# APPENDIX D

# SCOPED ENVIRONMENTAL IMPACT STUDY / MITIGATION PLAN FOR SPECIES AT RISK



# Township of Blandford-Blenheim Bridge 24 Environmental Assessment

Scoped Environmental Impact Study

Prepared for:

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Project No. 3191 | August 2024

NATURAL RESOURCE SOLUTIONS INC.
Aquatic, Terrestrial and Wetland Biologists

**Township of Blandford-Blenheim Bridge 24 Environmental Assessment**

**Scoped Environmental Impact Study**

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## 1.0 Introduction

Natural Resource Solutions Inc. (NRSI) was retained by K. Smart Associates Ltd., on behalf of the Township of Blandford-Blenheim, to complete a scoped Environmental Impact Study (EIS) as input to a Class B Environmental Assessment (EA) for a potential bridge replacement project.

The subject bridge, referred to by the Township of Blandford-Blenheim as Bridge 24, is located on Township Road 12 in the Township of Blandford-Blenheim, within the County of Oxford, Ontario (Map 1). It is a single-span structure crossing the Nith River, which is within the larger Upper Grand River watershed.

The general land cover surrounding Bridge 24 consists primarily of agricultural fields and deciduous forest, with swamp, marsh, and meadows also present. The Nith River, its floodplains, and associated wetlands are regulated by the Grand River Conservation Authority (GRCA) (GRCA 2023). Development within and adjacent to these natural features are subject to Ontario Regulation 41/24 under the *Conservation Authorities Act*. Additionally, the natural features adjacent to Bridge 24 are identified as Significant Valleylands and Erosion Hazard Lands in the Environmental Features Plan and Development Constraints (Schedule C-1 and C-2, respectively) of the Oxford County Official Plan (2021). The presence of Significant Valleylands and Fish Habitat within 50m of the proposed bridge enhancements have triggered the requirement for an EIS (Oxford County 2021). See Map 1 for the extent of the EIS study area and development area. For the purposes of this report, the term “study area” refers to the lands within 120m of the bridge and road right-of-way (ROW), while the “development area” refers to the lands with the potential to be impacted as a result of the proposed enhancements based on information provided by K. Smart Associates (see Appendix I).

This report summarizes background information on natural heritage features, as well as the results of original field surveys including vascular flora inventories, bat habitat assessments, aquatic habitat assessments, and mussel searches from within the study area. This EIS has been developed in accordance with the County and GRCA EIS requirements (Oxford County 2021, GRCA 2005).

# 2.0 Project Scoping

## 2.1 Background Information Review

In order to determine the study approach for the EIS, existing natural heritage information was first gathered and reviewed to identify key natural heritage features and species that are known or have the potential to occur within the study area. Background information was collected from the Natural Heritage Information Centre (NHIC) (MNRF 2023), the Grand River Information Network (GRIN) and online GRCA regulation mapping (GRCA 2023), Aquatic Resource Area database (Government of Ontario 2023), and Department of Fisheries and Oceans (DFO) (DFO 2023) database mapping, as well as taxa-specific databases as listed below.

Initial wildlife species lists were compiled to provide information on species reported from the vicinity of the study area (up to 10km) using various atlases, including the Ontario Breeding Bird Atlas (BSC et al. 2006), Ontario Mammal Atlas (Dobbyn 1994), the Ontario Reptile and Amphibian Atlas (Ontario Nature 2019), the Ontario Butterly Atlas (Macnaughton et al. 2023), and the Ontario Odonata Atlas (OOAD 2023). Information was compiled from the 10x10km atlas square that overlaps the study area (square 17NH39). These initial species lists were used to guide the scope and type of wildlife field surveys required as outlined in the following sections.

## 2.2 Significant Species and Habitat Screening

Species at Risk (SAR) as those listed on the Species at Risk in Ontario list (MECP 2024) and/or Schedule 1 of the federal *Species at Risk Act* (SARA). These include species identified by the Committee on the Status of Species at Risk in Ontario (COSSARO) as provincially Endangered, Threatened, or Special Concern. Species listed as Endangered or Threatened are awarded provincial protection under the *Endangered Species Act* (ESA). Aquatic species listed as Endangered, Threatened or Special Concern under Schedule 1 are protected under the federal SARA which includes protection to their habitat.

Species considered Special Concern are included in the definition of Species of Conservation Concern (SCC), which includes the following:

- Species designated provincially as Special Concern;
- Species that have been assigned a conservation status (S-Rank) of S1 to S3 or SH by the NHIC; and

- Species that are designated federally as Endangered or Threatened by the Committee for the Status of Endangered Wildlife in Canada (COSEWIC) but not provincially by the COSSARO (OMNR 2010). These species may be protected by the federal SARA if they are listed as Endangered or Threatened on Schedule 1 of SARA, but are not protected provincially by the ESA.

Habitat for SCC is considered Significant Wildlife Habitat (SWH) (OMNR 2010), which is afforded protection under the Provincial Policy Statement (OMMAH 2020) and municipal natural heritage protection policies. For the purposes of this report, the term "SAR" will refer to provincially Threatened and Endangered species regulated under the ESA, while provincial species of Special Concern will be considered SCC. Aquatic species listed as Endangered, Threatened or Special Concern on Schedule 1 of the SARA are also considered SAR in this report.

Based on NRSI's examination of background sources, and federally or provincially significant species with occurrence records in the study area vicinity (within 10km), a preliminary screening exercise was conducted on these species to identify which may have suitable habitat within the study area (Appendix II). This involved cross-referencing the preferred habitat for SAR (e.g., OMNR 2000) against known habitats within the study area. This was completed to ensure that the potential presence of all SAR and SCC within the study area were adequately assessed. The screening was further updated once field surveys were completed within the study area.

A preliminary screening for the presence of Significant Wildlife Habitat (SWH) was also completed for the study area based on discrete provincial significance criteria (MNRF 2015) and NRSI knowledge of the site conditions (Appendix III). The Significant Wildlife Habitat Technical Guide (SWHTG) outlines the types of habitats that the MNRF considers significant in Ontario as well as criteria to identify these habitats for Ecoregion 6E, in which the study area is located (OMNR 2000, MNRF 2015). The SWHTG groups SWH into four broad categories: seasonal concentration areas, rare vegetation communities and specialized wildlife habitat, habitats of SCC, and animal movement corridors. SWH is afforded protection under the Provincial Policy Statement (PPS) (OMMAH 2020) and municipal natural heritage protection policies. The screening was further updated once field surveys were completed within the study area, as presented in Appendix III.

## 2.3 Relevant Policies, Legislation and Regulations

For the purposes of this report, information on the natural heritage features within the study area was collected and assessed for ecological significance. To help inform and identify areas to be protected, these features are evaluated against the following relevant policies, legislations, and regulations. Table 1 provides a summary of these documents.

**Table 1. Relevant Policies, Legislation and Regulations**

| Policy/Legislation | Description | Project Relevance |
|---|---|---|
| Provincial Policy Statement (OMMAH 2020). | • Issued under the authority of Section 3 of the Planning Act and came into effect on May 1, 2020, replacing the 2014 PPS.<br>• Section 2.1 of the PPS – Natural Heritage establishes clear direction on the adoption of an ecosystem approach and the protection of resources that have been identified as 'significant'.<br>• The Natural Heritage Reference Manual (OMNR 2010) and the Significant Wildlife Habitat Technical Guide (OMNR 2000, MNRF 2015) were prepared by the MNRF to provide guidance on identifying natural features and in interpreting the Natural Heritage sections of the PPS. | • Natural features that occur or may occur within the study area, and which receive protection under the PPS, include:<br>  ○ Significant Woodland,<br>  ○ Fish Habitat,<br>  ○ Significant Valleyland<br>  ○ Potential Significant Wildlife Habitat, and<br>  ○ Potential habitat for Endangered and Threatened species.<br>• Section 2.1.5 of the PPS states that development or site alteration shall not be permitted in Significant Woodlands, Significant Valleyland or Significant Wildlife Habitat unless it has been demonstrated that there will be no negative impacts on the features or their ecological functions.<br>• Section 2.1.6 of the PPS states that development or site alteration shall not be permitted in fish habitat except in accordance with provincial and federal requirements.<br>• Section 2.1.8 of the PPS states that development and site alteration shall not be permitted on adjacent lands to the natural features described above unless it is demonstrated that there will be no negative impacts to the natural features or their ecological functions.<br>• Section 2.1.7 of the PPS states that development or site alteration shall not be permitted in habitat of Endangered or Threatened species except in accordance with provincial or federal requirements.<br>• Section 2.1.2 of the PPS states that the connectivity of natural features in an area should be maintained, restored, or where possible, improved. |
| *Endangered Species Act* | • The original ESA, written in 1971, underwent a year-long review which resulted in a number of changes which came into force in 2007. | • Based on a preliminary assessment, multiple SAR were identified as having the potential to occur within the study area based on presence of suitable habitat. |

| Policy/Legislation | Description | Project Relevance |
|---|---|---|
| | • The ESA prohibits killing, harming, harassing or capturing SAR and protects their habitats from damage and destruction. | |
| *Migratory Birds Convention Act* | • Prohibits the disturbance, destruction, or taking of a nest or eggs of migratory birds. | • Any vegetation removal required for construction of the proposed development must have regard for this legislation in the form of timing window restrictions or other suitable mitigation measures. |
| County of Oxford Official Plan (2023) | • The Oxford County Official Plan (2023) outlines current policies for the protection of the County's natural heritage resources.<br>• The current plan was adopted in 1995, but has been updated as of March 2023 to reflect the newest consolidation of amendments. | • Policies speak to the protection of natural features including significant wetlands, significant habitat of endangered or threatened species and other significant wildlife habitat, fish habitat, significant valleylands, significant woodlands and significant life science areas of natural and scientific interest. |
| *Conservation Authorities Act* and Ontario Regulation 41/24 | • Enacted on April 1, 2024, Ontario Regulation 41/24: Prohibited Activities, Exemptions and Permits replaces previous the conservation authority-specific regulations under the *Conservation Authorities Act* to outline where various development activities are prohibited under the Act.<br>• Through this regulation, the GRCA has the responsibility to regulate activities in hazardous areas (i.e., areas in and near rivers, streams, floodplains, wetlands, and slopes). | • The Nith River, its floodplain lands, slopes and study area wetlands are regulated by the GRCA.<br>• As such, permitting from the GRCA must be obtained for proposed works within their regulated areas. |
| *Fisheries Act* | • Under the updated federal *Fisheries Act*, fish are protected through two core prohibitions: Section 34.4(1) the death of fish by means other than fishing, and Section 35(1) the harmful alteration, disruption, or destruction (HADD) of fish habitat (Government of Canada 2019).<br>• Any proposed work, undertaking, or activity should aim to avoid causing the death of fish, or the harmful alteration, disruption or | • The study area includes the Nith River, which is protected under the *Fisheries Act*.<br>• If works are to be completed in the vicinity of watercourses that contain fish habitat, a proponent-led DFO assessment may be required to ensure that the works will result in no residual negative effects to fish or fish habitat. |

| Policy/Legislation | Description | Project Relevance |
|---|---|---|
| | destruction of fish habitat through the course or as a result of any proposed undertaking. Fish habitat is defined as "spawning grounds and any other areas, including nursery, rearing, food supply and migration areas, on which fish depend directly or indirectly in order to carry out their life processes".<br>• If there is any proposed work below the high-water mark or channel itself, a proponent-led Department of Fisheries and Oceans (DFO) assessment must be completed for the proposed works to determine if the works have the potential to contravene the *Fisheries Act* and require a request for review by the Fisheries Protection Program.<br>• If impacts to fish or fish habitat cannot be mitigated effectively, a *Fisheries Act* Authorization may be required. | |
| *Fish and Wildlife Conservation Act* | • The *Fish and Wildlife Conservation Act* (FWCA) provides protection for certain bird species not protected under the MBCA (e.g., raptors), as well as furbearing mammals and their dens or habitual dwellings, aside from the Red Fox (*Vulpes vulpes*) and Striped Skunk (*Mephitis mephitis*) | • The timing of construction activities, especially vegetation clearing and site grading must have consideration for bird nesting and den sites for furbearing mammals.<br>• Wildlife sweeps by a qualified biologist are recommended in advance of any vegetation clearing and site grubbing during the bird active season to ensure that no active nests/dens are present. |

## 3.0 Field Methods

The type and scope of study methods was determined based on the results of the SAR screening, SWH screening, background review, and information provided in the Oxford Natural Heritage Systems Study (County of Oxford 2016). Field surveys were undertaken within the study area to characterize any natural features and identify significant and sensitive features and species that have the potential to be impacted by the planned undertaking, and are described in detail below. Table 2 provides details on all site visits including survey type and date, protocols applied, weather conditions, and participating biologists.

**Table 2. Field Survey Summary**

| Survey Type | Protocol | Date | Air Temp (°C) | Wind Speed (Beaufort Scale) | Cloud Cover (%) | Precipitation | Observers |
|---|---|---|---|---|---|---|---|
| SWH Assessment | N/A | June 6, 2023 | 12-31 | 0-1 | 10-75 | None | P. Deacon |
| Spring Vegetation Inventory and ELC Delineation | Lee et al. 1998 | | | | | | |
| SWH Assessment | N/A | July 26, 2023 | DNC[1] | DNC[1] | DNC[1] | DNC[1] | P. Deacon |
| Summer Vegetation and ELC Delineation | Lee et al. 1998 | | | | | | |
| Nest Search | Area search | | | | | | |
| Aquatic Habitat Assessment | Stanfield 2017 (modified) | Sept. 9, 2023 | 16.6 | 1 | 0-5 | None | G. MacVeigh |
| Mussel Search | Mackie et al. 2008 | | | | | | |
| Silver Shiner Habitat Assessment | Area search of aquatic habitat | | | | | | |
| Bat Habitat Assessment | MECP 2022a | | | | | | H. Fotherby |

[1]DNC = Did Not Collect

## 3.1 Terrestrial Field Surveys

### 3.1.1 Vegetation Surveys

Vegetation communities within the study area were mapped and classified following the Ecological Land Classification (ELC) system for Southern Ontario (Lee et al. 1998) during both

the June 6 and July 6, 2023 site visits. Details on the vegetation communities were recorded, including species composition, uncommon species or features, and evidence of human impacts.

A two-season vegetation inventory (spring and summer) was conducted in tandem with ELC efforts to record all species of vascular flora within the study area. Inventories were completed based on what could be viewed from within the Township Road 12 ROW.

### 3.1.2 Bat Habitat Assessment

The MNRF has recently released revised guidelines for the identification of suitable bat roosting habitat as per the *Recovery Strategy for the Little Brown Myotis (Myotis lucifugus), Northern Myotis (Myotis septentrionalis) and Tri-colored Bat (Perimyotis subflavus) in Ontario* (Humphrey and Fotherby 2019), the *Species at Risk Bat Survey Standard Note* (MECP 2022a), and the *Bats and Treed Habitats - Maternity Roost Surveys* (MECP 2022b) distributed by the Ontario Ministry of Environment, Conservation and Parks (MECP). Given the presence of the bridge structure and woodlands adjacent to the bridge footprint, bat habitat assessments were conducted to determine the presence of bat roosting habitats based on the MECP protocols.

The assessment of suitable maternity roost habitat on the bridge comprised examination of the structure for vertical crevices sealed at the top, all other crevices >12” deep, guardrails, expansion joints, spaces between the end walls and bridge deck, and vertical surfaces on concrete I-beams that would provide suitable roosting habitat, as per the United States Fish and Wildlife Service’s Bridge/Structure Bat Assessment Form Guidance (USFWS 2020) and associated Bridge/Structure Inspection Form (USFWS 2015).

The assessment of suitable maternity roosts within woodlands and isolated trees was completed by examining every tree ≥10cm diameter-at-breast-height (DBH) that was accessible or could be viewed from the ROW for signs of loose bark, cracks and/or cavities, and dead foliage on live trees that would provide suitable roosting habitat (MECP 2022a). All trees ≥10cm DBH with loose exfoliating bark, or suitable cracks and crevices are considered suitable roosting habitat for Little Brown Myotis and Northern Myotis. Suitable habitat for the Tri-colored Bat (*Perimyotis subflavus*) includes dead leaves on live trees, particularly oak (*Quercus* spp.) and maple (*Acer* spp.) trees, accumulations of leaves and pine needles, squirrel nests, and cavities (Humphrey and Fotherby 2019).

Surveys for suitable bat roosting habitat were conducted on both the bridge and trees within the surrounding woodlands on September 9, 2023.

### 3.1.3 Avian Surveys

The existing bridge was thoroughly searched for the presence of any nesting birds (e.g., Barn Swallow (*Hirundo rustica*) or Cliff Swallow (*Petrochelidon pyrrhonota*)). Additionally, all incidental visual and auditory observations of birds within the study area were recorded as well as the highest level of breeding evidence exhibited for each reported species, in accordance with the Ontario Breeding Bird Atlas methodology (Birds Canada et al. 2021). Incidental observations of birds were documented on June 6, 2023, within the breeding window, and again on July 26, 2023 outside of the breeding window.

### 3.1.4 Additional Wildlife

All observations of birds, herpetofauna, mammals, butterflies and odonata (dragonflies and damselflies) were documented on all field visits. This included direct observations of individuals as well as signs of wildlife presence (i.e. tracks, scat, dens, nests, etc.).

## 3.2 Aquatic Surveys

An NRSI aquatic biologist conducted one visit to the study area on September 9, 2023. It was determined that a mussel habitat assessment and search, an aquatic SAR habitat assessment, and a general aquatic habitat assessment were required. The mussel search and SAR habitat assessments were triggered due to the results of the background information review which identified Silver Shiner (*Notropis photogenis*), Black Redhorse (*Moxostoma duquesnei*), Rainbow mussels (*Villosa iris*) and Wavy-rayed Lampmussel (*Lampsilis fasciola*) as occurring or potentially occurring within 1km of Bridge 24 (DFO 2023). Critical Habitat for Silver Shiner and Black Redhorse were also reported within 1km of the study area (DFO 2023).

During this site visit, the general aquatic habitat assessment, mussel habitat assessment and search, and the aquatic SAR habitat assessment were completed on a 50m reach of the Nith River, spanning 30m upstream (south) of the bridge to 20m downstream (north of the bridge). (Map 1). For the general habitat assessment, the following information was recorded:

- Adjacent land cover characteristics (e.g., land use, canopy, riparian habitat),
- Channel morphology (e.g. bankfull and wetted widths, bank height, planform),
- Substrate type and composition,
- Available habitat and fish cover,
- General flow conditions (e.g. water depths, riffle/run/pool features),

- In-situ water quality parameters (water temperature, conductivity, dissolved oxygen, etc.), and,
- Critical life stage areas for fish (i.e., spawning, nursery habitat, etc.).

The mussel search involved identifying live mussels and shells to species and documenting the habitat conditions in which they were found. The SAR habitat assessment for Black Redhorse and Silver Shiner was completed by comparing critical habitat for each species to the site conditions found within Nith River within the study area. The examination of the Nith River for these species and their habitat was completed to guide the determination of whether or not SAR permitting would be required for any in-water works.

No electrofishing was conducted within the subject area to determine presence of Silver Shiner or Black Redhorse since the timing for the construction phase of the project is unknown at this time. It was determined that if suitable habitat for these species exists within the study area, that it would be difficult to prove their absence. As such, if suitable habitat for these species is present it would be assumed that both Silver Shiner and Black Redhorse were present within the study area.

# 4.0 Existing Conditions

## 4.1 Soil, Terrain and Drainage

A combination of soil types are found within the study area, comprising poor to well-draining Burford and Gilford sandy loams and variable draining bottomlands (Wicklund and Richards 1961).

The area directly adjacent to the Nith River is comprised predominantly of bottomland. The general landscape surrounding the subject area is relatively flat with gentle sloping towards the Nith River, draining overland flows toward the river. Two other watercourses converge with the Nith River in the vicinity of the study area. The confluence of Washington Creek with the Nith River occurs approximately 350m upstream of the bridge (Map 1), while the confluence with an unnamed tributary occurs approximately 900m downstream of the bridge. The study area falls within the Lower Nith River catchment area, near the drainage divide with the Washington Creek catchment (Map 1).

Areas to the east and west of the study area are considered significant groundwater recharge areas (GRCA 2023). These areas also have surficial gravel soils present which likely influence groundwater percolation in the area (GRCA 2023).

## 4.2 Designated Natural Areas

As outlined within the Oxford County OP (2021), Environmental Protection Areas include significant wetlands, significant habitat of endangered or threatened species and other significant wildlife habitat, fish habitat, significant valleylands, significant woodlands and significant life science areas of natural and scientific interest.

There are no provincially or regionally significant wetlands or Areas of Natural or Scientific Interest (ANSI) reported within the subject area (MNRF 2023, County of Oxford 2023). The study area includes a portion of the Central Whiteman's/Horner Creek PSW complex, where a unit of the complex occurs immediately south of Township Road 12 to the west of the bridge. The PSW complex also includes the riparian corridor of Washington Creek where it flows into the Nith River just south of the study area (MNRF 2023) (Map 1). The GRCA also maps additional unevaluated wetlands within the study area, specifically along the north side of Township Road 12 west of the bridge, and along the north side of Township Road 12 east of the bridge (GRCA 2023) (Map 1). These wetlands are regulated by the GRCA but have not been

designated as a significant natural heritage feature within the Oxford County OP (County of Oxford 2023).

The valleylands surrounding the Nith River within the study area are considered Significant Valleylands in the Oxford County OP (County of Oxford 2023). The County does not map the presence of Environmental Protection Areas (labelled as "Locally Significant Natural Heritage Features") within the study area on OP Schedule C1. The County does not have its own criteria for woodland significance, but instead refers to the woodland significance criteria of the PPS and Natural Heritage Reference Manual (OMMAH 2020, OMNR 2010). Based on the Oxford Natural Heritage Systems Study (Oxford County 2016), woodlands to the immediate northeast and northwest of the bridge, as well as woodland within the southwest corner of the study area, are considered ecologically significant (Appendix IV). In particular, the woodlands should be considered significant due to their location within the Significant Valleylands which provides linkage functions and their proximity of 30m or less to an open watercourse which meets the water protection standard (Oxford County 2016). Furthermore, the woodland features within the study area are designated as Erosion Hazard Land and are considered development constraints, as shown on Schedule C-2 of the Oxford County OP (2021).

## 4.3 Vegetation

### 4.3.1 Vegetation Communities

The majority of the study area consists of wetlands, woodlands and agricultural fields. A summary of the ELC communities identified within the study area is provided in Table 3. ELC communities are described in detail below and are shown on Map 2.

**Table 3. Vegetation Communities Identified within the Study Area.**

| **Deciduous Forest** | |
|---|---|
| FOD7 | Fresh – Moist Lowland Deciduous Forest Ecosite |
| FOD7-4 | Fresh – Moist Black Walnut Lowland Deciduous Forest Type |
| FOD8-1 | Fresh – Moist Poplar Deciduous Forest Type |
| **Wetland** | |
| MAM2-2 | Reed-canary Grass Mineral Meadow Marsh Type |
| SWT2-9 | Gray Dogwood Mineral Thicket Swamp Type |
| SWD2-2 | Green Ash Mineral Deciduous Swamp Type |
| **Meadow** | |
| CUM1-1 | Dry – Moist Old Field Meadow Type |

Fresh – Moist Lowland Deciduous Forest Ecosite (FOD7)

Small areas of lowland forest are present on both sides of the river on the south side of the road, as well as an area of similar composition to the northwest of the bridge that is bounded on the west side by a laneway. These stands of trees reflect past disturbance 40-60 years ago and include mid-age Manitoba Maple (*Acer negundo*) with Black Walnut (*Juglans nigra*) and several large Crack Willow (*Salix euxina*) also present. The groundcover is most evident within canopy gaps and edge areas and includes Reed Canary Grass (*Phalaris arundinacea*) and Giant Ragweed (*Ambrosia trifida*). These communities are tolerant of disturbance and do not contain notable plant species that would be sensitive to disturbance.

Fresh – Moist Black Walnut Lowland Deciduous Forest Type (FOD7-4)

The Black Walnut-dominated lowland forest to the northeast of the bridge is similar to the FOD7 community but contains a much higher proportion of mid-age to mature Black Walnut and the stand is estimated to be 60-80 years old. Although the groundcover could not be assessed beyond the ROW limit, the presence of a swamp thicket or Grey Dogwood (*Cornus racemosa*) and Reed Canary Grass marsh, located centrally within the feature, suggests habitat diversity and a higher quality portion of the study area. Similar to the other approaches to the bridge, the steep roadside embankment down to the tableland and floodplain is of lower quality and is periodically affected by brush control, dust, snow plough and road grading and edge effects of non-native plant species that grow along the road shoulders. The development area is restricted to this lower quality embankment area.

Fresh – Moist Poplar Deciduous Forest Type (FOD8-1)

The forest to the northwest of the bridge, on the west side of the laneway, is a uniform age stand of Trembling Aspen (*Populus tremuloides*) with invasive White Popular (*P. alba*) along the roadside. This community provides vegetated buffer to the swamp feature to the west of it, but is generally of low quality.

Green Ash Mineral Deciduous Swamp Type (SWD2-2)

More than 100m from the western extent of the bridge, a mid-age swamp comprised of Green Ash (*Fraxinus pennsylvanica*) is present and intergrades with the poplar stand to the east of it. The mature ash trees have succumbed to Emerald Ash Borer and are regenerating as dense saplings and young trees. The hydrology of this swamp is influenced by drainage features that

originate further west and the feature appears to outlet to the Nith River approximately 50m north of the bridge.

Dry – Moist Old Field Meadow Type (CUM1-1)

To the southwest of the bridge an area of cultural meadow is dominated by Smooth Brome (*Bromus inermis*) with smaller amounts of Canada Goldenrod (*Solidago canadensis*) and Canada Anemone (*Anemonastrum canadensis*). Saplings and young Manitoba Maple trees are scattered throughout with small numbers of Red Osier Dogwood (*Cornus sericea*) and Black Walnut also present. This community exhibits low diversity and is in the early stage of succession toward thicket. A Reed Canary Grass marsh associated with a side channel to the river is present within the meadow and is almost entirely comprised of Reed Canary Grass.

### 4.3.2 Vascular Flora

A detailed vegetation inventory was conducted within the study area and adjacent habitats, as could be viewed from the ROW boundaries. In total, 62 plant species were identified. The species assemblage is typical of a riparian site in Oxford County with a mixture of trees and shrubs that prefer seasonally damp soil and are tolerant of temporary inundation and ice scour. Native asters and goldenrods are intermixed with introduced grass species, all of which contribute to water quality improvement, wildlife habitat and bank stabilization. None of the 18 introduced species are particularly invasive or problematic for intact natural communities. The shallow margins of the river include swaths of Floating Pondweed (*Potamogeton natans*) and Sago Pondweed (*Stuckenia pectinata*), and these species are not anticipated to be affected by the potential bridge replacement. The background review did not identify any SAR or SCC plant species that are known from the vicinity, and no provincially or federally significant species were reported during field surveys.

Several clumps of Riverbank Sedge (*Carex emoryi*) were observed approximately 10-20m south of the bridge on the eastern bank of the river. This species is considered to be rare in Oxford County (Oldham 2017). The plants are well-removed from the development footprint and will not be affected. This species is clonal and is highly effective in stabilizing banks where erosion could occur.

A complete list of the species observed can be found in Appendix V.

## 4.4 Wildlife

### 4.4.1 Birds

In total, 103 bird species are reported from within 10km of the study area based on the Ontario Breeding Bird Atlas (OBBA) (BSC et al. 2008). Eleven (11) species were documented within the study area during site visits, all of which are considered common with secure populations in Ontario (MNRF 2021). One SCC, the Eastern Wood-Pewee (*Contopus virens*), was heard calling during a vegetation survey on June 6, 2023. Specifically, the individual was heard calling from within the forested areas to the northeast and northwest of the study area (i.e., within the Fresh-Moist Black Walnut Lowland Deciduous Forest (FOD7-4) and Fresh-Moist Poplar Deciduous Forest (FOD8-1) communities, respectively). The presence of a singing male within suitable habitat during the breeding season suggests possible breeding evidence; however, as formal breeding bird surveys were not completed, it is assumed that Eastern Wood-Pewee uses the woodlands north of Township Road 12 as breeding habitat. No SAR birds were documented within the study area. An active Cliff Swallow nest with fledglings present was observed on the underside of the bridge structure during the bridge nest search on July 26, 2023.

Of the 103 bird species reported by the OBBA for the 10x10km atlas square containing the study area, nine of the species are considered SAR or SCC: Eastern Wood-Pewee, Common Nighthawk (*Chordeiles minor*), Chimney Swift (*Chaetura pelagica*), Red-headed Woodpecker (*Melanerpes erythrocephalus*), Barn Swallow, Bank Swallow (*Riparia riparia*), Wood Thrush (*Hylocichla mustelina*), Bobolink (*Dolichonyx oryzivorus*), and Eastern Meadowlark (*Sturnella magna*) (see Appendix VI). There is no suitable habitat present within the study area for Common Nighthawk, Chimney Swift, Bank Swallow, Bobolink, or Eastern Meadowlark.

Suitable habitat for Red-headed Woodpecker and Wood Thrush is present within the forested and swamp communities within the study area (i.e., the FOD8-1, Green Ash Mineral Deciduous Swamp (SWD2-2), and the FOD7-4 communities with associated inclusions). However, the standard two breeding bird surveys (Birds Canada et al. 2021) were not completed within these areas to confirm the presence or absence of these species. Suitable foraging habitat for Barn Swallow is present within the study area due to the presence of nearby agricultural fields and the Nith River, which may provide flying insect prey. No Barn Swallow nests were observed on or under the bridge structure during the nest search or other subsequent site visits.

A complete list of the bird species reported within the study area can be found in Appendix VI.

### 4.4.2 Herpetofauna

No herpetofauna SAR or SCC were observed during NRSI site investigations. The Ontario Reptile and Amphibian Atlas (ORAA) (Ontario Nature 2019) identifies 15 species of herpetofauna that are known to occur within the 10km square that includes the study area, one of which (Snapping Turtle (*Chelydra serpentina*)) is considered a SCC. The Nith River within the study area may provide suitable habitat for Snapping Turtle, such as by providing a landscape-level movement corridor. This species prefers slow flowing rivers and streams with soft substrate and aquatic vegetation present, which is present within the development area immediately around the bridge. Additionally, approximately 10-20m downstream of the bridge edge, a deep pool exists in the river that may provide suitable overwintering habitat for turtle species. However, this potential overwintering habitat is located outside of the development area itself.

A Green Frog (*Lithobates clamitans*) was the only herpetofauna species observed during NRSI field investigations. This species is common with a secure population in Ontario (MNRF 2021). A complete list of the herpetofauna species reported from the study area and vicinity can be found in Appendix VII.

### 4.4.3 Mammals

The Mammal Atlas of Ontario (Dobbyn 1994) identifies 42 mammal species that have been reported within the 100 $km^2$ grid square which includes the study area. Northern Raccoon (*Procyon lotor*) tracks were the only mammal species observation that was documented during visits to the study area. A complete list of the mammal species identified by background review and observed on-site can be found in Appendix VIII.

<u>Bat Habitat Assessment</u>

The Mammal Atlas of Ontario identifies eight bat species that have been reported within the 100km grid square that includes the study area. A bat habitat assessment was completed on both the bridge structure and the treed features bordering the ROW within the study area to determine if there was suitable maternity roosting habitat present.

The bat habitat tree assessment documented five trees that could provide suitable roosting habitat for the Little Brown Myotis or Northern Myotis (Humphrey and Fotherby 2019). These include three trees with loose bark, and two other trees with cavity or crevice features. The study area wooded natural features were not fully investigated for the presence of suitable bat

habitat. However, the small FOD7 features on either side of the bridge, south of the road, could be sufficiently viewed such that it was determined that suitable bat roosting habitat within these features is likely absent. It can generally be assumed that the larger wooded features north of Township Road 12 could provide habitat for any of the SAR Little Brown Myotis or Northern Myotis, or the SCC Silver-haired Bat, Hoary Bat or Eastern Red Bat. Tri-colored Bat is less likely to occupy the study area since maple and oak trees that this species typically uses are not abundant within the adjacent features.

The bridge structure was determined to be unsuitable for maternity roosting habitat, and no expansion joints are present on the bridge that could provide roosting habitat. No evidence of the presence of bats (i.e., guano or direct observation of roosting bats) was reported during the assessment. Although the bridge could potentially be used as night-roosting habitat for an individual bat, this is a very low sensitivity habitat type as many features on the surrounding landscape could serve as night-roosting habitat. Therefore, the bridge is not considered to represent SAR bat habitat.

### 4.4.4 Butterflies and Odonata

According to the Ontario Butterfly Atlas (Macnaughton et al. 2023), 44 species of butterflies are known to occur within 10km of the study area. These include three SAR: Black Dash (*Euphyes conspicua*), Hackberry Emperor (*Asterocampa celtis*), and Monarch (*Danaus plexippus*). The federal and provincial SAR ranking for these species can be found in Appendix IX.

In Ontario, Black Dash habitat is restricted to wet sedge meadows (Layberry et al. 1998a); however, this habitat is absent within the study area. Hackberry Emperor habitat comprises deciduous woodlands containing the hostplant Common Hackberry (*Celtis occidentalis*) (Layberry et al. 1998b). No Common Hackberry trees were identified during the roadside vegetation surveys on-site, and are not likely to occur in any great quantities within the adjacent woodlands that could support this species. Monarch caterpillars depend on meadow habitat with milkweed (*Asclepias* sp.) species, while Monarch butterflies are found in a diverse number of habitats where milkweed is present (Government of Ontario 2022). Swamp Milkweed (*Asclepias incarnata*) was observed within the Meadow Marsh (MAM2-2) ecosite south of the ROW. However, the MAM2-2 communities within the study area are relatively small and would not represent significant habitat for Monarch.

NRSI biologists did not document any butterfly species during the site investigations.

The Ontario Odonata Atlas Database (OOAD 2023) identifies eight odonata (dragonfly and damselfly) species known to occur within 10km of the study area. One of these odonate species, River Bluet (*Enallagma anna*), is ranked S3 ("Vulnerable" in Ontario) by the NHIC (MNRF 2021). The River Bluet prefers habitats comprised of moderate streams and rivers (Catling et al. 2001); the Nith River may therefore provide suitable habitat for this species.

No odonate species were documented by NRSI biologists during field surveys.

A complete list of the butterfly and odonata species reported for the vicinity of the study area can be found in Appendices IX and X, respectively.

## 4.5 Aquatic Resources

Bridge 24 crosses the Nith River, which drains a subwatershed that is part of the larger Grand River watershed. The Nith River's confluence with the Grand River is located in the town of Paris, Ontario, which is over 50km downstream of the study area. The Nith River is one of the larger tributaries to the Grand River and also forms the western boundary of the Grand River watershed. It is managed as a permanent, warmwater watercourse and has a diverse fishery including resident warmwater species and migratory species (NRSI 2017).

### 4.5.1 Aquatic Habitat Assessment

Aquatic habitat within the Nith River study area (20m downstream (north) and 30m upstream (south) of the bridge) is described in this report. The assessed section of the river was divided into six reaches based on consistent habitat characteristics which are described below. The reaches are described from the downstream to upstream extent. The visual habitat assessment was conducted on September 1, 2023 and at 0930 the water temperature was 17.1°C.

The downstream extent of the first reach was 20m downstream of the bridge and was 10m long. The habitat through this reach was characterized as a run. Depths through the cross section at the downstream extent of the reach ranged from 44-88cm with the depths remaining consistent throughout the reach. Sediments throughout the reach were dominated by cobble and silt, with gravel and sand also present in the centre of the watercourse. The wetted width of this cross-section was 27.7m with steep and heavily vegetated banks present. The west bank was greater than 1m tall, while the east bank was more gradual. Aquatic vegetation was present on the west bank with overhanging vegetation also found throughout the reach.

The second reach spanned from 10m downstream of the bridge to the centre of the bridge. The habitat throughout this reach was also characterized as a run with a backwater pool present on the east bank. The backwater pool was approximately 6m long and 6m wide with a depth of >1m. Substrates throughout the pool were dominated by silt with pondweed (*Potamogeton* sp.) species, Coontail (*Ceratophyllum demersum*), and arrowhead (*Sagittaria* sp.) species present. The substrates within the channel were comprised of cobble, gravel and sand with an abundance of aquatic vegetation present along the west bank. There was limited woody debris present in this reach of the channel to provide fish habitat. Live mussels and shells (not identified to species) were found within the centre of the channel with occasional individuals also documented along the west bank. The wetted width of this cross section was 28.8m. The west bank was gradually sloped (approximately 60° from the surface of the water) while the east bank was steeper.

The third assessment point was reported as a cross section rather than a reach and was located under the centre of the bridge. The habitat through this reach was again characterized by run habitat with another pool present on the east bank under the bridge. The pool was approximately 3m wide and 4m long with a maximum depth of 98cm. Substrates within the pool were largely comprised of silt with sparse pondweed and cattail (*Typha* sp.) species present. At this location, the wetted width of the watercourse was 31.8m with a 39m span from abutment to abutment and evidence of high water levels reaching the abutments. The substrates throughout the channel were defined primarily by cobble with gravel and sand present in smaller amounts. Aquatic vegetation was present throughout the reach and confined to the banks. Caddisfly (*Trichoptera* sp.) nets were present on the cobble substrates with an abundance of live mussels, shells and darter (*Etheostomatinae* sp.) fish species also documented within the reach.

The fourth assessment area ranged from 10m upstream of the bridge to the third cross-section under the middle of the bridge. Available habitat through this reach was characterized as a run with sparse aquatic vegetation present along the west bank providing fish and mussel habitat. Substrates throughout the reach were comprised primarily of cobble with limited sand and gravel also present. Near the bridge, there was an inlet documented on the west bank which contained very soft muck and silt substrates which are likely influenced by drainage from the roadway. The wetted width of this reach was 28.5m with a steep east bank and gradually sloped west bank.

The fifth assessment area began 20m upstream of the bridge and ended 10m downstream at assessment reach 4. The wetted width of this reach was 23.7m with a gradually sloping west bank and a steep east bank, both of which were densely vegetated while aquatic vegetation was sparse through this reach. The substrates throughout the watercourse here were dominated by cobble and gravel with limited silt and sand also present. Both live mussels and shells (not identified to species) were observed.

The sixth and final area that was assessed was 30m upstream of the bridge. The wetted width of this area was 25.7m with flow present and a hydraulic head of 1.2cm. The substrates recorded were gravel, cobble, silt and sand. There was no aquatic vegetation present within this reach of the river. The bank sloping was gradual on the east and steep on the west bank with erosion also noted along the west bank.

Generally, the length of the Nith River throughout the study area was a low gradient and meandering, with high vegetation density on the banks and fair to good bank stability as a result. The in-stream habitat available in the study area was largely comprised of pools, runs and backwater areas with riffles noted on the Nith River outside of the area assessed. Habitat cover consistently present throughout the extent included cobble and vegetation with woody debris, undercut banks and large rocks reported in very limited numbers. The valleylands adjacent to the channel were comprised of moderate slopes and a large (>30m) extent of a natural vegetation which was dominated by deciduous forest types with an agricultural field present upstream of the bridge on the east side. The floodplain was 0-10m wide and was dominated by shrubs, willows and terrestrial grasses. Throughout the study area, the river had poor shade with a maximum of 20% reported along the channel edge.

### 4.5.2 Significant Aquatic Species

Information regarding SAR and SCC fish and mussel species was collected from the DFO, NHIC, and GRCA species databases (DFO 2023, MNRF 2023, GRCA 2023) as described in Section 2.1. The following section provides a summary of significant fish and freshwater mussel species known to occur within the study area vicinity, their current status ranks, preferred habitats, and whether suitable habitat is found within the study area.

**Silver Shiner**

Silver Shiner is considered Threatened both provincially and federally (MECP 2024, Government of Canada 2024); it is therefore a SAR in Ontario. The species is primarily found in

large (>20m wide), relatively clear streams or rivers with swift currents and clay to boulder substrates, though cobble is favourable (COSEWIC 2011; OFFLHD n.d.). Their preferred habitats within these large watercourses include deep riffles, or pools adjacent to riffles (COSEWIC 2011). Suitable and Critical Habitat for Silver Shiner is present in the study area, specifically in the two pools noted above. Critical Habitat for Silver Shiner is also present throughout a 1km radius of the bridge location as identified by the DFO SAR mapping (DFO 2023), as shown on Map 2c.

**Black Redhorse**

Black Redhorse is listed as Threatened both provincially and federally (MECP 2024, Government of Canada 2024); it is therefore a SAR in Ontario. The species is primarily found in fast flowing areas of large (25 to 130m wide) warmwater watercourses with cobble or gravel substrates, though they have also been found in areas of sand, silt and boulders (COSEWIC 2015). Their preferred habitat within these streams are well-developed riffles or pools adjacent to riffles with no submerged aquatic vegetation (COSEWIC 2015). Suitable Black Redhorse habitat is present within the study area, specifically in the two pools present near the existing bridge structure. A 1km radius of the bridge location has also been identified as Critical Habitat for Black Redhorse and may provide additional suitable habitat (DFO 2023), as shown on Map 2c.

**Rainbow**

Rainbow mussels are considered species of Special Concern both federally and provincially (MECP 2024, Government of Canada 2024); they are therefore considered a SCC in Ontario. Rainbows are most often found in small to medium-sized rivers with moderate to strong flow, with few records of the species found in inland lakes (COSEWIC 2006). Their preferred riverine habitat is watercourses with cobble, gravel, sand and, on occasion, mud or boulder substrates with clean and well-oxygenated water less than 1m deep (COSEWIC 2006). Within these rivers, they are found in or near riffles and along the edges of submergent vegetation patches (COSEWIC 2006). There is no suitable habitat for Rainbow mussels within the study area due to the lack of riffle habitat present.

**Wavy-rayed Lampmussel**

Wavy-rayed Lampmussels are listed as Threatened provincially and Special Concern federally (MECP 2024, Government of Canada 2024); they are therefore considered a SAR in Ontario. In Ontario, they inhabit riverine systems with sand and gravel substrates that are stabilized with

cobble or boulders (COSEWIC 2010). The size of the watercourse is less important for this species, as long as steady currents and depths of 1m or less are present. They are often found in or around riffle habitats (COSEWIC 2010). A Wavy-rayed Lampmussel shell was found within the study area during the time of site investigations, but no live individuals were reported. There are no riffle habitats present within the study area; however, the bridge and a 1km radius surrounding it was identified as Critical Habitat for Wavy-rayed Lampmussels by the DFO (DFO 2023). Suitable habitat is assumed to be present within the study area portion of the Nith River as shown on Map 2c.

A complete list of the fish and freshwater mussel species reported from background information review can be found in Appendices XI and XII, respectively.

## 5.0 Significance and Sensitivity of Natural Features

An analysis of the significance and sensitivity of existing and natural features was used to identify features and habitats that are significant and/or sensitive to disturbance based on the rarity or significance of the features or the functions/ processes and/or policies, legislation, or planning related studies. Results of this analysis are intended to provide input on the proposed undertaking in order to avoid and reduce impacts to natural features and functions. A summary of the analysis is discussed below with natural feature constraints shown on Map 2.

### 5.1 Wetlands

Various wetland communities were confirmed to occur within the study area as shown on Map 2a, comprising Reed-canary Grass Mineral Meadow Marsh Type (MAM2-2), Gray Dogwood Mineral Thicket Swamp Type (SWT2-9), Green Ash Mineral Deciduous Swamp Type (SWD2-2).

The wetland communities that extend to within the development area are unevaluated in that they are mapped by the GRCA but have not been assessed for provincial significance by the MNRF (GRCA 2023, MNRF 2023). Due to the separation from the existing PSW complex, these wetlands would not be considered part of the complex and their small size (<2ha) would generally not warrant evaluation under the OWES guidelines.

The limits of the GRCA wetland mapping (GRCA 2023) were revised through completion of the fieldwork, as shown on Map 2a. For example, a portion of the GRCA-mapped wetland north of Township Road 12, west of the river, was confirmed to represent Fresh-Moist Poplar Deciduous Forest (FOD8-1). The wooded feature north of Township Road 12, east of the river, was confirmed to primarily comprise Fresh-Moist Black Walnut Lowland Deciduous Forest (FOD7-4), with only small inclusions of Gray Dogwood Mineral Thicket Swamp (SWT2-9) and Reed Canary Grass Mineral Meadow Marsh (MAM2-2) wetlands within the woodland. A previously unmapped (by MNRF (2024) or GRCA (2024)) wetland (a small MAM2-2 feature) was identified south of Township Road 12, west of the river. None of these wetlands immediately abut the Township Road 12 ROW or the bridge structure.

These wetlands fall within the GRCA's regulated areas; as described in Section 4.2, development or alteration of regulated lands are prohibited unless permitted by the GRCA in accordance with Ontario Regulation 41/24 of the *Conservation Authorities Act*. As outlined in Section 3.2.7.1.1 of the Oxford County OP (2021), non-PSW and unevaluated wetlands are considered to be of local importance and are encouraged to be retained.

## 5.2 Significant Woodlands

The Oxford County OP (2021) recognizes Significant Woodlands that are identified through provincial criteria described in the Natural Heritage Reference Manual (OMNR 2010). In the case of Oxford County, which contains 13.2% woodland cover (Oxford County 2016), any woodlands that meet any of the following criteria are considered significant:

- 4 ha in size or larger;
- contain interior habitat;
- located near another significant natural feature or fish habitat;
- provide a connecting link between two other significant features;
- located within a sensitive watershed or near a watercourse or fish habitat;
- have naturally occurring composition of native forest species or high native diversity through a combination of composition and terrain;
- contain a vegetation community with a provincial ranking of S1, S2, or S3; or
- have high economic or social functional values are considered significant (OMNR 2010).

Based on the above criteria, the treed communities along the north sides of the ROW, east and west of the river would be considered Significant Woodlands. Specifically, these comprise the Fresh-Moist Lowland Deciduous Forest Ecosite (FOD7), Fresh-Moist Black Walnut Lowland Deciduous Forest Type (FOD7-4), and Fresh-Moist Poplar Deciduous Forest Type (FOD8-1). Identification of these communities as Significant Woodland coincides with study area natural features mapped as significant in the Oxford Natural Heritage Systems Study (Oxford County 2016). Aspects of significance are identified for these communities due to their sizes, locations adjacent to the Nith River (fish habitat), representation as part of a larger regional ecological linkage along the river, and in the case of the FOD7-4 woodland ecosite, its provincially rare status in Ontario (ranked S2S3 “Imperiled/Vulnerable” in Ontario according to NHIC (MNRF 2021)). The small FOD7 woodland fragments along the Nith River slope, south of the ROW, should not be considered Significant Woodland.

As described in Section 3.2.4.1.1 of the Oxford County OP (2021), activities that create or maintain infrastructure authorized under an environmental assessment process may be permitted within an area designated as an Environmental Protection Area which includes Significant Woodlands. However, there must be regard for the significant natural features

insofar as all efforts are made to avoid, or otherwise minimize and sufficiently mitigate impacts to the natural features.

## 5.3 Significant Valleylands

Significant Valleylands are mapped throughout the study area on both the east and west banks of the Nith River in the Oxford County OP Schedule C-1 (2021). As described in Section 3.2.4.2.4 of the Official Plan (2021), Schedule C-1 may not be a reliable indicator of this feature at a local scale. Therefore, Significant Valleylands within the study area were delineated based on the extents of the Nith River floodplain identified by the GRCA (2023) as shown in Map 2a.

Additional studies such as geotechnical and fluvial geomorphic assessments may be required to further refine the specific limits of the Significant Valleyland within the study area (e.g., based on top-of-bank), if necessary. As described in Section 3.2.4.1.1 of the Oxford County OP (2021) activities that create or maintain infrastructure authorized under an environmental assessment process may be permitted within a Significant Valleyland if, through an EIS, it is demonstrated that the proposed activities will not negatively impact the Significant Valleyland and where the policies outlined in the Floodplain and Erosion Hazard and Unstable Soils section of the OP are satisfied. Section 3.2.8.1.1 (One Zone Flood Plain Policies) of the Oxford County OP (2021) states that structures which must be located near water or watercourses, such as roads, bridges or other public services may be permitted within the floodplain if the hydraulic design is deemed acceptable by the Conservation Authority with jurisdiction (i.e., the GRCA).

Valleylands are also regulated by the GRCA; activities that are proposed within the valleyland feature will therefore require a permit from the GRCA in accordance with O. Reg. 41/24.

## 5.4 Significant Wildlife Habitat

SWH is considered a form of “Significant Natural Feature and Area”, which is in turn designated an Environmental Protection Area in the Oxford County OP (2021). In accordance with Section 3.2.4.1.1 of the OP, activities that create or maintain infrastructure authorized under an EA process may be permitted within an Environmental Protection Area. However, there must be regard for the significant natural features insofar as all efforts are made to avoid, or otherwise minimize and sufficiently mitigate impacts to the natural features.

### 5.4.1 Confirmed Significant Wildlife Habitats

Based on field studies conducted by NRSI, two SWH types were confirmed within the study area: “Other Rare Vegetation Communities”, and “Special Concern and Rare Wildlife Species”.

The confirmed “Other Rare Vegetation Communities” SWH is associated with the provincially rare Fresh-Moist Black Walnut Lowland Deciduous Forest (FOD7-4) ecosite (Map 2b). This ecosite type is ranked as S2S3 (“Imperiled/Vulnerable” in Ontario) by the NHIC (MNRF 2021). With a S2S3 NHIC ranking, the FOD7-4 ecosite has been documented with between 20 and 100 occurrences in the province; may have fewer occurrences, but with “some extensive samples remaining” and “very rare in Ontario; usually between 5 and 20 occurrences in the province, or few remaining hectares” (OMNR 2000). Although the stand is not particularly diverse, as assessed from the roadside, the maturity of the trees provides a complex structure of canopy, sub-canopy and shrub layer with a high percentage of floodplain groundcover species indicative of this significant community type.

The confirmed Special Concern and Rare Wildlife Species SWH is associated with the SCC Eastern Wood-Pewee. The single observation of a calling Eastern Wood-Pewee constitutes possible breeding evidence. Although Eastern Wood-Pewee was only recorded on one occasion during the bird breeding period (possible breeding evidence), since the standard two breeding bird surveys (Birds Canada et al. 2021) were not completed as part of the EIS work scope, based on a precautionary approach it is assumed that these woodland ecosites represent confirmed habitat for the species. The FOD8-1 and FOD7-4 woodland communities in which the species was recorded are therefore identified as SWH (Map 2b).

### 5.4.2 Candidate Significant Wildlife Habitats

Based on the results of a comprehensive background review and field studies, six Candidate SWH types were identified within the study area. Since these habitats cannot be ruled out as potentially present, based on the scope of EIS field surveys, they should be assumed to be significant based on a precautionary approach. Due to the number of Candidate SWH types, and since these would collectively encompass all mapped vegetation communities (excluding the roadside hedgerows and the small FOD7 features on the south side of the bridge), including the Nith River itself, they are not shown on Map 2b. However, see below for a description of which communities each Candidate SWH is associated with.

- Bat Maternity Colonies – To be considered SWH, mature forest and swamp ecosites must contain a density of >10 large diameter (>25cm diameter-at-breast-height) trees

per hectare that provide suitable bat roosting habitat features. The density of suitable bat habitat trees within adjacent wooded features was not assessed through this study, although the potential for this habitat type within the study area would be limited to the woodlands to the north of the ROW.

- Waterfowl Nesting Area – The northeast end of the study area contains thicket swamp and meadow marsh habitat. The surrounding woodland, which is at least 120m wide, would meet provincial criteria to be considered Candidate SWH (MNRF 2015). No evidence of nesting was observed within the development area. However, since the standard two breeding bird surveys (Birds Canada et al. 2021) were not completed, waterfowl nesting within this feature cannot be ruled out.
- Turtle Wintering Area – A potentially deep pool >1m in depth was located in the Nith River approximately 10m downstream of the bridge. This deeper pool has the potential to provide overwintering habitat for turtles.
- Amphibian Breeding Habitat (Woodland) – Suitable habitat is not present within the ROW, but there is wetland and woodland present within the broader study area which may provide candidate habitat. Based on MNRF criteria, the Candidate SWH corresponds to the wetland features plus adjacent woodlands that are within 230m of the wetlands (MNRF 2015). The potentially significant habitat would be limited to the wooded natural features located north of the ROW.
- Terrestrial Crayfish – Suitable habitat is not present within the subject area as the ROW is comprised of floodplains and would likely be too moist, at least seasonally and no chimneys were observed within the area proposed for work. Suitable habitat may be present within the surrounding study area.
- Special Concern and Rare Wildlife Habitat for the following SCC species:
    - Wood Thrush – Suitable habitat is associated with the FOD8-1, SWD2-2, and the FOD7-4 wooded ecosites with their associated inclusions. Targeted surveys to assess the presence or absence of this species were not completed.
    - Barn Swallow – Suitable foraging habitat is associated with agricultural lands and other open habitats (i.e., CUM1-1, MAM2-2) and is abundant on the surrounding landscape.

- Snapping Turtle – Associated with the Nith River through the study area. Targeted surveys to assess the presence or absence of this species were not completed.
- Silver-haired Bat, Hoary Bat and Eastern Red Bat – Associated with the wooded natural features of the study area, specifically the wooded natural features located north of the ROW. Targeted surveys to assess the presence or absence of these species were not completed.
- River Bluet – Associated with the Nith River through the study area. Targeted surveys to assess the presence or absence of this species were not completed.

## 5.5 Fish Habitat

Based on the background information and the results of field investigations, direct fish and mussel habitat exists within the Nith River as it flows through the study area. As the work being proposed may involve a full bridge replacement, appropriate agency approvals from the GRCA, DFO and MNRF, including a fisheries collection permit, species at risk permits, a Request for Review and the application of appropriate mitigation measures will be required before any in-water works can occur. A Request for Review will need to be submitted to the DFO as the proposed works will be occurring below the high water mark of a naturally occurring watercourse. See Section 5.6 for further discussion about the SAR fish species known from the study area reach of the river.

## 5.6 Species at Risk

One SAR, Wavy-rayed Lampmussel, was confirmed to be present within the study area, while two other aquatic SAR, Silver Shiner and Black Redhorse, were assumed to be present based on previous species documentation in the area and the presence of suitable habitat. No terrestrial SAR were confirmed to occur within the study area. However, potential habitat for SAR bats was documented within certain roadside trees as well as for the larger woodlands to the north of the ROW. Suitable habitat for the SAR Red-headed Woodpecker is also present within the study area. See below for further information about each species and its protected habitat.

### 5.6.1 Confirmed Species at Risk Habitat

*Wavy-rayed Lampmussel*

Wavy-rayed Lampmussel is listed as provincially Threatened; this species and its general habitat are therefore protected under the ESA. This species and its habitat are also protected under the federal SARA. As summarized in Section 4.5.2, no live individuals were observed within the study area reach of the Nith River. However, since a Wavy-rayed Lampmussel shell was identified within the study area, and because the river within 1km of the bridge has been mapped as Critical Habitat for the species by the DFO (2024), the study area reach of the river is considered confirmed SAR habitat for Wavy-rayed Lampmussel as shown on Map 2c. The general habitat of Wavy-rayed Lampmussel includes the river itself as well as areas of natural or semi-natural vegetation located within 30m of the river (Government of Ontario 2021).

### 5.6.2 Potential Species at Risk Habitat

*Silver Shiner*

Silver Shiner is listed as provincially Threatened; this species and its general habitat are therefore protected under the ESA. This species and its habitat are also protected under the federal SARA. As summarized in Section 4.5.2, Silver Shiner is assumed to be potentially present within the study area reach of the Nith River due to the presence of suitable habitat and because this reach of the river was mapped as Critical Habitat for the species by the DFO (2024). The river itself is considered to be the protected habitat for the species as shown on Map 2c.

*Black Redhorse*

Black Redhorse is listed as provincially Threatened; this species and its general habitat are therefore protected under the ESA. This species and its habitat are also protected under the federal SARA. As summarized in Section 4.5.2, Black Redhorse is assumed to be potentially present within the study area reach of the Nith River due to the presence of suitable habitat and because this reach of the river was mapped as Critical Habitat for the species by the DFO (2024). The river itself is considered to be the protected habitat for the species as shown on Map 2c.

*Species at Risk Bats*

In total, five trees were identified along the Township Road 12 roadside that provide suitable bat roosting features, such as tree cavities, loose bark or crevices. As shown on Map 2c, the

locations of these trees varied and included the edges of Dry-Moist Old Field Meadow (CUM1-1), Fresh-Moist Lowland Deciduous Forest (FOD7), and Fresh-Moist Black Walnut Lowland Deciduous Forest (FOD7-4). The location of these trees adjacent to the Nith River, which provides a good quality insect prey foraging habitat and drinking source, enhances the value and potential for use of these trees. The adjacent woodland and swamp communities to the north of the ROW also have the potential to provide suitable habitat for bats. Following a precautionary approach, these trees, and the adjacent wooded features, should be assumed to represent potential SAR habitat for Little Brown Myotis and Northern Myotis. Suitable habitat for Tri-colored Bat is considered absent within the study area due to a lack of sufficient maple and oak tree coverage.

*Red-headed Woodpecker*

Red-headed Woodpecker is listed as provincially Endangered; this species and its general habitat are therefore protected under the ESA. Red-headed Woodpeckers occupy a variety of wooded habitats, including deciduous forests, small woodlands and woodland edges, and wooded swamps. These habitat types occur within the study area. No Red-headed Woodpeckers were documented during the site investigations; however, breeding bird surveys were not completed as part of the fieldwork scope. Following a precautionary approach, the FOD7-4 woodland is considered potential SAR habitat for Red-headed Woodpecker. Since this species requires habitat areas of at least 4ha (OMNR 2000), the other study area woodlands are considered too small to provide potential habitat.

# 6.0 Impact Assessment

## 6.1 Description of the Proposed Undertaking

Five different scenarios were evaluated as part of the EA process: 1) do nothing; 2) repairs/rehabilitation; 3) superstructure replacement; 4) replacement with a single-span bridge; 5) replacement with a multi-span bridge.

Based on the evaluation of alternatives that was undertaken in accordance with the EA process, the design scenario that would require the full replacement of the existing Bridge 24 structure with a new multi-span bridge structure (alternative #5) was evaluated since this scenario covers most impact and mitigation requirements. The profile of the road approaches to each side of the bridge will be raised up relative to their current elevations to match the level of the new bridge. A small portion of the road including the bridge and the road approaches, will be paved with asphalt. The likely design will incorporate a three-span bridge similar to other recently-constructed bridges over the Nith River in the nearby vicinity and to satisfy modern hydraulic regulations. A three-span bridge would also satisfy the traffic requirements of this location (e.g., required lane widths, accommodating agricultural vehicles, height and load restrictions). The middle span will be longer than the two side spans to minimize impacts to the river. The new structure will have a longer span than the existing bridge, which will require the abutments to be set-back further from the river than the original bridge (T. Hoard, K. Smart Associates, pers. comm., July 2024).

Surface drainage from the bridge deck will be directed via sheet flow to the four corners of the bridge. Runoff water will follow new concrete curbs and gutters before draining through concrete outlets. The water will drain down the embankments toward new roadside ditches that will then drain into the river.

Due to the planned raising of the road profile adjacent to the bridge, an existing agricultural field entrance located approximately 60m west of the bridge will be replaced with a new field entrance a short distance further west. A portion of driveway to an airstrip property to the north will also be reconstructed in its current location and configuration.

See Appendix XIII for the Preliminary Design plans for the planned bridge and road works. The design plans are overlaid on to existing natural feature mapping as shown on Map 3.

## 6.2 Approach to Impact Assessment

The assessment of potential impacts was determined by comparing the details of the preferred Preliminary Design with the characteristics of the existing natural features and their ecological functions. The outcome of this process was based primarily on the resilience of the identified natural features and functions to withstand predicted disturbances caused by design, construction and operation of the transportation infrastructure. In this manner, both the significance and sensitivity of the affected natural features and functions to disturbance were considered. The following is a description of the types of impacts which will be discussed.

- Direct Impacts – associated with the disruption or displacement of natural features, caused by the actual "footprint" of the undertaking;
- Indirect Impacts – associated with changes in site conditions such as drainage and water quantity/quality, and construction-stage disturbances to the adjacent features; and,
- Induced Impacts – associated with human-induced disturbances imposed on the existing study area natural features and ecological functions during post-construction operation of the infrastructure.

## 6.3 Direct Impacts and Mitigations

### 6.3.1 Vegetation Removal and Site Grading

The majority of the permanent road infrastructure footprint, including vegetation removal and grading associated with this footprint, will be contained within the existing Township Road 12 ROW (Map 3). Vegetation removal requirements will therefore be spatially limited and restricted to species that are common on the landscape and often associated with disturbed roadside conditions. The limits of road permanent road infrastructure will not extend into, and therefore not directly impact, adjacent Significant Woodland features that are located along the north side of the road. As described in Section 4.3.1, edges of the wooded communities that extend along the ROW limits are relatively low diversity and of poorer quality than the rest of the features located further from the road. However, efforts must be made to spatially offset construction-related disturbances from the woodland edge to the extent possible in order to minimize potential for damage to woodland edge trees or their root zones.

However, completion of the planned construction work will require temporary disturbance to areas adjacent to the bridge (an approximately 100m x 80m area surrounding the bridge), and up to 30m north and 30m south of the ROW for 100m extents west and east of the bridge (Map

3). These areas will be required to facilitate the construction work, including materials and equipment storage, stockpiling, dewatering discharge, construction staging, and for access around the bridge structure. It was noted that the temporary construction disturbance into the Significant Woodland to the northeast of the bridge should not be required, as there will be sufficient space along the other three corners of the bridge (T. Hoard, K. Smart Associates, pers. comm., May 2024). Temporary construction disturbance to the Fresh-Moist Black Walnut Lowland Deciduous Forest (FOD7-4), which represents confirmed SWH, is therefore not expected.

The 100m x 80m temporary construction disturbance area immediately around the bridge, excluding the FOD7-4 feature at the northeast corner, is expected to require removal of the small Fresh-Moist Lowland Deciduous Forest (FOD7) communities that occur along the embankments to the immediate south of the bridge. These treed features will need to be cleared to allow access around the bridge abutments and to facilitate the construction work. The construction disturbance zone will also extend into the southern end of the FOD7 community to the northwest of the bridge; however, the southern end of that feature that is to be impacted is less densely treed than the northern end, and is in a much more open habitat condition, minimizing tree removal requirements. The construction disturbance area along the southwest corner of the bridge is projected to extend into an area of Dry-Moist Old Field Meadow (CUM1-1) that contains the narrow inclusion of Reed Canary Grass Mineral Meadow Marsh (MAM2-2). In addition to this area containing wet and unstable soils, it is recommended that temporary construction access and staging activities be maintained outside of the MAM2-2 inclusion in order to avoid or minimize impacts to this GRCA-regulated feature. The limits of this wetland inclusion should be flagged prior to construction to ensure that vehicles, equipment, materials and personnel are kept outside of this feature in order to avoid inadvertent disturbance.

As shown on Map 3, the temporary construction disturbance area is proposed to extend 30m north and south of the ROW, with the exception of the area north of the ROW east of the bridge. This proposed disturbance area would require substantial encroachment into, and tree removal within, the Fresh-Moist Poplar Deciduous Forest (FOD8-1) to the northwest of the bridge. Although this community is not high-value from a vegetation species standpoint, when accounting for its landscape context it is considered a Significant Woodland (see Section 5.2). It is therefore recommended that temporary construction disturbance be maintained outside of the FOD8-1 woodland in its entirety.

It is generally recommended that temporary construction disturbance areas along the roadsides be targeted to areas of existing open land, such as agricultural field edges and CUM1-1 cultural meadow areas. In particular, these areas should be targeted to the south sides of the road that contain much less tree growth. However, the south end of the FOD7 woodland community located immediately northwest of the bridge may provide enough open, or relatively sparse tree growth, that use of the area shown within the Temporary Construction Disturbance Limit (Map 3) will not negatively impacted the denser FOD7 area to the north. The temporary construction disturbance may require removal of various hedgerow trees along the south side of the road. However, these trees comprise a mixture of Manitoba Maple and Trembling Aspen; species of relatively low quality that readily colonize disturbed sites, ditches and wet areas. It is recommended that, in compensation for required tree removals, that native replacement trees be planted at a minimum 1:1 ratio, or to the extent as can be accommodated within the ROW, as part of post-construction restoration activities (see Section 7.0).

Construction of the new agricultural field entrance will require removal of some trees growing along a hedgerow lining the agricultural field's boundary with the south side of the road (see Appendix XIII). However, the area of the new field entrance overlaps with the area of potential construction disturbance as noted above. Any trees that require removal to create the new field entrance should be compensated for a 1:1 ratio with native tree species, to the extent feasible as part of site restoration activities, as noted above.

No significant vegetation species will require removal as a result of the planned undertaking.

### 6.3.2 Impacts to Terrestrial Wildlife and their Habitats

*Species at Risk*

Species at Risk Bats

Of the five potential bat roosting habitat trees that were documented along the roadside, the three closest to the bridge will require removal to accommodate the proposed construction work (T. Hoard, K. Smart Associates, pers. comm., May 2024). Removal of these three trees will not represent a negative impact to SAR bat habitat relative to the potentially abundant habitat present in the immediately surrounding portions of the landscape.

The permanent infrastructure development footprint (e.g., road surface and roadside drainage ditches) are not proposed to extend into the woodlands to the north of the ROW that represent potential SAR bat habitat. However, temporary construction-stage encroachments into the

FOD8-1 woodland to the northwest of the bridge would require substantial tree removal that could represent a negative impact to SAR bat roosting or maternity colony habitat. Additionally, complete removal of the hedgerow trees identified within the Temporary Construction Disturbance zones, as well as complete removal of the small FOD7 features south of the bridge, could represent a negative impact to SAR bats due to the removal of local-scale treed connecting habitat (e.g., between roosting and foraging habitats). The following recommendations are therefore provided:

- Where possible, existing driveways or openings should be used for access to roadside open lands/agricultural field edges that are needed for temporary construction staging and storage activities.
- If hedgerow tree removal is required for access to these roadside areas, the number of trees removed should be limited to whatever is necessary for vehicle/equipment access to these areas (e.g., creating a gap of no more than 20m wide).
- Tree removal within the small FOD7 woodland features on the south side of the bridge should be limited to whatever is necessary for construction access around the bridge, and portions of these features should be maintained.

Provided these measures can be followed, negative impacts to SAR bat habitat are not anticipated. If additional tree removals are required (i.e., complete removal of the roadside hedgerow trees, complete removal of the FOD7 woodlands south of the bridge, or encroachment into the FOD8-1 woodland), then additional surveys will likely be required to ensure that impacts to SAR bats are avoided in compliance with the *Endangered Species Act*.

Based on a precautionary approach, it is recommended that trees be removed outside of the April 1-September 30 bat active period. This will ensure that impacts to individuals of the species are not killed, harmed or harassed, and is required to ensure compliance with the *Endangered Species Act*.

Red-headed Woodpecker

The grading and site alteration activities for the permanent road infrastructure footprint along Township Road 12 will be maintained within the existing ROW where it occurs adjacent to the potential Red-headed Woodpecker habitat within the Fresh-Moist Black Walnut Lowland Deciduous Forest (FOD7-4). No temporary disturbance areas associated with the construction

activities are anticipated within the FOD7-4 woodland habitat. As such, no negative impacts to this potential SAR habitat will occur.

*Significant Wildlife Habitat*

The confirmed rare vegetation community FOD7-4, and the SCC Eastern Wood-Pewee habitat that is assumed to be confirmed within the FOD7-4 woodland, will not be directly impacted by the proposed undertaking. All roadside grading and improvement works will be maintained within the ROW adjacent to these habitat features.

Temporary construction disturbance encroachment into the FOD8-1 woodland community will require removal of the southern edge of confirmed SWH for Eastern Wood-Pewee and for various Candidate SWH types that are associated with that feature: Bat Maternity Colonies, Waterfowl Nesting Areas, Amphibian Breeding Habitat (Woodland), Terrestrial Crayfish, habitat for SCC Wood Thrush and habitat for SCC bats. As noted above, it is therefore recommended that all construction-related activities be maintained outside of the FOD8-1 woodland area in order to avoid impacts to SWH. The above Candidate SWH types are not expected to extend into the southern extent of the FOD7 (within the Temporary Construction Disturbance zone) on the northwest side of the bridge due to the much thinner tree cover in that area. Provided the temporary construction limit does not extend northwards than what is shown on Map 3, negative impacts to Candidate SWH within the FOD7 feature are not expected. Construction disturbance should also be maintained outside of the MAM2-2 wetland inclusion to avoid potential SWH impacts (e.g., to terrestrial crayfish habitat).

The planned undertaking will require bridge replacement works that extend into the Nith River, which provides Candidate SWH for the SCC Snapping Turtle and River Bluet. However, the construction footprint within the river itself will be very localized to areas that are isolated behind cofferdams adjacent to the two bridge abutments. Negative impacts to habitats associated with these species will not occur. Additionally, Candidate Turtle Wintering Area SWH associated with a deep river pool approximately 10m away from the bridge will not be directly impacted.

*Bridge-Nesting Birds*

As stated in Section 4.4.1, Cliff Swallows were observed to be nesting on the underside of the bridge during NRSI site investigations. Although no SCC Barn Swallows were observed nesting on the bridge structure, there is potential that they could establish nests there. Construction and demolition must have regard for the federal *Migratory Bird Convention Act*, which prohibits the

disturbance, destruction, or taking of a nest or eggs of migratory birds. Demolition and/or construction during the breeding bird season, which occurs from April 1 to August 31, should be avoided in order to avoid any unintended consequences to birds. If bridge removal and replacement works must be completed during the bird breeding season, it is recommended that bird nesting deterrent measures be installed on the bridge structure prior to April 1. Installed measures may include the use construction netting to prevent bird access to the underside of the bridge deck, girders or the abutments. The bridge structure must be regularly inspected for the presence of newly established nests during the course of construction works during the April 1-August 31 period. If nests are observed, a qualified biologist must be retained to inspect the nests to determine whether they are subject to the protections of the *Migratory Birds Convention Act*.

*Other Wildlife Species*

Other wildlife species that are known or expected to occur in the study area are generally expected to comprise species that have “secure” (NHIC rank S5) or “apparently secure” (NHIC rank S4; MNRF 2021) populations in Ontario, and the majority are relatively common. Habitat for these species is widespread on the local landscape, and no impact to local populations of these species will occur as a result of the proposed undertaking.

Vegetation clearing has the potential to directly impact bird breeding activity through damage and destruction of nests, eggs and young, or avoidance of the area by breeding adults. Vegetation clearing should therefore occur outside the bird nesting season of April 1-August 31 so as to limit disturbances to nesting activities of birds and to avoid destruction of active nests. However, since certain trees requiring removal represent potential SAR bat habitat trees, it is recommended that all trees be removed outside the period April 1-September 30 to avoid contravention of both the *Migratory Birds Convention Act* and the *Endangered Species Act*.

In conjunction with the fish salvage that is to be completed prior to the dewatering of dry isolated zones around the bridge abutments (see Section 6.3.3), it is recommended these isolation zones also be searched for the presence of wildlife species. Any wildlife species present within the work zones should be captured and safely relocated to an adjacent area of suitable habitat outside of the work zone barrier. All species relocations are to be fully documented in accordance with permit conditions and reporting requirements (e.g., MNRF Wildlife Scientific Collectors’ Authorization).

*Wildlife Movement*

The Nith River riparian corridor and its associated adjacent natural features represents the primary ecological linkage and wildlife movement corridor across the landscape in the vicinity of the study area. The planned bridge replacement works will require temporary construction disturbance within this linkage. However, the disturbances will be highly localized and temporary in nature. No barriers to wildlife passage along the Nith River (e.g., turtles) will be created at any time. Landscape-scale bird movements along the corridor will be unaffected by the construction activities. Although there may be some temporary disruption to land-based wildlife movements along the wooded riparian corridor during daytime hours of the construction period, these effects will be of relatively short duration and would only affect relatively common species that are adaptable to human influences. The planned undertaking is therefore not expected to cause any impacts to wildlife movement patterns or behaviours through the study area.

### 6.3.3 Impacts to Fish and Aquatic Habitats

Impacts to the aquatic habitat and fish are generally limited to temporary disturbances to support the bridge replacement. However, two bridge piers are proposed for installation within the high-water mark of the Nith River, and therefore represent a loss of available fish habitat. Additionally, the presence of several SAR and SCC aquatic species requires considerations under the federal *Species at Risk Act*. As such, a Request for Review (RfR) must be submitted to the DFO to quantify the loss of available fish habitat, identify potential impacts, and summarize mitigation methods employed for limiting the potential impacts prohibited under the federal *Fisheries Act* and *Species at Risk Act*. The development of the RfR will synthesize information from the proposed concept, existing aquatic habitat conditions, and identify potential impacts to fish habitat and the adjacent riparian habitats, included under habitat protections of Silver Shiner and Wavy-rayed Lampmussel. Based on the proposed concept and loss of available habitat, there is potential that a Fisheries Act Authorization would be necessary to permit the works to proceed, to be determined based upon the response to the RfR from the DFO. A federal *Species at Risk Act* permit is also necessary to complete the works and support the proposed fish and mussel relocations.

The aforementioned aquatic SAR are regulated under the provincial ESA. Based on the proposed concept, the works qualify for exemption criteria for registering the works under Ontario Regulation 242/08 S. 23.4. As such, a Notice of Activity (NOA) must be submitted in

advance of commencing the bridge replacement and a mitigation plan must be prepared by a qualified professional. The NOA will detail the proposed timeline of the activity, a description of the proposed works and area in which it will be carried out, and the name of provincial SAR that may be affected by the works. The mitigation plan will outline all species with potential impacts resulting from the proposed works, and will identify measures taken to minimize or avoid adverse effects.

Standard construction mitigation measures will be employed to limit the potential impacts to fish and fish habitat, including sediment and erosion control, work-site isolation, and associated aquatic relocations. Sediment and erosion control measures will be implemented prior to the commencement of work, and will be monitored and maintained throughout construction to prevent erosion and subsequent sedimentation into the Nith River. These are further described in Section 6.4.2.

The proposed bridge construction will require temporary incursion into the Nith River and will utilize floating silt curtains during the installation and removal of temporary cofferdams to isolate the bridge abutments during the bridge replacement. Based on the proposed footprint of temporary and permanent impacts to aquatic habitats in the Nith River and the presence of regulated SAR and non-SAR mussels, a mussel relocation must be completed in advance of the installation of the temporary cofferdams. The mussel relocation must be completed in accordance with the *Protocol for the Detection and Relocation of Freshwater Mussel Species in the Ontario-Great-Lakes Area* (Mackie et. al 2008). The mussel relocation must be employed as a mitigation method to avoid contraventions under the *Fisheries Act*, SARA, and ESA.

Following the completion of a mussel relocation and work-site isolation, the existing flow within the Nith River will be maintained throughout the course of construction, and will permit fish passage beyond the isolated work areas. Works will adhere to the in-water timing windows (between July 15 and March 14) and will be completed in the dry, isolated work areas. As such, a fish salvage will be required to support the de-watering of the isolated in-water work areas to mitigate against the death of fish and the harmful alteration, disruption, or destruction of fish and fish habitat, prohibited under subsections 34.4(1) and 35(1) of the *Fisheries Act*. Similarly, SAR aquatic species are documented within the vicinity of the proposed bridge replacement, and fish relocations will mitigate against contraventions to the SARA and ESA.

Vegetation removal is required within the riparian habitat to support the access and proposed bridge replacement. However, riparian vegetation will be maintained to the extent possible, and areas slated for vegetation removal will be stabilized and re-vegetated following completion of all work to pre-existing conditions or better. As such, no long-term impacts are anticipated to result from the vegetation removal.

## 6.4 Indirect Impacts and Mitigations

The planned bridge and road works have the potential to cause indirect impacts to the Nith River, adjacent terrestrial features, and their associated habitats if not mitigated appropriately. Recommended mitigation measures are provided for each potential impact below.

### 6.4.1 Disturbance to Adjacent Natural Features and Wildlife Habitat

Activities associated with removal of the existing bridge, and construction of the new bridge, have the potential to negatively impact the aquatic habitats of the Nith River, such as through construction materials and debris falling into the river. This will be mitigated by installing a demolition platform under the bridge during removal of the existing concrete deck structure, when the potential for debris release is greatest. The demolition platform will capture falling debris so at to prevent it from entering the river. The platform will be removed following removal of the bridge deck; it may potentially remain in place during removal of the truss superstructure (T. Hoard, K. Smart Associates, pers. comm., July 2024). Efforts must be taken throughout the bridge reconstruction work to ensure that foreign and deleterious materials do not enter the river.

The planned undertaking has the potential to negatively impact adjacent retained vegetation if not appropriately mitigated. Clearly defined construction limit fencing must therefore be installed to ensure that inadvertent damage to adjacent natural features, tree and other vegetation is avoided. This fencing may take the form of erosion and sediment control (ESC) fencing, or otherwise brightly-coloured snow fencing where ESC fencing is not required. As stated in Section 6.3.1, the limits of the MAM2-2 wetland south of the bridge should be flagged if that wetland extends into a temporary construction disturbance zone.

To the extent feasible, construction limit fencing should be offset by at least 1m from the dripline of trees to be retained in order to protect their root zones. It is recommended that a Certified Arborist or Registered Professional Forester (RPF) confirm the appropriate placement of construction limit fencing or tree protection fencing where it occurs adjacent to retained tree

growth. If inadvertent damage to tree limbs or roots occurs during construction, a Certified Arborist or RPF must be retained to undertake remedial arboricultural measures (e.g., pruning of damaged roots).

Potential indirect impacts to natural features and wildlife may also arise from noise, vibrations, human presence, dust and artificial lighting associated with construction activities.

During construction activities such as vegetation clearing and grubbing, dust can potentially result in the following:

- Changes in vegetation due to increased heat absorption and decreased transpiration,
- Immediate visual impacts.

Impacts due to dust should be mitigated for by moistening areas of bare, dry soil with water as needed during construction activities to reduce the amount of dust produced.

If artificial lighting is required for completion of the construction works, it should be turned off during night-time hours or otherwise directed away from adjacent natural areas to prevent lightwash disturbances to adjacent habitats.

Wildlife impacts resulting from dust, noise, and vibrations are expected to be temporary, minimal and localized during the road construction works. In general, negative effects on wildlife are not anticipated and it is expected that displaced wildlife species will return to the vicinity of the roadside features following construction.

However, noise and vibrations caused by construction activities have the potential to disrupt turtle use of the nearby downstream (10m from the bridge) potential overwintering habitat within the deep river pool. It is therefore recommended that construction activities not be initiated during the turtle overwintering period (i.e., roughly late October to late March) to avoid disturbance to overwintering turtles that may cause them to need to relocate, increasing the potential for mortality. If construction activities need to occur during the turtle overwintering period, but if regular on-site activity is initiated prior to late October, it is likely that turtles will seek out alternate areas to overwinter.

### 6.4.2 Sedimentation and Erosion

*Construction-Stage*

During vegetation removal and site grading activities, areas of bare soil will be exposed along roadside areas which have the potential to erode during rainfall events and impact adjacent aquatic and terrestrial features and habitats. Reduced vegetation cover along the roadsides in combination with the presence of exposed soils during construction activities may also increase the potential for stormwater flow to into the river and other down-slope areas, if not appropriately mitigated. Increased stormwater surface flow and erosion processes may cause water quality impairment, increases in water turbidity, and vegetation die-back. Due to the need for in-water work in completing the construction activities, there is also an immediate risk of direct sedimentation of the river water and its aquatic habitat features without robust mitigation measures.

Soil compaction also has potential to occur as a result of heavy machinery in the area of construction. Soil compaction can greatly reduce the permeability of soils and affect their ability to retain water during rain/snow melt events. This will result in an increase in surface water run-off which will ultimately increase the erosion potential and the amount of sediment being transported into adjacent areas.

An ESC Plan (K. Smart Associates 2024) has been prepared to guide the implementation of ESC measures prior to and during construction activities (see Appendix XIII). Various measures have been incorporated into the plan, including, but not limited to, the following:

- All work will be completed in the dry. Cofferdams will be installed around each abutment to isolate the work zones.
- Floating silt curtains will be installed along the outer edge of the cofferdams, prior to cofferdam installation, to mitigate the release of sediments into the river.
- Silt fencing (ESC fencing) will be installed prior to initiation of site works in the locations shown on the ESC Plan.
- Straw bale and rock check dams will be installed prior to site works to control runoff flows.
- Temporary siltation ponds will be established to direct dewatering discharge to. These are to be located at least 30m from the river.

- All machinery is prohibited from entering the river for construction purposes or to cross to the other side.
- Disturbed areas and exposed soils will be re-vegetated with a standard herbaceous seed mix once construction activities have been completed. See Section 7.0 for further discussion about site restoration recommendations.
- Material stockpiles may require their own ESC measures, such as silt fencing, erosion control blankets, or seeding with a nurse crop for stabilization if the stockpile will remain for longer-term periods. If erosion control blankets are used, materials that are biodegradable and that do not pose a risk of small wildlife entanglement should be used; plastic materials should be avoided.

All ESC measures are to be inspected on a daily basis by designated construction personnel. Observed deficiencies in the ESC measures should be rectified through repair or replacement within 24 hours. Accumulated sediment should be removed as needed to ensure that the ESC measures are performing appropriately. The silt fencing and straw bale check dams are to be left in place for 12 months or until the site is deemed stabilized.

See the ESC Plan (Appendix XIII) for additional details.

*Post-Construction*

If left to drain uncontrolled, stormwater runoff from the bridge and road surface could cause erosion of flow paths down to the river at each corner of the bridge. This would cause subsequent sedimentation of the river water, impairment of fish habitat, and vegetation die-back. In order to mitigate this effect, drainage directed to the concrete outlets at each of the four corners of the bridge will be passed over an area of filter cloth and rip rap as it is conveyed down the embankment toward roadside ditches. The rip rap will slow down and attenuate the runoff flows, thereby mitigating the erosion of flow paths and associated sedimentation effects. Flows will then be directed along grassed ditches toward the river, which will further promote attenuation of flows.

### 6.4.3 Water Quality Control

Decreases in water quality, such as through discharge of deleterious substances in stormwater runoff, can cause both acute and chronic toxicity impacts within biological communities. These impacts include increased mortality rates, impaired health conditions, decreased reproductive

productivity and other reproductive impairments in wildlife. Environmental contaminants are also known to biomagnify 'up the food chain', where higher-level predators are particularly susceptible to impacts. Water quality impairments can also pose health risks to humans wherever there is potential to come into contact with untreated or inadequately treated water discharge. The water quality of aquatic receptors can also be compromised when excess nutrient concentrations, such as from fertilizers, cause eutrophic conditions which subsequently decrease oxygen availability for fish and other aquatic organisms.

The proposed undertaking is not expected to increase the potential for water quality impairments to the Nith River relative to the existing condition. Overall, there is likely a low level of water quality impact risk associated with the existing and new planned bridge infrastructure with respect to the health of the adjacent reach of the Nith River and its associated habitats. The greatest potential for water quality impairment is associated with road runoff containing road salts, oil, grit, and other deleterious materials. Road salt runoff cannot be easily mitigated, and is best controlled by minimizing application to the extent possible. Inflows of other deleterious substances to the river can be mitigated by re-vegetating any disturbed and exposed construction access areas around the bridge, such that particulates can be filtered out of the water by the vegetation before reaching the river. The roadside ditches will be grass-lined, which will dissipate flows and promote particulate filtration and settling upstream of the river.

Prior to construction, it is recommended that a Spill Response Plan be developed and that a spill kit be kept on site during construction activities. All vehicles and equipment arriving on site must be clean, in good working order and free of oil leaks. All vehicle and equipment refueling must be completed at least 30m away from the river. As stated in the ESC Plan (K Smart Associates 2024), measures must be taken to avoid concrete or concrete leachate from entering the river due to its highly toxic effects on fish and aquatic life. This will include ensuring that concrete materials are isolated covered from precipitation and isolated from the river until the concrete is sufficiently cured, and that containment facilities be provided at the site for the wash-down of vehicles and equipment coming into contact with concrete materials.

Provided these measures are implemented, negative water quality impacts to the Nith River, including its habitat for fish (including SAR fish and their Critical Habitats) and Candidate SWH for Snapping Turtle, River Bluet, and downstream turtle overwintering habitat, are not expected.

## 6.5 Induced Impacts

The planned bridge replacement and road works will maintain an existing transportation corridor land use through the study area. No changes to human use of the transportation corridor are anticipated, and the undertaking itself is not expected to result in an increase in vehicular use of the bridge and road. Furthermore, the study area section of road is not highly used by pedestrians. Post-construction human use impacts to the adjacent natural features as a result of the undertaking are therefore not expected.

## 7.0 Ecological Restoration and Enhancement

The bridge replacement and adjacent road reconstruction activities will create areas of disturbance within the ROW, and on certain lands immediately adjacent to the ROW, that will require ecological restoration to at least restore them to their pre-construction condition. Where feasible, measures are also recommended to enhance the roadside conditions beyond their previous condition, such as through the establishment of native and more diverse vegetation species.

All areas of construction disturbance adjacent to the new bridge and road infrastructure should be seeded with a native meadow seed mix that is hardy to roadside conditions. The seed mix should be applied following, or in conjunction with, the nurse crop (e.g., Annual Oats (*Avena sativa*), Barley (*Hordeum vulgare*), Canada Wild Rye (*Elymus canadensis*)) that is established for soil stabilization and to facilitate the native seed mix growth. Portions of the roadside disturbance zones that comprised agricultural field edges will be returned to their previous agricultural field use. A nurse crop can be applied to stabilize restored agricultural field edges if required. The previous/retired agricultural field entrance on the south side of Township Road 12 will be restored with a seed mix and tree/shrub plantings within the ROW.

The disturbed roadside areas should also be restored with a diverse suite of tree and shrub species that are adapted to the roadside conditions and reflective of the local site conditions. Trees that require removal to accommodate the construction should be replaced on at least a 1:1 basis, to the extent that they can be accommodated within the available planting zones. Some of these replacement trees may be substituted for shrubs at a higher ratio (e.g., 3:1). Woody vegetation should be targeted to any areas of disturbance along steeper embankments down to the Nith River along the sides of the bridge to help stabilize the soils and re-establish a source of woody debris and shading over that part of the river. However, plantings to be installed must not interfere with the roadside vegetated drainage ditches. Tree plantings should also be installed to replace any hedgerow trees that required removal.

All seeding and planting activities are to occur during seasonally appropriate times (i.e., spring or fall) to maximize healthy growth and survival. The details of the seeding and planting recommendations are to be illustrated in a Restoration and Enhancement Plan, including specific species types, locations, quantities, and other guidelines for implementation.

## 8.0 Monitoring

Pre-, during-, and post-construction monitoring measures should be undertaken to ensure that mitigation measures have been established and are functioning properly, and that ecological restoration measures are properly established. The following monitoring measures are recommended:

- Pre-construction
    - ESC measures (e.g., silt fencing) are to be installed and inspected by a designated site inspector prior to the initiation of site alteration and construction activities. Exclusion fencing around the limits of the Reed Canary Grass Mineral Meadow Marsh (MAM2-2) south of the ROW may also be required if this wetland falls within a larger Temporary Construction Disturbance zone.
    - Where applicable, a Certified Arborist or Registered Professional Forester should confirm the proper installation of tree protection fencing prior to the initiation of site alteration and construction activities.
- During Construction
    - Daily inspections of the ESC measures and tree protection fencing should be undertaken to ensure proper functioning and to undertake any necessary remediations in a timely manner.
    - If inadvertent damage to tree limbs or roots occurs during construction, a Certified Arborist should attend the site to undertake any necessary remedial measures (e.g., root pruning).
    - The bridge structure should be inspected for the presence of nesting birds on a daily basis during the April 1-August 31 period.
- Post-Construction
    - Tree and shrub plantings should be inspected at the end of their warranty period, which is typically two years. Remedial measures should be taken for any trees or shrubs showing signs of impaired health as determined by a Certified Arborist (e.g., enhanced watering, cutting away competing vegetation, installing tree guards to mitigate excessive deer browse). Any dead tree or shrub stock should be replaced on a 1:1 basis.

- Seeded areas should be inspected one year after application to ensure the appropriate species are growing in and with relatively even distribution. Additional seed should be applied to supplement any areas showing inadequate growth or if desired species are not establishing.

## 9.0 Summary

NRSI was retained by K Smart Associates, on behalf of the Township of Blandford-Blenheim, to complete a scoped EIS in support of a Class EA associated with the planned replacement of Bridge 24 spanning the Nith River, located on Township Road 12. The preferred Preliminary Design requires the complete removal and replacement of the existing bridge with a new single-span structure. The road profile for both road approaches to the bridge will be raised above the existing elevation to tie in to the new bridge structure. A new agricultural field entrance will be created on the south side of the road, west of the bridge, to replace an existing field entrance that will need to be closed due to the road profile change.

The Nith River within the study area has been mapped as Critical Habitat for the SAR Wavy-rayed Lampmussel, Silver Shiner, and Black Redhorse by the DFO. Wavy-rayed Lampmussel was observed within the study area, while the study area reach of the river is assumed to represent SAR habitat for Silver Shiner and Black Redhorse. Woodland to the northeast of the bridge represents confirmed SWH as a provincially rare vegetation community (Fresh-Moist Black Walnut Lowland Deciduous Forest (FOD7)) and also represents suitable habitat for the SAR Red-headed Woodpecker. SWH for the SCC Eastern Wood-Pewee was also confirmed for the study area woodlands located north of Township Road 12. Potential habitat for SAR bats has been identified for five roadside trees, and is assumed to occur within the larger woodlands to the north of the ROW. Various other Candidate SWH types were identified for other terrestrial study area features as well as the Nith River itself. The woodlands to the northeast and northwest of the bridge meet County and provincial criteria to be considered Significant Woodlands. Unevaluated wetlands were confirmed within the study area which are regulated by the GRCA and protected under County natural heritage policies. A small portion of PSW is located at the far west end of the study area, but will not be negatively impacted. The study area also falls within a County-mapped Significant Valleyland, which has been interpreted to correspond with the GRCA-mapped floodplain limits.

Various recommendations have been provided to avoid, or otherwise minimize or mitigate impacts to natural features or their ecological functions. A key mitigation requirement for the planned undertaking will be to isolate the work zones around the bridge abutments in order to allow for work to occur in the dry and to protect adjacent river flows and fish/aquatic habitats from construction disturbance and contamination. A fish, mussel and wildlife salvage will be required prior to dewatering of the isolated work zones. Various ESC measures will be implemented, in accordance to the ESC Plan, to protect the river and other adjacent natural

features from construction impacts (e.g., through use of a demolition platform, silt curtains and silt fencing). Installation of bird nesting deterrent measures, and subsequent bird nesting inspections, may be required if bridge removal and reconstruction works must be completed during the April 1-August 31 bird breeding period. Recommendations have been made to avoid construction encroachment into Significant Woodland and wetland features, and to minimize tree removals to the extent possible.

Provided these and other recommended mitigation measures are implemented, negative impacts to the adjacent natural features and their ecological functions are not anticipated. The proposed development is considered to be in conformance with the applicable policies outlined in Section 2.3. However, this is subject to DFO's review of the project (via Request for Review) to ensure conformance with the federal *Fisheries Act* and SARA, and is subject to MECP's review to ensure conformance with the provincial ESA.

## 9.1 Summary of Recommendations

The following is a summary of EIS recommendations to mitigate impacts, to restore and enhance, and to monitor the existing natural features and their ecological functions within the study area. Please refer to the relevant section of the report for additional details about each recommendation. Where applicable, the summary identifies where these recommendations have been incorporated into existing plans for the development.

**Table 4. Summary of EIS Recommendations**

| Number | Recommendation |
|---|---|
| *Direct Impact Mitigations* | |
| 1. | Efforts must be made to spatially offset construction-related disturbances from the woodland edge along the roadsides to the extent possible. No permanent or temporary construction encroachment into the FOD7-4 woodland to the northeast of the bridge is to occur. |
| 2. | It is recommended that all areas of temporary construction disturbance, such as for equipment and vehicle staging or storage, dewatering drainage, and materials stockpiling, be maintained outside of wooded natural features and be targeted to open lands (e.g., agricultural field edges, cultural meadow). |
| 3. | Construction disturbance should be maintained outside of the MAM2-2 wetland feature to the south of the ROW. The boundaries of this feature should be flagged prior to construction to avoid inadvertent encroachment or disturbance. |
| 4. | Temporary construction disturbance within the FOD7 north community, to the northwest of the bridge, should not extend further north than the 30m disturbance limit shown on Map 3 in order to avoid impacts to the denser tree growth. |
| 5. | Hedgerow tree removals along the roadside, as required for temporary construction storage/staging, etc. or for construction of the new agricultural field entrance, should be minimized and should be compensated for at a minimum 1:1 ratio as part of a Restoration Planting Plan. Where possible, existing driveways or openings should be used for access to these areas. |
| 6. | Tree removal within the small FOD7 woodland features on the south side of the bridge should be limited to whatever is necessary for construction access around the bridge, and portions of these features should be maintained. |
| 7. | Tree removals should be timed to occur outside of the period April 1-September 30 to avoid impacts to SAR bats and nesting migratory birds. Other vegetation removal should be timed to occur outside of the period April 1-August 31 to avoid impacts to nesting migratory birds. |
| 8. | Bridge removal and/or construction should be avoided during the April 1-August 31 bird nesting period, if possible, to avoid impacts to birds that may nest on the bridge structure. |
| 9. | If bridge removal/construction must occur during the bird nesting period, bird nesting deterrent measures should be installed on the bridge prior to April 1. The bridge structure must be inspected daily for the presence of newly established nests during the construction period, during the April 1-August 31 bird nesting period. |
| 10. | A DFO Request for Review submission will be required to ensure that the project is in compliance with the federal *Fisheries Act* and *Species at Risk Act*. |
| 11. | Registration of the proposed works under Ontario Regulation 282/04 S. 23.4, including issuance of a Notice of Activity and preparation of a mitigation plan for provincial aquatic SAR. |
| 12. | A fish, mussel and wildlife capture and relocation (“salvage”) should be completed within the isolated work zones adjacent to the bridge abutments prior to dewatering. Captured native species are to be relocated to areas of suitable habitat outside of the construction exclusion zones. |
| 13. | In-water works must adhere to the July 15-March 14 timing window, and are to be completed in the dry. |
| 14. | Riparian vegetation along the riverbanks is to be maintained to the extent possible. |
| *Indirect Impact Mitigations* | |
| 15. | A demolition platform will be installed to capture falling debris during removal of the existing concrete deck. See the ESC Plan (K. Smart Associates 2024) for details. |
| 16. | Efforts must be taken throughout the bridge reconstruction work to ensure that foreign and deleterious materials do not enter the river. |

| | |
|---|---|
| 17. | Construction limit fencing in the form of silt fencing, tree protection fencing, or otherwise brightly-coloured snow fencing, should be installed along the limits of construction. |
| 18. | To the extent possible, construction limit fencing or tree protection fencing should be installed at least 1m from the dripline of trees to be retained. A Certified Arborist or Registered Professional Forester should confirm the appropriate placing of fencing adjacent to trees. |
| 19. | A Certified Arborist or Registered Professional Forester should be retained to remediate any inadvertent damage to trees during construction. |
| 20. | Dust impacts should be mitigated by moistening areas of bare, dry soil with water as needed during construction. |
| 21. | If artificial lighting is required, it should be turned off at night or otherwise directed away from natural features. |
| 22. | If possible, construction activities should not be initiated during the turtle overwintering period (approximately late October to late March). If construction activities must occur during the winter, it is recommended they be initiated prior to late October to deter turtles from overwintering in the immediate vicinity of the river. |
| 23. | Floating silt curtains and cofferdams are to be installed around each abutment, to allow for dewatered work zones that will prevent the release of sediments and other materials into the river. See the ESC Plan (K. Smart Associates 2024) for details. |
| 24. | Silt fencing must be installed prior to the initiation of construction or site alteration, and all ESC measures are to be inspected on a daily basis. See the ESC Plan (K. Smart Associates 2024) for details. |
| 25. | Straw bale and rock check dams will be installed prior to site works to control runoff. See the ESC Plan (K. Smart Associates 2024) for details. |
| 26. | Dewatering discharge will be directed to temporary siltation ponds, which are to be located at least 30m from the river. See the ESC Plan (K. Smart Associates 2024) for details. |
| 27. | All machinery is prohibited from entering the river, and should arrive on site in a clean condition and good working order (e.g., no oil leaks). See the ESC Plan (K. Smart Associates 2024) for details. |
| 28. | Disturbed and exposed soils will be re-vegetated with a standard herbaceous seed mix to re-establish soil stability following the completion of construction activities. See the ESC Plan (K. Smart Associates 2024) for details. |
| 29. | Material stockpiles may require their own ESC measures, such as seeding with a nurse crop if piles are to remain in place for extended periods. If erosion control blankets are used, materials that are biodegradable and that do not pose an entanglement risk to small wildlife should be used; plastic materials should be avoided. |
| 30. | Winter road salt application should be minimized around the bridge where runoff flows may enter the river. |
| 31. | Prior to construction, a Spill Response Plan should be developed and a spill kit should be kept on site during construction. |
| 32. | Concrete is to be covered from precipitation and isolated from the river until the concrete is sufficiently cured. Containment facilities are to be provided at the site for the wash-down of vehicles and equipment coming into contact with concrete materials. See the ESC Plan (K. Smart Associates 2024) for details. |
| *Restoration and Enhancement* | |
| 33. | All areas of construction disturbance within naturally vegetated areas should be seeded with a native meadow seed mix along with a standard nurse crop. |
| 34. | The previous/retired agricultural field entrance along the south side of the ROW will be restored with a native seed mix and tree/shrub plantings. |
| 35. | Disturbed roadside areas should be restored with a mix of native tree and shrub species that are suitable to the local site conditions. Trees should be planted in replacement of those that required removal at a minimum 1:1 ratio, based on what can be accommodated within the restoration zones. Some of these trees may be substituted for shrubs at a higher ratio (e.g., 3:1). Woody vegetation should be targeted to the sloped river embankments adjacent to the bridge to help re-stabilize the soils. |
| 36. | All seeding and planting is to be implemented in accordance with a Restoration Planting Plan. |

| *Monitoring* | |
|---|---|
| 30. | Pre-construction measures are to include the following:<br>• Installation of ESC measures (e.g., silt fencing) and inspection to ensure appropriate installation prior to site alteration and construction. This includes flagging the limits of the MAM2-2 wetland south of the ROW if it falls within an area of construction disturbance.<br>• Where applicable, inspection of tree protection fencing by a Certified Arborist or Registered Professional Forester to ensure proper installation prior to site alteration and construction. |
| 31. | During-construction measures are to include the following:<br>• Daily inspections of ESC measures and tree protection fencing to ensure proper functioning and to undertake any necessary remediations in a timely manner.<br>• Daily inspections of the bridge for the presence of nesting birds, during construction activities that take place during the April 1-August 31 bird nesting period. |
| 32. | Post-construction measures are to include the following:<br>• Tree and shrub plantings are to be inspected at the end of their two-year warranty period. Remedial measures should be taken for any plantings showing signs of impaired health. Dead individuals should be replaced on a 1:1 basis.<br>• Seeded areas should be inspected one year after application to ensure proper growth and establishment. Areas showing unsatisfactory coverage should receive supplementary seed application. |

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# Maps

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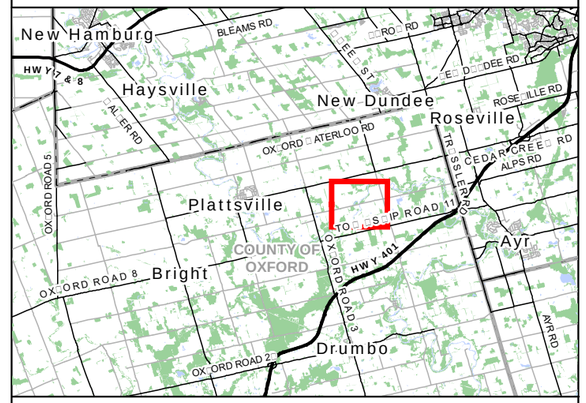
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Nith River - Lower
Washington Creek
Nith River
TOWNSHIP ROAD 12
BLENHEIM RD
Central Whiteman's/Horner Creek Complex (GR 4)
Washington Creek
Nith River - Lower
Nith River - Lower

# Map 1

## Blandford-Blenheim Bridge 24 EA

## Study Area and Designated Significant Natural Features




**Legend**

- Study Area
- De□elopment Area
- Primary Road
- Secondary Road
- Limit o□A□uatic □abitat Assessment
- Permanent □ atercourse
- □ ater Body
- Pro□incially Si□ni□icant □ etland □PS□ □
- □ etland □□RCA□
- Re□ulated □loodplain □□RCA□
- Re□ulation Limit □□RCA□
- Subcatc□ment Basin □□RCA□
- □ ooded Area

**Aquatic Species at Risk (SARA) Habitat (DFO)**

- Critical
- T□reatened
- Special Concern

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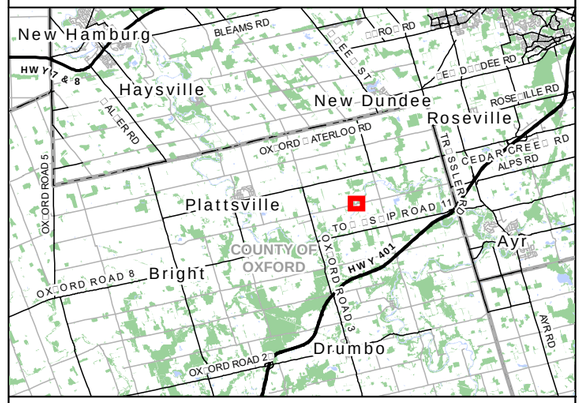
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Map 2a

# Blandford-Blenheim Bridge 24 EA

## Existing Conditions and Significant Features




### Legend

- Study Area
- De□elopment Area
- Permanent □ atercourse
- □is□ □abitat
- Si□ni□icant □ oodland
- Si□ni□icant □alleyland □□RCA□

**Wetlands**

- Pro□incially Si□ni□icant □ etland □PS□ □□M□R□□
- □ne□aluated □ etland □□RSI□

- Ecolo□ical Land Classi□ication □ELC□
- □C□M1□1□□Dry □Moist Old □ield Meado□ Type
- □□OD7□□res□ □Moist Lo□land Deciduous □orest Ecosite
- □□OD7□□□□res□ □Moist Blac□ □ alnut Lo□land Deciduous □orest Type
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- □S□ D2□2□□reen As□ Mineral Deciduous S□amp Type
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- Inclusion


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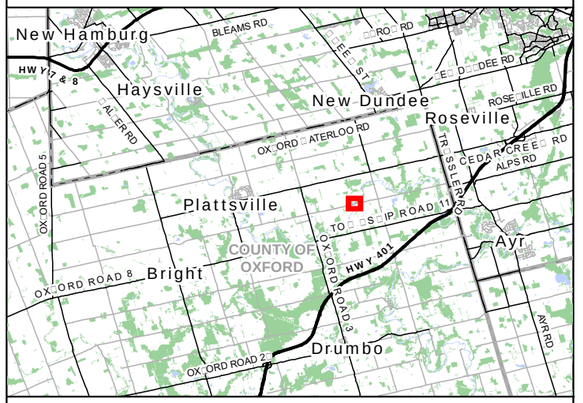
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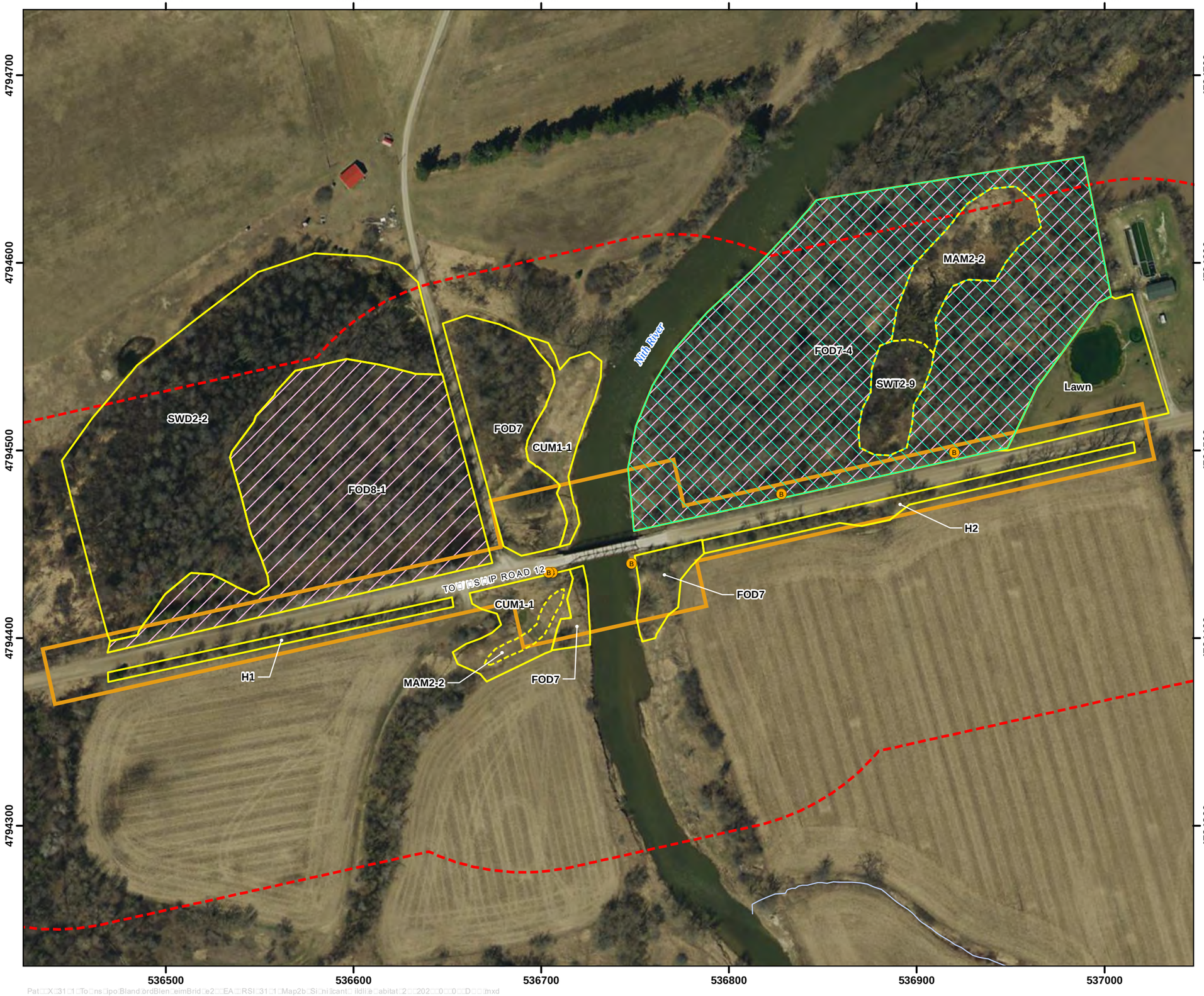
FOD8-1 SWD2-2 FOD7 CUM1-1 Nth. River MAM2-2 FOD7-4 SWT2-9 Lawn FOD7 H2 TOWNSHIP ROAD 12 CUM1-1 FOD7 H1 MAM2-2 FOD7 Central Whiteman's/Horner Creek Complex (GR 4)

Map 2b

# Blandford-Blenheim Bridge 24 EA

## Significant Wildlife Habitat




### Legend

- Study Area
- De□elopment Area
- Bat SAR Roost Trees
- Permanent □ atercourse

**Significant Wildlife Habitat**

- Rare □e□etation Community □ Blac□□ alnut lo□land
- Eastern □ ood□Pe□ee □abitat

- Ecolo□ical Land Classi□ication □ELC□
- □C□M1□1□Dry □Moist Old □ield Meado□ Type
- □□OD7□□res□ □Moist Lo□land Deciduous □orest Ecosite
- □□OD7□□□□res□ □Moist Blac□ □ alnut Lo□land Deciduous □orest Type
- □□OD8□1□□res□ □Moist Poplar Deciduous □orest Type
- □□□□ed□ero□
- □MAM2□2□Reed□canary □rass Mineral Meado□ Mars□ Type
- □S□ D2□2□□reen As□ Mineral Deciduous S□amp Type
- □S□ T2□□□□ray Do□□ood Mineral T□ic□et S□amp Type
- Inclusion

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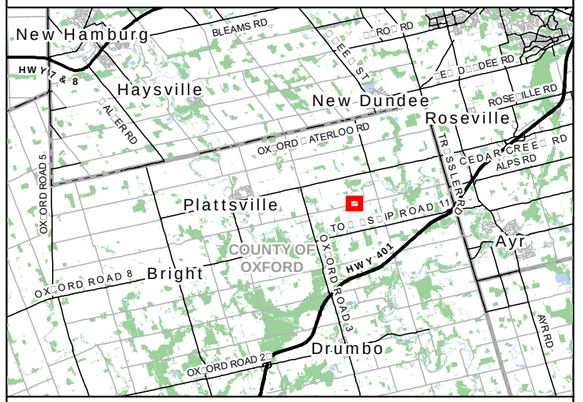
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Map 2c

# Blandford-Blenheim Bridge 24 EA

## Species at Risk Habitat




### Legend

- Study Area
- Development Area
- Permanent Watercourse

**Confirmed SAR Habitat**

- Gray Rayed Lampmussel Habitat

**Potential SAR Habitat**

- Bat SAR Roost Trees
- Potential SAR Bat Habitat
- Silver Shiner and Black Redhorse Habitat
- Redbreasted Woodpecker Habitat
- Ecological Land Classification (ELC)
- CUM1-1 Dry Moist Old Field Meadow Type
- FOD7 Fresh Moist Lowland Deciduous Forest Ecosite
- FOD7-4 Fresh Moist Black Walnut Lowland Deciduous Forest Type
- FOD8-1 Fresh Moist Poplar Deciduous Forest Type
- Shored Fern
- MAM2-2 Reed Canary Grass Mineral Meadow Marsh Type
- SWD2-2 Green Ash Mineral Deciduous Swamp Type
- SWT2-9 Gray Dogwood Mineral Thicket Swamp Type
- Inclusion




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Project 3161
Date June 17 2021

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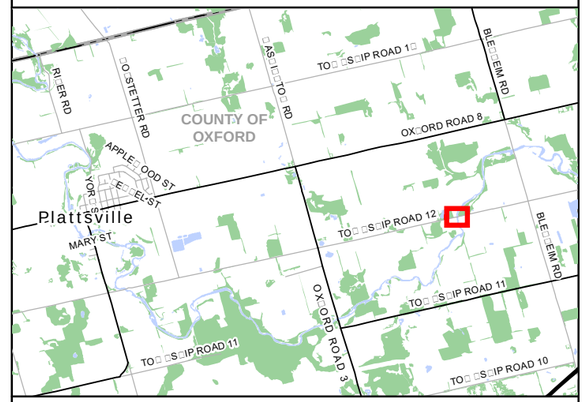
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SWD2-2
FOD8-1
FOD7
CUM1-1
Nith River
FOD7-4
SWT2-9
H2
TO□□S□IP ROAD 12
FOD7
CUM1-1
FOD7
H1
MAM2-2

# Map 3

# Blandford-Blenheim Bridge 24 EA

## Proposed Development




**Legend**

- Temporary Construction Disturbance Limit
- Property Line
- Proposed De□elopment
- Bat SAR Roost Trees
- Ecolo□ical Land Classi□ication □ELC□
- □C□M1□1□Dry □Moist Old □ield Meado□ Type
- □□OD7□□res□ □Moist Lo□land Deciduous □orest Ecosite
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- □S□ D2□2□□reen As□ Mineral Deciduous S□amp Type
- □S□ T2□□□□ray Do□□ood Mineral T□ic□et S□amp Type
- Inclusion

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Appendix I
Approximate Bridge Development Area Limits (K. Smart Associates)

Oxford County
Growing stronger together




**Legend**

Potential Estimated Impact Area

**Notes**



0 102 203 Meters

NAD_1983_UTM_Zone_17N

This map is a user generated static output from an Internet mapping site and is for reference only. Data layers that appear on this map may or may not be accurate, current, or otherwise reliable. This is not a plan of survey

*September 14, 2022*

Appendix II
Species at Risk/Species of Conservation Concern Habitat Assessment

**Species at Risk (SAR) and Species of Special Concern (SCC) Screening Table**

| Common Name | Scientific Name | SRANK | SARO | COSEWIC | SARA | SARA Schedule | NRSI Observed | Habitat Source | Habitat Preference | Suitable Habitats within Study Area | NRSI Observed | Rationale |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Birds** | | | | | | | | | | | | |
| Common Nighthawk | *Chordeiles minor* | S4B | SC | SC | SC | Schedule 1 | No | Significant Wildlife Habitat Technical Guide: Appendix G (OMNR 2000) | Open ground; clearings in dense forests (including burns and logged areas); rock barrens; peat bogs; ploughed fields; gravel beaches or barren areas with rocky soils; open woodlands; flat gravel roofs. | No | No | Suitable habitat is not present within the subject area where the bridge works are to occur. |
| Chimney Swift | *Chaetura pelagica* | S3B | THR | T | T | Schedule 1 | No | Significant Wildlife Habitat Technical Guide: Appendix G (OMNR 2000) | Commonly found in urban areas near buildings; nests in chimneys, hollow trees, and crevices of rock cliffs. Feeds over open water. | No | No | Suitable habitat is not present within the subject area where the bridge works are to occur. |
| Red-headed Woodpecker | *Melanerpes erythrocephalus* | S3 | END | E | E | Schedule 1 | No | Significant Wildlife Habitat Technical Guide: Appendix G (OMNR 2000) | Open, deciduous forest with little understory; fields, parks or pasture lands with scattered large trees; wooded swamps; orchards, small woodlots or forest edges; groves of dead or dying trees. Requires cavity trees with at least 40 cm dbh. | Yes | No | Suitable habitat is potentially present within the forested/swamp areas. Surveys were not completed as trees are not expected to be removed as part of the bridge works. |
| Eastern Wood-Pewee | *Contopus virens* | S4B | SC | SC | SC | Schedule 1 | Yes | Species at Risk in Ontario (MECP 2022) | Mid-canopy layer of forest clearings and edges of deciduous and mixed forest. Abundant in intermediate-age mature forest stands with little understory vegetation. | Yes | Yes | Suitable habitat present within the forested areas. Heard incidentally during spring visit. |
| Barn Swallow | *Hirundo rustica* | S4B | SC | SC | T | Schedule 1 | No | Significant Wildlife Habitat Technical Guide: Appendix G (OMNR 2000) | Farmlands, rural areas and other open or semi-open areas near body of water. Nests almost exclusively on human-made structures such as open barns, buildings, bridges and culverts. | Yes | No | No nests were observed under the bridge structure. |
| Bank Swallow | *Riparia riparia* | S4B | THR | T | T | Schedule 1 | No | Recovery Strategy for the Bank Swallow in Ontario (Falconer et al. 2016) | Nests in burrows in natural and human-made settings with vertical faces in silt and sand deposits. Usually on banks of river and lakes, but also found in sand and gravel pits. | No | No | Suitable habitat is not present within the subject area where the bridge works are to occur. |
| Wood Thrush | *Hylocichla mustelina* | S4B | SC | T | T | Schedule 1 | No | Significant Wildlife Habitat Technical Guide: Appendix G (OMNR 2000) | Carolinian and Great Lakes-St. Lawrence forest zones. Undisturbed moist mature deciduous or mixed forest with deciduous sapling growth. Near pond or swamp. Must have some trees higher than 12 m. | Yes | No | Suitable habitat present within the forested areas. Not heard during site visits but no specfic breeding bird surveys completed as forested areas not expected to be impacted by bridge works. |
| Bobolink | *Dolichonyx oryzivorus* | S4B | THR | SC | T | Schedule 1 | No | Recovery Strategy for the Bobolink and Eastern Meadowlark in Ontario (McCracken et al. 2013) | Large (>10 ha), open expansive grasslands, pastures, hayfields, meadows or fallow fields with dense ground cover. Occasionally nest in large (>50 ha) fields of winter wheat and rye in southwestern Ontario. | No | No | Suitable habitat is not present within the subject area where the bridge works are to occur. |
| Eastern Meadowlark | *Sturnella magna* | S4B,S3N | THR | T | T | Schedule 1 | No | Significant Wildlife Habitat Technical Guide: Appendix G (OMNR 2000) | Open pastures, hayfields, grasslands or grassy meadows with elevated singing perches (small trees, shrubs or fence posts). Also weedy borders of croplands, roadsides, orchards, airports, shrubby overgrown fields or other open areas. Generally prefers larger tracts of habitat >10 ha, but will sometimes use smaller tracts. | No | No | Suitable habitat is not present within the subject area where the bridge works are to occur. |
| **Reptiles and Amphibians** | | | | | | | | | | | | |
| Snapping Turtle | *Chelydra serpentina* | S4 | SC | SC | SC | Schedule 1 | No | Species at Risk in Ontario (MECP 2022) | Slow-flowing rivers and streams, lakes, and permanent or semi-permanent wetlands with soft substrates and vegetation. Key habitat requirements: open areas with structures for basking, open sand or gravel areas for nesting, shallow areas with soft substrates to bury in, soft banks or substrates for hibernation. | Yes | No | Nith River may provide suitable habitat for Snapping Turtle. Overwintering habitat not present. |
| **Mammals** | | | | | | | | | | | | |
| Eastern Small-footed Myotis | *Myotis leibii* | S2S3 | END | | | | No | Recovery Strategy for Eastern Small-footed Myotis In Ontario (Humphrey 2017) | Primarily roosts in open, sunny, rocky habitats, including cracks and crevices in cliffs and boulders, in talus slopes, beneath stones on rock barrens and in rock outcrops containing crevices. Occasionally roosts in buildings (including barns, sheds, and exterior walls). Maternity roosts have been documented in rocky habitats, on bridge structures, and in or on buildings. Overwinters in caves and abandoned mines. | No | No | There was no suitable maternity roosting habitat present on the bridge structure; the bridge does not represent suitable habitat |
| Little Brown Myotis | *Myotis lucifugus* | S3 | END | E | E | Schedule 1 | No | Recovery Strategy for the Little Brown Myotis, Northern Myotis and Tri-colored Bat in Ontario (Humphrey, C. & H. Fortherby. 2019) | 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 and forest edges. | Yes | No | Cavity tree assessment identified candidate roost trees within the edge of the woodland features. |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Northern Myotis | *Myotis septentrionalis* | S3 | END | E | E | Schedule 1 | No | Recovery Strategy for the Little Brown Myotis, Northern Myotis and Tri-colored Bat in Ontario (Humphrey, C. & H. Fortherby. 2019) | Roosts in houses and man-made structures but prefers hollow trees or under loose bark. Hibernates in mines or caves. Hunts within forest, below the canopy. | Yes | No | Cavity tree assessment identified candidate roost trees within the edge of the woodland features. |
| Tri-colored Bat | *Perimyotis subflavus* | S3? | END | E | E | Schedule 1 | No | Recovery Strategy for the Little Brown Myotis, Northern Myotis and Tri-colored Bat in Ontario (Humphrey, C. & H. Fortherby. 2019) | Roosts and maternity colonies in older forests and occasionally in barns or other structures. Forage over water and along streams in the forest. Hibernate in caves. | No | No | The woodland features are not largely comprised of maple or oak trees |
| Woodland Vole | *Microtus pinetorum* | S3? | SC | SC | SC | Schedule 1 | No | Species at Risk in Ontario (MECP 2022) | Mature deciduous forest in the Carolinian region where there is a deep litter layer that allows it to burrow. | No | No | Suitable habitat not present within the subject property but may be present within study area. |
| Gray Fox | *Urocyon cinereoargenteus* | S1 | THR | T | T | Schedule 1 | No | Significant Wildlife Habitat Technical Guide: Appendix G (OMNR 2000) | Hardwood forests with a mix of fields and woods; swamps; wooded, brushy or rocky habitats; woodland farmland edge; old fields with thickets; dens in hollow log or tree; individual has numerous winter dens throughout its range which is > 40 ha | No | No | Suitable habitat not present within the study area. |
| American Badger (Southwestern Ontario population) | *Taxidea taxus jacksoni* | S1 | END | E | E | Schedule 1 | No | Significant Wildlife Habitat Technical Guide: Appendix G (OMNR 2000) | Open grasslands and oak savannahs; dens in new hole or enlarged existing hole; sometimes makes food caches | No | No | Suitable habitat not present within the study area. |
| **Butterflies** | | | | | | | No | | | | | |
| Black Dash | *Euphyes conspicua* | S3 | | | | | No | Layberry et al. 1998a | Wet sedge meadows | No | No | Suitable habitat not present within the study area. |
| Hackberry Emperor | *Asterocampa celtis* | S3 | | | | | No | Layberry et al. 1998b | Deciduous woodlands containing Common Hackberry | No | No | Suitable habitat not present within the study area. |
| Monarch | *Danaus plexippus* | S2N,S4B | SC | E | SC | Schedule 1 | No | Species at Risk in Ontario (MECP 2022) | Adults found in a diversity of habitats with a variety of wildflowers. Caterpillars are confined to meadows and open areas where milkweeds grow (larval food plants). | Yes | No | Suitable habitat is present, but would not be considered significant for the species |
| **Odonates** | | | | | | | No | | | | | |
| River Bluet | *Enallagma anna* | S3 | | | | | No | Catling et al. 2001 | Moderate streams and rivers | Yes | No | The Nith River may provide suitable habitat |
| **Fish** | | | | | | | No | | | | | |
| Silver Shiner | *Notropis photogenis* | S2S3 | THR | T | T | Schedule 1 | No | Species at Risk in Ontario (MECP 2022) | Moderate to large size streams with swift currents, free of weeds, with clean gravel or boulder bottoms. Gravel riffles needed for spawning (June-July). | Yes | No | The Nith River provides suitable habitat for the species; it is assumed to be present |
| Black Redhorse | *Moxostoma duquesnei* | S2 | THR | T | T | Schedule 1 | No | Species at Risk in Ontario (MECP 2022) | Pools and riffle areas of medium-sized rivers and streams, usually less than two metres deep. Usually few aquatic plants, a moderate to fast current, and a sandy or gravel bottom. In the spring, adults migrate to breeding habitat where eggs are laid on gravel in fast water. | Yes | No | The Nith River provides suitable habitat for the species; it is assumed to be present |
| **Mussels** | | | | | | | No | | | | | |
| Rainbow | *Cambarunio iris* | S1 | SC | SC | SC | Schedule 1 | No | Species at Risk in Ontario (MECP 2022) | The Rainbow mussel prefers small to medium-sized rivers with a moderate to strong current and sand, rocky, or gravel bottoms. It is found in or near riffle areas and along the edges of vegetation in water less than one metre deep. The Rainbow mussel uses a variety of fish hosts in Ontario, including Striped shiner, Smallmouth bass, Largemouth bass, Green sunfish, Greenside darter, Rainbow darter, and Yellow perch. | No | No | Suitable habitat is not present within the study area. |
| Wavy-rayed Lampmussel | *Lampsilis fasciola* | S2 | THR | SC | SC | Schedule 1 | No | Species at Risk in Ontario (MECP 2022) | Small to medium rivers with clear water. Shallow riffle areas with clean gravel or sand bottoms. Fish hosts include: Largemouth bass and Smallmouth bass. | Yes | Yes | An individual shell was observed within the study area reach of the Nith River. |

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Appendix III
Significant Wildlife Habitat Assessment

**Significant Wildlife Habitat Assessment: Ecoregion 6E.**

**Table 1. Characteristics of Seasonal Concentration Areas**

| Rationale | Wildlife Species | Candidate SWH | | Confirmed SWH | Study Area |
|---|---|---|---|---|---|
| | | ELC Ecosite Codes | Habitat Criteria and Information Sources | Defining Criteria | Assessment Details |
| **Waterfowl Stopover and Staging Areas (Terrestrial)** | | | | | |
| Habitat important to migrating waterfowl. | American Black Duck<br>Wood Duck<br>Green-winged Teal<br>Blue-winged Teal<br>Mallard<br>Northern Pintail<br>Northern Shoveler<br>American Wigeon<br>Gadwall | CUM1<br>CUT1<br>- Plus evidence of annual spring flooding from melt water or run-off within these Ecosites. | Fields with sheet water during Spring (mid March to May).<br>• Fields flooding during spring melt and run-off provide important invertebrate foraging habitat for migrating waterfowl.<br>• Agricultural fields with waste grains are commonly used by waterfowl, these are not considered SWH unless they have spring sheet water available[exlviii].<br><br><u>Information Sources</u><br>• Anecdotal information from the landowner, adjacent landowners or local naturalist clubs may be good information in determining occurrence.<br>• Reports and other information available from Conservation Authorities (CAs)<br>• Sites documented through waterfowl planning processes (eg. EHJV implementation plan)<br>• Field Naturalist Clubs<br>• Ducks Unlimited Canada<br>• Natural Heritage Information Centre (NHIC) Waterfowl Concentration Area | Studies carried out and verified presence of an annual concentration of any listed species, evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects"[ccxi]<br>• Any mixed species aggregations of 100 or more individuals required.<br>• The area of the flooded field ecosite habitat plus a 100-300m radius buffer dependent on local site conditions and adjacent land use is the significant wildlife habitat[cxlviii].<br>• Annual use of habitat is documented from information sources or field studies (annual use can be based on studies or determined by past surveys with species numbers and dates).<br>• SWHMiST[cxlix] Index #7 provides development effects and mitigation measures. | The study area contains active agricultural fields to the southeast and southwest of the bridge crossing that may flood during the spring melt.<br><br>Limited CUM and no CUT present in the study area.<br><br>**Not SWH within development area.**<br>**Not SWH within study area.** |
| **Waterfowl Stopover and Staging Areas (Aquatic)** | | | | | |
| Important for local and migrant waterfowl populations during the spring or fall migration or both periods combined. Sites identified are usually only one of a few in the eco-district. | Canada Goose<br>Cackling Goose<br>Snow Goose<br>American Black Duck<br>Northern Pintail<br>Northern Shoveler<br>American Wigeon<br>Gadwall<br>Green-winged Teal<br>Blue-winged Teal<br>Hooded Merganser<br>Common Merganser<br>Lesser Scaup<br>Greater Scaup | MAS1<br>MAS2<br>MAS3<br>SAS1<br>SAM1<br>SAF1<br>SWD1<br>SWD2<br>SWD3<br>SWD4<br>SWD5<br>SWD6<br>SWD7 | • Ponds, marshes, lakes, bays, coastal inlets, and watercourses used during migration. Sewage treatment ponds and storm water ponds do not qualify as a SWH, however a reservoir managed as a large wetland or pond/lake does qualify.<br>• These habitats have an abundant food supply (mostly aquatic invertebrates and vegetation in shallow water). | Studies carried out and verified presence of:<br>• Aggregations of 100[l] or more of listed species for 7 days[l], results in > 700 waterfowl use days.<br>• Areas with annual staging of ruddy ducks, canvasbacks, and redheads are SWH[cxlix]<br>• The combined area of the ELC ecosites and a 100m radius area is the SWH[cxlviii]<br>• Wetland area and shorelines associated with sites identified within the SWHTG[cxlviii] Appendix | Suitable habitat could be present as SWD2 is present within the study area. Field assessment indicated suitable habitat not present within the Nith River.<br><br>**Not SWH within development area.**<br>**Not SWH within study area.** |

**Significant Wildlife Habitat Assessment: Ecoregion 6E.**

**Table 1. Characteristics of Seasonal Concentration Areas**

| Rationale | Wildlife Species | Candidate SWH | | Confirmed SWH | Study Area |
|---|---|---|---|---|---|
| | | ELC Ecosite Codes | Habitat Criteria and Information Sources | Defining Criteria | Assessment Details |
| | Long-tailed Duck<br>Surf Scoter<br>White-winged Scoter<br>Black Scoter<br>Ring-necked Duck<br>Common Goldeneye<br>Bufflehead<br>Redhead<br>Ruddy Duck<br>Red-breasted Merganser<br>Brant<br>Canvasback | | Information Sources<br>• Environment Canada<br>• Naturalist clubs often are aware of staging/stopover areas.<br>• OMNRF Wetland Evaluations indicate presence of locally and regionally significant waterfowl staging.<br>• Sites documented through waterfowl planning processes (eg. EHJV implementation plan)<br>• Ducks Unlimited projects<br>• Element occurrence specification by Nature Serve: http://www.natureserve.org<br>• Natural Heritage Information Centre (NHIC) Waterfowl Concentration Area | K[cxlix] are significant wildlife habitat.<br>• Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects"[ccxi]<br>• Annual Use of Habitat is Documented from Information Sources or Field Studies (Annual can be based on completed studies or determined from past surveys with species numbers and dates recorded).<br>• SWHMiST[cxlix] Index #7 provides development effects and mitigation measures. | |
| **Shorebird Migratory Stopover Area** | | | | | |
| High quality shorebird stopover habitat is extremely rare and typically has a long history of use. | Greater Yellowlegs<br>Lesser Yellowlegs<br>Marbled Godwit<br>Hudsonian Godwit<br>Black-bellied Plover<br>American Golden-Plover<br>Semipalmated Plover<br>Solitary Sandpiper<br>Spotted Sandpiper<br>Semipalmated Sandpiper<br>Pectoral Sandpiper<br>White-rumped Sandpiper<br>Baird's Sandpiper<br>Least Sandpiper<br>Purple Sandpiper<br>Stilt Sandpiper<br>Short-billed Dowitcher<br>Red-necked Phalarope<br>Whimbrel<br>Ruddy Turnstone<br>Sanderling<br>Dunlin<br>Whimbrel | BBO1<br>BBO2<br>BBS1<br>BBS2<br>BBT1<br>BBT2<br>SDO1<br>SDS2<br>SDT1<br>MAM1<br>MAM2<br>MAM3<br>MAM4<br>MAM5 | Shorelines of lakes, rivers and wetlands, including beach areas, bars and seasonally flooded, muddy and un-vegetated shoreline habitats. Great Lakes coastal shorelines, including groynes and other forms of armour rock lakeshores, are extremely important for migratory shorebirds in May to mid-June and early July to October. Sewage treatment ponds and storm water ponds do not qualify as a SWH.<br><br>Information Sources<br>• Western hemisphere shorebird reserve network.<br>• Canadian Wildlife Service (CWS) Ontario Shorebird Survey.<br>• Bird Studies Canada<br>• Ontario Nature<br>• Local birders and naturalist clubs<br>• Natural Heritage Information Center (NHIC) Shorebird Migratory Concentration Area | Studies confirming:<br>• Presence of 3 or more of listed species and > 1000 shorebird use days during spring or fall migration period. (shorebird use days are the accumulated number of shorebirds counted per day over the course of the fall or spring migration period)<br>• Whimbrel stop briefly (<24hrs) during spring migration, any site with >100 Whimbrel used for 3 years or more is significant.<br>• The area of significant shorebird habitat includes the mapped ELC shoreline ecosites plus a 100m radius area[cxlviii]<br>• Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects"[ccxi]<br>• SWHMiST[cxlix] Index #8 provides development effects and mitigation measures. | Suitable habitat could be present as along the edges of the Nith River within the subject property but in small amount.<br><br>Field assessment indicated that the area alongside the Nith River is not SWH.<br><br>**Not SWH within development area.**<br>**Not SWH within study area.** |

**Significant Wildlife Habitat Assessment: Ecoregion 6E.**

**Table 1. Characteristics of Seasonal Concentration Areas**

| Rationale | Wildlife Species | Candidate SWH | | Confirmed SWH | Study Area |
|---|---|---|---|---|---|
| | | ELC Ecosite Codes | Habitat Criteria and Information Sources | Defining Criteria | Assessment Details |
| **Raptor Wintering Area** | | | | | |
| Sites used by multiple species, a high number of individuals and used annually are most significant | Rough-legged Hawk<br>Red-tailed Hawk<br>Northern Harrier<br>American Kestrel<br>Snowy Owl<br><br><u>Special Concern:</u><br>Short-eared Owl<br>Bald Eagle | Hawks/Owls:<br>Combination of ELC Community Series; need to have present one Community Series from each land class:<br>Forest:<br>FOD, FOM, FOC<br><br>Upland:<br>CUM, CUT, CUS, CUW | The habitat provides a combination of fields and woodlands that provide roosting, foraging and resting habitats for wintering raptors.<br><br>Raptor wintering sites need to be > 20 ha[cxlviii, cxlix] with a combination of forest and upland.[xvi, xvii, xviii, xix, xx, xxi].<br>Least disturbed sites, idle/fallow or lightly grazed field/meadow (>15ha) with adjacent woodlands[cxlix]<br><br>Field area of the habitat is to be wind swept with limited snow depth or accumulation.<br><br>Eagle sites have open water, large trees and snags available for roosting<br><br><u>Information Sources</u><br>• OMNRF Ecologist or Biologist<br>• Field Natural Clubs<br>• Natural Heritage Information Center (NHIC) Raptor Winter Concentration Area<br>• Data from Bird Studies Canada<br>• Reports and other information available from Conservation Authorities CAs. | Studies confirm the use of these habitats by:<br>• One or more Short-eared Owls or; One or more Bald Eagles or; At least 10 individuals and two listed hawk/owl species<br>• To be significant a site must be used regularly (3 in 5 years)[cxlix] for a minimum of 20 days by the above number of birds<br>• The habitat area for an Eagle winter site is the shoreline forest ecosites directly adjacent to the prime hunting area<br>• Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects"[ccxi]<br>• SWHMiST[cxlix] Index #10 and #11 provides development effects and mitigation measures. | Suitable habitat potentially present within the development area and study area as there is a natural corridor along the Nith River.<br><br>As works will not be occurring within the winter, no field surveys are proposed and features not considered significant for this bridge replacement.<br><br>**Not SWH within development area.**<br>**Not SWH within study area.** |
| **Bat Hibernacula** | | | | | |
| Bat hibernacula are rare habitats in Ontario landscapes. | Big Brown Bat<br>Tri-coloured Bat | Bat Hibernacula may be found in these ecosites:<br>CCR1<br>CCR2<br>CCA1<br>CCA2<br>(Note: buildings are not considered to be SWH) | • Hibernacula may be found in caves, mine shafts, underground foundations and Karsts.<br>• Active mine sites should not be considered as SWH<br>• The locations of bat hibernacula are relatively poorly known.<br><br><u>Information Sources</u><br>• OMNRF for possible locations and contact for local experts<br>• Natural Heritage Information | • All sites with confirmed hibernating bats are SWH.<br>• The habitat area includes a 200m radius around the entrance of the hibernaculum[cxlviii, ccvii] for most.<br>• Studies are to be conducted during the peak swarming period (Aug. – Sept.). Surveys should be conducted following methods outlined in the "Bats and Bat Habitats: Guidelines for Wind | Suitable habitat not present within the development area and study area.<br><br>**Not SWH within development area.**<br>**Not SWH within study area.** |

**Significant Wildlife Habitat Assessment: Ecoregion 6E.**

**Table 1. Characteristics of Seasonal Concentration Areas**

| Rationale | Wildlife Species | Candidate SWH | | Confirmed SWH | Study Area |
|---|---|---|---|---|---|
| | | ELC Ecosite Codes | Habitat Criteria and Information Sources | Defining Criteria | Assessment Details |
| | | | Center (NHIC) Bat Hibernaculum<br>• Ministry of Northern Development and Mines for location of mine shafts.<br>• Clubs that explore caves (eg. Sierra Club)<br>• University Biology Departments with bat experts. | Power Projects"[ccv]<br>• SWHMiST[cxlix] Index #1 provides development effects and mitigation measures. | |
| **Bat Maternity Colonies** | | | | | |
| Known locations of forested bat maternity colonies is extremely rare in all Ontario landscapes. | Big Brown Bat<br>Silver-haired Bat | Maternity colonies considered SWH are found in forested Ecosites.<br><br>All ELC Ecosites in ELC Community Series:<br>FOD<br>FOM<br>SWD<br>SWM | Maternity colonies can be found in tree cavities, vegetation and often in buildings[xxii, xxv, xxvi, xxvii, xxxi] (buildings are not considered to be SWH).<br>• Maternity roosts are not found in caves and mines in Ontario[xxii]<br>• Maternity colonies located in Mature deciduous or mixed forest stands[ccix, ccx] with >10/ha large diameter (>25cm dbh) wildlife trees[ccvii]<br>• Female Bats prefer wildlife tree (snags) in early stages of decay, class 1-3[ccxiv] or class 1 or 2[ccxii]<br>• Silver-haired Bats prefer older mixed or deciduous forest and form maternity colonies in tree cavities and small hollows. Older forest areas with at least 21 snags/ha are preferred[ccx]<br><br><u>Information Sources</u><br>• OMNRF for possible locations and contact for local experts<br>• University Biology Departments with bat experts. | • Maternity Colonies with confirmed use by:<br>• >10 Big Brown Bats<br>• >5 Adult Female Silver-haired Bats<br>• The area of the habitat includes the entire woodland or a forest stand ELC Ecosite or an Ecoelement containing the maternity colonies.<br>• Evaluation methods for maternity colonies should be conducted following methods outlined in the "Bats and Bat Habitats: Guidelines for wind Power Projects[ccv]<br>• SWHMiS T[cxlix] Index #12 provides development effects and mitigation measures. | As FOD habitat is present within the subject property and greater study area there is potential for bats.<br><br>Field assessments identified cavity trees within the subject property (alongside the road).<br><br>**Candidate SWH within development area.**<br>**Candidate SWH within study area.** |
| **Turtle Wintering Area** | | | | | |
| Generally sites are the only known sites in the area. Sites with the highest number of individuals are most significant | Midland Painted Turtle<br><br><u>Special Concern</u>:<br>Northern Map Turtle<br>Snapping Turtle | Snapping and Midland Painted Turtles -<br>ELC Community Classes: SW, MA, OA and SA;<br>ELC Community Series: FEO and BOO<br><br>Northern Map Turtle - Open Water areas such as deeper rivers or streams and lakes | For most turtles, wintering areas are in the same general area as their core habitat. Water has to be deep enough not to freeze and have soft mud substrates.<br>• Over-wintering sites are permanent water bodies, large wetlands, and bogs or fens with adequate Dissolved Oxygen[cix, cx, cxi, cxviii]. | • Presence of 5 over-wintering Midland Painted Turtles is significant.<br>• One or more Northern Map Turtle or Snapping Turtle over-wintering within a wetland is significant.<br>• The mapped ELC ecosite area with the over wintering turtles is the SWH. If the hibernation site | Suitable habitat could be present as the Nith River is within the subject property.<br><br>Field assessment indicated that SWD feature not suitable for overwintering and Nith River within this area did not have suitable substrates.<br><br>**Not SWH within development area.**<br>**Candidate SWH within study area** |

**Significant Wildlife Habitat Assessment: Ecoregion 6E.**

**Table 1. Characteristics of Seasonal Concentration Areas**

| Rationale | Wildlife Species | Candidate SWH | | Confirmed SWH | Study Area |
|---|---|---|---|---|---|
| | | ELC Ecosite Codes | Habitat Criteria and Information Sources | Defining Criteria | Assessment Details |
| | | with current can also be used as over-wintering habitat. | • Man-made ponds such as sewage lagoons or storm water ponds should not be considered SWH.<br>Information Sources<br>• EIS studies carried out by Conservation Authorities.<br>• Local field naturalists and experts, as well as university herpetologists may also know where to find some of these sites.<br>• OMNRF ecologist or biologist<br>• Natural Heritage Information Center (NHIC) | is within a stream or river, the deep-water pool where the turtles are over wintering is the SWH.<br>• Over wintering areas may be identified by searching for congregations (Basking Areas) of turtles on warm, sunny days during the fall (Sept. – Oct.) or spring (Mar. – May)[cvii]<br>• Congregation of turtles is more common where wintering areas are limited and therefore significant[cix, cx, cxi, cxii].<br>• SWHMiST[cxlix] Index #28 provides development effects and mitigation measures for turtle wintering habitat. | |
| **Reptile Hibernaculum** | | | | | |
| Generally sites are the only known sites in the area. Sites with the highest number of individuals are most significant | Snakes:<br>Eastern Gartersnake<br>Northern Watersnake<br>Northern Red-bellied Snake<br>Northern Brownsnake<br>Smooth Green Snake<br>Northern Ring-necked Snake<br><br>Special Concern:<br>Milksnake<br>Eastern Ribbonsnake<br><br>Lizard:<br>Special Concern (Southern Shield population):<br>Five-lined Skink | For all snakes, habitat may be found in any ecosite other than very wet ones. Talus, Rock Barren, Crevice and Cave, and Alvar sites may be directly related to these habitats.<br><br>Observations of congregations of snakes on sunny warm days in the spring or fall is a good indicator.<br><br>For Five-lined Skink, ELC Community Series of FOD and FOM and Ecosites:<br>FOC1<br>FOC3 | • For snakes, hibernation takes place in sites located below frost lines in burrows, rock crevices and other natural locations. The existence of features that go below the frost line; such as rock piles or slopes, old stone fences, and abandoned crumbling foundations assist in identifying candidate SWH.<br>• Areas of broken and fissured rock are particularly valuable since they provide access to subterranean sites below the frost line[xliv, l, li, lii, cxii.]<br>• Wetlands can also be important over-wintering habitat in conifer or shrub swamps and swales, poor fens, or depressions in bedrock terrain with sparse trees or shrubs with sphagnum moss or sedge hummock ground cover.<br>• Five-lined skink prefer mixed forests with rock outcrop openings providing cover rock overlaying granite bedrock with fissures cciii.<br><br>Information Sources | Studies confirming:<br>• Presence of snake hibernacula used by a minimum of five individuals of a snake sp. or; individuals of two or more snake spp.<br>• Congregations of a minimum of five individuals of a snake sp. or; individuals of two or more snake spp. near potential hibernacula (eg. foundation or rocky slope) on sunny warm days in Spring (Apr/May) and Fall (Sept/Oct).<br>• Note: If there are Special Concern Species present, then site is SWH<br>• Note: Sites for hibernation possess specific habitat parameters (e.g. temperature, humidity, etc.) and consequently are used annually, often by many of the same individuals of a local population [i.e. strong hibernation site fidelity]. Other critical life processes (e.g. mating) often take place in close proximity to hibernacula. The feature in which the hibernacula | Suitable habitat could be present within the study area.<br><br>Field assessment indicated that existing bridge foundation would not be considered hibernaculum.<br><br>**Not SWH within development area.**<br>**Not SWH within study area.** |

**Table 1. Characteristics of Seasonal Concentration Areas**

| Rationale | Wildlife Species | Candidate SWH | | Confirmed SWH | Study Area |
|---|---|---|---|---|---|
| | | ELC Ecosite Codes | Habitat Criteria and Information Sources | Defining Criteria | Assessment Details |
| | | | • In spring, local residents or landowners may have observed the emergence of snakes on their property (e.g. old dug wells).<br>• Reports and other information from CAs.<br>• Local Field naturalists and experts, as well as university herpetologists may also know where to find some of these sites. clubs<br>• Natural Heritage Information Center (NHIC)<br>• OMNRF ecologist or biologist may be aware of locations of wintering skinks | is located plus a 30m buffer is the SWH[i]<br>• SWHMiST[cxlix] Index #13 provides development effects and mitigation measures for snake hibernacula.<br>• Presence of any active hibernaculum for skink is significant.<br>• SWHMiST[cxlix] Index #37 provides development effects and mitigation measures for five-lined skink wintering habitat. | |
| **Colonially - Nesting Bird Breeding Habitat (Bank and Cliff)** | | | | | |
| Historical use and number of nests in a colony make this habitat significant. An identified colony can be very important to local populations. All swallow populations are declining in Ontario. | Cliff Swallow<br>Northern Rough-winged Swallow<br>(this species is not colonial but can be found in Cliff Swallow colonies) | Eroding banks, sandy hills, borrow pits, steep slopes, and sand piles<br>Cliff faces, bridge abutments, silos, barns<br><br>Habitat found in the following ecosites:<br>CUM1 CUT1<br>CUS1 BLO1<br>BLS1 BLT1<br>CLO1 CLS1<br>CLT1 | • Any site or areas with exposed soil banks, undisturbed or naturally eroding that is not a licensed/permitted aggregate area.<br>• Does not include man-made structures (bridges or buildings) or recently (2 years) disturbed soil areas, such as berms, embankments, soil or aggregate stockpiles.<br>• Does not include a licensed/permitted Mineral Aggregate Operation.<br><br><u>Information Sources</u><br>• Reports and other information available from CAs<br>• Ontario Breeding Bird Atlas [ccv]<br>• Bird Studies Canada; *NatureCounts* http://www.birdscanada.org/birdmon/<br>• Field Naturalist clubs | Studies confirming:<br>• Presence of 1 or more nesting sites with 8[cxlvix] or more cliff swallow pairs and/or rough-winged swallow pairs during the breeding season.<br>• A colony identified as SWH will include a 50m radius habitat area from the peripheral nests[ccvii]<br>• Field surveys to observe and count swallow nests are to be completed during the breeding season Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects"[ccxi]<br>• SWHMiST[cxlix] Index #4 provides development effects and mitigation measures | Suitable ecosites not present within the study area.<br><br>**Not SWH within development area.**<br>**Not SWH within study area.** |
| **Colonially - Nesting Bird Breeding Habitat (Tree/Shrubs)** | | | | | |
| Large Colonies are important to local bird population, typically sites are only known colony | Great Blue Heron<br>Black-crowned Night-heron<br>Great Egret<br>Green Heron | SWM2 SWM3<br>SWM5 SWM6<br>SWD1 SWD2<br>SWD3 SWD4<br>SWD5 SWD6<br>SWD7 FET1 | • Nests in live or dead standing trees in wetlands, lakes, islands, and peninsulas. Shrubs and occasionally emergent vegetation may also be used.<br>• Most nests in trees are 11 to 15m | Studies confirming:<br>• Presence of 5[i] or more active nests of Great Blue Heron or other listed species.<br>• The habitat extends from the edge of the colony and a | Suitable habitat could be present as wetland areas are within the study area.<br><br>Preliminary site assessment did not observe heron nests or heron activity. |

**Significant Wildlife Habitat Assessment: Ecoregion 6E.**

**Table 1. Characteristics of Seasonal Concentration Areas**

| Rationale | Wildlife Species | Candidate SWH | | Confirmed SWH | Study Area |
|---|---|---|---|---|---|
| | | ELC Ecosite Codes | Habitat Criteria and Information Sources | Defining Criteria | Assessment Details |
| in area and are used annually. | | | from ground, near the top of the tree.<br><br>Information Sources<br>• Ontario Breeding Bird Atlas[ccv], colonial nest records.<br>• Ontario Heronry Inventory 1991 available from Bird Studies Canada or NHIC (OMNR).<br>• NHIC Mixed Wader Nesting Colony<br>• Aerial photographs can help identify large heronries<br>• Reports and other information available from CAs<br>• MNRF District Offices<br>• Local naturalist clubs | minimum 300m radius or extent of the Forest Ecosite containing the colony or any island <15.0ha with a colony is the SWH [cc, ccvii]<br>• Confirmation of active heronries are to be achieved through site visits conducted during the nesting season (April to August) or by evidence such as the presence of fresh guano, dead young and/or eggshells<br>• SWHMiST[cxlix] Index #5 provides development effects and mitigation measures. | **Not SWH within development area.**<br>**Not SWH within study area.** |
| **Colonially - Nesting Bird Breeding Habitat (Ground)** | | | | | |
| Colonies are important to local bird populations, typically sites are only known colony in area and are used annually. | Herring Gull<br>Great Black-backed Gull<br>Little Gull<br>Ring-billed Gull<br>Common Tern<br>Caspian Tern<br>Brewer's Blackbird | Any rocky island or peninsula (natural or artificial) within a lake or large river (two-lined on a 1:50,000 NTS map).<br><br>Close proximity to watercourses in open fields or pastures with scattered trees or shrubs (Brewer's Blackbird)<br><br>MAM1 – 6<br>MAS1 – 3<br>CUM<br>CUT<br>CUS | • Nesting colonies of gulls and terns are on islands or peninsulas associated with open water or in marshy areas.<br>• Brewers Blackbird colonies are found loosely on the ground in or in low bushes in close proximity to streams and irrigation ditches within farmlands.<br><br>Information Sources<br>• Ontario Breeding Bird Atlas[ccv], rare/colonial species records.<br>• Canadian Wildlife Service<br>• Reports and other information available from CAs<br>• Natural Heritage Information Center (NHIC) Colonial Waterbird Nesting Area<br>• MNRF District Offices<br>• Field naturalist clubs | Studies confirming:<br>• Presence of >25 active nests for Herring Gulls or Ring-billed Gulls, >5 active nests for Common Tern or >2 active nests for Caspian Tern[l].<br>• Presence of 5 or more pairs for Brewer's Blackbird.<br>• Any active nesting colony of one or more Little Gull, and Great Black-backed Gull is significant.<br>• The edge of the colony and a minimum 150m area of habitat, or the extent of the ELC ecosites containing the colony or any island <3.0ha with a colony is the SWH[cc, ccvii]<br>• Studies would be done during May/June when actively nesting. Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects"[ccxi]<br>• SWHMiST[cxlix] Index #6 provides development effects and mitigation measures. | Suitable habitat not present within the development area as suitable features (islands, scattered vegetation) are not present.<br><br>**Not SWH within development area.**<br>**Not SWH within study area.** |

**Significant Wildlife Habitat Assessment: Ecoregion 6E.**

**Table 1. Characteristics of Seasonal Concentration Areas**

| Rationale | Wildlife Species | Candidate SWH | | Confirmed SWH | Study Area |
|---|---|---|---|---|---|
| | | ELC Ecosite Codes | Habitat Criteria and Information Sources | Defining Criteria | Assessment Details |
| **Migratory Butterfly Stopover Areas** | | | | | |
| Butterfly stopovers areas are extremely rare habitats and are biologically important for butterfly species that migrate south for the winter. | Painted Lady<br>Red Admiral<br><br><u>Special Concern</u>:<br>Monarch | Combination of ELC Community Series:<br>Need to have present one Community Series from each landclass:<br><br><u>Field</u>:<br>CUM CUS<br>CUT<br><br><u>Forest</u>:<br>FOC FOM<br>FOD CUP<br><br>Anecdotally, a candidate sight for butterfly stopover will have a history of butterflies being observed. | A butterfly stopover area will be a minimum of 10 ha in size with a combination of field and forest habitat present, and will be located within 5 km of Lake Ontario[cxlix].<br>• The habitat is typically a combination of field and forest, and provides the butterflies with a location to rest prior to their long migration south[xxxii, xxxiii, xxxiv, xxxv, xxxvi.]<br>• The habitat should not be disturbed, fields/meadows with an abundance of preferred nectar plants and woodland edge providing shelter are requirements for this habitat cxlviii, cxlix.<br>• Staging areas usually provide protection from the elements and are often spits of land or areas with the shortest distance to cross the Great Lakes[xxxvii, xxxviii, xxxix, xl, xli.]<br><br><u>Information Sources</u><br>• OMNRF (NHIC)<br>• Agriculture Canada in Ottawa may have list of butterfly experts.<br>• Field Naturalist Clubs<br>• Toronto Entomologists Association<br>• Conservation Authorities | Studies confirm:<br>• The presence of Monarch Use Days (MUD) during fall migration (Aug/Oct)[xliii]. MUD is based on the number of days a site is used by Monarchs, multiplied by the number of individuals using the site. Numbers of butterflies can range from 100-500/day[xxxvii], significant variation can occur between years and multiple years of sampling should occur [xl, xlii].<br>• Observational studies are to be completed and need to be done frequently during the migration period to estimate MUD<br>• MUD of >5000 or >3000 with the presence of Painted Ladies or Red Admiral's is to be considered significant.<br>• SWHMiST[cxlix] Index #16 provides development effects and mitigation measures. | Suitable habitat not present within the development area as not within 5km of Lake Ontario.<br><br>**Not SWH within development area/ study area.** |
| **Landbird Migratory Stopover Areas** | | | | | |
| Sites with a high diversity of species as well as high number are most significant | All migratory songbirds.<br><br>Canadian Wildlife Service Ontario website: http://www.on.ec.gc.ca/wildlife_e.html<br><br>All migrant raptors species:<br><br>Ontario Ministry of Natural Resources:<br>Fish and Wildlife Conservation Act, 1997. | All Ecosites associated with these ELC Community Series:<br>FOC<br>FOM<br>FOD<br>SWC<br>SWM<br>SWD | Woodlots need to be >10 ha[l] in size and within 5km [iv, v, vi, vii, viii, ix, x, xi, xii, xiii, xiv, xv] of Lake Ontario.<br>• If multiple woodlands are located along the shoreline, those woodlands <2km from Lake Ontario are more significant[cxlix]<br>• Sites have a variety of habitats; forest, grassland and wetland complexes[cxlix].<br>• The largest sites are more significant[cxlix]<br>• Woodlots and forest fragments are important habitats to migrating birds[ccxviii], these features located | Studies confirm:<br>• Use of the woodlot by >200 birds/day and with >35 spp. with at least 10 bird spp. recorded on at least 5 different survey dates. This abundance and diversity of migrant bird species is considered above average and significant.<br>• Studies should be completed during spring (Apr/May) and fall (Aug/Oct) migration using standardized assessment techniques. Evaluation methods to follow "Bird and Bird Habitats: | Suitable habitat not present within the development area as not within 5km of Lake Ontario.<br><br>**Not SWH within development area/study area.** |

**Table 1. Characteristics of Seasonal Concentration Areas**

| Rationale | Wildlife Species | Candidate SWH | | Confirmed SWH | Study Area |
|---|---|---|---|---|---|
| | | ELC Ecosite Codes | Habitat Criteria and Information Sources | Defining Criteria | Assessment Details |
| | Schedule 7: Specially Protected Birds (Raptors) | | along the shore and located within 5km of Lake Ontario are Candidate SWH[cxlviii].<br><br>Information Sources<br>• Bird Studies Canada<br>• Ontario Nature<br>• Local birders and naturalist club<br>• Ontario Important Bird Areas (IBA) Program | Guidelines for Wind Power Projects"[ccxi]<br>• SWHMiST[cxlix] Index #9 provides development effects and mitigation measures. | |
| **Deer Yarding Areas** | | | | | |
| Winter habitat for deer is considered to be the main factor for northern deer populations. In winter, deer congregate in "yards" to survive severe winter conditions. Deer yards typically have a long history of annual use by deer, yards typically represent 10-15% of an areas summer range. | White-tailed Deer | Note: OMNRF to determine this habitat.<br><br>ELC Community Series providing a thermal cover component for a deer yard would include:<br>FOM, FOC, SWM and SWC.<br><br>Or these ELC Ecosites:<br>CUP2 CUP3<br>FOD3 CUT | • Deer yarding areas or winter concentration areas (yards) are areas deer move to in response to the onset of winter snow and cold. This is a behavioural response and deer will establish traditional use areas. The yard is composed of two areas referred to as Stratum I and Stratum II. Stratum II covers the entire winter yard area and is usually a mixed or deciduous forest with plenty of browse available for food. Agricultural lands can also be included in this area. Deer move to these areas in early winter and generally, when snow depths reach 20cm, most of the deer will have moved here. If the snow is light and fluffy, deer may continue to use this area until 30cm snow depth. In mild winters, deer may remain in the Stratum II area the entire winter.<br>• The Core of a deer yard (Stratum I) is located within the Stratum II area and is critical for deer survival in areas where winters become severe. It is primarily composed of coniferous trees (pine, hemlock, cedar, spruce) with a canopy cover of more than 60%[cxciv].<br>• OMNRF determines deer yards following methods outlined in "Selected Wildlife and Habitat Features: Inventory Manual"[cxcv]<br>• Woodlots with high densities of | No Studies Required:<br>• Snow depth and temperature are the greatest influence on deer use of winter yards. Snow depths > 40cm for more than 60 days in a typically winter are minimum criteria for a deer yard to be considered as SWH[lvi, lvii, lviii, lix, lx, i].<br>• Deer Yards are mapped by OMNRF District offices. Locations of Core or Stratum 1 and Stratum 2 Deer yards considered significant by OMNRF will be available at local MNRF offices or via Land Information Ontario (LIO).<br>• Field investigations that record deer tracks in winter are done to confirm use (best done from an aircraft). Preferably, this is done over a series of winters to establish the boundary of the Stratum I and Stratum II yard in an "average" winter. MNRF will complete these field investigations[cxcv].<br>• If a SWH is determined for Deer Wintering Area or if a proposed development is within Stratum II yarding area then Movement Corridors are to be considered as outlined in Table 1.4.1 of this Schedule.<br>• SWHMiST[cxlix] Index #2 | Suitable habitat not present within the development area as not identified during the background review.<br><br>**Not SWH within development area/study area.** |

**Significant Wildlife Habitat Assessment: Ecoregion 6E.**

**Table 1. Characteristics of Seasonal Concentration Areas**

| Rationale | Wildlife Species | Candidate SWH | | Confirmed SWH | Study Area |
|---|---|---|---|---|---|
| | | ELC Ecosite Codes | Habitat Criteria and Information Sources | Defining Criteria | Assessment Details |
| | | | deer due to artificial feeding are not significant. | provides development effects and mitigation measures. | |
| **Deer Winter Congregation Areas** | | | | | |
| Deer movement during winter in the southern areas of Ecoregion 6E are not constrained by snow depth, however deer will annually congregate in large numbers in suitable woodlands to reduce or avoid the impacts of winter conditions[exlviii] | White-tailed Deer | All Forested Ecosites with these ELC Community Series:<br>FOC<br>FOM<br>FOD<br>SWC<br>SWM<br>SWD<br><br>Conifer plantations much smaller than 50ha may also be used. | • Woodlots will typically be >100 ha in size. Woodlots <100ha may be considered as significant based on MNRF studies or assessment.<br>• Deer movement during winter in the southern areas of Eco-region 6E are not constrained by snow depth, however deer will annually congregate in large numbers in suitable woodlands[cxlviii].<br>• If deer are constrained by snow depth refer to the Deer Yarding Area habitat within Table 1.1 of this Schedule.<br>• Large woodlots > 100ha and up to 1500 ha are known to be used annually by densities of deer that range from 0.1-1.5 deer/ha[ccxxiv].<br>• Woodlots with high densities of deer due to artificial feeding are not significant.<br><br><u>Information Sources</u><br>• MNRF District Offices<br>• LIO/NRVIS | Studies confirm:<br>• Deer management is an MNRF responsibility, deer winter congregation areas considered significant will be mapped by MNRF[cxlviii].<br>• Use of the woodlot by white-tailed deer will be determined by MNRF, all woodlots exceeding the area criteria are significant, unless determined not to be significant by MNR[i].<br>• Studies should be completed during winter (Jan/Feb) when >20cm of snow is on the ground using aerial survey techniques[ccxxiv] , ground or road surveys, or a pellet count deer density survey[ccxxv].<br>• If a SWH is determined for Deer Wintering Area of if a proposed development is within Stratum II yarding area then Movement Corridors are to be considered as outlined in Table 1.4.1 of this Schedule.<br>• SWHMiST[cxlix] Index #2 provides development effects and mitigation measures. | Suitable habitat not present within the development area as not identified during the background review.<br><br>**Not SWH within development area/study area.** |

**Significant Wildlife Habitat Assessment: Ecoregion 6E.**

**Table 2. Characteristics of Rare Vegetation Communities**

| Rationale | Candidate SWH | | | Confirmed SWH | Study Area |
|---|---|---|---|---|---|
| | ELC Ecosite Codes | Habitat Description | Habitat Criteria and Information Sources | Defining Criteria | Assessment Details |
| **Cliffs and Talus Slopes** | | | | | |
| Cliffs and Talus Slopes are extremely rare habitats in Ontario. | Any ELC Ecosite within Community Series:<br><br>TAO CLO<br>TAS CLS<br>TAT CLT | A Cliff is vertical to near vertical bedrock >3m in height.<br><br>A Talus Slope is rock rubble at the base of a cliff made up of coarse rocky debris. | Most cliff and talus slopes occur along the Niagara Escarpment.<br><br>Information Sources<br>• The Niagara Escarpment Commission has detailed information on location of these habitats.<br>• OMNRF District<br>• Natural Heritage Information Center (NHIC) has location information on their website<br>• Local naturalist clubs<br>• Conservation Authorities | • Confirm any ELC Vegetation Type for Cliffs or Talus Slopes[lxxviii]<br>• SWHMiST[cxlix] Index #21 provides development effects and mitigation measures. | Suitable habitat not present within the development area as not cliffs and slopes are present.<br><br>**Not SWH within development area/study area.** |
| **Sand Barren** | | | | | |
| Sand barrens are rare in Ontario and support rare species. Most Sand Barrens have been lost due to cottage development and forestry. | ELC Ecosites:<br>SBO1<br>SBS1<br>SBT1<br><br>Vegetation cover varies from patchy and barren to continuous meadow (SBO1), thicket-like (SBS1), or more closed and treed (SBT1). Tree cover always <60%. | Sand Barrens typically are exposed sand, generally sparsely vegetated and caused by lack of moisture, periodic fires and erosion. They have little or no soil and the underlying rock protrudes through the surface. Usually located within other types of natural habitat such as forest or savannah. Vegetation can vary from patchy and barren to tree covered but less than 60%. | Any sand barren area, >0.5ha in size.<br><br>Information Sources<br>• OMNRF Districts.<br>• Natural Heritage Information Center (NHIC) has location information on their website<br>• Field naturalist clubs<br>• Conservation Authorities | • Confirm any ELC Vegetation Type for Sand Barrens[lxxviii]<br>• Site must not be dominated by exotic or introduced species (<50% vegetative cover exotics)[i].<br>• SWHMiST[cxlix] Index #20 provides development effects and mitigation measures. | Suitable habitat not present within the development area. Vegetation community not present.<br><br>**Not SWH within development area/study area.** |
| **Alvar** | | | | | |
| Alvars are extremely rare habitats in Ecoregion 6E. Most alvars in Ontario are in Ecoregion 6E and 7E. Alvars in 6E are small and highly localized just north of the Palaeozoic- | ALO1<br>ALS1<br>ALT1<br>FOC1<br>FOC2<br>CUM2<br>CUS2<br>CUT2-1<br>CUW2<br><br>Five Alvar<br><br>Indicator Species: | An alvar is typically a level, mostly unfractured calcareous bedrock feature with a mosaic of rock pavements and bedrock overlain by a thin veneer of soil. The hydrology of alvars is complex, with alternating periods of inundation and drought. Vegetation cover varies from sparse lichen-moss associations to grasslands and shrublands | An Alvar site > 0.5 ha in size[lxxv].<br><br>Information Sources<br>• Alvars of Ontario (2000), Federation of Ontario Naturalists[lxxvi].<br>• Ontario Nature – Conserving Great Lakes Alvars[ccviii].<br>• Natural Heritage Information Center (NHIC) has location information on their website<br>• Field Naturalist clubs<br>• Conservation Authorities | Field studies identify four of the five Alvar indicator species[lxxv, cxlix] at a Candidate Alvar site is Significant.<br><br>• Site must not be dominated by exotic or introduced species (<50% vegetative cover are exotics sp.).<br>• The alvar must be in excellent condition and fit in with surrounding landscape with few conflicting land uses[lxxv]. | Suitable habitat not present within the development area. Vegetation community not present.<br><br>**Not SWH within development area/study area.** |

**Significant Wildlife Habitat Assessment: Ecoregion 6E.**

**Table 2. Characteristics of Rare Vegetation Communities**

| Rationale | Candidate SWH | | | Confirmed SWH | Study Area |
|---|---|---|---|---|---|
| | ELC Ecosite Codes | Habitat Description | Habitat Criteria and Information Sources | Defining Criteria | Assessment Details |
| Precambrian contact. | 1) Carex crawei<br>2) Panicum philadelphicum<br>3) Eleochairs compressa<br>4) Scutellaria parvula<br>5) Trichostema branchiatum<br><br>These indicator species are very specific to Alvars within Ecoregion 6E | and comprising a number of characteristic or indicator plant. Undisturbed alvars can be phyto- and zoo geographically diverse, supporting many uncommon or are relict plant and animals species. Vegetation cover varies from patchy to barren with a less than 60% tree cover[lxxviii]. | | • SWHMiST[cxlix] Index #17 provides development effects and mitigation measures. | |
| **Old Growth Forest** | | | | | |
| Due to historic logging practices, extensive old growth forest is rare in the Ecoregion. Interior habitat provided by old growth forests is required by many wildlife species. | Forest Community Series:<br>FOD<br>FOC<br>FOM<br>SWD<br>SWC<br>SWM | Old Growth forests are characterized by heavy mortality or turnover of over-storey trees resulting in a mosaic of gaps that encourage development of a multi-layered canopy and an abundance of snags and downed woody debris. | Woodland Stands areas 30ha or greater in size or with at least 10 ha interior habitat assuming 100m buffer at edge of forest Í.<br><br>Information Sources<br>• OMNRF Forest Resource Inventory mapping<br>• OMNRF Forester, Ecologist or Biologist<br>• Field Local naturalist clubs<br>• Conservation Authorities<br>• Sustainable Forestry License (SFL) companies will possibly know locations through field operations.<br>• Municipal forestry departments | Field Studies will determine:<br>• If dominant trees species of the ecosite are >140 years old, then stand is Significant Wildlife Habitat[cxlviii]<br>• The stand will have experienced no recognizable forestry activities[cxlviii]<br>• The area of Forest Ecosites combined to make up the stand is the SWH.<br>• Determine ELC Vegetation Type for forest stand[lxxviii]<br>• SWHDSS[cxlix] Index #23 provides development effects and mitigation measures. | Suitable habitat not present within the development area. Vegetation community not present.<br><br>**Not SWH within development area/study area.** |
| **Tallgrass Prairie** | | | | | |
| Tallgrass Prairies are extremely rare habitats in Ontario. | TPO1<br>TPO2 | A Tallgrass Prairie has ground cover dominated by prairie grasses. An open Tallgrass Prairie habitat has < 25% tree cover. | • No minimum size to site<br>Site must be restored or a natural site. Remnant sites such as railway right of ways are not considered to be SWH.<br><br>Information Sources<br>• OMNR Districts<br>• Natural Heritage Information Center (NHIC) has location information available on their website<br>• Field naturalists clubs<br>• Conservation Authorities | Field studies confirm one or more of the Prairie indicator species listed in[lxxv] Appendix N should be present. Note: Prairie plant spp. list from Ecoregion 6E should be used[cxlviii].<br>• Area of the ELC Ecosite is the SWH<br>• Site must not be dominated by exotic or introduced species (<50% vegetative cover exotics).<br>• SWHMiST[cxlix] Index #19 provides development effects and mitigation measures. | Suitable habitat not present within the development area. Vegetation community not present.<br><br>**Not SWH within development area/study area.** |

**Significant Wildlife Habitat Assessment: Ecoregion 6E.**

**Table 2. Characteristics of Rare Vegetation Communities**

| Rationale | Candidate SWH | | | Confirmed SWH | Study Area |
|---|---|---|---|---|---|
| | ELC Ecosite Codes | Habitat Description | Habitat Criteria and Information Sources | Defining Criteria | Assessment Details |
| **Savannah** | | | | | |
| Savannahs are extremely rare habitats in Ontario. | TPS1<br>TPS2<br>TPW1<br>TPW2<br>CUS2 | A Savannah is a tallgrass prairie habitat that has tree cover between 25 – 60%. | • No minimum size to site<br>Site must be restored or a natural site. Remnant sites such as railway right of ways are not considered to be SWH.<br><br>Information Sources<br>• Natural Heritage Information Center (NHIC) has location information on their website<br>• OMNRF Ecologists<br>• Field naturalists clubs<br>• Conservation Authorities | Field studies confirm one or more of the Savannah indicator species listed in[lxxv] Appendix N should be present. Note: Savannah plant spp. list from Ecoregion 6E should be used[cxlviii].<br><br>• Area of the ELC Ecosite is the SWH.<br>• Site must not be dominated by exotic or introduced species (<50% vegetative cover exotics sp.).<br>• SWHMiST[cxlix] Index #18 provides development effects and mitigation measures. | Suitable habitat not present within the development area. Vegetation community not present.<br><br>**Not SWH within development area/study area.** |
| **Other Rare Vegetation Communities** | | | | | |
| Plant communities that often contain rare species which depend on the habitat for survival. | Provincially Rare S1, S2 and S3 vegetation communities are listed in Appendix M of the SWHTG[cxlviii]. Any ELC Ecosite Code that has a possible ELC Vegetation Type that is Provincially Rare is Candidate SWH. | Rare Vegetation Communities may include beaches, fens, forest, marsh, barrens, dunes and swamps. | ELC Ecosite codes that have the potential to be a rare ELC Vegetation Type as outlined in appendix M[cxlviii]<br><br>The OMNR/NHIC will have up to date listing for rare vegetation communities.<br><br>Information Sources<br>• Natural Heritage Information Center (NHIC) has location information available on their website<br>• OMNRF Districts<br>• Field naturalists clubs<br>• Conservation Authorities | Field studies should confirm if an ELC Vegetation Type is a rare vegetation community based on listing within Appendix M of SWHTG[cxlviii].<br><br>• Area of the ELC Vegetation Type polygon is the SWH.<br>• SWHMiST[cxlix] Index #37 provides development effects and mitigation measures. | FOD7-4 community, which is Black Walnut lowland along the roadway. This community is considered S2S3.<br><br>**Confirmed SWH within development area/study area.** |

**Significant Wildlife Habitat Assessment: Ecoregion 6E.**

**Table 3. Characteristics of Specialized Wildlife Habitat**

| Rationale | Wildlife Species | Candidate SWH | | Confirmed SWH | Study Area |
|---|---|---|---|---|---|
| | | ELC Ecosite Codes | Habitat Criteria and Information Sources | Defining Criteria | Assessment Details |
| **Waterfowl Nesting Area** | | | | | |
| Important to local waterfowl populations, sites with greatest number of species and highest number of individuals are significant. | American Black Duck<br>Northern Pintail<br>Northern Shoveler<br>Gadwall<br>Blue-winged Teal<br>Green-winged Teal<br>Wood Duck<br>Hooded Merganser<br>Mallard | All upland habitats located adjacent to these wetland ELC Ecosites are Candidate SWH:<br>MAS1 MAS2<br>MAS3 SAS1<br>SAM1 SAF1<br>MAM1 MAM2<br>MAM3 MAM4<br>MAM5 MAM6<br>SWT1 SWT2<br>SWD1 SWD2<br>SWD3 SWD4<br><br>Note: includes adjacency to Provincially Significant Wetlands | A waterfowl nesting area extends 120m[cxlix] from a wetland (> 0.5 ha) or a wetland (>0.5ha) and any small wetlands (0.5ha) within 120m or a cluster of 3 or more small (<0.5 ha) wetlands within 120m of each individual wetland where waterfowl nesting is known to occur[cxlix].<br>• Upland areas should be at least 120m wide so that predators such as raccoons, skunks, and foxes have difficulty finding nests.<br>• Wood Ducks and Hooded Mergansers utilize large diameter trees (>40cm dbh) in woodlands for cavity nest sites.<br><br><u>Information Sources</u><br>• Ducks Unlimited staff may know the locations of particularly productive nesting sites.<br>• OMNRF Wetland Evaluations for indication of significant waterfowl nesting habitat.<br>• Reports and other information available from CAs | Studies confirmed:<br>• Presence of 3 or more nesting pairs for listed species excluding Mallards, or<br>• Presence of 10 or more nesting pairs for listed species including Mallards.<br>• Any active nesting site of an American Black Duck is considered significant.<br>• Nesting studies should be completed during the spring breeding season (April - June). Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects"[ccxi]<br>• A field study confirming waterfowl nesting habitat will determine the boundary of the waterfowl nesting habitat for the SWH, this may be greater or less than 120m[cxlviii] from the wetland and will provide enough habitat for waterfowl to successfully nest.<br>• SWHMiST[cxlix] Index #25 provides development effects and mitigation measures. | Suitable habitat could be present within the study area, as wetlands are present with surrounding treed areas.<br>No evidence of nesting was observed within the subject property (ROW).<br><br>**Candidate SWH within development area.**<br>**Candidate SWH within study area.** |
| **Bald Eagle and Osprey Nesting, Foraging and Perching Habitat** | | | | | |
| Nest sites are fairly uncommon in Eco-region 6E are used annually by these species. Many suitable nesting locations may be lost due to increasing shoreline development pressures and scarcity of habitat. | Osprey<br><br><u>Special Concern</u>:<br>Bald Eagle | ELC Forest Community Series: FOD, FOM, FOC, SWD, SWM and SWC directly adjacent to riparian areas – rivers, lakes, ponds and wetlands | • Nests are associated with lakes, ponds, rivers or wetlands along forested shorelines, islands, or on structures over water.<br>• Osprey nests are usually at the top a tree whereas Bald Eagle nests are typically in super canopy trees in a notch within the tree's canopy.<br>• Nests located on man-made objects are not to be included as SWH (e.g. telephone poles and constructed nesting platforms). | Studies confirm the use of these nests by:<br>• One or more active Osprey or Bald Eagle nests in an area[cxlviii].<br>• Some species have more than one nest in a given area and priority is given to the primary nest with alternate nests included within the area of the SWH.<br>• For an Osprey, the active nest and a 300m radius around the nest or the contiguous woodland stand is the | Suitable habitat not present within the development area. Some treed areas over water present, but are likely not suitable (too small of an area). No stick nests observed within the subject property.<br><br>**Not SWH within development area.**<br><br>**Not SWH within study area.** |

**Significant Wildlife Habitat Assessment: Ecoregion 6E.**

**Table 3. Characteristics of Specialized Wildlife Habitat**

| Rationale | Wildlife Species | Candidate SWH | | Confirmed SWH | Study Area |
|---|---|---|---|---|---|
| | | ELC Ecosite Codes | Habitat Criteria and Information Sources | Defining Criteria | Assessment Details |
| | | | Information Sources<br>• Natural Heritage Information Center (NHIC) compiles all known nesting sites for Bald Eagles in Ontario.<br>• MNRF values information (LIO/NRVIS) will list known nesting locations. Note: data from NRVIS is provided as a point and does not represent all the habitat.<br>• Nature Counts, Ontario Nest Records Scheme data.<br>• OMNRF Districts<br>• Sustainable Forestry License (SFL) companies will identify additional nesting locations through field operations.<br>• Check the Ontario Breeding Bird Atlas[ccv] or Rare Breeding Birds in Ontario for species documented<br>• Reports and other information available from CAs.<br>• Field naturalists clubs | SWHccvii, maintaining undisturbed shorelines with large trees within this area is important[cxlviii].<br>• For a Bald Eagle the active nest and a 400-800m radius around the nest is the SWH[cvi], ccvii. Area of the habitat from 400-800m is dependent on site lines from the nest to the development and inclusion of perching and foraging habitat[cvi].<br>• To be significant a site must be used annually. When found inactive, the site must be known to be inactive for >3 years or suspected of not being used for >5 years before being considered not significant[ccvii]<br>• Observational studies to determine nest site use, perching sites and foraging areas need to be done from mid March to mid August.<br>• Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects"[ccxi]<br>• SWHMiST[cxlix] Index #26 provides development effects and mitigation measures | |
| **Woodland Raptor Nesting Habitat** | | | | | |
| Nests sites for these species are rarely identified; these area sensitive habitats and are often used annually by these species. | Northern Goshawk<br>Cooper's Hawk<br>Sharp-shinned Hawk<br>Red-shouldered Hawk<br>Barred Owl<br>Broad-winged Hawk | May be found in all forested ELC Ecosites.<br><br>May also be found in SWC, SWM, SWD and CUP3. | All natural or conifer plantation woodland/forest stands >30ha with >10ha of interior habitat[lxxxviii, lxxxix, xc, xci, xciii, xciv, xcv, xcvi, cxxxiii]. Interior habitat determined with a 200m buffer[cxlviii].<br>• Stick nests found in a variety of intermediate-aged to mature conifer, deciduous or mixed forests within tops or crotches of trees. Species such as Cooper's hawk nest along forest edges sometimes on peninsulas or small off-shore islands.<br>• In disturbed sites, nests may be | Studies confirm:<br>• Presence of 1 or more active nests from species list is considered significant[cxlviii].<br>• Red-shouldered Hawk and Northern Goshawk – a 400m radius around the nest or 28ha area of habitat is the SWH[ccvii].<br>• Barred Owl – a 200m radius around the nest is the SWH[ccvii].<br>• Broad-winged Hawk and Coopers Hawk – a 100m radius around the nest is the SWH[ccvii].<br>• Sharp-shinned Hawk – a 50m radius around the nest is the | Suitable habitat not present within the development area. No interior habitat present. No stick nests observed during the field assessments.<br><br>**Not SWH within development area.**<br>**Not SWH within study area.** |

**Table 3. Characteristics of Specialized Wildlife Habitat**

| Rationale | Wildlife Species | Candidate SWH | | Confirmed SWH | Study Area |
|---|---|---|---|---|---|
| | | ELC Ecosite Codes | Habitat Criteria and Information Sources | Defining Criteria | Assessment Details |
| | | | used again, or a new nest will be in close proximity to old nest.<br><br>Information Sources<br>• OMNRF<br>• Check the Ontario Breeding Bird Atlas[ccv] or Rare Breeding Birds in Ontario for species documented.<br>• Check data from Bird Studies Canada<br>• Reports and other information available from CAs | SWH[ccvii].<br>• Conduct field investigations from mid-March to end of May. The use of call broadcasts can help in locating territorial (courting/nesting) raptors and facilitate the discovery of nests by narrowing down the search area.<br>• SWHMiST[cxlix] Index #27 provides development effects and mitigation measures. | |
| **Turtle Nesting Areas** | | | | | |
| These habitats are rare and when identified will often be the only breeding site for local populations of turtles | Midland Painted Turtle<br><br>Special Concern:<br>Northern Map Turtle<br>Snapping Turtle | Exposed mineral soil (sand or gravel) areas adjacent (<100m)[cxlviii] or within the following ELC Ecosites:<br>MAS1<br>MAS2<br>MAS3<br>SAS1<br>SAM1<br>SAF1<br>BOO1<br>FEO1 | • Best nesting habitat for turtles are close to water and away from roads and sites less prone to loss of eggs by predation from skunks, raccoons or other animals.<br>• For an area to function as a turtle-nesting area, it must provide sand and gravel that turtles are able to dig in and are located in open, sunny areas. Nesting areas on the sides of municipal or provincial road embankments and shoulders are not SWH.<br>• Sand and gravel beaches adjacent to undisturbed shallow weedy areas of marshes, lakes, and rivers are most frequently used.<br><br>Information Sources<br>• Use Ontario Soil Survey reports and maps to help find suitable substrate for nesting turtles (well-drained sands and fine gravels).<br>• Check the Ontario Herpetofaunal Summary Atlas records or other similar atlases for uncommon turtles; location information may help to find potential nesting habitat for them.<br>• Natural Heritage Information Center (NHIC) | Studies confirm:<br>• Presence of 5 or more nesting Midland Painted Turtles<br>• One or more Northern Map Turtle or Snapping Turtle nesting is a SWH[l]<br>• The area or collection of sites within an area of exposed mineral soils where the turtles nest, plus a radius of 30-100m around the nesting area dependent on slope, riparian vegetation and adjacent land use is the SWH[cxlviii].<br>• Travel routes from wetland to nesting area are to be considered within the SWH[cxlix].<br>• Field investigations should be conducted in prime nesting season typically late spring to early summer. Observational studies observing the turtles nesting is a recommended method.<br>• SWHMiST[cxlix] Index #28 provides development effects and mitigation measures for turtle nesting habitat. | None of the ELC ecosites present within the subject property. No suitable nesting habitat associated with the bridge observed during the preliminary assessment.<br><br>**Not SWH within development area.**<br>**Not SWH within study area.** |

**Significant Wildlife Habitat Assessment: Ecoregion 6E.**

**Table 3. Characteristics of Specialized Wildlife Habitat**

| Rationale | Wildlife Species | Candidate SWH | | Confirmed SWH | Study Area |
|---|---|---|---|---|---|
| | | ELC Ecosite Codes | Habitat Criteria and Information Sources | Defining Criteria | Assessment Details |
| | | | • Field Naturalist clubs and landowners | | |
| **Seeps and Springs** | | | | | |
| Seeps/Springs are typical of headwater areas and are often at the source of coldwater streams. | Wild Turkey<br>Ruffed Grouse<br>Spruce Grouse<br>White-tailed Deer<br>Salamander spp. | Seeps/Springs are areas where ground water comes to the surface. Often they are found within headwater areas within forested habitats. Any forested Ecosite within the headwater areas of a stream could have seeps/springs. | Any forested area (with <25% meadow/field/pasture) within the headwaters of a stream or river system[cxvii, cxlix].<br>• Seeps and springs are important feeding and drinking areas especially in the winter will typically support a variety of plant and animal species[cxix, cxx, cxxi, cxxii, cxiii, cxiv]<br><br>Information Sources<br>• Topographical Map<br>• Thermography<br>• Hydrological surveys conducted by CAs and MOE<br>• Field naturalists clubs and landowners<br>• Municipalities and Conservation Authorities may have drainage maps and headwater areas mapped. | Field Studies confirm:<br>• Presence of a site with 2 or more seeps/springs should be considered SWH.<br>• The area of a ELC forest ecosite containing the seeps/springs is the SWH. The protection of the recharge area considering the slope, vegetation, height of trees and groundwater condition need to be considered in delineation the habitat[cxlviii]<br>• SWHMiST[cxlix] Index #30 provides development effects and mitigation measures | Suitable habitat is not present within the development area. Field assessments identified no seeps/springs within the ROW/subject property.<br><br>**Not SWH within development area.**<br>**Not SWH within study area.** |
| **Wildlife Habitat: Amphibian Breeding Habitat (Woodland)** | | | | | |
| These habitats are extremely important to amphibian biodiversity within a landscape and often represent the only breeding habitat for local amphibian populations. | Eastern Newt<br>Blue-spotted Salamander<br>Spotted Salamander<br>Gray Treefrog<br>Spring Peeper<br>Western Chorus Frog<br>Wood Frog | All Ecosites associated with these ELC Community Series:<br>FOC<br>FOM<br>FOD<br>SWC<br>SWM<br>SWD<br><br>Breeding pools within the woodland or the shortest distance from forest habitat are more significant because they are more likely to be used due to reduced risk to migrating amphibians. | • Presence of a wetland, pond or woodland pool (including vernal pools) >500m$^2$ (about 25m diameter) [ccvii] within or adjacent (within 120m) to a woodland (no minimum size)[clxxxii, lxiii, lxv, lxvi, lxvii, lxviii, lxix, lxx] Some small wetlands may not be mapped and may be important breeding pools for amphibians.<br>• Woodlands with permanent ponds or those containing water in most years until mid-July are more likely to be used as breeding habitat[cxlviii]<br><br>Information Sources<br>• Ontario Herpetofaunal Summary Atlas (or other similar atlases) for records<br>• Local landowners may also | Studies confirm:<br>• Presence of breeding population of 1 or more of the listed newt/salamander species or 2 or more of the listed frog species with at least 20 individuals (adults or eggs masses)[lxxi] or 2 or more of the listed frog species with Call Level Codes of 3.<br>• A combination of observational study and call count surveys[cviii] will be required during the spring March-June when amphibians are concentrated around suitable breeding habitat within or near the woodland/wetlands.<br>• The habitat is the woodland area plus a 230m radius of woodland area[lxiii,lxv, lxvi, lxvii, lxviii, lxix, | Suitable habitat not present within the subject property but could be present as wetland present within the study area.<br><br>**Candidate SWH within development area.**<br>**Candidate SWH within study area.** |

**Significant Wildlife Habitat Assessment: Ecoregion 6E.**

**Table 3. Characteristics of Specialized Wildlife Habitat**

| Rationale | Wildlife Species | Candidate SWH | | Confirmed SWH | Study Area |
|---|---|---|---|---|---|
| | | ELC Ecosite Codes | Habitat Criteria and Information Sources | Defining Criteria | Assessment Details |
| | | | provide assistance as they may hear spring-time choruses of amphibians on their property.<br>• OMNRF District<br>• OMNRF wetland evaluations<br>• Field naturalist clubs<br>• Canadian Wildlife Service Amphibian Road Call Survey<br>• Ontario Vernal Pool Association: http://www.ontariovernalpools.org | [lxx, lxxi] if a wetland area is adjacent to a woodland, a travel corridor connecting the wetland to the woodland is the be included in the habitat.<br>• SWHMiST[cxlix] Index #14 provides development effects and mitigation measures. | |
| **Wildlife Habitat: Amphibian Breeding Habitat (Wetland)** | | | | | |
| These habitats are extremely important to amphibian biodiversity within a landscape and often represent the only breeding habitat for local amphibian populations | Eastern Newt<br>American Toad<br>Spotted Salamander<br>Four-toed Salamander<br>Blue-spotted Salamander<br>Gray Tree frog<br>Western Chorus Frog<br>Northern Leopard Frog<br>Pickerel Frog<br>Green Frog<br>Mink Frog<br>Bullfrog | ELC Community Classes SW, MA, FE, BO, OA and SA.<br><br>Typically these wetland ecosites will be isolated (>120m) from woodland ecosites, however larger wetlands containing predominantly aquatic species (e.g. Bull Frog) may be adjacent to woodlands. | • Wetlands >500m2 (about 25m diameter)[ccvii] supporting high species diversity are significant; some small or ephemeral habitats may not be identified on MNRF mapping and could be important amphibian breeding habitats[clxxxiv].<br>• Presence of shrubs and logs increase significance of pond for some amphibian species because of available structure for calling, foraging, escape and concealment from predators.<br>• Bullfrogs require permanent water bodies with abundant emergent vegetation.<br><br><u>Information Sources</u><br>• Ontario Herpetofaunal Summary Atlas (or other similar atlases)<br>• Canadian Wildlife Service Amphibian Road Surveys and Backyard Amphibian Call Count.<br>• OMNRF Districts and wetland evaluations<br>• Reports and other information available from CAs. | Studies confirm:<br>• Presence of breeding population of 1 or more of the listed newt/salamander species or 2 or more of the listed frog/toad species and with at least 20 individuals (adults or eggs masses)[lxxi, lxxiii], or 2 or more of the listed frog/toad species with Call Level Codes of 3. or; Wetland with confirmed breeding Bullfrogs are significant.<br>• The ELC ecosite wetland area and the shoreline are the SWH.<br>• A combination of observational study and call count surveys[cviii] will be required during spring March to June) when amphibians are concentrated around suitable breeding habitat within or near the wetlands.<br>• If a SWH is determined for Amphibian Breeding Habitat (Wetlands) then Movement Corridors are to be considered as outlined in Table 1.4.1 of this Schedule.<br>• SWHMiST[cxlix] Index #15 provides development effects and mitigation measures. | Suitable habitat not present within the subject property or study area<br><br>**Not SWH within development area.**<br>**Not SWH within study area.** |
| **Woodland Area-Sensitive Bird Breeding Habitat** | | | | | |
| Large, natural blocks of mature woodland habitat | Yellow-Bellied Sapsucker<br>Red-breasted Nuthatch<br>Veery | All Ecosites associated with these ELC Community Series: | • Habitats where interior forest breeding birds are breeding, typically large mature (>60 yrs | • Presence of nesting or breeding pairs of 3 or more of the listed wildlife species. | Suitable habitat not present within the development area, interior forest size |

**Significant Wildlife Habitat Assessment: Ecoregion 6E.**

**Table 3. Characteristics of Specialized Wildlife Habitat**

| Rationale | Wildlife Species | Candidate SWH | | Confirmed SWH | Study Area |
|---|---|---|---|---|---|
| | | ELC Ecosite Codes | Habitat Criteria and Information Sources | Defining Criteria | Assessment Details |
| within the settled areas of Southern Ontario are important habitats for area sensitive interior forest song birds. | Blue-headed Vireo<br>Northern Parula<br>Black-throated Green Warbler<br>Blackburnian Warbler<br>Black-throated Blue Warbler<br>Ovenbird<br>Scarlet Tanager<br>Winter Wren<br><br>Special Concern:<br>Cerulean Warbler<br>Canada Warbler | FOC<br>FOM<br>FOD<br>SWC<br>SWM<br>SWD | old) forest stands or woodlots >30 ha.[cv, cxxxi, cxxxii, cxxxiii, cxxxiv, cxxv, cxxvi, cxxxvii, cxxxviii, cxxxix, cxl, cxli, cxlii, cxliii, cxliv, cxlv, cxlvi, cl, cli, clii, cliii, cliv, clv, clvii, clviii, clix]<br>• Interior forest habitats are at least 200m from forest edge habitat.<br><br>Information Sources<br>• Local bird clubs<br>• Canadian Wildlife Service (CWS) for the location of forest bird monitoring.<br>• Bird studies Canada conducted a 3-year study of 287 woodlands to determine the effects of forest fragmentation on forest birds and to greatest value to interior species<br>• Reports and other information available from CAs. | • Note: any site with breeding Cerulean Warblers or Canada Warblers is to be considered SWH.<br>• Conduct field investigations in spring and early summer when birds are singing and defending their territories.<br>• Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects"[ccxi]<br>• SWHMiST[cxlix] Index #34 provides development effects and mitigation measures. | does not meet the minimum requirement.<br><br>**Not SWH within development area.**<br>**Not SWH within study area.** |

**Significant Wildlife Habitat Assessment: Ecoregion 6E.**

**Table 4. Characteristics of Habitat for Species of Conservation Concern**

| Rationale | Wildlife Species | Candidate SWH | | Confirmed SWH | Study Area |
|---|---|---|---|---|---|
| | | ELC Ecosite Codes | Habitat Criteria and Information Sources | Defining Criteria | Assessment Details |
| **Marsh Bird Breeding Habitat** | | | | | |
| Wetlands for these bird species are typically productive and fairly rare in Southern Ontario landscapes. | American Bittern<br>Virginia Rail<br>Sora<br>Common Gallinule<br>American Coot<br>Pied-billed Grebe<br>Marsh Wren<br>Sedge Wren<br>Common Loon<br>Sandhill Crane<br>Green Heron<br>Trumpeter Swan<br><br><u>Special Concern</u>:<br>Black Tern<br>Yellow Rail | MAM1<br>MAM2<br>MAM3<br>MAM4<br>MAM5<br>MAM6<br>SAS1<br>SAM1<br>SAF1<br>FEO1<br>BOO1<br><br>For Green Heron:<br>All SW, MA and CUM1 sites. | • Nesting occurs in wetlands<br>• All wetland habitat is to be considered as long as there is shallow water with emergent aquatic vegetation present[cxxiv].<br>• For Green Heron, habitat is at the edge of water such as sluggish streams, ponds and marshes sheltered by shrubs and trees. Less frequently, it may be found in upland shrubs or forest a considerable distance from water.<br><br><u>Information Sources</u><br>• Contact OMNRF, wetland evaluations are a good source of information.<br>• Field naturalist clubs<br>• Natural Heritage Information Center (NHIC) Records<br>• Reports and other information available from CAs.<br>• Ontario Breeding Bird Atlas[ccv] | Studies confirm:<br>• Presence of 5 or more nesting pairs of Sedge Wren or Marsh Wren or 1 pair of Sandhill Cranes; or breeding by any combination of 5 or more of the listed species[l].<br>• Note: any wetland with breeding of 1 or more Black Terns, Trumpeter Swan, Green Heron or Yellow Rail is SWH[l].<br>• Area of the ELC ecosite is the SWH<br>• Breeding surveys should be done in May/June when these species are actively nesting in wetland habitats.<br>• Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects"[ccxi].<br>• SWHMiST[cxlix] Index #35 provides development effects and mitigation measures | Suitable habitat not present as ELC codes not present based on ELC.<br><br>**Not SWH within development area.**<br>**Not SWH within study area.** |
| **Open Country Bird Breeding Habitat** | | | | | |
| This wildlife habitat is declining throughout Ontario and North America. Species such as the Upland Sandpiper have declined significantly the past 40 years based on CWS (2004) trend records. | Upland Sandpiper<br>Grasshopper Sparrow<br>Vesper Sparrow<br>Northern Harrier<br>Savannah Sparrow<br><br><u>Special Concern</u>:<br>Short-eared Owl | CUM1<br>CUM2 | Large grassland areas (includes natural and cultural fields and meadows) >30 ha [clx, clxi, clxii, clxiii, clxiv, clxv, clxvi, clxvii, clxviii, clxix]. Grasslands not Class 1 or 2 agricultural lands, and not being actively used for farming (i.e. no row cropping or intensive hay or livestock pasturing in the last 5 years)[l].<br><br>Grassland sites considered significant should have a history of longevity, either abandoned fields, mature hayfields and pasturelands that are at least 5 years or older.<br><br>The Indicator bird species are area sensitive requiring larger grassland areas than the common | Field Studies confirm:<br>• Presence of nesting or breeding of 2 or more of the listed species.<br>• A field with 1 or more breeding Short-eared Owl is to be considered SWH.<br>• The area of SWH is the contiguous ELC ecosite field areas.<br>• Conduct field investigations of the most likely areas in spring and early summer when birds are singing and defending their territories.<br>• Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects"[ccxi]. | Suitable habitat not present within the development area, as open meadows are not present.<br><br>**Not SWH within development area.**<br><br>**Not SWH within study area.** |

**Significant Wildlife Habitat Assessment: Ecoregion 6E.**

**Table 4. Characteristics of Habitat for Species of Conservation Concern**

| Rationale | Wildlife Species | Candidate SWH | | Confirmed SWH | Study Area |
|---|---|---|---|---|---|
| | | ELC Ecosite Codes | Habitat Criteria and Information Sources | Defining Criteria | Assessment Details |
| | | | grassland species.<br><br>Information Sources<br>• Agricultural land classification maps, Ministry of Agriculture.<br>• Ask local birders<br>• Ontario Breeding Bird Atlas[ccv]<br>• Reports and other information available from CAs. | • SWHMiST[cxlix] Index #32 provides development effects and mitigation measures. | |
| **Shrub/Early Successional Bird Breeding Habitat** | | | | | |
| This wildlife habitat is declining throughout Ontario and North America. The Brown Thrasher has declined significantly over the past 40 years based on CWS (2004) trend records cxcix. | Indicator spp.:<br>Brown Thrasher<br>Clay-coloured Sparrow<br><br>Common spp.:<br>Field Sparrow<br>Black-billed Cuckoo<br>Eastern Towhee<br>Willow Flycatcher<br><br>Special Concern:<br>Yellow-breasted Chat<br>Golden-winged Warbler | CUT1<br>CUT2<br>CUS1<br>CUS2<br>CUW1<br>CUW2<br><br>Patches of shrub ecosites can be complexed into a larger habitat for some bird species. | Large field areas succeeding to shrub and thicket habitats>10ha[clxiv] in size.<br>• Shrub land or early successional fields, not class 1 or 2 agricultural lands, not being actively used for farming (i.e. no row-cropping, haying or live-stock pasturing in the last 5 years)[l].<br><br>Shrub thicket habitats (>10 ha) are most likely to support and sustain a diversity of these species [clxxiii].<br><br>Shrub and thicket habitat sites considered significant should have a history of longevity, either abandoned fields or pasturelands.<br><br>Information Sources<br>• Agricultural land classification maps Ministry of Agriculture<br>Local bird clubs<br>• Ontario Breeding Bird Atlas[ccv]<br>• Reports and other information available from CAs | Field Studies confirm:<br>• Presence of nesting or breeding of 1 of the indicator species and at least 2 of the common species[l].<br>• A field with breeding Yellow-breasted Chat or Golden-winged Warbler is to be considered as Significant Wildlife Habitat.<br>• The area of the SWH is the contiguous ELC ecosite field/thicket area.<br>• Conduct field investigations of the most likely areas in spring and early summer when birds are singing and defending their territories<br>• Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects"[ccxi]<br>• SWHMiST[cxlix] Index #33 provides development effects and mitigation measures. | Suitable habitat not present within the development area.<br><br>**Not SWH within development area.**<br>**Not SWH within study area.** |
| **Terrestrial Crayfish** | | | | | |
| Terrestrial Crayfish are only found within SW Ontario in Canada and their habitats are very rare. [ccii] | Chimney or Digger Crayfish: (*Fallicambarus fodiens*)<br><br>Devil Crawfish or Meadow Crayfish: (*Cambarus Diogenes*) | MAM1<br>MAM2<br>MAM3<br>MAM4<br>MAM5<br>MAM6<br>MAS1<br>MAS2<br>MAS3<br>SWD | Wet meadow and edges of shallow marshes (no minimum size) identified should be surveyed for terrestrial crayfish.<br>• Constructs burrows in marshes, mudflats, meadows, the ground can't be too moist. Can often be found far from water.<br>• Both species are a semi-terrestrial burrower which spends | Studies Confirm:<br>• Presence of 1 or more individuals of species listed or their chimneys (burrows) in suitable marsh meadow or terrestrial sites[cci]<br>• Area of ELC Ecosite or an ecoelement area of meadow marsh or swamp within the larger ecosite area is the SWH | Suitable habitat not present within the development area, as area is within a floodplain. Ground is likely too moist, at least seasonally. Suitable habitat may be present within the study area<br><br>No chimneys observed within the subject property.<br><br>**Not SWH within development area.** |

**Significant Wildlife Habitat Assessment: Ecoregion 6E.**

**Table 4. Characteristics of Habitat for Species of Conservation Concern**

| Rationale | Wildlife Species | Candidate SWH | | Confirmed SWH | Study Area |
|---|---|---|---|---|---|
| | | ELC Ecosite Codes | Habitat Criteria and Information Sources | Defining Criteria | Assessment Details |
| | | SWT<br>SWM | most of its life within burrows consisting of a network of tunnels. Usually the soil is not too moist so that the tunnel is well formed.<br><br>Information Sources<br>• Information sources from "Conservation Status of Freshwater Crayfishes" by Dr. Premek Hamr for the WWF and CNF March 1998 | • Surveys should be done April to August during in temporary or permanent water Note the presence of burrows or chemistry are often the only indicator of presence, observance or collection of individuals is very difficult[cci]<br>• SWHMiST[cxlix] Index #36 provides development effects and mitigation measures. | **Candidate SWH within study area.** |
| **Special Concern and Rare Wildlife Species** | | | | | |
| These species are quite rare or have experienced significant population declines in Ontario. | All Special Concern and Provincially Rare (S1-S3, SH) plant and animal species. Lists of these species are tracked by the Natural Heritage Information Centre. | All plant and animal element occurrences (EO) within a 1 or 10km grid.<br><br>Older element occurrences were recorded prior to GPS being available, therefore location information may lack accuracy. | When an element occurrence is identified within a 1 or 10 km grid for a Special Concern or provincially Rare species; linking candidate habitat on the site needs to be completed to ELC Ecosites[lxxviii].<br><br>Information Sources<br>• Natural Heritage Information Centre (NHIC) will have the Special Concern and Provincially Rare (S1-S3, SH) species lists with element occurrences data.<br>• NHIC Website: "Get Information": http://nhic.mnr.gov.on.ca<br>• Ontario Breeding Bird Atlas[ccv]<br>• Expert advice should be sought as many of the rare spp. have little information available about their requirements. | Studies Confirm:<br>• Assessment/inventory of the site for the identified special concern or rare species needs to be completed during the time of year when the species is present or easily identifiable.<br><br>• The area of the habitat to the finest ELC scale that protects the habitat form and function is the SWH, this must be delineated through detailed field studies. The habitat needs to be easily mapped and cover an important life stage component for a species e.g. specific nesting habitat or foraging habitat.<br>• SWHMiST[cxlix] Index #37 provides development effects and mitigation measures. | Suitable habitat could be present as various SAR have been identified to possibly be present during the background review.<br><br>**Confirmed SWH within development area/study area for Eastern Wood-Pewee.**<br><br>**Candidate SWH within development area/study area for Wood Thrush, Barn Swallow, Snapping Turtle, Silver-haired Bat, Hoary Bat, Eastern Red Bat, and River Bluet** |

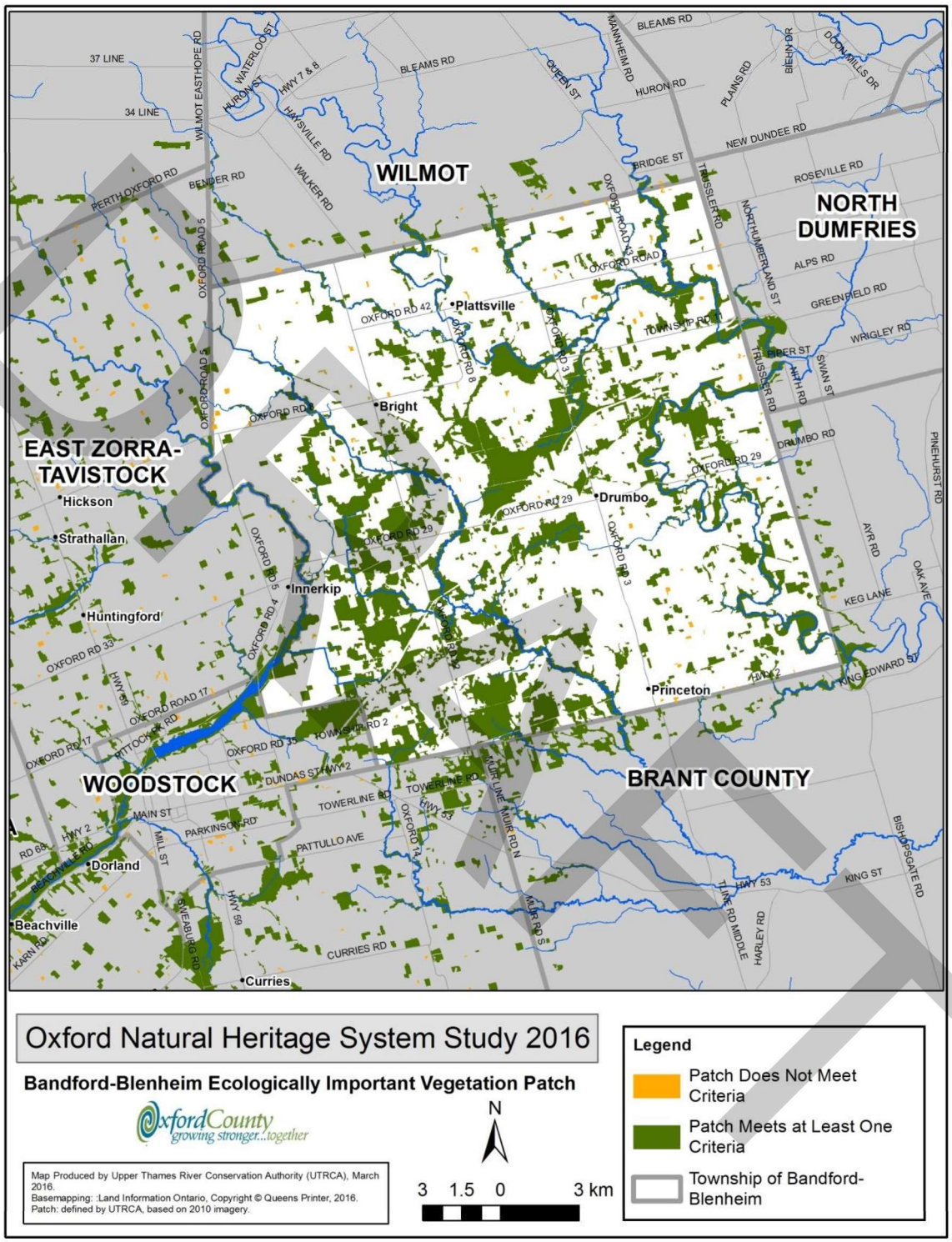
**Significant Wildlife Habitat Assessment: Ecoregion 6E.**

**Table 5. Characteristics of Animal Movement Corridors**

| Rationale | Wildlife Species | Candidate SWH | | Confirmed SWH | Study Area |
|---|---|---|---|---|---|
| | | ELC Ecosite Codes | Habitat Criteria and Information Sources | Defining Criteria | Assessment Details |
| **Amphibian Movement Corridors** | | | | | |
| Movement corridors for amphibians moving from their terrestrial habitat to breeding habitat can be extremely important for local populations. | Eastern Newt<br>Blue-spotted Salamander<br>Spotted Salamander<br>Gray Treefrog<br>Spring Peeper<br>Western Chorus Frog<br>Northern Leopard Frog<br>Pickerel Frog<br>Green Frog<br>Mink Frog<br>Bullfrog | Corridors may be found in all ecosites associated with water.<br>• Corridors will be determined based on identifying the significant breeding habitat for these species in Table 1.1. | Movement corridors between breeding habitat and summer habitat [clxxiv, clxxv, clxxvi, clxxvii, clxxviii, clxxix, clxxx, clxxxi].<br><br>Movement corridors must be determined when Amphibian breeding habitat is confirmed as SWH from Table 1.2.2 (Amphibian Breeding Habitat – Wetland) of this Schedule[i].<br><br><u>Information Sources</u><br>• MNRF District Office<br>• Natural Heritage Information Center NHIC<br>• Reports and other information available from CAs<br>• Field Naturalist Clubs | • Field Studies must be conducted at the time of year when species are expected to be migrating or entering breeding sites.<br>• Corridors should consist of native vegetation, with several layers of vegetation. Cooridors unbroken by roads, waterways or bodies, and undeveloped areas are most significant[cxlix].<br>• Corridors should have at least 15m of vegetation on both sides of waterway [cxlix] or be up to 200m wide[cxlix] of woodland habitat and with gaps <20m [cxlix].<br>• Shorter corridors are more significant than longer corridors, however amphibians must be able to get to and from their summer and breeding habitat[cxlix].<br>• SWHMiST[cxlix] Index #40 provides development effects and mitigation measures. | Suitable habitat likely not present as area is broken by a road, and minimum vegetation level is likely not met.<br><br>**Not SWH within development area.**<br>**Not SWH within study area.** |
| **Deer Movement Corridors** | | | | | |
| Corridors important for all species to be able to access seasonally important life-cycle habitats or to access new habitat for dispersing individuals by minimizing their vulnerability while travelling. | White-tailed Deer | Corridors may be found in all forested ecosites.<br><br>A Project Proposal in Stratum II Deer Wintering Area has potential to contain corridors. | Movement corridor must be determined when Deer Wintering Habitat is confirmed as SWH from Table 1.1 of this schedule[i].<br>• A deer wintering habitat identified by the OMNRF as SWH in Table 1.1 of this Schedule will have corridors that the deer use during fall migration and spring dispersion [clxxxii, clxxxiii, cxlix, cxciv].<br>• Corridors typically follow riparian areas, woodlots, areas of physical geography (ravines, or ridges).<br><br><u>Information Sources</u><br>• MNRF District Office<br>• Natural Heritage Information Center (NHIC)<br>• Reports and other information available from CAs<br>• Field Naturalist Clubs | • Studies must be conducted at the time of year when deer are migrating or moving to and from winter concentration areas.<br>• Corridors that lead to a deer wintering yard should be unbroken by roads and residential areas.<br>• Corridors should be at least 200m wide[cxlix] with gaps <20m[cxlix] and if following riparian area with at least 15m of vegetation on both sides of waterway[cxlix] . Shorter corridors are more significant than longer corridors[cxlix]<br>• SWHMiST[cxlix] Index #39 provides development effects and mitigation measures. | Suitable habitat likely not present as area is broken by a road, and minimum vegetation level is likely not met.<br><br>**Not SWH within development area.**<br>**Not SWH within study area.** |

Appendix IV
Oxford Natural Heritage Systems Study Natural Feature Significance Mapping
(County of Oxford 2016)

## Appendix M-6. Patches that meet one or more criteria for Ecological Importance in Blandford-Blenheim



# Appendix V
# Vascular Flora Species Inventoried within the Study Area

**Plant Species Reported from the Study Area - Township of Blandford-Blenheim Bridge 24 EA (Project #3191)**

| Scientific Name | Common Name | CC | SRANK | SARO | COSEWIC | SARA | SARA Schedule | Oxford | NRSI Observed | CUM1-1 w MAM2-2 Inclusion | FOD7 w MAM2-2 Inclusion | FOD7-4 w SWT2-9 and MAM2-2 Inclusions | H1 & H2 | FOD8-1 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Oldham et al. 1995 | MNRF 2023a | MECP 2023 | Government of Canada 2023 | Government of Canada 2023 | Government of Canada 2023 | Oldham 2017 | NRSI Results From 2023 | | | | | |
| **Dicotyledons** | **Dicots** | | | | | | | | | | | | | |
| **Aceraceae** | **Maple Family** | | | | | | | | | | | | | |
| *Acer negundo* | Manitoba Maple | 0 | S5 | | | | | X | X | X | X | X | | |
| **Apiaceae** | **Carrot or Parsley Family** | | | | | | | | | | | | | |
| *Angelica atropurpurea* | Purple-stemmed Angelica | 6 | S5 | | | | | X | X | | X | | | |
| **Asclepiadaceae** | **Milkweed Family** | | | | | | | | | | | | | |
| *Asclepias incarnata* | Swamp Milkweed | 6 | S5 | | | | | X | X | | X | | | |
| **Asteraceae** | **Composite or Aster Family** | | | | | | | | | | | | | |
| *Ageratina altissima* | Common White Snakeroot | 5 | S5 | | | | | X | X | | | X | | |
| *Ambrosia trifida* | Great Ragweed | 0 | S5 | | | | | X | X | X | X | | | |
| *Eutrochium maculatum* | Spotted Joe Pye Weed | 3 | S5 | | | | | | X | X | X | | | |
| *Solidago canadensis* | Canada Goldenrod | 1 | S5 | | | | | | X | X | | | | |
| *Symphyotrichum lanceolatum ssp. lanceol* | Panicled Aster | 3 | S5 | | | | | | X | X | X | X | X | |
| *Symphyotrichum pilosum var. pilosum* | Old Field Aster | 1 | S5 | | | | | X | X | | X | | | |
| **Balsaminaceae** | **Touch-me-not Family** | | | | | | | | | | | | | |
| *Impatiens capensis* | Spotted Jewelweed | 4 | S5 | | | | | X | X | | X | | | |
| *Impatiens pallida* | Pale Jewelweed | 7 | S4 | | | | | X | X | | X | X | | X |
| **Brassicaceae** | **Mustard Family** | | | | | | | | | | | | | |
| *Hesperis matronalis* | Dame's Rocket | | SE5 | | | | | IX | X | X | X | X | | |
| **Caprifoliaceae** | **Honeysuckle Family** | | | | | | | | | | | | | |
| *Lonicera tatarica* | Tatarian Honeysuckle | | SE5 | | | | | IX | X | | X | | | |
| *Sambucus canadensis* | Common Elderberry | 5 | S5 | | | | | X | X | | X | | | |
| **Caryophyllaceae** | **Pink Family** | | | | | | | | | | | | | |
| *Myosoton aquaticum* | Giant-chickweed | | SE3 | | | | | | X | | X | | | |
| **Ceratophyllaceae** | **Hornwort Family** | | | | | | | | | | | | | |
| *Ceratophyllum demersum* | Common Hornwort | 4 | S5 | | | | | X | X | | X | | | |
| **Cornaceae** | **Dogwood Family** | | | | | | | | | | | | | |
| *Cornus sericea* | Red-osier Dogwood | 2 | S5 | | | | | X | X | X | X | X | | |
| **Cucurbitaceae** | **Gourd Family** | | | | | | | | | | | | | |
| *Echinocystis lobata* | Wild Mock-cucumber | 3 | S5 | | | | | X | X | | X | X | | |
| **Juglandaceae** | **Walnut Family** | | | | | | | | | | | | | |
| *Juglans nigra* | Black Walnut | 5 | S4? | | | | | X | X | X | X | X | | |
| **Lamiaceae** | **Mint Family** | | | | | | | | | | | | | |
| *Glechoma hederacea* | Ground Ivy | | SE5 | | | | | | X | X | X | | | |
| *Lycopus americanus* | American Water-horehound | 4 | S5 | | | | | X | X | | X | X | | |
| *Mentha canadensis* | Canada Mint | 3 | S5 | | | | | X | X | | X | | | |
| **Oleaceae** | **Olive Family** | | | | | | | | | | | | | |
| *Fraxinus pennsylvanica* | Green Ash | 3 | S4 | | | | | X | X | | X | | | |
| **Onagraceae** | **Evening-primrose Family** | | | | | | | | | | | | | |
| *Circaea canadensis* | Broad-leaved Enchanter's Nightshade | 2 | S5 | | | | | | X | | X | X | X | X |
| *Oenothera biennis* | Common Evening-primrose | 0 | S5 | | | | | | X | X | | | | |
| **Plantaginaceae** | **Plantain Family** | | | | | | | | | | | | | |
| *Plantago rugelii* | Rugel's Plantain | 1 | S5 | | | | | X | X | X | | | | |
| **Polygonaceae** | **Smartweed Family** | | | | | | | | | | | | | |
| *Persicaria amphibia* | Water Smartweed | 5 | S5 | | | | | X | X | | X | | | |
| *Polygonum aviculare* | Prostrate Knotweed | 0 | S4? | | | | | | X | X | | | | |
| **Ranunculaceae** | **Buttercup Family** | | | | | | | | | | | | | |
| *Anemonastrum canadense* | Canada Anemone | 3 | S5 | | | | | | X | | X | X | | |
| *Clematis virginiana* | Virginia Virgin's-bower | 3 | S5 | | | | | X | X | | X | X | | |
| *Ranunculus acris* | Tall Buttercup | | SE5 | | | | | IX | X | X | | | | |
| *Ranunculus repens* | Creeping Buttercup | | SE5 | | | | | | X | | X | | | |
| *Thalictrum dasycarpum* | Purple Meadow-rue | 5 | S4? | | | | | | X | | | X | | |
| **Rosaceae** | **Rose Family** | | | | | | | | | | | | | |
| *Agrimonia gryposepala* | Hooked Agrimony | 2 | S5 | | | | | X | X | | | X | | |
| *Geum aleppicum* | Yellow Avens | 2 | S5 | | | | | X | X | | X | | | |
| *Geum canadense* | White Avens | 3 | S5 | | | | | X | X | | X | | | |
| *Geum x catlingii* | *(Geum canadense X Geum urbanum)* | | SNA | | | | | hyb | X | | X | | | |
| *Prunus virginiana* | Choke Cherry | 2 | S5 | | | | | X | X | | X | | | |
| *Rubus occidentalis* | Black Raspberry | 2 | S5 | | | | | X | X | | X | | | |

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Rubiaceae** | **Madder Family** | | | | | | | | | | | | | |
| *Galium aparine* | Cleavers | 4 | S5 | | | | | X | X | | X | X | X | X |
| *Galium mollugo* | Smooth Bedstraw | | SE5 | | | | | IX | X | X | | | | |
| **Salicaceae** | **Willow Family** | | | | | | | | | | | | | |
| *Populus alba* | White Poplar | | SE5 | | | | | IX | X | | | | | X |
| *Salix eriocephala* | Heart-leaved Willow | 4 | S5 | | | | | X | X | X | | | | |
| *Salix euxina* | Crack Willow | | SE | | | | | | X | | X | X | | |
| **Scrophulariaceae** | **Figwort Family** | | | | | | | | | | | | | |
| *Verbascum blattaria* | Moth Mullein | | SE5 | | | | | IX | X | X | | | | |
| **Ulmaceae** | **Elm Family** | | | | | | | | | | | | | |
| *Ulmus americana* | American Elm | 3 | S5 | | | | | X | X | | X | | | |
| **Urticaceae** | **Nettle Family** | | | | | | | | | | | | | |
| *Laportea canadensis* | Wood Nettle | 6 | S5 | | | | | X | X | | X | X | | X |
| *Urtica gracilis* | Slender Stinging Nettle | | S5 | | | | | X | X | | X | X | | |
| **Verbenaceae** | **Vervain Family** | | | | | | | | | | | | | |
| *Verbena hastata* | Blue Vervain | 4 | S5 | | | | | X | X | | X | | | |
| *Verbena urticifolia* | White Vervain | 4 | S5 | | | | | X | X | | X | | | |
| **Monocotyledons** | **Monocots** | | | | | | | | | | | | | |
| **Alismataceae** | **Water-plantain Family** | | | | | | | | | | | | | |
| *Sagittaria latifolia* | Broad-leaved Arrowhead | 4 | S5 | | | | | X | X | X | X | | | |
| **Araceae** | **Arum Family** | | | | | | | | | | | | | |
| *Symplocarpus foetidus* | Skunk Cabbage | 7 | S5 | | | | | X | X | | X | | | |
| **Cyperaceae** | **Sedge Family** | | | | | | | | | | | | | |
| *Carex emoryi* | Riverbank Sedge | 8 | S4 | | | | | R | X | | X | | | |
| *Carex grayi* | Gray's Sedge | 8 | S4 | | | | | | X | | | X | | |
| *Carex hitchcockiana* | Hitchcock's Sedge | 6 | S4S5 | | | | | X | X | | | X | | |
| **Liliaceae** | **Lily Family** | | | | | | | | | | | | | |
| *Maianthemum stellatum* | Star-flowered False Solomon's Seal | 6 | S5 | | | | | X | X | | | X | | |
| **Poaceae** | **Grass Family** | | | | | | | | | | | | | |
| *Bromus inermis* | Smooth Brome | | SE5 | | | | | IX | X | X | | | | |
| *Elymus repens* | Creeping Wildrye | | SE5 | | | | | IX | X | | X | | | |
| *Elymus virginicus* | Virginia Wildrye | 5 | S5 | | | | | | X | | X | X | X | X |
| *Phalaris arundinacea* | Reed Canary Grass | 0 | S5 | | | | | X | X | X | X | X | | |
| **Potamogetonaceae** | **Pondweed Family** | | | | | | | | | | | | | |
| *Potamogeton natans* | Floating Pondweed | 5 | S5 | | | | | X | X | X | | | | |
| *Stuckenia pectinata* | Sago Pondweed | 4 | S5 | | | | | X | X | | X | | | |
| **Total** | | | | | | | | | **62** | **20** | **45** | **23** | **4** | **6** |

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Appendix VI
Bird Species Reported from the Study Area and Vicinity

**Bird Species Reported from the Study Area - Township of Blandford-Blenheim Bridge 24 EA (Project #3191)**

| Scientific Name | Common Name | SRANK | SARO | COSEWIC | SARA | SARA Schedule | OBBA* | NRSI Observed: Highest Level of Breeding Evidence |
|---|---|---|---|---|---|---|---|---|
| | | MNRF 2023a | MECP 2023 | Government of Canada 2023 | Government of Canada 2023 | Government of Canada 2023 | BSC et al. 2006 | NRSI Results from 2023 |
| **Anatidae** | **Ducks, Geese & Swans** | | | | | | | |
| *Aix sponsa* | Wood Duck | S5B,S3N | | | | | PR | |
| *Anas platyrhynchos* | Mallard | S5 | | | | | CO | |
| *Branta canadensis* | Canada Goose | S5 | | | | | CO | |
| **Phasianidae** | **Partridges, Grouse & Turkeys** | | | | | | | |
| *Bonasa umbellus* | Ruffed Grouse | S5 | | | | | PO | |
| *Meleagris gallopavo* | Wild Turkey | S5 | | | | | CO | |
| *Phasianus colchicus* | Ring-necked Pheasant | SNA | | | | | PO | |
| **Columbidae** | **Pigeons & Doves** | | | | | | | |
| *Columba livia* | Rock Pigeon | SNA | | | | | CO | |
| *Zenaida macroura* | Mourning Dove | S5 | | | | | CO | |
| **Cuculiformes** | **Cuckoos & Anis** | | | | | | | |
| *Coccyzus erythropthalmus* | Black-billed Cuckoo | S4S5B | | | | | PO | |
| *Coccyzus sp.* | Black/Yellow-billed Cuckoo | NP | | | | | PR | |
| **Caprimulgidae** | **Goatsuckers** | | | | | | | |
| *Chordeiles minor* | Common Nighthawk | S4B | SC | SC | SC | Schedule 1 | PO | |
| **Apodidae** | **Swifts** | | | | | | | |
| *Chaetura pelagica* | Chimney Swift | S3B | THR | T | T | Schedule 1 | PR | |
| **Trochilidae** | **Hummingbirds** | | | | | | | |
| *Archilochus colubris* | Ruby-throated Hummingbird | S5B | | | | | PR | |
| **Rallidae** | **Rails, Gallinules & Coots** | | | | | | | |
| *Porzana carolina* | Sora | S5B | | | | | PR | |
| *Rallus limicola* | Virginia Rail | S4S5B | | | | | PR | |
| **Charadriidae** | **Plovers & Lapwings** | | | | | | | |
| *Charadrius vociferus* | Killdeer | S4B | | | | | CO | |
| **Scolopacidae** | **Sandpipers & Allies** | | | | | | | |
| *Actitis macularia* | Spotted Sandpiper | S5B | | | | | PR | |
| *Scolopax minor* | American Woodcock | S4B | | | | | PO | |
| **Ardeidae** | **Herons & Bitterns** | | | | | | | |
| *Ardea herodias* | Great Blue Heron | S4 | | | | | PO | **OB** |
| *Butorides virescens* | Green Heron | S4B | | | | | CO | |
| **Cathartidae** | **Vultures** | | | | | | | |
| *Cathartes aura* | Turkey Vulture | S5B,S3N | | | | | PO | |
| **Accipitridae** | **Hawks, Kites, Eagles & Allies** | | | | | | | |
| *Accipiter cooperii* | Cooper's Hawk | S4 | NAR | NAR | NS | No schedule | CO | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| *Accipiter striatus* | Sharp-shinned Hawk | S5 | NAR | NAR | NS | No schedule | CO | |
| *Buteo jamaicensis* | Red-tailed Hawk | S5 | NAR | NAR | NS | No schedule | CO | |
| *Buteo platypterus* | Broad-winged Hawk | S5B | | | | | PO | |
| *Circus hudsonius* | Northern Harrier | S5B,S4N | NAR | NAR | NS | No schedule | PO | |
| **Strigidae** | **Typical Owls** | | | | | | | |
| *Bubo virginianus* | Great Horned Owl | S4 | | | | | PR | |
| *Megascops asio* | Eastern Screech-Owl | S4 | NAR | NAR | NS | No schedule | PO | |
| **Alcedinidae** | **Kingfishers** | | | | | | | |
| *Megaceryle alcyon* | Belted Kingfisher | S5B,S4N | | | | | CO | **OB** |
| **Picidae** | **Woodpeckers** | | | | | | | |
| *Colaptes auratus* | Northern Flicker | S5 | | | | | CO | |
| *Dryobates pubescens* | Downy Woodpecker | S5 | | | | | CO | |
| *Dryobates villosus* | Hairy Woodpecker | S5 | | | | | PR | |
| *Dryocopus pileatus* | Pileated Woodpecker | S5 | | | | | CO | |
| *Melanerpes carolinus* | Red-bellied Woodpecker | S5 | | | | | CO | |
| *Melanerpes erythrocephalus* | Red-headed Woodpecker | S3 | END | E | E | Schedule 1 | PR | |
| *Sphyrapicus varius* | Yellow-bellied Sapsucker | S5B,S3N | | | | | PR | |
| **Falconidae** | **Caracaras & Falcons** | | | | | | | |
| *Falco sparverius* | American Kestrel | S4 | | | | | PO | |
| **Tyrannidae** | **Tyrant Flycatchers** | | | | | | | |
| *Contopus virens* | Eastern Wood-Pewee | S4B | SC | SC | SC | Schedule 1 | CO | **OB** |
| *Empidonax alnorum* | Alder Flycatcher | S5B | | | | | PR | |
| *Empidonax minimus* | Least Flycatcher | S5B | | | | | PR | |
| *Empidonax traillii* | Willow Flycatcher | S4B | | | | | PR | |
| *Myiarchus crinitus* | Great Crested Flycatcher | S5B | | | | | CO | |
| *Sayornis phoebe* | Eastern Phoebe | S5B | | | | | CO | |
| *Tyrannus tyrannus* | Eastern Kingbird | S4B | | | | | CO | **OB** |
| **Vireonidae** | **Vireos** | | | | | | | |
| *Vireo flavifrons* | Yellow-throated Vireo | S4B | | | | | PO | |
| *Vireo gilvus* | Warbling Vireo | S5B | | | | | PR | **OB** |
| *Vireo olivaceus* | Red-eyed Vireo | S5B | | | | | PR | |
| **Corvidae** | **Crows & Jays** | | | | | | | |
| *Corvus brachyrhynchos* | American Crow | S5 | | | | | CO | **OB** |
| *Cyanocitta cristata* | Blue Jay | S5 | | | | | CO | |
| **Alaudidae** | **Larks** | | | | | | | |
| *Eremophila alpestris* | Horned Lark | S4 | | | | | CO | |
| **Hirundinidae** | **Swallows** | | | | | | | |
| *Hirundo rustica* | Barn Swallow | S4B | SC | SC | T | Schedule 1 | CO | |
| *Petrochelidon pyrrhonota* | Cliff Swallow | S4S5B | | | | | CO | **CO** |
| *Riparia riparia* | Bank Swallow | S4B | THR | T | T | Schedule 1 | CO | |
| *Stelgidopteryx serripennis* | Northern Rough-winged Swallow | S4B | | | | | CO | |
| *Tachycineta bicolor* | Tree Swallow | S4S5B | | | | | CO | |
| **Paridae** | **Chickadees & Titmice** | | | | | | | |
| *Poecile atricapillus* | Black-capped Chickadee | S5 | | | | | CO | **OB** |

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|---|---|---|---|---|---|---|---|---|
| **Sittidae** | **Nuthatches** | | | | | | | |
| *Sitta canadensis* | Red-breasted Nuthatch | S5 | | | | | PR | |
| *Sitta carolinensis* | White-breasted Nuthatch | S5 | | | | | CO | |
| **Certhiidae** | **Creepers** | | | | | | | |
| *Certhia americana* | Brown Creeper | S5 | | | | | PR | |
| **Troglodytidae** | **Wrens** | | | | | | | |
| *Cistothorus stellaris* | Sedge Wren | S4B | NAR | NAR | NS | No schedule | PR | |
| *Troglodytes aedon* | House Wren | S5B | | | | | CO | |
| *Troglodytes hiemalis* | Winter Wren | S5B,S4N | | | | | PR | |
| **Polioptilidae** | **Gnatcatchers** | | | | | | | |
| *Polioptila caerulea* | Blue-gray Gnatcatcher | S4B | | | | | CO | |
| **Turdidae** | **Thrushes** | | | | | | | |
| *Catharus fuscescens* | Veery | S5B | | | | | PR | |
| *Hylocichla mustelina* | Wood Thrush | S4B | SC | T | T | Schedule 1 | CO | |
| *Sialia sialis* | Eastern Bluebird | S5B,S4N | NAR | NAR | NS | No schedule | CO | |
| *Turdus migratorius* | American Robin | S5 | | | | | CO | |
| **Mimidae** | **Mockingbirds, Thrashers & Allies** | | | | | | | |
| *Dumetella carolinensis* | Gray Catbird | S5B,S3N | | | | | CO | **OB** |
| *Mimus polyglottos* | Northern Mockingbird | S4 | | | | | PO | |
| *Toxostoma rufum* | Brown Thrasher | S4B | | | | | CO | |
| **Sturnidae** | **Starlings** | | | | | | | |
| *Sturnus vulgaris* | European Starling | SNA | | | | | CO | |
| **Bombycillidae** | **Waxwings** | | | | | | | |
| *Bombycilla cedrorum* | Cedar Waxwing | S5 | | | | | CO | **OB** |
| **Passeridae** | **Old World Sparrows** | | | | | | | |
| *Passer domesticus* | House Sparrow | SNA | | | | | CO | |
| **Fringillidae** | **Finches & Allies** | | | | | | | |
| *Haemorhous mexicanus* | House Finch | SNA | | | | | CO | |
| *Spinus tristis* | American Goldfinch | S5 | | | | | CO | **OB** |
| **Emberizidae** | **New World Sparrows & Allies** | | | | | | | |
| *Melospiza georgiana* | Swamp Sparrow | S5B,S4N | | | | | PR | |
| *Melospiza melodia* | Song Sparrow | S5 | | | | | CO | |
| *Passerculus sandwichensis* | Savannah Sparrow | S5B,S3N | | | | | CO | |
| *Pipilo erythrophthalmus* | Eastern Towhee | S4B,S3N | | | | | PO | |
| *Pooecetes gramineus* | Vesper Sparrow | S4B | | | | | PR | |
| *Spizella pallida* | Clay-colored Sparrow | S4B | | | | | PO | |
| *Spizella passerina* | Chipping Sparrow | S5B,S3N | | | | | CO | |
| *Spizella pusilla* | Field Sparrow | S4B,S3N | | | | | PR | |
| **Icteridae** | **Troupials & Allies** | | | | | | | |
| *Agelaius phoeniceus* | Red-winged Blackbird | S5 | | | | | CO | |
| *Dolichonyx oryzivorus* | Bobolink | S4B | THR | SC | T | Schedule 1 | CO | |
| *Icterus galbula* | Baltimore Oriole | S4B | | | | | CO | |
| *Molothrus ater* | Brown-headed Cowbird | S5 | | | | | CO | |
| *Quiscalus quiscula* | Common Grackle | S5 | | | | | CO | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| *Sturnella magna* | Eastern Meadowlark | S4B,S3N | THR | T | T | Schedule 1 | CO | |
| **Parulidae** | **Wood Warblers** | | | | | | | |
| *Geothlypis philadelphia* | Mourning Warbler | S5B | | | | | CO | |
| *Geothlypis trichas* | Common Yellowthroat | S5B,S3N | | | | | CO | |
| *Parkesia noveboracensis* | Northern Waterthrush | S5B | | | | | PR | |
| *Seiurus aurocapilla* | Ovenbird | S5B | | | | | PR | |
| *Setophaga pensylvanica* | Chestnut-sided Warbler | S5B | | | | | CO | |
| *Setophaga petechia* | Yellow Warbler | S5B | | | | | CO | |
| *Setophaga pinus* | Pine Warbler | S5B,S3N | | | | | PR | |
| *Setophaga ruticilla* | American Redstart | S5B | | | | | PR | |
| *Setophaga virens* | Black-throated Green Warbler | S5B | | | | | PR | |
| *Vermivora cyanoptera* | Blue-winged Warbler | S4B | | | | | PO | |
| **Cardinalidae** | **Cardinals, Grosbeaks & Allies** | | | | | | | |
| *Cardinalis cardinalis* | Northern Cardinal | S5 | | | | | CO | |
| *Passerina cyanea* | Indigo Bunting | S5B | | | | | CO | |
| *Pheucticus ludovicianus* | Rose-breasted Grosbeak | S5B | | | | | CO | |
| *Piranga olivacea* | Scarlet Tanager | S5B | | | | | PR | |
| **Total** | | | | | | | **103** | **11** |

*OBBA Atlas Square: 17NH39

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Appendix VII
Herpetofauna Species Reported from the Study Area and Vicinity

**Reptile and Amphibian Species Reported from the Study Area - Township of Balndford-Blenheim Bridge 24 EA (Project #3191)**

| Scientific Name | Common Name | SRANK | SARO | COSEWIC | SARA | SARA Schedule | ORAA* | NRSI Observed |
|---|---|---|---|---|---|---|---|---|
| | | MNRF 2023a | MECP 2023 | Government of Canada 2023 | Government of Canada 2023 | Government of Canada 2023 | Ontario Nature 2019 | NRSI Results from 2023 |
| **Turtles** | | | | | | | | |
| *Chelydra serpentina* | Snapping Turtle | S4 | SC | SC | SC | Schedule 1 | X | |
| *Chrysemys picta marginata* | Midland Painted Turtle | S4 | | SC | SC | Schedule 1 | X | |
| **Snakes** | | | | | | | | |
| *Lampropeltis triangulum* | Milksnake | S4 | NAR | SC | SC | Schedule 1 | X | |
| *Storeria dekayi* | Dekay's Brownsnake | S5 | NAR | NAR | NS | No schedule | X | |
| *Storeria occipitomaculata* | Red-bellied Snake | S5 | | | | | X | |
| *Thamnophis sirtalis sirtalis* | Eastern Gartersnake | S5 | | | | | X | |
| **Salamanders** | | | | | | | | |
| *Ambystoma sp.* | Jefferson/Blue-spotted Salamander Compl | NP | | | | | X | |
| *Necturus maculosus* | Mudpuppy | S4 | NAR | NAR | NS | No schedule | X | |
| *Plethodon cinereus* | Eastern Red-backed Salamander | S5 | | | | | X | |
| **Frogs and Toads** | | | | | | | | |
| *Anaxyrus americanus* | American Toad | S5 | | | | | X | |
| *Dryophytes versicolor* | Gray Treefrog | S5 | | | | | X | |
| *Pseudacris crucifer* | Spring Peeper | S5 | | | | | X | |
| *Lithobates clamitans* | Green Frog | S5 | | | | | X | X |
| *Lithobates pipiens* | Northern Leopard Frog | S5 | NAR | NAR | NS | No schedule | X | |
| *Lithobates sylvaticus* | Wood Frog | S5 | | | | | X | |
| **Total** | | | | | | | **15** | **1** |

*ORAA Atlas Square: 17NH39

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Appendix VIII
Mammal Species Reported from the Study Area and Vicinity

**Mammal Species Reported from the Study Area - Township of Blandford-Blenheim Bridge 24 EA (Project #3191)**

| Scientific Name | Common Name | SRANK | SARO | COSEWIC | SARA | SARA Schedule | Ontario Mammal Atlas | NRSI Observed |
|---|---|---|---|---|---|---|---|---|
| | | MNRF 2023a | MECP 2023 | Government of Canada 2023 | Government of Canada 2023 | Government of Canada 2023 | Dobbyn 1994 | NRSI Results from 2023 |
| **Didelphimorphia** | **Opossums** | | | | | | | |
| *Didelphis virginiana* | Virginia Opossum | S4 | | | | | X | |
| **Eulipotyphla** | **Shrews, Moles, Hedgehogs, and Allies** | | | | | | | |
| *Blarina brevicauda* | Northern Short-tailed Shrew | S5 | | | | | X | |
| *Condylura cristata* | Star-nosed Mole | S5 | | | | | X | |
| *Parascalops breweri* | Hairy-tailed Mole | S4 | | | | | X | |
| *Sorex cinereus* | Masked Shrew | S5 | | | | | X | |
| *Sorex fumeus* | Smoky Shrew | S5 | | | | | X | |
| **Chiroptera** | **Bats** | | | | | | | |
| *Eptesicus fuscus* | Big Brown Bat | S4 | | | | | X | |
| *Lasionycteris noctivagans* | Silver-haired Bat | S4 | | E | NS | No schedule | X | |
| *Lasiurus borealis* | Eastern Red Bat | S4 | | E | NS | No schedule | X | |
| *Lasiurus cinereus* | Hoary Bat | S4 | | E | NS | No schedule | X | |
| *Myotis leibii* | Eastern Small-footed Myotis | S2S3 | END | | | | X | |
| *Myotis lucifugus* | Little Brown Myotis | S3 | END | E | E | Schedule 1 | X | |
| *Myotis septentrionalis* | Northern Myotis | S3 | END | E | E | Schedule 1 | X | |
| *Perimyotis subflavus* | Tri-colored Bat | S3? | END | E | E | Schedule 1 | X | |
| **Lagomorpha** | **Rabbits and Hares** | | | | | | | |
| *Lepus europaeus* | European Hare | SNA | | | | | X | |
| *Sylvilagus floridanus* | Eastern Cottontail | S5 | | | | | X | |
| **Rodentia** | **Rodents** | | | | | | | |
| *Castor canadensis* | Beaver | S5 | | | | | X | |
| *Erethizon dorsatum* | Porcupine | S5 | | | | | X | |
| *Glaucomys volans* | Southern Flying Squirrel (Great Lakes Pla | S4 | NAR | NAR | NS | No schedule | X | |
| *Marmota monax* | Woodchuck | S5 | | | | | X | |
| *Microtus pennsylvanicus* | Meadow Vole | S5 | | | | | X | |
| *Microtus pinetorum* | Woodland Vole | S3? | SC | SC | SC | Schedule 1 | X | |
| *Mus musculus* | House Mouse | SNA | | | | | X | |
| *Napaeozapus insignis* | Woodland Jumping Mouse | S5 | | | | | X | |
| *Ondatra zibethicus* | Muskrat | S5 | | | | | X | |
| *Peromyscus leucopus* | White-footed Mouse | S5 | | | | | X | |
| *Peromyscus maniculatus* | Deer Mouse | S5 | | | | | X | |
| *Rattus norvegicus* | Norway Rat | SNA | | | | | X | |
| *Sciurus carolinensis* | Eastern Gray Squirrel | S5 | | | | | X | |
| *Tamias striatus* | Eastern Chipmunk | S5 | | | | | X | |
| *Tamiasciurus hudsonicus* | Red Squirrel | S5 | | | | | X | |
| *Zapus hudsonius* | Meadow Jumping Mouse | S5 | | | | | X | |
| **Canidae** | **Canines** | | | | | | | |
| *Canis latrans* | Coyote | S5 | | | | | X | |
| *Urocyon cinereoargenteus* | Gray Fox | S1 | THR | T | T | Schedule 1 | X | |
| *Vulpes vulpes* | Red Fox | S5 | | | | | X | |
| **Mephitidae** | **Skunks and Stink Badgers** | | | | | | | |
| *Mephitis mephitis* | Striped Skunk | S5 | | | | | X | |
| **Mustelidae** | **Weasels and Allies** | | | | | | | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| *Mustela richardsonii* | American Ermine | S5 | | | | | X | |
| *Neogale frenata* | Long-tailed Weasel | S4 | | | | | X | |
| *Neogale vison* | American Mink | S4 | | | | | X | |
| *Taxidea taxus jacksoni* | American Badger (Southwestern Ontario | S1 | END | E | E | Schedule 1 | X | |
| **Procyonidae** | **Raccoons and Allies** | | | | | | | |
| *Procyon lotor* | Northern Raccoon | S5 | | | | | X | X |
| **Artiodactyla** | **Deer and Bison** | | | | | | | |
| *Odocoileus virginianus* | White-tailed Deer | S5 | | | | | X | |
| **Total** | | | | | | | **42** | **1** |

**NHIC Atlas Squares: 17NH3694, 17NH379

**References**


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Appendix IX
Butterfly Species Reported from the Study Area and Vicinity

**Butterfly Species Reported from the Study Area - Township of Blandford-Blenheim Bridge 24 EA (Project #3191)**

| Scientific Name | Common Name | SRANK | SARO | COSEWIC | SARA | SARA Schedule | Ontario Butterfly Atlas* | NRSI Observed |
|---|---|---|---|---|---|---|---|---|
| | | MNRF 2023a | MECP 2023 | Government of Canada 2023 | Government of Canada 2023 | Government of Canada 2023 | Macnaughton et al. 2023 | NRSI Results from 2023 |
| **Hesperiidae** | **Skippers** | | | | | | | |
| *Anatrytone logan* | Delaware Skipper | S4 | | | | | X | |
| *Ancyloxypha numitor* | Least Skipper | S5 | | | | | X | |
| *Carterocephalus palaemon* | Arctic Skipper | S5 | | | | | X | |
| *Erynnis icelus* | Dreamy Duskywing | S5 | | | | | X | |
| *Erynnis juvenalis* | Juvenal's Duskywing | S5 | | | | | X | |
| *Euphyes conspicua* | Black Dash | S3 | | | | | X | |
| *Euphyes vestris* | Dun Skipper | S5 | | | | | X | |
| *Pholisora catullus* | Common Sootywing | S4 | | | | | X | |
| *Poanes hobomok* | Hobomok Skipper | S5 | | | | | X | |
| *Poanes massasoit* | Mulberry Wing | S4 | | | | | X | |
| *Polites mystic* | Long Dash Skipper | S5 | | | | | X | |
| *Polites peckius* | Peck's Skipper | S5 | | | | | X | |
| *Polites themistocles* | Tawny-edged Skipper | S5 | | | | | X | |
| *Thymelicus lineola* | European Skipper | SNA | | | | | X | |
| **Papilionidae** | **Swallowtails** | | | | | | | |
| *Papilio glaucus* | Eastern Tiger Swallowtail | S5 | | | | | X | |
| **Pieridae** | **Whites and Sulphurs** | | | | | | | |
| *Colias eurytheme* | Orange Sulphur | S5 | | | | | X | |
| *Colias philodice* | Clouded Sulphur | S5 | | | | | X | |
| *Pieris oleracea* | Mustard White | S4 | | | | | X | |
| *Pieris rapae* | Cabbage White | SNA | | | | | X | |
| **Lycaenidae** | **Harvesters, Coppers, Hairstreaks, Blues** | | | | | | | |
| *Celastrina neglecta* | Summer Azure | S5 | | | | | X | |
| *Lycaena hyllus* | Bronze Copper | S5 | | | | | X | |
| *Satyrium acadica* | Acadian Hairstreak | S4 | | | | | X | |
| **Nymphalidae** | **Brush-footed Butterflies** | | | | | | | |
| *Aglais milberti* | Milbert's Tortoiseshell | S5 | | | | | X | |
| *Asterocampa celtis* | Hackberry Emperor | S3 | | | | | X | |
| *Boloria selene* | Silver-bordered Fritillary | S5 | | | | | X | |
| *Cercyonis pegala* | Common Wood-Nymph | S5 | | | | | X | |
| *Danaus plexippus* | Monarch | S2N,S4B | SC | E | SC | Schedule 1 | X | |
| *Euphydryas phaeton* | Baltimore Checkerspot | S4 | | | | | X | |
| *Lethe anthedon* | Northern Pearly-Eye | S5 | | | | | X | |
| *Lethe appalachia* | Appalachian Brown | S4 | | | | | X | |
| *Lethe eurydice* | Eyed Brown | S5 | | | | | X | |
| *Limenitis archippus* | Viceroy | S5 | | | | | X | |
| *Limenitis arthemis astyanax* | Red-spotted Purple | S5 | | | | | X | |
| *Megisto cymela* | Little Wood-Satyr | S5 | | | | | X | |
| *Nymphalis antiopa* | Mourning Cloak | S5 | | | | | X | |
| *Phyciodes batesii* | Tawny Crescent | S4 | | | | | X | |
| *Phyciodes cocyta* | Northern Crescent | S5 | | | | | X | |
| *Phyciodes tharos* | Pearl Crescent | S4 | | | | | X | |
| *Polygonia comma* | Eastern Comma | S5 | | | | | X | |
| *Polygonia progne* | Gray Comma | S5 | | | | | X | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| *Speyeria cybele* | Great Spangled Fritillary | S5 | | | | | X | |
| *Vanessa atalanta* | Red Admiral | S5B | | | | | X | |
| *Vanessa cardui* | Painted Lady | S5B | | | | | X | |
| *Vanessa virginiensis* | American Lady | S5 | | | | | X | |
| **Total** | | | | | | | **44** | **0** |

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Appendix X
Odonata Species Reported from the Study Area and Vicinity

**Odonate Species Reported from the Study Area - Township of Blandford-Blenheim Bridge 24 EA (Project #3191)**

| Scientific Name | Common Name | SRANK | SARO | COSEWIC | SARA | SARA Schedule | Odonate Atlas* | NRSI Observed |
|---|---|---|---|---|---|---|---|---|
| | | MNRF 2023a | MECP 2023 | Government of Canada 2023 | Government of Canada 2023 | Government of Canada 2023 | OOAD 2023 | |
| **Calopterygidae** | **Broadwinged Damselflies** | | | | | | | |
| *Hetaerina americana* | American Rubyspot | S4 | | | | | X | |
| **Coenagrionidae** | **Narrow-winged Damselflies** | | | | | | | |
| *Argia apicalis* | Blue-fronted Dancer | S4 | | | | | X | |
| *Argia moesta* | Powdered Dancer | S5 | | | | | X | |
| *Enallagma anna* | River Bluet | S3 | | | | | X | |
| *Enallagma exsulans* | Stream Bluet | S5 | | | | | X | |
| *Enallagma geminatum* | Skimming Bluet | S4 | | | | | X | |
| *Enallagma signatum* | Orange Bluet | S4 | | | | | X | |
| **Aeshnidae** | **Darners** | | | | | | | |
| *Anax junius* | Common Green Darner | S5 | | | | | X | |
| **Total** | | | | | | | **8** | **0** |

**References**


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Appendix XI
Fish Species Reported from the Study Area and Vicinity

**Fish Species Reported from the Study Area - Township of Blandford-Blenheim Bridge 24 EA (Project #3191)**

| Scientific Name | Common Name | SRANK | SARO | COSEWIC | SARA | SARA Schedule | Fisheries and Oceans SAR Data | Aquatic Resource Area Data | NRSI Observed |
|---|---|---|---|---|---|---|---|---|---|
| | | MNRF 2023a | MECP 2022 | ernment of Canada | ernment of Canada | ernment of Canada | DFO 2022 | MNRF 2023b | |
| **Leuciscidae** | **Minnows** | | | | | | | | |
| *Luxilus cornutus* | Common Shiner | S5 | | | | | | X | |
| *Notropis photogenis* | Silver Shiner | S2S3 | THR | T | T | Schedule 1 | X | | |
| *Notropis rubellus* | Rosyface Shiner | S4 | NAR | NAR | NS | No schedule | | X | |
| *Pimephales notatus* | Bluntnose Minnow | S5 | NAR | NAR | NS | No schedule | | X | |
| *Rhinichthys atratulus* | Blacknose Dace | SNR | | | | | | X | |
| *Rhinichthys cataractae* | Longnose Dace | S5 | | | | | | X | |
| *Semotilus atromaculatus* | Creek Chub | S5 | | | | | | X | |
| **Catostomidae** | **Suckers** | | | | | | | | |
| *Catostomus commersonii* | White Sucker | S5 | | | | | | X | |
| *Moxostoma duquesnei* | Black Redhorse | S2 | THR | T | T | Schedule 1 | X | | |
| **Umbridae** | **Mudminnows** | | | | | | | | |
| *Umbra limi* | Central Mudminnow | S5 | | | | | | X | |
| **Salmonidae** | **Trouts and Salmons** | | | | | | | | |
| *Oncorhynchus mykiss* | Rainbow Trout | SNA | | | | | | X | |
| *Salvelinus fontinalis fontinalis* | Brook Trout | S5 | | | | | | X | |
| **Gasterosteidae** | **Sticklebacks** | | | | | | | | |
| *Culaea inconstans* | Brook Stickleback | S5 | | | | | | X | |
| **Percidae** | **Perches and Darters** | | | | | | | | |
| *Etheostoma* sp. | Darter species | | | | | | | | X |
| *Etheostoma blennioides* | Greenside Darter | S4 | NAR | NAR | SC | Schedule 3 | | X | |
| *Etheostoma caeruleum* | Rainbow Darter | S4 | | | | | | X | |
| *Etheostoma nigrum* | Johnny Darter | S5 | | | | | | X | |
| **Total** | | | | | | | **2** | **14** | **1** |

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Appendix XII
Freshwater Mussel Species Reported from the Study Area and Vicinity

**Mussel Species Reported from the Study Area**

| Scientific Name | Common Name | SRANK | SARO | COSEWIC | SARA STATUS | SARA SCHEDULE | Fisheries and Oceans SAR Data | NRSI Observed |
|---|---|---|---|---|---|---|---|---|
| | | MNRF 2023a | MECP 2023 | Government of Canada 2023 | Government of Canada 2023 | Government of Canada 2023 | DFO 2022 | NRSI Results from 2023 |
| **Unionida** | **Native Freshwater Mussels** | | | | | | | |
| **Ambleminae** | | | | | | | | |
| *Elliptio crassidens* | Elephantear | SU | | | | | | X |
| **Anodontinae** | | | | | | | | |
| *Lasmigona complanata* | White Heelsplitter | S4 | | | | | | |
| *Pyganodon grandis* | Giant Floater | S5 | | | | | | |
| **Lampsilinae** | | | | | | | | |
| *Epioblasma rangiana* | Northern Riffleshell | S1 | END | E | E | Schedule 1 | | X |
| *Lampsilis cardium* | Plain Pocketbook | S4 | | | | | | X |
| *Lampsilis fasciola* | Wavy-rayed Lampmussel | S2 | THR | SC | SC | Schedule 1 | | X |
| **Venerida** | **Non-native Saltwater/Freshwater Mussels** | | | | | | | |
| **Corbiculidae** | | | | | | | | |
| *Corbicula fluminea* | Asiatic Clam | SNA | | | | | | X |
| **Total** | | | | | | | **0** | **7** |

**References**


Ministry of Natural Resources and Forestry (MNRF). 2023a. Natural Heritage Information Centre (NHIC): Species List for Ontario. Published: 2014-07-17. All Species List Updated: 2023-05-17. Available: https://www.ontario.ca/page/get-natural-heritage-information

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Department of Fisheries and Oceans Canada (DFO). 2022. Aquatic Species at Risk Critical Habitat and Species at Risk Distribution Data. Updated: 2022-12-29. Available: https://www.dfo-mpo.gc.ca/species-especes/sara-lep/map-carte/index-eng.html

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Appendix XIII
Bridge 24 Replacement Preliminary Design Drawings (K. Smart Associates 2024)

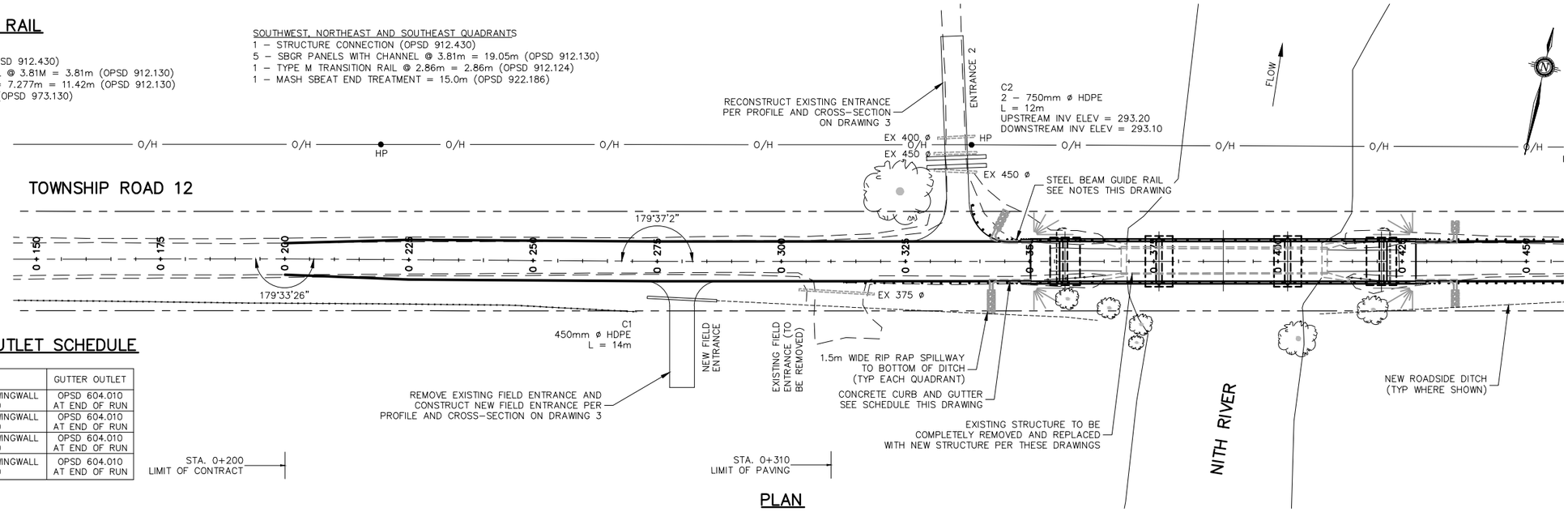
## STEEL BEAM GUIDE RAIL

NORTHWEST QUADRANT
1 – STRUCTURE CONNECTION (OPSD 912.430)
1 – SBGR PANELS WITH CHANNEL @ 3.81M = 3.81m (OPSD 912.130)
3 – SBGR PANELS @ 3.81m, R = 7.277m = 11.42m (OPSD 912.130)
1 – "FISHTAIL" END TREATMENT (OPSD 973.130)

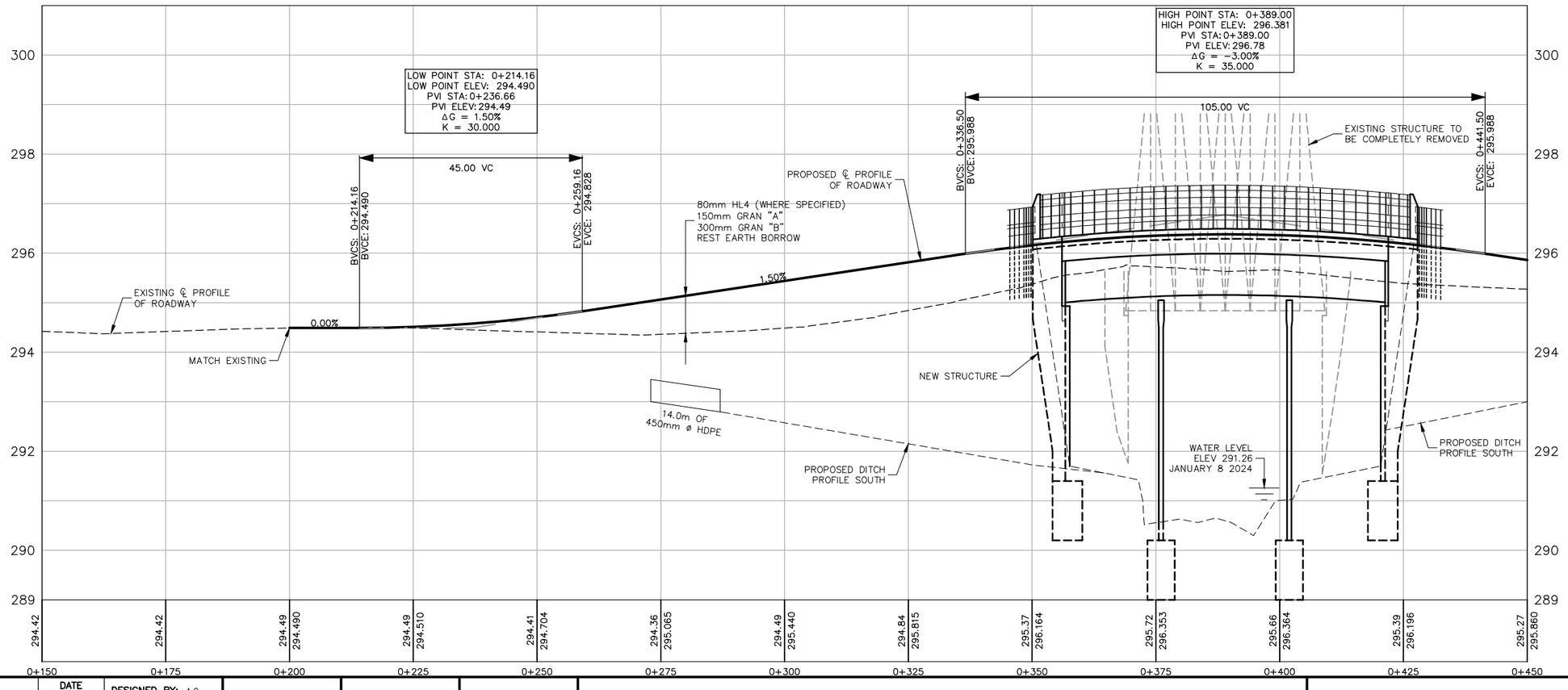
SOUTHWEST, NORTHEAST AND SOUTHEAST QUADRANTS
1 – STRUCTURE CONNECTION (OPSD 912.430)
5 – SBGR PANELS WITH CHANNEL @ 3.81m = 19.05m (OPSD 912.130)
1 – TYPE M TRANSITION RAIL @ 2.86m = 2.86m (OPSD 912.124)
1 – MASH SBEAT END TREATMENT = 15.0m (OPSD 922.186)

## CURB AND GUTTER OUTLET SCHEDULE

| LOCATION | LENGTH CURB TYPE | GUTTER OUTLET |
|---|---|---|
| NORTHEAST | 6.0m FROM END OF WINGWALL OPSD 600.040 | OPSD 604.010 AT END OF RUN |
| NORTHWEST | 6.0m FROM END OF WINGWALL OPSD 600.040 | OPSD 604.010 AT END OF RUN |
| SOUTHEAST | 6.0m FROM END OF WINGWALL OPSD 600.040 | OPSD 604.010 AT END OF RUN |
| SOUTHWEST | 6.0m FROM END OF WINGWALL OPSD 600.040 | OPSD 604.010 AT END OF RUN |




PLAN




| No. | REVISION | DATE |
|---|---|---|
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |

DESIGNED BY: A.G.
CHECKED BY: D.H.
DRAWN BY: D.Z.
CHECKED BY: A.G.
FIELD BOOK:

SCALE
HORIZ. 1:500
VERT. 1:50
5.0m 0 10.0m
(ON 24 x 36 PAPER)

# BRIDGE 24 REPLACEMENT

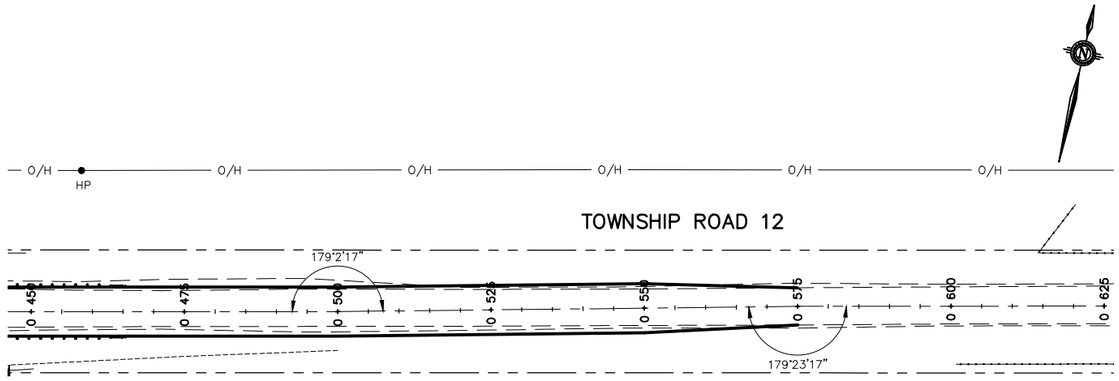
TOWNSHIP OF BLANDFORD–BLENHEIM

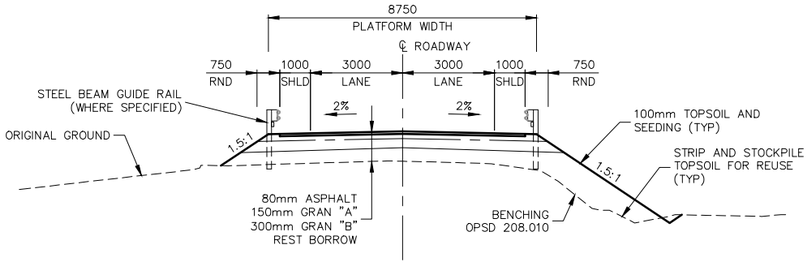
## PLAN AND PROFILE 1

K. SMART ASSOCIATES LIMITED
CONSULTING ENGINEERS AND PLANNERS
KITCHENER SUDBURY

JOB NUMBER 22–264
DATE APRIL 2024
DRAWING NUMBER 1

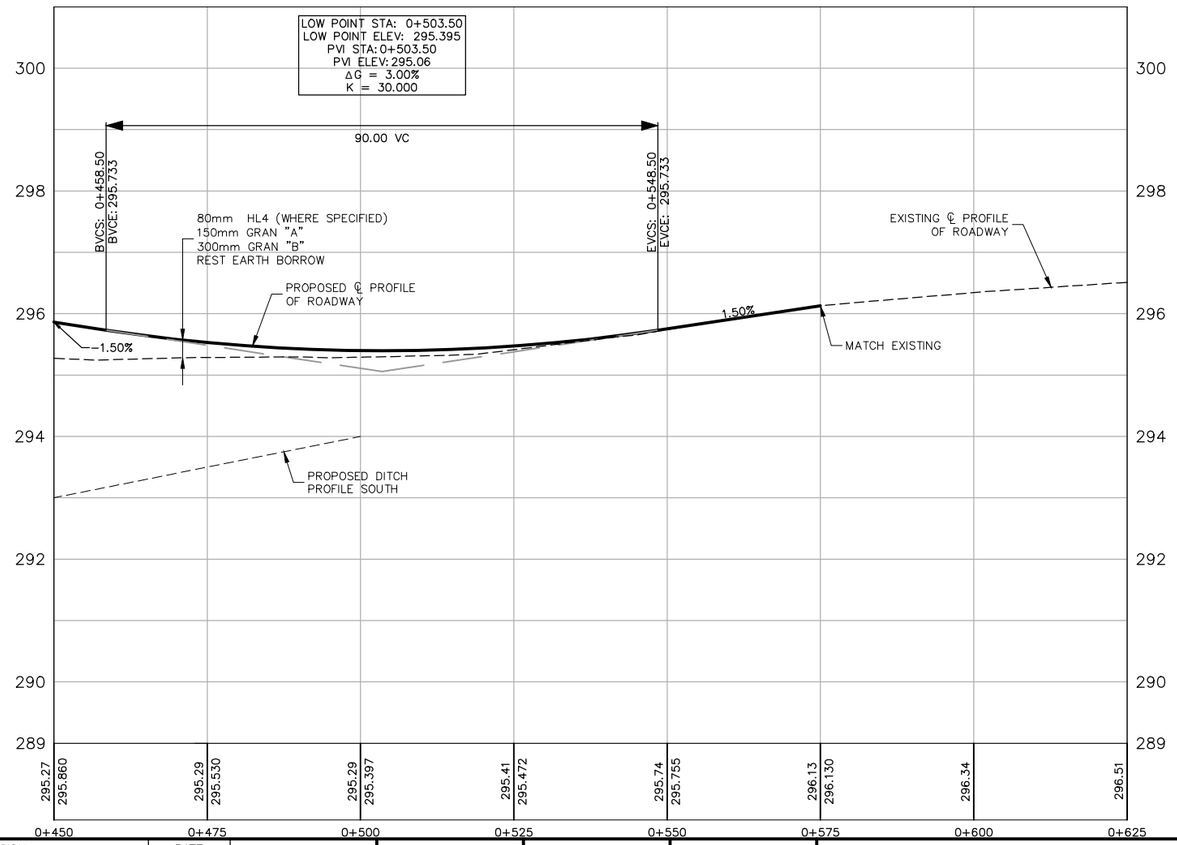
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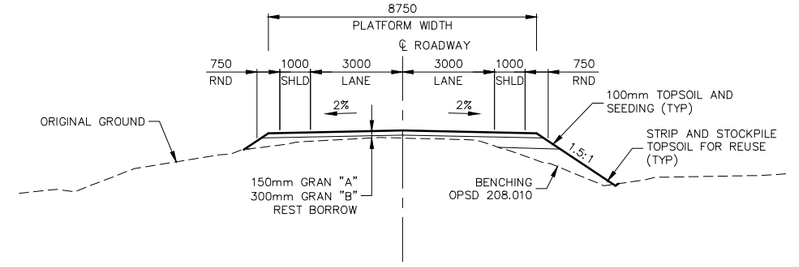



## TYPICAL ROADWAY SECTION
## STA 0+285 TO BRIDGE
## BRIDGE TO STA 0+470

SCALE 1:100




## TYPICAL ROADWAY SECTION
## REMAINDER

SCALE 1:100

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CHECKED BY: D.H.
DRAWN BY: D.Z.
CHECKED BY: A.G.
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# BRIDGE 24 REPLACEMENT

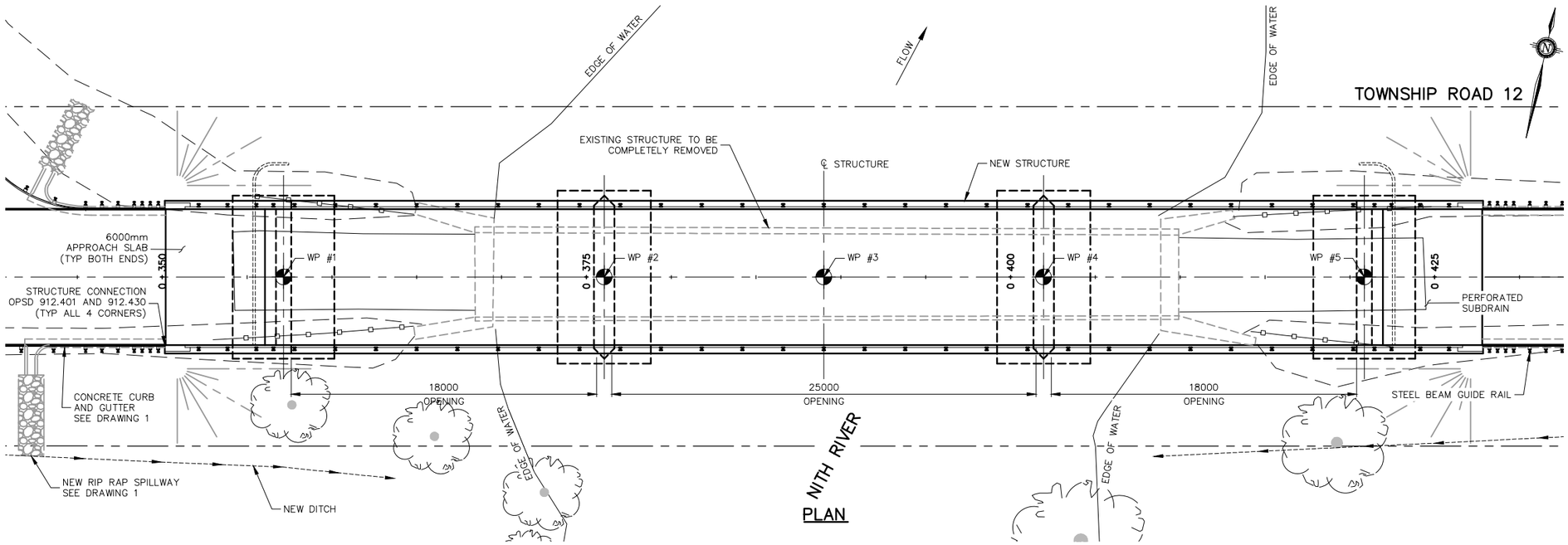
TOWNSHIP OF BLANDFORD-BLENHEIM

# PLAN AND PROFILE 2

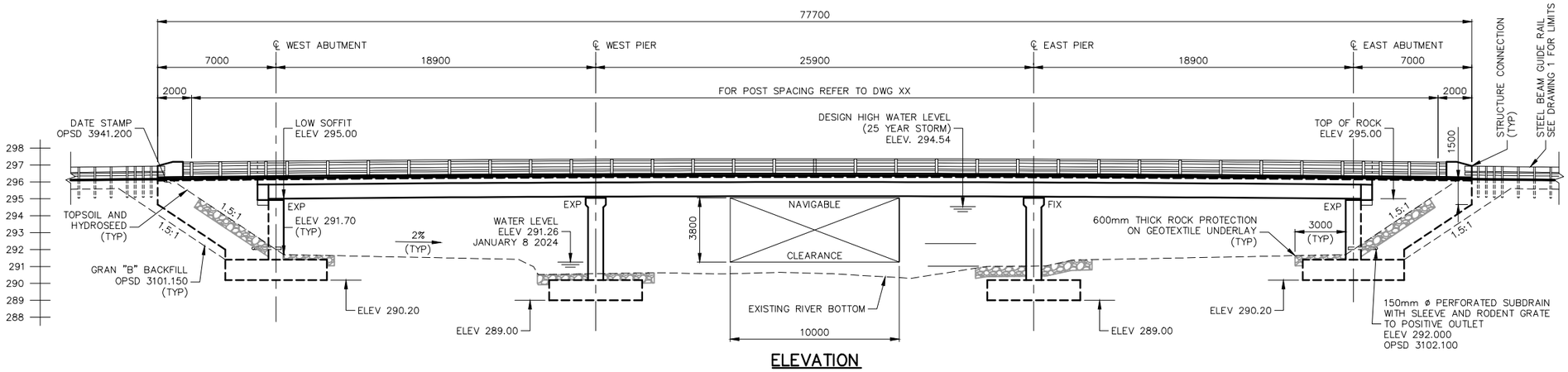
K. SMART ASSOCIATES LIMITED
CONSULTING ENGINEERS AND PLANNERS
KITCHENER SUDBURY

JOB NUMBER 22-264
DATE APRIL 2024
DRAWING NUMBER 2

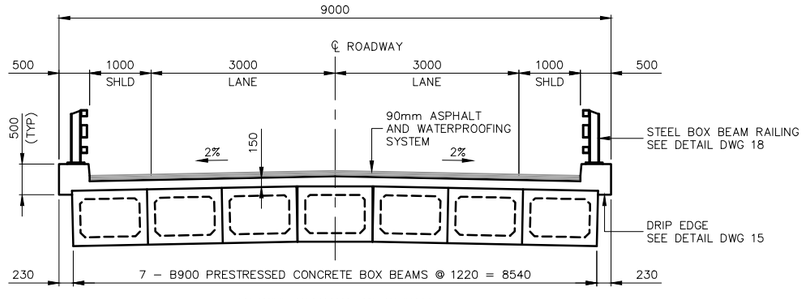
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PLAN




ELEVATION




DECK CROSS SECTION

SCALE 1:50

| | WP #1 | WP #2 | WP #3 | WP #4 | WP #5 |
|---|---|---|---|---|---|
| STATION | 0+357.150 | 0+376.050 | 0+389.000 | 0+401.950 | 0+420.850 |
| ELEVATION | 296.236 | 296.357 | 296.381 | 296.357 | 296.236 |

NOTE: WORKING POINT ELEVATIONS GIVEN TO TOP OF ASPHALT

## CONSTRUCTION NOTES

1. STRUCTURE DESIGNED FOR CL–625 (ONT) LOADING PLUS 90mm OF ASPHALT IN ACCORDANCE WITH THE CANADIAN HIGHWAY BRIDGE DESIGN CODE (CHBDC) 2019.
2. WORK ON THE STRUCTURE MUST NOT BE COMMENCED UNTIL MONUMENTS TO FIX CONTROL POINTS HAVE BEEN ERECTED AND CHECKED BY THE CONTRACT ADMINISTRATOR.
3. STRUCTURE TO BE BUILT IN ACCORDANCE WITH THE MOST CURRENT OPS SPECIFICATIONS AND DRAWINGS AS WELL AS THE CONTRACT ADMINISTRATOR'S SPECIFICATIONS.
4. THE COMPLETE SOIL INVESTIGATION BY PETO MACCALLUM LTD. FORM PART OF THE CONTRACT DOCUMENTS. THE CONTRACT ADMINISTRATOR DOES NOT GUARANTEE THE ACCURACY OF THIS REPORT. THE CONTRACTOR SHALL REVIEW THE REPORT AND DETERMINE HIS OWN METHOD TO CONTROL GROUND WATER DURING THE EXCAVATION.
5. THE CONTRACTOR SHALL CHECK AND VERIFY ALL DIMENSIONS ON THE JOB AND REPORT ANY DISCREPANCIES TO THE CONTRACT ADMINISTRATOR BEFORE PROCEEDING WITH THE WORK.
6. CLASS OF CONCRETE
   CAST–IN–PLACE CONCRETE — 35 MPa C–1 MIX
   PRESTRESSED CONCRETE — REFER TO RELEVANT DRAWINGS

   ALL CONCRETE SHALL INCLUDE AN APPROVED AIR ENTRAINING ADMIXTURE
7. CLEAR COVER TO REINFORCING STEEL TO BE:

| | |
|---|---|
| FOOTINGS | 100 ± 25mm |
| REMAINDER (UNLESS NOTED OTHERWISE) | 70 ± 20mm |
| PRESTRESSED CONCRETE | SEE PRESTRESSED DWGS |

8. REINFORCING STEEL SHALL BE GRADE 400. BARS MARKED WITH POSTFIX "S" DENOTE STAINLESS STEEL BARS. UNLESS OTHERWISE SHOWN, TENSION LAP LENGTHS NOT INDICATED ON THE CONTRACT DRAWINGS SHALL BE CLASS "B". BAR HOOKS SHALL BE MINIMUM LENGTH AND STIRRUPS SHALL HAVE MINIMUM HOOKS, UNLESS INDICATED OTHERWISE.
9. STAINLESS STEEL REINFORCING BARS SHALL BE TYPE 316 LN OR DUPLEX 2205 WITH A MINIMUM YIELD STRENGTH OF 500 MPa.
10. MINIMUM LAP OF REINFORCING STEEL SHALL BE IN ACCORDANCE WITH CHBDC (2019)
11. ALL CONCRETE SHALL BE PLACED IN THE DRY.
12. NO CONCRETE SHALL BE PLACED BEFORE MATERIALS, FORMWORK AND REINFORCING HAVE BEEN CHECKED AND APPROVED BY THE CONTRACT ADMINISTRATOR.
13. ALL EXPOSED EDGES SHALL BE CHAMFERED 19mm UNLESS OTHERWISE NOTED. ALL ACUTE ANGLES TO BE FILLED AS INDICATED.
14. CONSTRUCTION JOINTS NOT SHOWN ON THE PLANS MUST BE APPROVED BY THE CONTRACT ADMINISTRATOR.
15. FOOTING DEPTHS ARE SUBJECT TO REVISION BY THE CONTRACT ADMINISTRATOR. FOOTINGS DESIGNED FOR A BEARING CAPACITY OF 300 kPa (ULS) AND 200 kPa (SLS).
16. BEARING SEATS TO BE FINISHED DEAD LEVEL TO THE SPECIFIED ELEVATIONS TO A TOLERANCE OF ±3mm.
17. THE BRIDGE DECK SHALL BE FINISHED USING AN APPROVED FINISHING MACHINE IN ACCORDANCE WITH OPSS.MUNI 904.
18. ANY EXCAVATED OR IMPORTED MATERIAL SHALL BE STOCKPILED WELL AWAY FROM THE EDGE OF THE EXCAVATION AND AT APPROVED LOCATIONS.
19. NO BACKFILL SHALL BE PLACED UNLESS APPROVED BEFOREHAND BY THE CONTRACT ADMINISTRATOR. NATIVE MATERIAL SHALL NOT BE REMOVED FROM THE CONSTRUCTION SITE WITHOUT WRITTEN APPROVAL FROM THE CONTRACT ADMINISTRATOR.
20. ROCK PROTECTION SHALL BE 300mm NOMINAL SIZE WITH 50% LARGER THAN 300mm AND 50% SMALLER THAN 300mm. ROCK PROTECTION SHALL BE PLACED ON GEOTEXTILE UNDERLAY.
21. ALL AREAS AFFECTED/DISTURBED BY THE CONSTRUCTION SHALL BE FULY RESTORED TO A PRECONSTRUCTION STATE OR BETTER TO THE SATISFACTION OF THE CONTRACT ADMINISTRATOR.

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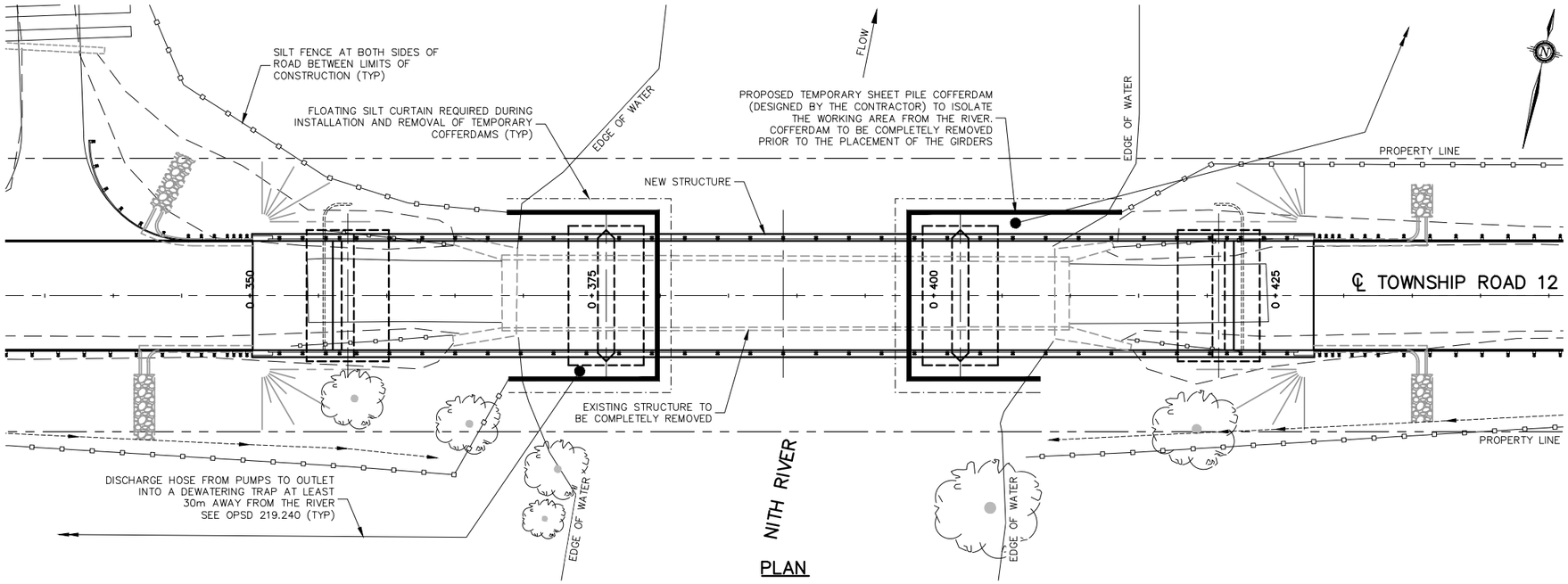
# BRIDGE 24 REPLACEMENT

TOWNSHIP OF BLANDFORD–BLENHEIM

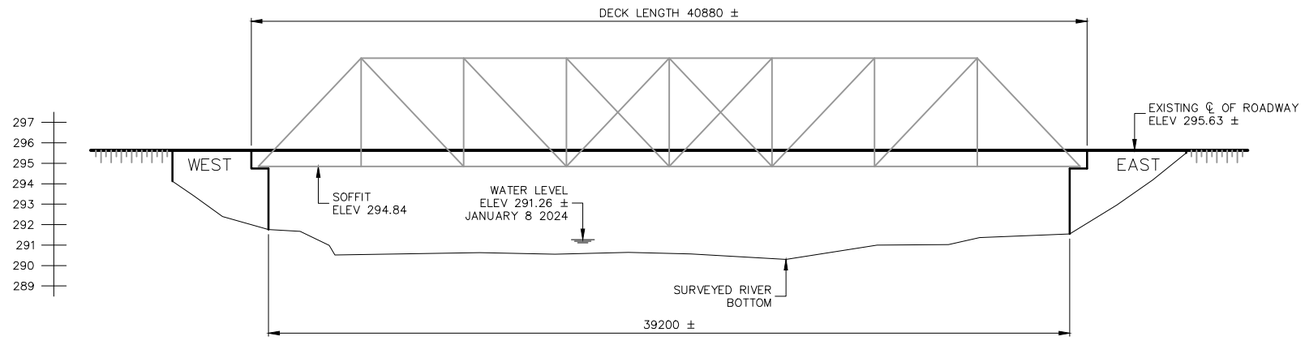
## GENERAL ARRANGEMENT

K. SMART ASSOCIATES LIMITED
CONSULTING ENGINEERS AND PLANNERS
KITCHENER SUDBURY

JOB NUMBER 22–264
DATE APRIL 2024
DRAWING NUMBER 4




PLAN




## EXISTING STRUCTURE

SCALE 1:150

## NAVIGATION

1. SIGNS TO BE PLACED 50m UPSTREAM AND DOWNSTREAM WARNING BOATERS OF THE CONSTRUCTION WORK AHEAD..
2. SILT CURTAINS OR DEWATERING BERMS, INSTALLED DURING NAVIGATION SEASON, ARE TO BE MARKED WITH YELLOW BUOYS AND/OR YELLOW LIGHTS.
3. NO PERSON SHALL PERMIT ANY TOOLS, EQUIPMENT, VEHICLES, TEMPORARY STRUCTURES OR PARTS THEREOF USED OR MAINTAINED FOR THE PURPOSE OF BUILDING OR PLACING A WORK IN A NAVIGABLE WATER TO REMAIN IN SUCH WATER AFTER THE COMPLETION OF THE PROJECT.
4. WHERE A WORK OR PORTION OF A WORK THAT IS BEING CONSTRUCTED OR MAINTAINED IN A NAVIGABLE WATER CAUSES DEBRIS OR OTHER MATERIAL TO ACCUMULATE ON THE BED OR SURFACE OF THE WATER, THE OWNER OF THAT WORK OR PORTION OF THAT WORK SHALL CAUSE THE DEBRIS OR OTHER MATERIAL TO BE REMOVED TO THE SATISFACTION OF THE MINISTER OF TRANSPORT, INFRASTRUCTURE AND COMMUNITIES.

## DEWATERING SEQUENCE

1. ATTEND A PRE-CONSTRUCTION MEETING WITH THE OWNER AND CONTRACT ADMINISTRATOR PRIOR TO COMMENCEMENT OF CONSTRUCTION.
2. INSTALL SILT FENCE, STRAW BALE CHECK DAMS AND ANY OTHER EROSION CONTROL MEASURES WHICH MAY BE REQUIRED.
3. CONSTRUCT DEMOLITION PLATFORM UNDERNEATH EXISTING BRIDGE AND REMOVE EXISTING CONCRETE DECK.
4. LIFT TRUSS SUPERSTRUCTURE OFF OF FOUNDATIONS AND STORE ON SITE FOR REMOVAL BY OTHERS.
5. CLEAN DEBRIS, DUST AND SLURRY FROM DEMOLITION PLATFORM AND REMOVE PLATFORM.
6. PLACE SILT FENCE AND/OR FLOATING SILT CURTAINS OUTSIDE OF PLANNED COFFERDAM LOCATIONS.
7. INSTALL TEMPORARY COFFERDAMS OR OTHER CONTAINMENT SYSTEM AS REQUIRED.
8. DEWATER EXCAVATIONS AND COMPLETE FISH SALVAGE AND TRANSFER OPERATIONS.
9. COMPLETE DEMOLITION OF THE EXISTING BRIDGE.
10. EXCAVATE AS REQUIRED IN ORDER TO CONSTRUCT NEW STRUCTURE.
11. CONSTRUCT PIER FOOTINGS, PIERS, ABUTMENT FOOTINGS AS WELL AS ABUTMENTS AND WINGWALLS TO BEARING SEAT ELEVATIONS.
12. PLACE BACKFILL AND ROCK PROTECTION AS REQUIRED TO FACILITATE REMOVAL OF COFFERDAMS. PLACE ROCK PROTECTION.
13. REMOVE COFFERDAMS.
14. REMOVE FLOATING SILT CURTAINS.
15. COMPLETE REMAINING CONSTRUCTION OF THE BRIDGE.
16. COMPLETE ROADWORK.
17. MAINTAIN SILT FENCE AND STRAW BALE CHECK DAMS UNTIL SITE STABILIZES AND NEW VEGETATION IS WELL ESTABLISHED. REMOVE WHEN NO LONGER REQUIRED.

## EROSION CONTROL – BRIDGE RECONSTRUCTION

1. ALL WORK SHALL BE DONE IN THE DRY.
2. IN-WATER WORK SHALL ONLY TAKE PLACE BETWEEN JULY 15 AND MARCH 14. NO IN-WATER WORK MAY OCCUR OUTSIDE OF THESE DATES FOR ANY REASON.
3. DEWATERING OF THE SITE SHALL BE ACHIEVED BY THE INSTALLATION OF COFFERDAMS TO ISOLATE THE WORKING AREA, AND THE PLACEMENT OF CONVENTIONAL SUMP PUMPS WHERE REQUIRED. THE CONTRACTOR'S SPECIFIC METHOD SHALL BE APPROVED BEFOREHAND BY THE CONTRACT ADMINISTRATOR.
4. DISCHARGE FROM PUMPING OPERATIONS SHALL FIRST OUTLET INTO A SILTING POND OR SEDIMENT TRAP BEFORE THE WATER IS ALLOWED TO RE-ENTER THE STREAM OR ANOTHER WATERCOURSE.
5. COFFERDAMS SHALL BE DESIGNED BY THE CONTRACTOR AND SUBMITTED TO THE CONTRACT ADMINISTRATOR FOR REVIEW PRIOR TO CONSTRUCTION. TOP OF COFFERDAM ELEVATION TO BE NOT LESS THAN ELEV. 312.00
6. ALL DISTURBED AREAS INCLUDING BANKS ABOVE WATER LEVEL SHALL BE REGRADED, TOPSOILED AND SEEDED TO THE SATISFACTION OF THE CONTRACT ADMINISTRATOR AS SOON AS POSSIBLE.
7. ALL EROSION CONTROL MEASURES (SILT FENCE, ROCK DAMS, SILTATION POND/DEWATERING TRAP, ETC.) SHALL BE CHECKED DAILY DURING ON-SITE WORK AND BE MAINTAINED IN GOOD STATE SO THAT THEY ARE FUNCTIONING PROPERLY. SILT FENCE AND STRAW BALE CHECK DAMS TO BE LEFT IN PLACE FOR 12 MONTHS OR UNTIL SUCH TIME AS THE SITE STABILIZES (THESE ARE LOCATED ABOVE HIGH WATER LEVEL).
8. NO MACHINERY SHALL CROSS THE RIVER AT ANY TIME. ANY MACHINERY THAT IS REQUIRED ON THE OTHER SIDE OF THE RIVER WHILE THE BRIDGE IS DISMANTLED OR UNDER CONSTRUCTION SHALL BE HAULED BY FLOAT OR DRIVEN AROUND ON THE ROADS. MACHINERY, VEHICLES, EQUIPMENT PUMPS, ETC., WILL NOT BE REFUELED WITHIN 30 METRES OF THE WATERCOURSE. MACHINERY SHALL NOT BE CLEANED WITHIN 30 METRES OF THE RIVER.
9. ALL WASTE MATERIAL FROM CONSTRUCTION SHALL BE STORED AWAY AND ABOVE THE HIGH WATERMARK AND AT NO TIME SHALL SUCH MATERIAL ENTER IN THE WATER.
10. FOR TYPICAL CHECK DAMS REFER TO OPSD 219.210
11. FOR SILT FENCE REFER TO OPSD 219.130 HEAVY DUTY.
12. SEED MIX TO BE STANDARD ROADSIDE MIX PER OPSS.MUNI 804.

## ADDITIONAL ENVIRONMENTAL MEASURES TO BE ADHERED TO:

1. SEDIMENT AND EROSION CONTROL MEASURES SHOULD BE IMPLEMENTED PRIOR TO WORK, AND MAINTAINED DURING THE WORK PHASE, TO PREVENT THE ENTRY OF SEDIMENT INTO THE WATER OR THE MOVEMENT OF RE-SUSPENDED SEDIMENT.
2. A FLOATING TURBIDITY CURTAIN OR SILT FENCE SHOULD BE PLACED IMMEDIATELY AROUND THE WORK SITE PRIOR TO THE INSTALLATION OF COFFERDAMS.
3. ALL DISTURBED WORK AREAS SHOULD BE STABILIZED AND RE-VEGETATED AS REQUIRED UPON THE COMPLETION OF WORK AND RESTORED TO A PRE-DISTURBED STATE OR BETTER.
4. SEDIMENT AND EROSION CONTROL MEASURES SHOULD BE LEFT IN PLACE UNTIL ALL DISTURBED AREAS HAVE BEEN STABILIZED.
5. EXISTING STREAM FLOWS SHOULD BE MAINTAINED DOWNSTREAM OF THE DE-WATERED WORK AREA WITHOUT INTERRUPTION, DURING ALL STAGES OF WORK. THERE SHOULD BE NO INCREASE IN WATER LEVELS UPSTREAM OF THE DE-WATERED WORK AREA.
6. FISH SHOULD BE REMOVED FROM THE WORK AREA PRIOR TO DE-WATERING AND RELEASED ALIVE IMMEDIATELY DOWNSTREAM.
7. SILT OR DEBRIS THAT HAS ACCUMULATED AROUND THE TEMPORARY COFFERDAMS SHOULD BE REMOVED PRIOR TO THE WITHDRAWAL.
8. NATURAL STRUCTURES SUCH AS LOGJAMS AND IN-STREAM WOODY COVER SHOULD NOT BE REMOVED UNLESS THEY REPRESENT A BARRIER TO FLOWS OR FISH MOVEMENT.
9. OPERATE HEAVY MACHINERY ON LAND AND IN A MANNER THAT MINIMIZES DISTURBANCE TO THE BANKS OR BED OF THE STREAM.
10. ENSURE THAT MACHINERY ARRIVES ON SITE IN A CLEAN, WASHED CONDITION AND IS MAINTAINED FREE OF FLUID LEAKS.
11. WASH, REFUEL AND SERVICE MACHINERY AND STORE FUEL AND OTHER MATERIALS FOR THE MACHINERY AT LEAST 30m AWAY FROM THE WATER TO PREVENT ANY DELETERIOUS SUBSTANCE FROM ENTERING THE WATER OR SPREADING ONTO THE ICE SURFACE.
12. KEEP AN EMERGENCY SPILL KIT ON SITE IN CASE OF FLUID LEAKS OR SPILLS FROM MACHINERY.
13. STABILIZE ANY WASTE MATERIALS REMOVED FROM THE WORK SITE TO PREVENT IT FROM ENTERING THE RIVER. THIS COULD INCLUDE COVERING STOCKPILES WITH BIODEGRADABLE MATS OR TARPS, OR PLANTING STOCKPILES WITH GRASS OR SHRUBS.
14. ALL UNSTABLE BANKS OF THE WATERCOURSE SHOULD BE STABILIZED AND SIDE RUN-OFF DITCHES SHOULD BE CONSTRUCTED TO DIVERT ROAD RUN-OFF THROUGH THE GREENBELT BEFORE ENTERING THE STREAM.
15. VEGETATE AND STABILIZE ANY DISTURBED AREAS BY SEEDING AND PLANTING TREES, SHRUBS, OR GRASSES PER SPECIFICATIONS. SEE SEED MIX REQUIREMENTS IN NOTE 12 ABOVE.
16. STREAM CROSSINGS SHOULD ALLOW FOR UNIMPEDED UPSTREAM AND DOWNSTREAM MOVEMENT OF FISH.
17. CONCRETE LEACHATE IS ALKALINE AND HIGHLY TOXIC TO FISH AND AQUATIC LIFE AND MEASURES MUST BE TAKEN TO PREVENT ANY INCIDENCE OF CONCRETE OR CONCRETE LEACHATE FROM ENTERING THE RIVER. ALL CAST-IN-PLACE CONCRETE, GROUT, MORTARS, ETC. SHOULD BE TOTALLY ISOLATED FROM PRECIPITATION AND THE WATERS OF THE WATERCOURSE FOR A MINIMUM 48 HOUR PERIOD OR UNTIL SIGNIFICANTLY CURED TO ALLOW THE pH TO REACH NEUTRAL LEVELS. CONTAINMENT FACILITIES SHOULD BE PROVIDED AT THE SITE FOR THE WASH-DOWN FROM CONCRETE DELIVERY TRUCKS, CONCRETE PUMPING EQUIPMENT, AND OTHER TOOLS AND EQUIPMENT AS REQUIRED.

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# BRIDGE 24 REPLACEMENT

TOWNSHIP OF BLANDFORD-BLENHEIM

# EROSION AND SEDIMENT CONTROL

K. SMART ASSOCIATES LIMITED
CONSULTING ENGINEERS AND PLANNERS
KITCHENER SUDBURY

JOB NUMBER 22-264
DATE APRIL 2024
DRAWING NUMBER 5

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# Blandford-Blenheim Bridge 24 Replacement, Perry's Corners, Ontario

Mitigation Plan for Species at Risk

Prepared for:

Township of Blandford-Blenheim
47 Wilmot Street South
Drumbo, ON – N0J 1G0

&

K. Smart Associates Ltd.
85 McIntyre Drive
Kitchener, ON – N2R 1H6

Project No. 3191A | July 2025

NATURAL RESOURCE SOLUTIONS INC.
Aquatic, Terrestrial and Wetland Biologists

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## 1.0 Introduction

Natural Resource Solutions Inc. (NRSI) was retained by K. Smart Associates Ltd. on behalf of the Township of Blandford-Blenheim to complete a scoped Environmental Impact Study (EIS) to inform a Class B Environmental Assessment (EA) for a proposed replacement of Bridge 24 along Township Road 12 over the Nith River. Following completion of the EIS, NRSI was subsequently retained to provide environmental services in support of the proposed Blandford-Blenheim Bridge project. The proposed bridge replacement involves the decommissioning and removal of the existing steel truss bridge, including the existing abutments, and construction of a new concrete bridge, piers, and abutments. The new bridge has been designed to meet current transportation and safety standards, including lane widths, accommodation of agricultural vehicles, and applicable height and load ratings.

Due to the presence of Species at Risk, including Black Redhorse (*Moxostoma duquesnei*), Silver Shiner (*Notropis photogenis*), and Wavyrayed Lampmussel (*Lampsilis fasciola*), additional measures must be implemented to protect these species during construction. In accordance with the Endangered Species Act, this includes the capture and relocation of individuals from within the Nith River to prevent harm. As part of project registration under Section 23.18-Threates to Health and Safety – Non-Imminent of O. Reg. 242.08, a qualified expert must prepare a Mitigation Plan for each SAR listed as endangered or threatened that could be impacted by the construction activities. Natural Resource Solutions Inc. (NRSI) was retained by K. Smart Associates Ltd. on behalf of the Township of Blandford-Blenheim to prepare this Mitigation Plan for three aquatic SAR species deemed to have potential to exist within the area the activity will be taking place.

This Mitigation Plan has been prepared in accordance with Ontario Reg. 242/08 under the ESA and includes the following required components:

- A description of the proposed activity, its main purposed and an explanation of the threat to human health or safety that requires the activity, and the potential serious consequences both short and long term, if the activity was not undertaken;
- The name and contact information of the individual or organization responsible for carrying out the activity;
- The qualifications of the author preparing the Mitigation Plan;
- The proposed start and completion dates of the activity;

- A description and timeline for all the stages of the activity:
- Geographic location of work, including supporting map:
- A list of all species listed as endangered or threatened under the Species at Risk in Ontario List that are likely to be affected by the activity:
- An assessment of the activity's potential effects on individuals of each species identified:
- A description of the mitigation measures to be implemented to minimize potential impacts on each species, including the methods and locations of application.

This Mitigation Plan has been developed using the best available information for the three identified species at risk, including Black Redhorse, Silver Shiner, and Wavyrayed Lampmussel. It has been prepared in advance of construction activities that may affect the species or their habitat. In accordance with the Regulation, this plan must be retained for at least 5 years after the activity is completed. A copy of this Mitigation Plan must be provided to Ministry of Environment, Conservation and Parks (MECP) within 14 days, if requested. The project proponent is expected to be responsible for implementing this Mitigation Plan for the duration of the bridge replacement activities.

## 2.0 Description of the Activity

In accordance with O. Reg 242/08 s.23.18 (3), this mitigation plan includes a description of the activity, its primary purpose and an explanation of the threat to human health or safety that requires the activity be carried out and the potential short-and long-term consequences, if the activity was not carried out.

The proposed work involves the removal of the existing steel truss bridge and its replacement with a concrete 3-span bridge structure over the Nith River along Township Road 12. To accommodate the new bridge, the road approaches on both sides will be raised relative to their current grades, and a portion of the roadway, including the bridge and its immediate approaches, will be paved with asphalt. The new bridge design will meet hydraulic and structural standards, and to safely accommodate current and future traffic demands, including appropriate lane widths, height and load ratings, and clearance for agricultural vehicles.

The central (middle) span of the new bridge will be longer than the two outer side spans to minimize the extent of in-water works and related impacts. Compared to the existing bridge, the

new structure will have an increased total span, allowing the new abutments to be set farther back from the riverbanks, minimizing direct encroachment on the aquatic habitat.

The activity is necessary to address public safety risks associated with the aging infrastructure. The existing bridge no longer meets current structural standards and presents increasing concerns related to load capacity, corrosion, and long-term serviceability. If the bridge is not replaced, the consequences could include structural failure, road closure, and restricted access for emergency services, agricultural operations, and local transportation—all of which pose a serious risk to public safety in both the short and long term.

Prior to construction, sediment and erosion control measures such as silt fencing will be installed adjacent to the work area to protect the surrounding environment. A mussel relocation program will be implemented to remove all unionid species from the in-water work area to mitigate potential harm to aquatic species and their habitat.

A demolition platform will be installed beneath the existing bridge to facilitate safe removal of the existing concrete deck. The existing truss superstructure will be lifted off its foundations and stored on-site, out of the high-water mark for decommissioning and removal. Any demolition debris, dust or slurry will be contained and removed from the demolition platform prior to removal.

Following deck and superstructure removal, floating silt curtains and temporary sheet-pile cofferdams will be installed around the in-water work area. Once the work area has been isolated, a fish salvage and relocation will be carried out in accordance with applicable protocols in conjunction dewatering. Any remaining demolition required will occur following the fish relocation and complete de-watering of the work areas. Excavation will occur, as necessary, to prepare the construction of the new structure within these isolated work areas.

Construction of the new pier footings, piers, abutment footings, and abutments, along with wingwalls will proceed within the isolated and dewatered zones. Upon completion of structural components, backfill and placement of rock protection will be completed prior to the removal of coffer dams and floating silt curtains. The remaining bridge components will then be constructed, followed by final roadwork activities. All ESC measures will remain in place until the bridge and associated roadworks has been completed and the site is stabilized.

## 3.0 Contact Information

The primary contacts responsible for the Blandford-Blenheim Bridge 24 replacement along Township Road 12 between Blenheim Road and Oxford Road #3 within the Township of Blandford-Blenheim, Ontario are as follows:

| | |
|---|---|
| **Name of Proponent:** | Township of Blandford-Blenheim |
| **Prime Contact:** | Jim Borton, Director of Public Works |
| **Address:** | 47 Wilmot Street South, Drumbo, ON – N0J 1G0 |
| **Telephone:** | 519-463-5347 ext. 7426 |
| **Email:** | jborton@blandfordblenheim.ca |

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| **Name of Contractor:** | K. Smart Associates Ltd. |
| **Prime Contact:** | Trevor Hoard, C.E.T. |
| **Address:** | 85 McIntyre Drive, Kitchener, Ontario N2R 1H6 |
| **Telephone:** | 519-748-1199 ext. 229 |
| **Email:** | thoard@ksmart.ca |

## 3.1 Qualifications and Expertise of Person Developing Mitigation Plan

Natural Resource Solutions Inc. (NRSI) is an environmental consulting firm specializing in terrestrial, wetland and aquatic biologist. With a dedicated focus on natural environment, NRSI offers a high level of technical expertise supported by extensive field experience and scientific knowledge. Our team includes specialists in ecology, botany, aquatic sciences, and Species at Risk who regularly undertake Species at Risk (SAR) assessments, habitat evaluations, and environmental permitting processes.

NRSI's collective experience spans a wide range of project types, including research initiatives, natural heritage and resource management, Class Environmental Assessments (EAs), Environmental Impact Studies (EISs), ecological mitigation and restoration plans, transportation and infrastructure studies, stormwater and servicing assessments, retrofit and redevelopment projects, environmental monitoring programs, peer reviews, and SAR surveys.

The development of this Mitigation Plan was led by qualified aquatic biologists with direct experience in SAR assessments and permitting under the *Endangered Species Act, 2007*. Staff involved have completed numerous similar mitigation plans and relocation efforts for aquatic SAR species, including freshwater mussels and fish, in compliance with provincial and federal regulations.

The primary author responsible for preparation of this mitigation plan is as follows:


| | |
|---|---|
| **Name of Company** | Natural Resource Solutions Inc. |
| **Prime Contact:** | Sam Catry, Aquatic Biologist |
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**Sam Catry** is an aquatic biologist and freshwater mussel specialist with over seven years of technical experience, including over five years in environmental consulting with NRSI. Sam specializes in freshwater mussel surveys and relocations, habitat assessments for SAR fish and mussels, fish community assessments, and long-term aquatic monitoring studies. He has a broad range of experience working with both the Endangered Species Act (ESA), and federal Species at Risk Act (SARA). Sam regularly reviews background information and screens pre-existing information to identify sensitive habitats and/or SAR occurrences that may warrant additional assessment or mitigation. His consulting work spans a range of project types, including secondary plans, Environmental Assessments, and Environmental Impact Studies, where he has coordinated multi-disciplinary ecological surveys and supported permitting processes under various federal and provincial legislations.

Sam is well versed in the applicable policies and legislation regarding aquatic and terrestrial species and their habitat, and is capable of providing guidance during all stages of a project to ensure compliance and approvals. He has authored and contributed to the development of several Mitigation Plans under O.Reg 242/08, Section 23.9 for a variety of species including Wavyrayed Lampmussel, Black Redhorse, Silver Shiner, Mapleleaf (*Quadrula quadrula*), Rainbow (*Villosa iris*), and Lilliput (*Toxolasma parvum*).

Sam has extensive experience working in Ontario with freshwater mussels and fish, and has led numerous projects involving the permitting and subsequent relocation and monitoring of SAR mussels in accordance with the DFO Protocol for the Detection and Relocation of Freshwater Mussel Species at Risk in Ontario-Great Lakes Area (OGLA). His experience includes completing mussel relocations triggered by the presence of Lilliput within the Big Marsh Drain system on Pelee Island, including the searching of spoils dredged from the drainage system to permit dredging to occur. Additionally, he has led the mussel relocation triggered by the

presence of Wavyrayed Lampmussel during the decommissioning of Howson Dam in Wingham, Ontario, among others.

As a freshwater mussel specialist, Sam is a comprehensive knowledgeable of Ontario's native mussel species and is proficient in their identification. Sam has contributed to national species assessments having authored the draft provincial Recovery Strategy for Purple Wartyback (Cyclonaias tuberculata) and draft status report for Wavyrayed Lampmussel for the Committee on the Status of Endangered Wildlife in Canada (COSEWIC), both currently under agency review.

**Eve Krauss** is an Aquatic Biologist and Junior Freshwater Mussel Specialist with over four years of technical field experience across a wide range of aquatic surveys and monitoring programs in Ontario. She has led numerous fish relocations, fish community assessments, and aquatic habitat surveys, and has assisted with numerous freshwater mussel relocations and monitoring events across Southern Ontario.

Eve has received formal training from industry leading aquatic organizations such as the Department of Fisheries and Oceans Canada (Freshwater Mussel Identification Workshop, Todd Morris) and the Royal Ontario Museum (Cyprinid Identification Workshop, Species at Risk Workshop, Erling Holmes), where she participated in specialized training workshops focused on Cyprinid identification and Species at Risk. Her technical knowledge is supported by extensive hands-on experience, and she is well-versed in the identification of Ontario's freshwater fish and mussel species, including those that exhibit sexual dimorphism.

She holds certifications for leading both active and passive sampling techniques, including backpack and raft/boat electrofishing, as well as gill netting and fyke netting surveys. Eve is proficient in the use of aquatic survey protocols and equipment and demonstrates strong skills in specimen handling, measurement, and species identification.

In addition to her fieldwork, Eve plays a key role in regulatory permitting at NRSI. She is responsible for preparing and submitting permit applications, coordinating with regulatory agencies, and drafting summary reports to meet Ministry expectations. Her familiarity with provincial and federal permitting requirements, coupled with her ability to effectively communicate with agency staff, ensures timely and accurate documentation in support of compliance and project approvals

Further qualifications of NRSI, as well as Sam and Eve's CVs can be found in Appendix I.

## 4.0 Proposed Start and Completion Dates of the Activity

The proposed works are slated to start in August 2025 and end in July 2026.

## 4.1 Stages of the Activity and Timelines

Mussel Relocation

Prior to any in-water works occurring within the high-water mark of the Nith River, a mussel relocation will be conducted within the Projects Prescribed Search Area (PSA). The PSA includes the direct in-water work zone (Activity Zone), a surrounding Risk Zone and a broader Zone of Influence to account for potential indirect impacts. The total area of the Prescribed Search Area (PSA) is approximately 370m$^2$. This relocation will follow the *Detection and Relocation of Freshwater Mussel Species at Risk in Ontario-Great Lakes Area* (Mackie et al. 2008), further referred to as 'the Protocol'.

Prior to the relocation of mussels from the PSA, a relocation and control site will be identified and selected upstream of the PSA. These sites will be selected based upon comparable habitat characteristics including, substrate composition, flows, and depths. These sites will be subsampled utilizing a simple random sampling selection methodology, as outlined in *A Guide to Sampling Freshwater Mussel Populations* (Strayer and Smith 2003). This sampling will be conducted using the simple random approach where areas are overlaid with 1m$^2$ grid and then locations are randomly selected using a random number generator.

Within the PSA, 1m-wide transects will be delineated, and NRSI biologists will systematically search the entire PSA using 1m$^2$ quadrats along each transect. Each quadrat will be searched for 8-10 minutes using a tactile searching methodology, which involves digging down 1into the substrates to a depth of approximately 10cm in search of mussels. Visual inspections will also be carried out with the use of underwater viewers to detect any mussels dislodged during the tactile search.

In deeper water where tactile searching is not feasible, long-handled mussel scoops will be used. These long-handled mussel scoops are designed to collect and sift through substrates in depths of approximately 1m.

All mussels encountered during the relocation will be:

- Identified to species level
- Enumerated,
- Photographed (at least one per species)
- Temporarily stored in submerged mesh bags.

Mussels will then be transplanted at the pre-determined relocation site. All SAR mussels, along with a subset of non-SAR mussels, will be coded using shellfish tags. A unique identifying code will be affixed to each valve prior to relocation at monitoring pegs placed at the relocation site for future monitoring.

The number of non-SAR mussels coded will depend on the quantity encountered during the relocation, but will be sufficient to statistically determine differences in growth and survival at subsequent monitoring events. All other non-SAR mussels that exceed the subset requirement will be identified, enumerated, and relocated.

Note: If no SAR mussels are encountered during the relocation, post-relocation monitoring requirements will be waived.

It is expected that this work will be completed in August 2025, and that it will require approximately 3 days to complete, including the sampling of the control and relocation sites. The 1-month monitoring event is anticipated to occur in mid to late September 2025.

Work-site Isolation and Removal of Existing Bridge and Abutments

Erosion and sediment control measures will also be installed prior to the commencement of construction. This will include the installation of silt fencing adjacent to the work area to prevent sedimentation and runoff into the Nith River.

Following the completion of the mussel relocation efforts, site isolation and demolition activities are scheduled to begin in September 2025. Turbidity curtains and floating debris containment platforms will be installed to isolate the in-water work area to support the removal of the existing bridge and abutments.

The footprint of the temporary turbidity curtains is approximately 11x12.5m for the western isolated work area, with an off-set configuration of 15.5x12.5m for the eastern work area. The footprint of the turbidity curtains will envelope the existing abutments and location of the proposed pier footings for the bridge replacement.

A demolition platform will be installed under the existing bridge for removal of the existing deck. The existing truss superstructure will be lifted from the foundations and stored on-site, out of the high-water mark, for decommissioning and removal. Any demolition debris, dust, or slurry will be contained within this demolition platform and will be removed prior to removal of the platform. Once the demolition platform has been removed and the in-water area fully isolated with cofferdams or turbidity barriers, dewatering and fish relocation activities will be completed. The removal of the existing concrete abutments will follow, occurring entirely within the isolated and dewatered work zone.

Cofferdam Installations and Fish Relocation

Following the installation of the turbidity curtains, sheet pile cofferdams will be installed within the isolated in-water work areas to fully contain the abutment removal and pier construction areas. These cofferdams will provide a dry workspace and reduce the potential for sediment mobilization or harm to aquatic life during construction activities.

NRSI will complete a fish relocation within the two isolated in-water work areas. Fish relocation efforts will commence once de-watering of the isolated work area has begun, with water levels not exceeding 1m, to ensure effective sampling effort with one of NRSI's electrofishing backpacks. The electrofishing backpack produces an electrical current within the water which momentarily stuns fish, bringing them to the surface and allowing a netter to collect them and place them in a live well for identification and relocation.

All captured fish will be identified, enumerated, and live individuals will be relocated downstream of the isolated work area. Any mortalities or invasive species will be disposed of, as directed by the Aylmer-Guelph District of the MNR. Voucher photographs and/or individual fish may be collected for reference purposes.

Based upon the proposed construction timeline, it is anticipated that the fish relocations will occur in October 2025. The relocation effort is expected to take two days to complete.

Pier Construction and Riverbed Restoration

Timing: November 2025 – January 2026

The new pier footings and pier shafts, along with wingwalls, will be constructed following the removal of the existing structure. Subsequent backfill and placement of rock protection will be completed prior to the removal of cofferdams and turbidity curtains. Native substrates are

proposed to be placed over the pier footings and rock protection to restore the existing riverbed. Following completion of the in-water pier construction, the sheet pile cofferdams will be cut and removed.

Abutment Construction

Timing: February 2026 – May 2026

The new bridge abutment footings and abutments will be constructed following removal of the existing structure and in-water pier construction. The construction of the new bridge abutments will occur beyond the high-water mark, and will not require any in-water works. Following completion of the abutment construction, the bridge girders will be installed and the new concrete deck top installed.

Bridge Finalization and Road Works

To accommodate the new bridge structure, the roadway approaches on both sides will be raised up relative to their existing grades. A portion of the roadway, including the bridge and its immediate approaches, will be paved with asphalt. During this phase, bridge railings will also be installed to finalize the bridge construction. The final roadworks are anticipated to occur in June 2026. No in-water works are proposed during this stage, and all construction activities will occur within the previously disturbed terrestrial zones.

Restoration Plantings

Following completion of the bridge construction, restoration plantings and seeding will be completed to stabilize disturbed areas and restore ecological function. Restoration efforts will occur in July 2026, however, may be deferred until fall of 2026 to optimize plant survival and minimize heat/drought stresses during the summer.

All areas of construction disturbance adjacent to the new bridge and road infrastructure will be seeded with a native meadow mix that is hardy to roadside conditions. The seed mix will be applied following, or in conjunction with, the nurse crop (e.g., Annual Oats (*Avena sativa*), Barley (*Hordeum vulgare*), Canada Wild Rye (*Elymus canadensis*)) that is established for soil stabilization and to facilitate the native seed mix growth. Portions of the roadside disturbance zones that formerly comprised agricultural field edges will be returned to their previous agricultural field use. A nurse crop can be applied to stabilize restored agricultural field edges if

required. The previous/retired agricultural field entrance on the south side of Township Road 12 will be restored with a seed mix and tree/shrub plantings within the ROW.

The disturbed roadside areas will also be restored with a diverse suite of native tree and shrub species adapted to the roadside conditions and reflective of the local site conditions. Tree compensation will occur at a minimum of a 1:1 basis, to the extent that can be accommodated within the available planting zones. Some trees may be replaced with shrubs at a higher ratio (e.g., 3:1).

Woody vegetation will be prioritized along steeper embankments to the Nith River, where it will support slope stabilization re-establish a source of woody debris and provide shading over the river to improve aquatic habitat. However, plantings will be strategically placed to avoid interference with the roadside vegetated drainage ditches, ensuring continued function of surface water conveyance features.

## 5.0 Location of Works

Blandford-Blenheim Bridge 24 is located along Township Road 12 between Blenheim Road and Oxford Road #3, outside of Perry's Corners, Ontario, as shown on Map 1. The UTM for the pond is 17T 536736m E, 4794449m N.

Directions to the site are as follows: Highway 401 to exit 250 at Oxford Road 29, westbound. Continue on Oxford Road 29 to Hubbard Road, heading north to Township Road 8. Take a left (west) on Township Road 8 and a right on Hubbard Road (north). Continue north on Hubbard Road to Oxford Road 8, taking a right to head eastbound. Follow Oxford Road 8 to Township Road 12, taking a right and heading eastbound, bringing you to the west side of Blandford-Blenheim Bridge 24.

## 6.0 Species at Risk & Assessment of Activities Effects

Species at Risk (SAR) known to occur or with a high potential to occur within the Blandford-Blenheim Bridge 24 project area were identified through background review following the Client's Guide to Preliminary Screening for Species at Risk. In addition, NRSI conducted field surveys within the Nith River to assess the suitability of aquatic habitats to support SAR fish and to document the presence and composition of freshwater mussel communities. The results of these surveys were summarized in a previous Environmental Assessment (EA).

Several SAR were identified as having occurrence records within the project area included species listed as Endangered (END), Threatened (THR) and Special Concern (SC). Only those species listed as END and THR receive protection under the ESA and require mandatory mitigation measures. The measures presented in this document aim to mitigate impacts to both SAR and non-SAR species.

Based on the available habitat and results of the preliminary screening, three aquatic SAR have suitable habitat within this section of the Nith River; including, Black Redhorse, Silver Shiner, and Wavyrayed Lampmussel. These species are discussed through this Mitigation Plan, as they have the potential to be adversely affected by the proposed works.

The proposed work includes; in-water work that will disturb the aquatic habitat, and limited clearing of adjacent terrestrial vegetation to allow for site access and staging. Direct and indirect impacts to documented SAR as a result of the bridge construction may include:

- Harm or harassment to Black Redhorse, Silver Shiner, and Wavyrayed Lampmussel;
- Loss of riparian vegetation, clearing and grubbing along banks. Possible harm to the species with release of sediment from disturbed soils into the receiving waterbodies;
- Increased turbidity levels and sedimentation during installation of turbidity curtains within the receiving waterbody.
    - Reduced feeding efficiency of visual predators such as Black Redhorse and Silver Shiner;
    - Smother spawning habitats (e.g. Gravel beds) and pool habitats used by fish and mussels;
    - Suffocate fish eggs or juvenile mussels embedded in sediment

If SAR are injured/harmed during the course of the works, the London District MECP should be notified to provide further guidance. Appendix II provides the contact information for the MECP London District and a SAR Sighting Response form.

Table 1 below outlines the END and THR species potentially affected by the project (directly or indirectly), their associated habitat types and applicable mitigation measures.

With adherence to the outlined mitigation measures including the timing windows, isolation procedures, fish and mussel relocation protocols, and ESC strategies, it is anticipated that the project will not result in a negative effect to the species or their habitats.

**Table 1. Species at Risk with Potential to be Adversely Affected**

| Scientific Name | Common Name | ESA[1] | Habitat Preference [1,2] | Assessment of Activity's likely effects | Restricted Timing Window for Works |
|---|---|---|---|---|---|
| **Fish Species** | | | | | |
| *Moxostoma duquesnei* | Black Redhorse | THR | Pools and riffle areas of medium-sized rivers and streams, usually less than two metres deep. Usually few aquatic plants, a moderate to fast current, and a sandy or gravel bottom. In the spring, adults migrate to breeding habitat where eggs are laid on gravel in fast water. | Without mitigation measures, the dewatering and subsequent construction within the high-water mark has the potential to directly harm this species and their habitat.<br><br>With implementing the mitigation measures outlined in section 7.1 and 7.2 the effects to the species should be minimized and the effects to their habitat temporary. | No in-water works between March 15 and July 15th in any given year. |
| *Notropis photogenis* | Silver Shiner | THR | Moderate to large size streams with swift currents, free of weeds, with clean gravel or boulder bottoms. Gravel riffles needed for spawning (June-July). | Without mitigation measures, the dewatering and subsequent construction within the high-water mark has the potential to directly harm this species and their habitat.<br><br>With implementing the mitigation measures outlined in section 7.1 and 7.2 the effects to the species should be minimized and the effects to their habitat temporary. | No in-water works between March 15 and July 15th in any given year. |
| **Mussel Species** | | | | | |
| *Lampsilis fasciola* | Wavyrayed Lampmussel | THR | Small to medium rivers with clear water. Shallow riffle areas with clean gravel or sand bottoms. Fish hosts include: Largemouth bass and Smallmouth bass. | Without mitigation measures, the dewatering and subsequent construction within the high-water mark has the potential to directly harm this species and their habitat.<br><br>With implementing the mitigation measures outlined in section 7.1 and 7.3 the effects to the species should be minimized and the effects to their habitat temporary. | No in-water works between March 15 and July 15th in any given year.<br><br>Water temperatures must be ≥ 16ºC for relocation activities[3]. |

[1]Government of Ontario 2024

[2]Photo Field Guide to the Freshwater Mussels of Ontario 2005

[3]Protocol for the Detection and Relocation of Freshwater Mussel Species at Risk in the Ontario Great Lakes Area 2008

## 7.0 Mitigation Measures

Based on the SAR that may be present within this section of the Nith River, the following mitigation measures are recommended to minimize impacts and ensure compliance with the ESA. These measures have been developed using the best available information and should be implemented in full prior to and during all construction activities.

Contractors and site staff are expected to review and adhere to the following:

- Species-specific identification sheets (provided in Appendix III) to assist with on-site recognition of SAR that may be encountered;
- SAR Activity and Observation Reporting Forms (provided in Appendix IV) to document any observations or encounters during construction. The contractor must be capable of accurately completing these forms, which may be required for post-construction reporting;
- Training sign-off sheet (included in Appendix V) to be completed by all on-site personnel following review of this Mitigation Plan and its appendices. This sign-off confirms that staff understand and agree to comply with the SAR protection requirements.

The mitigation measures outlined in this section are designed to reduce the likelihood of harm, harassment, or habitat degradation for SAR species. Adherence to these measures is a condition of project approval and is necessary to ensure regulatory compliance and environmental protection.

### 7.1 General Mitigation Measures

The following mitigation measures have been established to minimize or avoid impacts to the natural environment during the Blandford-Blenheim Bridge 24 replacement. The list below should be used as a checklist by the contractor and site supervisors to ensure that these general mitigation measures are followed throughout all phases of the construction. Specific mitigation measures for the species that may be adversely affected are presented in Section 7.2 and Section 7.3.

General Environmental Protection Measures:

- File a Notice of Activity with the MECP (being completed by NRSI on behalf of K. Smart Associates Ltd. and the Township of Blandford-Blenheim),

- Ensure on-site staff are familiar with the species that may be present within the work area,
- Review and follow the guidance provided in Appendix III (Species at Risk Specific Information Sheets) and Appendix IV (Species at Risk Encounter Reporting Form), including protocols for SAR encounters and reporting procedures.
- Adhere to species-specific seasonal timing windows to avoid sensitive time periods,
- Schedule work to avoid wet, windy, and rainy periods that may increase erosion and sedimentation,

Equipment and Site Management

- Ensure that machinery arrives on site in a clean condition and is maintained free of fluid leaks. This is important for limiting the risk of invasive species.
    - Vehicles should be checked thoroughly both inside and out.
    - Details on cleaning equipment / managing invasive species can be found in the Clean Equipment Protocol for Industry online at https://www.ontarioinvasiveplants.ca/wp-content/uploads/2016/07/Clean-Equipment-Protocol_June2016_D3_WEB-1.pdf
- Wash, refuel, and service machinery and store fuel and other materials for the machinery in such a way as to prevent any deleterious substances from entering the water or vicinity (minimum distance of 30 m from watercourse and natural features).
- Keep and maintain an emergency spill kit on site,

Wildlife and Vegetation Protection

- Limit vegetation clearing and tree removal where feasible.
- Conduct wildlife sweeps prior to works or if vehicles left idle.

Sediment and Erosion Control

- Develop and implement a sediment control planwhich should be maintained and monitoring through to completion of the works, and include stabilizing the disturbed ground.
- Refer to DFO's Measures to Avoid Harm (http://www.dfo-mpo.gc.ca/pnw-ppe/measures-mesures/measures-mesures-eng.html) which outlines measures to follow for:
    - Project planning
    - Erosion and sediment control
    - Shoreline/bank re-vegetation and stabilization
    - Fish protection

- Operation of machinery

## 7.2 Fish Specific Mitigation Plans & Timing

Critical Habitat for Black Redhorse and Silver Shiner has been identified within this section of the Nith River. Accordingly, they have been assumed to be present within the bridge replacement work areas. The following mitigation measures have been developed in accordance with the most current guidance, such as the Recovery Strategy for Black Redhorse in Ontario (MECP 2023a) and Recovery Strategy for Silver Shiner (MECP 2023b) . These mitigation measures aim to avoid or minimize harm and disturbance to both species and their habitats. Table 2 below outlines the specific mitigation measures to be followed for the Blandford-Blenheim Bridge 24 replacement. Appendix III provides an identification sheet for Black Redhorse and Silver Shiner.

Permitting Requirements

In order to undertake the necessary fish relocation activities, the following permits are required:

- A License to Collect Fish for Scientific Purposes under O.Reg. 664/98, to be issued from the Aylmer-Guelph District MNR,
- A federal Species at Risk Act permit (DFO File No. 25-HCAA-01113) issued by Fisheries and Oceans Canada (DFO) to support the collection, handling and relocation of listed SAR fish.

Upon completion of the fish relocation, a Fish Collection Report will be submitted to the MNR summarizing the methods, species captured, and relocation outcomes. Additionally, a summary report will be provided to DFO to fulfill federal SARA permit conditions.

**Table 2. Fish Mitigation Plan**

| Species | Mitigation Measures |
|---|---|
| Black Redhorse (THR)<br>Silver Shiner (THR) | • Follow timing windows (i.e., No in-water works between March 15 and July 15th in any given year).<br>• Work in a period of low or no flow (i.e., de-water within isolated work area in advance of commencing in-water work).<br>• Avoid work in rainy periods where increased erosion is anticipated.<br>• Choose conditions or equipment appropriate to minimize site disturbance by equipment (e.g. frozen or dry soil conditions or the use of load distributing machines or mats).<br>• Install and maintain appropriate erosion and sediment controls until the site is stabilized<br>• Re-vegetate and stabilize all exposed soils as soon as possible following the disturbance<br>• Follow timing windows (i.e., No in-water works between March 15 and July 15th in any given year).<br>• Work in a period of low or no flow (i.e., de-water within isolated work area in advance of commencing in-water work).<br>• Avoid work in rainy periods where increased erosion is anticipated.<br>• Choose conditions or equipment appropriate to minimize site disturbance by equipment (e.g. frozen or dry soil conditions or the use of load distributing machines or mats).<br>• Install and maintain appropriate erosion and sediment controls until the site is stabilized<br>• Re-vegetate and stabilize all exposed soils as soon as possible following the disturbance<br>• Due to the potential presence of these species, in-water work areas will be isolated utilizing temporary turbidity curtains and cofferdams to permit work to be completed in the dry, while excluding Black Redhorse and Silver Shiner from re-entering the work area.<br>• Any Black Redhorse or Silver Shiner contained within the isolated in-water work areas will be captured under the authority of suitable federal and provincial permitting, and relocated by a qualified biologist. Observations of these individuals will be reported to the MECP, MNR, and DFO. |

## 7.3 Mussel Specific Mitigation Plans & Timing

Wavyrayed Lampmussel, a Threatened species under the ESA has been confirmed within this section of the Nith River. As suitable habitat is present and individuals have been observed, mitigation measures are required to prevent harm and ensure regularity compliance during bridge replacement activities.

The primary mitigation stragegy for freshwater mussels is relocation from the construction footprint as detailed in Table 3, below. These measures follow guidance outlined in the DFO Protocol for the Detection and Relocation of Freshwater Mussel Species at Risk in Ontario – Great Lakes Area (Macki et al. 2008) hereafter referred to as the Protocol.

Timing and Implementation

The mussel relocation will be completed after July 15, 2025, and prior to the commencement of any in-water works, including the installation of turbidity curtains and cofferdams. NRSI will coordinate closely with the contractor to initiate the survey and capture/relocation of mussels within wadeable habitats within one month of the proposed isolation activities. This window ensures minimal mussel movement back into the work area and compliance with seasonal constraints.

The mussel relocation will follow methods detailed within the Protocol (Mackie et al. 2008). If any SAR mussels are captured during the relocation, a post-relocation monitoring program will be initiated following the Protocol at 1-month, 1-year, and 2-years after the relocation. If no SAR mussels are captured, monitoring requirements under the Protocol will be waived.

Permitting Requirements

To complete the mussel relocation as part of the required mitigation measures, a License to Collect Fish for Scientific Purposes permit will be required from the Aylmer-Guelph District MNR (O.Reg. 664/98). Upon completion of the relocation activities, a Fish Collection Report will be submitted to the MNRF to document the methods, findings, and outcomes of the work. NRSI is responsible for securing the LCF on behalf of the project team.

Additionally, to comply with the federal Species at Risk Act, NRSI will prepare and submit an application for a SARA permit to authorize the capture, handling, and relocation of any Threatened or Endangered freshwater mussel species encountered during the work. The SARA permit will be obtained in advance of completing the works.

**Table 3. Mussel Mitigation Plan**

| Species | Mitigation Measures |
|---|---|
| Wavyrayed Lampmussel (THR) | • Follow timing windows (i.e., No in-water works between March 15 and July 15th in any given year).<br>• Follow guidelines for water temperatures which state they must be ≥ 16ºC for relocation activities.<br>• Schedule works so that they can be completed in relatively dry conditions and when there is no risk of a rain event that may create adverse conditions<br>• Have a mussel relocation/survey completed by a qualified biologist within the prescribed work area (PSA). A relocation site and control site should also be chosen and searched if SAR mussels found. *This is the main mechanism for mitigation associated with mussels*.<br>• Mussel Relocation should follow the Protocol. If SAR mussels are found they should be coded and measured so their growth and survival can be monitored at 1-month, 1-year and 2-years after relocation.<br>• During the relocations, all mussel encountered should be identified, photographed (as per DFO guidance documents) and temporarily stored in mesh bags to be moved to the predetermined relocation area.<br>• Stress should be minimized while collecting mussels by:<br>(1) generally limiting exposure of mussels to the atmosphere for no more than 3 min (120 seconds to identify and code the mussels, plus 60 seconds to measure and record their length, height and width);<br>(2) returning mussels to the substrate with the posterior end up to provide opportunity for the mussel to position itself as it desires;<br>(3) removing the mussels from the substrate by hand, not with tools; and<br>(4) taking care not to step on any mussels during the searches.<br>• To help minimize stress on the mussels the mesh bag or bucket should be kept deep enough within the river to bathe all mussels and buckets.<br>• Proper handling and transport protocols should be used, such as limiting air exposure and keeping water temperature within 2°C of river water.<br>• Selection of suitable relocation habitat with stable substrates and native mussels present is also a key criterion for preserving unionids at relocation and control sites. |

** Permitting and reporting requirements may also be provided within the *Species at Risk Act (*SARA) conditions.

## 8.0 Reporting

While an annual report is not required under s.23.18 of O.Reg 242, information must be provided if requested by MECP.

A summary report outlining the methodology used for the mussel and fish relocation and results will be prepared and submitted to K. Smart Associates Ltd. and the Township of Blandford-Blenheim. The summary report will provide relevant details related to the federal and provincial permitting, the results of the mussel and fish relocation work and include the results of the 1-month post-relocation mussel monitoring. Additional reporting and summary information is required as a condition of approval under the LCF. Any observed SAR also need to be submitted to the NHIC.

## 9.0 References


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Strayer, D.L., and Smith D.R. 2003. A guide to sampling freshwater mussel populations. American Fisheries Society, Monograph 8, Bethesda, Maryland. 103 p

**APPENDIX I** Qualifications of Author and Company

# NATURAL RESOURCE SOLUTIONS INC.

Aquatic, Terrestrial and Wetland Biologists

## SPECIES AT RISK

Natural Resource Solutions Inc. (NRSI) has extensive experience addressing Species at Risk (SAR) on a wide range of projects including Environmental Impact Studies, Renewable Energy Projects, and Environmental Assessments.

NRSI's team of terrestrial, wetland and aquatic biologists is highly trained and experienced to address SAR through all stages of project implementation. Past corporate experience on projects involving SAR has given NRSI a strong knowledge of the processes and effective strategies to avoid and mitigate related impacts. NRSI's extensive experience and strong working relationship with the Ministry of Natural Resources and Forestry (MNRF) and other regulatory authorities ensures that SAR issues are dealt with effectively and in a timely manner. In order to avoid project delays, staff take proactive steps to collect existing information from all relevant sources, screen for potential SAR presence, and engage regulatory agencies at an early stage. Targeted surveys are completed to accurately assess the presence of SAR within the study area. In addition to clearly reporting study results, NRSI staff advise clients of timelines and apply for permits accordingly.

NRSI staff have a strong working knowledge of federal and provincial government legislation pertaining to SAR, including the *Endangered Species Act,* 2007 and the *Species at Risk Act*, 2002. Staff are also familiar with and conform to the *Provincial Policy Statement*, 2014, as well as municipal Official Plan policies respecting SAR habitats. With a strong understanding of SAR guidelines and policies, NRSI can be counted on to provide the best possible solutions when projects encounter SAR.

NRSI biologists have the training and experience required to identify species and complete targeted surveys according to agency sanctioned, species-specific protocols. The following are examples of SAR groups that NRSI has experience addressing.

## Bird Species at Risk

NRSI staff are very experienced in addressing bird SAR in a wide variety of locations throughout Ontario. The latest accepted survey methods are routinely implemented to assess the presence of SAR birds and other significant bird species. Bird species that NRSI has addressed include:

- Acadian Flycatcher
- Bald Eagle
- Barn Swallow
- Bank Swallow
- Bobolink
- Canada Warbler
- Cerulean Warbler
- Chimney Swift
- Common Nighthawk
- Eastern Meadowlark
- Eastern Whip-poor-will
- Golden-winged Warbler
- Henslow's Sparrow
- Least Bittern
- Loggerhead Shrike
- Red-headed Woodpecker
- Rusty Blackbird
- Wood Thrush

## Herpetofauna Species at Risk

NRSI has completed numerous studies investigating the presence and movement patterns of reptile and amphibian SAR such as Jefferson Salamander. NRSI has addressed a variety of herpetofauna SAR in locations in southern Ontario such as Guelph, and northern Ontario such as the French River. Herpetofauna species that NRSI has addressed include:

- Blanding's Turtle
- Jefferson Salamander
- Massasauga Rattlesnake
- Eastern Hog-nose Snake
- Five-lined Skink
- Queensnake
- Eastern Foxsnake
- Eastern Ribbonsnake
- Spotted Turtle
- Wood Turtle
- Spiny Softshell
- Fowler's Toad



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## Mammal Species at Risk

NRSI is well recognized among regulatory agencies and clients in Ontario for its considerable experience and expertise implementing state-of-the-art bat survey technologies. Bat habitat assessments, activity surveys, and mortality monitoring are routinely completed prior to and following development projects throughout Ontario, with a focus on bat SAR. NRSI staff are also fully capable of recognizing field-signs of other elusive SAR mammals, such as the American Badger and Eastern Wolf. Mammal species that NRSI has addressed include:

- American Badger
- Eastern Wolf
- Little Brown Myotis
- Northern Myotis
- Woodland Caribou
- Eastern Small-footed Myotis

## Insect Species at Risk

NRSI staff are considered experts in the identification and survey methodologies for several insect SAR and their habitats, with an emphasis on butterflies, dragonflies, and damselflies. Surveys for these groups are routinely completed during NRSI field work programs. Staff experience includes several research projects and completion of the COSEWIC Status Report for the Mottled Duskywing. Insect SAR that NRSI has addressed include:

- Monarch
- Mottled Duskywing
- Rusty-patched Bumble Bee
- West Virginia White

## Vegetation Species at Risk

The NRSI team includes expert botanists and MNRF-certified arborists that have applied their extensive experience and knowledge toward identifying and recommending avoidance or mitigation measures for vegetation SAR. NRSI's certified Butternut Health Assessors are uniquely qualified to provide accurate assessments of Butternut hybridity and health condition. Vegetation SAR that NRSI has addressed include:

- Butternut
- American Ginseng
- Dense Blazing Star
- Wood Poppy
- Dwarf Lake Iris
- Pitcher's Thistle
- Willowleaf Aster

## Fish Species at Risk

The aquatic biologists at NRSI are highly trained in identifying SAR fish, as well as in survey protocols and capture and tagging methods. NRSI has encountered fish SAR in several locations throughout both southern and northern Ontario. Fish SAR that NRSI has addressed include:

- Black Redhorse
- Lake Sturgeon
- Redside Dace
- Silver Shiner

## Mussel Species at Risk

NRSI prides itself in being a leader in the industry when it comes to SAR, which is shown through the acquisition of Water Systems Analysts (WSA), previously owned and operated by Dr. Gerry Mackie. Dr. Mackie is a renowned mussel expert, and is a lead authority on the relocations of freshwater mussels in Ontario. Dr. Mackie brings invaluable knowledge and experience to NRSI, establishing the company as the leader in mussel studies and relocation work in Ontario. Prior to joining NRSI, Dr. Mackie (WSA) undertook all relocations of freshwater mussels in southern Ontario. Mussel SAR that WSA and NRSI have addressed include:

- Mapleleaf
- Rainbow
- Wavy-rayed Lampmussel

## Species at Risk Publications

NRSI takes pride in its role as a leader in researching, developing and implementing new strategies, guidelines, and survey methods for SAR, in close consultation with government agencies. The NRSI team has authored Recovery Strategies, Status Reports for the Committee on the Status of Endangered Wildlife in Canada (COSEWIC), and survey protocols for SAR fish, plants, birds, and butterflies. The following are a select few examples of SAR publications written by NRSI.

- Cutlip Minnow Recovery Strategy, OMNR
- Mottled Duskywing, Harris's Sparrow, and Rapids Clubtail Status Reports, COSEWIC
- Survey Protocols for Henslow's Sparrow and E. Meadowlark, OMNR
- Channel Darter Best Management Practices Guide for Waterpower Projects, Ontario Waterpower Association
- Best Management Practices for the Salvage and Exclusion of Species At Risk Fishes from In-Water Work Sites OMNRF



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NATURAL RESOURCE SOLUTIONS INC.
Aquatic, Terrestrial and Wetland Biologists

# Sam Catry, F.W.T., B.A.
# AQUATIC BIOLOGIST/ FRESHWATER MUSSEL SPECIALIST

## EDUCATION

- Fish and Wildlife Technician (2020), Sir Sandford Fleming College, Lindsay, Ontario
- Bachelor of Arts, Geography (2017), Queen's University, Kingston, Ontario

## CERTIFICATIONS AND MEMBERSHIPS

- Certifications:
  - Electrofishing Crew Leader Class 2 (Backpack/Raft and Boat), 2022
  - Introductory Fish Identification Workshop, Royal Ontario Museum (ROM), 2020
  - Ontario Freshwater Mussel ID Workshop, Fisheries and Oceans Canada (DFO), 2021
  - Cyprinid Identification Workshop, ROM, 2021
  - Species at Risk Fishes Workshop, ROM, 2022
- Memberships:
  - American Fisheries Society (AFS), Southern Ontario Chapter

## AREAS OF PROFESSIONAL EXPERIENCE

Sam is an Aquatic Biologist and Freshwater Mussel Specialist with more than six years of technical field skills, including over five years of experience directly related to environmental consulting with Natural Resource Solutions Inc. He specializes in freshwater mussel surveys and relocations, assessments of habitat for mussel and fish Species at Risk (SAR), fish community assessments, and long-term aquatic monitoring studies. Sam has extensive experience working in Ontario with freshwater mussels, and has led numerous projects involving the permitting and subsequent relocation and monitoring of SAR mussels according to the *DFO Protocol for the Detection and Relocation of Freshwater Mussel Species at Risk in Ontario-Great Lakes Area (OGLA)*. He regularly works on multidisciplinary project teams and contributes aquatic biology information, and provides guidance regarding environmental constraints and opportunities. Sam is well versed in applicable policies and legislation as they relate to aquatic and terrestrial species and their habitats, and provides guidance to project teams during the design process to ensure project compliance and approval. Sam regularly leads aquatic sampling in adherence to standardized protocols and best management practices.

Sam conducts biological monitoring studies with a high regard to study design, quality field techniques, data analysis, and reporting.

Sam provides expertise in the following areas:

- mussel surveys, relocations, and monitoring
- aquatic habitat surveys and mapping
- fish community sampling using active and passive capture methods
- aquatic SAR habitat assessments
- aquatic SAR review and permitting
- technical reporting for Environmental Assessments and Environmental Impact Studies

*Freshwater Mussel Biology Services*

As a freshwater mussel specialist, Sam is knowledgeable of the species present within Ontario and is able to readily identify them. He is also aware of their habitat requirements, including their potential fish hosts. Sam provides the lead role in the assessment, permitting, and mussel relocations, including directing crews to search for mussels according to the standards of the DFO protocol. Sam has also carried out monitoring on these mussel relocation projects, and has written technical reports for relocations and monitoring events to document and analyze the population data to the satisfaction of DFO and MNRF biologists.

Sam has obtained permits under the *Species at Risk Act, Endangered Species Act,* and *Fisheries Act*, and has prepared mitigation plans for SAR in order for qualification of projects under Ontario Regulation 242/08. This includes early consultation with the agencies to ensure that project timelines are met, through to offsetting measures as conditions of approval. Sam has developed the provincial Recovery Strategy for Purple Wartyback (*Cyclonaias tuberculata*) and the draft status report for Wavy-rayed Lampmussel (*Lampsilis fasciola*) for the Committee on the Status of Endangered Wildlife in Canada (COSEWIC), and is in the process of completion with agency review.

Sam's specific expertise includes:

- mussel habitat assessments
- mussel relocations and monitoring
- identification of live mussels and shells
- client liaison
- applications for permits under the ESA and SARA
- reporting requirements for relocations and monitoring events

*Fisheries Biology Services*
As an Aquatic Biologist, Sam routinely carries out aquatic habitat assessments throughout Ontario and has a sound understanding of the physical features and processes that affect aquatic species. He regularly completes habitat screening assessments for species at risk, comparing existing conditions to habitat preferences and requirements to inform environmental constraints and dictate permitting and approval requirements. Sam has worked in both northern and southern Ontario in a variety of settings, including urban and rural areas. He has carried out countless sampling exercises for the assessment of fisheries communities in streams, rivers, ponds, and lakes including long-term monitoring programs in support of hydroelectric developments. Sam is experienced in using a variety of active and passive methods and protocols of fish capture in the context of biological monitoring studies, population and biomass estimates, and fish community descriptions and assessments. He has obtained his Class 2 electrofishing certification, has completed assessments according to the Ontario Stream Assessment Protocol (OSAP), and is proficient in other assessment protocols.

Sam's specific expertise includes:

- aquatic habitat characterization and habitat mapping
- backpack and raft/boat electrofishing
- passive fish sampling gear (gill nets, trap nets, fyke nets etc.)
- removal sampling for population and biomass estimates
- compensation habitat monitoring
- permit acquisition and agency correspondence

## RELEVANT FRESHWATER MUSSEL PROJECT EXPERIENCE

A brief list of relevant projects that Sam has recently managed or been involved in that relate to Freshwater Mussels are listed below.

- **Howson Dam Removal, Maitland River Mussel Species and Habitat Assessment** (Jun. 2023 – Ongoing), Client: GSS Engineering Consultants Ltd.

- **Guelph to Goderich Trail Pedestrian Bridge, Conestogo River Species at Risk Mussel Habitat Screening, Permitting, Mussel Relocation and Monitoring** (Jan. 2023 – Ongoing), Client: Wellesley Township
- **Canard River Mussel Relocation and Monitoring** (Jun. 2022 – Present), Client: Town of Amherstburg
- **Delsey Pond Permitting & Mussel Relocation** (Jun. 2021 – July 2024), Client: City of Hamilton
- **Argyle Street Bridge, Grand River Mussel Relocation and Monitoring** (Jun. 2019 – ongoing), Client: Ministry of Transportation Ontario
- **Conestogo River Mussel Species and Habitat Assessment** (May 2022 - Dec. 2022), Client: Hutchinson Environmental Sciences Ltd.
- **Pelee Island Big Marsh Drain SAR Mussel Relocation & Terrestrial SAR Mitigation Plans** (Oct. 2018 – Sept. 2020), Client: Township of Pelee
- **Perth South Bridge Mussel Relocation, Avon River** (Jul. 2020 – Dec. 2020), Client: B.M Ross & Associates
- **Blind Line Bridge, Little Maitland River SAR Habitat Assessment, Permitting & Relocation** (Jun. 2019 – Nov. 2021), Client: B.M. Ross & Associates, on behalf of the Municipality of Morris-Turnberry
- **McCurdy Bridge Replacement, Saugeen River Aquatic SAR Habitat, Permitting, Relocation and Monitoring** (May 2013 – Jan. 2022), Client: County of Bruce
- **Clegg Line Bridge Replacement, Middle Maitland SAR Habitat Assessment, Permitting and Relocations** (May 2019 – Oct. 2020), Client: Municipality of Morris-Turnberry
- **Blandford-Blenheim Bridge SAR Habitat Assessment, Permitting, Mitigation Plan & Mussel Relocation** (Mar. 2017 – Sept. 2020), Client: Township of Blandford-Blenheim

## EMPLOYMENT HISTORY

**Aquatic Biologist (Permanent)**
Natural Resource Solutions Inc., Waterloo, Ontario 2021 to Present

**Aquatic Biologist (Contract)**
Natural Resource Solutions Inc., Waterloo, Ontario 2019 to 2021

**Fisheries Lab Assistant**
Fleming College – Frost Campus, Lindsay, Ontario 2020

## PUBLICATIONS

Catry, S., G. MacVeigh, and J.E. Linton. 2025. Recovery Strategy for Purple Wartyback (*Cyclonaias tuberculata*) in Ontario. Ontario Recovery Strategy Series. Prepared for the Ministry of the Environment, Conservation and Parks, Peterborough, Ontario. v + 31 pp.

COSEWIC. 2023. DRAFT COSEWIC assessment and status report on the Wavy-rayed Lampmussel *Lampsilis fasciola* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. i + 77 pp.

# Eve Krauss, B.Sc. (Env)
# AQUATIC BIOLOGIST & JUNIOR FRESHWATER MUSSEL SPECIALIST

## EDUCATION

- Bachelor of Science in Environmental Science, Ecology (2023), University of Guelph, Guelph, Ontario

## CERTIFICATIONS AND MEMBERSHIPS

Certifications:

- Class 2 Crew Lead Electrofishing Certification (backpack/raft), 2023
- Royal Ontario Museum Cyprinid Identification Workshop, 2023
- Royal Ontario Museum Species at Risk Workshop, 2023
- DFO Freshwater Mussel Identification Workshop, 2024

## AREAS OF PROFESSIONAL EXPERIENCE

Eve is an Aquatic Biologist with more than six years of technical field experience, including three years of experience directly related to environmental consulting with Natural Resource Solutions Inc. (NRSI). In addition to her experience with consulting, she has also worked on large research vessels with the Department of Fisheries and Oceans (DFO) and in laboratory settings with both the DFO and the University of Guelph. Eve has experience with leading a variety of field surveys such as aquatic habitat assessments, fish community assessments, fish relocations, benthic invertebrate collection, anuran call surveys, and additional terrestrial focused surveys.

In addition to her leadership roles, she also has extensive experience assisting as the second staff with mussel relocations, remote northern work, and assessing habitat for species at risk fish and mussels. As a result of her extensive experience, she has become proficient in the handling, identification and habitat requirements of the freshwater fish and unionids of Ontario, as well as a deep understanding of the standardized protocols associated with aquatic surveys. Eve has recently taken on a larger role in project management, successfully managing multi-disciplinary projects from developing site-specific monitoring programs, scheduling surveys and staff, and completing the associated data analysis and reporting.

Eve provides expertise in the following areas:

- aquatic habitat surveys,
- fish sampling using active and passive capture methods,
- freshwater fish and mussel relocations,
- environmental assessments and environmental impact studies,
- permit acquisition and agency correspondence.

*Fish and Mussel Sampling and Relocations*
As an aquatic biologist, Eve has led numerous fish sampling and relocations across Ontario using both active and passive capture methodologies. She has completed fish sampling on various habitat types such as lakes, rivers, drains, and stormwater management ponds. She is certified to operate and lead crews on electrofishing backpacks, rafts and boats. She is also skillful at setting and retrieving passive capture methods such as gill nets and fyke nets. Her experience with fish sampling and relocations have provided her with the skills to identify specimens to species, humanely collect aging structures, and effectively measure captured individuals.

Eve has also assisted on various mussel relocations across Southern Ontario under the supervision of NRSI's esteemed freshwater mussel specialists. She has completed the DFO Freshwater Mussel Identification Workshop, and is able to identify specimens to species, and differentiate the sexes of sexually dimorphic species. She is familiar with the methodologies outlined in the *Protocol for the Detection of Freshwater Mussel Species at Risk in Ontario-Great Lakes Area (OGLA)*, and has experience preparing summary reports to the satisfaction of the Canadian DFO.

*Permit Acquisition and Agency Correspondence*
Eve is responsible for a large amount of permit acquisition at NRSI, and is adept at compiling Licence to Collect Fish for Scientific Purposes and Wildlife Collectors Scientific Authorizations applications and associated summary reporting to the satisfaction of the Ministry of Natural Resources (MNR). In addition to Site Collection Reports, she has also prepared comprehensive summary reports for the DFO following freshwater mussel relocations following the requirements outlined in the *Protocol for the Detection and Relocation of Freshwater Mussel Species at Risk in Ontario-Great Lakes Area (OGLA)* by Mackie, Morris and Ming (2008).

## EMPLOYMENT HISTORY

**Aquatic Biologist**
Natural Resource Solutions Inc., Waterloo, Ontario 2023 to Present

**Biologist (Co-op)**
Natural Resource Solutions Inc., Waterloo, Ontario 2022

**Laboratory and Field Technician (Co-op)**
Department of Fisheries and Oceans Canada, Burlington, Ontario 2021

**Laboratory Technician (Co-op)**
Department of Integrative Biology, University of Guelph, Guelph, Ontario 2020

**APPENDIX II** SAR Notification/Contact Schedule

NATURAL RESOURCE SOLUTIONS INC.
Aquatic, Terrestrial and Wetland Biologists

**Contact Information**

Name of Proponent: Jim Borton, Director of Public Works – Township of Blandford-Blenheim
Email: jborton@blandfordblenheim.ca
Phone: 519-463-5347 ext. 7426

Name of Contractor: Trevor Hoard, K. Smart Associates Ltd.
Email: thoard@ksmart.ca
Phone: 519-748-1199 ext. 229

**NRSI CONTACT INFORMATION**

Prime Contact: Sam Catry, Project Biologist, Natural Resource Solutions Inc.
Email: scatry@nrsi.on.ca
Phone: 519-725-2227 Cell: 613-217-6488

*Can be contacted regarding the mitigation plan and specific measures, identification questions, training, scheduling, and guidance.

**MECP CONTACT INFORMATION**

Prime Contact: Ministry of Environment, Conservation and Parks
General ESA Email: SAROntario@ontario.ca
General ESA Phone: 905-521-7650

London MECP District Office:
General Phone: 519-873-5000

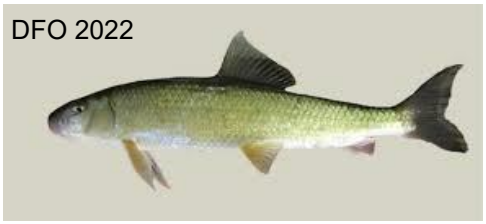
*Should be contacted regarding SAR occurrences and sightings within 2 business days. Also provides guidance on SAR injured and dead species (if any) and should be contacted if transporting any SAR.

**APPENDIX III** Species at Risk Specific Information Sheets

# BLACK REDHORSE

Provincial Status: Threatened | Federal Status: Threatened


UTRCA 2023


DFO 2022

## IDENTIFICATION

| | |
|---|---|
| **Size** | Adults are up to 50cm in length, weighing up to 1kg. |
| **Colour** | Backs are grey, brassy or olive brown with silvery-blue overtones, while sides are lighter and silvery-blue and the belly is silver or white. Fins are usually grey in colour, but lower fins can also be pale orange. |
| **Description** | Shallow body, rounded snout and downward facing sucker mouth. |
| **Habitat** | Shallow (<2m), medium sized rivers and streams with a moderate to fast flow, limited aquatic vegetation, and a sandy or gravel bottom. |

## IF FOUND

1. Construction activities must immediately stop in the vicinity of the Species at Risk observation. Refer to Specific Mitigation Measures for Fish.
2. Representative photos should be taken
3. NRSI Aquatic Biologist should conduct additional relocation measures, removing any stranded fish from the in-water work area.
4. Contact MECP and DFO for further guidance if required.

# SILVER SHINER

Provincial Status: Threatened | Federal Status: Threatened

DFO 2022



COSEWIC 2011



## IDENTIFICATION

| | |
|---|---|
| **Size** | Adults are typically 14cm long. |
| **Colour** | Silver with blue or green iridescence and a dark stripe down the centre of the back. |
| **Description** | A slender silver minnow with a long snout and two black crescents between the nostrils. Fins are transparent or white with no spots or other distinctive markings. |
| **Habitat** | Large, swift flowing streams with gravel or boulder substrates and no aquatic vegetation. |

## IF FOUND

1. Construction activities must immediately stop in the vicinity of the Species at Risk observation. Refer to Specific Mitigation Measures for Fish.
2. Representative photos should be taken
3. NRSI Aquatic Biologist should conduct additional relocation measures, removing any stranded fish from the in-water work area.
4. Contact MECP and DFO for further guidance if required.

# WAVYRAYED LAMPMUSSEL

Provincial Status: Threatened | Federal Status: Special Concern


MECP 2024


COSEWIC 2010


University of Guelph 2022

## IDENTIFICATION

| | |
|---|---|
| **Size** | Average length of 75-100mm. |
| **Colour** | Yellow, or yellowish-green in colour. |
| **Description** | Rounded shell with numerous thin, wavy green rays. |
| **Habitat** | Clear rivers and streams with steady flows and gravel or sand substrates. |

## IF FOUND

1. Construction activities must immediately stop in the vicinity of the Species at Risk observation. Refer to Specific Mitigation Measures for Mussels.
2. Representative photos should be taken
3. NRSI Aquatic Biologist should do a sweep to search for any additional SAR mussels. Any found SAR mussels should be relocated.
4. Contact MECP and DFO for further guidance if required.

**APPENDIX IV** Species at Risk Encounter Reporting Form

Species at Risk Encounter Reporting Form

| ENCOUNTER INFORMATION | |
|---|---|
| Encounter Type:<br>☐ Sighting ☐ Occurrence – Action was required<br>No action required. | |
| **Species Encountered:** | |
| Additional Comments on Species: | |
| **Name of Observer:** | |
| **Contact Number (s) of Observer:** | **Date & Time of Encounter:** |

| SPECIES INFORMATION |
|---|
| **Species Description**: (e.g. # of individuals, approximate size/length, key id features, distinctive marks, nest, etc.). Any pictures taken. |
| **Status of Species and Additional Comments:** (Alive, injured, or dead, extent of injuries, etc.) |
| **Behaviour and Additional Comments:** (Basking, feeding, nesting, travelling, etc.) |

| ACTION TAKEN | |
|---|---|
| **Action Taken:** (Check all that apply)<br>☐ Stopped activity<br>☐ Avoided animal/nest<br>☐ Allowed animal to disperse<br>☐ Flagged buffer zone for nest/ nesting SAR<br>☐ Contacted MECP for direction<br>☐ Contacted Qualified Biologist/Member<br>☐ *Captured/relocated animal<br>☐ Transported animal to Wildlife Custodian | **Additional Comments**: (if captured and taken to Wildlife Custodian, where and when, and what was the outcome, what stored in, etc.) |
| **Name, Contact Info, and Date and Time of Site of Qualified Staff (if action taken):** | |

| SITE CONDITIONS |
|---|
| **Weather:** (sunny, cloudy, raining, temperature, etc.): |
| **Additional Comments:** |

| LOCATION |
|---|
| **Location and Surrounding Site Description:** (indicate if attaching map, photos, etc., where observed) |

**APPENDIX V** Training Sign-off Sheet

Training Sign-off Sheet

Signing this form is indicating that you have read, understand and will follow the measures provided in this mitigation plan for the Blandford-Blenheim Bridge 24 replacement.

| Date | Name (Printed) | Name (Signature) | Company |
|---|---|---|---|
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