low Reversibility: Low Geographic Extent: Low Duration: Low Frequency: Low	No residual impacts anticipated.	Operational constraints and monitoring as requirements of the PTTW.
Terrestrial Vegetation	Removal of trees and shrubs and clearing of herbaceous ground cover to accommodate construction of the new dam, access road, and parking area. Per current construction plans, necessary vegetation removal will be minimal, no more than might occur naturally due to windfall or storm events.	• Implement the Site Restoration Plan using native shrub species for site restoration and replacement of lost habitat/vegetation • Follow Tree Protection and Hording ESG (ESG-4-Pre), Vegetation Clearing and Protection ESG (ESG-5-Pre), and Revegetation ESG (ESG-1-Post) • Adhere to current vegetation clearing plan and continue to minimize removals and disturbance as much as possible	Magnitude: Moderate Reversibility: Low Geographic Extent: Low Duration: High Frequency: Low	Negligible residual impacts anticipated – new plantings will take time to establish and grow on the site	Monitoring health of plantings during the warranty period following construction
	Occurrence of or increase to invasive species on the site as a result of construction disturbance. Dog-strangling Vine (*Vincetoxicum* sp.) is noted as a species of concern for the area per EDD mapping but other species may opportunistically occur.	• A pre-construction survey should be conducted to identify potential invasive species onsite. Specific strategies to address management of these species during disturbance should be included in a Environmental Management Plan. • Follow Invasive Species Management ESG (ESG-11-C) during construction • Utilize cover treatment during post-construction seeding to prevent erosion and provide weed control • Monitor seeding area post-construction and respond to incursions of invasive species with appropriate removal protocols	Magnitude: Low Reversibility: Low Geographic Extent: Low Duration: Low Frequency: Low	Negligible – some invasive plants could take advantage of site disturbance but the area is small enough that this may be managed	Post-construction monitoring of affected areas to determine growth of invasive species
Terrestrial Wildlife and Habitat	Harm to or mortality of any wildlife in the work area: wildlife encounters could occur within the construction area while construction activities are taking place.	• Adhere to the Wildlife Protection and Management Plan, and to the Wildlife and Species at Risk Protection During Construction ESG (ESG-17-C) • Animals must not be harmed or harassed at any time by on-site workers. If an animal enters the work area, work in the vicinity will cease until the animal has left the area	Magnitude: Low Reversibility: Low Geographic Extent: Low Duration: Low Frequency: Low	Negligible residual impacts anticipated following the implementation of prescribed mitigation.	Monitor for wildlife in the work area during construction

VALUED COMPONENT (VC)	POTENTIAL ENVIRONMENTAL EFFECTS	MITIGATION	POTENTIAL EFFECTS FOLLOWING MITIGATION	SIGNIFICANCE OF RESIDUAL EFFECTS	INSPECTION/ MONITORING REQUIREMENTS
		• Handling of wild animals is discouraged; handling of SAR is prohibited without a permit unless there is an imminent, unavoidable threat to the animal's health. If physical removal of an animal from the work area is unavoidable, this removal should be completed by a qualified individual. The animal should be gently and carefully placed outside of the construction area, out of harm's way and in an area of similar habitat • If an animal is injured during the course of construction, a qualified wildlife rehabilitator should be contacted to provide guidance and, if needed, administer care to the animal. A list of qualified rehabilitators may be found at the following site: https://www.ontario.ca/page/find-wildlife-rehabilitator • Thorough daily sweeps should be conducted to ensure wildlife is not present within the construction area which could be harmed • Maintain the site in a clean condition; avoid litter and garbage which could attract animals • Limit vehicle speeds on the site and access routes to avoid collisions with animals			
	Noise impacts: temporary disturbance of wildlife due to increased noise from construction activities.	• Adhere to noise mitigation measures discussed elsewhere in this table • Follow Noise, Vibration, and Ambient Light Management Plan	Magnitude: Low Reversibility: Low Geographic Extent: Low Duration: Low Frequency: Low	Negligible residual impacts anticipated following the implementation of prescribed mitigation. Wildlife to temporarily avoid the area during construction.	None identified
	Direct harm to or mortality of snakes during construction: snakes entering the work area may come into conflict with workers or equipment.	• Adhere to the Wildlife Protection and Management Plan and the general measures for wildlife protection listed above • Snake mitigation measures must be applied during all stages of the project - i.e., during site preparation and vegetation removal, active construction, and site clean-up • Install and maintain wildlife exclusion fencing around the perimeter of the work area (see also: the section below concerning turtles). Gray Ratsnakes	Magnitude: Low Reversibility: Low Geographic Extent: Low Duration: Low Frequency: Low	No residual impacts anticipated.	Monitor for wildlife in the work area during construction. Monitor effectiveness and condition of wildlife exclusion fencing.

VALUED COMPONENT (VC)	POTENTIAL ENVIRONMENTAL EFFECTS	MITIGATION	POTENTIAL EFFECTS FOLLOWING MITIGATION	SIGNIFICANCE OF RESIDUAL EFFECTS	INSPECTION/ MONITORING REQUIREMENTS
		may be able to climb this fencing so continued monitoring inside the perimeter will be required • Fences for the Gray Ratsnake need to be a minimum of 1.4 m high and constructed with a smooth surface such as Poly Sheeting sealed tightly to the ground. • Snake passage across the access road may be required • Any construction equipment or materials that could provide snake habitat (such as vehicles which are left idle for extended periods, piles of debris or rocks, and flat pieces of wood or metal) should be checked for the presence of snakes prior to their disturbance or removal. The access road surface should be reviewed for basking snakes prior to vehicle passage • The use of netted erosion control blanket or other products containing plastic or wire mesh is prohibited due to the risk of snake entanglement			
	Interference with snake hibernation habitat: rocky outcrops on the north lakeshore could potentially be associated with hibernacula. Construction for this project is anticipated to begin in the summer and extend into the following winter, so snakes actively seeking out hibernacula in or near the work area may be affected. Clean-up activities proposed for spring, 2017 could also impact snakes emerging from hibernation.	• To preserve potential snake hibernation habitat, construction disturbance (i.e., excavation, stockpiling of materials) of rocky outcrops should be avoided as much as possible • Workers must be mindful that snakes may be concentrated around hibernacula and basking sites in early spring and late fall. Increased monitoring for wildlife may be appropriate as snakes could be slower-moving and more vulnerable to harm • Any observations of snakes concentrating on or near the rocky areas should be documented and reported to Parks Canada immediately.	Magnitude: Low Reversibility: Low Geographic Extent: Low Duration: Low Frequency: Low	Negligible residual impacts anticipated following the implementation of prescribed mitigation.	Monitor for wildlife in the work area during construction
	Direct harm to or disturbance of turtles that enter the work site and/or turtle nests within the work area. Potential turtle nesting habitat (areas of exposed, loose substrate, sand or gravel) was identified within the work area. In addition, disturbed ground and stockpiled materials may attract turtles looking for a suitable nesting location. Construction activities could put turtles and their eggs in harm's way.	• Adhere to the Wildlife Protection and Management Plan and the general measures for wildlife protection listed elsewhere in this table. • Install and maintain wildlife exclusion fencing around the perimeter of the work area. • Fencing should be securely keyed into the ground. Refer to the MNRF Best Management Practices for Mitigating the Effects of Roads on Amphibian and Reptile Species at Risk (2016) guideline document. • Any potential or confirmed turtle nest within the work area will not be	Magnitude: Low Reversibility: Low Geographic Extent: Low Duration: Low Frequency: Low	Negligible residual impacts anticipated following the implementation of prescribed mitigation.	Monitor for wildlife in the work area during construction and monitor effectiveness and condition of wildlife exclusion fencing

VALUED COMPONENT (VC)	POTENTIAL ENVIRONMENTAL EFFECTS	MITIGATION	POTENTIAL EFFECTS FOLLOWING MITIGATION	SIGNIFICANCE OF RESIDUAL EFFECTS	INSPECTION/ MONITORING REQUIREMENTS
		disturbed; if a nest is found, Parks Canada should be contacted immediately for guidance.			
	Direct harm or impact to over-wintering turtles: in-water construction during the late fall and winter could impact turtles attempting to over-winter in accumulated sediment upstream of the dam.	• Adhere to the Wildlife Protection and Management Plan and the general measures for wildlife protection listed above. • Cofferdams must be installed prior to October 1st to protect overwintering turtles. • Minimize the area that is isolated and dewatered for construction as much as possible	Magnitude: Low Reversibility: Low Geographic Extent: Low Duration: Low Frequency: Low	No residual impacts anticipated.	None identified
	Loss of turtle over-wintering habitat: elimination of deep water and accumulated sediment between the existing and new dam.	• No mitigation proposed. The area between the existing dam and the new dam will be permanently changed from deep water lake habitat to riverine. However, the area affected is very small compared to the overall extent of habitat available in Bobs Lake, and is not likely to provide high-quality habitat due to the regular operations of the dam itself	Magnitude: Low Reversibility: High Geographic Extent: Low Duration: Low Frequency: Low	Insignificant residual effects - loss of overwintering habitat is small.	None identified
Air Quality	Air quality degradation through dust and particulate emissions arising from construction activities and the operation of machinery.	• Implement Dust and Air Quality Management Plan • The effects on air quality from construction activities are generally controlled by good construction practice and proper equipment function • Anti-pollution systems on vehicles will be operational and meet regulatory requirements • Avoid work that will cause excessive dust during windy days • Apply water as a dust suppressant on access roads and staging areas, as required • Cover stockpiled material • Machinery will be turned off when not in use	Magnitude: Low Reversibility: Low Geographic Extent: Low Duration: Low Frequency: Low	Negligible residual impacts anticipated following the implementation of prescribed mitigation.	Informal monitoring of complaints related to dust and air quality
Noise	Noise from construction and demolition activities may be an irritant for local land owners and recreational users of Bobs Lake.	• Implement Noise, Vibration and Ambient Light Management Plan • Ensure that noise is source-controlled where practical • Use new or well-maintained equipment and machinery, preferably with fully functional emission control systems/muffler/exhaust system baffles, and engine covers • Avoid unnecessary idling of machinery and vehicles on the work site	Magnitude: Low Reversibility: Low Geographic Extent: Low Duration: Low Frequency: Low	Negligible residual impacts anticipated following the implementation of prescribed mitigation.	Informal monitoring of complaints related to noise outside of by-law restrictions
Waste Management and	Construction waste and demolition material could result in negative environmental effect if left	• The Contractor will develop and implement a Waste Management Plan in accordance with PWGSC policies (Parks Canada pers. comm., 2016)	Magnitude: Low Reversibility: Low Geographic Extent: Low	Negligible residual impacts anticipated	Monitoring and reporting requirements as per the Waste

VALUED COMPONENT (VC)	POTENTIAL ENVIRONMENTAL EFFECTS	MITIGATION	POTENTIAL EFFECTS FOLLOWING MITIGATION	SIGNIFICANCE OF RESIDUAL EFFECTS	INSPECTION/ MONITORING REQUIREMENTS
Designated Substances	onsite or deposited into the watercourse.	and Parks Canada ESG Document (July 2017) • Demolition or construction debris is not to be deposited in any watercourse; inert concrete will be considered a deleterious substance	Duration: Low Frequency: Low	following the implementation of prescribed mitigation.	Management Plan
	Although it has not been confirmed, paint used as coating on the structure (such as the railings) may contain lead, which could 0062e detrimental to worker health and safety.	• Adhere to the requirements of the Waste Management Plan • The Contractor will be responsible for proper handling and disposal of paint coated material in accordance with contract specifications	Magnitude: Low Reversibility: Low Geographic Extent: Low Duration: Low Frequency: Low	Negligible residual impacts anticipated following the implementation of prescribed mitigation.	None identified
Contamination	Potential contamination of existing sediment within the watercourse could affect human health and ecological integrity.	• Based on a Parks Canada Sediment Assessment Screening for the site, the potential impact to workers health and the environment is low • If contaminated soils are encountered during construction, appropriate measures will be taken to ensure that it addressed in a way that reduces ecological and human health risks	Magnitude: Low Reversibility: Low Geographic Extent: Low Duration: Low Frequency: Low	Negligible residual impacts anticipated following the implementation of contingency mitigation.	None identified

6.3 ENVIRONMENTAL PROTECTION PLANS

As a result of the proposed construction activities, mitigation plans are recommended to be developed and incorporated in the contractors Environmental Management Plan prior to construction activities commencing on site. Each Plan will form a 'component' of the overall Environmental Management Plan (EMP). These plans are intended to detail aspects of the project such as proposed methods, strategies, structures, facilities, equipment and systems critical to environmental protection; all proposed environmental protection and mitigation measures, monitoring and follow-up activities; all relevant standards and guidelines; and, all performance criteria applicable to the project. The Contractor's EMP must be prepared by a Qualified Professional(s), signed and submitted to Parks Canada, for review and acceptance prior to mobilization to site and the commencement of work. All Plans must be consistent with Parks Canada Environmental Standards and Guidelines Document. The suggested plans have been identified in Table 9, and are described below.

6.3.1 SPILLS PREVENTION AND EMERGENCY RESPONSE PLAN

The purpose of the Spills Prevention and Emergency Response Plan is to minimize the risk of accidents and malfunctions; minimize the risk to worker and public health and safety; minimize disturbance and protect aquatic and terrestrial resources; effective respond to spills and other emergency on-site (Parks, 2017). A written plan is to be prepared which will document the prevention and response procedures, instructions, and reports to be used in event of unforeseen spills. Spills or discharge of pollutants or contaminants are to be reported immediately. Cleanup shall be initiated quickly to ensure the protection of the environment.

As per Parks Canada (2017) the component plan shall:

- Define project and site-specific objectives
- List the applicable legislative and regulatory requirements
- Describe the on-site roles and responsibilities for spills and emergency response

- Tabulate applicable EIA commitments, terms and conditions of approval and relevant environmental standards and guidelines with respect to spills prevention and emergency response procedures, including procedures for:
    - reporting a spill
    - stopping the spill if possible
    - containing the spill
    - protecting the area of the spill
    - removing the material to an approved location for storage or disposal
- Describe monitoring and reporting requirements
- Provide cross-references to other component plans

6.3.2 FUEL MANAGEMENT PLAN

The purpose of the Fuel Management Plan is to: minimize the risk of accidents and malfunctions; minimize risks to worker and public health and safety.

As per Parks Canada (2017) the component plan shall:

- Define project and site-specific objectives
- List the applicable legislative and regulatory requirements
- Identify the locations and provide descriptions of facilities for fuel transfer and storage
- Describe the fuel handling, transfer and storage procedures
- Provide equipment refueling plans
- Provide an inventory and location of spill equipment to be stored on-site
- Tabulate applicable EIA commitments, terms and conditions of approval and relevant environmental standards and guidelines
- Describe approach to construction site winterization and/or winter operations
- Describe the maintenance program for all structures, facilities, equipment and systems critical to environmental protection
- Provide cross-references to other component plans

6.3.3 WASTE MANAGEMENT PLAN

The purpose of the Waste Management Plan is to: minimize the generation and need for disposal of hazardous and non-hazardous waste; minimize risk to worker and public health and safety. The Waste Management Plan will form a component of the Demolition Plan (described below).

As per Parks Canada (2017) the component plan shall:

- Define project and site-specific objectives
- List the applicable legislative and regulatory requirements
- Identify the locations and provide descriptions of waste storage, recycling and/or disposal facilities on-site.
- Identify all off-site disposal facilities to be utilized and confirm their licensing status
- Describe site house-keeping procedures
- Describe the measures and procedures to minimize wildlife attraction to wastes
- Describe procedures for waste minimization, recycling, storage and disposal of hazardous and non-hazardous wastes, including wastes generated by:
    - vegetation removal
    - earthworks (i.e., overburden stripping
    - dredging and sediment removal
- Tabulate applicable EIA commitments, terms and conditions of approval and relevant environmental standards and guidelines

6.3.4 NOISE, VIBRATION AND AMBIENT LIGHT MANAGEMENT PLAN

The Purpose of the Noise, Vibration and Ambient Light Management Plan is to: minimize the potential effects and disruption to residents, businesses, community facilities recreation tourist activities.

As per Parks Canada (2017) the component plan shall:

- Define project and site-specific objectives
- List the applicable legislative and regulatory requirements
- Describe the key sources of noise, vibration and light (e.g., equipment, works and activities) associated with the Project
- Identify the locations and provide a description of sensitive receptors
- List the key methods, strategies, structures, facilities, equipment and systems critical to noise, vibration and ambient light management
- Describe approach to construction site winterization and/or winter operations
- Tabulate applicable EIA commitments, terms and conditions of approval and relevant environmental standards and guidelines
- Describe the maintenance program for all structures, facilities, equipment and systems critical to environmental protection
- Describe the approach to adaptive management
- Describe monitoring and reporting requirements

6.3.5 DUST AND AIR QUALITY MANAGEMENT PLAN

The purpose of the Dust and Air Quality Management Plan is to minimize potential effects and disruption to residents, businesses, community facilities, recreational and tourist facilities.

As per Parks Canada (2017) the component plan shall:

- Define project and site-specific objectives.
- List the applicable legislative and regulatory requirements
- Describe the key sources of dust and air emissions (e.g., equipment, works and activities) associated with the Project
- Identify the locations and provide a description of sensitive receptors
- List the key methods, strategies, structures, facilities, equipment and systems critical to dust and air quality management
- Describe approach to construction site winterization and/or winter operations
- Tabulate applicable EIA commitments, terms and conditions of approval and relevant environmental standards and guidelines
- Describe the maintenance program for all structures, facilities, equipment and systems critical to environmental protection
- Describe the approach to adaptive management
- Describe monitoring and reporting requirements

6.3.6 HAZARDOUS MATERIALS MANAGEMENT PLAN

The purpose of the Hazardous Material Management Plan is to identify the procedures for the transportation, storage and safe use of hazardous material on-site.

As per Parks Canada (2017) the component plan shall:

- Define project and site-specific objectives
- List the applicable legislative and regulatory requirements
- Identify the locations and provide descriptions of hazardous materials storage facilities on-site
- Identify all off-site disposal facilities to be utilized and confirm their licensing status
- Provide an inventory of hazardous materials that will be used on-site
- Provide MSDS for all hazardous materials in use or to be stored on-site
- Provide an inventory and location of spill equipment to be stored on-site
- List the personnel trained to handle hazardous materials.
- Tabulate applicable EIA commitments, terms and conditions of approval and relevant environmental standards and guidelines
- Describe approach to construction site winterization and/or winter operations.
- Describe the maintenance program for all structures, facilities, equipment and systems critical to environmental protection
- Provide cross-references to other component plans.

6.3.7 DEWATERING AND WASTEWATER MANAGEMENT PLAN

The purpose Dewatering and Wastewater Management Plan is to: control water takings from watercourses, waterbodies or from the ground from entering the construction site; to prevent contaminated water resulting from the dewatering process and wastewater management from being discharged into the environment; to isolate clean off-site water from contaminated construction water and to minimize the volume of contaminated water.

As per Parks Canada (2017) the component plan shall:

- Define project and site-specific objectives.
- List the applicable legislative and regulatory requirements.
- Confirm the need for a Provincial Permit to Take Water (PTTW) in accordance with the Ontario Water Resources Act (OWRA) and the Water Taking Regulation (O. Reg. 387/04) a regulation under the Act. Section 34 of the OWRA requires anyone taking more than a total of 50,000 litres of water in a day, with some exceptions, to obtain a Permit from a Director appointed by the Minister for the purposes of Section 34. The following water takings related to construction site dewatering and road construction may be eligible for registration in the Environmental Activity and Sector Registry (EASR):
    - Surface water takings related to specific road construction purposes; and
    - Groundwater and/or storm water takings of more than 50,000 L/day but less than 400,000 L/day for the purposes of construction site dewatering
- Describe the purpose of dewatering, sources and amount of water taking/removal required
- Describe the proposed dewatering and wastewater management methods, strategies, equipment and materials to be used, including any controls (that is, settling tank, turbidity curtain, etc.) and method of effluent discharge
- Provide at time schedule for dewatering works and activities
- Specify the anticipated dewatering flow rate and total dewatering duration
- Specify the anticipated wastewater volumes
- Specify water quality discharge criteria
    - If dewatering conducted in a contaminated area, engineering specifications for dewatering effluent treatment and details for an analytical monitoring program to ensure that effluent will meet water quality discharge criteria
    - If wastewater is to be discharged, engineering specifications for treated effluent and details for an analytical monitoring program to ensure that effluent will meet water quality discharge criteria
- Specify the point(s) of discharge
- Describe the maintenance program for all structures, facilities, equipment and systems critical to environmental protection

- Describe the approach to adaptive management (e.g., contingency plan in case of any emergency situation)
- Describe approach to construction site winterization and/or winter operations

6.3.8 DEMOLITION PLAN

The purpose of the Demolition Plan is to identify demolition procedures and timing. As per Parks Canada (2017) the component plan shall:

- Define project and site-specific objectives
- List the applicable legislative and regulatory requirements
- List and describe the buildings and structures to be demolished
- Provide time schedule for demolition works
- For each building and structure to be demolished provide the following information:
    - Historical and/or heritage status
    - Presence/absence of Species at Risk (e.g., bats)
    - Demolition waste types and volumes
    - Presence and volumes of hazardous materials
- Describe the procedures for:
    - Installation and removal of coffer dams
    - Noise abatement
    - Fugitive dust control
    - Treatment of discharge waters
    - Demolition waste management
    - Hazardous materials management
- Describe the approach to adaptive management (e.g., contingency plan in case of any emergency situation)
- Describe approach to construction site winterization and/or winter operations
- Provide cross-references to other component plans
- Describe monitoring and reporting requirements

6.3.9 SURFACE WATER, EROSION AND SEDIMENT MANAGEMENT PLAN

The purpose of the Surface Water, Erosion and Sediment Management Plan (Erosion and Sediment Control (ESC)) is to: control and mandate surface water from off-site and withint the project area; minimize the amount of erosion of erosion on site ; control the amount of sedimentation occuring on site; minimize the deposition of deleterious substances to surface waters and minimize sediment input to surface waters (Parks Canada, 2017).

As per Parks Canada (2017) the component plan shall:

- Define project and site-specific objectives
- List the applicable legislative and regulatory requirements
- Describe the key sources of emissions or discharges to surface waters (e.g., equipment, works and activities) associated with the Project
- Identify the key point and non-point sources of contaminants (e.g., equipment, material storage areas or stockpiles, waste management facilities, vehicle and equipment maintenance facilities).
- Identify need for alternative equipment, material storage or stockpile locations off-site.
- Provide at time schedule for in-water works
- Describe the soil types found on-site and their constraints with respect to, surface water management, erosion control, and sediment control
- Describe the surface water drainage patterns on the project site as well as coming on to the site and areas sensitive to erosion and sedimentation during each phase of the work.

- List the key methods, strategies, structures, facilities, equipment and systems critical to surface water management, erosion control, and sediment control
- Tabulate applicable EIA commitments, terms and conditions of approval and relevant environmental standards and guidelines
- Describe approach to construction site winterization and/or winter operations for all structures, facilities, equipment and systems critical to surface water management, erosion control, and sediment control
- Describe the maintenance program for all structures, facilities, equipment and systems critical to environmental protection
- Describe the approach to adaptive management
- Describe monitoring and reporting requirements

6.3.10 INVASIVE SPECIES MANAGEMENT PLAN

The purpose of the Invasive Species Management Plan is to control the spread of existing invasive plant infestations and prevent new infestations from establishing in the project area.

As per Parks Canada (2017), the component plan shall:

- Define project and site-specific objectives
- List the applicable legislative and regulatory requirements
- List the invasive species of concern on the project site (including area immediately surrounding the Project site)
- Tabulate applicable EIA commitments, terms and conditions of approval and relevant environmental standards and guidelines
- Describe the approach to adaptive management
- Describe monitoring and reporting requirements
- Provide cross-references to other component plans

6.3.11 VEGETATION PROTECTION PLAN

The purpose of the Vegetation Protection Plan to minimize and phase disturbance and protect native vegetation.

As per Parks Canada (2017), the component plan shall:

- Define project and site-specific objectives
- List the applicable legislative and regulatory requirements
- Describe the key Project works and activities with the potential to adversely affect native vegetation.
- Provide a time schedule for vegetation removal and/or ground disturbing activities
- Identify the locations and provide descriptions of areas to be disturbed and areas to be left undisturbed, including sensitive features (e.g., wetlands, woodlands, grasslands, valley lands, areas with Species at Risk)
- List the key methods, strategies, structures, facilities, equipment and systems critical to vegetation protection
- Tabulate applicable EIA commitments, terms and conditions of approval and relevant environmental standards and guidelines
- Describe approach to construction site winterization and/or winter operations
- Describe the maintenance program for all structures, facilities, equipment and systems critical to environmental protection
- Describe the approach to adaptive management
- Describe monitoring and reporting requirements
- Provide cross-references to other component plans

6.3.12 SITE RESTORATION PLAN

The purpose of the Site Restoration Plan is to minimize risks to worker and public safety; minimize long term effects on aquatic and terrestrial resources; to restore site aesthetics and minimize disruption to residents, businesses, community facilities, recreation and tourist activities.

As per Parks Canada (2017), the component plan shall:

- List the applicable legislative and regulatory requirements
- Provide a time schedule for site restoration works
- Identify areas to be restored and their respective restoration objectives
- Describe the restoration methods, vegetation to be used, etc.
- Tabulate applicable EIA commitments, terms and conditions of approval and relevant environmental standards and guidelines
- Describe approach to construction site winterization and/or winter operations
- Describe the approach to adaptive management
- Describe monitoring and reporting requirements
- Provide cross-references to other component plans

6.3.13 WILDLIFE PROTECTION AND MANAGEMENT PLAN

The purpose of the wildlife Protection and Management Plan is to minimize disturbance to wildlife and hazards associated with wildlife.

As per Parks Canada (2017), the component plan shall:

- Define project and site-specific objectives
- List the applicable legislative and regulatory requirements
- Describe the key Project works and activities with the potential to adversely affect wildlife
- Identify the locations and provide descriptions of any areas to be disturbed and areas to be left undisturbed, including sensitive features (e.g., bat roosts, snake hibernacula, wildlife dens, bird nests, wildlife crossing areas, salt licks). Describe exclusionary measures (if required)
- List the key methods, strategies, structures, facilities, equipment and systems critical to wildlife protection
- Tabulate applicable EIA commitments, terms and conditions of approval and relevant environmental standards and guidelines
- Describe the approach to nuisance wildlife control
- Describe approach to construction site winterization and/or winter operations
- Describe the maintenance program for all structures, facilities, equipment and systems critical to environmental protection
- Describe the approach to adaptive management
- Describe monitoring and reporting requirements
- Provide cross-references to other component plans

6.3.14 AQUATIC RESOURCES MANAGEMENT PLAN

The purpose of the Aquatic Resources Management Plan is to minimize disturbance and protect aquatic resources, including sensitive species their habitat.

As per Parks Canada (2017), the component plan shall:

- Define project and site-specific objectives
- List the applicable legislative and regulatory requirements
- Identify the locations and provide a description of in-water works

- Provide a time schedule for in-water works
- Identify the locations and provide a description of sensitive aquatic species and their habitat
- List the key methods, strategies, structures, facilities, equipment and systems critical to aquatic resources management
- Tabulate applicable EIA commitments, terms and conditions of approval and relevant environmental standards and guidelines
- Describe approach to construction site winterization and/or winter operations
- Describe the maintenance program for all structures, facilities, equipment and systems critical to environmental protection
- Describe the approach to adaptive management
- Describe monitoring and reporting requirements
- Provide cross-references to other component plans

6.3.15 SPECIES AT RISK PROTECTION PLAN

The purpose of the Species at Risk Protection Plan is to minimize the disturbance and protect aquatic and terrestrial Species at Risk and their habitat.

As per Parks Canada (2017), the component plan shall:

- Define project and site-specific objectives
- List the applicable legislative and regulatory requirements
- Provide a time schedule for vegetation clearing and in-water works
- Identify Species at Risk to be protected
- Identify the locations and provide a description of Species at Risk critical habitat or other habitat areas to be protected
- List the key methods, strategies, structures, facilities, equipment and systems critical to wildlife and aquatic resources management
- Tabulate applicable EIA commitments, terms and conditions of approval and relevant environmental standards and guidelines
- Describe approach to construction site winterization and/or winter operations.
- Describe the maintenance program for all structures, facilities, equipment and systems critical to environmental protection
- Describe the adaptive management approach
- Describe monitoring and reporting requirements
- Provide cross-references to other component plans

6.4 SIGNIFICANCE OF RESIDUAL EFFECTS

The analysis conducted within Table 9 of this report addresses the significance of residual effect/impacts on different VCs. The determination of significance of an impact included considerations of magnitude, reversibility, geographic extent, duration and frequency. For all components, it is anticipated that environmental impacts can be mitigated.

6.4.1 FISH AND AQUATIC HABITAT

The new dam will constrict the flow in the lake and act as a barrier to fish movement through the system. However, this is not a new impact; the old dam created the same environment. The most notable residual effect of this project is due to the repositioning of the dam upstream, thereby permanently changing the morphology and flow characteristics of the area between the existing and new dams. Areas affected downstream of the new dam include the loss of lacustrine habitat which will be reconstructed into riverine and riparian habitat. Fish habitat will also be lost due to footprint of the new dam.

Overall there will be a net loss of fish habitat as the morphology between the new dam and the existing dam changes from lake/reservoir to active river channel. Pelagic areas that were previously wetted will become dry and form the new river banks. Due to the turbulence and velocity of the water exiting the new dam any aquatic vegetation or organic debris in the aforementioned area will be lost from the system. A permanent change in slope and drainage patterns surrounding the worksites as a result of the new dam, removal of the old dam and construction of the access roads, may occur; however, no decrease in return volume is expected.

Table 10 presents the footprint in square metres of lacustrine habitat lost and the amount of riverine/riparian habitat created by the construction of the new dam and the proposed environmental rehabilitation (CIMA, 2017). While there is a permanent loss of vegetation and fish habitat, the affected area is extremely small relative to Bobs Lake as a whole and the vegetation and habitat is ubiquitous throughout the outlet bay. The loss of this type of fish habitat is not expected to impact the overall production of fish habitat in Bobs Lake and is expected to be negligible in the lake's fish populations. In addition, the potential exists to increase the Walleye spawning habitat in the area as part of the riverbed design and rehabilitation, which may be considered an overall benefit.

Table 10 – Quantifying Fish Habitat Loss/Gain by Type

HABITAT TYPE	HABITAT LOST (SQ. M)	HABITAT GAINED (SQ. M)
Lacustrine	907.30	-
Riverine	-	499.54
Riparian (including new shore area)	-	407.76
Fish Habitat (including new dam footprint)	448.11	-
TOTAL	1,355.41	907.30

Source: Adapted from CIMA, 2017.

A total of 1,355.41 m^2 of habitat area is lost, including the area taken by the footprint of the new dam, and a total of 907.30 m^2 of riverine and riparian habitat is created. The existing dam has a smaller footprint then the new dam, therefore its removal will not compensate for the net loss of fish habitat noted above. The loss of fish habitat will be compensated by the creation of quality habitat for Walleye as well as stable and treed riparian habitat (CIMA, 2017).

Additional measures have been incorporated into the design to satisfy the DFO issued, Letter of Advice (LOA; October 13th, 2017 – see Appendix I). These measures focus on dredging and the grading of new rock material in the channel rehabilitation area. As described in the Dredging and Sediment Removal ESG (ESG-6-C), and reiterated in the LOA, dredging activities will be isolated with a turbidity curtain and/or cofferdam sufficient to contain sediments within the dredged area. The isolation measures shall remain in place until the sediments have settled and the water within is the same clarity as the outside open water. Dredged spoils will either be removed immediately from the site, or placed on land and contained in a manner such that they do not erode back into the waterbody. Rock used for the streambed reconstruction has been designed for expected flows. In addition, the rock will be well graded in size, with small gravels and/or sand added as required to ensure that the interstitial spaces are sufficiently filled to keep water at the surface and avoid the creation of a rock drain.

Despite dredging efforts to remove the accumulated sediment between the old and new dams prior to the structure removal and release of water from the new dam into the newly constructed channel, some sediment (including sand or small gravel used to fill the interstitial spaces between the rock) may be transported to the downstream system. This phase of construction (opening of the new channel) will be closely monitored to ensure that CCME guidelines for suspended sediment are being adhered to. If suspended sediment exceedances to the guidelines are observed, construction activities will be paused or altered. While this residual impact will be greatly reduced by sediment removal and channel restoration, full mitigation is not expected. Including this effect, based on the documentation review and taking into account mitigation measures mentioned above, it is anticipated that the project is not likely to cause any significant adverse residual environmental effects to fish and aquatic habitats.

6.4.2 VEGETATION

The proposed construction involves some removal of vegetation from the site. Post-construction site restoration includes tree and shrub planting of native species to compensate for this loss, but there will be a period of transition in which the new vegetation establishes and grows, and portions of the site may transition through different successional stages. Overall, however, the number of plants and the geographic area affected is very small, and the surrounding landscape contains similar habitats which can provide similar habitat and landscape functions while this transition occurs. There are not anticipated to be significant residual effects in the long-term.

6.4.3 GOLDEN-WINGED WARBLER

The proposed construction area includes an area which fulfils the criteria for critical habitat of Golden-winged Warbler: namely, the open areas located within 50 m of the interface between forest and open habitats on the north shore of the lake. Permanent site alteration will consist of the creation of a seldom-used access road and parking area in what is currently pre-disturbed land; nonly a small number of trees and shrubs (totaling approx. 43 m^2) will be removed prior to construction. Further, the implementation of the Site Restoration Plan using native shrubs and trees will provide compensation for the small amount of removed vegetation, and the restoration area between the new and existing dams will be allowed to naturalize, providing new successional plant communities on the site as vegetation establishes. As vegetation removal will be along the forest edge, it is anticipated that activities may, in the long term, maintain the early successional requirements of the species as the Golden-winged Warbler has evolved to capitalize on the dynamic habitat created by periodic disturbances (Environment and Climate Change Canada, 2016). Therefore, it is not expected to be a significant loss or alteration of suitable habitat at the site.

6.4.4 GREY RATSNAKE

As a result of the proposed construction, there will be a small amount of vegetation removal from the site and the conversion of open pasture and disturbed land to a granular access road and parking area. As discussed above, these actions could result in a small loss of habitat for Grey Ratsnake and a disturbance to the species while it is excluded from the site during construction. Mitigation and protection measures have been prescribed to minimize the risk to Grey Ratsnakes both during and following the dam replacement, and habitat alteration is unlikely to affect the species' ability to use the site in the future. The residual effects of the project are therefore expected to be insignificant in the long term.

6.4.5 BUTTERNUT

It is currently anticipated that the noted Butternut location at the south end of the existing dam will not be disturbed, as the existing wing wall at this location will remain when the rest of the dam is demolished. There would be no residual effects associated with leaving the trees in place and protecting them from harm during construction.

However, if this area is disturbed and removal of Butternut trees must occur to accommodate the removal of the existing dam, this activity would fall under the requirements of the SARA. The two mature Butternut trees at this location were observed to be in very poor condition and as such do not contribute much to the overall conservation of this species (e.g., seed production). They were confirmed Category 1 ('non-retainable') by MNRF. The residual effects of their loss, therefore, are considered insignificant.

At least one Butternut sapling was also noted at this location by MNRF. If clearing must occur that affects a Butternut sapling, it is anticipated that these small specimens could be transplanted to a site outside of the work zone, and therefore the residual effects would be negligible so long as the trees were handled with care to ensure their health. Transplanting of Butternut would require a permit under the SARA.

6.4.6 BAT HABITAT

There are no anticipated impacts to regulated bat hibernation habitat, and there will be minimal tree removal to accommodate the new dam construction. So long as removal of those trees takes place outside of the typical maternity period for bats, direct impacts to the animals will be avoided. There is abundant additional habitat in the surrounding lands for bats to use during the construction period and beyond. Replacement trees will be planted as a post-construction restoration measure that will, in time, compensate for the vegetation that is lost. Based on these considerations, there are no anticipated residual impacts to bat SAR as a result of this project.

6.4.7 TURTLE HABITAT

A permanent loss of a small area of potential turtle habitat (overwintering, aquatic - lake) will occur between the existing dam and the new dam. The residual effects of this loss are considered insignificant because a) the area of loss is very small when compared to the total amount of potential habitat found along the shores of Bobs Lake, and b) the area immediately above the existing dam is thought to be lower-quality habitat due to the frequent changes in water and sediment levels caused by the dam, and the lack of natural riparian vegetation or wetland areas along the banks. Additionally, this area will be restored to riverine habitat (including placement of basking logs, which may result in a change of habitat to nesting and basking/feeding areas.

6.4.8 WILDLIFE HEALTH AND SAFETY

A key component of impact mitigation for this assignment will be ensuring the safety of wildlife by a) proactively excluding them from areas which will be affected by construction (e.g., through fencing or early vegetation removals), and b) requiring all on-site workers to be mindful of the potential for wildlife to be present on the site. Regular, comprehensive monitoring of the work area will be required during construction to detect animals and ensure they do not come into conflict with construction equipment or activities. Residual effects associated with direct impacts to wildlife during construction, including both potential and confirmed SAR for the study area, will be negligible assuming that appropriate protection measures are enacted throughout construction.

Post-construction, the presence of a new, permanent access road and parking area increases the chances of wildlife mortality due to vehicle collision. However, traffic in these new areas will be minimal, and potential impacts can be mitigated by continued vigilance and caution by drivers. A warning sign flagging for wildlife presence could be placed on the new access road as a reminder.

6.4.9 CULTURAL RESOURCES

The siting of the proposed dam will directly impact in situ cultural resources related to the northern portion of the original 1821 dam which has been identified as having cultural heritage value. The residual effects of the impact would be considered insignificant; prior to the removal of the cultural resource off site, detailed excavation and data recording will occur, which will contribute to a better overall understanding of the resource, including its design.

Cumulative Environmental Effects

7.0 Cumulative Environmental Effects

Cumulative environmental effects are defined as the effects on the environment caused by an action in combination with other past, present and future human actions. Cumulative effects are residual effects on the environment combined with the environmental effects of past, present and future projects or activities. Cumulative effects can also result from the

combination of different individual environmental effects of the project, acting on the same environmental component (CEAA, 2012).

Parks Canada notified Parsons that they were in contact with the Tay Valley Township to obtain information on planned construction projects that could overlap spatially or temporarily with the DIA study area. No planned construction was identified by Parks Canada. As such, cumulative effects are not anticipated for this project.

Monitoring and Follow-Up Programs

8.0 Monitoring and Follow-Up Programs

8.1 MITIGATION MONITORING

Mitigation Monitoring is intended to ensure the efficacy of construction and demolition mitigation impacts for the duration of the works. All required mitigation measures are summarized in the Mitigation Monitoring Report form in Appendix H. This report form is to be used to ensure that mitigation measures identified in this report are implemented. It is the responsibility of the Project Manager to ensure that the Mitigation Monitoring Report form is completed over the duration of the project.

Note that these mitigation measures should not be taken to imply authorization of the undertaking in accordance with any federal, provincial, or municipal legislation. The mitigation measures are intended to avoid significant adverse environmental effects and do not relieve the proponent from compliance with any applicable legislation.

8.2 PRE-CONSTRUCTION MONITORING

Existing baseline date, such as benthic invertebrate records and Walleye spawning mapping, will be used to establish pre-construction conditions. Parks Canada will also be taking baseline measurements of water quality parameters (e.g., turbidity, pH, temperature, and dissolved oxygen) prior to the beginning of construction. The implementation of a static data logger could be considered, this could also aid in during and post-construction monitoring.

Vegetation removal areas should be reviewed prior to clearing to ensure there are no additional Butternut trees present. The site should be reviewed prior to the commencement of construction to determine the presence of wildlife (breeding birds, snakes, turtles).

8.3 CONSTRUCTION MONITORING

Archaeological Monitoring – As per Paterson (2017), archaeological monitoring during dewatering operations and excavation within the 5 m archaeological buffer is recommended. Once the site is dewatered, a combination of in situ recording, preservation and mitigation excavation is planned. Archeological monitoring will be required to be incorporated in to the contractors EMP.

Erosion and Sediment Control – As Per Parks Canada (2017), an inspection program (e.g., performance monitoring) that evaluates the integrity, functionality and effectiveness of erosion control methods shall be described in the EMP and accepted by Parks Canada. Inspection of erosion controls within the construction area shall be undertaken weekly and following each rainfall or snowmelt event, and repaired as required. The inspections are intended to:

- confirm erosion control methods and devices have been installed according to the contract plans and correctly according to installation standards
- confirm erosions control methods and devices are maintained and functioning as intended
- identify deficiencies of selected measures based on observations of terrain, soils, or construction progress

Dewatering Operation – As per Parks Canada (2017), monitoring during dewatering operations will be required to ensure sediment laden water is properly captured, and treated prior to disposal. A monitoring report will be required following water takings. The report will be prepared by the contractor and submitted to the Parks Canada project manager. The report shall include parameters such as time and date of dewatering, duration, volume, treatment method and discharge location.

Water Quality Monitoring During Concrete Pour Operations, Chipping and Cutting – As per Parks Canada (2017), all concrete pour operations must be described in the site-specific EMP and accepted by Parks Canada. During concrete pour operations water quality monitoring is required:

- All concrete pours in or near water must have a Qualified Professional(s) on-site to monitor downstream surface water turbidity and pH and assist in mitigating the effects of a concrete release
- Water pH shall be monitored frequently in the intake of discharge pump, holding tank, outflow, and/or downstream of the isolated work site or discharge point until the works are completed. Monitoring of water downstream of a worksite or discharge point shall be undertaken at 100 m, 200, and 400 m or as directed by Parks Canada. In addition, waters within the isolated work area for a Tremie pour operation shall be sampled
- Water pH monitoring must be conducted by a Qualified Professional(s) using a digital pH meter with an accuracy of +/- 0.2 pH units
- Corrective measures shall be implemented if downstream pH has changed more than 1.0 pH unit from background, measured to an accuracy of +/- 0.2 pH units, or is below 6.5 or above 9.0 pH units

Fish Rescue – As per Parks Canada (2017), fish exclusion, salvage and relocation procedures shall be outlined in the site specific EMP and accepted by Parks Canada. For all dewatering operations, the contractor will be required to provide a Qualified Professional(s) to rescue fish which become trapped in any isolated in-water work area, prior to beginning dewatering.

Daily Wildlife Monitoring – As per Parks Canada (2017), on a daily basis, an inspection of the work area shall be performed prior to commencement of project works and activities to ensure wildlife is not present within the work area. Wildlife exclusion measures such as the recommended turtle/snake fencing, shall also be inspected for deficiencies and repaired as necessary. A site inspection checklist shall be included in the site-specific EMP and accepted by Parks Canada. Required mitigation measures for the protection of wildlife on the site (as described in the preceding sections) will be enacted.

Waste Management – As per Parks Canada (2017) and in accordance with the Environmentally Responsible Construction and Renovation Handbook – Edition 2 (PWGSC, 2000), the diversion of non-hazardous construction waste from a landfill will be a requirement for this project. Prior to hauling material off site, the contractor will be responsible for completing a Waste Material Tracking Form. The form will include hauler, material type, destination and percentage recycled. The form will be prepared by the contractor and submitted to the Parks Canada. Waste diversion monitoring shall be identified in the site-specific EMP and accepted by Parks Canada.

Vegetation Protection Monitoring – The implemented vegetation protection measures identified in the site-specific EMP, accepted by Parks Canada will require monitoring. As per Parks Canada (2017):

- Fencing and root protection measures shall be inspected monthly
- Plywood sheets and mulch must be replaced and replenished as necessary to maintain the 20 cm root protection layers thickness at all times
- Any damaged fencing, hording or other approved protection measures shall be replaced immediately
- Fencing and armoring devices shall only be removed after the completion of the project, following the final cleanup

8.4 FOLLOW-UP MONITORING PROGRAMS

The Canadian Environmental Assessment (CEA) Agency has developed a list of considerations when determining if follow-up programs are appropriate. Follow-up programs: a) help verify the accuracy of the environmental assessment, and b) help determine the effectiveness of the implemented mitigation. Table 11 lists these considerations and an associated response as to their appropriateness for a Follow-Up Program.

Table 11 – Follow-Up Program Determination Checklist

FOLLOW-UP PROGRAM CONSIDERATIONS	RESPONSE
Environmentally Sensitive Area/Valued Components	Walleye spawning habitat has been identified directly downstream of the existing dam location. Confirmed or potential significant habitat for SAR is present in the study area.
Protected Areas or Areas under Consideration for Protection	The site is not located within a protected area or under the consideration of protection.
Public Concerns	There are no public concerns on record regarding the proposed reconstruction project.
Accuracy of Predictions	Potential environmental effects are predictable and well-known.
Effectiveness of Mitigation Measures	All mitigation measures are effective in their intent.
New or Unproven Techniques and Technology	The project construction methods and implementation are well known and proven.
Cumulative Environmental Effects	Cumulative environmental effects have not been identified.
Nature of Project	The project construction methods and implementation are well known including the potential environmental effects.
Limited Scientific Knowledge	The scientific knowledge used to predict the environmental effects of the proposed project is appropriate for the scope of the project.

Based on the results of the overall effects evaluation and the potentially high level of environmental risk associated with the dam reconstruction project should mitigation measures not be effective, warranted follow-up monitoring programs include: monitoring of the new and pre-existing walleye spawning habitats; and reptile surveys (i.e., review of basking sites and shorelines) to determine/confirm the potential usage of the site by the targeted wildlife species. Monitoring of planted and seeded vegetation to ensure its establishment on the site is also warranted, particularly if any Butternut are transplanted as part of the project.

8.4.1 WALLEYE SPAWNING HABITAT MONITORING

The creation of quality Walleye spawning habitat downstream of the new dam has been considered an enhancement, consistent with Provincial Fisheries Management Objectives. DFO determined that minor loss of lacustrine habitat upstream of the dam did not constitute Series Harm under the Fisheries Act and therefore an Authorization and associated monitoring was not required. Parks Canada is however interested in monitoring the usage and quality of the habitat following construction. Degradation to the spawning habitat can be expressed as an overall decrease in water quality and as a change in substrate, which is important for egg settlement.

Pre-construction monitoring of water quality could include the installation of a data logger, or other static device. This same unit could be kept in place or returned to the same site to monitor water quality during follow-up monitoring. Regular visual observations at the same location can provide an estimate of sediment accumulation in the area. In addition, benthic community sampling (either in collaboration with RVCA OBBN monitoring, or in addition) will provide a metric for comparing changes in water quality.

The Walleye spawning habitat identified downstream of the exiting dam is considered an Environmentally Sensitive Area/Feature and it may be important to monitor the preexisting downstream reach of Walleye spawning habitat which is also susceptible to sediment deposition, in addition to the newly created habitats. Parks Canada will conduct Walleye substrate mapping to ensure that construction activities will not impact existing habitat due to sedimentation. Night time flashlight surveys will be conducted to document distribution and numbers of adults arriving at the spawning sites, pre- and post-construction. Frequency and locations of monitoring will be determined prior to construction based on a review of existing information and fish habitat conditions.

8.4.2 REPTILE SURVEYS

As previously noted, there is the potential for conflict with the new access road and parking area occurring in proximity to potential snake habitat. Snakes may be attracted to the open road surface to bask, particularly on cool, sunny mornings and early in the spring. Turtles may also be attracted to the gravel parking area as a nest site.

Post-construction monitoring for reptiles (both alive and dead) on the road, and for turtle nesting activity in the parking area would be crucial in assessing whether additional mitigation measures are required for the long-term operation of the site (e.g., if snakes are regularly observed basking on the access road where they are in danger of being struck by vehicles, or if multiple attempted turtle nests are observed in unavoidable areas of the parking lot).

8.4.4 VEGETATION INSPECTION

Establishment of seeded and planted vegetation is typically guaranteed under the contractor's landscape warranty item. At minimum, the installed vegetation should be monitored to ensure that trees and shrubs survive and establish, and that seeded areas achieve sufficient coverage to ensure surface erosion protection and open habitat establishment. If a particular species in included in the applied seed mix (e.g., milkweed for Monarch butterflies) then seeded areas could also be assessed for the establishment of these species in particular.

The proposed vegetation monitoring (CIMA, 2017) consists of one annual site visit at the beginning of summer (for two years), following the completion of work, to verify the condition of vegetation and to make provision for any corrections or replacements. All vegetation in poor condition (based on the quality standards below) one year after planting will be replaced at the Contractor's expense. The same applies to the second year after planting. The responsible party for this monitoring is to be determined by Parks Canada. Acceptable quality standards for plantings and growth are stated in the Revegetation ESG (ESG-1-Post), and areas that fail to meet these quality standards will require replanting or reseeding as appropriate.

9.0 Summary and Conclusion

The Bobs Lake Dam has a history of structural problems dating back to 1966. In 2013, Genivar completed a Dam Safety Review (DSR) that identified deficiencies related to operational and structural components, and concluded that the dam is in generally poor condition and a new dam should be built.

This DIA has been prepared in accordance to Section 67 of the *Canadian Environmental Assessment Act*, where an Environmental Impact Analysis is required of Federal Authorities with a role/interest in the project to determine the likelihood of adverse environmental effects of the project. This DIA was prepared in-line with the "Guide to Parks Canada Environmental Impact Analysis", June 2015.

The Bobs Lake Dam Reconstruction Project has the potential to cause negative construction-related effects to the surrounding social and bio-physical environment. Typical construction activities are expected to cause temporary effects such as noise and dust. These, however can be managed through construction best practices and will not extend beyond the construction period.

A permanent net loss of aquatic (fish and turtle) habitat will occur in the footprint of the new dam and between the new and existing dams with the associated change from lake/reservoir morphology to active river channel. This extent of lake/reservoir habitat loss is small considering the lake as a whole and that the habitat is ubiquitous throughout the outlet bay. This change in morphology will also lead to the opportunity for increasing Walleye spawning habitat in a known spawning area, due to the additional area of active river channel. The design of the new dam has taken the recommendations of both the DFO and local MNRF into consideration to best mitigate the potential long and short-term effects to the aquatic system.

Impacts to the surrounding terrestrial environment, which includes Species at Risk (SAR) habitat, are minimized since the majority of work will occur in a previously disturbed area. Impacts will be further mitigated by following the applicable Parks Canada Environmental Standards and Guidelines (ESGs) in all phases (pre-, during, and post-construction), and through the implementation of monitoring programs, such that no significant residual effects are anticipated. Critical habitat for SAR will not be permanently altered or reduced in a way that results in said habitat no longer being able to support the life processes of the indicated species.

With the implementation of the prescribed mitigation identified in this report, it is anticipated that the construction of the Bobs Lake dam is not likely to cause significant adverse environmental effects.

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

☒ **Not likely to cause significant adverse environmental impacts**

☐ **Likely to cause significant adverse environmental effects**

SARA Requirements:

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

Recommended by: Valerie Minelga, Environmental Assessment Scientist	Date:
Approved by: Jewel Cunningham, Director, Ontario Waterways	Date:

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10.0 References

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Appendix A

Photographic Record

Appendix A – Photographic Record


Photo 1 (left): View eastward towards existing dam from proposed staging area on north lakeshore; note recently disturbed ground from geotechnical investigations which could provide turtle nesting habitat.
Photo 2 (right): View westward from proposed staging area; note rocky outcrops (potential snake habitat) on right hillside.


Photo 3 (left): Rocky outcrop (potential snake habitat) north of lake near proposed staging area.
Photo 4 (right): Existing path which coincides with new access road options to staging area.


Photo 5 (left): Mixed forest on steep slopes on south lake shore, upstream of existing dam.
Photo 6 (right): Butternut location at southeast corner of existing dam.


Photo 7 (left) and Photo 8 (right): Vegetation adjacent to existing dam access on riverbank.


Photo 9 (left): Characteristic vegetation along fenceline between dam site and Crow Lake Road, west of pasture.
Photo 10 (right): Approximate area of new dam in Bobs Lake, from north bank looking south.


Photo 11 (left): Outlet bay in Bobs Lake from the north bank at the dam.
Photo 12 (right): Water exiting Bobs Lake Dam, view from north bank.


Photo 13 (left): North bank at proposed location of new dam, looking east to existing dam.
Photo 14 (right): Substrate at Photo 13 location, showing freshwater mussel shells.


Photo 15 (left): Proposed area of new dam from north bank with lake substrate and vegetation visible.
Photo 16 (right): View of the outlet bay from the top of the path looking west. Narrow inlet to bay visible in background.


Photo 17 (left): Bobs Lake Dam from the top of the north bank access stairs.
Photo 18 (right): Sediment in Bobs Lake immediately upstream of the dam (north bank).


Photo 19 (left): Water exiting Bobs Lake Dam, view from the dam looking downstream at the Tay River.
Photo 20 (right): Substrate on the north bank of the Tay River, east of the dam.


Photo 21 (left): Tay River at the rock/concrete weir near the small outbuilding monitoring station, looking upstream towards the dam (approx. 100 m).
Photo 22 (right): Substrate in the river at Photo 21 location, north bank looking south.


Photo 23 (left): Tay River, approximately 100 m from dam (Photo 21 location), looking downstream.
Photo 24 (right): Crow Lake Road Bridge over the Tay River, north bank.


Photo 25 (left): Tay River, upstream of Crow Lake Rd. Bridge, looking toward dam.
Photo 26 (right): Tay River, downstream of Crow Lake Rd. Bridge, looking away from dam.


Photo 27 (left): Bridge over Tay River at Davern Ln. (2 km downstream of Crow Lake Rd.), note the calm water surface of the river.
Photo 28 (right): Tay River looking upstream of Davern Ln. bridge.


Photo 29 (left): Tay River looking downstream of Davern Ln. bridge.
Photo 30 (right): Substrate in Tay River at Davern Ln. bridge.

Appendix B

Fish Species of Bobs Lake and the Tay River

Appendix B – Fish Species of Bobs Lake and the Tay River

Definitions/References

HABITAT REQUIREMENTS

Habitat preferences summarized from "The ROM Field Guide to Freshwater Fishes of Ontario" by Erling Holm, Nicholas E. Mandrak, and Mary E. Burridge (2009).

DATA SOURCES

Fish records for Bobs Lake provided by the Kemptville MNRF office. Fish records for the Tay River/Christie Lake provided by the Peterborough MNRF office.

[1] Indicates species that were observed during fish habitat assessments by CIMA in July 2016.

Fish Species of Bobs Lake and Tay River and Likelihood of Habitat/Presence in the Immediate Study Area

FISH SPECIES	SCIENTIFIC NAME	BOBS LAKE	TAY RIVER (CHRISTIE LAKE)	HABITAT PREFERENCES	LIKELIHOOD OF PRESENCE IN STUDY AREA
American Eel	*Anguilla rostrata*	X	X	Catadromous. Cool waters in lakes and tributaries with gravel, sand and silt bottoms.	Low – historic records in lake only
Banded Killifish	*Fundulus diaphanus*	X	X	Warm surface waters of clear streams and nearshore lakes.	Moderate – warmer water with vegetation habitat in outlet bay
Black Crappie	*Pomoxis nigromaculatus*	X	X	Warm waters of lakes and slow-moving streams, usually with abundant vegetation.	High – warmer water with vegetation habitat in outlet bay
Blacknose Dace	*Rhinichthys atratulus*		[1]	Small, shallow, cool streams with instream and riparian cover.	High – observed in Tay River by CIMA in July 2016
Blacknose Shiner	*Notropis heterolepis*		X	Clear, cool water of shallow, vegetated areas of lakes and slow moving-streams over silt, sand, or gravel.	Low – no records in lake, unsuitable habitat below dam
Bluegill	*Lepomis macrochirus*	X	X	Warm waters of lakes and slow-moving streams with abundant aquatic vegetation.	High – warmer water habitat in outlet bay
Bluntnose Minnow	*Pimephales notatus*	X	X	Wide range of shallow habitats in warm waters of lakes and streams.	Moderate – shallow, warmer water habitat in outlet bay

FISH SPECIES	SCIENTIFIC NAME	BOBS LAKE	TAY RIVER (CHRISTIE LAKE)	HABITAT PREFERENCES	LIKELIHOOD OF PRESENCE IN STUDY AREA
Brook Stickleback	*Culaea inconstans*		X	Cool shallow and deep waters of streams, lakes, and wetlands.	Moderate – no records in lake, potential in downstream river
Brown Bullhead	*Ameiurus nebulosus*	X	X	Bottom of warm, shallow lakes and slow-moving streams, prefers cover.	Moderate – cool water species could potentially use shallower outlet bay
Burbot	*Lota lota*	X	X	Cold bottom water of lakes and streams.	Low – cold water species probably prefers deeper areas of lake
Central Mudminnow	*Umbra limi*		X	Quiet, vegetated waters of cool lakes and streams.	Low – no records in lake, unsuitable habitat below dam
Cisco	*Coregonus artedi*	X	X	Cold, deeper waters of lakes, occasionally large streams.	Low – cold water species probably prefers deeper areas of lake
Common Shiner	*Luxilus cornutus*	X	X	Cool shallow waters of streams, occasionally lakes.	Moderate – shallow water and suitable habitat in outlet bay
Creek Chub	*Semotilus atromaculatus*		X	Wide variety of cool water habitats in lakes and streams.	Moderate – no records in lake, potential in downstream river
Fallfish	*Semotilus corporalis*		X	Cool, clear waters of streams with gravel bottoms, occasionally lakes.	Moderate – no records in lake, potential in downstream river
Golden Shiner	*Notemigonus crysoleucas*	X	X	Cool, heavily vegetated waters of lakes and streams.	Moderate – potential in outlet bay, unsuitable habitat below dam
Greater Redhorse	*Moxostoma valenciennesi*		X	Cool bottom waters of large streams with substantial flows.	High – no records in lake, potential in river throughout study area
Johnny Darter	*Etheostoma nigrum*		X	Wide variety of bottom habitats in lakes and streams.	Moderate – no records in lake, potential in downstream river
Lake Trout	*Salvelinus namaycush*	X	X	Coldwater lakes of the Canadian Shield.	Low – cold water species likely prefers deeper areas of lake
Lake Whitefish	*Coregonus clupeiformis*	X	X	Cold, deeper waters of lakes, occasionally large streams.	Low – cold water species likely prefers deeper areas of lake
Largemouth Bass	*Micropterus salmoides*	[1]X	X	Warm waters of lakes and slow-moving streams with extensive aquatic vegetation and other cover.	High – warmer water with vegetation habitat in outlet bay. Observed by CIMA in July 2016
Logperch	*Percina caprodes*	X	X	Rocky and sandy bottoms of lakes and slow to fast-moving streams.	High – rock and sand substrate within outlet bay, potential in downstream river.

FISH SPECIES	SCIENTIFIC NAME	BOBS LAKE	TAY RIVER (CHRISTIE LAKE)	HABITAT PREFERENCES	LIKELIHOOD OF PRESENCE IN STUDY AREA
Muskellunge	*Esox masquinongy*		X	Cool water of lakes and larger streams, near aquatic vegetation.	Low – no records in lake, unsuitable habitat in downstream study area
Northern Pike	*Esox lucius*	X	X	Cool water habitats of streams and lakes, near aquatic vegetation.	Moderate – potential in vegetated outlet bay of lake
Northern Redbelly Dace	*Chrosomus eos*	X		Cool, heavily vegetated, shallow waters of lakes and slow-moving streams, over silt and detritus.	High – vegetation and substrates including silt and detritus in outlet bay, no records in river
Pumpkinseed	*Lepomis gibbosus*	[1]X	X	Cool to warm waters of lakes and slow-moving streams with aquatic vegetation. Often near surface.	High – warmer water habitat in outlet bay, unsuitable habitat below dam. Observed by CIMA in July 2016
Rock Bass	*Ambloplites rupestris*	X	X	Cool water of lakes and slow-moving streams, often over rocky bottom.	Moderate – potential in outlet bay, unsuitable habitat below dam
Shorthead Redhorse	*Moxostoma macrolepidotum*		X	Cool bottom waters of large lakes and streams.	Moderate – suitable habitat in downstream river, no records in lake
Smallmouth Bass	*Micropterus dolomieu*	X	[1]X	Cool waters of lakes and streams, rocky bottoms, associated with various types of cover.	High – observed in Tay River by CIMA in July 2016
Spotfin Shiner	*Cyprinella spiloptera*		X	Slow-moving areas of streams with gravel bottoms.	Low – no records in lake, unsuitable habitat in downstream study area
Spottail Shiner	*Notropis hudsonius*	X	X	Open, clear, cold or cool waters of large lakes and streams and their tributaries, sand or gravel bottoms.	High – suitable habitat in lake outlet bay, unlikely in downstream study area
Walleye	*Sander vitreus*	X	X	Wide variety of cool water habitats in lakes and streams. Deeper waters or in dense vegetation in day.	High – confirmed spawning habitat directly below dam, unlikely in outlet bay of lake
White Sucker	*Catostomus commersonii*	X	X	Wide range of habitats. Prefers cool water, near bottom.	High – potential habitat in lake outlet bay and downstream river
Yellow Bullhead	*Ameiurus natalis*	X	X	Bottom of warm shallow lakes and slow-moving streams, prefers cover.	Moderate – suitable habitat in outlet bay, unlikely in downstream study area
Yellow Perch	*Perca flavescens*	X	X	Wide variety of water temperatures and habitats in lakes and slow-moving streams.	Moderate – potential in outlet bay, unlikely in downstream river

PARSONS

Appendix C

Bird Species Records

Appendix C – Bird Species Records

Definitions

DATA SOURCES:

1) **eBird** - checklist submissions from locations near the dam, obtained both directly from the eBird and via the NatureCounts data inquiry system.

2) **BCLA** - Greater Bobs and Crow Lakes Association website. Species were identified from publicly-posted photos on the site.

3) **OBBA** - the Ontario Breeding Bird Atlas organizes observations on a grid of 10 km by 10 km squares. As this does not provide precise locations for observations as related to the study area, and since more precise data is available in the form of eBird records, the table does not list of every species noted in the OBBA for the square containing the dam. Rather, the OBBA has been used to supplement and comment on Species at Risk and other noteworthy species that have been documented as breeding in the vicinity. The most recently published atlas covers the 2001-2005 breeding period.

4) **Parsons** - species observed by Parsons' staff during 2015 field investigations.

5) **PC** - species reported to Parsons by Parks Canada contact while in discussions in the field.

6) **CIMA** – species documented in the 2017 Fish Habitat Assessment by CIMA.

STATUS:

1) **ESA** - Ontario Endangered Species Act. Species are listed as Endangered (**END**), Threatened (**THR**), and Special Concern (**SC**).

2) **SARA** - Canadian Species at Risk Act. **END**, **THR**, and **SC** categories as above.

3) **COSEWIC** - The Committee on the Status of Endangered Wildlife in Canada. **END**, **THR**, and **SC** categories as above.

4) Subnational rankings for Ontario. **S1** - extremely rare; **S2** - very rare; **S3** - rare to uncommon; **S4** - common and apparently secure; **S5** - very common and demonstrably secure; **SNA** - not ranked, usually refers to non-native species. '**B**' and '**N**' are used as appropriate to indicate differences in breeding vs. non-breeding range status.

COMMON NAME	SCIENTIFIC NAME	DATA SOURCE	STATUS	DISCUSSION/COMMENTS
Ducks, Geese, and Swans				
Canada Goose	*Branta canadensis*	eBird	S5	
Mallard	*Anas platyrhynchos*	eBird, BCLA	S5	
Partridges, Grouse, and Turkeys				
Ruffed Grouse	*Bonasa umbellus*	eBird	S4	
Gulls, Terns, and Skimmers				
Ring-billed Gull	*Larus delawarensis*	CIMA	S5B, S4N	
Loons				
Common Loon	*Gavia immer*	eBird, CIMA	S5B, S5N	
Herons and Bitterns				
Great Blue Heron	*Ardea herodias*	eBird, CIMA	S4	
Vultures				
Turkey Vulture	*Cathartes aura*	eBird, BCLA	S5B	
Osprey				
Osprey	*Pandion haliaetus*	eBird	S5B	
Hawks, Kites, and Eagles				
Bald Eagle	*Haliaeetus leucocephalus*	BCLA	SARA - no status ESA - SC COSEWIC - not at risk S2N, S4B	Photos include one showing a stick nest with eagles present, indicating the species is breeding in the area.
Red-shouldered Hawk	*Buteo lineatus*	eBird, CIMA	SARA - SC ESA - no status COSEWIC - not at risk S4B	SARA status listed on schedule 3, most provisions do not apply.
Broad-winged Hawk	*Buteo platypterus*	eBird	S5B	
Red-tailed Hawk	*Buteo jamaicensis*	eBird	S5	
Cranes				
Sandhill Crane	*Grus canadensis*	eBird	S5B	
Plovers				
Killdeer	*Charadrius vociferus*	eBird	S5B, S5N	

COMMON NAME	SCIENTIFIC NAME	DATA SOURCE	STATUS	DISCUSSION/COMMENTS
Typical Owls				
Barred Owl	*Strix varia*	BCLA	S5	
Hummingbirds				
Ruby-throated Hummingbird	*Archilochus colubris*	BCLA	S5B	
Kingfishers				
Belted Kingfisher	*Megaceryle alcyon*	eBird, Parsons, CIMA	S4B	Observed by Parsons, Nov 2015, flying over river downstream of dam.
Woodpeckers				
Northern Flicker	*Colaptes auratus*	eBird	S4B	
Tyrant Flycatchers				
Eastern Wood-pewee	*Contopus virens*	eBird	SARA - SC ESA - SC COSEWIC - SC S4B	
Eastern Phoebe	*Sayornis phoebe*	eBird	S5B	
Great Crested Flycatcher	*Myiarchus crinitus*	eBird	S4B	
Eastern Kingbird	*Tyrannus tyrannus*	eBird	S4B	
Shrikes				
Northern Shrike	*Lanius excubitor*	eBird	SNA	
Vireos				
Yellow-throated Vireo	*Vireo flavifrons*	eBird	S4B	
Warbling Vireo	*Vireo gilvus*	eBird	S5B	
Red-eyed Vireo	*Vireo olivaceus*	eBird	S5B	
Crows and Jays				
Blue Jay	*Cyanocitta cristata*	eBird, Parsons	S5	Heard by Parsons, Nov 2015, vocalizing from vegetation surrounding the dam at several locations.
American Crow	*Corvus brachyrhynchos*	eBird	S5B	
Swallows				
Tree Swallow	*Tachycineta bicolor*	eBird	S4B	
Northern Rough-winged Swallow	*Stelgidopteryx serripennis*	eBird	S4B	

COMMON NAME	SCIENTIFIC NAME	DATA SOURCE	STATUS	DISCUSSION/COMMENTS
Cliff Swallow	*Petrochelidon pyrrhonota*	eBird	S4B	
Barn Swallow	*Hirundo rustica*	eBird, PC, CIMA	SARA - THR ESA - THR COSEWIC - THR S4B	Reported by Parks Canada staff to be nesting in numbers in one of the farm buildings nearby the dam. No nests were observed on the dam itself.
Chickadees and Titmice				
Black-capped Chickadee	*Poecile atricapillus*	eBird, Parsons	S5	Heard by Parsons, Nov 2015, vocalizing from vegetation surrounding the dam at several locations.
Nuthatches				
White-breasted Nuthatch	*Sitta carolinensis*	eBird	S5	
Wrens				
House Wren	*Troglodytes aedon*	eBird	S5B	
Thrushes				
Eastern Bluebird	*Sialia sialis*	eBird	S5B	
Veery	*Catharus fuscescens*	eBird	S4B	
Wood Thrush	*Hylocichla mustelina*	OBBA, eBird	SARA - THR ESA - SC COSEWIC - THR S4B	Probable breeder in 10x10 km square according to 2nd OBBA (2001-2005). Reported via eBird data within ~1 km of the dam. Considered likely to occur in forest habitat adjacent to the dam site.
American Robin	*Turdus migratorius*	eBird, CIMA	S5B	
Mockingbirds and Thrashers				
Gray Catbird	*Dumetella carolinensis*	eBird	S4B	
Starlings				
European Starling	*Sturnus vulgaris*	eBird	SNA	
Waxwings				
Cedar Waxwing	*Bombycilla cedrorum*	eBird	S5B	
Wood-warblers				
Ovenbird	*Seiurus aurocapilla*	eBird	S4B	

COMMON NAME	SCIENTIFIC NAME	DATA SOURCE	STATUS	DISCUSSION/COMMENTS
Golden-winged Warbler	*Vermivora chrysoptera*	eBird, OBBA	SARA - THR ESA - SC COSEWIC - THR S4B	Confirmed breeding in 10x10 km square by 2nd OBBA (2001-2005). Reported via eBird ~1 km to the east along Bolingbroke Road.
Black-and-white Warbler	*Mniotilta varia*	eBird	S5B	
Common Yellowthroat	*Geothlypis trichas*	eBird	S5B	
American Redstart	*Setophaga ruticilla*	eBird	S5B	
Cerulean Warbler	*Setophaga cerulea*	OBBA	SARA - SC ESA - THR COSEWIC - END S3B	Probable breeder in 10x10 km square according to 2nd OBBA (2001-2005). Nearest eBird observations reported over 4 km away.
Yellow Warbler	*Setophaga petechia*	eBird	S5B	
Chestnut-sided Warbler	*Setophaga pensylvanica*	eBird	S5B	
Pine Warbler	*Setophaga pinus*	eBird	S5B	
Black-throated Green Warbler	*Setophaga virens*	eBird	S5B	
Canada Warbler	*Cardellina canadensis*	OBBA	SARA - SC ESA - SC COSEWIC - THR S4B	Possible breeder in 10x10 km square according to 2nd OBBA (2001-2005), but the observation was not made within ~1 km of the dam per Nature Counts data provided.
Sparrows				
Chipping Sparrow	*Spizella passerina*	eBird	S5B	
Field Sparrow	*Spizella pusilla*	eBird	S4B	
Savannah Sparrow	*Passerculus sandwichensis*	eBird	S4B	
Song Sparrow	*Melospiza melodia*	eBird, CIMA	S5B	
Swamp Sparrow	*Melospiza georgiana*	eBird, CIMA	S5B	
Cardinals and Allies				
Rose-breasted Grosbeak	*Pheucticus ludovicianus*	eBird	S4B	
Indigo Bunting	*Passerina cyanea*	eBird	S4B	
Blackbirds				

COMMON NAME	SCIENTIFIC NAME	DATA SOURCE	STATUS	DISCUSSION/COMMENTS
Bobolink	*Dolichonyx oryzivorus*	OBBA	SARA - THR ESA - THR COSEWIC - THR S4B	Probable breeder in 10x10 km square according to 2nd OBBA (2001-2005), but the observation was not made within ~1 km of the dam per Nature Counts data provided.
Red-winged Blackbird	*Agelaius phoeniceus*	eBird	S4	
Eastern Meadowlark	*Sturnella magna*	eBird	SARA - THR ESA - THR COSEWIC - THR S4B	eBird observation point is mapped more than 1km away from the dam site
Common Grackle	*Quiscalus quiscula*	eBird	S5B	
Brown-headed Cowbird	*Molothrus ater*	eBird	S4B	
Finches				
American Goldfinch	*Spinus tristis*	eBird, CIMA	S5B	

Appendix D

Other Terrestrial Wildlife Records

Appendix D – Other Terrestrial Wildlife Records

Definitions

DATA SOURCES

ORAA - Ontario Reptile and Amphibian Atlas. Similar to the Ontario Breeding Bird Atlas, this resource organizes observations on a grid of 10 km by 10 km squares. Although the atlas does not provide precise locations for the observations related to the study area, it has been used as a resource here since more location-specific observation data is lacking. Species listed in the table are those with recent observation records (dated 1995 or later) available for the square containing the dam.

BCLA - Greater Bobs and Crow Lakes Association website. Species were identified from publicly-posted photos on the site.

NHIC - Natural Heritage Information Centre online database of Species at Risk observations. Indicated species above have past observation records for the area in the vicinity of the dam.

Parsons - species observed by Parsons during Nov, 2015 field investigations.

CIMA – species documented in the 2017 Fish Habitat Assessment prepared by CIMA.

STATUS

ESA - Ontario Endangered Species Act. Species are listed as Endangered (**END**), Threatened (**THR**), and Special Concern (**SC**)

SARA - Canadian Species at Risk Act. **END**, **THR**, and **SC** categories as above.

COSEWIC - the Committee on the Status of Endangered Wildlife in Canada. **END**, **THR**, and **SC** categories as above.

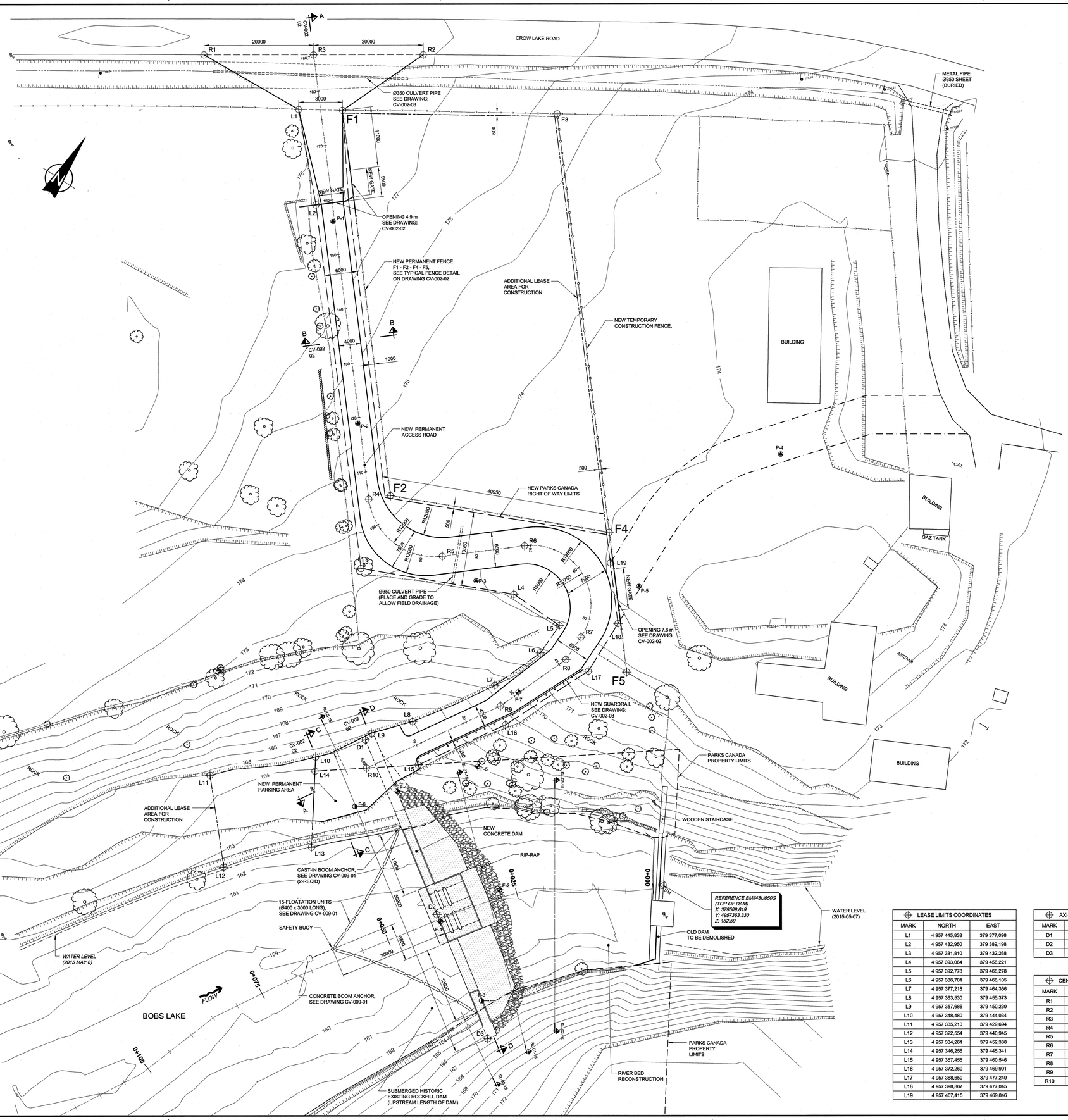
Subnational rankings for Ontario. **S1** - extremely rare; **S2** - very rare; **S3** - rare to uncommon; **S4** - common and apparently secure; **S5** - very common and demonstrably secure. '**B**' and '**N**' are used as appropriate to indicate differences in breeding vs. non-breeding range status.

COMMON NAME	SCIENTIFIC NAME	DATA SOURCE	STATUS	DISCUSSION
Snakes				
Eastern Garter Snake	*Thamnophis sirtalis sirtalis*	ORAA	S5	Very common and widespread species in Ontario; high probability of occurring in the study area.
Eastern Milksnake	*Lampropeltis triangulum*	ORAA	SARA - SC ESA - SC COSEWIC - SC S3	Tends to be secretive and hard to find even by dedicated snake surveys.
Gray Ratsnake (Frontenac Axis population)	*Pantherophis spiloides*	NHIC	SARA - THR ESA - THR COSEWIC - THR S3	Great Lakes-St. Lawrence population. The study area is at the northwest edge of this population's range in Ontario. Historical observations are present in the ORAA, but none that are recent.
Northern Ring-necked Snake	*Diadophis punctatus*	ORAA	S4	
Northern Watersnake	*Nerodia sipedon sipedon*	ORAA	S5	Fairly common and widespread species in Ontario; high probability of occurring in the study area.
Red-bellied Snake	*Storeria occipitomaculata*	ORAA	S5	
Smooth Greensnake	*Opheodrys vernalis*	ORAA	S4	
Turtles				
Blanding's Turtle	*Emydoidea blandingii*	ORAA	SARA - THR ESA - SC COSEWIC - SC S3	
Eastern Musk Turtle	*Sternotherus odoratus*	CIMA	SARA - THR ESA - SC COSEWIC - SC S3	Carcass of a Musk Turtle was documented by CIMA in the study area, washed up on the banks upstream of the existing dam. This species is due to be downlisted to SC under the SARA in the near future.
Midland Painted Turtle	*Chrysemys picta marginata*	ORAA	S5	
Northern Map Turtle	*Graptemys geographica*	ORAA, BCLA	SARA - SC ESA - SC COSEWIC - SC S3	Map Turtles were photographed basking on either Bobs or Crow Lake.

COMMON NAME	SCIENTIFIC NAME	DATA SOURCE	STATUS	DISCUSSION
Snapping Turtle	*Chelydra serpentina*	ORAA, NHIC	SARA - SC ESA - SC COSEWIC - SC S3	
Lizards				
Five-lined Skink	*Plestiodon fasciatus*	ORAA	SARA - SC ESA - SC COSEWIC - SC S3	Great Lakes - St. Lawrence population.
Amphibians				
American Bullfrog	*Lithobates catesbeianus*	ORAA	S4	
American Toad	*Anaxyrus americanus*	ORAA	S5	
Eastern Newt	*Notophthalmus viridescens*	ORAA	S5	
Gray Treefrog	*Hyla versicolor*	ORAA	S5	
Green Frog	*Lithobates clamitans*	ORAA, CIMA	S5	
Northern Leopard Frog	*Lithobates pipiens*	ORAA	S5	
Spring Peeper	*Pseudacris crucifer*	ORAA	S5	
Spotted Salamander	*Ambystoma maculatum*	ORAA	S4	
Western Chorus Frog	*Pseudacris triseriata*	ORAA	SARA - THR ESA - not at risk COSEWIC - THR S4	Great Lakes / St. Lawrence - Canadian Shield population. Study area is near the northern range limit for this species as indicated in the atlas.
Wood Frog	*Lithobates sylvaticus*	ORAA	S5	
Mammals				
Eastern Chipmunk	*Tamias striatus*	CIMA	S5	
Red Squirrel	*Tamiasciurus hudsonicus*	BCLA	S5	
Muskrat	*Ondatra zibethicus*	Parsons	S5	Observed swimming in lake just upstream of dam. No visible den sites on nearby banks.
White-tailed Deer	*Odocoileus virginianus*	BCLA	S5	

Appendix E

Construction Drawings



1) GENERAL NOTES

1.1 ALL WORK SHALL BE DONE IN ACCORDANCE WITH THE REQUIREMENTS OF THE NATIONAL BUILDING CODE, SPECIFICATIONS AND DRAWINGS.

1.2 DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE NOTED.

1.3 FOR FOUNDATION ON ROCK, THE BEDROCK SURFACE SHALL BE COMPLETELY CLEARED OF LOOSE ROCK, INCLUDING BLAST ROCK, AND THE SURFACE INSPECTED PRIOR TO PLACEMENT OF CONCRETE FOUNDATIONS.

1.4 THE CONSULTANT SHALL VERIFY THAT THE ACTUAL SITE CONDITIONS DO NOT SUBSTANTIALLY VARY FROM THE GEOTECHNICAL REPORT.

1.5 CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS BEFORE FABRICATION AND NEW CONSTRUCTION BEGINS.

1.6 IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY WHEN EXCAVATING TO PROVIDE PROPER SHORING AS REQUIRED.

1.7 RESTORE ALL LEASED AND PARKS CANADA STAGING AND WORK AREAS TO ORIGINAL CONDITIONS AFTER COMPLETION OF CONSTRUCTION.

2) SOIL AND ROCK INVESTIGATIONS

THE RESULTS OF 2015 INVESTIGATIONS ARE PRESENTED IN THE FOLLOWING REPORTS:

2.1 GEOPHYSIC GPR INTERNATIONAL INC., "SEISMIC REFRACTION SURVEYS AT BOB'S LAKE DAM SITE - BOLINGBROKE ONTARIO)", AUGUST 2015.

2.2 GHD LIMITED, "GEOTECHNICAL INVESTIGATION - RELOCATION/RECONSTRUCTION BOLINGBROKE DAM - MABERLY (ONTARIO)", FEBRUARY 2016.

3) CONCRETE GENERAL NOTES

3.1 CONCRETE AND RELATED WORK SHALL BE MIXED, PLACED, AND CURED IN ACCORDANCE WITH CAN/CSA A23.1, "CONCRETE MATERIALS AND METHODS OF CONCRETE CONSTRUCTION AND CAN/CSA A23.2 TEST METHODS AND STANDARD PRACTICES FOR CONCRETE," LATEST EDITION.

3.2 CONTRACTOR SHALL BE RESPONSIBLE FOR THE MIX DESIGN IN ACCORDANCE WITH CAN/CSA A23.1.

3.3 CONCRETE SHALL BE CSA A23.1 EXPOSURE CLASS C-1:

a) WITH MAXIMUM AGGREGATE SIZE OF 20 mm:
28 DAY COMPRESSIVE STRENGTH OF 35 MPa, 5-8% ENTRAINED AIR, SLUMP 75 mm ±25, WATER/CEMENT RATIO = 0.40.

b) WHITH AGGREGAT SIZE 20-40 mm:
28 DAY COMPRESSIVE STRENGTH OF 35 MPa, 4-7% ENTRAINED AIR, SLUMP 75 mm ±25, WATER/CEMENT RATIO = 0.40.

3.4 REINFORCING BARS SHALL CONFORM TO CAN/CSA G30.18, GRADE 400R.

3.5 UNLESS OTHERWISE NOTED ON THE DRAWINGS, CONCRETE COVER FOR REINFORCING BARS SHALL CONFORM TO THE MINIMUM REQUIREMENTS OF CAN/CSA A23.3.

3.6 FABRICATION OF REINFORCING STEEL SHALL BE IN ACCORDANCE WITH THE "REINFORCING STEEL MANUAL OF STANDARD PRACTICE", BY THE REINFORCING STEEL INSTITUTE OF CANADA, AND CAN/CSA A23.1.

3.7 UNLESS OTHERWISE NOTED, LAP SPLICES SHALL BE CLASS B ACCORDING TO CAN/CSA A23.3 FOR THE RESPECTIVE STEEL GRADE AND CONCRETE ULTIMATE STRENGTH.

3.8 REINFORCING SHOP AND PLACEMENT DRAWINGS SHALL BE FURNISHED TO THE ENGINEER FOR APPROVAL OF DESIGN COMPLIANCE.

3.9 FORMED CONCRETE SURFACES SHALL HAVE SMOOTH FINISH FREE FROM HONEY COMBING OR CRACKS.

WORK COVERED BY CONTRACT DOCUMENTS:

1- WORK OF THIS CONTRACT COMPRISES FULL DEMOLITION AND RECONSTRUCTION OF BOBS LAKE DAM OF RIDEAU CANAL, LOCATED NEAR THE HAMLET OF BOLINGBROKE, APPROXIMATELY 30 km WEST OF THE TOWN OF PERTH; AND FURTHER IDENTIFIED AS PCA PROJECT No. 30025767.

2- THE CONSTRUCTION WORK INCLUDES BUT IS NOT LIMITED TO THE FOLLOWING:

1. DEVELOPING WORK / STAGING AREAS;
2. PUBLIC/RECREATIONAL TRAFFIC CONTROL / DETOUR (PORTAGING ACCESS ROUTE);
3. DESIGNING AND CONSTRUCTING TEMPORARY AND PERMANENT ACCESS ROADS;
4. SEDIMENT AND EROSION CONTROL, AND OTHER ENVIRONMENTAL PROTECTION. ENVIRONMENTAL MITIGATIONS AND MEASURES INCLUDING THE ENVIRONMENTAL PROTECTION PLAN TO BE DEVELOPED AND CERTIFIED BY CONTRACTOR PROFESSIONAL ENGINEER EXPERIENCED IN SEDIMENT AND TURBIDITY CONTROL;
5. OBTAINING REGULATORY PERMITS CERTIFICATES OF AUTHORIZATION AND APPROVALS;
6. COFFERDAMS DESIGN, SUPPLY AND INSTALLATION AND DEWATERING OF WORK AREA, INCLUDING MAINTENANCE OF THE DEWATERING SYSTEM;
7. DESIGNING AND CONSTRUCTING WATER DIVERSION WORK, INCLUDING MAINTENANCE AND OPERATION OF DIVERSION SYSTEM THROUGH CONSTRUCTION PROJECT AND COFFERDAMS;
8. PROTECTION OF EXISTING ADJACENT STRUCTURES / PROPERTIES AND OTHER WORKS INCLUDING EMBANKMENTS, DURING CONSTRUCTION. PROTECTION OF HISTORIC ROCK CRIB DAM. SITE COFFERDAM UPSTREAM OF HISTORIC DAM;
9. PREPARATION AND IMPLEMENTATION OF A EMERGENCY RESPONSE PLAN (ERP), OPERATION/MONITORING/SURVEILLANCE PLAN (OMS) FOR CONTRACTOR'S TEMPORARY WORKS;
10. DEMOLITION OF THE EXISTING CONCRETE GRAVITY DAM STRUCTURE, AFTER CONSTRUCTION OF THE NEW DAM;
11. SALVAGING OF THE EXISTING WINCHES AND OTHER IDENTIFIED EQUIPMENT;
12. CONSTRUCTION OF THE NEW CONCRETE DAM STRUCTURE AND RELATED WORK;
13. STREAM BED ENVIRONMENTAL REHABILITATION BETWEEN NEW AND OLD DAM INCLUDING BY-PASS OF MINIMAL ENVIRONMENTAL FLOW THROUGH WORK AREA;
14. REMOVAL OF WATER DIVERSION SYSTEM, TEMPORARY CONSTRUCTION ACCESS ROADS AND OTHER TEMPORARY WORKS;
15. SUPPLY AND INSTALLATION OF THE NEW SAFETY BOOM SYSTEM;
16. DAM COMMISSIONING AND DIVERSION DURING STREAM CHANNEL DEVELOPMENT AND DEMOLITION OF THE OLD DAM;
17. SITE REINSTATEMENT AND RESTORATION;
18. IN ADDITION, THE WORK UNDER THIS CONTRACT, THE CONTRACTOR WILL ALSO BE RESPONSIBLE FOR:
- DESIGN, APPROVALS AND MONITORING WORK ASSOCIATED WITH THE TEMPORARY WORKS (CONSTRUCTION ACCESS ROADS, WATER DIVERSION SYSTEM, DEWATERING, SEDIMENT CONTROL, ETC.).

3- THE CONTRACTOR SHALL SUPPLY ALL LABOUR, EQUIPMENT, AND MATERIAL TO PERFORM THE WORK AS DESCRIBED IN THE CONTRACT PLANS AND SPECIFICATIONS, AND WILL RETAIN QUALIFIED PERSONNEL TO PERFORM THE WORK.

LEASE LIMITS COORDINATES		
MARK	NORTH	EAST
L1	4 957 445,838	379 377,098
L2	4 957 432,950	379 389,198
L3	4 957 381,810	379 432,268
L4	4 957 393,084	379 458,221
L5	4 957 392,778	379 468,278
L6	4 957 386,701	379 468,105
L7	4 957 377,218	379 464,366
L8	4 957 363,530	379 455,373
L9	4 957 357,686	379 450,230
L10	4 957 348,480	379 444,034
L11	4 957 335,210	379 429,694
L12	4 957 322,554	379 440,945
L13	4 957 334,261	379 452,388
L14	4 957 346,256	379 445,341
L15	4 957 357,455	379 460,546
L16	4 957 372,260	379 469,901
L17	4 957 388,650	379 477,240
L18	4 957 398,867	379 477,045
L19	4 957 407,415	379 469,846

AXIS OF DAM COORDINATES		
MARK	NORTH	EAST
D1	4 957 356,047	379 449,958
D2	4 957 336,416	379 478,267
D3	4 957 322,483	379 498,359

CENTER OF ROAD COORDINATES		
MARK	NORTH	EAST
R1	4 957 444,824	379 357,176
R2	4 957 466,586	379 390,738
R3	4 957 455,700	379 373,961
R4	4 957 393,232	379 426,570
R5	4 957 391,784	379 443,478
R6	4 957 401,538	379 455,060
R7	4 957 393,159	379 472,734
R8	4 957 388,214	379 472,662
R9	4 957 374,640	379 467,269
R10	4 957 351,855	379 452,943

NEW FENCES COORDINATES		
MARK	NORTH	EAST
F1	4 957 450,056	379 383,895
F2	4 957 395,916	379 429,540
F3	4 957 470,822	379 417,099
F4	4 957 412,002	379 466,637
F5	4 957 392,322	379 483,211

No	NOTES
1	COORDINATE SYSTEM: UTM NAD 83, ZONE 18, NORTH. ORTHOMETRIC HEIGHT: CGVD28.

LEGEND :

- PROPERTY LIMITS
- KNOWN ELEMENT
- ASSUMED ELEMENT
- ROCK
- NEW CONCRETE
- EXISTING CONCRETE
- SLOPE 2% — SLOPE (IN %)

ABBREVIATIONS:

CL	CENTER LINE
EL.	ELEVATION
VAR.	VARIABLE
MIN.	MINIMUM
MAX.	MAXIMUM
TYP.	TYPICAL
C.J.	CONSTRUCTION JOINT
E.J.	EXPANSION JOINT
C/C	CENTER TO CENTER

2015 BOREHOLES BY GHD:

SEE GEOTECHNICAL INVESTIGATION REPORT FOR GEODESIC COORDINATES OF THE BOREHOLES

- F-X — VERTICAL BOREHOLES
- F-X — BOREHOLES DRILLED AT 45° ANGLE
- ROCK PROBES

no	date	issues and/or modifications	by
6	2018-02-22	ISSUED FOR TENDER	J.K.
5	2017-03-21	ISSUED FOR REVIEW	J.K.
4	2017-02-23	ISSUED FOR REVIEW	J.K.
3	2017-02-10	ISSUED FOR REVIEW	J.K.
2	2016-11-04	ISSUED FOR REVIEW	J.K.
1	2016-08-02	PRELIMINARY DESIGN - 66% STAGE	J.K.
0	2016-06-02	PRELIMINARY	J.K.

Parks Canada / Parcs Canada

Canada

CIMA
ISO 9001
600-3400 du Souvenir Blvd
Laval QC H7V 3Z2
Phone: 514 337-2462
Fax: 450 682-1013
www.cima.ca

seals

LICENSED PROFESSIONAL ENGINEER J. KONCZYNSKI 100113405 PROVINCE OF ONTARIO 2018-02-22

project: BOBS LAKE DAM REPLACEMENT BOLINGBROKE - ONTARIO

title: GENERAL ARRANGEMENT PLAN AND ACCESS ROAD

drawn	H. OTMANI	scale	1:250
checked	J. CARON	date	2015-07-28
designed	Y. BERTON	reference	
approved	J. KONCZYNSKI		

client	project	drawing no	revision
A0138	A000492B	CV 002 01	6

0 10 m

SCALE 1:250

2018-02-21
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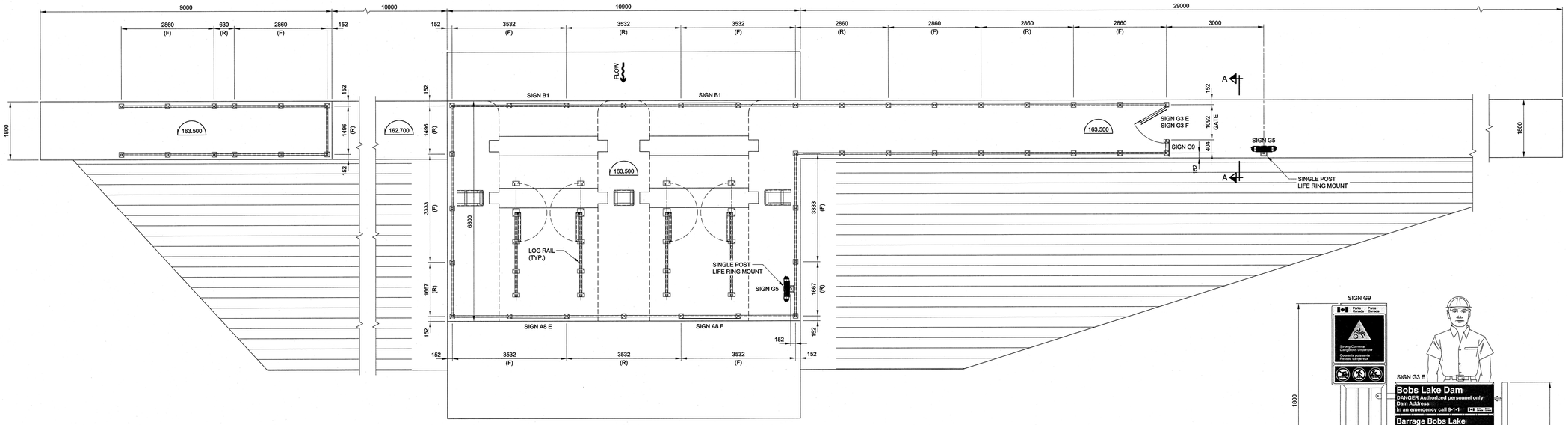
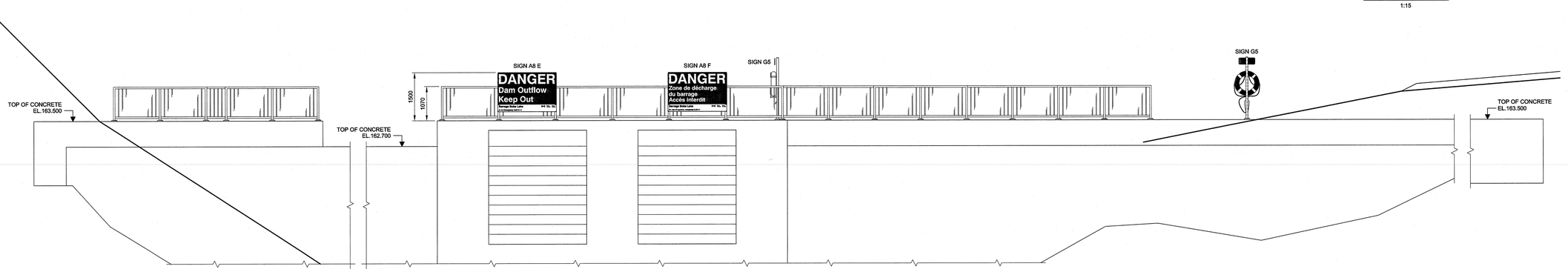
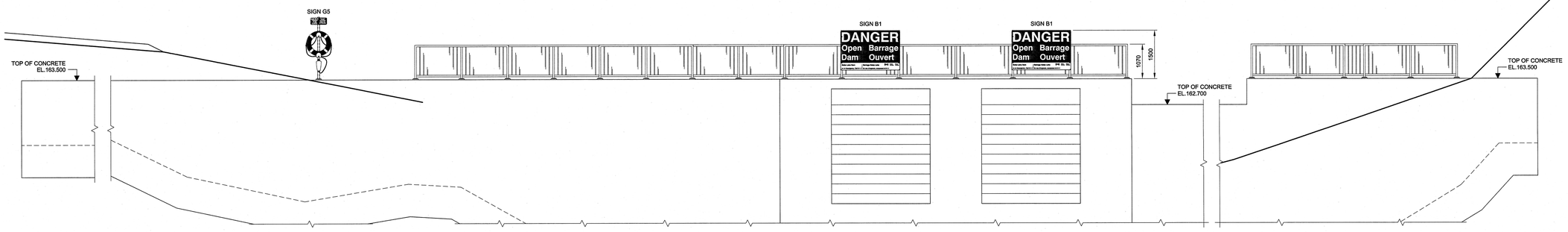


PLAN
1:50

ELEVATION A-A
1:15



DOWNSTREAM ELEVATION
1:50



UPSTREAM ELEVATION
1:50

No	NOTES
1.	SEE DRAWING CV-002-01 FOR GENERAL NOTES, LEGEND AND ABBREVIATIONS.
2.	SEE DRAWING CV-008-01 FOR PUBLIC STYLE GUARD RAIL FABRICATION DETAILS.
3.	SEE DRAWING CV-009-01 FOR SAFETY SIGNS SCHEDULE AND MOUNTING DETAILS.

LEGEND:

(F) FIXED RAIL SECTION

(R) REMOVABLE SECTION

no	date	issues and/or modifications	by
4	2018-02-22	ISSUED FOR TENDER	J.K.
3	2017-02-23	ISSUED FOR REVIEW	J.K.
2	2016-11-04	ISSUED FOR REVIEW	J.K.
1	2016-08-02	PRELIMINARY DESIGN - 66% STAGE	J.K.
0	2016-08-02	PRELIMINARY	J.K.

Parks Canada Parcs Canada

Canada

CIMA
ISO 9001
600-3400 du Souvenir Blvd
Laval QC H7V 3Z2
Phone: 514 337-2462
Fax: 450 682-1013
www.cima.ca

seals

LICENCED PROFESSIONAL ENGINEER
J. KONCZYNSKI
100118465
PROVINCE OF ONTARIO
2018-02-22

project
BOBS LAKE DAM REPLACEMENT
BOLINGBROKE - ONTARIO

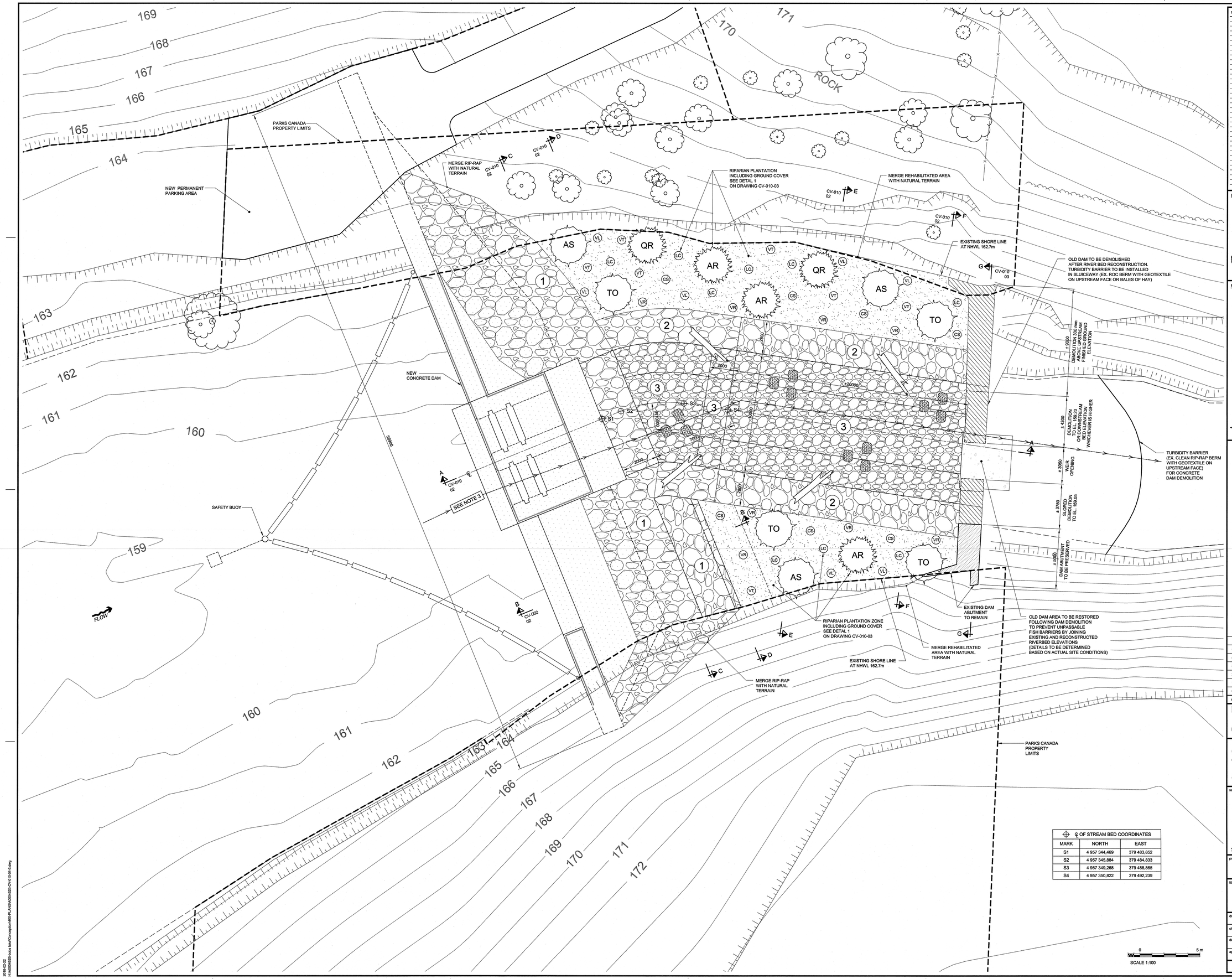
title
GUARDRAIL PLAN
ELEVATIONS AND DETAILS

drawn	H. OTMANI	scale	1:50
checked	J. CARON	date	2015-07-28
designed	M. LAPLANTE	reference	
approved	J. KONCZYNSKI		

client	project	drawing no			revision
A0138	A000492B	CV	007	01	4

2018-02-21
H:\A000492B-bobs lake\Conception\A0\D-PLANS\000492B-CV-007-01-4.dwg

(11-04) A0 1189 x 841 mm



No.	NOTES
1.	SEE DRAWING CV-002-01 FOR GENERAL NOTES, LEGEND AND ABBREVIATIONS.
2.	ENVIRONMENTAL MEASURES AS PER SPECIFICATIONS.
3	MAINTAIN MINIMUM ENVIRONMENTAL FLOW OF 1.5 cms UP TO 2.5 cms BY PUMPING, PIPING OR OTHER MEANS IN ORDER TO PASS CLEAN LAKE WATER FROM UPSTREAM OF NEW DAM TO DISCHARGE POINT DOWNSTREAM OF OLD DAM DURING STREAM CHANNEL DEVELOPMENT AND OLD DAM DEMOLITION.
4.	STREAM BED ENVIRONMENTAL REHABILITATION AND DAM DEMOLITION MUST BE SUBSTANTIALLY COMPLETED WITHIN A THREE WEEK PERIOD TO ALLOW FOR PASSAGE OF WATER THOUGH THE NEW STREAM CHANNEL. SCHEDULING OF THIS WORK IS DEPENDENT ON IN WATER WORK RESTRICTION AND FLOW CONDITIONS REQUIREMENTS AT BOBS LAKE, PROCESS WOULD ENTAIL:
	1) PARTIAL DRAW DOWN OF AREA BETWEEN NEW DAM AND OLD DAM IN A MANNER TO PREVENT EROSION AND TURBIDITY
	2) CONSTRUCTION AND COMMISSIONING OF BYPASS SYSTEM TO PASS MINIMUM 1.5 cms UP TO 2.5 cms THROUGH STREAM BED REHABILITATION AND DEMOLITION AREA
	3) FULL DRAW DOWN OF AREA BETWEEN OLD DAM AND NEW DAM
	4) MEASURES TO CONTROL SEEPAGE FROM NEW DAM, DIVERT SEEPAGE TO SEDIMENT TREATMENT, AND RELEASE IN ORDER TO FACILITATE STREAM BED REHABILITATION WORK IN THE DRY
	5) CONSTRUCTION OF STREAM BED REHABILITATION AND OLD DAM DEMOLITION PRIORITIZING ZONE 1, ZONE 3 AND OLD DAM DEMOLITION TO ALLOW RE-WATERING OF RIVERBED AS SOON AS POSSIBLE
5.	ALL TEMPORARY WORKS ARE SHOWN FOR INDICATIVE PURPOSE ONLY, DESIGN IS THE RESPONSIBILITY OF THE CONTRACTOR.

LEGEND :

1. ANGULAR ROCKFILL (Ø 300-500) (RIP RAP)
2. ROCKFILL WITH RIVER ROCKS (Ø 300-500) (NO SHARP EDGES) FILL VOIDS WITH SAND GRAVEL MIX
3. ROCKFILL WITH RIVER ROCK (Ø 50-300) (NO SHARP EDGES)FILL VOIDS WITH SAND GRAVEL MIX
- BOULDER CLUSTER (Ø 1000) (NO SHARP EDGES)

PLANTATION:

TREE :

- TO THUYA OCCIDENTALIS (4)
- AS ACER SACCHARUM (3)
- AR ACER RUBRUM (3)
- QR QUERCUS RUBRA (2)

SHRUB:

- VR VITIS RIPARIA (8)
- CS CORNUS STOLONIFEA (7)
- VT VIBURNUM TRILOBUM (7)
- LC LONICEA CANADENSIS (9)
- VL VIBURNUM LENTAGO (7)

LARGE WOODED DEBRIS (4)

NOTE: FILL IN ZONE 3

℄ OF STREAM BED COORDINATES		
MARK	NORTH	EAST
S1	4 957 344,489	379 483,852
S2	4 957 345,884	379 484,833
S3	4 957 349,268	379 488,865
S4	4 957 350,822	379 492,239

no	date	issues and/or modifications	by
5	2018-02-22	ISSUED FOR TENDER	J.K.
4	2017-02-23	ISSUED FOR REVIEW	J.K.
3	2016-11-04	ISSUED FOR REVIEW	J.K.
2	2016-10-28	PRELIMINARY DESIGN	J.K.
1	2016-08-02	PRELIMINARY DESIGN - 66% STAGE	J.K.
0	2016-08-02	PRELIMINARY	J.K.

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CIMA

600-3400 du Souvenir Blvd
Laval QC H7V 3Z2
Phone: 514 337-2462
Fax: 450 682-1013
www.cima.ca

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LICENSED PROFESSIONAL ENGINEER J. KONCZYNSKI 100113483 PROVINCE OF ONTARIO 2018-02-22

project

BOBS LAKE DAM REPLACEMENT
BOLINGBROKE - ONTARIO

title

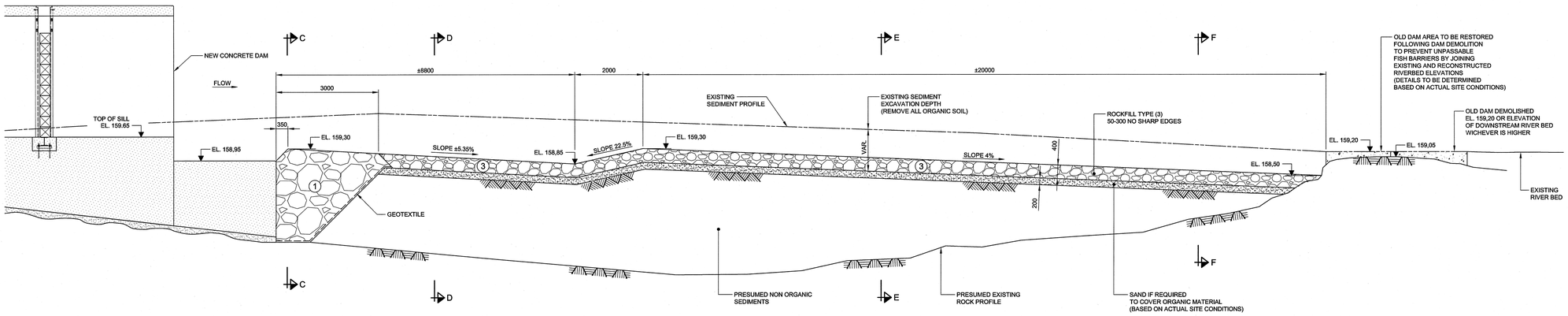
STREAM BED
ENVIRONMENTAL REHABILITATION
PLAN

drawn	H. OTMANI	scale	1:100
checked	J. CARON	date	2015-07-28
designed	Y. BERTON	reference	
approved	J. KONCZYNSKI		

client	project	drawing no	revision
A0138	A000492B	CV 010 01	5

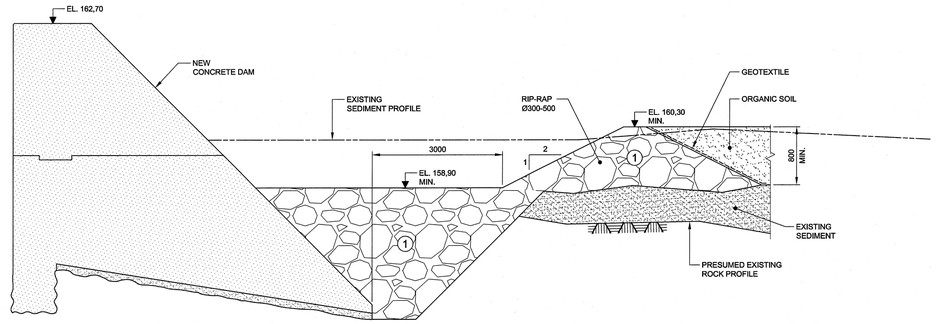
2018-02-22
N:\A000492B\Data Iale\Conception\400-PLANS\A000492B-CV-010-01-5.dwg

(11-04) A0 1189 x 841 mm



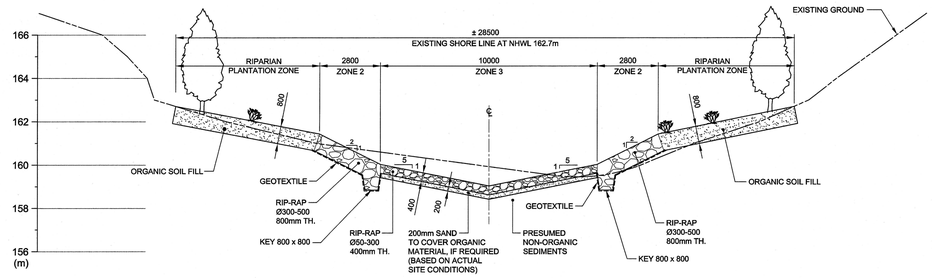
LONGITUDINAL SECTION A-A

CV-010-01
1:50



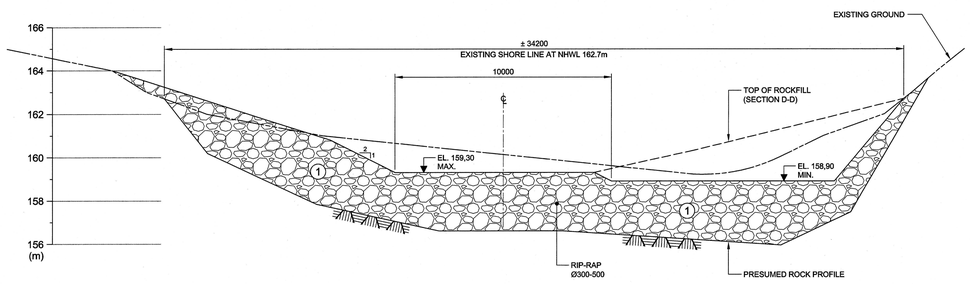
SECTION B-B

CV-010-01
1:50



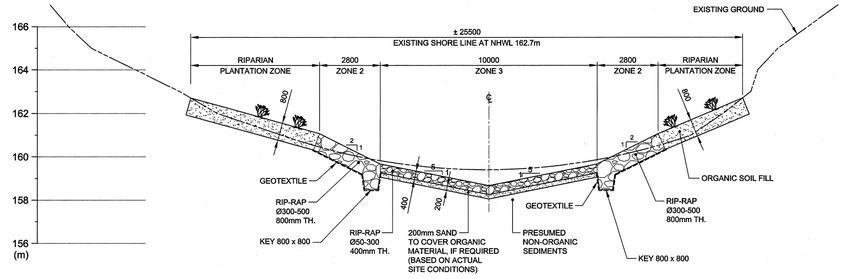
CROSS SECTION E-E

CV-010-01
1:100



CROSS SECTION C-C

CV-010-01
1:100



CROSS SECTION F-F

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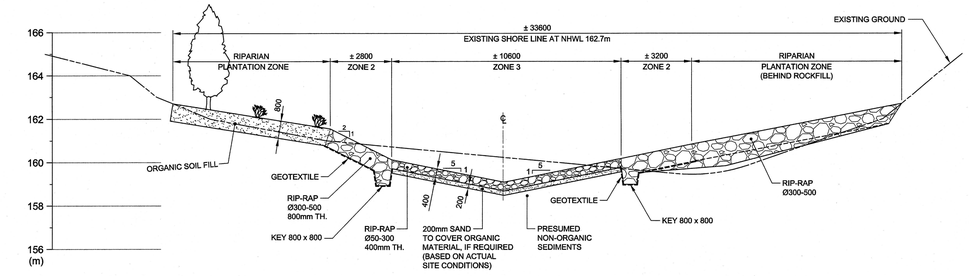
1:100



CROSS SECTION D-D

CV-010-01
1:100

No	NOTES
1.	SEE DRAWING CV-002-01 FOR GENERAL NOTES, LEGEND AND ABBREVIATIONS.
2.	ENVIRONMENTAL MEASURES AS PER SPECIFICATIONS.

no	date	issues and/or modifications	by
3	2018-02-22	ISSUED FOR TENDER	J.K.
2	2017-02-23	ISSUED FOR REVIEW	J.K.
1	2016-11-04	ISSUED FOR REVIEW	J.K.
0	2016-10-28	PRELIMINARY	J.K.

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Canada

CIMA
ISO 9001
600-3400 du Souvenir Blvd
Laval QC H7V 3Z2
Phone: 514 337-2462
Fax: 450 682-1013
www.cima.ca

seals

LICENCED PROFESSIONAL ENGINEER
J. KONCZYNSKI
100113495
PROVINCE OF ONTARIO
2018-02-22

project
BOBS LAKE DAM REPLACEMENT
BOLINGBROKE - ONTARIO

title
STREAM BED
ENVIRONMENTAL REHABILITATION
LONGITUDINAL AND CROSS SECTIONS

drawn	H. OTMANI	scale	1:200
checked	J. CARON	date	2015-08-03
designed	Y. BERTON	reference	
approved	J. KONCZYNSKI		

client	project	drawing no	revision
A0138	A000492B	CV 010 02	3

2019-02-21
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(11-04) A0 1189 x 841 mm

Appendix F

Technical Memorandum: DFO Pathways of Effects Analysis (Parsons)

PARSONS

1069 Wellington Road, South, Suite 214
P: +1 519-681-8771 | F: +1 519-681-4995| www.parsons.com

Memorandum

To: Project Team
Copy: n/a
From: Courtney Beneteau, Fisheries Biologist

Date: January, 2018
Parsons Project: 602956

Re: **Bobs Lake Dam Reconstruction**
DFO Pathways of Effects Analysis

As the Bobs Lake Dam Reconstruction Project is primarily aquatic in nature, this memo provides added detail on the analysis completed to identify potential effects to fish and fish habitat within the study area using the Department of Fisheries and Oceans (DFO) Pathways of Effects (PoE) diagrams. For reference, "fish" as defined by the *Fisheries Act* includes shellfish, crustaceans, marine animals, and all parts and life stages of these animals.

Potential impacts to fish and fish habitat can be identified as: a direct loss of habitat; direct injury to fish as a result of construction; or indirect changes to fish habitat that may occur in the long term and/or over a larger area. The DFO has developed PoE diagrams to describe the cause-effect relationships connecting a project activity to a potential stressor, and the stressor to some ultimate effect on fish and fish habitat. These diagrams were used as a tool in the following assessment to identify appropriate mitigation measures and residual impacts or effects in order to assess the project risk of serious harm to fish and fish habitat. The project was submitted by Parks Canada Agency (PCA) to the DFO for review and it was ultimately determined that, provided the appropriate mitigation measures are implemented and the DFO guidance is followed, the project should not result in serious harm to fish and no formal approval is required under the *Fisheries Act* or the *Species at Risk Act* (SARA). This document also contains the design and construction mitigation recommendations of the DFO, as indicated in their Letter of Advice (dated October 13, 2017 – which can be found in Appendix I). Additional mitigation measure recommendations were received from the Ministry of Natural Resources and Forestry (MNRF) in a letter to PCA (also dated October 13, 2017 – Appendix I); these are included in the analysis below, where applicable.

The proposed reconstruction of Bobs Lake Dam will be generally staged as follows: construction of an access road to the site; construction of the new dam upstream of the existing location; and removal of the old dam. These works will include various construction activities that have the potential to impact the surrounding aquatic environments, such as: excavation, use of industrial equipment, vegetation clearing, removal of aquatic vegetation, change in flow, organic debris management, placement of materials or structures in water, structure removal, wastewater management, water extraction, grading, and riparian planting. The following sections provide assessment of the potential environmental impacts associated with the above-noted construction activities, a description of the appropriate mitigation measures required to avoid and/or minimize those impacts, and the analysis of any residual environmental effects.

Excavation

Bank excavation will be required prior to construction of the new dam, and potentially also during construction of the access road and removal of the existing dam. Excavation exposes soils and increases the likelihood of erosion and release of sediments into the nearby watercourse. Release of sediment into the Tay River (or resuspension of sediment in Bobs Lake) could have significant detrimental impacts to water quality and fish habitats. Sediments that enter a watercourse can increase stream turbidity, abrade fish gill membranes (leading to physical stress), cover spawning areas and incubating juvenile fish, decrease food production, and smother freshwater mussels.

Excavation also changes the shape of the land, which affects slopes and drainage. Due to the proximity of the excavation required to construct the new dam to the surrounding shallow groundwater, altering baseflow during construction may

pose a concern. This activity will most likely also require the use of industrial equipment, water extraction, and wastewater management, all of which are discussed in separate sections below.

Excavation impacts will be mitigated by Erosion and Sediment Controls (ESC) implemented during construction, such as heavy-duty silt fence surrounding areas of exposed soils, and fibre filtration tubes installed in swales and drainage channels to slow water velocities and allow settling of suspended sediments. In general, all work areas will be isolated from the open watercourse via cofferdam to avoid sediment loading and resuspension in the waterbodies. All permanent changes to the slopes in the area as a result of excavation should be stabilized in the short term with interim products (such as bonded fibre matrix) and long term with vegetation (grasses and native plantings, discussed below). All excess materials generated by excavation will be stockpiled, handled, and disposed of in a manner that prevents entry into the adjacent waterbody.

A permanent change in slope and drainage patterns surrounding the worksites as a result of the new dam, removal of the old dam and construction of the access roads, may occur; however, no decrease in return volume is expected. Following application of the mitigation measures noted above, most importantly ESCs, no residual effects to the fish and fish habitats are anticipated as result of excavation.

Use of Industrial Equipment

Industrial equipment accessing the water features and their banks may release deleterious materials such as debris, oil, fuel, and grease into the Bobs Lake/Tay River system. Industrial equipment will be required for excavation during construction of the new dam, and most likely during construction of the access road and removal of the existing dam. Heavy equipment entering a watercourse may possibly harm or kill aquatic species within its path. Heavy machinery will need to access the lakebed in order to construct the new dam, and potentially to erect temporary access roads/jetties and to demolish the existing dam.

Any part of equipment entering the waterbody or operating on the banks shall be free of fluid leaks and externally cleaned and/or degreased. All equipment maintenance and refueling shall be conducted away from the watercourse. A Spill Response and Action Plan will be prepared that describes actions to be taken in the event of an incident such as an accidental spill. A spill kit containing absorbent materials (appropriate for removing petroleum from water and ground surfaces, i.e., pads, socks, granular) will be kept on site at all times to be used in the event of deleterious materials release. Any area of lakebed that will be accessed by industrial equipment will be isolated from the open waterbody, and any fish confined within the sequestered area will be removed by a qualified biologist prior to dewatering in order to prevent suffocation and mechanical harm.

Following the application of mitigation measures, no residual effects to fish and fish habitat are anticipated as a result of the use of industrial equipment.

Vegetation Clearing

Vegetation clearing will be required for construction access and to construct the new dam. For the most part, the vegetation to be removed will consist of grasses and ‘weedy’ herbaceous plants with few trees or shrubs affected. Vegetation clearing exposes soils and increases the likelihood of erosion and release of sediments into the nearby waterbody. As previously discussed, the release of sediment into a watercourse can have significant detrimental impacts to fish and fish habitats. Removing riparian vegetation can also decrease watercourse shading, thereby affecting the water temperature, and can limit the natural shedding of organic materials into the watercourse which may provide food, cover, and nutrients to the aquatic ecosystems.

Vegetation clearing impacts to the watercourse slopes and banks will be mitigated by ESCs (e.g., silt fence, fibre filtration tube flow checks, etc.) in place during construction. Vegetation removal will be kept to a minimum, as required for access only. Vegetation scheduled for removal will have proper clearing techniques implemented to protect and retain the surrounding vegetation, and root masses will be left in place for bank stabilization where feasible. To mitigate the loss of woody vegetation as a result of clearing activities, Landscape Plan including native shrub species should be enacted in

decommissioned access and staging areas where removals occurred. All exposed soils will be stabilized with a suitable seed and cover mix.

Following the application of mitigation measures, no residual effects to fish and fish habitat are anticipated as a result of vegetation clearing.

Change in Flow

The new dam will be installed approximately 40 m upstream of the existing Bobs Lake Dam. Once the new dam construction is complete, the old dam will be removed and the area between the two structures will change from a lake/reservoir morphology to an active river channel. During construction, the flow in Bobs Lake will be constricted as cofferdams will be in place at different phases to allow isolation of the worksites. During demolition of the old dam, the flow will be conveyed through flumes. Changes in flow have the potential to erode channel banks, scour channel beds, alter substrate composition, and change sediment and nutrient input concentrations. Changes in flow may affect the local water chemistry, food supply, and habitat availability, and can displace fish or prevent movement through the area.

Any work that must take place in the water will be isolated from the open portion of the surrounding waterbody via cofferdams. Isolating the work areas will ensure that any sediment generated during the construction activities will not be permitted to exit the worksite. Any fish and freshwater mussels trapped within the isolated areas must be removed prior to the initiation of work. Once the new dam is constructed, it will serve as the temporary flow by-pass, in conjunction with the diversion flumes, to allow demolition of the old dam to be done “in the dry” and to maintain upstream to downstream flow in the watercourse. The fact that Bobs Lake acts as a reservoir controlled by the dam, increases the resiliency of the existing downstream system and reduces the erosive potential of changes in flow.

The new dam will constrict the flow in the lake and act as a barrier to fish movement through the system. However, this is not a new impact; the old dam created the same environment. The residual effect of this project is due to the repositioning of the dam approximately 40 m upstream which thereby permanently changing the morphology and flow characteristics of the area between the existing and new dam. The old and new dam will follow the same operational procedure; therefore, no change in the flows and velocities are anticipated downstream of the dam.

Removal of Aquatic Vegetation

The outlet bay of Bobs Lake, upstream of the existing dam, contains several species of aquatic plants, whereas the Tay River within the study area has very little aquatic vegetation, likely due to the turbulence downstream of the. As previously mentioned, the watercourse morphology between the existing and new dam locations will essentially be converted from lake/reservoir to river, and therefore any aquatic vegetation in this area will be lost from the system. This will result in a change in light penetration, primary productivity, and nutrient inputs in this area which could contribute to changes in water temperature, dissolved oxygen, food supply, contaminant concentration, and habitat structure and cover.

Since the section of watercourse between where the new dam is built and the old dam will be changing from one morphology to another, there is no opportunity to replace the removed aquatic vegetation, since the newly created habitat will no longer support its growth. Fortunately, the affected area is small relative to the rest of the outlet bay, which provides similar habitat and would contain the same aquatic vegetation, and very small relative to Bobs Lake as a whole.

Organic Debris Management

Typical of an impoundment, organic debris (e.g., submerged logs, branches, and leaves) has accumulated upstream of the Bobs Lake Dam. As previously mentioned, the area of impounded water between the new and old dams will be free to flow downstream when the old dam is removed. Barring intervention, all the accumulated organic debris will be washed downstream or deposited on the new riverbanks. In addition, removal of organic debris changes the habitat structure, removes cover for aquatic organisms, and changes the food supply and nutrient concentrations in the area.

There will be no opportunity to replace the organic debris that is removed from the area between the old and new dams, since that area will experience a complete change in watercourse morphology that will no longer support debris

accumulation. Fortunately, that area is small relative to the rest of the outlet bay, in which organic debris has and will continue to accumulate and provide habitat similar to that being lost. All organic materials, and accompanying sediment that is removed will be temporarily stored/stockpiled, handled, and disposed of in a manner that prevents re-entry to the waterbody.

Placement of Material or Structures in Water

The installation of the new dam approximately 50 m upstream of the existing dam in Bobs Lake will be a permanent structure covering a sizeable area of lakebed. The new dam will restrict the flow between the lake and Tay River and will be used to regulate the water level of the Rideau Canal. In order to construct the new dam, additional materials will be placed in the water during construction for access (rock jetty) and to isolate work areas (cofferdam). In order to remove the old dam, temporary diversion flumes will be placed in the water to convey the flow through the demolition area. Lakebed rehabilitation in the area between the dams will require the placement of rock to simulate a natural river channel following completion of the new dam. Improperly sized material has the potential to become displaced and cause erosion issues or barrier to fish movement. The placement of materials in water can disturb and re-suspend the sediments, negatively affecting the aquatic organisms in the area. The new permanent structure, and to a lesser extent, the temporary access jetty and cofferdams, will change the channel morphology, shoreline morphometry, substrate and aquatic macrophyte compositions, and water flows. Increased flows from the new dam will have enormous erosive capability, especially in the silt and sand that has built up in the area upstream of the old dam. This will cause resuspension of the sediment between the two dams and greatly increase the concentration of sediment that flows into the Tay River.

To avoid resuspension of sediment as result of lakebed disturbance during the placement of material or structures in water, all in-water work areas will be isolated from the open waterbody using cofferdams. Any fish confined within the isolated areas will be removed by a qualified biologist prior to dewatering, in order to prevent harm. Cofferdams will consist of double-walled sheet piles lined with a membrane and filled with granular. All temporary containment areas will be stabilized against the impacts of high flow. Any rock placed in the newly created river channel between the dams will be sized appropriately such that it will withstand the high flows exiting the new dam and not shed downstream in the system. Rock placed in the new Walleye Spawning Habitat will also be sized as per MNRF's direction; boulders > 500 mm in diameter placed in or near the middle of the channel. Temporary flow will be maintained from upstream to downstream, either around the cofferdams or through the diversion flumes, at all times to prevent impacts to the river system below the dam. While the constriction of flow as a result of the cofferdams and diversion flumes will be temporary and limited to the construction and demolition periods only, the very purpose of the new dam is to permanently restrict the flow of water exiting Bobs Lake. To avoid construction related impacts and disruption to fish species during their most vulnerable life cycles, both the Kingston Area (Bobs Lake jurisdiction) and the Kemptville District (Tay River jurisdiction) MNRF offices provided in-water work timing restrictions for all construction activities directly or indirectly impacting the applicable waterbody. In December, the MNRF released the Updated In-Water Work Timing Guidelines for the Kemptville District; which in the case of Bobs Lake, the Tay River, and Christie Lake, stipulates no in-water work between October 15th and June 30th.

Upstream of the new dam, the lake morphology and aquatic habitats including substrate and macrophyte compositions, and flows, will remain relatively consistent with pre-construction conditions. There will be an overall loss of fish habitat from the system in the direct footprint of the new dam.

Structure Removal

The existing Bobs Lake Dam was built in 1870. Since that time, the dam has restricted the flow of water and encouraged sedimentation (the settling out of suspended particles in the water column), particularly upstream of the dam in the outlet bay of Bobs Lake. An estimated 2.0 m of sediment (silty sand with cobble and boulders) is currently built up in the downstream section of the outlet bay and is being retained by the existing dam (GHD, 2015). Removal of this structure is scheduled to occur after the new dam has been constructed and the morphology of the area between the dams will change from a lake/reservoir to an active river channel. As previously noted above in Placement of Material or Structures in Water, the flows coming out of the new dam will have enormous erosive capability. Couple that force with the removal of the only

barrier to the Tay River (old Bobs Lake Dam), and the potential for sediment transport reaches far outside that of the study area with potential for sedimentation impacts kilometers downstream. Sediment deposition downstream will occur along stream banks, stream bottoms, backwater and floodplain areas, and will affect biota in a variety of ways. Freshwater mussels, eggs and newly hatched fish, in particular, will become smothered or entombed by fines (sand, silt). Spawning habitats, like riffles, will become buried and potentially unusable. Benthic invertebrate populations, which are often important food sources for fish at sensitive life stages, will be impacted by the sediment as well. In addition to the initial sediment pulse and long-term sedimentation impacts of fines, coarser substrate (gravel, cobbles, and boulders) deposition will also occur over time and can change the river morphology downstream.

The primary measure that will mitigate the harmful impacts of sediment deposition in the Tay River system as a result of the Bobs Lake Dam removal, is channel restoration and removal of the sediment that has accumulated in the area between the dams. The location of the new dam (i.e., the distance from the existing dam) will dictate the extent of sediment removal and total change in aquatic habitats. Minimizing this area will in turn minimize the channel restoration requirements and sediment release potential. All materials removed from the lakebed will be either stored onsite or taken off site and disposed of in a manner that prevents re-entry to the waterbody. Some of the larger boulders may be retained for channel restoration. The area between the dams will be isolated from the open waterbody prior to any work or equipment access. Any fish that are trapped in the isolated area should be relocated to suitable habitat within Bobs Lake by a qualified biologist, prior to dewatering. To maintain flow from upstream of the new dam to downstream of the work area during riverbed rehabilitation and structure removal, temporary diversion should be conveyed through flumes. This will allow work to be done “in the dry” and will prevent impacts to the downstream system that would result from a halt in flow. To facilitate sediment removal and new river channel construction, water in the isolated area between the dams will be pumped out (see water extraction). Despite dewatering, the sediments built up in the area between the dams are anticipated to be very soft and excavation may prove difficult. To prevent the sediment-laden slurry from overwhelming settling ponds or filtration bags and re-entering the waterbody, the recommended removal method is via vacuum truck. This method would allow the soft sediment to be sucked up and immediately removed from the site. The existing dam will be removed in pieces so that no construction debris is permitted to fall into the river below. An in-water work timing window has been stipulated by the MNRF restricting work between October 15th and June 30th, due to the presence of spring and fall spawning fish species.

Despite efforts to remove the accumulated lakebed sediments between the old and new dams prior to the structure removal and release of water from the new dam into the newly constructed channel, some of the finer substrates (sand, silt) may be transported to the downstream system. While this residual impact will be greatly reduced by sediment removal and channel restoration, full mitigation may not be realistic. The existing dam has a smaller footprint then the new dam, therefore its removal will not compensate for the net loss of fish habitat noted above.

Wastewater Management

During construction, wastewater (including storm water) management may become a concern in inclement weather. Significant rain events can raise water levels and increase flows drastically within a very short time and may potentially flood the isolated in-water worksites, or access/staging areas on the banks and move sediment and deleterious materials into the adjacent waterbody.

Surface runoff will be managed through the implementation of ESC measures. ESC measures (i.e., silt fence, fibre filtration tubes, etc.) will be installed along waterbody banks and surrounding worksites and temporary staging areas or storage areas/stockpiles, to ensure suspended sediments do not enter the watercourse. Erosion protection measures will be installed prior to sediment disturbance to prevent sediment release. Sediment controls will be installed to ensure than any sediment that does become displaced remains out of the nearby watercourse. Any water removed from the watercourse during unwatering will be treated (i.e., via settlement pond, filter bag, filtering through vegetation, etc.) to remove any suspended sediments prior to re-entering the stream.

Following the application of mitigation measures, no residual effects to fish and fish habitat are anticipated as a result of wastewater management.

Water Extraction

Water contained in temporarily isolated work areas will be extracted prior to construction or equipment accessing the area. Cofferdams and watercourse diversions (i.e., temporary flumes conveying flow around the work area between the dams and for old dam removal) have the potential to strand fish. The treatment and discharge of effluent water will be required during water extraction. This activity may accidentally entrain fish in pumps and also has the potential to displace or strand fish. The discharge of wastewater may erode banks and increase sediment concentrations in the watercourse. Unwatering effluent discharged directly downstream without filtration will negatively impact water quality within the immediate area and downstream. Water extraction in isolated work areas is expected to be required below the lake surface level in order to complete the work. The groundwater level is assumed to be at lake level within the study area, and so unwatering of the surface water in the isolated work areas may in fact turn into dewatering of the surrounding groundwater, which may alter base flow.

Any fish that are trapped in the isolated area will be relocated to suitable habitat within Bobs Lake by a qualified biologist, prior to water extraction, to prevent the displacement or stranding of aquatic organisms. The fish will be transferred to suitable habitat within Bobs Lake using appropriate capture, handling, and release techniques. Screens will be placed at the end of all pump intakes, in accordance with DFO's "Freshwater Intake End-of-Pipe Fish Screen Guideline" (March 1995), to prevent the potential entrainment of fish and other aquatic animals during water extraction. Any water removed from the watercourse during extraction will be treated (i.e., via settlement pond, filter bag, flowing through vegetated land, etc.) to remove suspended sediments prior to re-entering the stream. Treated water will be released back into the system in a manner that prevents erosion and sediment inputs in the receiving waterbodies. Any impacts to groundwater as a result of water extraction during construction are temporary and extracted water will be directed back into the system.

Following the application of mitigation measures, no residual effects to fish and fish habitat are anticipated as a result of water extraction.

Grading

Grading will be required following bank disturbance due to construction equipment access and staging. Grading operations disturb the ground and expose soils, increasing the likelihood of erosion and the potential release of sediments into nearby water features. As previously noted, release of sediment from adjacent graded areas can degrade fish habitat and have significant detrimental impacts to water quality.

The installation of ESC measures at key locations will be paramount in preventing the release of sediments into nearby water features. These measures will be monitored regularly to ensure effective ESC and mitigation of erosion and sediment runoff. These measures will continue to be maintained until acceptable vegetative cover is established. The completion dates for seed and cover of the newly graded areas will be included in the contract.

Following the application of mitigation measures, no residual effects to fish and fish habitat are anticipated as a result of grading.

Riparian Planting

Riparian plantings will be used to replace any woody vegetation removed from the banks for construction access or staging. Preparation of the planting sites (i.e., digging in the banks, harrowing, etc.) increases erosion potential and risk of sediment entering the adjacent waterbody. Using fertilizers at the time of planting increases the risk of contaminants entering the water, through potential runoff after a rain event. Other potential impacts of riparian plantings include increased shade from improved canopy and potential change in water temperature, and a change in vegetation species composition which may affect the habitat structure and cover.

Again, the installation of ESC measures at key locations will mitigate potential for sediment entering the adjacent waterbody. Only specified amounts and types of fertilizers will be permitted adjacent to the waterbody to prevent chemical leaching or runoff. Landscape Plan will include only species native to the area.

Riparian planting will be used primarily to compensate the loss of vegetation as a result of clearing required for construction access. Following the application of mitigation measures, no negative residual effects to fish and fish habitat are anticipated.

Residual Effects Summary

A summary of the stressors and effects on fish and fish habitat as a result of the construction activities assessed above, as well as the measures prescribed for mitigation and the resulting residual effects can be found in the following table:

Summary of Environmental Effects on Fish and Fish Habitat

ACTIVITY	STRESSORS	EFFECTS	MITIGATION	RESIDUAL EFFECTS
Excavation	Alteration of groundwater flows to surface waters. Change in bank stability, slope, and drainage. Exposed soils and increased erosion potential. Dewatering of pit/trench.	Change in baseflow. Change in water temperature. Change in [sediment].	ESC and worksite isolation. Slope stabilization to prevent erosion. (also see Water extraction)	Potential change in local slope and drainage patterns, however will not affect return volume to system.
Use of industrial equipment	Bank stability and exposed soils. Increased erosion potential. Oil, grease, and fuel leaks from equipment. Resuspension and entrainment of sediments.	Potential mortality of fish/eggs/ova from equipment. Change in [sediment]. Change in [contaminant].	ESC and worksite isolation. Fish salvage prior to streambed access with heavy machinery. Operational constraints to keep equipment clean, fuel away from watercourse. Spill kit onsite.	No residual effects anticipated.
Vegetation clearing	Alteration of riparian vegetation. Removal of instream organic structure. Change in shade. Increased erosion potential. Change in external nutrient/energy inputs.	Change in water temperature, food supply, [nutrient], habitat structure and cover, [sediment], and [contaminant].	ESC and bank stabilization with seed and cover. Riparian planting plan to replace cleared woody vegetation. (also see Riparian planting)	No residual effects anticipated with implementation of riparian planting plan.
Removal of aquatic vegetation	Change in light penetration, primary productivity, and nutrient inputs. Resuspension and entrainment of sediments.	Change in water temperature, DO_2, food supply, [nutrient], habitat structure and cover, [sediment], and [contaminant].	Excess materials management.	Loss of aquatic vegetation in the area between the old and new dams (morphology changing from lake to river between the old and new dams, and will not support aquatic vegetation).
Change in timing, duration, and frequency of flow	Dewatering. Bank erosion. Change in substrate composition.	Displacement or stranding of fish. Change in [sediment], habitat structure and cover, food supply, water temperature, [contaminant], and [nutrient].	Worksite isolation. Fish salvage. Temporary flow by-pass maintenance. ESC.	Waterbody morphology and associated flow change from lake/ reservoir to active river channel between the old and new dams.

ACTIVITY	STRESSORS	EFFECTS	MITIGATION	RESIDUAL EFFECTS
Organic debris management	Removal of organic material. Disturbance of substrates. Bank stability and exposed soils. Increased erosion potential.	Change in food supply, [nutrient], habitat structure and cover, [sediment], and [contaminant].	Excess materials management. ESC.	Loss of organic debris in area between the old and new dams (morphology changing from lake to river between the old and new dams, and will not support organic debris).
Placement of material or structures in water	Constriction of flow. Change in channel morphology and shoreline morphometry. Change in substrate and aquatic macrophyte compositions.	Change in [sediment], habitat structure and cover, food supply, and [nutrient].	Worksite isolation. ESC and bank stabilization. Fish salvage. Temporary flow. In-water timing window.	Loss of lacustrine fish habitat in footprint area of new dam. Change in morphology of area between dams from lake/reservoir to active river channel.
Structure removal	Change in flow regime. Change in channel morphology and hydraulics. Change in channel stability and substrate. Resuspension and entrainment of sediment.	Change in [sediment], habitat structure and cover, food supply, and [contaminant].	Worksite isolation. Remove accumulated sediment between dams and restore river channel. Opportunity to enhance new river channel to provide spawning habitat for Walleye. ESC and bank stabilization. Fish salvage. Temporary flow. In-water timing window.	Change in morphology of area between dams from lake/reservoir to active river channel. Loss of fish habitat in pelagic areas with decreased wetted channel associated with morphology change. Some sediment transport following opening of new channel.
Wastewater management	Thermal loading. Nutrient loading. Input of contaminants. Alteration of currents, thermocline.	Change in water temperature, [DO_2], [nutrient], access to habitats/migration, and [contaminant]. Pathogens, disease, vectors, exotics.	ESC measures. Effluent treated prior to re-entry into watercourse. Water will be directed back into the system.	No residual effects anticipated.
Water extraction	Placement of material in water. Reduced flow. Entrainment in pumps or machinery. Change in groundwater flows.	Direct mortality of fish. Alteration of baseflow.	Effluent treated prior to re-entry into watercourse. Water will be directed back into the system in a manner that does not erode the receiving waterbody banks. Fish salvage. In-water timing windows. Pump intake screens (DFO 1995).	No residual effects anticipated.
Grading	Removal of instream organic structure. Bank stability and exposed soils. Change in slope and land drainage patterns. Increased erosion potential.	Change in [sediment], habitat and cover.	ESC and bank stabilization with seed and cover. Riparian planting plan.	No residual effects anticipated.

ACTIVITY	STRESSORS	EFFECTS	MITIGATION	RESIDUAL EFFECTS
Riparian planting	Increased erosion potential as a result of site preparation. Use of fertilizers. Increased shade from improved canopy. Change in vegetation species composition.	Change in water temperature, DO_2, food supply, [nutrient], habitat cover and structure, [sediment], and [contaminant].	ESC measures. Fertilizer restrictions. Planting Plan with native species.	No residual effects anticipated.

Memo prepared by:

Courtney Beneteau, M.Sc.
Fisheries Biologist
Parsons

Appendix G

Technical Memorandum: Terrestrial Ecosystems Impact Analysis (Parsons)

PARSONS

1069 Wellington Road, South, Suite 214
P: +1 519-681-8771 | F: +1 519-681-4995| www.parsons.com

Memorandum

To: Project Team
Copy: n/a
From: Julie Scott, Terrestrial Ecologist

Date: January, 2018
Parsons Project: 602956

Re: **Bobs Lake Dam Reconstruction**
Terrestrial Ecosystems Impact Analysis

This memo has been provided to discuss in greater detail the potential impacts associated with the above-noted project, and the mitigation, protection, and monitoring requirements which may be appropriate. It is expected that the discussion below will be summarized and incorporated into the Detailed Impact Assessment Report prepared for this assignment.

Terrestrial Vegetation

Vegetation Removals

The proposed construction activity (i.e., access, staging/storage, etc.) will take place on the north shore of Bobs Lake where vegetation is sparse. The new permanent access road will be sited in what is currently open pasture, avoiding impacts to the adjancent fencerow. Vegetation removals to accommodate construction are therefore anticipated to be minimal; as indicated in the construction drawings (CV-003-01), clearing is only indicated along a small section of the north shore adjacent to the new dam site. This area contains only a few isolated trees and no forest habitat. Necessary vegetation removals on the north shore have been minimized by aligning access routes and work areas with existing roads and cleared areas. Protective fencing (e.g., silt fence or highly-visible orange snow fencing) should be used at the perimeter of work areas to ensure that machinery or workers do not access habitats or damage vegetation that is to be retained.

Althought not shown on construction drawings, it is anticipated that some minor removal of vegetation from the southern lake shore may occur in the immediate vicinity of the new dam site. As of the time of this submission, this area has not been quantified by the designer nor has an approximate number of trees within that area been indicated. However, the removal is is likely to be limited to a very small number trees in the direct footprint of the new structure. The south shoreline in the vicinity of the new dam site is sparsely vegetated due to the proximity of the water and the effects of water level fluctuation, containing Eastern White Cedar and small-diameter deciduous trees, and is sloped sharply towards the lake.

A Landscape Plan should be prepared for post-construction site restoration. This Plan should identify: vegetation to be removed or retained; the timing of all plantings; the number, species, and condition of all plants to be installed; planting details; and the location and installation details of any exclusionary fencing or support structures needed for the site. The Plan should utilize native, non-invasive species which are suited to the site conditions and in keeping with wildlife habitat goals (discussed later in this memo). Examples of appropriate species for planting include those species which were observed on and around the site (such as Eastern White Cedar, White and Yellow Birch, and Sugar Maple) and other native species which are especially suited to riverbank/lakeshore conditions (such as willow and dogwood shrubs). Final species selection and placement should, however, be based on the specific requirements of the plants as related to the site conditions (e.g., soil moisture, shading, etc.).

All areas of exposed soil should be treated post-construction with seed and cover to limit erosion, and the applied seed mix should also consist of native, non-invasive herbaceous species. The seeded area is likely to include some of the “new” riverbank that is created between the existing and new dam locations. Seed should be applied with a cover treatment (e.g., bonded fibre matrix) for erosion control and weed suppression. An invasive species control program, likely consisting of hand-pulling undesirable plants, may be enacted if these plants interfere with the establishment of the desired seed mix;

however, this would be dependent on the post-construction site conditions (e.g., what invasive species are present, the degree to which they have established, and what methods of removal those species typically respond to).

Butternut Impacts

The two mature Butternut trees and at least one sapling noted on the site are growing in close proximity to the southeast corner of the existing dam. The wing wall at this corner of the dam will remain on the site while the rest of the dam is demolished, minimizing the risk of harm to vegetation on this part of the bank. Removal of the existing dam will be completed via a temporary access route created between the existing and new dam locations (i.e., the area that is currently lakebed and is therefore unvegetated), further limiting disturbance to adjacent bank vegetation.

There is the potential for additional Butternuts to be present elsewhere on the site, particularly seedlings or small saplings which would have been difficult to identify in November without foliage. All vegetation removal areas should be reviewed prior to clearing to confirm there is no Butternut present in these areas.

If for some reason removal of or damage to any Butternut tree is unavoidable, then a permit under Section 73 of the Species at Risk Act (SARA) will likely be required. While the two mature Butternuts appeared in poor health, they are still protected under SAR legislation, as are any saplings growing on the site.

Terrestrial Wildlife and Wildlife Habitat

General Wildlife Protection

A Wildlife Protection Plan should be prepared for this project, detailing the measures to be used to mitigate wildlife encounters during construction, preserve or restore wildlife habitat once construction is complete, and protect wildlife habitat features within the study area. It is expected that the Wildlife Mitigation Plan will incorporate the wildlife impact mitigation measures discussed in this and the following sections.

In general, any animals that enter the work area should not be harmed or harassed by on-site workers. Work in the vicinity of such animals should cease until such time as the animal has, preferably, left the area on its own. Handling of wild animals is discouraged; however, if physical removal of an animal from the work area is unavoidable (e.g., if it becomes trapped inside the work area or is in immediate danger of being hurt or killed due to construction activities), this removal should be completed with the welfare of both the animal and the handler in mind. If there is any chance that the animal may be injured through handling, or that that the animal may injure a person attempting to handle it, then professional wildlife control specialists should be contacted to complete the work.

If an animal is injured during the course of construction, a qualified wildlife rehabilitator should be contacted to provide guidance and, if needed, administer care to the animal. A list of qualified rehabilitators may be found at the following site:

https://www.ontario.ca/page/find-wildlife-rehabilitator

As noted below, SAR may not be handled without without a permit. On-site workers should be trained in the identification of SAR so that appropriate species-specific action may be taken for all animals encountered.

Construction noise disturbance to local wildlife should be minimized by maintaining all vehicles and equipment in good working order and avoiding unnecessary idling on-site.

Active Bird Nests

Removal of vegetation during the bird nesting season risks destroying or disturbing the active nests (i.e., nests with eggs or young) of migratory birds. All necessary vegetation removal should therefore be completed outside of the typical bird nesting season which extends from April 1 to August 31 (as per Environment and Climate Change Canada guidelines).

For individual, isolated trees and small patches of low-complexity vegetation, vegetation removal during the bird nesting season may be allowed so long as it is preceded by a nest inspection by a qualified individual who is experienced in the

location and identification of bird nests. For larger groups of trees, forests, and any other complex habitats where nests are not easily found, the timing restriction should stand since the detectability of nests in this type of area will be very low.

If active bird nests are found in the work area at any point during construction, then work in the vicinity should cease and the area should be fenced off with an appropriate buffer distance established so as to avoid disturbing the nest. Species-appropriate buffer requirements should be determined in consultation with Environment and Climate Change Canada. The nest area should remain undisturbed until such time as a follow-up inspection determines that the young birds have fledged or the nest has otherwise been abandoned.

Turtle Nesting Habitat

Potential turtle nesting areas (i.e., areas of exposed, loose substrate such as sand or gravel) were observed on the north lakeshore in what will be the construction staging area, although no evidence of old nests was present at the time of investigation. These areas of exposed soil were likely created by recent disturbance from the installation of monitoring wells. Potential impacts due to construction include harm to or mortality of adult turtles coming into conflict with construction equipment while trying to access nesting areas, and destruction of nests due to the passage of vehicles/equipment and ground disturbance. During the nesting season (typically late May - July), adult turtles could also migrate through the work area while seeking additional nesting habitat elsewhere.

It is recommended to surround the potential nest areas with wildlife exclusion fencing. Since active construction will be occurring during the latter part of the turtle nesting season, it would be appropriate to extend this wildlife exclusion fencing to form a perimeter fence around the entire work site. Fencing should be installed prior to the beginning of the nesting season; leaving the installation until the July 1 construction start date risks having turtles nest on the site before this date, and then having the nests destroyed during construction. Exclusion fencing may be composed of wire-backed, heavy-duty silt cloth and should not include any plastic mesh (as this poses an entanglement risk for other wildlife). Fencing must be securely buried at the base to avoid the potential for animals to pass beneath it. For reference, see: MNRF's "Best Management Practices for Mitigating the Effects of Roads on Reptile and Amphibian Species in Ontario" (April 2016), which includes details on fence design and installation.

Attempting to cover potential nest areas with weighted tarps or geotextile cloth is not recommended in this case, partly because this method is not always effective (Snapping Turtles in particular can dig through many of these materials), but mostly because this could create a new microhabitat that would appeal to snakes and potentially cause conflicts with them later on.

Any turtles that are observed in the work area during construction will not be harmed or harassed; work in the vicinity will cease until the animal has preferably left the area under its own power and Parks Canada will be notified. A turtle in immediate danger of being harmed or killed may be carefully removed from the area; however, it should be noted that Snapping Turtles often respond aggressively to human handling and should therefore be approached with caution. In the event that a turtle nest or suspected nest (e.g., a recently-disturbed dig site) is found in the work area, the nest should not be disturbed and the Parks Canada project contact should be notified for guidance on how to proceed.

Turtle Wintering Habitat

To avoid potential impacts to over-wintering turtles, in-water work (i.e., work that would disturb or expose the lakebed and risk exposing or harming turtles) would ideally not occur between the months of October and April of any given year. The construction timeline for this project, however, begins July 1 and extends for approximately six months thereafter (excluding site clean-up activities which are intended for the following spring), so there is the potential for disturbance of any over-wintering turtles that may occur near the dam.

The measures recommended for the protection of fish on this project include a requirement for workers to attempt to scare fish away from areas affected by rockfill placement for cofferdams. This activity would also help to scare turtles away from the affected areas. During dewatering of the area between the existing and new dams, workers should be aware that turtles may be exposed as water levels go down and may need to be relocated to deeper water upstream of the new dam if they

are unable to relocate themselves. This is of particular concern for any dewatering that occurs in late fall or winter, as colder temperatures pose a risk to turtles' health if they are exposed for too long.

A small, permanent loss of potential turtle overwintering habitat will occur between the existing and new dams, where lake habitat with deeper water and accumulated sediment will be changed to river habitat containing shallower, faster water flow and, presumably, no potential for accumulated sediment which would shelter turtles in the winter. The area between the two dams has been minimized through design considerations, and no further mitigation of this impact is possible.

It should be noted that the area immediately upstream of the dam is likely already highly variable in terms of water depth and depth of sediment at any given time, due to the fact that the dam is under active operation. When the dam is opened, water depth lowers and some sediment is flushed downstream. This existing variation may already deter turtles from overwintering near the dam, especially since there are other inlets and wetlands present elsewhere along the lakeshore which provide more stable conditions.

Snakes

There is the potential for snakes to occur within the construction area during all stages of this project (i.e., during site preparation and vegetation removal prior to July 1, active construction from July 1 through to late fall, and site clean-up the following spring). Therefore, the following mitigation measures should be applied throughout the project.

Of particular concern with regard to snakes is the proximity of the proposed access road and staging area to the rocky outcrop that runs along the north edge of the work area. If this rocky area provides snake hibernation habitat, then in the early spring and late fall snakes will be concentrated in this area and will be at an increased risk of coming into conflict with construction activities due to their slowed reaction time. They may attempt to use the access road surface as a basking site. Even if hibernation habitat is lacking, individual snakes may attempt to bask on the road surface or nearby rocks and slopes throughout their active season.

Wildlife exclusion fencing, as discussed above with regards to turtles, will help to exclude smaller snake species from the site so long as this fencing is properly installed and maintained. Installing exclusion fencing around the site perimeter and between the access road and the rocky outcrop to the north may limit snake access to the roadway.

It should be noted, however, that Gray Ratsnakes are very good climbers and could circumvent a typical silt fence barrier. Taller fencing and/or a fence with an overhanging lip at the top would be more effective at excluding this species. However, considering the relatively short duration and small scale of construction, and the increased expense associated with more complicated fences, an approach consisting of diligent observation and avoidance seems more appropriate for this project than the additional fencing requirements.

Regular inspections for snakes within the work area should include such measures as: reviewing the access road prior to any vehicle passage to ensure no snakes are present (particularly first thing in the morning when basking may be more common); and inspecting any construction equipment or materials that could provide snake habitat (such as vehicles which are left idle for extended periods, piles of debris or rocks, and flat pieces of wood or metal) for the presence of snakes prior to their disturbance or removal.

The use of netted erosion control blanket or other products containing plastic mesh should be prohibited due to the risk of snake entanglement.

Snake Hibernation Habitat

As noted in the previous section, potential snake hibernation habitat in the study area is primarily found in association with the rocky outcrop north of the lake, which offers an exposed, south-facing slope. The proposed construction will not remove or destroy any of this rocky area and therefore should not permanently impact snake hibernation habitat in the study area. However, workers should be made aware that this area may be associated with snake habitat and could have a concentration of snakes nearby, particularly in the spring and fall. Measures should be taken to detect and protect snakes in the work area, as discussed previously.

Any observations of snakes concentrating on or near the rocky areas around the work site should be documented and reported. Snake hibernacula are notoriously difficult to locate, and a newly-discovered hibernaculum could have potential for conservation or research applications in the future.

Bat Maternity and Hibernation Habitat

The removal of vegetation from the study area could potentially include trees which are used as roosting habitat by bats. The clearing area shown on construction drawings only impacts a very small number of trees in an open area along the lake shore, which reduces the likelihood that these trees will be used for SAR bat maternity since colonies tend to be formed in forest habitats with plenty of large standing snags and cavity trees. However, to ensure that no impacts to bats occur, tree clearing should take place in early spring outside of the bat breeding season. Since bat maternity overlaps with the bird nesting period, the previously noted timing restriction of April 1 to August 31 can safely apply.

Potential hibernation habitat in the area is likely limited to the nearby abandoned farm buildings; there are no proposed changes or removals of these buildings and therefore no impacts to any bats using these features.

Early-Successional Bird Habitat

The overall study area contains patches of overgrown, shrubby habitat which could appeal to birds such as Golden-winged Warbler. However, as previously noted, the only area proposed for clearing to accommodate construction is an open, disturbed area with only a few isolated trees at the lake shore. Loss of early-successional vegetation is therefore expected to be minimal.

The Landscape Plan prepared for this project should include native shrub species to provide food and habitat to encourage the presence of early-successional birds.

Terrestrial SAR Recognition and Reporting

One of the greatest hurdles in the conservation of SAR is lack of knowledge, and particularly a lack of recent, widespread observation data which would help determine the current range and population size of rare species. With this in mind, on-site workers should be trained in the identification of SAR wildlife that could occur in the work area, so that any observations of SAR may be documented and reported. The MNRF actively tracks SAR observations in Ontario and accepts online observation reports on the following site:

https://www.ontario.ca/page/report-rare-species-animals-and-plants

Threatened or endangered SAR cannot be handled without agency permission, unless the animal's life is in imminent danger if it is left in place.

Species-specific SAR Mitigation Measures

Impacts to some of the SAR that occur or potentially occur in the study area were discussed above under the headings for vegetation (Butternut), turtles (Snapping Turtle, Blanding's Turtle, Northern Map Turtle, and Eastern Musk Turtle), and snakes (Gray Ratsnake, Eastern Ribbonsnake, and Eastern Milksnake). The above sections provide mitigation for common habitat requirements/features (e.g., bird nesting sites in trees and shrubs, snake basking on roads, communal snake hibernation sites). Other species in general or species-specific mitigation measures which were not previously discussed follow below.

Gray Ratsnake

Protection and exclusion measures applying to snakes, including Gray Ratsnake, were discussed in previous sections. Federal critical habitat for this species was identified as occurring in the study area per correspondence with Environment and Climate Change Canada (via email to Parks Canada in late 2017). The criticial habitat definition for this species includes the biophysical attributes necessary to support life processes; i.e., foraging, hibernation, oviposition, thermoregulation, and movement features, typically occurring in a mosaic of forest, forest edge, and open habitat. At least

some of these habitat features suitable to support Grey Ratsnake likely occur in the area surrounding the Bobs Lake Dam project.

Destruction of critical habitat would occur "if part of the critical habitat was degraded, either permanently or temporarily, such that it would not serve its function when needed by the species" (Environment and Climate Change Canada, 2017). Activities that are likely to result in the destruction of critical habitat, as noted in the Recovery Strategy for this species, include:

- Activities causing habitat fragmentation, such as the creation of roads: There will be a new permanent access road and parking area created from adjacent to the new dam, extending northeast through the existing pasture to Crow Lake Road. This access road will be a private drive used only sporadically (estimated one vehicle per week, at most) by Parks Canada employees, and as such there will not be frequent, heavy, and/or high-velocity traffic present that would create a permanent barrier effect for snakes in the area. There will be an increased risk of snake mortality on the new road, due to collisions with vehicles accessing the site. This can be mitigated by requiring vehicles to drive slowly, and requiring drivers to keep watch for snakes as they drive. Post-construction monitoring for snake mortality on the new road could be completed to identify any problem areas for future application of additional protection or mitigation measures.

- Activities resulting in the permanent removal or reduction of habitat features such as forests, wetlands, rock outcrops, etc.: The proposed work does not include any clearing of forest habitat tracts, destruction of wetlands, removal of rock outcrops, or similar activities that would cause a permanent loss or degradation of suitable habitat features.

- Removal or alteration of documented nesting sites or hibernacula: Although snake usage of the potential hibernation habitat provided by rocky outcrops in the study area has not been confirmed, these features will not be permanently blocked or removed due to the proposed work. If potential egg-laying sites (e.g., rotting logs, compost piles) are found within the area to be cleared for construction, it is likely possible to relocate or recreate these features outside of the work area, a short distance away (NB: oviposition habitat was not documented by Parsons in the field, field investigations were completed in 2015 so this does not preclude the potential for such features to be present now).

- Activities that result in the alteration of water levels at/near documented hibernacula: There will be a permanent alteration of water level in the small area between the new and existing dams. Although no confirmed, documented hibernacula occur in the study area, there is the potential for such features to exist.

Based on the above, there could be some impacts to critical habitat for Gray Ratsnake associated with this project, although these impacts are largely theoretical since there is not a confirmed presence of this species on the site. The potential impacts can typically be mitigated for (e.g., by driver awareness and monitoring to address mortality on the access road) or are of a limited extent (e.g., the small area of water level change between the two dams).

Eastern Whip-poor-will

Critical habitat for Eastern Whip-poor-will was identified in the project area via correspondence with Environment and Climate Change Canada, presumably because breeding bird surveys confirmed habitat occupancy within the 10 x 10 km square containing the study area. Suitable habitat includes both breeding and foraging sites, which typically form a mosaic on the landscape and can overlap. Nesting occurs in forests, but foraging habitat can include agricultural lands scattered trees and shrubs to be used as perches, occuring adjacent to forests that provide suitable nesting habitat. A distance of 1,250 m from the edge with suitable nesting habitat is suggested for inclusion as a corresponding foraging area. Based on these criteria, the forests within and adjacent to the study area potentially provide nesting and/or foraging habitat for Eastern Whip-poor-will, and the open habitats and agricultural lands provide potential foraging habitat only.

Destruction of critical habitat "would result if part of the critical habitat were degraded, either permanently or temporarily, such that it would not serve its function when needed by the species" (Environment and Climate Change Canada, 2015). Examples given for activities likely to result in critical habitat destruction include: intensification of agricultural practices,

construction of urban infrastructure, maintenance of linear infrastructures, and conversion of forests to agricultural lands, all of which are large-scale events resulting in the removal or permanent conversion of areas of suitable habitat. The proposed work associated with the replacement of the Bobs Lake Dam involves construction activities which will be contained in a previously-disturbed, open area of small geographic extent. Vegetation removal will be minimal and will not involve any clearing of forest habitat on the north shore. On the south shore, a very small area of vegetation may be cleared, but due to the exposure to the lake and fluctuations of water levels, it is not expected that ground-nesting birds would chose to nest in this area. The new permanent access road and parking area have been sited in locations with previous disturbance, and these features will be subject to a very low level of usage by vehicles during their lifespan. Given these considerations, it is unlikely that the proposed works will alter or disturb the site significantly enough to cause a functional degradation of suitable Eastern Whip-poor-will habitat.

Golden-winged Warbler

Potential impacts to Golden-winged Warbler associated with this project include loss of nesting habitat due to vegetation removal (as discussed above with regards to early successional habitat) and direct damage to or loss of active nests (as discussed above regarding general protection measures for migratory birds). The mitigation and protection measures previously discussed in those two sections should mitigate impacts to this species.

Regulated critical habitat for Golden-winged Warbler under the SARA is present in the study area, as the Bobs Lake Dam site falls within a 10 x 10 km square that has confirmed habitat occupancy for this species. Suitable habitat requires both forest and open/shrub vegetation communities to be present, as it is the interface between these two that is particularly important for Golden-winged Warblers (Environment and Climate Change Canada, 2016). Suitable habitat therefore includes the entire transition between forested and open communities, plus 200 m into suitable forest habitat, plus 50 or 200 m into suitable open/shrub habitat (200 m if the habitat has scattered trees and patches of shrubby growth; 50 m if the habitat is open grassland lacking these features). Within the study area, an open/forest habitat transition is present on the north bank mainly east of the proposed work area. Adjacent open habitat includes mainly pasture and cleared land with few trees and shrubs along fencerows; the 50 m value has therefore been applied to the site, which still encompasses the majority of the work area.

Activities that are likely to result in the destruction of critical habitat, as noted in the Recovery Strategy for this species, include:

- Removal or alteration of necessary habitat attributes (without replacement): the dam replacement should not affect the interface between forest and open habitat, which is the primary Golden-winged Warbler habitat feature present. Some minor removal of trees/shrubs will occur from the open portion of the site, but replacement plantings will also occur on the site post-construction to offset this loss. The area between the new and existing dam will also be allowed to naturalize, creating a new area of successional vegetation as it establishes.

- Reducing the amount of critical habitat available: The permanent additions to the site affecting terrestrial habitat (i.e., the new parking area and access road) have been sited in locations that are already open and disturbed. There should be no significant change in vegetation community structure from the addition of these features, pre- to post-construction, and the usage of the surrounding lands will not change.

- Compromising the ability of a focal area to be restored to the minimum amount of critical habitat, if required (e.g., large-scale permanent removal of habitat): The project will not result in a large-scale, permanent removal of suitable habitat.

Based on the above points, the proposed work is unlikely to result in the destruction of critical habitat for Golden-winged Warbler.

Bobolink and Eastern Meadowlark

While there is limited undisturbed, open habitat for these two species in the study area, they are known to occur in the area at large and could be present if the study area is part of a larger territory. Both of these species nest on the ground

and require fairly large, contiguous areas of open habitat such as grassland or pasture (at least 10 ha for Eastern Meadowlark, at leat 50 ha for Bobolink [MNRF, 2000]). While the small patches of old field meadow and pastureland found in the study area are not likely of themselves large enough to support these species, the study area could act as part of a larger territory.

It is considered unlikely that birds would be attracted to an active construction site or busy construction access road to begin nesting. However, if nests are established in access routes or staging areas before construction begins, these nests could feasibly come in conflict with construction activities. Prior to any new construction access or activities during the nesting season (April 1 to August 31), the area to be disturbed should be inspected for the presence of nests, reviewing not only woody vegetation but open areas to account for ground-nesting Eastern Meadowlark and Bobolink. If active bird nests are found in the work area at this time (or any point during construction), then work in the vicinity should cease and the area should be fenced off with an appropriate buffer distance established so as to avoid disturbing the nest.

Eastern Wood-pewee and Wood Thrush

These two species are primarily birds of forests and woodlands, and no impacts to forest habitat are anticipated as part of the Bobs Lake Dam replacement. Completion of all necessary vegetation removals outside of the nesting season, and protection of retained vegetation from collateral damage (e.g., branch damage from equipment collisions) will ensure there are no impacts to these birds' nesting habitat. Completing tree and shrub planting post-construction to replace the removed vegetation will help improve suitable habitat for these species in the long term.

Barn Swallow

The building that is the primary nesting habitat for Barn Swallow will not be directly impacted by the proposed construction works, and no nests were observed on the dam itself. Swallows will likely be found flying and foraging in the study area during construction. Construction access will primarily be via the new permanent access road location which goes through the existing pasture directly to Crow Lake Road, avoiding the primary Barn Swallow nesting location. A secondary access, to be used only occasionally during construction, will pass close to the building and may disturb birds with vehicle noise and proximity. Noise mitigation on vehicles entering and exiting the site by this route should be emphasized, and vehicles on this route should drive slowly and with care to avoid collisions with Barn Swallows entering and exiting the nesting structure.

Northern Myotis, Little Brown Myotis, and Tri-colored Bat

As noted above, potential impacts to bat species are primarily associated with vegetation removals during the breeding season which occurs generally in spring and summer. Completing all necessary vegetation removals outside of this period (i.e., not between April 1 and August 31) will ensure that potential impacts are avoided. The noted species hibernate in caves or mines, and not in trees or buildings (COSEWIC, 2013); defined critical habitat for these species includes only known hibernation sites. Vegetation removals in the off-season will therefore not affect hibernating individuals of these species.

Monarch

Impacts to butterfly habitat associated with this project should be minimal, as the open areas of the site were observed to contain mostly grasses and not the abundant wildflowers or milkweed that would be preferred by Monarchs. Using native wildflowers (particularly milkweed) in the herbaceous seed mix for site restoration post-construction would provide a net benefit to butterflies in the long term.

Monitoring Requirements

During construction, wildlife exclusion fencing should be regularly inspected to ensure it is structurally sound. Any necessary repairs or replacements of sections of fencing should be completed promptly.

Inspection of the work area and access road for the presence of wildlife should be ongoing and frequent throughout the duration of the project. All work areas should be regularly and frequently reviewed for the presence of wildlife and, if necessary, appropriate actions should be taken to secure or remove animals found on the site.

Post-construction, once the Landscape Plan has been enacted, planted vegetation should be inspected so that any defective or dying material may be replaced under the landscape warranty. Seeded areas should be inspected to ensure adequate germination and establishment to provide permanent erosion control and ground cover.

The potential presence of snakes on the access road will be an ongoing consideration even after construction of the new dam is completed. Workers accessing the site in future should be instructed to drive slowly and watch for snakes and other wildlife on the access road, in order to minimize future mortality due to collisions. Post-construction wildlife monitoring should include documentation of any animals, particularly snakes, on the new access road and parking area, to determine whether additional mitigation measures may be required to address road mortality concerns in the long-term.

Memo prepared by:

Julie Scott
Terrestrial Ecologist
Parsons

Appendix H

Mitigation Summary List

MITIGATION MEASURES

General

1. Inform the Departmental Representative and the Parks Canada Environmental Authority (Environmental Assessment Officer), regarding any changes to project plans and/or scheduling. Any changes not assessed under this DIA will require approval from Parks Canada 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 (EA), reviewed and accepted by Parks Canada prior to the commencement of work and mobilization to site.
3. It is recommended that a qualified environmental professional(s) prepare the EMP or its component plans in accordance with Parks Canada'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. Parks Canada's Environmental Authority (EA), Rideau Waterway, will outline all the prescribed mitigation measures, including those found in BMPs, in a construction start-up meeting with the project manager and the contractor, to ensure that all on-site personnel are aware of these mitigation measures.
5. The contractor is to ensure that all on-site personnel are aware of, and comply with the prescribed mitigation measures within this DIA.
6. Should conditions at the work site indicate that there are unforeseen negative impacts to fish, wildlife, cultural, or visitor experience resources, all works shall cease until the problem has been corrected and/or any required input can be obtained by Parks Canada or other relevant authorities. The Rideau Waterway 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 Waterway 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.
8. All materials and equipment used for the purpose of site preparation and project completion shall be operated and stored in a manner that prevents any deleterious substance (e.g. petroleum productions, debris etc.) from entering the water. Ensure measures are in place to minimize impacts of accidental spills.
9. Store all oils, lubricants, fuels, and chemicals in secure areas on impermeable pads.
10. Conduct daily inspections to ensure all machinery and equipment shall be clean, free of leaks, and in optimal working condition.
11. 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.
12. Vehicle and equipment re-fueling and/or maintenance shall be conducted off of slopes and away from the waterbody at a recommended distance of 30 m if possible. If this is not possible, fuelling sites will be as per Environmental Management Plan and mitigations to prevent substances from entering the water course applied.
13. A designated re-fueling depot will minimize the potential for extensive impacts at the site due to accidental releases of substances; proper spill management equipment shall be in place for fueling. Drip trays shall be placed under immobile fuel-powered equipment.

14. Only the working part of a machine is to enter the water; any part of a machine or equipment entering the water shall be free of fluid leaks and externally degreased to prevent any deleterious substance from entering the water. Complete the in-water activity as quickly as possible to minimize the time equipment is in the water; do not leave equipment in water during breaks in work activity.
15. Only clean material, free of fine particulate matter, shall be placed in the water.
16. Spill control and emergency plans will be in place prior to initiation of construction. A spills kit will be maintained on site and the contractor will ensure that adequate additional resources are available. Spills shall be reported as soon as possible to the Parks Canada Project Manager. The Ontario Ministry of Environment and Climate Change Spills Action Center, (1-800-268-6060) shall be notified, if required.
17. In the event of a spill, remediation will be conducted immediately contain and clean up in accordance with federal regulatory requirements and to the satisfaction of Parks Canada. Documentation of remediation, testing and results will be provided to Parks Canada.
18. No tools, equipment, temporary structures or parts thereof, used or maintained for the purpose of this project, shall be permitted to remain at the site after completion of the project.

Vegetation

19. Phase vegetation removal to reflect construction activity; grubbing should not be conducted too far ahead and too large an area to be properly mitigated with Erosion and Sediment controls.
20. 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.
21. Trees, shrubs and vegetation which are to remain throughout construction should be properly identified, delineated, and protected.
22. Survey removal areas for the presence of Butternut prior to vegetation clearing.
23. Identify Butternuts as specimen trees to be retained and complete the removal of the existing dam with care to avoid impacts to vegetation at known growth site (i.e., southeast end of the existing dam).
24. Where practical, the branches of the large trees should be trimmed back as the first option rather than cutting the entire tree.
25. Only cut trees using tools designed for tree cutting activities (e.g., chainsaw, brush saw).
26. Prune limbs close to the tree trunk. For a clean cut, make a shallow undercut first, then follow with the top cut. This prevents the limb from peeling bark off the tree as it falls. Do not use an axe for pruning.
27. In the event that the installation of root-protectant fencing is not possible and/or ideal, alternative measures, as approved by Parks Canada, must then be implemented. Such measures must provide a sufficient amount of soil compaction prevention with regards to the highest level of activity to occur within the immediate area of protection.
28. Alternative methodology for soil-compaction prevention may be utilized (e.g., blast mats), as reviewed and approved by Parks Canada.
29. Clear vegetation from unstable or erodible banks by hand, and where possible avoid the use of heavy machinery. Operate machinery on land and in a manner that minimizes disturbance to the banks of the waterbody.
30. Should any vegetation require chipping/mulching, the after product will be stored onsite for the duration of the project to supplement erosion and sediment control methods.
31. Native grasses, shrubs, etc. should be planted to match existing species growing on the sites. Common Milkweed should be actively restored.
32. If there is insufficient time remaining in the growing season, the site should 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.

33. 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.

34. Cleared vegetation will be piled and extracted from a designated area, to be identified by Parks Canada staff. Burning of cleared vegetation is not be permitted on site.

Invasive Species

35. Any equipment or vehicles which are to be used in water, should be thoroughly cleaned before and after use of any visible mud, vegetation, mussels, etc.:
    - Vessels/equipment should be drained of standing water.
    - Vessels/equipment should ideally be cleaned with hot water (>50 °C) at high pressure water (>250 psi).
    - Vessels/equipment should be dried for 2 – 7 days in sunlight before transported between waterbodies.
    - Cleaning of vessels/equipment should be conducted away from waterbodies at a recommended distance of at least 30 m from the shoreline.

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

37. Use weed-free seed and confirm that seed mix to be used for re-vegetation purposes does not (potentially) contain invasive plants.

38. Seed purchased commercially should have a label that states the following:
    - Species;
    - Purity: Most seed should be no less than 75% pure and preferably over 85% pure. The rest is inert matter, or other seed;
    - Weed seed content: The tag should state NO invasive plants are present. Only certified weed-free seed should be used; and
    - Germination of desired seed: Germination generally should not be less than 50% for most species, although some shrubs and forbs will have lower percentages.

39. 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.

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

41. Should an invasive species be encountered (or at least suspected), a photo and report of the specimen should be sent to Parks Canada's EA staff.

Wildlife

42. Site clearing/commencement of construction should be planned to occur outside of sensitive nesting times - April 1st to August 31st. If this is not feasible, then the site must be inspected by a biologist prior to clearing, to check for the presence of nests and maternity roosting bats.

43. The Site Specific EMP must demonstrate procedures for avoiding disturbance/harm to wildlife.

44. If recommended by a qualified person and approved by Parks Canada, exclusion zones or "no go" areas will be established to protect areas with known residences (e.g., hibernacula, dens, nests).

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

46. On a daily basis, an inspection or "sweep" of the work area shall be performed prior to commencement of project works and activities to ensure wildlife are not present in the work area (include in site

checklist). This must include not only natural habitats but the surface of access roads which may attract basking snakes, and soil stockpiles or parking areas which may attract nesting turtles.

47. Field information regarding incidental encounters with wildlife (non-SAR wildlife) shall be compiled and reported on a daily basis.

48. For incidental encounters the following information should be recorded in the field:
    a. Locations, dates and time of day where the species were encountered;
    b. Names of species encountered;
    c. Photographs of the species, if taken;
    d. Condition of animal.

49. If injured/dead wildlife are encountered report to Parks Canada immediately. Parks Canada may require retrieval and storage on ice of carcass for laboratory testing.

50. All vehicles and equipment used by project personnel will follow any construction zone speed limits to reduce the risk of hitting wildlife, as enforced by the site supervisor.

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

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

53. Feeding of wildlife is prohibited.

<u>Species at Risk</u>

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

55. Species at Risk (SAR) training shall be provided to all employees before they begin work on site (materials can be part of the Environmental Protection Plan). Employees must be able to identify potential SAR and know the proper procedures to follow when they encounter a species at risk. Special emphasis will be made on Grey Ratsnake sightings.

56. Should any suspected SAR (snakes or turtles and/or eggs) be encountered during construction - project staging, implementation or demobilization - work shall halt immediately and Parks Environmental Assessment Staff will be notified. The species must not be harmed or harassed. Stand back and allow the animal to leave the site. If the species does not leave or cannot leave the site, the contractor must immediately stop the works and contact the Departmental Representative and Parks Canada's Environmental Assessment Officer (705-761-1634) immediately. Additional measures to avoid impacts may be required before work can restart.

57. Temporary reptile exclusion fencing should be installed completely around the work area(s) and access road(s) to prevent reptile access to the project area. Fencing should be a minimum of 1.4 m high and constructed with a smooth surface (e.g., poly sheeting) sealed tightly to the ground to provide exclusion of Grey Ratsnake. For guidance on how to plan and install exclusion fencing, refer to the document titled *"Ontario Ministry of Natural Resources and Forestry. April 2016. Best Management Practices for Mitigating the Effects of Roads on Amphibians and Reptile Species at Risk in Ontario."*

58. If directed by Parks Canada, open-grate temporary wildlife passage culvert(s) will be installed beneath the access road(s) during construction to maintain habitat connectivity.

59. Any compost piles, debris piles, rotting logs/stumps, or similar features in the work area limits which could provide snake oviposition habitat should be relocated or recreated outside of the work area a short distance away.

60. Erosion Control Blankets/Mats made with synthetic, plastic or fused netting or fibres are not permitted, as they pose as an entrapment hazard to reptiles. Fibre-based, 100% bio-degradable Erosion Control Blankets/Mats are only to be utilized.

61. If a turtle is found within the limits of the fencing it may, with the approval of Parks Canada's Environmental Assessment Officer, be gently captured and placed outside of the construction site. Typically, animals should be released not more than 250 m from the capture site. Release sites should

be near water with vegetation cover for shelter. If the animal cannot be handled, the nearest fence segment may be temporarily removed and the animal may be carefully herded out this opening before fencing is reinstated. All fencing should subsequently be inspected to determine the animal's likely access point, and repairs made as necessary.

Fish/Water Quality

62. All in-water work should be started after June 30th and completed before October 15th. Should in-water work be required beyond this date, additional mitigation measures may be required based on site specific characteristics. Work beyond October 15th must be approved by the Departmental Representative and Parks Canada prior to work occurring, and may not be granted if conditions do not allow it.
63. Isolate in-water work areas from the open waterbody.
64. Maintain temporary flow by-pass systems to allow upstream to downstream flow during construction at all times, sufficient to maintain fish habitat functions downstream of the work area.
65. Canadian Council of Ministers of the Environment (CCME) Canadian Water Quality Guidelines for the Protection of Aquatic Life will form the baseline for water and streambed quality (see http://ceqg-rcqe.ccme.ca/en/index.html#void).
66. Ontario Drinking Water Quality Guidelines cannot be exceeded (beyond parameters that currently exist) due to project activities.
67. At the discharge point into the watercourse, maximum increase of suspended sediment concentrations by more than 25 mg/L over background levels during any short-term exposure period (e.g., 24hr period). For longer term exposure (e.g., > 24 hr period), 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.
68. At the discharge point into the watercourse (i.e. the interface between the work site and the natural waterbody) maximum increase of 8 NTU from background levels for a short-term exposure (e.g., 24 hr period). Maximum average increase of 2 NTU from background levels for a longer term exposure (e.g., >24 hr period). If elevated turbidity beyond 8 NTU 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.
69. Dewatering, demolition and construction is staged such that clean is pumped back to the system and turbid water is managed through a waste water system.
70. All work should be completed in the dry. A De-watering Plan shall be submitted, as part of an EMP, to Parks Canada for review and acceptance prior to any dewatering.
71. Design and construct coffer dams to minimize sediment inputs to the watercourse; coffer dams shall not be composed of loose aggregate/granular material. Only clean material free of fine particulate matter shall be placed in or near water where it has been previously planned and authorized.
72. All debris on lake/streambed (including unused aggregate/concrete rubble) shall be completely removed and area restored to original state upon completion of work.
73. Complete riverbed reconstruction and sediment removal in the area between the dams prior to removal of the existing dam and isolation measures.
74. Parks Canada to verify the height and in-stream placement of Walleye habitat boulder clusters during construction to optimize desired habitat characteristics.
75. Sediment/turbidity curtains shall be deployed in a manner that prevents entrapment of fish inside the curtain (e.g. moved in a direction from close to shore/structures outward).
76. Ensure cofferdams are sufficient to prevent overtopping during high water events.
77. Ensure that there is a fish screen that complies with DFO Freshwater Intake End-of-Pipe Fish Screen Guideline when pumping in fish-bearing water to prevent impingement or entrainment of fish.

78. For construction dewatering and water taking greater than 50,000 L/day, a PTTW or Environmental Activity and Sector Registry (EASR) may be required and further review by a qualified professional should occur to determine related impacts and necessary mitigation.

79. Fish shall be removed from the work area prior to complete dewatering and released alive downstream into the river.
    - Parks Canada's Environmental Authority (EA) shall be advised 24 hours prior to fish rescue.
    - Minimize the length of time fish are out of the water.
    - Use appropriate equipment to remove any stranded fish in the dewatered area. As water levels drop in the work area monitor the deeper pool areas where fish are congregating. If safe to do so, seine nets or dip nets can be operated by field staff to remove the fish.
    - Contact Parks Canada EA staff should there be any issues with fish removal.
    - Any fish found within the dewatered coffer dam areas will be documented by species, counted, removed, and placed downstream if found in the downstream coffer dam and upstream if found in the upstream cofferdam.
    - 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.

Concrete

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

81. 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.

82. Ensure that all works involving the use of concrete will not deposit, directly or indirectly, sediments, debris, concrete, concrete fines, wash or contact water into or about any watercourse;

83. Wash equipment away from water and provide containment facilities for the wash-down water from concrete delivery trucks, concrete pumping equipment, and other tools and equipment;

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

85. Additional Environmental Mitigation Measures for Placement Of Tremie Concrete:
    - Ensure concrete forms are tight and no flow is occurring.
    - Isolate area with curtain or impermeable material specified for concrete particulates; ensure fish exclusion is followed.
    - Isolated area should be the minimum size required to complete task.
    - For tremie pours or where water comes into contact with the forms, CO_2 system must be installed and operating along the entire length of the isolated area; the tank shall be used to release carbon dioxide gas into an affected area to neutralize pH levels. Ensure sufficiently sized tanks for the concrete volumes used.
    - Workers shall be trained in the use of the system.
    - Use of neutralizing acids is not permitted unless the system is designed and implemented by a qualified professional.
    - pH monitoring shall be conducted inside and outside the containment area.

Erosion and Sediment Control

86. An Erosion and Sediment Control Plan, as part of the Environmental Management Plan, should be prepared by a qualified professional and submitted to the Departmental Representative and accepted

by Parks Canada. The plan should focus on separating offsite and infiltrating water into the construction site from construction activities and sediment sources.

87. The document shall specify:

    - 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;
    - How clean storm run-on will be diverted around the site and away from exposed areas;
    - How sediment-laden run-off will be directed to detention or retention facilities on-site. Large drainage areas can produce a significant amount of run-off, resulting in a need for large detention or retention structures;
    - Channels that are designed and constructed to the necessary design discharge;
    - Temporary and permanent erosion control needs for all drainage channels;
    - Consideration of project schedule in selecting, designing and laying out environmental controls;
    - Consideration of seasonal requirements (for longer-term projects); select and design controls and practices for controlling erosion and sedimentation including shutdown periods.

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

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

89. 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:
    - Diversions 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).

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

91. If erosion and sediment control measures are not functioning properly, no further work shall occur until the sediment and/or erosion problem is addressed to the satisfaction of Parks Canada.

92. All disturbed areas of the work site shall be stabilized immediately and re-vegetated as soon as conditions allow. All exposed areas should be covered with erosion control blankets or other measures to keep the soil in place and prevent erosion until vegetated in the spring. Erosion and sediment control measures shall be left in place until all areas of the work site have been stabilized.

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

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

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

96. A turbidity curtain will be maintained in the water around all working areas during construction to contain and control the suspension of fines. Curtains should be as close to the work area as possible. If water levels/conditions do not permit the flotation of a turbidity curtain, other measures as approved will be implemented.

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

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

99. Flow dissipaters and/or filter bags, or equivalent, shall be placed at water discharge points to prevent erosion and sediment release.

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

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

102. 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.

Cultural Resources and Archaeology

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

104. Main vehicular access routes and staging areas will be restricted to roadways and parking lots. If this is not possible, the use of protective covering such as geotextile protective mats with a wood chip lift or granular “A” gravel is required. All protective covering must be removed following construction and the area restored to pre-construction state. Excavation is not permitted during installation or removal of protective covering.

105. If unrecorded archaeological resources (e.g. structural features or artifact concentrations) are encountered during construction activities, work will cease in the immediate area, the findings photographed, and the Parks Canada Project Manager informed; contact the TSW, Peterborough Office at 705-750-4900. The Project Manager should then contact Parks Canada's Terrestrial Archaeology section for advice and assessment of significance, which will in turn determine what will be required to mitigate the find. Ensure that all exposed underwater cultural materials are kept submerged and/or wet while waiting for direction.

106. Preserve the remains of the original 1821 dam (which has been identified as having Cultural Heritage Significance) as indicated in the contract documents per the recommendations of the “Non-Disturbance Underwater Archaeological Survey: Bobs Lake Dam” (Paterson Group Inc. 2017).

Air Quality and Noise

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

108. The Departmental Representative or a Parks Canada Environmental Assessment Officer 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.

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

110. 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.

111. Keep idling of construction equipment to a minimum.

Waste Disposal

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

Appendix I

Correspondence

Ontario Benthos Biomonitoring Network 2014– Rideau Valley Conservation Authority

Waterbody Name:	**Tay River**	**Water Quality:**	**Spring:**	**Fall:**
Site Location:	Crow Lake Road	Date Sampled:	May 14, 2014	October 7, 2014
Municipality:	Tay Valley	DO (mg/L):	11.5	9.98
Site Code:	TA-1	Water Temperature (C):	12.8	16.0
Collection Method:	Traveling Kick & Sweep	Conductivity (us/cm):	105.1	112
		pH:	7.97	8.00

Photo Replicate 1 (Spring)

Photo Replicate 2 (Spring)

Photo Replicate 3 (Spring)

Photo Replicate 1 (Fall)

Photo Replicate 2 (Fall)

Photo Replicate 3 (Fall)

The mean value of the three replicates at each site has been used to calculate the value for each index.
Results coupled by an * indicate not all three sample replicates contained one hundred benthos

Tay River	**2007**		**2008**		**2009**		**2010**		**2011**		**2012**		**2013**		**2014**	
Site	Spring	Fall	Spring	Fall	Spring	Fall	Spring	Fall	Spring	Fall	Spring	Fall	Spring	Fall	Spring	Fall
Family Biotic Index	4.350 Good	3.828 V.Good	*0/3	4.032 V.Good	4.631 Good	4.040 V.Good	5.045 Fair	3.925 V.Good	4.516 Good	3.605 Excellent	4.001 V.Good	4.812 Good	4.963 Good	*2/3 3.685 Excellent	4.376 Good	3.843 V.Good
Family Richness	7	11.3	*0/3	13.6	10.7	14.6	14	11	13.66	12.66	12.3	14	13.3	10	10.667	12.667
%EPT	68.94	89.40	*0/3	81.53	48.92	69.84	58.09	74.32	55.48	80.94	65.81	45.69	31.51	87.23691	51.18	79.72
%CigH	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.33	0.66
%Amphipoda	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.6381	1.1564
%Oligochaeta	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0	0
%Gastropoda	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0	0
%Diptera	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	20.81	3.10
%Dominants	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
%Abundance	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	160.46	318.22

Family Biotic Index (Hilsenhoff)

Family Biotic Index	Water Quality	Degree of Organic Pollution
0.00 - 3.75	Excellent	Organic pollution unlikely
3.76 - 4.25	Very Good	Possible slight organic pollution
4.26 - 5.00	Good	Some organic pollution probable
5.01 - 5.75	Fair	Fairly substantial pollution likely
5.76 - 6.50	Fairly Poor	Substantial pollution likely
6.51 - 7.25	Poor	Very substantial pollution likely
7.26 - 10.00	Very Poor	Severe organic pollution likely

Ephemeroptera, Plecoptera, Trichoptera Richness Index (% EPT) *Ephemeroptera* (Mayflies), *Plecoptera* (Stoneflies), and *Trichoptera* (Caddisflies) are all species that are considered to be very sensitive to poor water quality conditions, therefore the presence of these organisms are indicators of good water quality sites. Higher populations of these organisms in a sample typically indicate increased stability for the site

Family Richness (FR) indicates the health of the community through its diversity, and increases with increasing habitat diversity suitability, and water quality (Plafkin et al., 1989). FR equates the total number of families found within the sample. The healthier the community is, the greater the number of families found within the community

Ministry of Natural Resources and Forestry

Kemptville District

10 Campus Drive
Postal Box 2002
Kemptville ON K0G 1J0
Tel.: 613 258-8204
Fax: 613 258-3920

Ministère des Richesses naturelles et des Forêts

District de Kemptville

10, promenade Campus
Case postale, 2002
Kemptville ON K0G 1J0
Tél.: 613 258-8204
Téléc.: 613 258-3920

Ontario

December 21, 2015

Julie Scott
Parsons
1069 Wellington Rd. S., Suite 214
London, Ontario N6E 2H6

Attention: Julie Scott

Subject: Information Request - Developments
Project Name: Bobs Lake Dam Rehabilitation
Our File No. 2015_SSH-3291

Natural Heritage Values

The Ministry of Natural Resources and Forestry (MNRF) Kemptville District has carried out a preliminary review of the area in order to identify any potential natural resource and natural heritage values.

The MNRF works closely with partner agencies and local municipalities in order to establish concurrent approval process and to achieve streamlined and efficient service delivery. The MNRF strongly encourages all proponents to contact partner agencies (e.g. MOECC, Conservation Authority, etc.) and appropriate municipalities early on in the planning process. This provides the proponent with early knowledge regarding agency requirements and approval timelines.

Natural heritage features and values contribute to the province's rich biodiversity and provide habitat for a variety of species. The following Natural Heritage values were identified in proximity to the project site:

- Bobs Lake
- Davern Creek
- Tay River
- Walleye Spawning Area
- Unevaluated Wetland (Not evaluated per OWES)

The following fish species were also identified: American eel, banded killifish, black crappie, blacknose shiner, bluegill, bluntnose minnow, brook stickleback, brown bullhead, burbot, central mudminnow, cisco, common shiner, creek chub, golden shiner, johnny darter, lake trout, lake whitefish, largemouth bass, logperch, muskellunge, northern pike, pumpkinseed, rock bass, shorthead redhorse, smallmouth bass, spotfin shiner, spottail shiner, walleye, white sucker, yellow bullhead, and yellow perch.

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Kemptville District

10 Campus Drive
Postal Box 2002
Kemptville ON K0G 1J0
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Fax: 613 258-3920

Ministère des Richesses naturelles et des Forêts

District de Kemptville

10, promenade Campus
Case postale, 2002
Kemptville ON K0G 1J0
Tél.: 613 258-8204
Téléc.: 613 258-3920

Municipal Official Plans contain additional information related to natural heritage features. Please see the local municipal Official Plan for more information such as specific policies and direction pertaining to activities which may impact natural heritage features. For planning advice or Official Plan interpretation, please contact the local municipality.

Where natural values and natural hazards exist (e.g., floodplains), there may be additional approvals and permitting required from the local Conservation Authority. The MNRF strongly recommends contacting the local Conservation Authority for further information and approvals. Please see the MNRF Kemptville Information Guide (2012) for contact information pertaining to Conservation Authorities located within the Kemptville District area.

For additional information and online mapping tools, please see the Natural Heritage Information Centre (NHIC), where additional data and files can be downloaded in both list and digital format. In addition sensitive species information can be requested and accessed through the NHIC at NHICrequests@ontario.ca.

Water

Where the site is adjacent to or contains a watercourses or waterbodies, additional considerations apply. If any in-water works are to occur, there are timing restriction periods for which work in water can take place (see below). Appropriate measures should be taken to minimize and mitigate impact on water quality and fish habitat, including:

- including the installation of sediment and erosion control measures;
- avoiding removal alteration or covering of substrates used for fish spawning, feeding, over-wintering or nursery areas; and
- debris control measures should be put in place to manage falling debris (e.g. spalling).

A work permit from the MNRF may be required pending further details regarding the proposed works. No encroachment on the bed or banks of the waterbody (e.g. abutments, embankments, etc.) is permitted until MNRF approval and clearance has been issued. In order for MNRF staff to determine when a work permit is required, additional information can include:

- Detailed drawings (existing and proposed)
- Location mapping
- Registered Plan survey
- Site photographs
- Public Lands Act Forms - application forms, ownership form and landowner notification form.

The MNRF does not have any water quality or quantity data available. We recommend that the Ministry of the Environment and Climate Change be contacted for such data along with the local Conservation Authority. For further information regarding fish habitat and protocols, please refer to the following interagency, document, *Fish Habitat Referral Protocol for* Ontario at: http://www.MNRF.gov.ca/264110.pdf

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Kemptville District

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Kemptville ON K0G 1J0
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Fax: 613 258-3920

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Case postale, 2002
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Timing restriction periods in MNRF Kemptville District*:

Warmwater → March 15 – June 30
→ March 15 – July 15 for St. Lawrence River & Ottawa River
Coldwater → October 1 – May 31
Mixed lakes → October 1 – June 30 (Big Rideau & Charleston)

* *Please note: Additional timing restrictions may apply as it relates to Endangered and Threatened Species, including works in both water and wetland areas.*

	FISH SPECIES	TIMING WINDOW
Spring:	Walleye	March 15 to May 31
	Northern Pike	March 15 to May 31
	Lake Sturgeon	May 1 to June 30
	Muskellunge	March 15 to May 31
	Largemouth/Smallmouth Bass	May 1 to July 15
	Rainbow Trout	March 15 to June 15
	Other/Unknown Spring Spawning Species	March 15 to July 15

	FISH SPECIES	TIMING WINDOW
Fall:	Lake Trout	October 1 to May 31
	Brook Trout	October 1 to May 31
	Pacific Salmon	September 15 to May 31
	Lake Whitefish	October 15 to May 31
	Lake Herring	October 15 to May 31
	Other/Unknown Fall Spawning Species	October 1 to May 31

Additional approvals and permits may be required for the proposed works as it relates to the Fisheries Act. Please contact your local Conservation Authority and the Department of Fisheries and Oceans to determine requirements and next steps. Where the Fisheries Act is triggered and habitat compensation, mitigation measures or best management practices are being considered; as the MNRF is charged with the management of Provincial fish populations, the MNRF requests ongoing involvement in such discussions in order to ensure population conservation. Furthermore, local Conservation Authorities may also have additional approvals for works in and adjacent to water and wetland features. Finally, Transport Canada's Navigable Waters Protection Division may require review and approval of the proposed project. Please contact these local agencies directly for more information.

As per the Natural Heritage Reference Manual (Section 13; OMNRF 2010) the MNRF strongly recommends that an Ecological Site Assessment be carried out to more thoroughly determine the presence of natural heritage features, and Species at Risk and their habitat located on site. The MNRF can provide survey methodology for particular species at risk and their habitats. In addition, the local planning authority may have more details pertaining to the

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Kemptville District

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Postal Box 2002
Kemptville ON K0G 1J0
Tel.: 613 258-8204
Fax: 613 258-3920

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District de Kemptville

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requirements of the assessment process, which will allow for the municipality to make planning decisions which are consistent with the Provincial Policy Statement (2005).

Species at Risk

With the new Endangered Species Act (ESA, 2007) in effect, it is important to understand which species and habitats exist in the area and the implications of the legislation. A review of the Natural Heritage Information Centre (NHIC) and internal records and aerial photograph interpretation indicate that there is a potential for the following Threatened (THR) and/or Endangered (END) species on the site or in proximity to it:

- American Eel (END)
- Blanding's Turtle (THR)
- Gray Ratsnake (THR)
- Northern Long-eared Bat (END)
- Barn Swallow (THR)
- Bobolink (THR)
- Butternut (END)
- Eastern Meadowlark (THR)
- Little Brown Bat (END)
- Whip poor will (THR)

All Endangered and Threatened species receive individual protection under section 9 of the ESA and receive general habitat protection under Section 10 of the ESA, 2007. Thus any potential works should consider disturbance of possible important habitat (e.g. nesting sites). Please note that as of June 30, 2013 general habitat protection applies to all Threatened and Endangered species. The habitat of these listed species is protected from damage and destruction and certain activities may require authorization(s) under the ESA. Please keep this date in mind when planning any species and habitat surveys

Species receiving General Habitat protection:

- American Eel (END)
- Barn Swallow (THR)
- Blanding's Turtle (THR)
- Bobolink (THR)
- Butternut (END)
- Eastern Meadowlark (THR)
- Gray Ratsnake (THR)
- Little Brown Bat (END)
- Northern Long-eared Bat (END)
- Whip poor will (THR)

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If the proposed activity is known to have an impact on the species mentioned above or any other SAR, an authorization under the Endangered Species Act, 2007 (ESA) may be required. It is recommended that MNRF Kemptville be contacted prior to any activities being carried out to discuss potential survey and mitigation measures to avoid contravention of the ESA.

Habitat has been identified within the project area that appears suitable for one or more species listed by SARO as Special Concern (SC). In Addition, one or more Special Concern species has been documented to occur either on the site or nearby. Species listed as Special Concern are not protected under the ESA, 2007. However, please note that some of these species may be protected under the Fish and Wildlife Conservation Act. Species of Special Concern for consideration:

- Eastern Ribbonsnake (SC)
- Golden-winged Warbler (SC)
- Northern Map Turtle (SC)
- Eastern Musk Turtle (SC)
- Eastern Wood-Pewee (SC)
- Golden-winged Warbler (SC)
- Milksnake (SC)
- Monarch (SC)
- Snapping Turtle (SC)
- Wood Thrush (SC)

If any of these or any other species at risk are discovered throughout the course of the work, and/or should any species at risk or their habitat be potentially impacted by on site activities, MNRF should be contacted immediately and operations be modified to avoid any negative impacts to species at risk or their habitat until further direction is provided by MNRF.

Please note that information regarding species at risk is based on documented occurrences only and does not include an interpretation of potential habitat within or in proximity to the site in question. Although this data represents the MNRF's best current available information, it is important to note that a lack of information for a site does not mean that additional features and values are not present. i.e.: Species at Risk (SAR) or their habitat could still be present at the location or in the immediate area. It is the responsibility of the proponent to ensure that species at risk are not killed, harmed, or harassed; or their habitat is not damaged or destroyed through the activities carried out on the site. The MNRF continues to strongly encourage ecological site assessments to determine the potential for SAR habitat and occurrences. When a SAR or potential habitat for a SAR does occur on a site, it is recommended that the proponent contact the MNRF for technical advice and to discuss what activities can occur without contravention of the Act. If an activity is proposed that will contravene the ESA (such as Section 9 or 10), the proponent must contact the MNRF to discuss the potential for a permit (Section 17). For specific questions regarding the Endangered Species Act (2007) or SAR, please contact a district Species at Risk Biologist

Ministry of Natural Resources and Forestry

Kemptville District

10 Campus Drive
Postal Box 2002
Kemptville ON K0G 1J0
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Case postale, 2002
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Tél.: 613 258-8204
Téléc.: 613 258-3920

Ontario

at sar.kemptville@ontario.ca. For more information regarding the ESA (2007), please see attached ESA Information Sheet.

The advice in this letter may become invalid if:

- The Committee on the Status of Species at Risk in Ontario (COSSARO) re-assesses the status of the above-named species OR adds a species to the SARO List such that the section 9 and/or 10 protection provisions apply to those species.
- Additional occurrences of species are discovered.
- Habitat protection comes into force for one of the above-mentioned species through the creation of a habitat regulation (see general habitat protection above).

This letter is valid until: Tue. Dec 20, 2016

MNRF is streamlining and automating its approvals processes for natural resource-related activities. Some activities that may otherwise contravene the ESA may be eligible to proceed without a permit from MNRF provided that regulatory conditions are met for the ongoing protection of species at risk and their habitats. There are regulatory provisions for projects that have attained a specified level of approval prior to, or shortly after, the specified species or its habitat became protected under the ESA. Their requirements include registering the activity with the Ministry of Natural Resources and Forestry, taking steps to immediately minimize adverse effects on species and habitat, and developing a mitigation plan. Anyone intending to use this regulatory provision is strongly advised to review Ontario Regulation 242/08 under the Endangered Species Act, 2007 for the full legal requirements.
For more information please check out the following link http://www.ontario.ca/environment-and-energy/development-and-infrastructure-projects-and-endangered-or-threatened-species

The MNRF would like to continue to be circulated on information with regards to this project. If you have any questions or require clarification please do not hesitate to contact me.

Sincerely,

Mary Dillon

Mary Dillon
Management Biologist
mary.dillon@ontario.ca

Encl.\
-ESA Infosheet
-NHIC/LIO Infosheet

Endangered Species Act, 2007 & Species At Risk in Ontario

Background

Endangered Species Act: http://www.e-laws.gov.on.ca/html/statutes/english/elaws_statues-07e06_e.htm
Species at Risk in Ontario List: www.mnr.gov.on.ca/en/Business/Species/2ColumnSubPage/246809.html

The Endangered Species Act (ESA) 2007 protects both species and habitat. Section 9 of the ESA "prohibits killing, harming, harassing, capturing, possessing, collecting, buying, selling, trading, leasing or transporting species that are listed as threatened, endangered or extirpated". Section 10 of the ESA, 2007 prohibits damaging or destroying habitat of endangered or threatened species. Protected habitat is either based on general definition in the Act or prescribed through a regulation. The ESA 2007 defines general habitat as an area on which the species depends, directly or indirectly, to carry on its life processes, including reproduction, rearing, hibernation, migration or feeding.

It is important to be aware that changes may occur in both species and habitat protection. The ESA applies to listed species on the Species at Risk in Ontario List (SARO). The Committee on the Status of Species in Ontario (COSSARO) meets regularly to evaluate species for listing and/or re-evaluate species already listed. As a result, species' designations may change that could in turn change the level of protection they receive under the ESA 2007. Also, habitat protection provisions for a species may change e.g. if a species-specific habitat regulation comes into effect. The regulation would establish the area that is protected as habitat for the species.

Information with respect to SAR can be found in the online database at the Natural Heritage Information Centre (NHIC) - http://nhic.mnr.gov.on.ca/nhic.cfm . The NHIC compiles, maintains and distributes information on species at risk and updates its information on a regular basis. We encourage you to routinely check the NHIC database to obtain the most up to date SAR information for proposed work locations. However, while the NHIC database is the best available source of data, even when there are no known occurrences documented at a site, there is a possibility that SAR may occur at a proposed work location.

All data represents the MNR's best current available information, it is important to note that a lack of occurrence at a site does not mean that there are no Species at Risk (SAR) at the location. The MNR continues to encourage ecological site assessments to determine the potential for other SAR occurrences. When a SAR does occur on a proposed site, it is recommended that the proponent contact the MNR for technical advice and to discuss what activities can occur without contravention of the Act. If an activity is proposed that will contravene the Act (such as Section 9 or 10), the proponent must contact the MNR to discuss the potential for application of certain permits (Section 17) or agreement (Regulation 242/08). For specific questions regarding the Endangered Species Act (2007) or species at risk, please contact a district Species at Risk Biologist at sar.kemptville@ontario.ca.

Natural Heritage Information Centre

Land Information Ontario

Natural Heritage Information Centre: http://nhic.mnr.gov.on.ca/
Biodiversity Explorer (mapping): https://www.biodiversityexplorer.mnr.gov.on.ca/nhicWEB/main.jsp

Land Information Ontario: http://www.mnr.gov.on.ca/en/Business/LIO/index.html
Ontario Geospatial Data Exchange: http://www.mnr.gov.on.ca/en/Business/LIO/2ColumnSubPage/STEL02_167959.html
LIO Make-a-Map: http://www.mnr.gov.on.ca/en/Business/LIO/2ColumnSubPage/STDPROD_068999.html
Ontario Maps: http://www.mnr.gov.on.ca/en/Business/LIO/2ColumnSubPage/STDPROD_068512.html

The **Natural Heritage Information Centre** (NHIC) compiles, maintains and distributes information on natural species, plant communities and spaces of conservation concern in Ontario. This information is stored in a spatial database used for tracking this information. The Centre also has a library with conservation-related literature, reports, books, and maps, which are accessible for conservation applications, land use planning, and natural resource management. The NHIC website makes much of this information available through the internet.

Natural Heritage Information Centre
300 Water Street, 2nd Floor, North Tower
P.O. Box 7000, Peterborough, ON, K9J 8M5
Tel.:(705) 755-2159 Fax:(705) 755-2168

Land Information Ontario (LIO) manages key provincial datasets. LIO makes these and hundreds of other data sets available to registered users at no charge. LIO also coordinates public and private sector organizations to collect high resolution satellite imagery for Ontario providing significant cost savings for all partners. Technical bulletins, newsletters and more are available online. More details regarding Ontario imagery and data can be searched, ordered and accessed online.

LIO's Ontario Geospatial Data Exchange (OGDE) allows more than 400 public sector organizations to easily share and use digital geographic information under a single legal agreement. Membership is available to eligible public organizations at no costs.

Through the website, Maps & Map Tools are made available, including online mapping software: LIO Make-a-Map.

Land Information Ontario
lio@ontario.ca
LIO Support Team: (705) 755-1878

Or for specifics, see online at:
http://www.mnr.gov.on.ca/en/Business/LIO/2ColumnSubPage/STDPROD_068510.html

Additional Information pertaining to NHIC, LIO and other Natural Heritage and Data and Information tools is available in the MNR Kemptville Information Request Guide (2012).

Fish Species for Bob's Lake

Source: MNR (2008)

Walleye	Smallmouth Bass	Largemouth Bass
Northern Pike	Lake Trout	Lake Herring
Yellow Perch	Bluegill	Pumpkinseed
Rock Bass	Brown Bullhead	Yellow Bullhead
White Sucker	Burbot	Golden Shiner
Spottail Shiner	Smallmouth Bass	Bluntnose Minnow
Common Shiner	Logperch	Lake Whitefish
Black Crappie	Cisco	

Source: MNR (2007)

Smallmouth Bass	Largemouth Bass	Walleye
Yellow Perch	Northern Pike	Pumpkinseed
Bluegill		

Source: McIntosh-Perry Consulting Enginners Ltd. (2003)

Northern Redbelly Dace

Source: MNR (2002)

Walleye	Northern Pike	Smallmouth Bass
Largemouth Bass	Lake Trout	Yellow Perch
Rock Bass	Lake Herring	Lake Whitefish
Brown Bullhead	White Sucker	Bluegill
Pumpkinseed	Ling	

Source: MNR (1997)

Lake Herring	Northern Pike	White Sucker
Golden Shiner	Black Bullhead	Yellow Bullhead
Brown Bullhead	Burbot	Rock Bass
Pumpkinseed	Bluegill	Smallmouth Bass
Largemouth Bass	Yellow Perch	Lake Whitefish
Walleye	Lake Trout	Brown Bullhead

Source: MNR (1993)

Lake Trout	Walleye	Northern Pike
Smallmouth Bass	Largemouth Bass	Lake Whitefish

Source: MNR (1990)

Cisco

Source: MNR (1987)

Lake Whitefish	Northern Pike	Lake Herring
Burbot	Smallmouth Bass	White Sucker

Source: MNR (1977)

Lake Trout	Walleye	Northern Pike
Smallmouth Bass	Largemouth Bass	Lake White Fish
White Sucker	Brown Bullhead	Rock Bass
Pumpkinseed	Bluegill	Yellow Perch
Americal Eel	Banded Killifish	Burbot
Yellow Perch		

Source: MNR (1973)

Brook Trout	Pickerel	Panfish
Pike	Bullhead	Yellow Perch
Northern Pike	Smallmouth Bass	Largemouth Bass
Lake Trout	Yellow Perch	Catfish
Rock Bass	Bluegill	Sunfish
Lake Herring		

Source: MNR (1970)

Lake Trout	Smallmouth Bass	Largemouth Bass
Northern Pike	Brown Bullhead	White Sucker
Yellow Perch	Rock Bass	Bluegill
Eel	Fallfish	Lake Whitefish
Lake Herring	Ling	Walleye
Cisco	Yellow Bullhead	Golden Shiner
Burbot	Common Shiner	Logperch

Source: MNR (1961)

Lake Trout	Smallmouth Bass	Largemouth Bass
Northern Pike	Brown Bullhead	White Sucker
Yellow Perch	Rock Bass	Bluegill
Ling	Fallfish	

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Kemptville District

10 Campus Drive
Postal Box 2002
Kemptville ON K0G 1J0
Tel.: 613 258-8204
Fax: 613 258-3920

Ministère des Richesses naturelles et des Forêts

District de Kemptville

10, promenade Campus
Case postale, 2002
Kemptville ON K0G 1J0
Tél.: 613 258-8204
Téléc.: 613 258-3920

Ontario

October 13, 2017

Chris Strand
Environmental Assessment Officer
Parks Canada
P.O. Box 567, 2155 Ashburnham Dr.
Peterborough, ON K9J 6Z6

Dear Mr. Strand:

Re: Bobs Lake Dam Reconstruction, Detailed Impact Analysis Draft Report (May 2017) Review

The Detailed Impact Analysis Draft Report submitted to Parks Canada Agency for the Bobs Lake Dam Reconstruction project, prepared by Parsons, and dated May 2017 has been reviewed by the Kemptville District Office of the Ontario Ministry of Natural Resources and Forestry. Based on this review and our recent meeting (Smiths Falls Parks Canada Office) and site visit (Bobs Lake Dam in Bolingbroke) on October 3, 2017, and the following comments are provided for your review, consideration and follow-up response:

- First off, we appreciate Parks Canada's verbal agreement (October 3, 2017 meeting) to modify the Walleye Spawning Habitat component of the project (i.e. to increase the size of the boulders > 500 mm in diameter, and to place them in or near the middle of the channel), as requested in our September 7, 2017 letter.
- Under section 3.3.2 Fisheries and Aquatic Habitat (p. 11 – Table 4), it should be noted that Lake Trout and Muskellunge are not considered to be present in the Tay River (Christie Lake). The presence of Lake Whitefish within this reach of the Tay River is undetermined.
- Under section 3.3.3 Terrestrial Vegetation (p. 11), it is stated that the Field Investigations were conducted in late November, which greatly limited the flora species that could be identified on site and that a full Ecological Land Classification system assessment could not and was not completed for the site. As such, the value of the information provided in this particular section of the document is quite limited at best.
- Under section 3.3.6 Species At Risk (p. 17-18), it is stated that "Federally, SAR receive protection under the SARA (2002), and this is the legislation which will apply to federal lands such as the study area." and "As this report applies to a federal project, the main focus of this assessment is on federally-listed SAR which could have permitting implications for the proposed work…However, current legal obligations associated with the proposed work will be determined solely by the SARA.". It should be noted that the Ontario Endangered Species Act (ESA) is considered a piece of legislation of general application which could potentially apply to Federal Lands (e.g. for provincially (but non-federally) listed SAR). It is now our understanding (from Parks Canada's assertions made during our October 3, 2017 meeting) that the aquatic habitat on site (i.e. lake/river bottom) is Federal Crown Land, and as such, there will be no further legal obligations

under other MNRF legislation (i.e. Public Lands Act; Lakes and Rivers Improvement Act), associated with this project.

- As mentioned in our September 7, 2017 letter, MNRF may have potential concerns related to vegetation clearing and/or construction footprint impacts on Butternuts. Our site visit has confirmed that the two (2) previously documented, larger size, heavily cankered Butternut trees would indeed be considered non-retainable. However, it appeared that at least one or more young saplings were growing in very close proximity to the above mentioned trees, and as such, consideration should be given to further determining the project's impacts (i.e. vegetation clearing, construction footprint, but more so, the existing dam's demolition) on the immediate Butternut habitat (i.e. 50 m. radius) around each individual young tree).
- MNRF may also have potential concerns related to the project's potential impacts on the following other Species At Risk which were confirmed on site or previously identified as potentially occurring on site, and should still be addressed in terms of potential impacts and/or to inform mitigation:
    - Barn Swallow – confirmed on site
    - Gray Ratsnake – high potential to occur on site
    - Eastern Meadowlark
    - Bobolink
    - Species at Risk Bats
    - Blanding's Turtle
    - Eastern Whip-Poor-Will
- As discussed during our October 3, 2017 meeting and site visit, MNRF strongly recommends developing and implementing a rigid, Construction Project Environmental Monitoring Plan, with a stand-alone Species at Risk specific component, which would include, but not be limited to, the following monitoring and/or mitigation measures:
    - Barn Swallow – confirmed on site: a monitoring plan component should be established during the construction project to survey and document the use of the site (and the neighbouring property), to ensure that any potential project impacts (e.g. Disturbance to the nesting site (in the structure(s)) from the nearby heavy vehicle traffic) on the species and/or its critical habitat(s), are effectively assessed, and mitigated if required.
    - Eastern Meadowlark: a monitoring plan component should be established during the construction project to survey and document the use of the site (and the neighbouring property), to ensure that any potential project impacts (e.g. Disturbance to the nesting site (from the nearby heavy vehicle traffic) on the species and/or its critical habitat(s), are effectively assessed, and mitigated if required.
    - Bobolink: a monitoring plan component should be established during the construction project to survey and document the use of the site (and the neighbouring property), to ensure that any potential project impacts (e.g. Disturbance to the nesting site (from the nearby heavy vehicle traffic) on the species and/or its critical habitat(s), are effectively assessed, and mitigated if required.
    - Eastern Whip-Poor-Will: a monitoring plan component should be established during the construction project to conduct a spring breeding survey, to ensure that any potential project impacts on the species and/or its critical habitat(s), are effectively assessed, and mitigated if required.
    - Gray Ratsnake: a monitoring plan component should be established during the construction project to conduct multiple (including an early morning – i.e. prior to vehicle traffic on site) daily visual site surveys, within the delineated/fenced

construction site (and beyond – in and around rocky outcrops), to ensure that any potential project impacts on the species and/or its critical habitat(s), are effectively assessed, and mitigated if required, especially given that as stated in the document, "There is a high probability that Grey Ratsnake is present in the study area.".
    - Blanding's Turtle: a monitoring plan component should be established during the construction project to conduct multiple (including an early morning – i.e. prior to vehicle traffic on site) daily visual site surveys, within the delineated/fenced construction site, to ensure that any potential project impacts on the species, are effectively assessed, and mitigated if required.
    - Species at Risk Bats: vegetation removal (including the few snag trees on site), should be completed, prior to the active bat season (i.e. by mid-April).
- In regards to American Eel (SAR under the ESA), MNRF concurs that the species is not likely to currently occur at the site, nor currently be impacted by the project. However, it should be noted that MNRF does not concur with the determination that "...the habitat below the dam is unsuitable." for this species. That being said, as discussed during our October 3, 2017 meeting, we are pleased that consideration has already been given to plan for the potential future incorporation of American Eel passage structures (i.e. ladder for upstream passage and a slide for downstream passage) at the facility, and that provisions for future passage will be incorporated in the project's detailed design.
- As mentioned in our September 7, 2017 letter, RE: In-Water Work Timing Guidelines (referenced in the document): We have, or are about to update our in-water work timing guidelines for Kemptville District, which in the case of Bobs Lake, the Tay River and Christie Lake, will be modified to Oct. 15 – June 30th (i.e. no in-water work) due to the presence of Fall spawning fish species (i.e. Cisco (Lake Herring)). Isolation of the in-water work site beforehand, with barriers remaining in place for the duration of the timing restriction period, to allow work to proceed during this time, was partially addressed in the document. As mentioned in our September 7, 2017 letter, and further discussed during our October 3, 2017 meeting, further modifications to the planning of the cofferdam (i.e. sheet piling, as opposed to granular) and by-pass configurations (i.e. piping and/or small, removable sheet piling openings) will be incorporated into the construction project details, to essentially adhere to the above-mentioned In-Water Work Timing Guidelines, but also provide for some level of flexibility when staging from one construction phase to the other, while at the same time, significantly reducing any associated impacts on fish and/or fish habitats. MNRF will still require more detailed information on the temporary flow by-pass (i.e. the type, timelines, etc.) to inform our review of potential project impacts (e.g. on downstream Walleye spawning beds).
- Under section 8.4.1 Walleye Spawning Habitat Monitoring, it is stated that it may be important to monitor the pre-existing downstream reach of Walleye spawning habitat for potential impacts. This should be incorporated as part of the construction project requirements. And furthermore, post-construction effectiveness monitoring (i.e. Walleye Spawning Observations: pre-construction at existing site and post-construction at existing site and new site, for comparison) of the spawning habitat created, should also be incorporated.
- MNRF will still require more detailed information on the demolition of the existing dam (i.e. how it will be done (e.g. barge, crane, etc.), timelines, etc.) to inform our review of potential project impacts (e.g. on downstream Walleye spawning beds).
- And finally, it is strongly recommended that the above-mentioned development of monitoring plans (and associated mitigation measures) and the actual monitoring and

supervision of mitigation the efforts, should be done by qualified individuals (i.e. by an environmental consultant and not by the contractor or one of his/her employees.).

Should you have any further questions, please do not hesitate to contact me directly at 613-258-8214 or joff.cote@ontario.ca.

Sincerely,

Joffre Cote
Management Biologist (Fisheries)

Fisheries and Oceans Canada | Pêches et Océans Canada

Fisheries Protection Program
Central and Arctic Region
501 University Crescent.
Winnipeg, Manitoba R3T 2N6

Programme pour la Protection des Pêches
Région du centre et de l'arctique
501 University Crescent
Winnipeg (Manitoba) R3T 2N6

Your file *Votre référence*

October 13, 2017

Our file *Notre référence*
15-HCAA-01187

Christopher Strand
Ontario Waterways Project Delivery
Parks Canada
P.O. Box 567
Peterborough, On K9J 6Z6

Dear Mr. Strand:

Subject: Implementation of mitigation measures to avoid and mitigate impacts to fish and fish habitat and aquatic species at risk – Bob's Lake Dam Replacement

The Fisheries Protection Program (the Program) of Fisheries and Oceans Canada received your proposal on September 10, 2015.

Your proposal has been reviewed to determine whether it is likely to result in serious harm to fish which is prohibited under subsection 35(1) of the *Fisheries Act*. Your proposal has also been reviewed to determine whether it will adversely impact listed aquatic species at risk and contravene sections 32, 33 or 58 of the *Species at Risk Act* (SARA).

Our review considered the following:

- Request for Project review dated September 10, 2015
- Additional information received March 1 2016
- Additional information received July 25, 2017
- Additional information received August 10, 2017
- Phone conversation with Chris Strand August 17, 2017

We understand that you propose to:

- Replace the existing outlet dam at Bob's Lake on the Tay River with a new dam constructed approximately 40 m upstream
- That the new dam construction will be isolated with two double wall sheetpile coffer dams lined with a membrane and filled with granular, and additionally with turbidity curtains
- That the old dam will remain in place until the streambed between the old and new dam is restored by removing accumulated sediments and constructing a cobble/boulder streambed
- That turbidity and sediment levels will be monitored during construction and that CCME guidelines will be followed
- The removal of the existing dam will be isolated with a small coffer dam and/or turbidity curtains depending on flow conditions.
- That an eel fishway will be installed if and when American Eel are returned to the Tay River and in consultation with the Province and DFO.

Since there are no SARA species or their habitats identified in the project area, no additional approvals under SARA will be required for your proposed activities.

To avoid the potential for serious harm to fish that is prohibited under the *Fisheries Act*, the mitigation measures listed below, in addition to those set out in your project plans, are to be followed:

- All dredging should be isolated with a turbidity curtain and/or coffer dams sufficient to contain sediments within the dredged area. The isolation should remain in place until the sediments have settled and the water inside the isolation is the same clarity as the water. Dredged spoils should be placed on land and contained such that they do not erode back into any water body.
- Rock used for the streambed reconstruction should be designed for expected flows, be well graded in size, and small gravels and/or sand added as required to ensure that the interstitial spaces are sufficiently filled to keep water at the surface and avoid the creation of a rock drain.

Provided that you implement the required mitigation measures for your project, and follow the guidance available on the DFO website at http://www.dfo-mpo.gc.ca/pnw-ppe/measures/index-eng.html, the Program is of the view that your proposal should not result in serious harm to fish or contravene sections 32, 33 or 58 of the *Species at Risk Act*. No formal approval is required from the Program under the *Fisheries Act* or the *Species at Risk Act* in order to proceed with your proposal.

If your plans have changed or if the description of your proposal is incomplete, or changes in the future, you should consult our website (http://www.dfo-mpo.gc.ca/pnw-ppe/index-eng.html) or consult with a qualified environmental consultant to determine if further review is required by the Program.

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

If you have any questions, please contact Todd Schwartz at (204) 983-4231, or by email at Todd.Schwartz@dfo-mpo.gc.ca. Please refer to the file number referenced above when corresponding with the Program.

Yours sincerely,

Richard Janusz
Senior Fisheries Protection Biologist
Fisheries Protection Program

J. Thomas (A/DFO Regional Manager Regulatory Review – Burlington)
T. Schwartz (DFO Fisheries Protection Biologist - Winnipeg)
J. Côté (OMNRF Management Biologist – Kemptville)

Appendix J

Technical Report: Fish Habitat Assessment (CIMA)

Public Works and Government Services Canada (PWGSC)

Technical report
Fish habitat assessment

Bobs Lake Dam Reconstruction

March 2017

A000492-110-080

CIMA+
Partenaire de génie

Public Works and Government Services Canada (PWGSC)

Technical report
Fish habitat assessment

Bobs Lake Dam Reconstruction

Project nº A000492B-104-080

Prepared by :

Dominique Chalifoux, technician
Project Manager - Environment

Verified by :

Nicholas Bertrand, Biologist
Project Manager - Environment

CIMA+
420 Maloney East Blvd.
Suite 201
Gatineau (Québec) J8P 1E7

2017-03-07

Table of Content

Tables

Appendices

1. Project Identification

1.1 Project Title

Bobs Lake Dam Reconstruction

1.2 Project Location

The project is located within the limits of the Tay Valley Township in Ontario. The existing Dam is located on the Tay River, at the outlet of Bobs Lake. The new Dam is to be constructed approximately 50 meters upstream from the existing Dam.

The approximate center of the whole project corresponds to the following coordinates: latitude: 44° 45' 34" N, longitude 76° 31' 21" W. The site location is presented in Figure 1, **Appendix A** of this report.

1.3 Project Summary

Parks Canada Agency (PCA) requested a proposal for engineering and design services to support the rehabilitation of a channel between the proposed new Bobs Lake Dam and the to-be-removed existing Bobs Lake Dam.

The project includes the construction of the stream channel on a distance of approximately 50 meters and must include diverse and stable aquatic habitat. The newly dry lake bed riparian habitat downstream of the new dam will need to be stabilized and re-vegetated. Stability of the new channel and management of sediments are important issues as there is a significant Walleye (*Sander vitreus*) spawning area located downstream of the proposed work.

2. Approach and Methodology

2.1 Fish habitat surveys

On-site investigation of flora and fauna was planned, and occurred during a time of year that allowed for identification and observation of species and their habitat. The assessment was conducted and overseen by a team of environmental technicians and biologists (CIMA+). Special efforts were made to characterize Walleye habitat and identify related environmental features.

Fish habitat surveys were performed based on existing protocols, guidelines, information and field data sheets, from the Department of Fisheries and Oceans (DFO), Fondation de la Faune du Québec (FFQ) and United States Environmental Protection Agency (EPA), water division. Any specific references used for this assessment are noted further in this report.

The site visit was conducted on July 28th, 2016, on a sunny day, with warm temperatures. The surveys were completed during appropriate weather, in order to observe the features of the fish habitat and surrounding area. Fish habitat was examined thoroughly by foot, where it

was safely accessible. The study area spanned 100 meters downstream from the existing dam and approximately 60 meters upstream. Written field notes and above and underwater digital photographs were taken.

Field survey covered the following environmental features:

- Biophysical characteristics of the Tay River and riparian area;
- Surrounding environment;
- Identification of vegetation (aquatic and riparian);
- Riverbed substrate characterisation;
- Nature of the banks and riparian area;
- Quality of fish habitat;
- Presence or signs of presence of any animal species.

2.2 Aquatic and riparian habitat reconstruction

A Desktop research provided valuable information on fish habitat, Walleye spawning habitat and management of Walleye spawning ground. Information regarding species choice and proper plantation techniques for riparian re-vegetation was also collected and analyzed. Documents consulted are identified in the *References* section.

Based on these findings and on the findings of the field surveys, the drawings detailing the existing conditions, profiles and the proposed work for the new dam were analyzed and aquatic/fish habitat and re-vegetation details were added.

The design focuses on providing optimal Walleye spawning habitat.

3. Description of the Existing Environment

3.1 General surrounding habitat

The general surrounding habitat consists mainly of agricultural farmland on the north side and a wooded area on the southside of the study area. Bobs Lake is located upstream from the study area and the Tay River runs downstream.

Photos of the study area are presented in **Appendix B**.

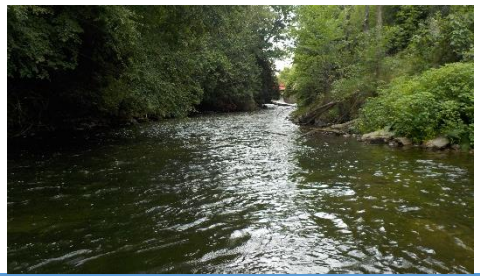
3.2 Fish habitat

3.2.1 Downstream from the existing Dam

The surveyed area downstream of the existing dam consists of a 100 meter section of the Tay River. It is relatively straight, with natural banks and diverse substrate from sand to big boulders, and bedrock. Characteristics of this section are presented in Table 1, below.

Table 1. Tay River habitat characteristics – Section 1 – Downstream of the existing dam

IDENTIFICATION		
Name of waterway:	Tay River	
Name of segment:	Section 1 - downstream	
Municipality:	Tay Valley	
Type of waterway:	River	
Survey date:	July 28th 2016	
BIOPHYSIC CHARACTERISTICS		
Length of segment :	100 meters	
Average width of segment:	10 meters	
Configuration of segment:	Straight	
Obstacles:	Dam located upstream	
Forest canopy:	45 % Mixed Forest	
Surrounding environment:	Forest 100 %	
SUBSTRATE		
Bedrock	5 %	
Big boulders >500 mm	15 %	
Boulders 250 - 500 mm	15 %	
Cobbles 80 - 250 mm	45 %	
Pebbles 40 - 80 mm	10 %	
Gravel 5 - 40 mm	5 %	
Sand 0.125 - 5 mm	5 %	
Silt < 0.125 mm	0 %	
Organic debris	0 %	
BANKS	**Left**	**Right**
Natural	100 %	100%
Man-made	0 %	0 %
Trees	25 %	80 %
Bushes	40 %	5 %
Ground cover	35 %	15 %
Eroded	0 %	0 %
Height:	< 5 m	> 5 m
Slope :	> 30%	> 30 %
QUALITY OF FISH HABITAT		
Shelter (type and %)	Boulders and big boulders	30 %
Pools :	Yes approx. 10m length	15% %
Flow threshold:	Yes	
Cascades:	Yes	
Food supply:	Yes, fish and invertebrates	
Species observed:	Smallmouth bass, blacknose dace	

VEGETATION
Aquatic vegetation
Water Milfoil (*Myriophyllum sp.*) Pondweed (*Potamogeton sp.* - possibly *richradsonii*) American Eel-grass (*Vallisneria americana*) Narrow-leaved Bur-reed (*Sparganium angustifolium*)
Riparian vegetation
Trees and regeneration
American Elm (*Ulmus americana*) White Cedar (*Thuja occidentalis*) Sugar Maple (*Acer saccharum*) White Birch (*Betula papyrifera*) Manitoba Maple (*Acer negundo*) Yellow Birch (*Betula alleghaniensis*) Red Ash (*Fraxinus pennsylvanica*) Black Cherry (*Prunus serotina*) American Basswood (*Tilia americana*) Red Maple (*Acer rubrum*) Butternut (*Juglans cinerea*) Eastern Hemlock (*Tsuga canadensis*)
Shrubs
Alternate-leaved Dogwood (*Cornus alternifolia*) Riverbank Grape (*Vitis riparia*) Wild Red Currant (*Ribes Rubrum*) Wild Red Raspberry (*Rubus idaeus*) Glossy Buckthorn (*Frangula alnus*)
Ground cover
Lutetian Enchanter's Nightshade (*Circaea lutetiana*) Orange Jewelweed *(Imaptiens capensis*) Climbing Nightshade (*Solanum dulcamara*) American Wild Mint (*Mentha canadensis*) Stinging Nettle (*Urtica dioica*) Great Burdock (*Arctium lappa*)
WILDLIFE OBSERVATIONS
Belted Kingfisher (*Megaceryle alcyon*) Barn Swallow (*Hirundo rustica*) Song Sparrow (*Melospiza melodia*) Great Blue Heron *(Ardea herodias*)
PHOTOGRAPH


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3.2.2 Upstream of the existing Dam (proposed Dam area)

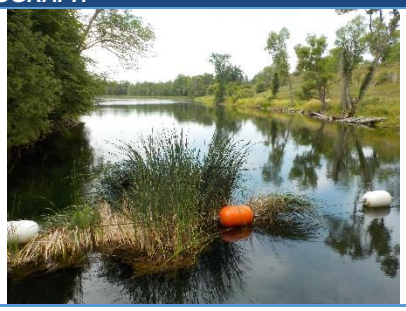
The surveyed area upstream from the existing dam consist of a 60 meter section of the Tay River at Bob's Lake outlet. This section consists of Bob's Lake narrowing and flowing into the Tay River. The riparian area is mostly natural, but has been altered on the north side by farming activity and a grass path leading to the River. Substrate is variable, consisting of 40% sand and 30% of pebbles and cobbles, 15% organic debris, some gravel and boulders. Characteristics of this section are detailed in Table 2, below.

Table 2. Bob's Lake habitat characteristics – Section 2 – Upstream of the existing dam

IDENTIFICATION		
Name of waterway:	Bob's Lake	
Name of segment:	Section 2 - Upstream	
Municipality:	Tay Valley	
Type of waterway:	Lake	
Survey date:	July 28th 2016	
BIOPHYSIC CHARACTERISTICS		
Length of segment :	60 meters	
Average width of segment:	25 meters	
Configuration of segment:	Narrowing	
Obstacles:	Dam located downstream	
Forest canopy:	20 % Mixed Forest	
Surrounding environment:	Agricultural 50 % Forest 50 %	
SUBSTRATE		
Bedrock	0%	
Big boulders >500 mm	1 %	
Boulders 250 - 500 mm	3 %	
Cobbles 80 - 250 mm	15 %	
Pebbles 40 - 80 mm	15 %	
Gravel 5 - 40 mm	20 %	
Sand 0.125 - 5 mm	40 %	
Silt < 0.125 mm	1 %	
Organic debris	5 %	
BANKS	***Left***	***Right***
Natural	100 %	100%
Man-made	0 %	0 %
Trees	10 %	75 %
Bushes	10 %	10 %
Ground cover	80 %	15 %

VEGETATION
Aquatic vegetation
Water Milfoil (*Myriophyllum sp*.) Pondweed (*Potamogeton sp*. - possibly *richradsonii*) American Eel-grass (*Vallisneria americana*) Narrow-leaved Bur-reed (*Sparganium angustifolium*) Water Smartweed (*Persicaria amphibia*)
Riperian vegetation
Trees and regeneration
American Elm (*Ulmus americana*) White Cedar (*Thuja occidentalis*) Sugar Maple (*Acer saccharum*) White Birch (*Betula papyrifera*) Yellow Birch (*Betula alleghaniensis*) Red Ash (*Fraxinus pennsylvanic*a) Black Cherry (*Prunus serotina*) American Basswood (*Tilia americana*) Butternut (*Juglans cinerea*) Eastern Hemlock (*Tsuga canadensis*) Red Oak (*Quercus rubra*) Black Willow (*Salix nigra*)
Shrubs
Staghorn Sumac (*Rhus typhina*) Riverbank Grape (*Vitis riparia*) Glossy Buckthorn (*Frangula alnus*)
Ground cover
Reed Canarygrass (*Phalaris arundinacea*) Poison Ivy (*Rhus radicans*) Swamp Milkweed (*Asclepias incarnata*)
WILDLIFE OBSERVATIONS
Common Loon (*Gavia immer*) Eastern Chipmunk (*Tamias striatus*) Song Sparrow(*Melospiza melodia*) **Common Musk Turtle**[1] (*Sternotherus oderatus*) Swamp Sparrow (*Melospiza georgiana*) Belted Kingfisher (*Megaceryle alcyon*) American Robin (*Turdus migratorius*) Red-shouldered Hawk (*Buteo lineatus*) American Goldfinch (*Spinus tristis*) Green frog (*Lithobates clamitans*) Ring-billed Gull (*Larus delawarensis*) Barn Swallow (*Hirundo rustica*) Great Blue Heron *(Ardea herodias*)

[1] A common musk turtle, also known as Stinkpot, carcass was observed in the study area (see photo in Appendix B). This species is designated under SARA legislation as: Schedule 1, Threatened.

Eroded	0 %	0 %	***PHOTOGRAPH***
Height:	< 5 m	> 5 m	
Slope :	< 30%	> 30 %	
FISH HABITAT			
Shelter (type and %)	Boulders and big boulders (10%) Aquatic vegetation (65%)		
Pools :	No		
Flow threshold:	No		
Cascades:	No		
Food supply:	Yes, fish and invertebrates		
Species observed:	Largemouth bass Pumpkinseed		

4. Environmental rehabilitation

The drawing and design for the stream bed environmental rehabilitation which includes the aquatic and riparian habitat reconstruction is presented in **Appendix C**. Preferred Walleye spawning habitat elements were used for the design of the aquatic habitat reconstruction and re-vegetation of riparian habitat was designed to replicate the surrounding natural habitat.

4.1 Aquatic habitat reconstruction

For the reconstruction design of the aquatic habitat, characteristics of Walleye spawning habitat were used. Walleye spawning period varies from one region to another and can occur between the beginnings of April till the end of June, in some regions, in a variety of habitats. Preferred spawning habitats are well-oxygenated moving waters, with a temperature between 6º and 11ºC, often located at the foot of waterfalls or dam and include gravel-cobble substrate (approx. 50 – 200 mm in diameter). Walleye, which tend to use the same spawning ground from one year to the next are broadcast spawners, meaning the female releases adhesive eggs into the water, which are immediately fertilized by the males, then fall onto and between the rock substrate. The eggs hatch between 12 and 18 days later, and the fry leave spawning area approximately 10 and 15 days after hatching.

The following characteristics[2] were used in the design of the aquatic habitat reconstruction plan.

- Substrate diameter: 50 to 200 mm placed on an approximate 25% upward slope upstream and a downward slope of less than 5% downstream;
- The spawning ground should be at least 0.3 m in depth, ideal water level after substrate filling should vary between 0.3 m to 1.8 m;
- Substrate filling should consist of rocks from 50 to 200 mm in diameter;
- The thickness of the added rock substrate reaches between 300mm to 600 mm;
- Where currents allow, rocks should be round, with no sharp edges;

[2] Reference : FAUNE ET FONDATION DE LA FAUNE DU QUÉBEC, 1996. *Habitat du poisson : le doré jaune. Guide d'aménagement d'habitats.* Québec, 20 p.

- Riprap should cover the banks to prevent bank erosion;
- Bank slopes ratio should range between 1:4 and 1:3;
- Width of the spawning ground should be approximately 10 meters;
- Shelter in or near the spawning ground should be planned by placing boulders (4 clusters of 3 boulders) of at least 500 mm in diameter and large wooded debris (cedar) well anchored, (for example by anchoring the log with a metal into the banks rod and placing boulders at the base on the bank or by using steel cable to tie them to an anchor in the bank), recreating natural shelter habitat, as specified in the Stream bed environmental rehabilitation plan;
- Creation of a pool with a water depth between 1.2 and 2.2 meters would be optimal.

The following characteristics were also taken into consideration when designing the rehabilitation plan.

- High water mark (2 year recurrence) after new dam construction: 159.7 m
- Proposed Normal water mark after new dam construction: 158.8 m;
- Alignment of the dam;
- Design velocities of 0.5 to 1.5 m/sec;
- Existing water depths will determine sediments excavation depths and rockfill profil, considering desired water depths range between 0.3 to 1.8m;
- Rock diameter required to resist water current from the open dam.

Velocities of the proposed riverbed reconstruction area are calculated as follows:

Spring thaw: *max. water volume*: 10 m^3/s, Velocity: 0.7 to 2.2 m/s, Water level: 0.6 to 1.7 m

Ecological flow**:** *water volume*: 1.5 m^3/s, Velocity: 0.3 to 1.5 m/s, Water level: 0.4 to 1.1 m

Very low flow**:** *water volume*: 20 l/s, Velocity: 0 to 0.6 m/s, Water level: 0.05 to 0.1 m

The stream bed environmental rehabilitation plan presented in **Appendix C** was designed taking into consideration all of the above characteristics.

4.2 Riparian habitat reconstruction

The plantation plan for the re-vegetation of the riparian habitat was designed to promote the growth of indigenous trees and shrubs to replicate the natural habitat surrounding the existing aquatic habitat, downstream from the existing dam, which represents a forested area with a tree cover ranging from 40% to 60% over the stream. Trees are to be planted 5-6 meters apart, and shrubs; 2 meters apart in staggered rows as identified in the stream bed environmental rehabilitation and plantation plan presented in **Appendix C**. Ground cover will consist of either hydroseeding, mechanical or manual seeding of the plantation area with a mixture of indigenous herbaceous plants. Species for the plantation and seeding are specified below.

Table 3. Species recommended for plantations

TREES (total:13)	
Common name	***Latin name***
White Cedar (4)	*Thuya occidentalis*
Sugar Maple (3)	*Acer saccharum*
Red Maple (3)	*Acer rubrum*
Red Oak (3)	*Quercus rubra*
SHRUBS (total: 54)	
Common name	***Latin name***
Red Osier Dogwood (10)	*Cornus stolonifera*
Canada Fly Honeysuckle (12)	*Lonicera Canadensis*
Nannyberry (10)	*Viburnum lentago*
Cranberry Bush (12)	*Viburnum trilobum*
Riverbank Grape (10)	*Vitis riparia*
GROUND COVER (approximate seeding rate: 9.8 to 25.0 g/m²) *A mixture of the following species (or equivalent)*	
Common name	***Latin name***
Big Bluestem	*Andropogon Gerardii*
Bluejoint Reedgrass	*Calamagrostis Canadensis*
Sallow Sedge	*Carex lurida*
Pointed Broom Sedge	*Carex scoparia*
Tufted Hairgrass	*Deschampsia cespitosa*
Deer-tongue Grass	*Dichanthelium clandestinum*
Canada Wildrye	*Elymus Canadensis*
Red Fescue	*Festuca rubra*
Canada mannagrass	*Glyceria Canadensis*
Soft rush	*Juncus effuses*
Old Switch Panicgrass	*Panicum virgatum*
Fowl Bluegrass	*Poa palustris*
Dark-Green Bulrush	*Scirpus atrovirens*
Prairie Cordgrass	*Spartina pectinate*

After seedling, mulch should be added to the ground to conserve its moisture. It should be light and airy to let the young plants grow, degrade quickly, and be free of invasive or non-native pasture species. However, this mulch should not be carried away by the runoff or current. An erosion control mattress made out of natural fiber such as coconut fiber could also be used.

4.3 Affected area

The reconstruction of the dam upstream from the existing dam will have an effect on the footprint of habitat lost and created. Areas affected downstream of the new dam include the loss of lacustrine habitat which will be reconstructed into riverine and riparian habitat. Fish habitat will also be lost due to footprint of the new dam. The table below presents the footprint in sq. m of lacustrine habitat lost and the amount of riverine/riparian habitat created by the construction of the new dam and the proposed environmental rehabilitation.

Table 4. Total habitat loss and habitat creation per habitat type

Habitat type	habitat lost (sq. m)	habitat gained (sq.m)
Lacustrine	907.30	-
Riverine	-	499.54
Riparian (including new shore area)	-	407.76
Fish habitat (new dam footprint)	448.11	
Total	**1 355.41**	**907.30**

A total of 1 355.41 square meters of habitat area is lost, including the area taken by the footprint of the new dam and a total of 907.30 square meters of riverine and riparian habitat is created.

The loss of fish habitat is compensated by the creation of quality habitat for Walleye as well as stable and treed riparian habitat.

5. Recommended Environmental Mitigation Measures

The potential effects of the project on ecological components were analyzed based on a review of project-related activities, the field surveys, personal knowledge and professional judgment. Measures to mitigate the potential adverse effects were then developed. The significance of after-effects was determined following an assessment of the scope of the effect, its geographic coverage, duration and frequency, irreversibility and the ecological circumstances.

The following Table 4 summarizes the above information and describes the mitigation measures required.

Assessment Methodology:

Significant (S): Used to describe effects that may be widespread, enduring or in contravention of legislation, standards or environmental guidelines or objectives; significant effects include permanent reduction of species or of the diversity of populations of species; permanent loss of critical/productive habitat; permanent alteration to community characteristics or services, land use or established patterns; and/or permanent loss of archaeological/heritage resources.

Insignificant (I): Used to describe effects that are not widespread; are temporary or short-term in duration (i.e. only during construction); if recurring, lasting for short periods of time during or after project implementation; once cause of effect is removed, the integrity of the social/environmental components is resumed.

Negligible (N): Used to describe effects that are virtually non-existent or hardly discernable. Negligible effects affect a localized area and or are short-term and have no measurable impact on a given population, entity or group as a whole.

Positive (P): Used to describe an effect that exhibits a beneficial outcome.

Table 5. Identification of environmental impacts and mitigation measures recommended.

VALUED COMPONENTS AND POTENTIAL ENVIRONMENTAL IMPACTS	POTENTIAL SIGNIFICANCE OF ADVERSE	MITIGATION MEASURES REQUIRED	SIGNIFICANCE OF RESIDUAL EFFECTS	MONITORING REQUIREMENTS
Air quality - Emission of airborne pollutants (gases and dust) during the operation of machinery and equipment.	**I**	1. Vehicle with anti-pollution systems will be operational and will meet regulatory requirements related to air quality. 2. Machinery, chainsaws and equipment will be turned off when not in use. 3. If necessary, measures will be taken to reduce dust emissions (watering). 4. Disturbed areas will be restored as soon as possible to limit soil erosion.	**N**	If concerns are expressed on or off site during construction, air quality **may** be monitored by the Contractor and a Site Supervisor.

Soil quality - Risk of soils and groundwater contamination from petroleum products.	**I**	5. It will be the responsibility of the contractor to develop a spills response plan that will be review and accepted by Parks Canada. 6. The list of persons and agencies to contact in the event of an emergency shall be maintained on the work site for the duration of the work. 7. Re-fuelling, mechanical inspections, cleaning of rolling stock and the handling and storage of hydrocarbons will be performed in locations free of any risk of contamination of the aquatic environment and at least 30 meters from the watercourses. 8. No isolated machinery will be left within 30 meters of the watercourse during site closure hours. 9. Machinery used in or near the streambed will work exclusively on biodegradable oils, lubricants and greases. 10. Machinery will arrive on site clean and kept clean to limit any grease or oil deposits inside the work area. 11. Frequent inspections will be performed to detect any oil, fuel, grease or other leaks. If a leak is detected, the necessary corrective action will be taken immediately. 12. An emergency kit for the recovery of petroleum products will be kept on site at all times. The kit will be stored near the location of work and machinery, and kept within easy reach at all times to ensure a rapid response. 13. Install and maintain erosion and sedimentation control devices according to the Ontario Provincial Standard Specifications (OPSS) (e.g., sediment barriers, bales of straw, geotextile membranes, sedimentation ponds, filtration berm) to prevent particulate from mixing with surface water.	**N**	Site supervisor to monitor work methods.
Soil stability - Risk of landslides caused by excavations in the embankment.	**I**	14. Maintain appropriate setbacks for heavy machinery where embankment is unstable and during periods where soils are saturated (spring and fall, after heavy rains, etc.).	**N**	

VALUED COMPONENTS AND POTENTIAL ENVIRONMENTAL IMPACTS	POTENTIAL SIGNIFICANCE OF ADVERSE	MITIGATION MEASURES REQUIRED	SIGNIFICANCE OF RESIDUAL EFFECTS	MONITORING REQUIREMENTS
Surface water quality - Risk of surface water contamination by petroleum products. - Temporary deterioration in water quality with the inflow of fine material into Tay River. - Increase in turbidity in watercourses due to in-water works for abutment protection. - Soil erosion and destabilization caused by the use of heavy machinery, the uprooting of trees and excavation work.	**I**	15. Repeated measures: 6 to 14; 16. If work is to take place between October 15th and March 15th, exposed sol may need to be covered (for example, using erosion control blankets, tarps, straw, etc.) to prevent soil erosion during spring freshet. 17. Stream flow requirements will be determined by Parks Canada, considering Bob's lake is a feeder lake for the Rideau Canal. 18. All in-stream work should be completed in the dry by de-watering the work area and diverting and/or pumping any flows around cofferdams placed at the limits of the work area. 19. A De-Watering Plan, and a Sediment and Erosion Control Plan must be prepared by the contractor and submitted to Parks Canada before the work starts; 20. The banks disturbed by the work will be stabilized and reinstated; 21. Machinery will be clean and free of leaks upon arrival on site. It will be kept in this state thereafter conducting regular inspections, maintenance and repairs required on a site designated for this purpose at least 30 meters from watercourses; 22. No storage of petroleum products or other hazardous materials will be permitted within 30 meters of a water body; 23. No refueling of mobile equipment will be permitted within 30 meters of a water body; 24. Immoblile equipment such as pumps and generators may be fueled closer than 30 meters to the watercourse if a spill containment system (i.e. drip pan) is in place. 25. Turbidity control will be proposed by the contractor in their Environmental Management Plan and be reviewed by Parks Canada.	**N**	Site Supervisor to monitor work methods.

VALUED COMPONENTS AND POTENTIAL ENVIRONMENTAL IMPACTS	POTENTIAL SIGNIFICANCE OF ADVERSE	MITIGATION MEASURES REQUIRED	SIGNIFICANCE OF RESIDUAL EFFECTS	MONITORING REQUIREMENTS
		26. Seeding and planting should be done using native, non-invasive species, as outlined in the planting plan, in areas that have been disturbed. If the growing season is too late, stabilize the terrain (eg, cover exposed areas with erosion control blankets (or similar product) to control soil movement and erosion) and seeding will then take place in the spring during appropriate growing conditions.		

VALUED COMPONENTS AND POTENTIAL ENVIRONMENTAL IMPACTS	POTENTIAL SIGNIFICANCE OF ADVERSE	MITIGATION MEASURES REQUIRED	SIGNIFICANCE OF RESIDUAL EFFECTS	MONITORING REQUIREMENTS
Vegetation -Damage to trees located outside the work site. -Possible dispersal of exotic invasive species (Glossy Buckthorn, Manitoba Maple). -Loss of herbaceous plants and shrubs - Trees in good to fair conditions might need to be removed.	**I**	27. The working perimeter will be clearly identified in order to leave any vegetation outside this perimeter untouched; 28. Exotic invasive species (Alder Buckthorn, Manitoba Maple) at the site of vegetation cutting activities will be cut manually. Such cutting as well as temporary storage and disposal will be performed to prevent the dispersal of seeds and samara into the environment. 29. Revegetation of sites where vegetation was cut or damaged. This includes restoring the profile of the sites, spreading topsoil, seeding soil (using indigenous species) 30. Plantation and seeding will be done according to the stream bed environmental rehabilitation and plantation plans presented in **Appendix C**. The use of indigenous species adapted to the site is imperative.	**N**	One annual site visit at the beginning of summer (for 2 years), following the completion of work, to verify the condition of vegetation, and to make provision for any corrections or replacements

VALUED COMPONENTS AND POTENTIAL ENVIRONMENTAL IMPACTS	POTENTIAL SIGNIFICANCE OF ADVERSE	MITIGATION MEASURES REQUIRED	SIGNIFICANCE OF RESIDUAL EFFECTS	MONITORING REQUIREMENTS
Wildlife -Loss of a portion of wooded area that can serve as habitat and shelter for birds and wildlife, and -Risk of collision during movement of machinery - Possibility that certain species be present on the site and in the watercourse before undergoing the works and during works	**N**	31. Limit vehicle speed on site to minimize the risk of collisions with wildlife; 32. Limit vegetation clearing to a minimum, only the necessary amount to allow access of machinery and the demolition of the existing dam, the construction of the new dam and the rehabilitation activities; 33. No tree cutting will be permitted for storage sites; 34. The work of clearing and tree removal will be scheduled to avoid the breeding and nesting season of migratory birds and should take place between August 28th and April 1st. Should any tree cutting be required during the migratory bird breeding season, a professional should confirm the absence of nests prior to work. 35. Workers should remain attentive during work cutting to avoid disturbance of nesting birds; 36. Under the Migratory Birds Convention Act, it is prohibited to disturb, destroy or take a nest, shelter, nest shelter, duck shack or egg of a migratory bird, or have in his possession a live migratory bird, a carcass or skin of a migratory bird; 37. Workers maintain the site in a clean condition and avoid leaving trash or food scraps that may attract wild animals. 38. Before any work involving soil disturbance, the presence of wildlife will be verified by raising the shelters where such species may be hiding. 39. Minimize the temporary placement of artificial debris (eg, boards, branches, sheets, etc.) That might attract snakes (thermoregulation site).	**N**	Evidence of wildlife presence and activity, requiring attention, will be monitored during the work by the Contractor and Site Supervisor. Daily sweeps will be carried out to detect the presence of wildlife within the work area.

VALUED COMPONENTS AND POTENTIAL ENVIRONMENTAL IMPACTS	POTENTIAL SIGNIFICANCE OF ADVERSE	MITIGATION MEASURES REQUIRED	SIGNIFICANCE OF RESIDUAL EFFECTS	MONITORING REQUIREMENTS
Fish and fish habitat -Suspension of fine particulate in fish habitat. -Risk of fish habitat disturbance by petroleum products and other hazardous substances.	**N**	40. Apply measures: 7 to 16 41. Apply measure: 19 to 29 42. There will be no in-water works between March 15 and July 1, of any given year. 43. Work in-water shall not be conducted at times when flows are elevated due to local rain events, storms or seasonal floods. 44. Fish removal will be carried out by a qualified professional from the dewatered area.	**N**	Contractor and Site Supervisor to monitor work methods near watercourses.

6. Environmental monitoring

Dam demolition, construction of the new dam and the rehabilitation and plantation works, will be subject to environmental monitoring to ensure the respect and good operation of mitigation measures, and that new vegetation is well established.

Plantation and seeding monitoring will be ensured. This monitoring consists of one annual site visit at the beginning of summer (for 2 years), following the completion of work, to verify the condition of vegetation, and to make provision for any corrections or replacements. All vegetation in poor condition (based on the quality standards below) one year after planting will be replaced at the Contractor's expense. The same applies to the second year after planting. The responsible party for this monitoring is to be determined by Parks Canada Agency.

Acceptable quality standards for plantings are as follows. Plant material is considered acceptable if it remains free from damage, shows signs of growth and sufficient bud formation and is free of any indication of deterioration whatsoever. Plant materials that do not meet these quality standards will not be accepted.

7. Conclusion

This report aimed at describing the existing aquatic habitat and its surroundings upstream and downstream of both the existing dam and the proposed new dam in order to assess the environmental effects and propose mitigation measures and rehabilitation work accordingly. This exercise demonstrates that the project is not likely to cause significant adverse environmental effects, provided that the implementation of appropriate mitigation measures identified in this report are assured. It is expected that the new dam will provide a solid and secure structure. In addition, it is expected that the rehabilitation works will provide additional, quality, spawning habitat for Walleye as well as quality aquatic habitat for varied fauna.

The proposed rehabilitation and plantation plan should prove to be beneficial for fish habitat and ecosystems present while having a minimal impact the environmental components identified.

8. References

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APPENDIX A

Site location plan

N

25 0 25 50 75 100 m

Legend

Site location

Source: Bing Aerial, Satellite Image 2010

CIMA+ Partners in excellence

Bobs Lake Dam Reconstruction
Fish habitat assessment and technical report

Site location

Scale:	Projet:	Date:
1 : 4 500	A000492B	October 2016
Prepared by: N. Bertrand, bio.	Verified by: D. Chalifoux, tech. Sr.	**Figure 1**

APPENDIX B

Site photographs

Photo #1
View of Tay River and existing dam downstream of the existing dam
Bobs Lake Dam
Tay Valley Township (Ontario)

Photo #2
View of Tay River downstream from the existing dam
Bobs Lake Dam
Tay Valley Township (Ontario)

Photo #3
View of Tay River and Bobs Lake upstream from the existing dam
Bobs Lake Dam
Tay Valley Township (Ontario)

Photo #4
View on the Tay River just upstream from the existing dam
Bobs Lake Dam
Tay Valley Township (Ontario)

Photos #5 and #6
View on the carcass of *Sternotherus odoratus* found upstream of the existing dam
Bobs Lake Dam
Tay Valley Township (Ontario)

Photo #7
View of fish and fish habitat found downstream of the existing dam
Bobs Lake Dam
Tay Valley Township (Ontario)

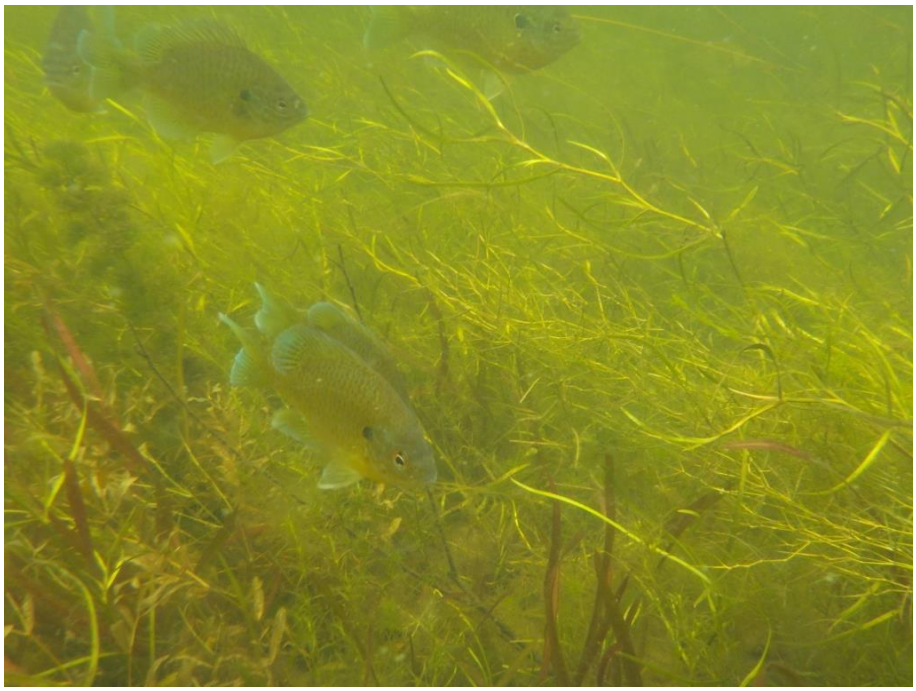

Photo #8
View of fish and fish habitat upstream from the existing dam
Bobs Lake Dam
Tay Valley Township (Ontario)

Photo #9
View of the bank upstream of the existing dam on the north side of the Tay River
Bobs Lake Dam
Tay Valley Township (Ontario)

Photo #10
View of the bank upstream of the existing dam on the south side of the Tay River
Bobs Lake Dam
Tay Valley Township (Ontario)

Photo #11
View of both banks of the Tay River downstream of the existing dam
Bobs Lake Dam
Tay Valley Township (Ontario)

APPENDIX C

Stream bed environmental rehabilitation and plantation plan

No	NOTES
1	SEE DRAWING CV-002-01 FOR GENERAL NOTES, LEGEND AND ABBREVIATIONS.
2	ENVIRONMENTAL MEASURES AS PER SPECIFICATIONS.
3	MAINTAIN MINIMUM ENVIRONMENTAL FLOW OF 1.5 cms BY PUMPING AND PIPING OR OTHER MEANS IN ORDER TO PASS CLEAN LAKE WATER FROM UPSTREAM OF NEW DAM TO DISCHARGE POINT DOWNSTREAM OF OLD DAM DURING STREAM CHANNEL DEVELOPMENT AND OLD DAM DEMOLITION.
4	STEAM BED ENVIRONMENTAL REHABILITATION AND DAM DEMOLITION MUST BE SUBSTANTIALLY COMPLETED WITHIN A THREE WEEK PERIOD TO ALLOW FOR PASSAGE OF WATER THOUGH THE NEW STREAM CHANNEL. SCHEDULING OF THIS WORK IS DEPENDENT ON IN WATER WORK RESTRICTION AND FLOW CONDITIONS REQUIREMENTS AT BOBS LAKE. PROCESS WOULD ENTAIL: 1) PARTIAL DRAW DOWN OF AREA BETWEEN NEW DAM AND OLD DAM IN A MANNER TO PREVENT EROSION AND TURBIDITY 2) CONSTRUCTION AND COMMISSIONING OF BYPASS SYSTEM TO PASS MINIMUM 1.5 cms THROUGH STREAM BED REHABILITATION AND DEMOLITION AREA 3) FULL DRAW DOWN OF AREA BETWEEN OLD DAM AND NEW DAM. 4) MEASURES TO CONTROL SEEPAGE FROM NEW DAM, DIVERT SEEPAGE TO SEDIMENT TREATMENT, AND RELEASE IN ORDER TO FACILITATE STREAM BED REHABILITATION WORK IN THE DRY. 5) CONSTRUCTION OF STREAM BED REHABILITATION AND OLD DAM DEMOLITION 6) SUBSTANTIAL COMPLETION OF STREAM BED REHABILITATION AND OLD DAM DEMOLITION WITHIN THREE WEEK PERIOD TO ALLOW FOR COMMISSIONING OF NEW DAM AND FLOWS THROUGH NEW STREAM CHANNEL.

LEGEND :

1. ANGULAR ROCKFILL (Ø 300-500) (RIP RAP)
2. ROCKFILL WITH RIVER ROCKS (Ø 300-500) (NO SHARP EDGES)
3. ROCKFILL WITH RIVER ROCK (Ø 50-300) (NO SHARP EDGES)

BOULDER CLUSTER (Ø 1000) (NO SHARP EDGES)

PLANTATION:

TREE :
- TO — THUYA OCCIDENTALIS (4)
- AS — ACER SACCHARUM (3)
- AR — ACER RUBRUM (3)
- QR — QUERCUS RUBRA (2)

SHRUB:
- VR — VITIS RIPARIA (7)
- CS — CORNUS STOLONIFEA (7)
- VT — VIBURNUM TRILOBUM (6)
- LC — LONICEA CANADENSIS (8)
- VL — VIBURNUM LENTAGO (6)

LARGE WOODED DEBRIS (4)

no	date	issues and/or modifications	by
4	2017-XX-XX	ISSUED FOR REVIEW	J.K.
3	2016-11-04	ISSUED FOR REVIEW	J.K.
2	2016-10-28	PRELIMINARY DESIGN	J.K.
1	2016-08-02	PRELIMINARY DESIGN - 66% STAGE	J.K.
0	2016-06-02	PRELIMINARY	J.K.

Parks Canada / Parcs Canada

Canada

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600-3400 du Souvenir Blvd
Laval QC H7V 3Z2
Phone: 514 337-2462
Fax: 450 682-1013
www.cima.ca

seals

project: BOBS LAKE DAM REPLACEMENT
BOLINGBROKE - ONTARIO

title: STREAM BED
ENVIRONMENTAL REHABILITATION
PLAN

drawn	H. OTMANI	scale	1:100
checked	J. CARON	date	2015-07-28
designed	Y. BERTON	reference	
approved	J. KONCZYNSKI		

client	project	drawing no			revision
A0138	A000492B	CV	010	01	4

SCALE 1:100

2017-02-07
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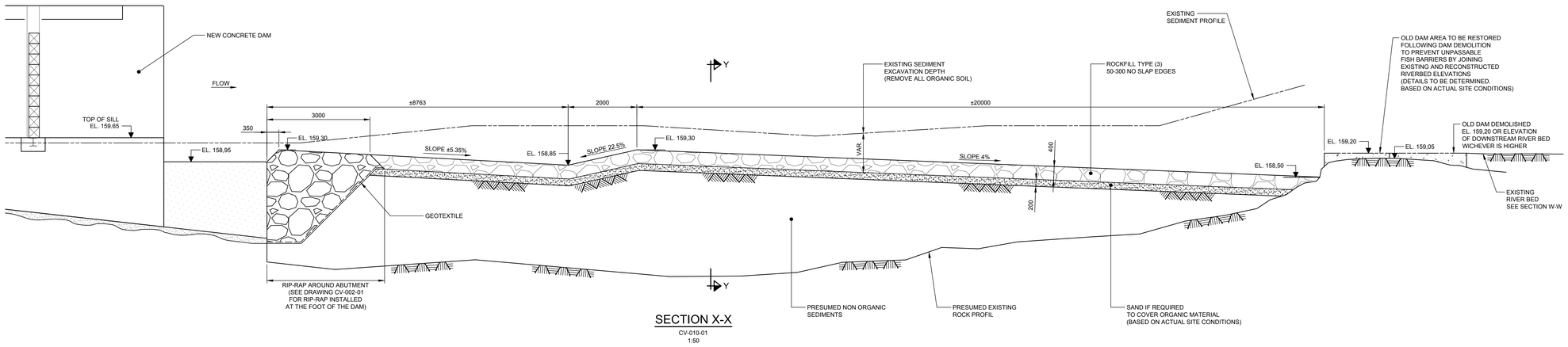

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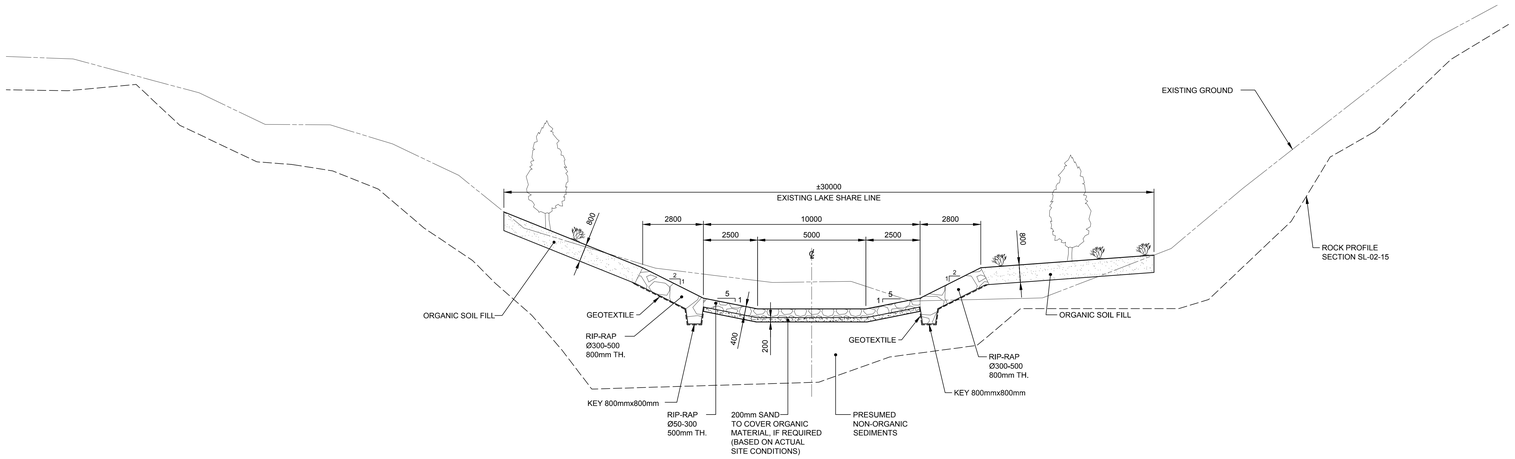

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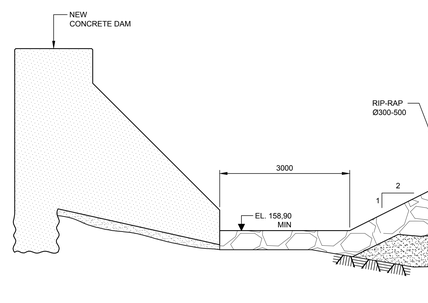

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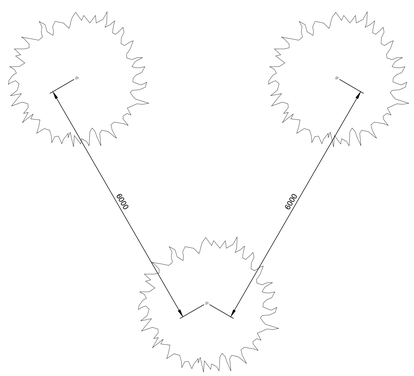
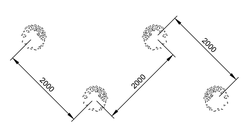


TREES (DISTANCE STAGGERAD)

SPECIES AS PER CHART

DETAIL A

CV-010-01



SHRUBS (DISTANCE STAGGERAD)

SPECIES AS PER CHART

TREES	
COMMON NAME	LATIN NAME
White Cedar Sugar Maple Red Maple Red Oak	Thuya occidentalis Acer saccharum Acer rubrum Quercus rubra
SHRUBS	
COMMON NAME	LATIN NAME
Red Osier Dogwood Canada Fly Honeysuckle Nannyberry Cranberry Bush Riverbank Grape* *to be planted first row, along the lowest portion of the bank	*Cornus Stolonifera* *Lonicera Canadensis* *Viburnum lentago* *Viburnum trilobum* *Vitis riparia*
GROUND COVER A MIXTURE OF THE FOLLOWING SPECIES (OR EQUIVALENT) AND DISTRIBUTED OVER THE AREA	
COMMON NAME	LATIN NAME
Big Bluestem Bluejoint Reedgrass Sallow Sedge Pointed Broom Sedge Tufted Hairgrass Deer-tongue Grass Canada Wildrye Red Fescue Canada mannagrass Soft rush Old Switch Panicgrass Fowl Bluegrass Dark-Green Bulrush Prairie Cordgrass	Andropogon Gerardii Calamagrostis Canadensis Carex lurida Carex scoparia Deschampsia cespitosa Dichanthelium clandestinum Elymus Canadensis Festuca rubra Glyceria Canadensis Juncus effuses Panicum virgatum Poa palustris Scirpus atrovirens Spartina pectinate

RECONSTRUCTION OF RIPARIAN HABITAT:

1- CUT OR DAMAGED VEGETATION IN RIPARIAN ZONES NEED TO BE REHABILITATED WITH SEEDING AND PLANTATION.

2- AS WELL, WHEREVER SOIL WAS DISTURBED, THE CONTRACTOR MUST STABILIZE WITH SEEDING AND PLANTATION.

3- SHRUBS AND TREES ARE PLANTED ON DISTURBED SOILS IN RIPARIAN ZONES OF THE RIVER. THE AREAS OCCUPIED BY RIPRAP ARE EXCLUDED FROM PLANTATION. PLANTING SITES SHOULD BE IDENTIFIED IN THE FIELD BY THE CONTRACTOR AND APPROVED BY THE SUPERVISOR BEFORE CARRYING PLANTING WORK.

THE CONTRACTOR MUST USE A MINIMUM OF THREE (3) SHRUB SPECIES PRESENTED IN THE TABLE BELOW. SHRUBS SHOULD BE PURCHASED IN CONTAINERS OF ONE GALLON AND/OR SHRUBS WILL HAVE A HEIGHT OF AT LEAST 30-40 CM. THE SHRUBS WILL BE PLANTED IN STAGGERED ROWS, AT A DISTANCE OF 2 METER CENTER TO CENTER.

THE CONTRACTOR MUST USE A MINIMUM OF THREE (3) TREE SPECIES PRESENTED IN THE TABLE BELOW. TREES HAVE A SIZE OF AROUND 6 CM DIAMETER, 30 CM UP FROM THE GROUND. THE TREES WILL BE PLANTED IN STAGGERED ROWS, AT A DISTANCE OF 5-6 METERS.

4- THE CONTRACTOR SHALL ENSURE THAT ANY PERSON UNDER ITS RESPONSIBILITY SHALL TAKE ALL NECESSARY MEASURES TO PROTECT THE ENVIRONMENT, ESPECIALLY THE FOLLOWING:

i. ENSURE THAT THERE IS NO MATERIALS STORAGE, UNNECESSARY MACHINERY TRAFFIC OR DIGGING IN OR NEAR THE RIVER.

ii. PRESERVE ALL VEGETATION IN RIPARIAN ZONES THAT DO NOT INTERFERE WITH WORK.

iii. PROCEED AS QUICKLY AS POSSIBLE AND AS WORK PROGRESSES TO THE RESTORATION OF DISTURBED AREAS.

No	NOTES
1	SEE DRAWING CV-002-01 FOR GENERAL NOTES, LEGEND AND ABBREVIATIONS.
2	ENVIRONMENTAL MEASURES AS PER SPECIFICATIONS.

no	date	issues and/or modifications	by
2	2017-XX-XX	ISSUED FOR REVIEW	J.K.
1	2016-11-04	ISSUED FOR REVIEW	J.K.
0	2016-10-28	PRELIMINARY	J.K.

CIMA+
ISO 9001
600-3400 du Souvenir Blvd
Laval QC H7V 3Z2
Phone: 514 337-2462
Fax: 450 682-1013
www.cima.ca

seals

project: BOBS LAKE DAM REPLACEMENT
BOLINGBROKE - ONTARIO

title: STEAM BED
ENVIRONMENTAL REHABILITATION
SECTIONS AND DETAIL

drawn	H. OTMANI	scale	1:200
checked	J. CARON	date	2015-08-03
designed	Y. BERTON	reference	
approved	J. KONCZYNSKI		

client	project	drawing no	revision
A0138	A000492B	CV 010 02	2

2017-02-27
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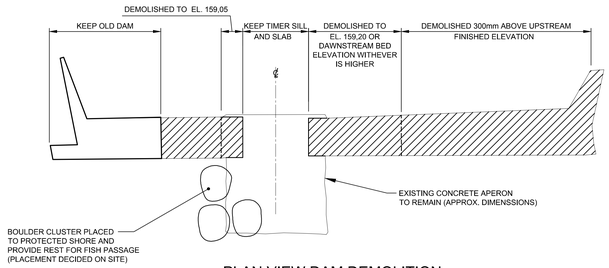
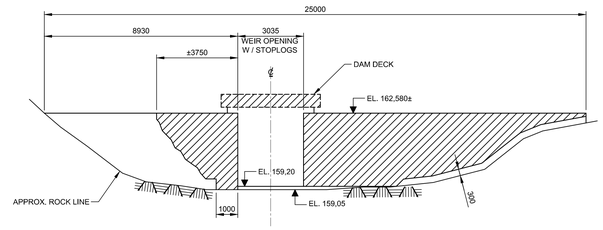


PLAN VIEW DAM DEMOLITION

1:100



SECTION W-W

CV-010-01

1:100

No	NOTES
1	SEE DRAWING CV-002-01 FOR GENERAL NOTES, LEGEND AND ABBREVIATIONS.

no	date	issues and/or modifications	by
0	2017-XX-XX	ISSUED FOR REVIEW	J.K.

CIMA

600-3400 du Souvenir Blvd
Laval QC H7V 3Z2
Phone: 514 337-2462
Fax: 450 682-1013
www.cima.ca

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seals

project

BOBS LAKE DAM REPLACEMENT
BOLINGBROKE - ONTARIO

title

STEAM BED
ENVIRONMENTAL REHABILITATION
PLAN AND SECTIONS

drawn	I. ZIECIK	scale	1:200
checked	J. CARON	date	2017-02-03
designed	Y. BERTON	reference	
approved	J. KONCZYNSKI		

client	project	drawing no			revision
A0138	A000492B	CV	010	03	0

2017-02-06
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Appendix K

Public Engagement

Community Feedback Regarding Bobs Lake Dam Replacement Project

In the time since the project to replace the Bobs Lake Dam was announced in 2015, Parks Canada has engaged the area residents and community organizations in order to inform and elicit feedback. To date, Parks Canada staff have participated in 5 public forums, have responded to email enquiries from more than 70 residents, and have been working with stakeholder organizations to provide updates. The organizations include the Greater Bobs and Crowe Lakes Association, the Christie Lake Association, the Tay Valley Township, Friends of the Tay Valley, and the Rideau Valley Conservation Authority. Inquiries related to the Bobs Lake Dam were also received from the area Member of Parliament and Member of Provincial Parliament. Parks Canada staff have also engaged in discussions through social media in the Facebook groups associated with Bobs Lake, the Greater Bobs and Crowe Lake Association, and Christie Lake.

The information that follows is a condensed compilation of the feedback received throughout the preparation process and the period for stakeholder comment on the Detailed Impact Assessment. All comments have been carefully considered by the project team including the Project Manager, Environmental Assessment Officers, and the Communications Officer. All commenters will receive a direct response to their comments and the issues raised and questions asked will form the basis of a Questions and Answers document for the project web page.

Some of the feedback received helped guide mitigation measures as part of the Detailed Impact Assessment. Other feedback will be raised with the eventual contractor as guidance for site regulation and fostering positive relations with Parks Canada's neighbours. In other cases the feedback did not speak directly to matters related to the construction of a new Bobs Lake dam and was reviewed and then relayed to Parks Canada's operations staff for awareness.

Water Levels:

- Concerns were raised that construction would require either the raising or lowering of water levels up and/or downstream of the dam in order to facilitate construction. There are a number of residents on the lake who are particularly susceptible to flooding during high water levels and others who are unable to access the main body of the lake when water levels are too low. Additionally, residents were concerned about any possible impact to private infrastructure as a result of oscillating water levels.

- Residents were also concerned that average water levels would be drastically different or unpredictable following construction of a new dam and sought clarity regarding the plan for future water levels.

- Parks Canada has been asked to provide notice in case of potentially dangerous water level fluctuations during construction.

- Several comments were also made that the new dam should be built in such a way that would eliminate all future risk of flooding.

- A request has been made to explore the possibility of incorporating different sized logs (in addition to the typical full and half logs) in order to have different gradients of adjustment.

- Concern was raised that the drawings contained within the DIA demonstrate an insufficient freeboard and as a result will not sufficiently address the risk of overtopping.

- Residents from both Bobs and Christie Lakes requested that the rule curves that help to guide water level management be adjusted following construction. Residents from Christie Lake have indicated a desire to explore lowering water levels on Bobs Lake in order to create more storage capacity. Conversely, residents on Bobs Lake have indicated a desire to alter the rule curve so as to maintain higher water levels on Bobs Lake throughout the year.

Environment:

- Commenters took note that the relocation of the dam will result in a reduction of habitat for aquatic vegetation and for fish within Bobs Lake.

- A commenter argued that the reduction in fish habitat should be counteracted by a 5 year program of stocking Bobs Lake with walleye and perch.

- The potential impact on turtles and fish during construction was also flagged. Commenters have asked that care be exercised during work.

- Question was raised about communication protocol in case of spills. Parks Canada has been asked to ensure that the provincial reporting mechanism is adhered to.

- Appreciation was extended for the wealth of information contained in the DIA as it will add to the existing knowledge basis

Dam and surrounding area:

- Parks Canada has been asked if a portage route could be created around the new dam at the end of construction.

- There is a remnant of an old dock near the existing dam that allows boaters to moor their vessel near the dam and then walk to the structure. Parks Canada has been asked to explore the possibility of constructing a new dock at the new structure.

- Parks Canada was asked to carefully monitor the release of sediment associated with the work. Concern was raised that elevated sediment release could result in damage to artifacts from heritage mill sites nearby.

- Concern was raised about the current state and condition of the nearby road and bridge infrastructure and whether it was suitable robust for construction traffic.

- Parks Canada was asked to explore the possibility of mechanizing the dam.

- Commenters also raised the possibility of hydro generation as a feature of the new dam.

Ongoing Communications

- Parks Canada was asked to prepare a communications plan in order to ensure that the community was quickly notified in the case of any construction accident that may cause danger to downstream residents

- It has been requested that Parks Canada provide additional community engagement opportunities so that residents and property owners can learn more about the forthcoming work.

- A desire for frequent updates on project status was indicated. Additionally, one commenter suggested a work site camera be installed so that interested residents could look in on construction and monitor progress.

- Several commenters referenced the unique history of the area and the role that dams have played in the evolution of the watershed and the Tay Canal downstream. Parks Canada has been asked to further investigate the site of the Korry mills and do more to promote the cultural heritage associated with the historic sites of the dams at Bolingbroke.

DIA – Bobs Lake Dam Reconstruction

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