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Strathburn Almonte Regional Inc. - Brown Lands

Scoped Environmental Impact Statement

Submitted to Strathburn Almonte Regional Inc. by IBI Group
February 2023

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Scoped Environmental Impact Study

Strathburn Almonte Regional Inc.: Brown Lands



Prepared for Strathburn Almonte Regional Inc.
by Arcadis | IBI Group

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1 Introduction

1.1 Purpose

IBI Group Professional Services (Canada) Inc. (Arcadis IBI Group) was retained by Strathburn Almonte Regional Inc. Group to complete Scoped Environmental Impact Study (EIS) for the proposed Brown Lands development (the Project) located in the Municipality of Mississippi Mills (MMM), Ontario. (The ‘Subject Property’ -- **Figure 1**). This Scoped EIS has been prepared to:

- Document the natural features within the Study Area;
- Consider federal, provincial, and municipal policies and legislation from relevant regulatory agencies in order to maintain compliance with the governmental legislation that pertain to the Project;
- Ensure the development does not contravene the *Endangered Species Act, 2007*;
- Support the retention of natural vegetation where possible;
- Evaluate potential environmental impacts;
- Develop mitigation plans addressing potential impacts; and
- Suggest ways to enhance natural features and functions.

Due to the seasonal constraints of this study, the impact assessment is based on a desktop review and two field visits. It is expected that additional field investigations will be required to provide a more detailed understanding of the ecological features and functions within the Study Area. The full scope of these supplementary field investigations will be established through this report.

The supplementary field investigations will be completed during the appropriate timing window (as required by industry standard protocols) in spring and summer of 2023. The results of these surveys will further refine the anticipated impacts and determine the appropriate mitigation measures and adherence with existing policies and legislation. The results from the supplementary 2023 investigation be used to refine this impact assessment and will be delivered in an addendum to this report as a final EIS.

1.2 Background

Within the MMM, an EIS is required when a development proposal could affect certain natural heritage features or land adjacent to such features and areas. The EIS shall be prepared to support planning applications, such as official plan amendments, zoning by-law amendments, minor variances, plans of subdivision, consents, and site plan control (MMM 2019).

The Study Area includes the area within 120 metres (m) of the Subject Property (**Figure 1**) to account for policy requirements and setback distances outlined in the *Provincial Policy Statement, 2020* and the accompanying *Natural Heritage Reference Manual* (MNR 2010). In addition, specific Species at Risk (SAR) and natural heritage features will be considered up to two kilometres (km) from the proposed development as concerns may arise with respect to specific environmental policy or legislation.

This site contains two unevaluated wetlands that drain into Wolf Grove Creek before flowing into the Mississippi River (MVCA 2022a). In addition, agricultural tile drains are positioned along the western edge of both unevaluated wetlands and act as headwater drainage features (HDFs). A small segment of Significant Woodland is present within the Project Footprint. This report has

been prepared to consider federal, provincial, and municipal policies and regulations that may pertain to the Project.

1.2.1 Property Information

Owner:	Strathburn Almonte Regional Inc.
Address:	286 Strathburn Street
Lot and Concession:	Lot 17 Concession 9 (southern portion)
Zoning:	Residential
Traditional Territories:	Un-ceded Anishinabe Algonquin Territory
Official Plan Designation (Schedule B):	Residential
Existing Land Uses:	Agricultural, Pasture, Meadow, Wetland, Multi Use Pathway

Location

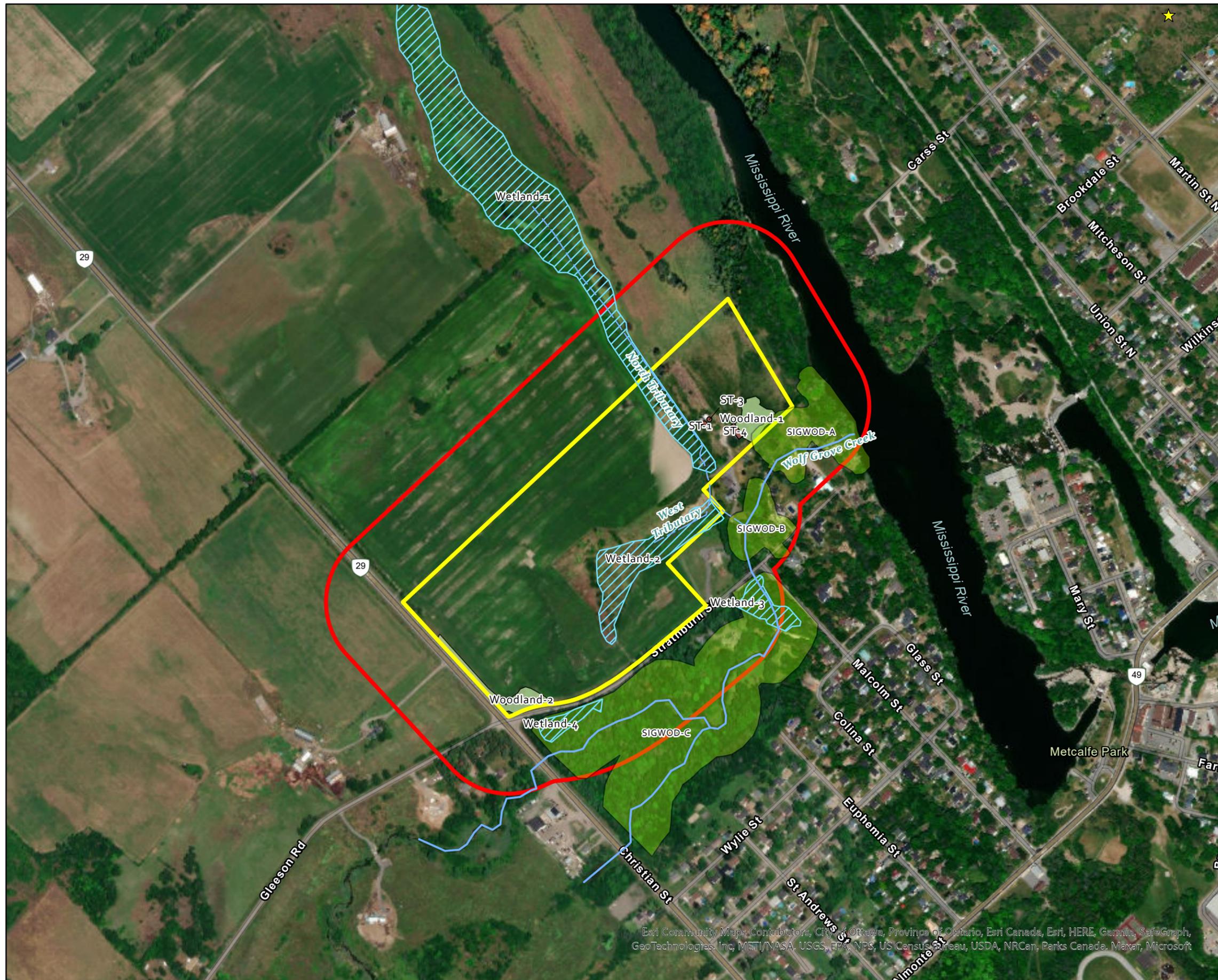
The Study Area for the proposed project is located on the unceded traditional territory of the Anishinaabe Peoples.

The Study Area lies within the community of Almonte, Ontario adjacent to 286 Strathburn Street and is situated northeast of the County Road 29 and Strathburn Street intersection. The property lies between agricultural fields west of Country Road 29, the Mississippi Riverbank to the east, agricultural fields and meadow to the north, and a woodland on the south side of Strathburn Street (**Figure 1**).

Land Use and Zoning

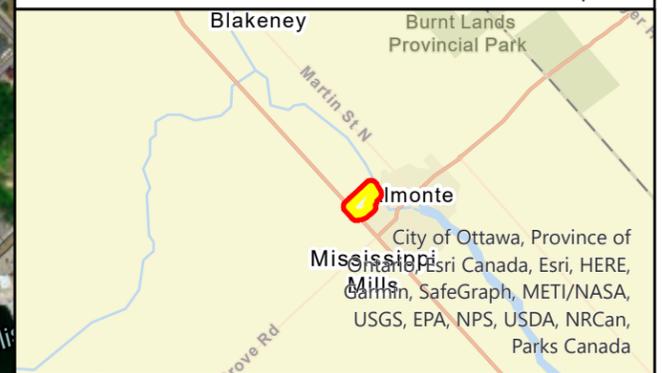
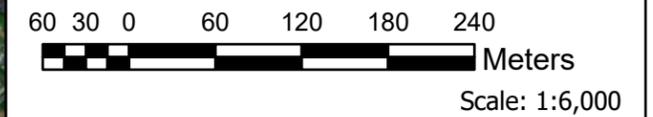
The Subject Property falls within the Almonte ward of Mississippi Mills. The Official Plan for Mississippi Mills designates the Study Area as 'Residential', and the property is zoned for Development (MMM 2019).

The Almonte Riverside Trail and associated trailhead currently traverses the Subject Property. This trail is commonly used by hikers, mountain bikers, and dog walkers. It meanders through the existing agricultural fields and meadows, and along wetlands to where it eventually connects to a larger trail system along the Mississippi River.



Legend

- Wolf Grove Creek (NHIC)
- - - Watercourse
- Subject Property
- Study Area
- Unevaluated Wetland (MVCA)
- Significant Woodlot (MMM OP)
- Non Significant Woodlands (Aerial Imagery)
- Existing Structures
- ★ Abandoned Mine Sites



Client:
Strathburn Almonte Regional Inc.

Title:
Brown Lands: Study Area and Natural Heritage Features

Prepared By:
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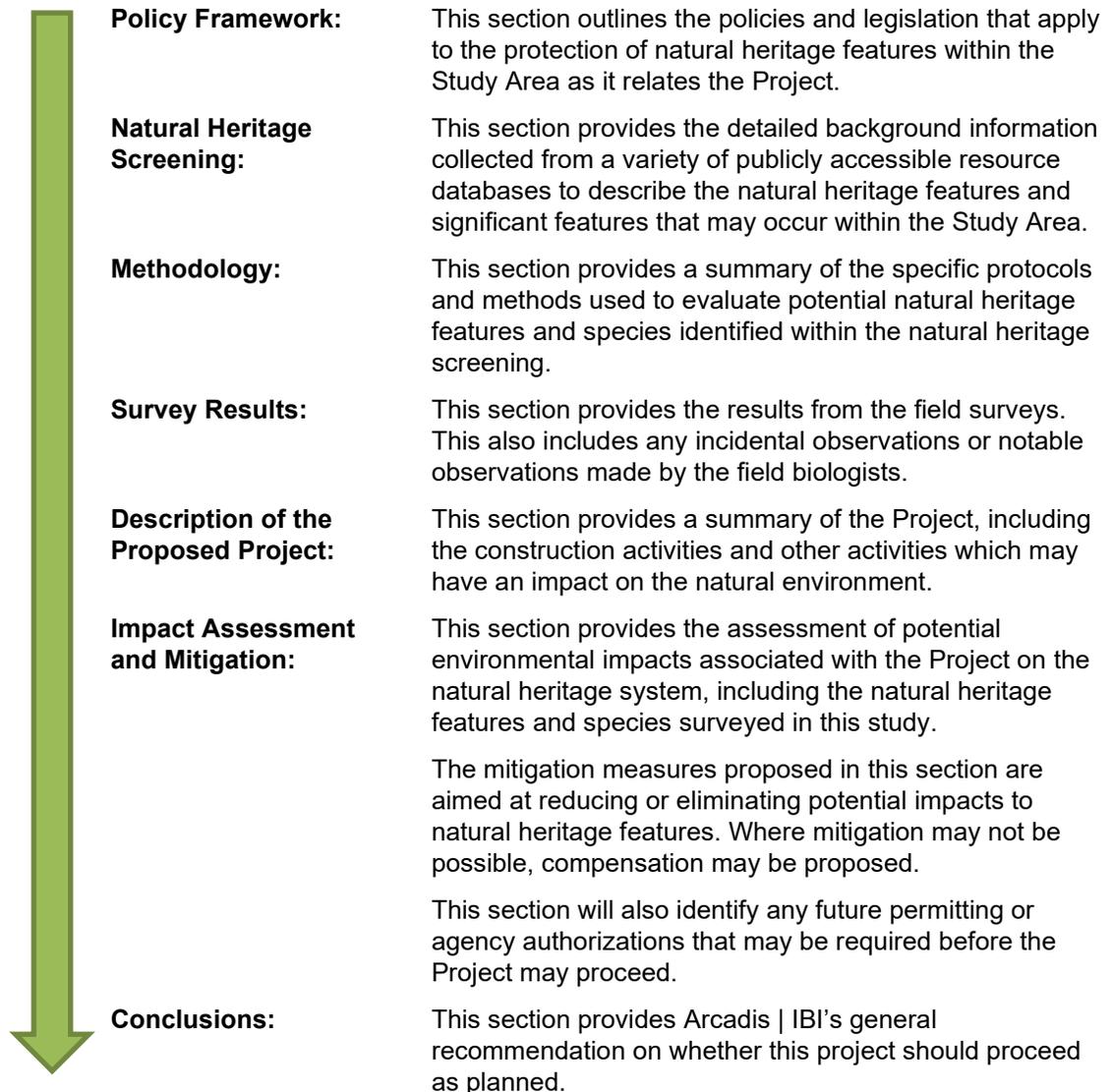
Project: 140876
Date: 2023-02-20

Figure: 1

Esri Community Maps Contributors, City of Ottawa, Province of Ontario, Esri Canada, Esri, HERE, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, EPA, NPS, US Census Bureau, USDA, NRCAN, Parks Canada, Maxar, Microsoft

1.3 Study Approach

The following approach has been developed to provide a clear methodological direction towards characterizing the natural environment and assessing the potential for significant species and habitats within the Study Area. This provides a logical outline for the EIS and ensures the natural heritage features and functions outlined in the Ontario *Provincial Policy Statement* are accurately assessed while meeting all relevant policy and legislative obligations.



2 Policy Framework

This study references the regulatory agencies and legislative authorities mandated to protect different elements of the Natural Heritage System’s features and functions within the MMM, Ontario, and Canada. A list of the applicable policies and legislation for the protection of natural heritage features and SAR either municipally, provincially, and/or federally, is provided in Table 1.

Table 1: Relevant Policies, Legislation, and Background Sources

POLICY / LEGISLATION	GUIDELINES AND SUPPORTING DOCUMENTS
Federal Government of Canada	
Migratory Birds Convention Act, 1994, S.C. 1994, c. 22 (MBCA)	Environment and Climate Change Canada (ECCC) - Guidelines to Avoid Harm to Migratory Birds (ECCC 2022a)
Species at Risk Act, S.C. 2002, c. 29 (SARA)	Federal Species at Risk Public Registry - Distribution of Aquatic Species at Risk mapping (DFO 2022a) - Open Data: Range Map Extents, Species at Risk, Canada (ECCC 2022b)
Fisheries Act, R.S.C., 1985, c. F-14	Fisheries and Oceans Canada (DFO) - Distribution of Aquatic Species at Risk mapping (DFO 2022a) - Projects Near Water online resources (DFO 2022b)
Province of Ontario	
Fish and Wildlife Conservation Act, 1997, S.O. 1997, c. 41 (FWCA)	Wildlife Schedules (O. Reg. 669/98)
Endangered Species Act, 2007, S.O. 2007, c. 6 (ESA)	Ministry of the Environment, Conservation and Parks (MECP) - Species at Risk in Ontario (SARO) List (O. Reg. 230.08)
Planning Act, R.S.O. 1990, c. P.13	Provincial Policy Statement, 2020
	Ministry of Natural Resources and Forestry (MNRF) – Kemptville District
	MNRF Natural Heritage Information Centre (NHIC) Database - Species at Risk occurrence records - Species of Conservation Concern - Natural Heritage Features
	Wildlife Atlases and Databases: - Ontario Breeding Bird Atlas (BSC et al. 2006) - Ontario Reptile and Amphibian Atlas (Ontario Nature 2020) - Ontario Butterfly Atlas (TEA 2022) - iNaturalist Observation Records (iNaturalist 2022) - eBird HotSpot species lists (eBird 2022) - Atlas of the Mammals of Ontario (Dobbyn 1994)
	Significant Wildlife Habitat Technical Guide (MNR 2000): - Significant Wildlife Habitat Ecoregion 6E Criterion Schedule (MNRF 2015).
	Ecological Land Classification for Southern Ontario, First Approximation, and its Application (Lee et al. 1998)
	Protocol for Wildlife Protection During Construction (City of Ottawa 2015)
	Mississippi Valley Conservation Authority (MVCA):

POLICY / LEGISLATION	GUIDELINES AND SUPPORTING DOCUMENTS
Conservation Authorities Act, R.S.O. 1990, c. C.27	<ul style="list-style-type: none"> - MVCA: Regulation of Development, Interference with Wetlands and Alterations to Shorelines and Watercourses (O. Reg. 153/06) - Floodplain mapping - EIS Checklist for Development Near Wetlands and Other Natural Heritage Features (MVCA 2022b) Toronto and Region Conservation Authority: <ul style="list-style-type: none"> - Evaluation, Classification and Management of Headwater Drainage Features Guidelines (TRCA and CVC 2014)
Municipality of Mississippi Mills	
Municipality of Mississippi Mills Community Official Plan (2019)	Official Plan (2019) including: <ul style="list-style-type: none"> - Environmental Impact Study guidelines under Section 3.1.5 - Environmental and Natural Heritage Features under Section 3.1.4 Guidelines for Tree Conservation & Planting (MMM 2018)

2.1 Ontario *Endangered Species Act, 2007*

The Ontario ESA prohibits the killing or harming of species identified as Threatened and Endangered under the ESA. Section 10 of the ESA prohibits the damage or destruction of a species' habitat that have been classified as Endangered or Threatened on the Species at Risk in Ontario (SARO) List in *Ontario Regulation (O. Reg.) 230/08*.

Under the ESA “habitat” is defined as:

“with respect to any other species of animal, plant or other organism, an area on which the species depends, directly or indirectly, to carry on its life processes, including life processes such as reproduction, rearing, hibernation, migration or feeding.”

General habitat protection is afforded to all species once they become listed as Threatened or Endangered and remains in place until regulated habitat is designated.

Regulated habitat is defined as:

“with respect to a species of animal, plant, or any other organism for which a regulation made under Clause 55 (1) (a) is in force, the area prescribed by that regulation as the habitat of the species.”

Regulated habitat provides more precise details on the species-specific habitats such as specific features, geographic boundaries, or unique requirements of a species.

To balance social and economic considerations with protection and recovery goals, the ESA also enables the Ministry of Environment, Conservation and Parks (MECP) to issue permits or enter into agreements with proponents to authorize activities that would otherwise be prohibited by subsections 9(1) or 10(1) of the ESA provided the legal requirements of the ESA are met.

If Ontario designated Endangered/Threatened species or their habitat are believed to be directly harmed on non-federally owned land, an ESA authorization and/or permit may be required.

3 Natural Heritage Screening

A desktop review of the existing natural environment features identified within the Study Area has been completed to inform the field studies required for the EIS.

Several natural heritage features require consideration for protection under the Ontario Provincial Policy Statement. The protection of these features is administered in part through the requirements of the MMM Community Official Plan. Protected natural heritage features include:

- Provincially Significant Wetlands;
- Significant Woodlands;
- Significant Valleylands;
- Areas of Natural and Scientific Interest;
- Significant Wildlife Habitat (SWH);
- Species at Risk (SAR) habitat; and
- Fish habitat.

The sub-sections below provide data from secondary sources review.

3.1 Historic Land Use

A desktop review of recent and historic aerial imagery highlights the land uses within and adjacent to the Study Area has provided an understanding of the context of the natural heritage features and changes over time. From this review, it was determined that the Subject Property has predominantly been used for agricultural purposes dating back to 2005, and likely far earlier (**Figure 2**).

The property itself and the field to the northwest maintains a recent but steady history in agricultural practices. Residential dwellings to the southeast have remained constant between 2005-2022 and have not withstood further development or urbanization. The woodlot to the southwest has similarly remained untouched over the observed period.



2021



2018



Figure 2: Land Use Change (Google Earth Pro 2022)

3.2 Landform, Soils and Geology

The Study Area generally gently slopes northeast towards the Mississippi River with the exception of stretches of the existing Almonte Riverside Trail that feature more exaggerated slopes. Existing entirely within the Clay Plains physiographic region (MENDM, 2007), the surficial geology of the Study Area is predominantly composed of Paleozoic Bedrock (10 ha) with an inclusion of Fine-textured Glaciomarine Deposits (5.5 ha) in the northwestern corner of the property (MENDM, 2010). The underlying bedrock of the Study Area is part of the Oxford Formation, consisting of dolomite, minor shale, and sandstone (MENDM, 2010).

Overall, the Study Area is comprised of neutral, coarsely textured materials, with layers of silty sediments. Low infiltration rates are expected within the northwestern quadrant of the Study Area due to the physiographic findings of fine-textured soils. Further information on the geology and associated influences on this project may be found within the Geotechnical report prepared by Paterson Group (January 2023).

3.3 Aquatic Environment

Within the context of this report, aquatic environment includes inland surface water and ground water, as well as the characteristics of the water and organisms / wildlife living within the water. The following subsections describe the aquatic feature at a watershed and site-specific scale.

3.3.1 Floodplain and Regulated Limit

The MVCA is the governing body that regulates zones with potential for flooding, protects associated natural features, and restores and enhances ecosystems within the Mississippi Valley watershed. Development within these regulated areas is governed by *O. Reg. 153/06 Development, Interference with Wetlands, and Alterations to Shorelines and Watercourses*.

The Study Area lies within the Mississippi River – Lower Mississippi Watershed (MVCA 2022). Although this subwatershed acts as a major tributary to the Ottawa River, apart from Wolf Grove Creek, the Study Area only contains portions of ephemeral water features including two unevaluated wetlands and associated drainage features. Due to their small catchment areas, these features do not provide significant contributions to the overall watershed. Illustrations of the above listed features and corresponding MVCA regulation limits are found within **Figure 3**.

3.3.2 Fish and Fish Habitat

Wolf Grove Creek

Within the Study Area, but outside of the Subject Property footprint, approximately 400 m of a tributary to Wolf Grove Creek and 600 m of Wolf Grove Creek flow eastward into the Mississippi River. Although MVCA maintains, monitors, and collects information related to water quality/quantity, fisheries resources, they did not have fisheries data for Wolf Grove Creek or its tributaries. The following fish species are present within Wolf Grove Creek based on Land Information Ontario's catch records (LIO 2018):

- Brassy Minnow (*Hybognathus hankinsoni*)
- Brook Stickleback (*Culaea inconstans*)
- Central Mudminnow (*Umbra limi*)
- Common Shiner (*Luxilus cornutus*)
- Creek Chub (*Semotilus atromaculatus*)
- Fathead Minnow (*Pimephales promelas*)
- Northern Pearl Dace (*Margariscus nachtriebi*)
- Northern Redbelly Dace (*Chrosomus eos*)
- Sculpins (*Cottus spp.*)
- White Sucker (*Catostomus commersonii*)

Mississippi River

According to Land Information Ontario – GeoHub's records of Fish Activity Area database, a White Sucker spawning area may be present within middle portion of the Mississippi River (LIO 2022). In addition to the small bodied species found in the Wolf Grove Creek, the Mississippi River is also known to contain larger game fish (LIO 2018), these include:

- Black Crappie (*Pomoxis nigromaculatus*)
- Bluegill (*Lepomis macrochirus*)
- Largemouth Bass (*Micropterus salmoides*)
- Northern Pike (*Esox lucius*)
- Smallmouth Bass (*Micropterus dolomieu*)
- Walleye (*Sander vitreus*)

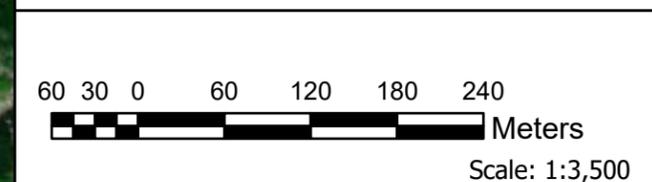
3.3.3 Headwater Drainage Features

Mapping resources from the Municipality of Mississippi Mills (2022), NHIC (MNRF 2022), and MVCA (2022b) indicate the presence of unnamed headwater drainage features within the Study Area. For the purposes of this study these features are referred to as the 'North Tributary' and the 'West Tributary' (See **Figure 1**). To classify the features and provide appropriate management options, headwater drainage feature assessments will be required in the spring and summer of 2023.



Legend

- - - MVCA Regulation Limit (MVCA)
- - - Watercourse
- ▭ Study Area
- ▭ Subject Property
- ▨ Unevaluated Wetland (MVCA)
- - - Watercourse
- ▬ Wolf Grove Creek (NHIC)



Client:
Strathburn Almonte Regional Inc.

Title:
**Brown Lands:
MVCA Regulation Limits**

Prepared By:
ARCADIS | IBI GROUP

Project: 140876	Figure: 3
Date: 2023-02-20	

Esri Community Maps Contributors, City of Ottawa, Province of Ontario, Esri Canada, Esri, HERE, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, EPA, NPS, US Census Bureau, USDA, NRCan, Parks Canada, Maxar, Microsoft

3.4 Terrestrial Environment

Terrestrial environment includes the land-based ecosystems including flora and fauna. The following subsections describe the land-based ecosystems within the context of the protected natural heritage features which they are a part of.

3.4.1 Wetlands

A review of the MVCA (2022b) online mapping services indicates the presence of four unevaluated wetlands within the Study Area (**Figure 1**). The northernmost wetland (Wetland-1) covers roughly 2.7 ha of the Study Area (5.5 ha in total) and extends to the north outside of the Study Area. Located southwest of Wetland-1, Wetland-2 covers approximately 1.23 ha of the Subject Property and is connected to Wetland-1. Wetland-3 and Wetland-4 lie outside of the envelope of the Subject Lands but remain within the Study Area. Fed by Wolf Grove Creek, Wetland-3 contains 0.36 ha of a forested region to the southeast. Similarly, Wetland-4 (0.24 ha) is bound within a forested region but lies adjacent to Wolf Grove Creek. No Provincially Significant Wetlands were identified within the Study Area.

3.4.2 Woodlands

The MMM's Official Plan - Community Map (MMM 2022) indicates that Significant Woodlands are present within the Study Area. Three pockets of significant woodlot have been identified within the southeast section of the Study Area surrounding Wolf Grove Creek. The northernmost significant woodlot, Significant Woodland-A, encroaches 0.07 ha into the Subject property and covers 1.47 ha of land in the Subject Area. To the southwest of Significant Woodland-A, Significant Woodland-B completely resides within the Study Area covering approximately 0.85 ha. Significant Woodland-C covers 4.18 ha of the Subject Lands and is situated on the southern edge of Strathburn Street.

Small Non-Significant Woodlands are found within the limits of the Subject Lands. Woodland-1 lies within the northeastern-most corner of the property and contains 0.26 ha of woodland and is partially connected to Significant Woodland-A. Located at the south-westernmost corner of the property at the County Road 29 and Strathburn Road intersection, Woodland-3 spans 0.29 ha in total. All Non-Significant Woodlands present within the Subject Lands are smaller than the minimum 0.5 ha size requirement for Ecological Land Classification (ELC) delineation. However, all trees within the Subject Property will be subject to the MMM's *Guidelines for Tree Conservation and Planting By-Law* (MMM 2018).

3.4.3 Valleylands

No Valleylands are present within the Study Area.

3.4.4 Areas of Natural and Scientific Interest

No Areas of Natural and Scientific Interest are present within the Study Area.

3.4.5 Significant Wildlife Habitat

Four categories of Significant Wildlife Habitat (SWH) exist within the eastern Ontario Ecoregion 6E (MNRF 2015). These include:

- Seasonal Concentration Areas of Animals;
- Rare Vegetation Communities or Specialized Habitat Wildlife;
- Habitat for Species of Conservation Concern (not including Threatened or Endangered Species); and

- Animal Movement Corridors.

A preliminary assessment of candidate SWH categories with the potential to be found within the Study Area was conducted using available background information and air-photo interpretation. The following sections provide a summary of this assessment and the potential for SWH within the Study Area.

Seasonal Concentration Areas of Animals

Based on the criteria established for Candidate SWH, the following seasonal concentration areas of animals may be found within the Study Area:

- Bat Maternity Colonies: The presence of old structures may provide suitable roosting conditions for SAR and non-SAR bats. Existing structures with potential for hosting SWH are illustrated in **Figure 1**.
- Avian Species of Concern and SAR: Within the Study Area, agricultural fields and meadow communities may provide suitable breeding habitat for Bobolink, Eastern Meadow Lark, and/or Grasshopper Sparrow, decommissioned agricultural structures may provide suitable nesting habitat for Barn Swallow, and Common Nighthawk may find suitable habitat within woodland clearings or grasslands.

Specialized Habitat for Wildlife

Based on the criteria established for Candidate SWH, the following specialized habitat for wildlife may be found within the Study Area:

- Amphibian Breeding Habitat: the presence of wet forest community, headwater drainage features, and marsh wetland communities may provide the ephemeral water may provide habitat for amphibian breeding.
- Turtle Nesting Habitat: The mouth of Wolf Grove Creek may entice Snapping Turtles to migrate upstream into aquatic habitats within the Study Area. This includes wetlands, water courses, and HDF's.
- Reptile Hibernacula: Rock outcrops and underground crevasses in surficial geology within the Study Area are likely to contribute to hibernating habitat for reptilian species. These features need to penetrate below the frostline to provide functional habitat.

Habitat for Species of Conservation Concern

The *Significant Wildlife Habitat Technical Guide* (MNR 2000) defines Species of Conservation Concern as globally, nationally, provincially, regionally, or locally rare (S-Rank of S2 or S3). S-Ranks are an indicator of commonness within the province of Ontario, on a scale of 1-5. S2 represents a species that is considered imperiled within Ontario. S3 represents a species considered as vulnerable within Ontario. Species of Conservation Concern does not include SAR (listed as Endangered or Threatened under the ESA).

A review of background data suggests that candidate SWH for breeding birds, reptiles, insects, and fish may occur within the Study Area. Those species identified have potential to be associated with the forest, meadow, creek, and wetland communities. A list of Species of Conservation Concern with occurrence records within and/or adjacent to the Study Area is provided in **Appendix C Table C1**.

Animal Movement Corridors

Animal movement corridors are elongated, naturally vegetated parts of the landscape used by animals to move from one habitat to another, including but not limited to riparian zones, shorelines, wetland buffers, woodlands, fencerows, and windbreaks (MNR 2000). The Natural Heritage Component of the Provincial Policy Statement states that natural connections between natural features should be maintained and improved where possible. However, as per the *Significant Wildlife Habitat Criteria Schedules for Ecoregion 6E* (MNR 2015), Animal Movement Corridors should only be identified as SWH where a Confirmed or Candidate SWH has been identified by MNR or the planning authority based on documented evidence of a habitat identified within the MNR's Criterion Schedules or the *Significant Wildlife Habitat Technical Guide* (MNR 2000).

No Animal Movement Corridor SWH has been identified by MNR or the MMM.

3.4.6 Wildlife Habitat

In addition to the SAR noted below, a review of current and historic aerial photos of the Study Area were used to identify potential wildlife habitat. Several species of fauna common to the MMM's rural and urban areas are known to live in the habitats present within the Study Area. These species may include, but are not limited to:

- **Mammals:** Coyote (*Canis latrans*), Raccoon (*Procyon lotor*), White-tailed Deer (*Odocoileus virginianus*), Eastern Gray Squirrel (*Sciurus carolinensis*), and Eastern Cottontail (*Sylvilagus floridanus*).
- **Reptiles and Amphibians:** Eastern Gartersnake (*Thamnophis sirtalis*), American Toad (*Anaxyrus americanus*), and Gray Tree Frog (*Hyla versicolor*).
- **Birds:** American Crow (*Corvus brachyrhynchos*), American Goldfinch (*Spinus tristis*), Black-capped Chickadee (*Poecile atricapillus*), Blue Jay (*Cyanocitta cristata*), Cedar Waxwing (*Bombycilla cedrorum*), Canada Goose (*Branta canadensis*), Downy Woodpecker (*Picoides pubescens*), Killdeer (*Charadrius vociferus*), and Song Sparrow (*Melospiza melodia*).

3.4.7 Ecological Linkages

The *Provincial Policy Statement* declares that ecological linkages are intended to provide connectivity (at the regional or site level) and support natural processes which are necessary to maintain biological and geological diversity, natural functions, viable populations of indigenous species, and ecosystems.

A review of desktop resources and aerial photos suggests that functional ecological linkages are limited within the Study Area. Core natural areas surrounding the Subject Property are fragmented by roadways and residential buildings. Furthermore, the agricultural use within the majority of the Subject Property leaves little opportunity for connectivity to the surrounding natural heritage features. Limited connectivity is provided between the wetlands on the Subject Property, and significant woodland (**Figure 1**, SIGWOD-B) and Wolf Grove Creek, outside the Subject Property.

3.5 Species at Risk and Species at Risk Habitat

A desktop review identified the potential for several SAR to occur within and/or adjacent to the Study Area. Under the ESA, all species listed as Threatened or Endangered in Ontario receive immediate 'general habitat protection'. This includes places that are used as dens, nests, hibernacula, or other residences. For some SAR, agencies have defined general habitat descriptions that provide science-based criteria for the habitat to be protected.

A review of aerial imagery was used to identify general candidate habitat for SAR based on the description of their habitat. A list of species identified as having a moderate to high potential to occur within the Study Area is provided in the bullet list below. Additional details supporting this assessment are included in **Appendix C Table C2**.

- Bobolink (*Dolichonyx oryzivorus*)
- Chimney Swift (*Chaetura pelagica*)
- Eastern Meadowlark (*Sturnella magna*)
- Little Brown Bat (*Myotis lucifugus*)
- Northern Myotis (*Myotis septentrionalis*)
- Tri-colored Bat (*Perimyotis subflavus*)
- Butternut (*Juglans cinerea*)

3.6 Trees

A review of aerial imagery suggests that the Study Area contains small, deciduous, and mixed deciduous-conifer woodland areas in addition to stand-alone trees. Both woodlands within the Subject Property contain a mix of regenerative to mature trees and large shrubs. Woodland-1 shares a border with Significant Woodland-a and appears to be predominately deciduous in nature. Woodland-2 consists of Mixed deciduous and conifer trees that are aligned into a hedgerow between County Road 29 and Strathburn Road. (**Figure 3**). A review of recent and historic aerial photos suggest that the Significant Woodlands within the Study Area are more mature relative to the non-Significant woodlands within the Subject Area.

3.7 Other Development Constraints

The Community Official Plan (MMM 2019) identifies two abandoned mine sites with a 1,000 m zone of influence from the subject property. These abandoned mine sites are located approximately 750 m north and east of the subject property, on the other side of the Mississippi River (see **Figure 1**).

Abandoned mines may provide suitable conditions for hibernating SAR bats. However, since no direct or indirect impacts are on these features are anticipated, ecological surveys or assessments of these features was not within the scope of this study. It is important to note that prior to development within the influence area, which includes approximate 40% of the Subject Property, the nature and extent of any hazards must be determined and mitigated to the satisfaction of the Ministry of Northern Development and Mines. Development within the influence areas of the abandoned mines may be subject to site plan control.

4 Methodology

The requirements for field surveys have been dictated by the presence of key natural heritage features and specifications of the relevant policy and regulatory framework. This section of the EIS identifies how the existing natural heritage features and functions of the Study Area will be identified during the 2023 field investigations.

4.1 Scope of Work

Based on the description of the existing natural environment outlined above, the natural heritage surveys outlined below have been scoped to assess the impacts of the proposed development on the natural environment. These surveys followed industry standard protocols and are intended to establish baseline conditions.

The ecological surveys outlined below are recommended for completion in the appropriate timing windows of 2023. These surveys will follow industry standard protocols and are intended to establish baseline conditions and fill gaps in the existing data. Surveys will be limited to the Subject Property boundary. Where possible, natural features within the larger Study Area will be evaluated from a distance or via aerial photo interpretation.

The results of the following surveys will be used to evaluate the potential for negative impacts from the proposed development project.

Aquatic Environment

- 2023 Headwater Drainage Feature (HDF) Assessment [**Pending**]

Terrestrial Environment

- Scoped Ecological Land Classification (ELC), including:
 - Preliminary vegetation survey [**Completed October 2022**]; and
 - Wetland Delineation [**Completed October 2022**].
- Full ELC [**Pending**], including:
 - Refined vegetation survey [May-June 2023]
 - Refined wetland assessment [April and June 2023]
 - Woodland delineation and evaluation [May – June 2023]
- Surveys for identification of potential SWH [**Pending**]:
 - Breeding Bird Surveys [three visits; between May 24 and July 10, 2023]
 - Amphibian Breeding Surveys [three visits; April, May, and June, 2023]
 - General habitat assessment for Species of Conservation Concern – including reptile hibernacula and nesting sites [May – June 2023]
 - Incidental wildlife and wildlife habitat observations [May – June 2023]

Species at Risk [Pending]:

- Identification of Species at Risk and potential Species at Risk habitat [May – June 2023]
- Bat Acoustic Monitoring Survey [three visits; June and July 2023]

Incidental Wildlife [Ongoing]

- Visual and auditory observations of wildlife [during all field visits]

4.2 Aquatic Environment

Headwater Drainage features identified in the spring of 2023 will be assessed following the *Evaluation, Classification and Management of Headwater Drainage Features Guidelines* (TRCA and CVC 2014). Field surveys will be carried out following the rapid assessment method, which utilizes the Unconstrained Headwater Sampling (Section 4, Module 11) methodology in the Ontario Stream Assessment Protocol (Stanfield 2017).

4.3 Terrestrial Environment

4.3.1 Ecological Land Classification

Two ELC surveys will be completed for this study, the Scoped Survey completed in October 2022, and the yet to be completed full ELC survey schedule for the summer of 2023. Vegetation communities within the Study Area are characterized and mapped using the ELC system for Southern Ontario (Lee et al. 1988). The ecological community boundaries were determined in October 2022 through the review of aerial photography and two site visits. During 2023, vegetation communities will be further refined through more comprehensive on-site vegetation surveys, as specified by the protocol. For areas where access is not granted, observations will be conducted from either the road right-of-way or the property edge, to the extent possible.

The ELC protocol recommends that a vegetation community be a minimum of 0.5 ha in size before they are defined as a discrete community. Unique communities less than 0.5 ha and disturbed / planted vegetation will be described to the community level only or will be described as an inclusion or complex to an existing vegetation community. In some instances, where vegetation is less than 0.5 ha, but appears relatively undisturbed and clearly fits within an ELC vegetation type, the more refined classification will be used.

In 2007, the MNRF refined the original vegetation type codes to encompass a larger range of natural and cultural communities commonly occurring across Southern Ontario. Through this process, many new codes have been added while some have changed slightly. These new ELC codes will be used for reporting purposes in this study as they are more representative of the vegetation communities within the Study Area.

Vegetation Survey

Vegetation will be surveyed in tandem with each ELC survey and a corresponding vascular plant list will be compiled. The vascular plants observed at the time of survey will be screened for any provincially rare species and/or SAR not previously identified within the Study Area.

Scientific nomenclature and English colloquial names of plant species generally followed Newmaster et al. (2005), with updates taken from published volumes of the Flora of North America Editorial Committee (2005) and Michigan Flora Online (University of Michigan 2015).

4.3.2 Wetland Delineation and Assessment

The delineation of wetland features within the Study Area will be undertaken in two phases. The primary wetland delineation was completed in October of 2022 using the ELC protocol noted above to map the wetland boundary through both vegetation composition and soil characteristics. The soil auger samples were taken within and surrounding the wetlands feature. And the wetland edge was ultimately defined and mapped using the “50% wetland vegetation

rule” as described in the Ontario Wetland Evaluation System manual (MNR, 2013). This approach accurately defined the wetland limits necessary for this scoped EIS submission.

Further vegetation surveys will be undertaken in the spring and summer of 2023. The intent of this survey is to better understand the ecological function and more comprehensively document the vegetation within the features.

4.3.3 Woodlands

As per the Comprehensive Zoning By-law (11-83) of the Town of Mississippi Mills, the Study Area is located within a zoned residential area for development. Significant woodland features were identified using digital data provided by the MNR and will be ground checked in accordance with the *Community Official Plan* (Section 3.1.4.4). As applicable, mitigation measures will be aligned with the Significant Woodlands and Vegetation Cover General Policies which govern development and forestry resources (*Community Official Plan* Section 3.1.4.4.1).

The ELC delineation will be used to determine the size of woodlands and historic aerial imagery and tree inventories will be used to estimate the age.

4.3.4 Significant Wildlife Habitat

Breeding bird, amphibian breeding, and bat echolocation surveys will be conducted during the 2023 field season. General habitat assessments for Species of Conservation Concern, and incidental wildlife and wildlife habitat observations will also be recorded. These results will contribute to the baseline conditions within the Study Area, and will allow for the identification of SWH, as discussed in **Section 3.4.5**.

Breeding Bird Surveys

Diurnal breeding bird surveys will be conducted within the Study Area following methods outlined in the *Ontario Breeding Bird Atlas Guide for Participants* (BSC, 2001). The protocol requires the observer to record all the birds seen and heard at a point count station during a 5-minute period. Three surveys will be completed between dawn and approximately 5 hours after dawn, 10 days apart, between May 24 and July 10, in good weather. Stations will be placed be approximately 300 m apart, adjusted for habitat (e.g., using smaller radii in loud areas and densely forested areas).

Each of the three surveys will consist of visiting predetermined bird point count locations for five minutes. The surveys will document visual and auditory observations of birds. Visual observations will include bird behaviours indicative of nesting activity. Results will establish estimates of bird species and abundance in different habitat types within the Study Area.

Amphibian Breeding Surveys

The protocol for amphibian breeding surveys, is detailed in the *Marsh Monitoring Program Participant's Handbook for Surveying Amphibians* (BSC et al. 2008). The protocol requires a total of three surveys, one survey during each of the following date ranges (based on the Project location) and meeting the specified temperature requirements:

- April 15 to 30, temperature greater than 5°C;
- May 15 to 30, temperature greater than 10°C; and
- June 15 to 30, temperature greater than 17°C.

Surveys are to begin no earlier than one half hour after sunset and end before midnight, and there must be at least 15 days between surveys.

Each of the three surveys dates will include 3-minute surveys at survey points positioned near potential amphibian breeding habitats. Amphibians will be identified by sound and all calling activity will be ranked using one of the following three abundance code categories:

- Code 1: Individuals can be counted, and calls are not simultaneous;
- Code 2: Calls are distinguishable with some simultaneous calling; or
- Code 3: A full chorus, where calls are continuous and overlapping.

General Habitat Assessment for Species of Conservation Concern

In addition to the targeted wildlife and vegetation community surveys described above, general habitat observations will be noted as they relate to the habitat requirements for Species of Conservation Concern (**Table D1**).

4.4 Species at Risk and Species at Risk Habitat

Targeted SAR surveys for Monarch, Butternut, and SAR bats will be conducted during the 2023 field season. The surveys will also include breeding bird surveys to record any potential bird SAR, specifically grassland birds.

Butternut

Arcadis IBI Group biologists conducted preliminary searches for Butternut within the Study Area in October of 2022. A more extensive survey for Butternut within the Study Area will be conducted in 2023 concurrent with the outstanding vegetation survey.

If any Butternut trees are located during the search, a qualified biologist will perform a preliminary Butternut Health Assessment and follow guidelines as outlined in the *Butternut Health Assessor's Field Guide* (MNRF 2015) and *Butternut Assessment Guidelines: Assessment of Butternut Tree Health for the Purposes of the Endangered Species Act, 2007* (MNRF 2011a).

SAR Bats

The presence or absence of SAR bat habitat will be evaluated during the 2023 field surveys. Bat acoustic monitoring will follow methods outlined in *Bats and Bat Habitats: Guidelines for Wind Power Projects* (MNRF 2011b).

Incidental Species at Risk and Species at Risk Habitat Observations will be noted during all site visits.

4.5 Incidental Wildlife

A wildlife assessment within the property will be completed through incidental observations during all site visits. Any incidental observations of wildlife as well as other wildlife evidence such as dens, tracks, and scat will be documented by means of observational notes, photographs, and UTM coordinates, as applicable. Such observations help validate our conclusions on the ecological function of the Study Area.

5 Survey Results

The following sections outline the findings from the field surveys and characterize the existing conditions within the Study Area. Survey results are discussed below and illustrated in **Figures 3, 4, 5 and 6**, depending on survey context.

Survey results from 2023 field investigations will be detailed in the subsequent EIS addendum.

5.1 Site Investigations

Fieldwork conducted for this Scoped EIS took place in October 2022 when weather conditions and timing were deemed suitable based on the survey protocols being implemented. Fieldwork consisted of high level ELC delineation, preliminary vegetation survey, preliminary watercourse verification, and the primary wetland delineation. Incidental wildlife and SWH observations made during the surveys were also documented. Curricula Vitae of key staff involved in the project have been included in **Appendix A**. The dates, times, surveyor names, and weather conditions for all surveys are listed in **Table 2**.

Table 2: Field Survey Details (2022)

PURPOSE OF VISIT	DATE	TIME	PERSONNEL	WEATHER CONDITIONS	AIR TEMP (°C)
Wetland delineation, watercourse verification, high level ELC, preliminary vegetation inventory, general site walk	October 6, 2022	10:00 AM-4:30 PM	A.Zeller, L.Jackson, B.Semmler	Overcast with slight precipitation, Gentle breeze	20
Vegetation confirmation, watercourse verification	October 17, 2022	1:00 PM-4:15 PM	B.Semmler	Light rain, overcast, gentle breeze	9

5.2 Aquatic Environment

A defined channel in the northern section of the Study Area conveys flow from the adjacent property’s row-crop fields to the Undefined Wetland before flowing into Wolf Grove Creek. Site visits revealed the drainage channel is dominated by Rough Manna Grass (*Glyceria maxima*), a highly invasive wetland species that poses a threat to local biodiversity.

5.2.1 Headwater Drainage Features

The North Tributary is the main headwater drainage feature observed which flows south through the middle of the property (see **Figure 5**). This feature conveys surface water from the adjacent agricultural fields and the wetlands, through the shallow marsh within the subject property, and into Wolf Grove Creek. Within the subject property, this feature flows through the highly invasive Giant Mana Grass marsh limiting the ecological function of this feature to the conveyance of flow downstream. The quality of this feature is further limited by the proximity of a highly utilized cow pasture situated 2-3 meters from the eastern bank. It’s likely that overland flows contaminated by cow manure are negatively affecting water quality downstream. Given the ephemeral nature of this feature, the assumption that it provides ‘valued fish habitat’ in the spring, the limited riparian habitat, and the prevalence of invasive Mana Grass along this reach; it is expected that this feature will be categorized as having a management recommendation of “Conservation” as per the Headwater Drainage Features Guidelines (CVC, 2014).

The West Tributary flows from west to east through the subject property and into the North Tributary described above (see **Figure 5**). This feature is fundamentally associated with an inline invasive Giant Mana Grass Marsh, conveying surface water flows from tile drains at the boundary of the agricultural fields. Site visits confirmed the presence of three tile drainage features along the eastern slope of the meadowed graminoid community (**Figure 5**). Although most of the reach between the delineated wetland habitat and the tile drains is largely undefined. Given the lack of a defined channel upstream of the wetland, it's unlikely that this feature provides seasonal fish habitat ('valued functions'). It is therefor expected that this feature will be categorized as having a management recommendation of "Mitigation" as per the headwater Drainage Feature Guidelines (CVC, 2014).

These HDF's will be further assessed and categorized in the 2023 field season to further clarify the hydrological and ecological functions within the Study Area.

5.2.2 Fish Habitat

Within the Study Area, Wolf Grove Creek and the Mississippi River are the primary sources of fish habitat. Wetlands and headwater drainage features within the Study Area appeared to be ephemeral making them unlikely to provided permanent direct fish habitat but may provide 'valued fish habitat' in the spring as noted above. These features also likely provided "indirect fish habitat" as they contribute to fish habitat downstream.

Field surveys in 2023 will further assess the value and extent of fish habitat within the property.

5.3 Terrestrial Environment

5.3.1 Ecological Land Classification

The preliminary ELC survey completed in 2022 identified a total of nine vegetation communities within the Study Area.

The prominent vegetation communities within the Study Area are agricultural, forests, meadow, and residential. All vegetation communities identified within the Study Area are considered common within Ontario. The communities documented during the preliminary ELC surveys are outlined with summaries of the abundant vegetation cover in **Table 3** below. The location, type, and boundaries of vegetation communities are delineated in **Figure 4**. Reference photos for the vegetation communities are included in **Appendix C**.

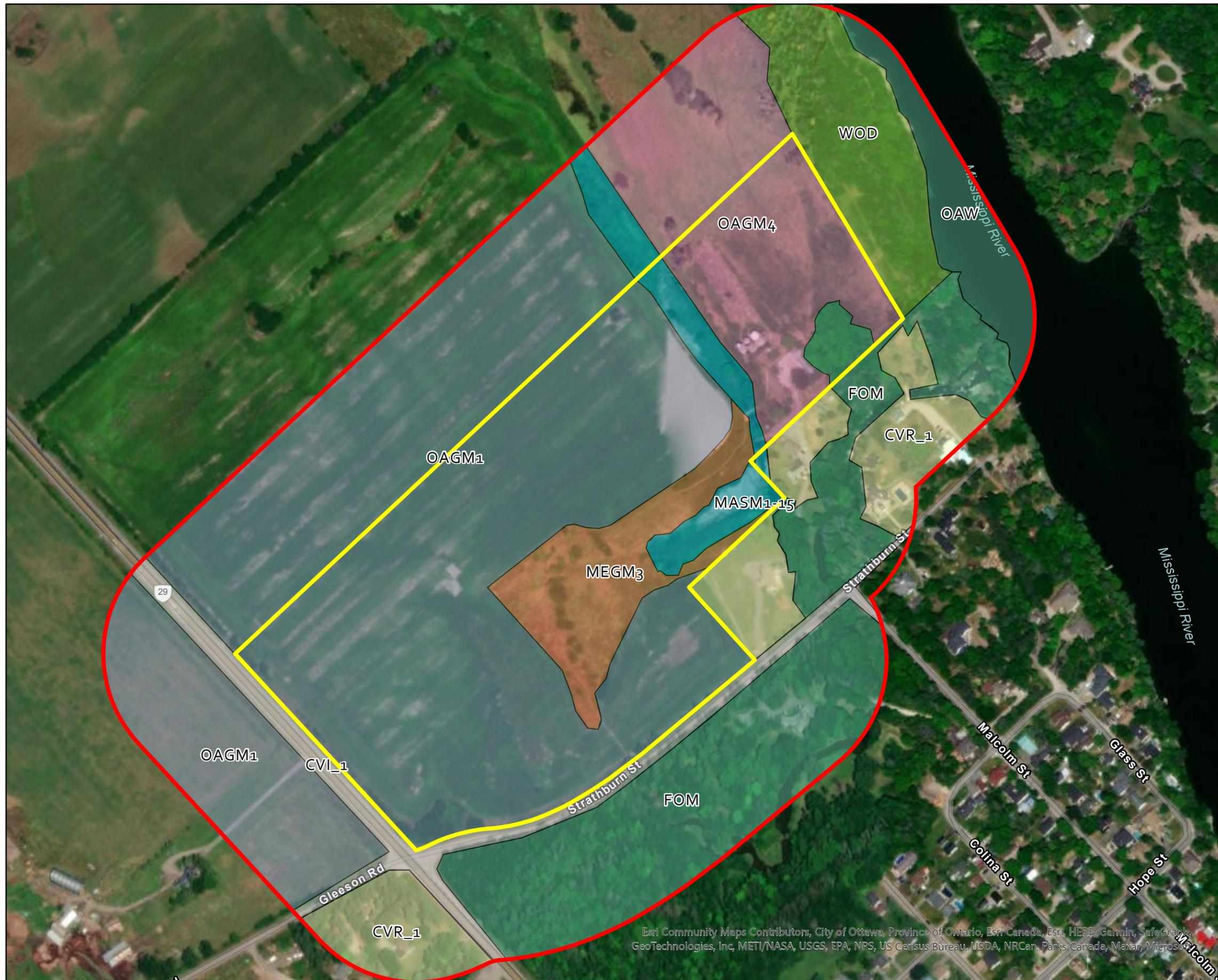
Floristic Inventory

The preliminary vegetation survey identified 54 vegetation species within the Survey Area. A complete species list is provided in **Appendix C**. Of the 54 vegetation species documented, 27 (i.e., 54%) of the species were evaluated as being common within Ontario, having S-Ranks of S4 or S5. Nearly 46% of the species identified are considered non-native or invasive in Ontario.

There is potential for Butternut (*Juglans cinerea*), an Endangered species to Ontario, to be present within the Study Area. Additional surveys, during the growing season, will be required in the 2023 field season to confirm the presence of Butternut or any other provincially and/or federally protected plant SAR are found within the Study Area.

Table 3: Ecological Land Classification Survey Results

ELC TYPE	AREA (ha)	COMMUNITY DESCRIPTION
Shallow Marsh (MAS)		
MASM1-15 Giant Manna Grass Mineral Shallow Marsh Type	1.3	Central portions of this wetland are completely dominated by dense patches of Rough Manna Grass (<i>Glyceria maxima</i>), a highly invasive species of concern within Ontario. This ecosite holds minimal species diversity due to the intrusive nature of Rough Manna Grass and exists as a threat to local biodiversity. Wetland and moisture tolerant vascular plant species were found bordering the dense patches of Giant Manna Grass and were inclusive of Swamp Thistle (<i>Cirsium muticum</i>), Slender Mannagrass (<i>Glyceria melicaria</i>), Reed Canary Grass (<i>Phalaris arundinacea</i>), Broad-leaved Cattail, (<i>Typha latifolia</i>), Grass-leaved Goldenrod (<i>Euthamia graminifolia</i>), Blue Vervain (<i>Verbena hastata</i>), Sensitive Fern (<i>Onoclea sensibilis</i>), Fringed Brome (<i>Bromus ciliates</i>), and Purple Loosestrife (<i>Lythrum salicaria</i>).
Graminoid Meadow (MEG)		
MEGM3 Dry - Fresh Graminoid Meadow Ecosite	2.1	This community surrounds the Giant Manna Grass Mineral Shallow Marsh and is encompassed by the Agricultural Row Crop field in the southwestern section of the Subject Property. This community has a grassed slope that extends eastward towards Wetland-2. In addition to grasses, this community contains a small variety of clustered sub-canopy and understory shrubs inclusive of; Nannyberry (<i>Viburnum lentago</i>), Black Walnut (<i>Juglans nigra</i>), Trembling Aspen (<i>Populus tremuloides</i>), Common Buckthorn (<i>Rhamnus cathartica</i>), Amur Honeysuckle (<i>Lonicera maackii</i>), and Manitoba Maple (<i>Acer negundo</i>). Graminoid groundcover species such as Smooth Brome (<i>Bromus inermis</i>), Fringed Brome (<i>Bromus ciliates</i>), and Fowl Bluegrass (<i>Poa palustris</i>) were dominant in this community. Small occurrences of forb species inclusive of Arctic Sweet Coltsfoot (<i>Petasites frigidus</i>), Common Vetch (<i>Vicia sativa</i>), Canada Thistle (<i>Cirsium arvense</i>), Butter and Eggs (<i>Linaria vulgaris</i>), Field Sow-thistle (<i>Sonchus arvensis</i>), and Common Burdock (<i>Arctium minus</i>) were found at the bases of shrubbery and intermixed with graminoids.
Deciduous Woodland (WOD)		
WOD Deciduous Woodland	2.4	This woodland exists outside of the Subject Property along the Mississippi River. This community was unable to be directly assessed as permission to enter properties adjacent to the Subject Property was not granted. Located along the northeastern property extent, this community is dominated by young regenerative species such as Trembling Aspen, Manitoba Maple (<i>Acer negundo</i>), and Green Ash (<i>Fraxinus pennsylvanica</i>). Concentrations of Common Buckthorn, Amur Honeysuckle, and Nannyberry (<i>Viburnum lentago</i>) represent the understory.
Open Pasture (OAGM4)		
OAGM4 Open Pasture	4.9	This community lies between the Giant Manna Grass Mineral Shallow Marsh and the Deciduous Woodlot in the northeast section of the property. Vegetation in this community is managed by grazing cows that wander the pasture. Decommissioned structures from the site's historical agricultural land use are located in the southern end of the community. Species found at this location are predominantly non-native to invasive species with small occurrences of native vegetation. This community is composed of Northern Bedstraw (<i>Galium boreale</i>), stonecrop species (<i>Sedum sp.</i>), Common Vetch (<i>Vicia sativa</i>), Spiny Plumeless Thistle (<i>Carduus acanthoides</i>), Common Dandelion (<i>Taraxacum officinale</i>), Common Viper's Bugloss (<i>Echium vulgare</i>), Smooth Brome (<i>Bromus inermis</i>), and Creeping Wildrye (<i>Elymus repens</i>).
Mixed Forest (FOM)		
FOM Mixed Forest	6.9	Parts of this community is designated as a 'Significant Woodlot', as per the Municipality of Mississippi Mills, and is associated with Significant Woodland-A, Significant Woodland-B and Significant Woodland-C. As these communities are within the Study Area and outside of the Subject Property, vegetation communities were based off arial interpretation and species observations from public lands. Canopy level species observed within this community include Eastern White Cedar (<i>Thuja occidentalis</i>), Eastern White Pine (<i>Pinus strobus</i>), Green Ash (<i>Fraxinus pennsylvanica</i>), poplar species (<i>Populus sp.</i>), Basswood (<i>Tilia americana</i>), Swamp White Oak (<i>Quercus bicolor</i>).
Open Agriculture (OAG)		
OAGM1 Annual Row Crops	20.5	Agricultural land use is prevalent within the Subject Property. Row Crops of soybeans are planted within soils dominated with clay and silt.
Open Water (OA)		
OAW Open Water	1.3	This community contains the portion of the Mississippi River that is within the Study Area.
Residential (CVR)		
CVR_1 Low Density Residential	3.3	This area consists of home dwellings with large and irregular lot sizes at the southeastern and southwestern extent of the Study Area.
Transportation and Utilities (CVI)		
CVI_1 Transportation – Highways & Roads	1.7	Paved municipal roads inclusive of Strathburn Street, Country Road 29, Gleeson Road, and a small portion of Malcom Street are present within the Study Area.



Legend

Subject Property	Deciduous Woodland (WOD)
Study Area	Mixed Forest (FOM)
Giant Manna Grass Mineral Shallow Marsh (MASM1-15)	Transportation-Highways & Roads (CVI_1)
Dry-Fresh Graminoid Meadow (MEGM3)	Low Density Residential (CVR_1)
Annual Row Crops (OAGM1)	Open Water (OAW)
Open Pasture (OAGM4)	

60 30 0 60 120 180 240

 Meters
 Scale: 1:3,500



Client:
Strathburn Almonte Regional Inc.

Title:
Brown Lands: Ecological Land Classification

Prepared By:
 | IBI GROUP

Project: 140876	Figure: 4
Date: 2023-02-20	

Esri Community Maps Contributors, City of Ottawa, Province of Ontario, Esri Canada, Esri, HERE, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, EPA, NPS, US Census Bureau, USDA, NRCan, Parks Canada, Maxar, Microsoft

5.3.2 Wetlands

Four unevaluated wetland features were identified in the background review using the MVCA database as illustrated in **Figure 1**. Wetland-1 and Wetland-2 were assessed within the Subject Property and Wetland-3 and Wetland-4 are located within the Study Area but beyond the borders of the Subject Property and were not directly investigated as no access was granted to enter either of the adjacent lands.

Wetland-1 is a large Unidentified Wetland, recognized by the MVCA, that encompasses a total of 5.8 ha, including a 2.7 ha portion within the Study Area and extending outside the Study Area to the north. A review of localized topography suggest water accumulation is due to the area's low elevation point. Tile drains from the adjacent agricultural fields direct water to Wetland-1, where water then flows into Wetland-2, then to Wolf Grove Creek and the Mississippi River. Field surveys on October 6, 2022 confirmed a heavy presence of the highly invasive Rough Manna Grass (*Glyceria maxima*) within Wetland-1 and Wetland-2. The magnitude of Rough Manna Grass's occupation greatly reduces the overall ecological function and value of Wetland-1. Displacement of SWH and SAR is expected as rapid root and foliar growth of this invasive grass limits accessibility to wetland habitat.

5.3.3 Woodlands

As discussed in section 3.4.2, the Natural Heritage Screening section for Significant Woodlots, mapping from the MMM identifies three woodlands of significance are located within the Study Area (Figure 1). Only A small section of Significant Woodland-A (0.07 ha) encroaches into the Subject Property.

Records from areal interpretation and preliminary field investigations confirms that all three Significant Woodlands are likely significant based of observed tree maturity (estimated DBH) and age of woodlot (> 40 years via. arial interpretation).

Two smaller Non-Significant Woodlands were delineated by areal interpretation and confirmed the field (Figure.1). Woodland-1 is partially connected to significant Woodland-A according to the MMM. However, field observations in October 2023 confirmed that Woodland-1 contains young to regenerative understory species with a few mature trees suggesting a younger, non-significant stand. Although the species composition within Woodland-2 is consistent with the Mixed Forest (FOM) community, this pocket of woodland appears to be younger and more variable in nature due to the presence of younger, and more regenerative canopy and understory species.

5.3.4 Valleylands

Site visits and background reviews confirmed an absence of Valleylands within the Study Area.

5.3.5 Significant Wildlife Habitat

The following sub-sections highlight the candidate SWH that was observed during the October 2022 field investigations.

Breeding bird, amphibian breeding, and bat acoustic surveys will be conducted in the 2023 field season to establish baseline conditions within the Study Area and identify presence of SWH.

Seasonal Concentration Areas of Animals

Based on the criteria established for Candidate SWH, the following seasonal concentration areas of animals may be found within the Study Area:

- Bat Maternity Colonies: The mature forest habitats within and adjacent to the subject property may provide suitable cavities and roosting trees. Wetland habitat featured on the property provides favourable foraging habitat for bats.

Specialized Habitat for Wildlife

Based on the preliminary site visit in the following specialized habitat for wildlife may be found within the Study Area:

- Amphibian Breeding Habitat may be found within the forest communities, headwater drainage features, and wetlands within the subject property.
- Snapping Turtle may be found in the permanent and semi-permanent slow-moving freshwater marshes with the Subject Property.
- Reptile Hibernacula: Areas within the open pasture ecosite includes several rocky hibernaculum features (Appendix B-Photo 12) that highly suggests the presence of snakes and other herpetofauna.

Habitat for Species of Conservation Concern

Potential habitat for the following four Species of Conservation Concern (SCC) were confirmed during the ELC assessment. Results of suitable habitat and the presence / absence of SCC within the Study Area include:

- Monarch: Areas of meadow and pasture containing milkweed were recorded within the Study Area thus indicating presence of Monarch breeding and feeding habitat.
- Eastern Musk Turtle: This species may use the Wolf Grove Creek within the Study Area for nesting habitat due to watercourse connectivity from the Mississippi River.
- Grasshopper Sparrow: Low graminoid coverage with taller weeds ideal for perching were found to in the western portion of unevaluated Wetland-2. Fallow fields are also present within the property.
- Common Nighthawk: Open sandy substrate with little low-lying vegetative coverage is located within the western portion of the Subject Area.

Field surveys in 2023 will further assess the potential for SSC species and habitat within the property.

Incidental Observations of Significant Wildlife Habitat

There were no incidental observations of SWH during the preliminary site visit or ELC and tree surveys. Further investigations will be conducted in 2023 to identify the presence of candidate and confirmed SWH.

5.4 Species at Risk and Species at Risk Habitat

The field studies completed in October 2022 included a habitat suitability assessment for those species identified in the background screening. The following sub-sections outline any incidental observations made during the October field surveys and the potential for these species to be found within the study area.

5.4.1 Butternut

No butternut trees were observed during the October 2022 field surveys although suitable habitat for butternut is found throughout the study area.

Tree and vegetation surveys are expected to be completed in 2023. These surveys will include a search for butternut and health Assessment if butternuts are identified within the Subject Property.

5.4.2 Bobolink and Eastern Meadowlark

The agricultural pasture (OAGM4) and small meadow (MEGM3) habitats found within the Study Area may provide some foraging habitat for Bobolink and Eastern Meadowlark. However, these habitats do not seem to provide the characteristics these species require for nesting. The agricultural pasture is heavily utilized by grazing cattle and as such do not possess the tall grasses and relatively undisturbed environments these species require.

The meadow habitat does provide suitable grasslands for nesting, however, the area is considered too small to provide nesting, as these species generally prefer >20 ha of contiguous meadow habitat.

Breeding bird surveys are expected to be completed in 2023. If Bobolink or Eastern Meadowlark are observed during these surveys an additional site visit will be completed as per the survey protocol to determine if the species are utilizing lands within the Study Area.

5.4.3 Chimney Swift

The site visit completed in 2023 did not observe any suitable Chimney Swift's or Chimney Swift habitat within the Subject Property. The old agricultural buildings within the property do not contain suitable habitat (old chimney's). It's assumed that those residential homes located outside of the Subject Property, but within the Study Area, have chimneys that are well used and do not provide suitable nesting habitat for chimney Swift.

Breeding bird surveys and Amphibian surveys are expected to be completed in 2023. If Chimney Swift's are observed supplementary surveys will be completed to determine where they are nesting.



Legend

- Proposed Setback
- Wolf Grove Creek (NHIC)
- Tile Drainage Discharge Location
- Watercourse
- Field Mapped Wetland
- Study Area
- Subject Property
- Watercourse
- Wolf Grove Creek (NHIC)

60 30 0 60 120 180 240
 Meters
 Scale: 1:3,500



Client:
Strathburn Almonte Regional Inc.

Title:
Brown Lands: Wetland Delineation and Proposed Setbacks

Prepared By:
 | IBI GROUP

Project: 140876	Figure: 5
Date: 2023-02-20	

Esri Community Maps Contributors, City of Ottawa, Province of Ontario, Esri Canada, Esri, HERE, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, EPA, NPS, US Census Bureau, USDA, NRCAN, Parks Canada, Maxar, Microsoft

5.4.4 SAR Bats

The Study Area contains two forest communities, several agricultural buildings, and a couple residential homes that may provided suitable roosting habitat for SAR bats. A preliminary assessment of the agricultural buildings did not identify any signs of bats.

Acoustic bat surveys will be completed in 2023 to confirm the presence of SAR bats within the subject property. Additional incidental observations and searches of agricultural buildings will also be completed to observe any signs that bats may be using these buildings

5.5 Trees

Tree data will be provided following 2023 field investigations.

5.6 Incidental Wildlife and Wildlife Habitat

The following incidental wildlife observations were made during 2022 site visits:

- Barn Swallow (*Hirundo rustica*)
- Northern Leopard Frog (*Lithobates pipiens*);
- Black-capped Chickadee (*Poecile atricapillus*);
- Northern Harrier (*Circus hudsonius*);
- Twice-stabbed ladybug (*Chilocorus stigma*); and
- Spring Peeper (*Pseudacris crucifer*).

Additional incidental observations for wildlife habitat will be documented during 2023 field investigations.

6 Description of the Proposed Project

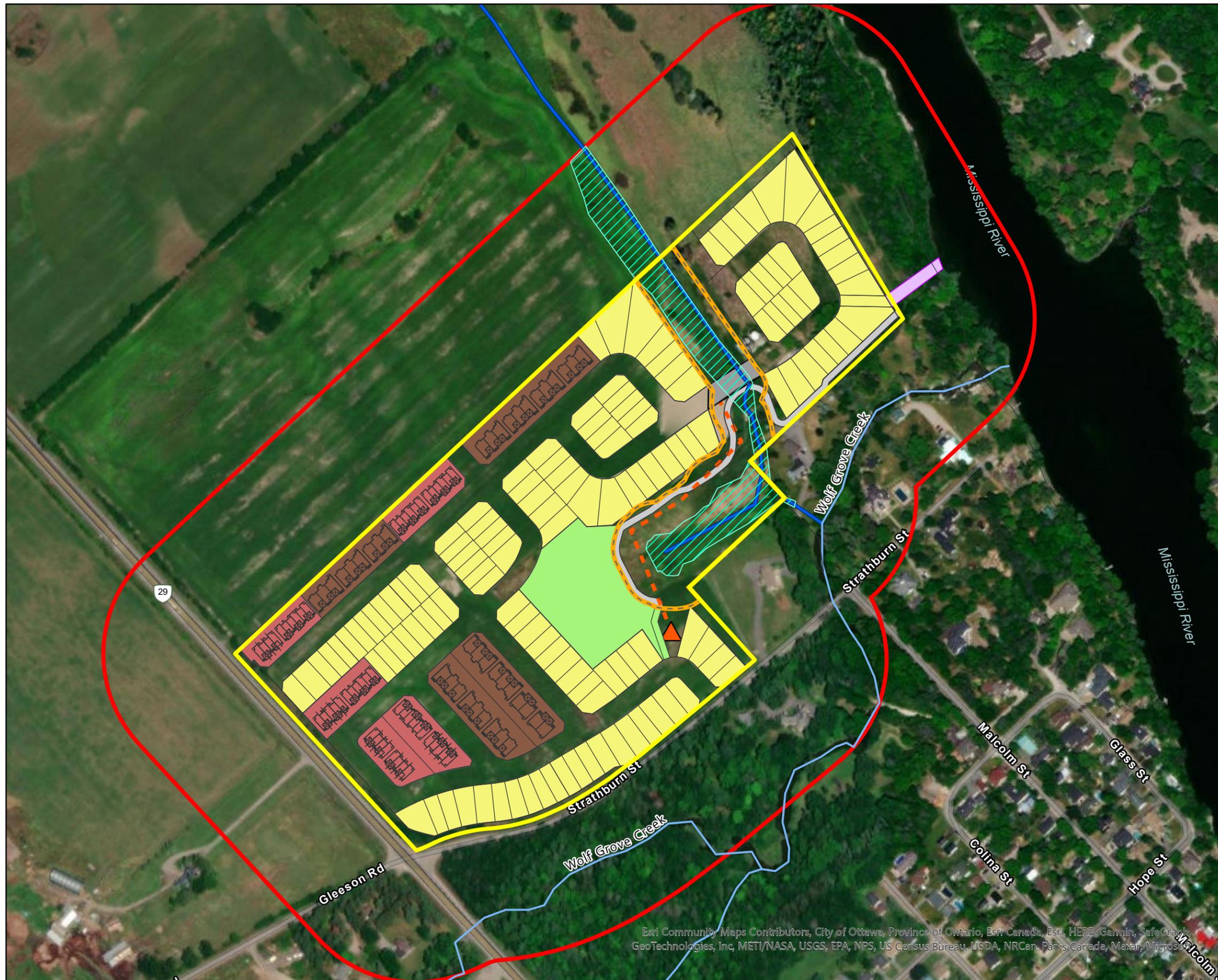
Strathburn Almonte Regional Inc. is proposing to develop a mixed residential development including single family homes, bungalow townhomes, and two-storey townhomes with a central park area and pump station, adjacent to the existing watercourse and wetland feature. The limit of development, proposed block plan, and other key infrastructure is illustrated on **Figure 6**.

As illustrated, the proposed plan has been developed to minimize impacts on natural features within and adjacent to the limit of development.

6.1 Construction Activities

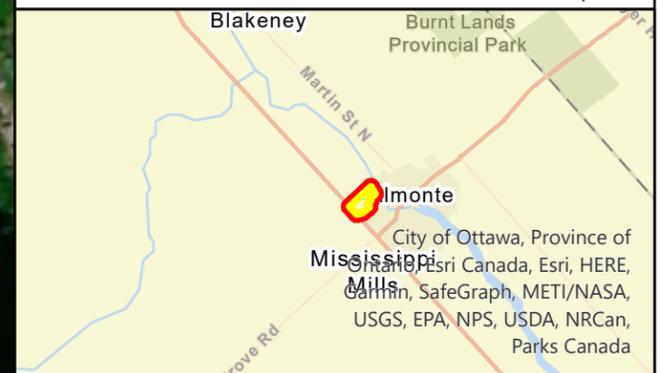
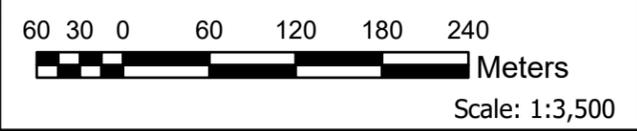
It is assumed the development of this property will include the following major project components:

- Surveying and staking out the development.
- Clearing, excavation, and grading property to accommodate construction.
- Installation of storm water drainage network, and related infrastructure.
- Excavation to accommodate underground utilities including water, sanitary sewer, gas, and hydro.
- Installation of a Storm Water Outlet into the Mississippi River (with associated multi-use path and pedestrian lookout).
- Construction of a Road Crossing over the North Tributary
- Construction of buildings, driveways, and access roads.
- Paving parking areas and access roads.
- Landscaping and fencing.
- On-going usage and maintenance.



Legend

- Watercourse
- Site Plan
- Proposed Setback
- Study Area
- Subject Property
- Field Mapped Wetland
- Bungalow Town Home
- Park
- Single Home
- Two-story Townhome
- Bike Path
- - - Sanitary Line (Approximate Location)
- ▲ Sanitary Pump Station (Approximate Location)
- Storm Water Outlet (Approximate Location)
- Road Crossing
- Wolf Grove Creek



Client:
Strathburn Almonte Regional Inc.

Title:
Brown Lands: Site Plan

Prepared By:
ARCADIS | IBI GROUP

Project: 140876
Date: 2023-02-20

Figure: 6

Esri Community Maps Contributors, City of Ottawa, Province of Ontario, Esri Canada, Esri, HERE, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, EPA, NPS, US Census Bureau, USDA, NRCan, Parks Canada, Maxar, Microsoft

7 Impact Assessment and Mitigation

Following the completion of the 2023 field investigation, an assessment of impacts will be completed, and appropriate mitigation measures will be identified accordingly. The impact assessment and associated mitigation measures will consider both temporary (i.e., construction related) impacts and permanent impacts associated with the occupation of the development.

7.1 Aquatic Habitat and Headwater Drainage Features

The site plan for the proposed residential development (**Figure 6**) has identified the requirement for a storm water outlet into the **Mississippi River** northeast of the subject property. While the detail design and precise alignment of this required infrastructure has yet to be determined, it is expected that some negative impacts may occur along the shoreline of the Mississippi River. The anticipated impacts on the Mississippi River associated with this infrastructure may include:

- The permanent installation of a storm water headwall or similar outlet structure causing potential direct and permanent physical impacts on aquatic and riparian habitat. However, these impacts are expected to be localized to a small area along the shoreline and are not expected limit habitat availability within this reach of the river.
- The indirect, temporary impacts, associated with construction activities along the shoreline of the Mississippi River are also expected. Specifically, those impacts caused by erosion and sedimentation during construction. There is not expected to be an increase in erosion potential post-construction.
- A permanent contribution of storm water flows into the Mississippi River is expected to result in a negligible increase of flows directly to the river during the 25 mm, 2-year and 5-year rain events (Novatech, 2023). However, given the minor contribution of this flow relative to the size of the Mississippi River, quantity control is not required.
- The direct contribution of Storm Water flows to the Mississippi River from the proposed development is expected to result in a net improvement in water quality. Under the existing conditions, runoff from the agricultural fields and cow pastures likely contribute a significant nutrient load to the watercourse. In the post-development condition these overland flows may still contain a minimal amount of other pollutants associated with urban runoff (e.g. road salt), however the heavy nutrient load is not expected. This change is expected to be an overall improvement.

The specific impacts associated with the storm water outlet will be revisited following the results of the 2023 aquatic habitat surveys.

The North Tributary is the primary headwater drainage feature that bisects the subject property. As noted in Section 5.2, it's expected that this feature would be categorized as "Conservation" under HDF Assessment Guidelines. This categorization means the feature should be maintained (or relocated) along with its riparian corridor. Based on the provided site plan, the feature will be retained within its existing channel and riparian corridor. However, a few direct and indirect impacts on this North Tributary are anticipated. These include:

- The proposed development is expected to result in a minor (~10%) increase in overland flows into the watercourse under all modeled rain events (Novatech, 2023). This increase in flow is expected to have a permanent but generally negligible negative impact on the aquatic habitat within the tributary.
- A road crossing of this watercourse is required to access lots in the eastern portion of the proposed development. This crossing is expected to span the full width of the feature and replace two known informal culvert crossings further downstream. The

installation is not expected to have a significant impact on the aquatic habitat and may ultimately result in improved fish (and wildlife) passage.

The specific impacts associated with the proposed crossing and change in flows will be revisited following the results of the 2023 aquatic habitat surveys.

The Western Tributary conveys overland flow from the agricultural fields to the west, through the associated Giant Manna Grass mineral shallow marsh (MASM1-15), and ultimately into Wolf Grove Creek and the Mississippi River. As noted in Section 5.2, it's expected that this feature would be categorized as "Mitigation" under HDF Assessment Guidelines. This categorization means the feature can be removed, but the functions of the feature should be retained or enhanced – in this case the primary function of this feature is to convey surface water flow from the tile drains downstream. The proposed residential development and expected construction activities will require the permanent removal of all tile drains within the Subject Property and the proposed development of a community park, resulting in the following anticipated impacts:

- The removal of the tile drains and the capture of overland flows by the storm water infrastructure is expected to result in a permanent 50% loss of flow into this feature downstream of the proposed park (Novatech, 2023).

The management recommendations and impacts will be re-assessed following the 2023 Headwater Drainage Feature Assessment.

Proposed Mitigation Measures – Planning and Design Stage

- ✓ A Fisheries Act 'Request for Review' will likely be required to address the fisheries impacts associated with the storm water outlet, the crossing of the North Tributary, and the removal of the West Tributary. This should be completed following detailed design stage as required by DFO.
- ✓ A 30m setback from the southwest bank and a 15 meters setback from the northeast bank is recommended for the North Tributary bisecting the property. This setback has been illustrated in **Figure 7**.
- ✓ A 30m setback from the lower reach of the West Tributary is proposed within the subject property. This setback has been illustrated in **Figure 7**.
- ✓ Stormwater conveyance and site grading should explore additional opportunities to supplement overland flows into the wetland reach of the West Tributary during detailed design. Re-direction surface flow into the wetland feature will maintain the existing function of tile drains.
- ✓ The road and trail crossing of the North Tributary should be reviewed by a qualified biologist at detailed design to ensure the proposed structure does not impede fish (and wildlife) passage.

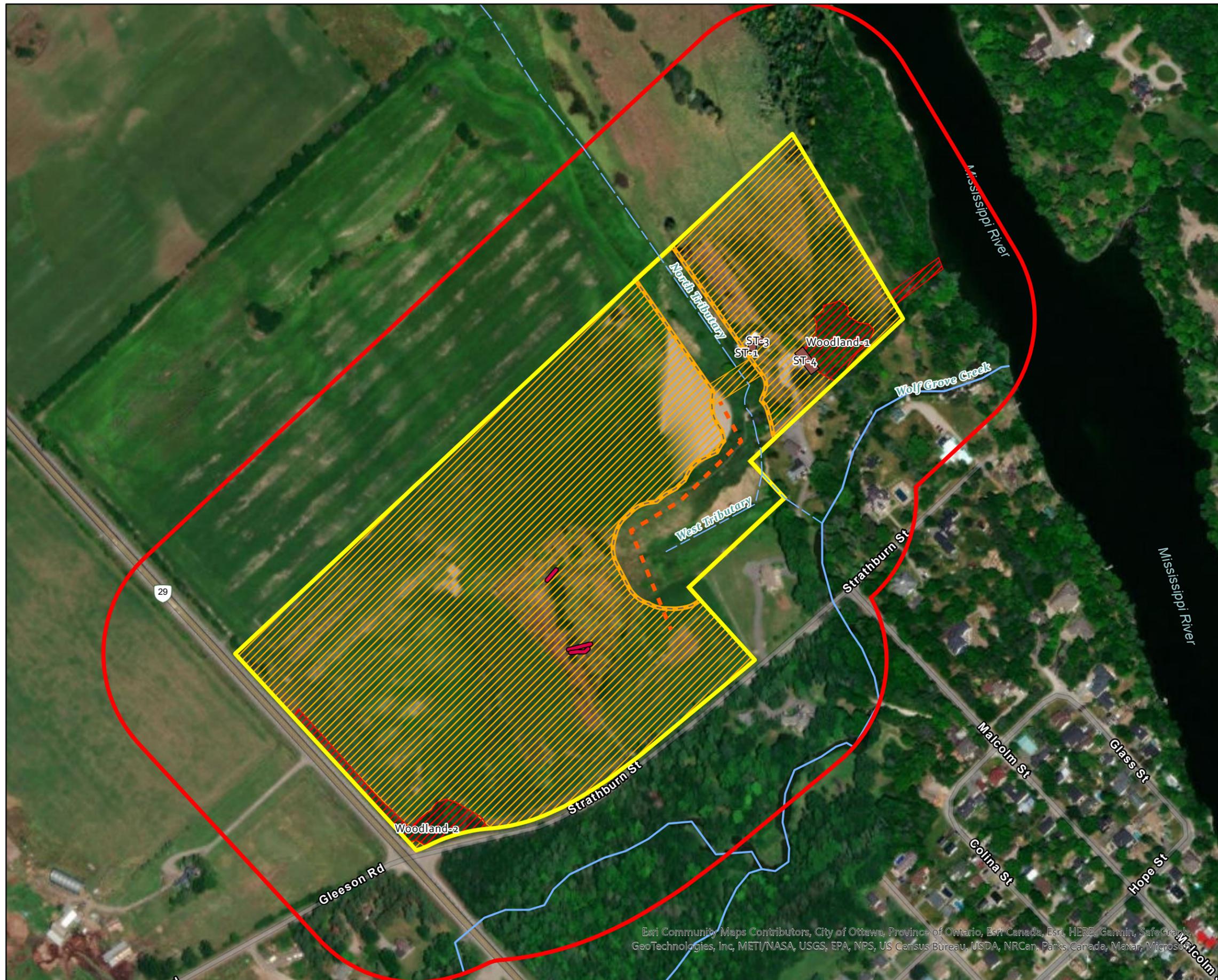
Proposed Mitigation Measures – Construction Implementation

The following general mitigation measures are recommended to address impacts on the aquatic habitat adjacent to the development area:

- ✓ An Erosion and Sediment Control Plan should consider the specific construction related impacts from the storm water outlet on the Mississippi River.
- ✓ In water works should not be undertaken between March 15th to July 15th. This applies to the storm water outlet, the North Tributary crossing, and any other construction activities within or directly adjacent to the watercourses.

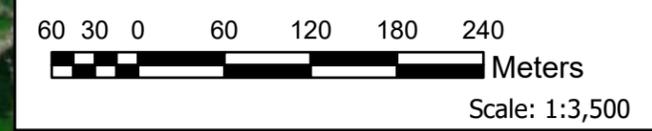
- ✓ Light-duty silt fencing (OPSD 219.110) and / or other equivalent erosion and sediment control measures should be installed at the limit of the proposed watercourse to clearly demarcate the development area and prevent erosion and sedimentation into adjacent habitats (i.e., the slope between the construction site and the Mississippi River along the northeastern property edge). Erosion and sediment control measures should be monitored weekly to ensure they are functioning properly and if issues are identified should be dealt with within 48 hours of notification.
- ✓ Construction related impacts to the watercourses or riparian habitats should be reinstated as per the recommendations outlined in section 7.2.2, below.
- ✓ Stockpiling of excavated material should not occur outside the delineated work area. If stockpiling is to occur outside of this area, double-row silt fencing and straw bales shall be used to contain any spoil piles to prevent sedimentation into adjacent areas.
- ✓ A spill response plan shall be developed by the contractor and implemented as required.

With the successful implementation of the mitigation measures outlined above, impacts from the proposed development on the aquatic environment is expected to be permanent, but negligible in the context of the greater watershed.



Legend

- Proposed Setback
- Watercourse
- Tile Drain - Removal
- Subject Property
- Study Area
- Woodland - Removal
- Vegetation - Removal
- Sanitary Line (Approximate Location)
- Wolf Grove Creek (NHIC)
- Watercourse
- Proposed Setback
- Existing Structures - Removal



Client:
Strathburn Almonte Regional Inc.

Title:
**Brown Lands:
 Impact Assessment**

Prepared By:
ARCADIS | IBI GROUP

Project: 140876

Date:
 2023-02-20

Figure: 7

Esri Community Maps Contributors, City of Ottawa, Province of Ontario, Esri Canada, Esri, HERE, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, EPA, NPS, US Census Bureau, USDA, NRCAN, Parks Canada, Maxar, Microsoft

7.2 Terrestrial Environment

7.2.1 Vegetation Communities

To accommodate the construction of the proposed residential development, it is anticipated that the permanent removal of approximately 16 ha of native vegetation is required (**Figure 7**). **Table 4**, below, provides a summary of the vegetation removal required to accommodate the proposed residential development.

Table 4: Area of Impact to ELC Communities

ELC COMMUNITY	VEGETATION REMOVAL (HA)
Open Vegetation (Row Crops, Open Pasture, and Meadow)	14.7
Woodland Vegetation (Mixed Forest)	1.5

Two specific areas of clearing is required beyond what is needed for the construction of houses. The first area is a narrow (~5 m) band of ‘dry-fresh graminoid meadow’ (MEGM3) around the wetland area. This will be a temporary impact to accommodate the permanent installation of a 250mm sanitary line (see **Figure 7**). It is understood that this area will be reinstated as native meadow habitat following construction. The precise location of this infrastructure will be determined during detailed design.

The second specific area of vegetation removal is required to accommodate storm water infrastructure within the deciduous woodland adjacent to the Mississippi River. In this area a 15-20 m wide path needs to be cleared of vegetation to accommodate the required storm water outlet (see **Figure 7**). As above, the precise location of this infrastructure will be determined during detailed design.

In addition to the direct impacts noted above, the following indirect impacts associated with vegetation removal may include:

- The permanent loss of habitat for wildlife dependent upon the terrestrial communities.
- Decreased biodiversity, reduced number of species, or abundance of species.
- Erosion and sedimentation into adjacent vegetation communities.
- Permanent loss of native vegetation due to increased potential for non-native and invasive vegetation species after development.

Specific impacts will be revisited following the results of the 2023 ELC and Vegetation surveys.

Proposed Mitigation Measures – Planning and Design Stage

- ✓ The impact on native vegetation should be considered when determining the precise location of the storm water outlet in advance of detailed design. This alignment should be staked in the field with the support of a qualified biologist.
- ✓ The reinstatement of native vegetation associated with the installation of the sanitary line is required. The native meadow seed mix used should be approved by a qualified biologist.
- ✓ Landscaping plans should incorporate native trees and vegetation where feasible. Opportunities for enhanced natural landscape features should be considered during detailed design. These features may include, but are not limited to, naturalized pollinator gardens, rain gardens, native vegetation adjacent to roadways, etc.

- ✓ A Forest Edge Management Plan should be prepared during detailed design in areas where development encroaches into the forest habitat. This includes the path cleared to accommodate the required storm water outlet. This is intended to re-instate the forest edge with native trees and shrubs. This should include the monitoring of the establishment of non-native and invasive species.

Proposed Mitigation Measures – Construction Implementation

The following general mitigation measures are recommended to address impacts on the terrestrial environment adjacent to the development area:

- ✓ Orange snow fencing or other suitable security fencing should be used to delineate the construction limits from the adjacent natural habitats that will be retained. This is intended to prevent encroachment of construction activities into the adjacent natural features. It is expected that this will be installed at the following specific locations:
 - adjacent to forest habitat at the eastern limit of the subject property.
 - On either side of the construction corridor required for the installation of the stormwater outlet.
 - At the setback limits for wetlands-1 and 2, and along the setbacks associated with the North Tributary.

The final location of the fencing shall be established during detailed design.

- ✓ Erosion and sediment control measures should be installed where necessary to prevent erosion and sedimentation outside of work areas, specifically adjacent to natural areas.
- ✓ Landscaping plans shall make use of appropriate native species where practical to offset the loss of native vegetation and biodiversity.
- ✓ Invasive species should be removed within areas being reinstated using species-appropriate methods to limit further spread and comply with invasive species legislation.
- ✓ Machinery will arrive on site in clean condition and will be free of fluid leaks, invasive species, and noxious weeds as issued through the [Clean Equipment Protocol for Industry](#).
- ✓ Construction machinery should remain within the limit of development and stored in an area that is isolated from the Natural Heritage Feature to ensure that no deleterious substances enter the adjacent watercourses or wetlands.
- ✓ All excess construction material shall be removed from site upon project completion as required.

Proposed Mitigation Measures – Post-Construction

- ✓ Installation of garbage bins in public spaces is recommended adjacent to the development area.
- ✓ 'No Littering' signage is recommended in parks and public spaces.
- ✓ The creation and distribution of an 'environmental awareness handbook' should be considered to educate homeowners about the sensitive features and habitats within and adjacent to the proposed development.

With the successful implementation of the mitigation measures outlined above, a low decrease in native terrestrial vegetation is anticipated due to a minor amount of vegetation proposed for removal.

7.2.2 Wetlands

The two Giant Manna Grass mineral shallow marsh wetland (MASM1-15) features identified within the Subject Property (Wetland-1 & Wetland-2) provide negligible ecological value as they contain dense patches of the highly invasive Giant Manna Grass. Field observations confirmed that this grass has displaced most of the native wetland species and likely limits the biodiversity associated with these features.

Nevertheless, these wetland features continue to provide a flood control/storage function within the watershed. As noted above, the proposed residential development will require the permanent removal of all tile drains within the Subject Property. The removal of these tile drains is expected to result in a permanent, 50% loss of flow into Wetland-2 (Novatech, 2023). This reduction in flows is expected to have a negative impact on Wetland-2 and associated hydrologic function. However, given that the predominant function of the wetland is expected to be flood storage, this impact can be mitigated through on-site storm water management.

Given the limited ecological value associated with Wetland-1, the impact on this feature is expected to be negligible. The one notable direct impact on this feature is associated with the construction of the road and trail crossing over the North Tributary. It is expected that the proposed crossing will require the removal of a small portion of wetland. Given that this impact is primarily impacts an invasive species dominated vegetation community, the impact is negligible.

Development impacts on these two wetland features will be re-evaluated following the results of the 2023 field investigations. It is possible that the wetland provided some amphibian breeding function.

Proposed Mitigation Measures – Planning and Design Stage

- ✓ A 30m setback from Wetland-2 is proposed within the subject property. This setback has been illustrated in **Figure 7**.
- ✓ A 'Habitat Restoration and Monitoring Plan' should be considered to reinstate areas that have been impacted by construction with functional wetland habitat and the removal of invasive Mana Grass where practical.
 - The plan should include native vegetation plantings, invasive species removal, and habitat feature construction.
 - The plan can be a subset of the required landscape plan or a stand-alone document depending on the extent of the proposed works.
 - Plantings should include an appropriate native wetland seed mix interspersed with some potted or bare root shrub plantings around the edge of the wetland feature.
- ✓ During detailed design stormwater conveyance and site grading should explore opportunities to supplement overland flows into the marsh associated with the Western Tributary (Wetland-2). This may include additional rear-yard drainage or hydrating the marsh through flows from the North Tributary.

Proposed Mitigation Measures – Construction Implementation

The following general mitigation measures are recommended to address impacts on the wetland habitats adjacent to the development area:

- ✓ Orange snow fencing or other suitable fencing should be used to delineate the construction limits from the above noted wetland setbacks. This will prevent encroachment of construction activities into the adjacent natural features.

- ✓ Erosion and sediment control measures should be implemented to prevent sedimentation outside of work areas, specifically within the natural areas.

7.2.3 Woodlands

Within the subject property, two woodland areas will be removed (Woodland-1 & Woodland-2) to accommodate the proposed development plan (See **Figure 7**). Woodland-1 forms part of a larger significant woodland (SIGWOD-A) located south of the subject property and is associated with the Wolf Grove Creek corridor. Preliminary field investigations suggest that this mixedwood forest community contains several mature White Cedar, Eastern White Pine, Green Ash, Poplar Species, Basswood, and White Oak. Given the extent of forested lands within the landscape, the removal of this feature will have a minor permanent impact on woodland forest cover within the area. Indirect impacts on the remaining significant woodland (SIGWOD-A) may include the encroachment of invasive species and an increased susceptibility to wind damage may result.

Woodland-2, located in the southern corner of the subject property, will also be removed to accommodate the proposed development. This feature is quite small and disconnected from adjacent woodland areas. Direct impacts associated with the removal of this woodland included the loss of general forest cover within the region.

In addition to those woodlands directly impacted by the proposed residential development, a portion of the deciduous forest located adjacent to the Mississippi River will also be impacted to accommodate the storm water outlet as discussed in Section 7.2.1. The required outlet will require a 15-20 m wide path down to the Mississippi River (see **Figure 7**). However, the precise location of this infrastructure will be determined during detailed design. This path will be reinstated with a pedestrian trail and associated landscaping.

The Significant Woodlands (SIGWOD-A, B, & C) delineated by in the Municipal Official Plan are located outside the subject property, but within the Study Area. Direct impacts to these features are expected to be negligible and generally temporary in nature. However, the woodlands may be subject to indirect impacts associated with nearby construction activities which may affect the fauna and connectivity within the landscape. These indirect impacts may include:

- A General decrease in local biodiversity in the area.
- Temporary increase in dust from earth works and other construction activities.
- Erosion and sedimentation into adjacent habitats.

These impacts will be reassessed following the results of the 2023 field investigations.

Proposed Mitigation Measures – Planning and Design Stage

- ✓ Impacts on the woodland should be considered when determining the specific location of the storm water outlet in advance of detailed design. This alignment can be staked in the field with the support of a qualified biologist.
- ✓ As per Section 7.2.1, a Forest Edge Management Plan should be prepared during detailed design where development encroaches into the forest habitat.
- ✓ Grading plans should match new grades to the existing grades of the woodlot up to the Critical Root Zone (CRZ) of the edge trees were possible.

Proposed Mitigation Measures - Construction Stage

The following general mitigation measures are recommended to address impacts on the woodlands within the proposed development blocks:

- ✓ General project landscaping plans should consider use of appropriate native species to offset loss of species, biodiversity, and canopy cover from vegetation removals.
- ✓ General mitigation for vegetation removals as described in Section 7.2.1.

It is anticipated that the clearing of woodlands within the subject property will result in a relatively minor reduction in woodland habitat.

7.2.4 Significant Wildlife Habitat

BREEDING BIRDS

It is expected that the above noted removal and disturbance to forest, thicket, and meadow within the proposed development area will result in a loss of potential nesting and foraging habitat for breeding birds. The following direct and indirect impacts on breeding birds are a possible result of the proposed development:

- The permanent loss of nesting and foraging habitat will likely result from the clearing of vegetation within the property.
- Potential physical harm to birds or birds' nests during clearing and construction activities.
- Reduced composition, distribution, and abundance of a bird species within the area.
- Predation by domestic cats during occupation.
- The increased potential for fatal bird collisions associated with building windows following construction.

These impacts will be revisited following the results of the 2023 breeding bird field investigations.

Proposed Mitigation Measures – Planning and Design Stage

“Bird-friendly” building design principals should be considered in the design of the development. Potential measures may include the following:

- ✓ Bird friendly design should be incorporated as described in the [City of Ottawa's bird-friendly design guidelines](#) (City of Ottawa, 2020) or other similar standards.
- ✓ Enhanced tree planting and reforestation measures should consider bird breeding and foraging habitat within the subject property.

Proposed Mitigation Measures – Construction Implementation

The following mitigation measures are intended to address potential impacts to breeding birds resulting from the proposed development:

- ✓ Clearing of vegetation should be avoided during the breeding bird season, between April 15th and August 15th. Should any clearing be required during the breeding bird season, nest searches shall be conducted by a qualified person must be completed 48 hours prior to clearing activities. If nests are found, an appropriate setback will be established by the qualified professional. No work will be permitted within this setback in accordance with the federal Migratory Birds Convention Act (MBCA) (Government of Canada, 1994).
- ✓ A qualified bird rehabilitation centre should be contacted if any birds are injured or found injured during construction activity. Injured birds should be transported to a qualified for

care with a small donation of money to help pay for the care (a local facility is the [Ottawa Valley Wild Bird Care Centre](#)).

- ✓ The construction area should be pre-stressed prior to any vegetation clearing within the proposed development area.

With the successful implementation of the recommended mitigation, a temporary site-wide loss of breeding and foraging habitat for birds is expected.

REPTILE (Snake) HIBERNACULA

Based on preliminary observations made during the October 2022 field investigations, the proposed development may directly impact candidate Reptile (Snake) Hibernacula. The old agricultural buildings with foundations and rocky outcrops observed within the open pasture (Appendix B-Photo 12) likely provides suitable habitat for snake hibernation. It's likely that other suitable hibernation habitat exists within local landscape and the removal of these features may not be limiting.

These impacts will be revisited following the results of the 2023 field investigations.

Proposed Mitigation Measures – Planning and Design Stage

- ✓ A '[Habitat Restoration and Monitoring Plan](#)' could consider the installation of an artificial snake hibernacula within or adjacent the development area if a suitable location can be identified. These features generally consist of burring rock and rubble below the frost line with access to the surface.

Proposed Mitigation Measures – Construction Implementation

- ✓ [Pre-stress the area on a regular basis leading up to construction](#) to encourage snakes to leave the area before construction starts. Other recommendations for pre-stressing are outlined in the *Protocol for Wildlife Protection During Construction* (City of Ottawa 2015).
- ✓ [Construction crews working on site should be educated on local wildlife](#) and take appropriate measures for avoiding wildlife.

With the successful implementation of the recommended mitigation, a temporary site-wide loss of breeding and foraging habitat for birds is expected.

BAT MATERNITY COLONY SWH

Based on the concept plan and anticipated removal of removal of Woodland #1 and Woodland #2, it is expected that there will be a negligible permanent loss of available roost habitat. In addition, the preliminary field investigation identified several agricultural buildings that may provided roost habitat for bats. However, given the extent and proximity of suitable habitat in adjacent woodlands and habitats along the Mississippi River, this impact is not expected to be habitat limiting for bats in this region and the impacts are expected to be localized.

The following impacts on bat roost habitat is possible:

- Permanent loss of candidate roost trees within forested habitat from vegetation removals.
- Permanent loss of candidate foraging area within meadow habitat from vegetation removals and construction activities.

- Accidental displacement, injury, or death of bats which may be using woodlands as temporary roosting habitat during roosting period.

Field investigations in 2023 will assess the available habitat within the subject property in more detail. This will include acoustic surveys to document the species present, the location of bats, and the relative numbers of individuals using the area. However, given the context of the landscape the results from these field investigations are not expected to significantly affect the general impact assessment or the proposed recommendations noted below.

Proposed Mitigation Measures – Planning and Design Stage

- ✓ Planting of native deciduous trees within the parks and opens spaces should be considered during the landscape design. Native deciduous trees provide suitable roosting habitat upon reaching maturity.
- ✓ Installation of artificial roosting structures such as large bat boxes (two per post); should be considered in open areas adjacent to the restored wetland habitat. A total of 4 bat boxes (on 2 posts) is recommended.

Proposed Mitigation Measures – Construction Implementation

- ✓ Clearing of vegetation should be avoided during the general active and maternity roosting periods for bats (May 1st to October 15th).

With the successful implementation of the mitigation measures outlined above, it is anticipated that the proposed development will result in a negligible impact to bats and bat habitat within the Study Area.

HABITAT FOR SPECIES OF CONSERVATION CONCERN

Habitat for three (3) Species of Conservation Concern (SCC) (Monarch, Grasshopper Sparrow, Eastern Wood Pewee) were encountered on-site during field investigations and candidate habitat for five (5) other SCC was identified within the Study Area. The following impacts to SCC may occur:

- Disturbance or removal of suitable breeding and feeding habitat for SCC.
- Accidental harm or injury to SCC during construction activities.

Proposed Mitigation Measures – Construction Implementation

- ✓ Clearing of vegetation should be avoided between April 15th and September 15th, to avoid potential physical harm to Monarch and Species of Conservation Concern birds during breeding and foraging seasons.
- ✓ Construction areas should be pre-stressed during clearing to allow Species of Conservation Concern to safely leave the area as per the City of Ottawa's Protocol for Wildlife Protection during Construction.

Proposed Mitigation Measures – Post-Construction

- ✓ Pesticide use should be limited, or avoided, in landscape maintenance to reduce risk of exposure to Monarch.
- ✓ The creation and distribution of an 'environmental awareness handbook' should be considered to educate homeowners about the sensitive wildlife within and adjacent to the proposed development.

With the successful implementation of the mitigation measures outlined above, it is anticipated that there will be minimal impacts to Species of Conservation Concern.

7.3 Species at Risk and Species at Risk Habitat

The following sub-sections describe the anticipated impacts that this development project may have on Species at Risk and associated habitat.

BUTTERNUT

As noted above, no Butternut trees were observed during the October 2022 field investigations. Additional tree and vegetation surveys are expected to be completed in 2023 and subsequent addendum to this EIS will confirm these findings.

Field investigations in 2023 will confirm if this project will adversely affect Butternut.

Proposed Mitigation Measures – Planning and Design Stage

- ✓ Vegetation survey and butternut tree search shall be completed in 2023 to confirm the absence of this species from the Subject Property.
- ✓ The submission of Butternut Health Assessment report and associated registration/permit application may be required if butternuts are observed during the 2023 field surveys. These approvals may require compensation as prescribed by MECP.

Proposed Mitigation Measures – Construction Implementation

The following are applicable only if butternut trees are identified within the study area in 2023:

- ✓ Construction awareness training package should be provided to contractors working on-site. The package will provide general information and mitigation for Butternut and other natural heritage features that may be encountered directly or indirectly on site and standard procedures if encountered.

Site alteration should be avoided until the required 2023 field investigation have been completed confirming the absence of butternut trees within the Subject Property.

BOBOLINK AND EASTERN MEADOW LARK

It is anticipated that the proposed project will have no direct impacts on Bobolink, Meadowlark, or their critical/important habitat. Preliminary site investigation completed in October 2022 suggested that there no suitable nesting habitat within the subject property. However, there may be a negligible, non-limiting, loss of stopover and incidental foraging habitat. It is also possible that vegetation clearing may result in the displacement, injury, or death of Bobolink or Eastern Meadowlark which may be in the area.

As noted above, breeding bird survey are expected to be completed in 2023. If Bobolink or Eastern Meadowlark are observed during these surveys an additional site visit will be completed as per the survey protocol to determine if the species are utilizing lands within the Study Area.

Proposed Mitigation Measures – Construction Implementation

The following measures are intended avoid harm to grassland birds within the proposed project area:

- ✓ Vegetation clearing should be avoided between April 15th and August 15th to avoid potential physical harm to Bobolink and Eastern Meadowlark.
- ✓ Construction awareness training package should be provided to contractors working on-site. This is intended to make workers aware of potential presence of SAR and protocols if SAR are found incidentally during work activities.

With the successful implementation of the recommended mitigation, it is expected that the proposed development will have no direct impacts on Bobolink or Eastern Meadowlark.

CHIMNEY SWIFT

The site visit completed in 2022 did not observe any suitable Chimney Swift's or Chimney Swift habitat within the Subject Property. The old agricultural buildings within the property do not contain suitable habitat (old chimney's). It is also assumed that those residential homes located outside of the Subject Property, but within the Study Area, have chimney's that are well used and do not provide suitable nesting habitat for chimney Swift.

Breeding bird surveys and Amphibian surveys are expected to be completed in 2023. If Chimney Swift's are observed supplementary surveys will be completed to determine where they are nesting.

Proposed Mitigation Measures – Construction Implementation

- ✓ Removal of agricultural buildings be avoided between April 15th and August 15th to avoid potential physical harm to Chimney Swift. If this timing window cannot be accommodated, a search of the structures by a qualified biologist is required within 2 days of the structure being demolished.

With the successful implementation of the recommended mitigation, it is expected that the proposed development will have no direct impacts on Bobolink or Eastern Meadowlark.

SAR BATS

Based on the habitat observed during the October 2022 field investigations, it is expected that the proposed development could have a minor negative, but not limiting, impacts to SAR bats within the Study Area due to loss of habitat. The clearing of Woodland -1 and Woodland-2 and the agricultural buildings will likely result in the loss of small number of candidate roost trees a disturb candidate foraging habitat over the course of construction. Additional impacts to bats may include:

- Permanent, but minor, loss of candidate roost trees within forest habitat from vegetation removals.
- Permanent, but minor, loss of naturalized foraging area within meadow and riparian habitat from vegetation removals and construction activities.
- Potential for accidental displacement, injury, or death of bats that may be using woodlands as temporary roosting habitat during roosting period.

Bat acoustic surveys are expected to be completed in 2023 to determine the species, location, and relative quantity of SAR bats found within the property. However, the given the context of the landscape the results from these field investigations are not expected to significantly affect the general impact assessment or the proposed recommendations noted below.

Mitigation During Construction

- ✓ Clearing of vegetation should be avoided during the general active and maternity roosting periods for bats (May 1st to October 15th).
- ✓ Construction areas should be pre-stressed during clearing to allow SAR bats to safely leave the area.
- ✓ Installation of bat boxes as per the recommendations in Section 7.2.3.
- ✓ Environmental awareness training and materials should be provided to construction staff by a qualified biologist to make construction staff aware of safety protocols should SAR be encountered directly during construction activities.

With the successful implementation of the recommended mitigation, it is expected that the proposed development will have no direct impacts to SAR Bats and any impacts to SAR Bat habitat will be non-limiting.

7.4 Trees

Site investigation completed in 2023 identified two small forest communities and a number of isolated trees throughout the Subject Property. These trees will be permanent removed to accommodate the proposed development. Given the number of trees within the context of the surrounding landscape, the loss of these trees be a negligible negative impact. Further, supplemental tree plantings associated with wetland rehabilitation area and general landscaping within the community may result in a neutral or net increase in trees within this area.

Additional tree and vegetation surveys will to be completed in 2023 and subsequent addendum to this EIS document the impacts to local trees in more detail.

Proposed Mitigation Measures – Planning and Design Stage

- ✓ The landscape plan should include tree planting recommendations consistent with the municipal targets for increased canopy cover to the extent possible within the property.
- ✓ Trees within parklands are to be retained where possible and conveyed to the municipality with the park where possible.
- ✓ Invasive species, such as Buckthorn, should be prioritized for removal during reinstatement activities and replaced with suitable native species.

Proposed Mitigation Measures – Construction Implementation

- ✓ Trees protection fencing should be installed around all trees that will be retained (i.e., property boundary). Additional tree protection fencing requirements include;
 - Fencing should be installed following industry standard practices.
 - Protection fencing around trees that will be retained shall be installed at the critical root zone (CRZ) to ensure no impacts to this area. The CRZ is calculated as the DBH x 10 cm.
 - Layouts for tree protection fencing should be reviewed by a qualified professional.
 - Local adjustment of the protection fence should occur to slightly alter grading to mitigate adverse harm to specific trees along the forest edges
 - Groups of trees can be fenced together if the fencing still meets the recommended placement described above.
- ✓ Do not place any material or equipment within the CRZ of any trees to be preserved.
- ✓ Do not attach any signs, notices, or posters to any tree.
- ✓ Do not raise or lower the existing grade within the CRZ of trees without approval.
- ✓ Do not tunnel or bore when digging within the CRZ of a tree.
- ✓ Excavation activities around trees shall not damage the root system, trunk or branches of any tree to be preserved.
- ✓ Exhaust fumes from all heavy machinery, vehicles, generators, and other equipment shall not be directed towards any trees for prolonged periods of time.
- ✓ Tree removals should be avoided during the breeding bird season (April 15th to August 15th) to limit disturbance to nesting birds and their nests or young and comply with the MBCA, 1994.

- ✓ All Green and White Ash trees removed should be treated as infected by the Emerald Ash Borer beetle and appropriately disposed of so not to infect other areas of the city.

Proposed Mitigation Measures – Post-Construction

- ✓ Post-construction tree maintenance methods should be used to repair any damage caused to trees by construction activities. These may include, but is not limited to; treating trunk and crown injuries, irrigation and drainage, mulching, and aeration of root zone.
- ✓ Within 12 months of completion of construction, an assessment of preserved trees should be conducted. Trees that are dead, in poor health, or hazardous should be removed or pruned, as determined by an ISA Certified Arborist. Tree removal, if necessary, should occur promptly to avoid foreseeable risk of trees falling and causing damage or harm to people and/or property.

With the successful implementation of the mitigation measures recommended above, it is anticipated that the proposed development will result in an overall decrease in young to mid-aged low quality native and invasive trees.

7.5 Incidental Wildlife

The proposed development is expected to have negative impact on local wildlife due to the general loss of natural habitat and direct impacts related to construction activities. Potential impacts to wildlife resulting from the proposed development include the following:

- Displacement, injury, or death resulting from contact with heavy equipment during clearing and grading activities.
- Loss of general natural habitat suitable for the life processes of common urban and rural wildlife.
- Disturbance to wildlife resulting from noise associated with construction activities, particularly during breeding periods.
- Conflict between wildlife and humans following development, including mortality from vehicles.

Proposed Mitigation Measures – Construction Implementation

The best practices outlined in the [Protocol for Wildlife Protection during Construction \(City of Ottawa 2015\)](#) provides a reasonable basis to manage wildlife impacts during all construction activities associated with the development. The following measures are consistent with the protocol:

- ✓ Pre-stress the area on a regular basis leading up to construction to encourage wildlife to leave the area before construction starts. Other recommendations for pre-stressing are outlined in the *Protocol for Wildlife Protection During Construction* (City of Ottawa 2015).
- ✓ Orange snow fencing should be installed around the perimeter of the work area to clearly demarcate the development area and prevent wildlife from entering the construction zone. Fencing should be monitored regularly to ensure they are functioning properly and if issues are identified should be dealt with promptly.
- ✓ Perimeter fencing should not prevent wildlife from leaving the site during clearing activities by clearing the area prior to installing the fence.
- ✓ Wildlife within the construction area can be relocated to an area outside of the development into an area of appropriate habitat.

- ✓ Avoid vegetation clearing during sensitive times of year for local wildlife (e.g., spring and early summer).
- ✓ Construction crews working on site should be educated on local wildlife and take appropriate measures for avoiding wildlife.
- ✓ A qualified wildlife rehabilitation centre should be contacted if any animals are injured or found injured during construction. Injured animals should be transported to an appropriate wildlife rehabilitation centre for care with a small donation of money to help pay for the care (a local facility is the Rideau Valley Wildlife Sanctuary).

With the mitigation measures outlined above, it is anticipated that the proposed development will result in a negligible loss of rural wildlife habitat.

8 Conclusions

This report provides a preliminary evaluation of the anticipated impacts associated with the construction and long-term occupation of the proposed residential development located in the Town of Almonte, Ontario. The environmental impacts and mitigation measures are based on desktop studies and field investigations completed in October 2022.

The mitigation measures described herein have been developed to avoid or limit negative environmental impacts associated with the proposed development. These measures are based on our best understanding of the ecology within the Study Area based on the two site visits and desktop screening completed in 2022. While it is expected that these measures will be updated following the 2023 field surveys. Compensation or habitat enhancement recommendations have been provided to offset those impacts that could not be readily mitigated.

Based on the information available, it is our opinion that the proposed residential development can be conditionally accepted with the understanding that an updated EIS will be required in 2023 capturing all the required investigations. Based on the information collected in 2022, it is our opinion that the basic assessment of natural heritage impacts and associated mitigation/avoidance measures, will not significantly change in 2023.

Further, it is expected that any permits or authorizations associated with Species at Risk, the Fisheries Act, or Conservation Authority will be minor in scope and is not likely to alter the proposed development plan.

The results and findings of this study have been reported without bias or prejudice. Thus, conclusions have been based on our own professional opinion, substantiated by the results of this study, and have not been influenced in any way.

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APPENDIX A

Curriculum Vitae

Alex Zeller M.SC Natural Systems, Associate – Manager

Role on Project – Project Manager & Sr Ecologist

Alexander is a Project Manager and Senior Ecologist with 20 years of experience in terrestrial and aquatic ecology, open space planning, and natural heritage authorizations. With a broad experience in both Aquatic and Terrestrial ecology, Alex has led, managed, and supported many natural heritage studies within the City of Ottawa and across Canada. These studies have included; Environmental Impact Studies, Municipal and Federal Environmental Assessments, Species at Risk permitting, wetland evaluations, post – construction monitoring, Community Design Plans, and other natural heritage projects associated with land development, transportation and other sectors.

Representative Experience

Land Development

Canada Lands Company – 470 Tremblay Road, Ottawa, ON (2019 – 2021) – Lead Ecologist responsible for the preparation of an Environmental Impact Statement and Tree Conservation Report for a brownfield re-development in Ottawa. This project involved both CLC and Public Services and Procurement Canada (PSPC) working together to develop a mixed used development while managing the ecological constraints and opportunities. Species at Risk and wetland constraints were the primary features managed during this study.

Claridge Homes – 3252 Navan Road, Ontario, Canada (2020) – Project Manager and Lead Ecologist. An Environmental Impact statement and an Environmental Impact Statement and Tree Conservation Report for a development in Ottawa. This study was completed in support of plan of subdivision for a residential development. Species at Risk, headwater drains, and wetlands were managed through this process

Canada Lands Company – 291 Carling Avenue, Ottawa, Ontario (2018) – Project Manager and Lead Ecologist. An Environmental Impact Statement and Tree Conservation Report for a development in downtown Ottawa. Urban trees, invasive species were addressed in this study.

Claridge Homes Group of Companies – 760 River Road, Ottawa, Ontario, Canada (2019) – Project Manager and Lead Ecologist. An Environmental Impact statement and an Environmental Impact Statement and Tree Conservation Reports for a development in south Ottawa. This study was completed in support of plan of subdivision for a residential development. Species at Risk habitat and a constraints associated with a watercourse were the key features managed through these studies

Urbandale Construction – Riverview Lane, Kemptville, Ontario, Canada (2018 – Present) – Project Manager and Lead Ecologist. Natural heritage approvals associated with a residential subdivision. Scope of work included SAR authorizations, Fisheries authorizations, wetland design and restoration plans; watercourse and fish habitat design and plans, and general agency consultation.

Minto Communities – Quinns Pointe, Ottawa, Ontario (2021) – Project Manager and Lead Ecologist. Responsible for natural heritage approvals associated with a residential subdivision. Scope of work included SAR surveys, vegetation survey, tree survey, significant wildlife habitat assessment, avoidance and mitigation recommendations, reporting, and general agency consultation.

Minto Communities – Avalon Isgar, Ottawa, ON (2018 – 2021) – Project Manager and Lead Ecologist. Responsible for natural heritage approvals associated with a residential subdivision.

Education

Master of Science in Biology, Lakehead University, Thunder Bay, ON/CA, 2007

Honours Bachelor Environmental Science, Lakehead University, Thunder Bay, ON/CA, 2003

Experience

2021–Present

IBI Group Professional (Canada) Inc., Ottawa, ON/CA, Natural System, Associate – Manager

2018–2021

WSP, Ottawa, ON/CA, Senior Ecologist, Environment

2013–2018

Dillion Consulting Limited, Ottawa, ON/CA, Associate

2006–2013

Dillion Consulting Limited, Ottawa, ON/CA, Ecologist



Scope of work included SAR surveys, vegetation survey, tree survey, significant wildlife habitat assessment, avoidance and mitigation recommendations, reporting, and general agency consultation.

Minto Communities – 323 Jockvaile Road, Ottawa, Ontario, Canada (2018) – Project Manager and Lead Ecologist. An Environmental Impact statement and a tree conservation report for a proposed residential development in the south Orleans community. These reports were completed following the City of Ottawa guidelines.

Minto Communities – Barrhaven South Community Design Plan, Ottawa, Ontario, Canada (2015 – 2017) – Project Manager and Lead Biologist. Multi – disciplined consulting team undertaking the Barrhaven South Community Design Plan. Responsible for managing the natural heritage related studies, reports, and public consultation contributions. Also responsible for consulting with stakeholders to ensure the community design plan meets their expectations and requirements.

Minto Communities – Clark Lands Development, Environmental Impact Statement, Ottawa, Ontario, Canada (2013 – 2017) – Project manager and lead biologist for an Environmental Impact Statement and Tree Conservation Study for a development. This study was completed in support of plan of subdivision for a residential development.

Minto Communities – Potter’s Key Development, Environmental Impact Statement, Stittsville, Ontario, Canada (2013 – 2021) – Project Manager and Lead Biologist. An Environmental Impact Statement, Tree Conservation Report, Species at Risk Permitting, Fisheries approvals, and on – going environmental monitoring for a development. The study was completed as part of an application for residential development.

Minto Communities – Chapman Mills Environmental Impact Statement Addendum, Ottawa, Ontario, Canada (2011) – Project Manager. An addendum to an environmental impact statement assessing the impact of a residential development on trees and local hydrology within a small woodlot south of Ottawa. Responsibilities included managing budget, invoicing, field survey, report writing and communicating with the client.

KNL Developments – SAR Permit Implementation and Monitoring, Ontario, Canada (2017 – Present) – Project Manager and Lead Biologist. Management and implementation of one of the most complex Species at Risk (SAR) permits issued in Ontario. Responsible for – establishing habitat creation plans, negotiating revisions to permit, coordination of environmental monitoring and species surveys, fisheries authorizations, design of habitat compensation features, consultation with relevant agencies and stakeholders, and all associated reporting and documentation.

Ironclad Developments – 800 Eagleson Road EIS and TCR, Ottawa, Ontario, Canada (2018) – Project Manager and Lead Ecologist. Responsible for completing an Environmental Impact Statement and Tree Conservation Study for a development in Ottawa West. The proposed project will consist of a six – story rental apartment building with approximately 150 units with access from Eagleson Road.

Riverside South Development Corporation – Phases 12, 13.2, 14, 15, 16, 17, and 18; Environmental Impact Statement, Ottawa, Ontario, Canada (2014 – Present) – Project Manager and Lead Biologist. A series of Environmental Impact Statements and Tree Conservation Reports for a several primarily residential developments. Terrestrial and aquatic environments were evaluated, and impacts assessed for each development. Mitigation measures and management recommendations were developed to address the identified environmental impacts associated with the proposed development.

McArthur Island Developments, Carleton Place, Ontario, Canada (2015) – Project Manager and Lead Biologist. Natural heritage compliance requirements supporting a multi – phase residential/retirement complex located on McArthur Island within the Mississippi River. This project included the redevelopment of an historic woollen mill and the construction of several other multi – story buildings. The scope of environmental services provided included Environmental Impact



Studies and associated field surveys, arborist reports, specific wildlife surveys, and environmental compensation design.

Richcraft Group of Companies, Fernbank Lands Development Environmental Impact Statement, Stittsville, Ontario Canada (2013 – 2017) – Project Manager and Lead Biologist. Environmental Impact Statement, Tree conservation Report, and Species at Risk Permitting were completed as part of an application for residential development.

Walton Developments, Environmental Screening Study, Ottawa, Ontario, Canada (2012 – 2014) – Project Manager and Terrestrial Ecologist. Natural heritage screening study for a project aimed at identifying any natural heritage constraints that may affect the ability to develop several properties in southwest Ottawa. Responsibilities include project management, reporting, terrestrial field surveys, avian surveys and GIS mapping.

City of Ottawa, Scoped Environmental Impact Statement, City of Ottawa, Ontario, Canada (2011) – Project Manager. A scoped environmental impact statement to specifically address the concern for the impact of a rural residential development in south Ottawa on Species at Risk. Responsibilities include managing budget, invoicing, field survey, report writing and communicating with the client.

Infrastructure

Public Services and Procurement Canada (PSPC) Energy Services Acquisition Program (ESAP), Ottawa, Ontario, Canada (2019 – 2021) – Lead Project Ecologist. Responsible for overseeing all ecological studies, reporting requirements, agency consultation, and associated permitting and authorizations required to facilitate the design and construction of 14 km of district heating/cooling pipeline and associated plants.

Public Services and Procurement Canada (PSPC) Centre Block Rehabilitation Project, Ottawa, Ontario, Canada (2018 – 2021) – Lead Project Ecologist. Responsible for – all ecological studies, development and management mitigation and compensation measures, reporting requirements, and agency consultation required to facilitate the project on Parliament Hill in Ottawa.

City of Ottawa in Public – Private Partnership – Confederation Line Extension Light Rail Transit (2019 – 2021) – Lead Ecologist. Responsible for the implementing the established management recommendations and facilitating the outstanding permitting requirements to accommodate detail design phase of the project.

City of Ottawa – West Transitway Extension, Phase 11 – Stillwater Creek, Ottawa, Ontario, Canada (2018) – Project Manager and Lead Ecologist. Post – construction monitoring for the realignment of Stillwater Creek required to accommodate the West Transitway Extension. This project included; a species at risk screening, amphibian breeding surveys, breeding bird surveys, vegetation community inventories, fish community sampling, aquatic habitat assessment, water quality parameters, fluvial geomorphology studies.

Hydro One – Riverview to Overbrook – transmission line upgrade, Ottawa, Ontario Canada (2016) – Lead Ecologist. Class Environmental Assessment in support of a transmission line upgrade between Overbrook and Riverview facilities. Alexander was responsible for coordinating and undertaking field surveys, participating in public consultation, reporting writing, impact assessment, and developing mitigation and avoidance measures.

Enbridge Gas Distribution Inc., Innes Road Reinforcement Pipeline Project – Environmental Monitoring and Environmental Awareness Training, Ottawa, Ontario Canada (2014-2016) – Project Manager and Lead Biologist. Environmental monitoring and environmental awareness in support of the 2.8 km pipeline installation along Innes Road. This installation included 580m of

Awards and Publications

Patriquin, D., Zeller, A. Truman, K., Hayes, R. and Gibbs, S. 2020. Managing and Enhancing Terrestrial Road Ecology. Ottawa, ON – Transportation Association of Canada.

Zeller, A., Patriquin, D. 2021. From Butterflies to Bears – Developing Standards for Road Ecology across Canada. Canadian Section of the Wildlife Society (CSTWS) Conference and AGM. March 2021

Zeller, A., N. Stow, S. Young, S. Boudreau, B. Aird. 2019. Connectivity for Landscape (Re)Generation. Presentation and Panel discussion at the Canadian Institute of Planners (CIP) Annual Conference, July 2019. Ottawa, Ontario.

Gleeson, J., A. Zeller and J.W. McLaughlin. 2006. Peat as a Fuel Source in Ontario – A Preliminary Literature Review, Ontario Forest Research Institute, Forest Research Information Paper 161, Sault Ste. Marie, Ontario.

Zeller, A.J. 2005. Using landscape indices to model environmental gradients within the Mixedwood Boreal Forests of northwestern Ontario, Canada. Poster Presentation at Ontario Ecology and Ethology Colloquium, 2005. Ottawa, Ontario.



horizontal directional drilling of NPS12 steel pipe under Highway 417. The project included the development and delivery of a bespoke environmental awareness training program and the ongoing environmental monitoring during construction.

Enbridge Gas Distribution Inc., Innes Road Reinforcement Pipeline Project – Environmental Assessment, Ottawa, Ontario Canada (2014) – Lead Biologist. Class environmental assessment for the 2.8 km gas distribution pipeline installation. Alexander was responsible for coordinating and undertaking biophysical field surveys, reporting writing, impact assessment, and developing mitigation and avoidance measures.

Enbridge Gas Distribution Inc., Ottawa West Reinforcement Pipeline Environmental Assessment, Ottawa, Ontario, Canada (2011-2013) – The local biologist for a multidisciplinary team of biologists, planners and engineers working on environmental and cumulative effects assessment for the installation of 20 km of 24-inch natural gas pipeline in Western Ottawa. Took over project management role for the construction phase. This phase included the more detailed biophysical surveys to support environmental authorizations, pre- and post-construction water well monitoring, and development of a detailed mitigation strategy. These mitigation measures included; physical mitigation measures, environmental awareness training, daily on-site environmental monitoring, environmental compensation; and an assessment of agricultural crop loss and associated compensation.

Enbridge Gas Distribution Inc., GTA Reinforcement Pipeline Environmental Assessment, Toronto, Ontario, Canada (2011) – Acting as both an ecologist and spatial analyst for a multidisciplinary team of biologists, planners, and engineers working on an environmental and cumulative effects assessment for the pipeline reinforcement in the Greater Toronto Area. Responsibilities include managing a majority of the GIS mapping pertaining to the three large study areas, conducting terrestrial biology surveys, and liaising with the client when required.

Town of Perth, Infrastructure Master Plan, Perth, Ontario, Canada (2009-2010) – Completed the ecological assessment and natural heritage inventory for an infrastructure master plan. This study involved a full vegetation survey of the study area, identification of soils, observations of wildlife and detailed mapping of the existing ecosystems within the study area. Additional responsibilities included maintaining the GIS library, consulting with stakeholders and producing GIS figures for report.

Ministry of Transportation, Truck Inspection Station Assessment, Ontario, Canada (2008) – Completed the ecological assessment and resource inventories for nine different truck inspection stations throughout northern Ontario. This study involved a full vegetation survey of the study areas, identification of soils, observations of wildlife, detailed mapping of the existing ecosystems within the study areas and publishing all mapping for reports. Additional responsibilities included maintaining the GIS library, consulting with stakeholders and producing GIS figures for report.

Natural Resource Studies

Transportation Association of Canada (TAC) Synthesis of Practice for Management and Enhancement of Terrestrial Roadway Ecology, Ottawa, ON (2020 – 2021) – Project Manager. This project developed a synthesis of Beneficial Management Practices to manage terrestrial road ecology concerns across Canada, such as wildlife crossings and invasive species control, to emerging topics like roadside naturalization and ice road concerns. Drawing on literature and expert input from within Canada and around the world; the synthesis identified practices applicable to the diverse ecosystems, climates and rural to urban transportation systems across Canada.

City of Ottawa – West Transitway – Stillwater Creek Realignment Post – construction monitoring, Ottawa, Ontario, Canada (2018 – present) – Project Manager and Lead ecologist for the post – construction monitoring of the realigned Stillwater creek. Ecological monitoring includes water quality monitoring, Fish sampling, vegetation monitoring, and incidental wildlife observations.



City of Ottawa – Kizell Wetland Trail – SAR Authorizations, Ottawa, Ontario, Canada (2019) – Project Manager and Lead Ecologist for the Species at Risk authorizations required for the construction of a pedestrian trail network within the conservation forest around the Kizell wetland in Kanata.

City of Ottawa – Goulbourn Wetland Re – delineation, Ottawa, Ontario, Canada (2015 – 2016) – Project Manager. The objective was to undertake a boundary re – delineation of the provincially significant wetland (PSW) known as the Goulbourn Wetland Complex. Alexander was responsible for ensuring the quality of the re – delineation and associated report, consulting with landowners, and reviewing the approach and findings with the City and the Ontario Ministry of Natural resources.

City of Ottawa – Feedmill Creek Species at Risk Screening, Ottawa, Ontario, Canada (2017) – Project Manager and Lead Ecologist. A species at risk screening of Feedmill Creek in support of the proposed restoration efforts included specific surveys – bat habitat surveys, Blanding's turtle basking surveys, butternut Screening, and other incidental observations.

City of Ottawa – 2014 Species at Risk Screening, Ottawa, Ontario, Canada (2014) – Project Manager and Lead Biologist. A Species at Risk screening study for the Infrastructure Branch with the objective to identify the potential threat that various planned infrastructure projects had to Species at Risk. In total 489 projects were evaluated over the course of the project. A new risk assessment approach and a series of management tools were developed to aid City Project Managers. Many of these tools continue to be used by the City for subsequent SAR Screenings. These tools included – standardized risk categories, a suite of standardized mitigation recommendations, a GIS database of the screening results, a document summarizing and illustrating the Species at Risk that may be found within the city, and a SAR screening process flowchart.

City of Ottawa – Terry Fox Drive Environmental Construction Monitoring, Ottawa, Ontario, Canada (2010 – 2012) – Assisted with the on – going environmental monitoring of the Terry Fox Drive road construction project, to ensure compliance of environmental mitigation. Duties included water quality monitoring, sediment and erosion control recommendations, wildlife observations, species at risk monitoring and environmental awareness training.

City of Ottawa – Terry Fox Drive Environmental Assessment, Ottawa, Ontario, Canada (2007 – 2010) – Completed the assessment of natural features along the future Terry Fox Drive corridor in west Ottawa. This included the electrofishing of aquatic habitat, salamander survey and general ecological observations. In addition to the field assessments, also coordinated the GIS analysis and map production for various environmental assessment reports.

National Capital Commission – Ecological Land Classification, Ontario, Canada (2015) – Project Manager and Lead Biologist. Project to map all ecotypes within the NCC's urban and greenbelt lands. Ecological mapping was done using Ontario Ecological Land Classification and covers an area of approximately 62 km². The mapping will be used to for various future ecological landscape management projects.

Defence Construction Canada (DCC) – Species at Risk Survey, CFB Shilo Range Training Area, Manitoba, Canada (2014) – GIS Analyst and Biologist. Responsible for the species at risk habitat suitability modelling used in the Environmental Assessment Report. This modelling was used to establish the potential threats to SAR across the base and in turn recommend best management practices for training in SAR habitat.

County of Frontenac – Natural Heritage Study, County of Frontenac, Ontario, Canada (2011 – 2012) – Lead Landscape Ecologist for the County of Frontenac's Natural Heritage Study forming the major piece of the county's Official Plan (OP) and to provide policy and zoning recommendations for future OP schedules. Marxan and corridor design modelling was done to assist in the development of ecologically sound natural heritage zoning. Responsibilities include public consultation, managing the GIS and spatial analysis, assisting with policy development, and managing GIS modelling.

Parks Canada – Rideau Canal Landscape Strategy, Ontario, Canada (2012) – Lead Ecologist. Rideau Canal Landscape Strategy study being conducted to characterize the landscape and develop



policy recommendations along the Rideau Canal in support on the UNESCO World Heritage Status. Personal responsibilities include public consultation, ecological characterization and recommendations, geospatial analysis, field survey, report writing and communicating with the client.

Municipality of Hastings Highlands – Birds Creek Secondary Plan, Bancroft, Ontario, Canada (2011 – 2012) – Lead Ecologist. Working to produce/develop a secondary plan for the community of Birds Creek, north of Bancroft. The plan will promote a healthy living philosophy and promote sustainable development practices. Responsibilities include consultation with public and client, assessing the existing natural resources, assisting in incorporating natural heritage features into the plan and developing GIS mapping for study area.

Regional Municipality of Wood Buffalo – Regional Ecology Planning Framework, Regional Municipality of Wood Buffalo, Alberta, Canada (2008) – Lead Ecologist Working to develop an ecological planning framework that will aid the municipality in balancing development pressures with municipal – specific environmental conservation goals. Responsible for developing the GIS – based ecological planning model and decision support tools created specifically for the municipality.

City of Yellowknife – Yellowknife Smart Growth Plan – Ecological Preservation Study, Yellowknife, Northwest Territories, Canada (2007 – 2010) – Project Ecologist Working with a team of planners to advance Yellowknife's existing Ecological Resource Inventory which will allow for greater public engagement on the quality of life impacts of 40 natural sites. Personal duties include GPS data collection, GIS mapping, Remote Sensing Landcover Classification, and consultation with public and other stakeholders.

Tsuu T'ina First Nation – Satellite Image Classification, Tsuu T'ina First Nation, Alberta, Canada (2007) – Spatial Analyst Conducted a satellite image classification to update outdated vegetation mapping. Landsat – 7 TM data was classified using IDRISI Andes software. Training areas were delineated to represent the various vegetation communities in the image, and a maximum likelihood classification method was used to classify the image. The results of the image classification proved to be excellent and corresponded to ground – truth landcover classes very well.

Tlicho Government – Tlicho Land Use Plan, Northwest Territories, Canada (2006 – 2009) – Lead Ecologist. Personal responsibilities include the development of the GIS database and spatial model within the GIS to aid in the production of the final land use plan. This model incorporates traditional indigenous knowledge and ecological features with economic and social influences to identify suitable land use zones. The emphasis of the Tlicho Land Use Plan is on mitigating the cumulative effects of development on the natural and social environment while still promoting sustainable economic development.

Public Works Government Services – Mathews Lake Habitat Restoration, Northwest Territories, Canada (2008) – Assisted with the 2008 post – construction monitoring of the fish habitat enhancement in the Mathews Lake waterhead. This rehabilitation work was done to improve the fish habitat in the immediate vicinity of Salmita Mine and Tundra Mine. Duties included seine netting and fish identification, construction of new fish habitat structures, benthos and water quality assessments.

Canadian Pacific Railway – Aquatic Habitat Assessment, Peterborough, Ontario, Canada (2007) – Field Biologist Assisting in aquatic habitat assessment for a water crossing along the railways. The objective of the study was to improve habitat for native brook trout and other resident fish by providing in – stream habitat near the crossing.

St. Mary's Cement – Westside Creek and Marsh Reconfiguration, Great Lakes Region, Canada (2006) – Developed a GIS database to incorporate the annual environmental monitoring data for the reconfiguration of Westside Creek and Marsh. Produced a landcover classification from satellite imagery to assess the vegetation change within the marsh and the surrounding area.



APPENDIX B

Photo Record

Photo 1:

October 6, 2022

Notes: Eastern side of the Almonte Riverside Trail within the Dry - Fresh Graminoid Meadow Ecosite (MEGM3). The Annual Row Crop community (OAGM1) and the Mixed Forest Community (FOM; outside of the Subject Property) are visible in the background.



Photo 2:

October 6, 2022

Notes: A pocket of Rough Manna Grass (*Glyceria maxima*) within a low-lying area with clay soil was found at the base of a hill in the Dry - Fresh Graminoid Meadow Ecosite (MEGM3). Invasive Common Buckthorn (*Rhamnus cathartica*) and other sub-canopy vegetation is found in small inclusions across this community.



Photo 3:

October 6, 2022

Notes: Giant Manna Grass Mineral Shallow Marsh Type (MASM1-15) is visible on the right, with Dry - Fresh Graminoid Meadow Ecosite (MEGM3) on the left. Topography of the hill is visible.



Photo 4:

October 6, 2022

Notes: Dense monocultures of Giant Manna Grass are present within the Giant Manna Grass Mineral Shallow Marsh Type (MASM1-15)



Photo 5:

October 6, 2022

Notes: Dense monocultures of Giant Manna Grass are present within the Giant Manna Grass Mineral Shallow Marsh Type (MASM1-15).



Photo 6:

October 6, 2022

Notes: A portion of the Almonte Riverside Trail located near the top of the hill while looking southeast. Dry - Fresh Graminoid Meadow Ecosite (MEGM3) on both sides of the trail.



Photo 7:

October 6, 2022

Notes: Decommissioned structures are present within the property. Structures such as this have potential to house SAR birds such as Barn Swallow (*Hirundo rustica*).



Photo 8:

October 6, 2022

Notes: Large silos may provide habitat for SAR birds such as Chimney Swift (*Chaetura pelagica*).

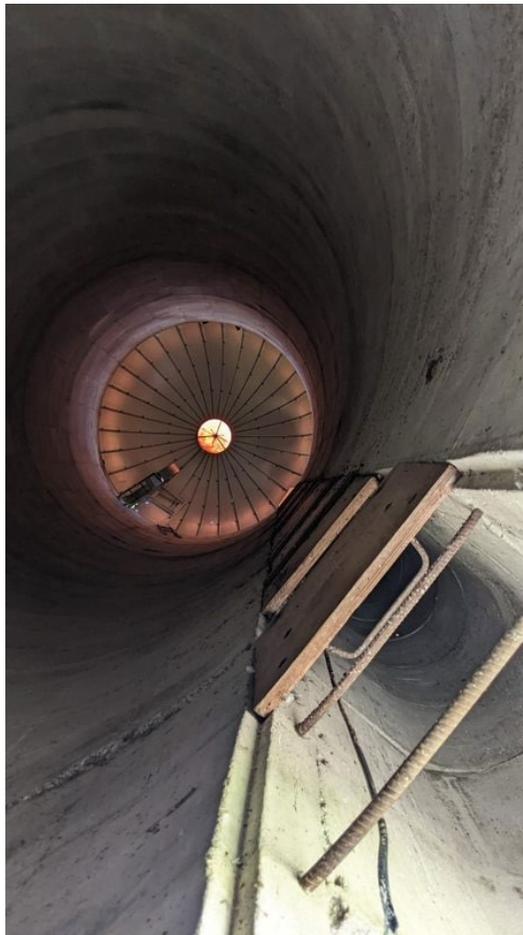


Photo 9:

October 6, 2022

Notes: Eastern edge of Giant Manna Grass Mineral Shallow Marsh Type (MASM1-15) and Open Pasture (OAGM4) features a hard line of ELC division. An abundance of Prickly Ash (*Zanthoxylum Americanum*) divided the two ELC's.



Photo 10:

October 6, 2022

Notes: Open Pasture (OAGM4) community and the property edge. Cows were observed grazing in this community.



Photo 11:

October 6, 2022

Notes: Northern Leopard Frogs (*Lithobates pipiens*) were found around the northwestern wetland channel.



Photo 12:

October 6, 2022

Notes: Potential herpetofauna hibernaculum is present within the Open Pasture (OAGM4) community.



Photo 13:

October 6, 2022

Notes: Four ELC sites are visible from the top of the Almonte Riverside Trail looking east. Dry - Fresh Graminoid Meadow Ecosite (MEGM3) is present within the forefront, Giant Manna Grass Mineral Shallow Marsh Type (MASM1-15) lies behind, the Annual Row Crop community (OAGM1) is slightly beyond, and the Mixed Forest Community (FOM; outside of the Subject Property).



Photo 14:

October 6, 2022

Notes: Dry - Fresh Graminoid Meadow Ecosite (MEGM3) from the top of the Almonte Riverside Trail looking east.



Photo 15:

October 6, 2022

Notes: Annual Row Crop community (OAGM1) in the northwest of the Subject Property.



Photo 15:

October 6, 2022

Notes: Tile drains pointed northeast towards the wetland within the Dry - Fresh Graminoid Meadow Ecosite (MEGM3).



APPENDIX C

Vascular Plant Species List

Common Name	Scientific Name	Conservation Status			Coefficient of Conservatism ²	Coefficient of Wetness ³
		Federal (SARA 2002)	Provincial (ESA 2007)	S-Rank ¹		
<i>Tilia americana</i>	American Basswood	---	---	S5	4	3
<i>Ulmus americana</i>	American Elm	---	---	S5	3	-3
<i>Lycopus americanus</i>	American Water-horehound	---	---	S5	4	-3
<i>Lonicera maackii</i>	Amur Honeysuckle	---	---	SNA	---	5
<i>Petasites frigidus</i>	Arctic Sweet Coltsfoot	---	---	S5	8	-3
<i>Artemisia biennis</i>	Biennial Wormwood	SNA	---	SNA	---	-3
<i>Juglans nigra</i>	Black Walnut	---	---	S4	5	3
<i>Silene vulgaris</i>	Bladder Champion	---	---	SNA	---	5
<i>Verbena hastata</i>	Blue Vervain	---	---	S5	4	-3
<i>Typha latifolia</i>	Broad-leaved Cattail	---	---	S5	1	-5
<i>Linaria vulgaris</i>	Butter-and-eggs	---	---	SNA	---	5
<i>Cirsium arvense</i>	Canada Thistle	---	---	SNA	---	3
<i>Nepeta cataria</i>	Catnip	---	---	SNA	---	3
<i>Rhamnus cathartica</i>	Common Buckthorn	---	---	SNA	---	-4
<i>Arctium minus</i>	Common Burdock	---	---	SNA	---	3
<i>Taraxacum officinale</i>	Common Dandelion	---	---	SNA	---	3
<i>Asclepias syriaca</i>	Common Milkweed	---	---	S5	0	5
<i>Leonurus cardiaca</i>	Common Motherwort	---	---	SNA	---	5
<i>Verbascum thapsus</i>	Common Mullein	---	---	---	---	5
<i>Zanthoxylum americanum</i>	Common Prickly-ash	---	---	S5	3	3
<i>Vicia sativa</i>	Common Vetch	---	---	SNA	---	3
<i>Echium vulgare</i>	Common Viper's Bugloss	---	---	SNA	---	5
<i>Elymus repens</i>	Creeping Wildrye	---	---	SNA	---	3
<i>Rumex crispus</i>	Curly Dock	---	---	SNA	---	0
<i>Ribes spp.</i>	Currant Spp.	---	---	---	---	---
<i>Thuja occidentalis</i>	Eastern White Cedar	---	---	S5	4	-3
<i>Pinus strobus</i>	Eastern White Pine	---	---	S5	4	3
<i>Convolvulus arvensis</i>	Field Bindweed	---	---	SNA	---	5
<i>Sonchus arvensis</i>	Field Sow-thistle	---	---	SNA	---	3
<i>Poa palustris</i>	Fowl Bluegrass	---	---	S5	5	-3
<i>Bromus ciliatus</i>	Fringed Brome	---	---	S5	6	-3
<i>Solidago spp.</i>	Goldenrod spp	---	---	---	---	---
<i>Euthamia graminifolia</i>	Grass-leaved Goldenrod	---	---	S5	2	0
<i>Fraxinus pennsylvanica</i>	Green Ash	---	---	S4?	3	-3
<i>Acer negundo</i>	Manitoba Maple	---	---	S5	0	0
<i>Cirsium palustre</i>	Marsh Thistle	---	---	SNA	---	-3
<i>Viburnum lentago</i>	Nannyberry	---	---	S5	4	0

Common Name	Scientific Name	Conservation Status			Coefficient of Conservatism ²	Coefficient of Wetness ³
		Federal (SARA 2002)	Provincial (ESA 2007)	S-Rank ¹		
<i>Bidens cernua</i>	Nodding Beggarticks	---	---	S5	2	-5
<i>Galium boreale</i>	Northern Bedstraw	---	---	---	7	0
<i>Hemerocallis fulva</i>	Orange Daylily	---	---	SNA	---	5
<i>Lythrum salicaria</i>	Purple Loosestrife	---	---	SNA	---	-5
<i>Phalaris arundinacea</i>	Reed Canary Grass	---	---	S5	0	-3
<i>Glyceria maxima</i>	Rough Mannagrass	---	---	SNA	---	-5
<i>Sedum Spp.</i>	Sedum Spp.	---	---	---	---	---
<i>Onoclea sensibilis</i>	Sensitive Fern	---	---	S5	4	-3
<i>Glyceria melicaria</i>	Slender Mannagrass	---	---	S4	10	-4
<i>Bromus inermis</i>	Smooth Brome	---	---	SNA	---	5
<i>Carduus acanthoides</i>	Spiny Plumeless Thistle	---	---	SNA	---	5
<i>Cirsium muticum</i>	Swamp Thistle	---	---	---	8	-3
<i>Quercus bicolor</i>	Swamp White Oak	---	---	S4?	8	-3
<i>Populus tremuloides</i>	Trembling Aspen	---	---	S5	2	0
<i>Parthenocissus quinquefolia</i>	Virginia Creeper	---	---	S4?	6	3
<i>Trifolium repens</i>	White Clover	---	---	SNA	---	3
<i>Rubus idaeus ssp. strigosus</i>	Wild Red Raspberry	---	---	S5	2	3

¹S-Rank (Provincial Status (NHIC))	<p>S1: Critically Imperiled – Critically imperiled in the province because of extreme rarity (often 5 or fewer occurrences) or because of some factor(s) such as very steep declines making it especially vulnerable to extirpation from the province.</p> <p>S2: Imperiled – Imperiled in the province because of rarity due to very restricted range, very few populations (often 20 or fewer), steep declines, or other factors making it very vulnerable to extirpation from the province.</p> <p>S3: Vulnerable – Vulnerable in the nation or sprovince due to a restricted range, relatively few populations (often 80 or fewer), recent and widespread declines, or other factors making it vulnerable to extirpation.</p> <p>S4: Apparently Secure – Uncommon but not rare; some cause for longterm concern due to declines or other factors.</p> <p>S5: Secure – Common, widespread, and abundant in the province.</p> <p>SU: Unrankable – Currently unrankable due to lack of information or due to substantially conflicting information about status or trends.</p> <p>SNA: Not Applicable – A conservation status rank is not applicable because the species is not a suitable target for conservation activities.</p>						
²Coefficient of Conservatism <i>Oldham, M. J., W. D. Bakowsky and D. A. Sutherland. 1995. Floristic Quality Assessment System for Southern Ontario. Natural Heritage Information Centre, Ministry of Natural Resources. Peterborough, Ontario.</i>	Coefficient of Conservatism. Rank of 0 to 10 based on plants degree of fidelity to a range of synecological parameters: (0-3) Taxa found in a variety of plant communities; (4-6) Taxa typically associated with a specific plant community but tolerate moderate disturbance; (7-8) Taxa associated with a plant community in an advanced successional stage that has undergone minor disturbance; (9-10) Taxa with a high fidelity to a narrow range of synecological parameters.						
³Coefficient of Wetness <i>Oldham, M. J., W. D. Bakowsky and D. A. Sutherland. 1995. Floristic</i>	<table border="1"> <tbody> <tr> <td>-5</td> <td>Obligate Wetland - Occurs almost always in wetlands under natural conditions (99% probability)</td> </tr> <tr> <td>-4</td> <td>Facultative Wetland - Usually occurs in wetlands, but occasionally found in non-wetlands (67-99%)</td> </tr> <tr> <td>-3</td> <td></td> </tr> </tbody> </table>	-5	Obligate Wetland - Occurs almost always in wetlands under natural conditions (99% probability)	-4	Facultative Wetland - Usually occurs in wetlands, but occasionally found in non-wetlands (67-99%)	-3	
-5	Obligate Wetland - Occurs almost always in wetlands under natural conditions (99% probability)						
-4	Facultative Wetland - Usually occurs in wetlands, but occasionally found in non-wetlands (67-99%)						
-3							

<i>Quality Assessment System for Southern Ontario. Natural Heritage Information Centre, Ministry of Natural Resources. Peterborough, Ontario.</i>	-2	
	-1	
	0	Facultative - Equally likely to occur in wetlands or non-wetlands (34-66%)
	1	
	2	Facultative Upland - Occasionally occurs in wetlands, but usually occurs in non-wetlands (1-33%)
	3	
	4	
5	Upland - Occurs almost never in wetlands under natural conditions (<1%)	

APPENDIX D

Species of Conservation Concern & Species at Risk Species Lists

Table D1: Species at Risk and Species of Conservation Concern

COMMON NAME	SCIENTIFIC NAME	HABITAT Description ¹	CONSERVATION Status			SOURCE ³	Potential For Habitat Within Study Area	Rationale ⁴
			FEDERAL (SARA, 2002)	PROVINCIAL (ESA, 2007)	S-RANK ²			
Birds								
Bald Eagle	<i>Haliaeetus leucocephalus</i>	Require large continuous area of deciduous or mixed woods around large lakes, rivers; require area of 255 ha for nesting, shelter, feeding, roosting; prefer open woods with 30 to 50% canopy cover; nest in tall trees 50 to 200 m from shore; require tall, dead, partially dead trees within 400 m of nest for perching.	N/A	SC	S4	OBBA	No	Woodlots within the Subject Area are too modest to provide suitable habitat for this species.
Bobolink	<i>Dolichonyx oryzivorus</i>	Large, open expansive grasslands with dense ground cover; hayfields, meadows or fallow fields; marshes; requires tracts of grassland >50 ha.	THR	THR	S3	OBBA	Yes	Grassland meadow habitat is present within the Study Area. Greater than 50 ha of agricultural fields continue to the west of the Subject Property.
Chimney Swift	<i>Chaetura pelagica</i>	Commonly found in urban areas near buildings; nests in hollow trees, crevices of rock cliffs, chimneys; highly gregarious; feeds over open water	THR	THR	S4	OBBA	Yes	Large structures suitable for Chimney Swift habitation are present on the property. Additionally, small rock crevices and open water are present within the Study Area.
Common Nighthawk	<i>Chordeiles minor</i>	Open ground; clearings in dense forests; ploughed fields; gravel beaches or barren areas with rocky soils; open woodlands; flat gravel roofs.	THR	SC	S4	OBBA	Yes	Open sandy substrate with little low-lying vegetative coverage is located within the western portion of the Subject Area.

COMMON NAME	SCIENTIFIC NAME	HABITAT Description ¹	CONSERVATION Status			SOURCE ³	Potential For Habitat Within Study Area	Rationale ⁴
			FEDERAL (SARA, 2002)	PROVINCIAL (ESA, 2007)	S-RANK ²			
Eastern Meadowlark	<i>Sturnella magna</i>	Open, grassy meadows, farmland, pastures, hayfields or grasslands with elevated singing perches; cultivated land and weedy areas with trees; old orchards with adjacent, open grassy areas >10 ha in size.	THR	THR	S5	NHIC	Yes	Open grassland area greater than 10 ha is present within the Study Area.
Eastern Wood-Pee-wee	<i>Contopus virens</i>	Open, deciduous, mixed or coniferous forest; predominated by oak with little understory; forest clearings, edges; farm woodlots, parks.	SC	SC	S5	OBBA	Yes	The mixed forest community within Significant Woodland-C may contain minimal understory vegetation ideal for this species habitation. Clearings, edges, farm woodlots and open spaces are present surrounding the Woodland.
Evening Grosbeak	<i>Coccothraustes vespertinus</i>	Mature mixed conifer forests dominated by either spruce, firs, or trembling aspens; areas with high concentrations of Spruce Budworm.	N/A	SC	S4	OBBA	No	No accounts of mature spruce for feeding preferences were found within the Study Area.
Grasshopper Sparrow	<i>Ammodramus savannarum</i>	Well-drained grassland or prairie with low cover of grasses, taller weeds on sandy soil; hayfields or weedy fallow fields; uplands with ground vegetation of various densities; perches for singing; requires tracts of grassland > 10 ha.	SC	SC	S2	OBBA	Yes	Low grass coverage with taller weeds ideal for perching were found in the western portion of unevaluated wetland-2. Fallow fields are also present within the property.
Rusty Blackbird	<i>Euphagus carolinus</i>	Openings in coniferous woodlands bordering bodies of water; tree- bordered marshes, beaver ponds, muskegs, bogs, fens or wooded swamps; stream borders with alder, willow; wooded islands on lakes.	THR	SC	S4	OBBA	No	Wetland corridors present within the Study Area do not provide suitable habitat. Furthermore, no coniferous forests exist within the Study Area.

COMMON NAME	SCIENTIFIC NAME	HABITAT Description ¹	CONSERVATION Status			SOURCE ³	Potential For Habitat Within Study Area	Rationale ⁴
			FEDERAL (SARA, 2002)	PROVINCIAL (ESA, 2007)	S-RANK ²			
Wood Thrush	<i>Hylocichla mustelina</i>	Carolinian and Great Lakes-St. Lawrence forest zones; undisturbed moist mature deciduous or mixed forest with deciduous sapling growth; near pond or swamp; hardwood forest edges; must have some trees higher than 12 m.	THR	SC	S4	OBBA	No	Minimal interior forest habitat is present, a lack of dense understory vegetation, or tracks of forest with trees higher than 12 m exist on this property.

COMMON NAME	SCIENTIFIC NAME	HABITAT Description ¹	CONSERVATION Status			SOURCE ³	Potential For Habitat Within Study Area	Rationale ⁴
			FEDERAL (SARA, 2002)	PROVINCIAL (ESA, 2007)	S-RANK ²			
Reptiles								
Midland Painted Turtle	<i>Chrysemys picta marginata</i>	Quiet, warm, shallow water with abundant aquatic vegetation such as ponds, large pools, streams, ditches, swamps, marshy meadows; eggs are laid in sandy places, usually in a bank or hillside, or in fields; basks in groups; not territorial.	SC	N/A	S4	ON	No	Although the Study Area features a vegetation covered channelized waterway, and is flanked by sandy meadows, the Study Area provides no suitable turtle basking habitat and is contained by steep walls.
Northern Map Turtle	<i>Graptemys geographica</i>	Large bodies of water with soft bottoms, and aquatic vegetation; basks on logs or rocks or on beaches and grassy edges, will bask in groups; uses soft soil or clean dry sand for nest sites; may nest at some distance from water; home range size is larger for females (about 70 ha) than males (about 30 ha) and includes hibernation, basking, nesting and feeding areas; aquatic corridors (e.g., stream) are required for movement.	SC	SC	S3	ON	No	Large bodies of water do not occur within the Study Area, resulting in a property that is unsuitable for Northern Map Turtles.
Snapping Turtle	<i>Chelydra serpentina</i>	Permanent, semi-permanent freshwater; marshes, swamps or bogs; rivers and streams with soft muddy banks or bottoms; often uses soft soil or clean dry sand on south-facing slopes for nest sites; may nest at some distance from water; often hibernate together in groups in mud under water; home range size ~28 ha.	SC	SC	S4	ON	Yes	Permanent and semi-permanent freshwater marshes occur within the Subject Property. This species may use the Study Area due to watercourse connectivity to the Mississippi River, but there is more preferred habitat for this species within the Study Area, outside the Subject Property.

COMMON NAME	SCIENTIFIC NAME	HABITAT Description ¹	CONSERVATION Status			SOURCE ³	Potential For Habitat Within Study Area	Rationale ⁴
			FEDERAL (SARA, 2002)	PROVINCIAL (ESA, 2007)	S-RANK ²			
Eastern Musk Turtle	<i>Sternotherus odoratus</i>	Aquatic, except when laying eggs; shallow slow-moving water of lakes, streams, marshes and ponds; hibernate in underwater mud, in banks or in muskrat lodges; eggs are laid in debris or under stumps or fallen logs at waters edge; often share nest sites; sometimes congregate at hibernation sites; not readily observed.	SC	SC	S3	ON	Yes	Aquatic habitat is not present within the Subject Property. Slow-moving water within the back-water areas Wolf Grove Creek may be suitable with appropriate nest sites on the banks
Insects								
Monarch	<i>Danaus plexippus</i>	The habitat is typically a combination of field and forest and provides the butterflies with a location to rest. Caterpillars eat exclusively milkweed and adults require the nectar of wildflowers to feed.	END	SC	S2	BA	Yes	Meadow communities within the Study Area contain milkweed plants that provide feeding and breeding habitat for the species. A targeted survey for milkweed abundance is required.
Mammals								

COMMON NAME	SCIENTIFIC NAME	HABITAT Description ¹	CONSERVATION Status			SOURCE ³	Potential For Habitat Within Study Area	Rationale ⁴
			FEDERAL (SARA, 2002)	PROVINCIAL (ESA, 2007)	S-RANK ²			
Little Brown Bat	<i>Myotis lucifugus</i>	Uses caves, quarries, tunnels, hollow trees or buildings for roosting; winters in humid caves; maternity sites in dark warm areas such as attics and barns; feeds primarily in wetlands, forest edges.	END	END	S3	OMA	Yes	Study Area contains deciduous forests with large diameter trees with cavities suited for roosting, and forest edges for feeding habitat.
Northern Myotis	<i>Myotis septentrionalis</i>	Hibernates during winter in mines or caves; during summer males roost alone and females form maternity colonies of up to 60 adults; roosts in houses, manmade structures but prefers hollow trees or under loose bark; hunts within forests, below canopy	END	END	S3	OMA	Yes	Study Area contains deciduous forests with large diameter trees with cavities and loose bark, suited for roosting, and forests for feeding habitat.
Tri-colored Bat	<i>Perimyotis subflavus</i>	Open woods near water; roosts in trees, cliff crevices, buildings or caves; hibernates in damp, draft-free, warm caves, mines or rock crevices.	END	END	S3	OMA	Yes	Study Area contains open woods near water suited for roosting and foraging.

Vascular Plants								
Butternut	<i>Juglans cinerea</i>	Prefers moist, well-drained soil and is often found along streams. It is also found on well-drained gravel sites and rarely on dry rocky soil. Often grows in sunny openings and near forest edges.	END	END	S2	NHIC	Yes	Moist, well-drained are present within th

- 1 Where Critical Habitat is not defined for a species, the Habitat Description provided is the "General Habitat" according to the MNR (2000) *Significant Wildlife Habitat Technical Guide*.
 - 2 S-Rank is an indicator of commonness in the Province of Ontario. A scale between 1 and 5, with 5 being very common and 1 being the least common.
 - 3 Information sources include: MNR = Ministry of Natural Resources and Forestry Response to Information Request; NHIC = Natural Heritage Information Centre; OBBA = Ontario Breeding Bird Atlas; ON = Ontario Nature: Ontario Reptile and Amphibian Atlas; BA = Toronto Entomologists' Association: Butterfly Atlas; DFO = Fisheries and Oceans Canada;
 - 4 Determination based on desktop review and preliminary 2022 site investigations.
 - 5 The Rationale should be revisited following 2023 investigations and this note should be revised at that time.
- Species in **bold** text with a green cell indicate those with potential for habitat within the Study Area
 No occurrence records were found for amphibian or aquatic Species of Conservation Concern.
 --- denotes no information or not applicable.

Table D2: Species at Risk

COMMON NAME	SCIENTIFIC NAME	HABITAT Description ¹	CONSERVATION Status			Source ³	POTENTIAL For HABITAT Within STUDY AREA	
			Federal (SARA, 2002)	Provincial (ESA, 2007)	S-Rank ²			
Birds								
Red-headed Woodpecker	<i>Melanerpes erythrocephalus</i>	Open, deciduous forest with little understory; fields or pasture lands with scattered large trees; wooded swamps; orchards, small woodlots or forest edges; groves of dead or dying trees; feeds on insects and stores nuts or acorns for winter; loss of habitat is limiting factor; requires cavity trees with at least 40 cm DBH; require about 4 ha for a territory	THR	END	S4B	OBBA	Yes	The mixed forest habitat is present in the Study Area. Significant habitat loss is occurring in areas less than 40 cm
Barn Swallow	<i>Hirundo rustica</i>	Farmlands or rural areas; cliffs, caves, rock niches; buildings or other man-made structures for nesting; open country near body of water.	THR	THR	S5	OBBA	Yes	Preferred nesting sites are found in the Study Area, including bodies of water and open areas.
Bobolink	<i>Dolichonyx oryzivorus</i>	Large, open expansive grasslands with dense ground cover; hayfields, meadows or fallow fields; marshes; requires tracts of grassland >50 ha.	THR	THR	S3	OBBA	Yes	Grassland habitat is present in the Study Area, including areas with the presence of agricultural fields.
Chimney Swift	<i>Chaetura pelagica</i>	Commonly found in urban areas near buildings; nests in hollow trees, crevices of rock cliffs, chimneys; highly gregarious; feeds over open water	THR	THR	S4	OBBA	Yes	Large structures are present in the Study Area, including buildings and open water bodies.
Eastern Meadowlark	<i>Sturnella magna</i>	Open, grassy meadows, farmland, pastures, hayfields or grasslands with elevated singing perches; cultivated land and weedy areas with trees; old orchards with adjacent, open grassy areas >10 ha in size.	THR	THR	S5	NHIC	Yes	Open grassy areas are present within the Study Area.
Eastern Whip-poor-will	<i>Antrostomus vociferus</i>	Dry, open, deciduous woodlands of small to medium trees; oak or beech with lots of clearings and shaded leaf litter; wooded edges, forest clearings with little herbaceous growth; pine plantations; associated with >100 ha forests; may require 500 to 1000 ha to maintain population.	THR	THR	S4	OBBA	No	Study Area does not contain suitable habitat for this species.
Golden Eagle	<i>Aquila chrysaetos</i>	wild, arid plateaus, deeply cut by streams and canyons or sparsely treed slopes and rock crags	NAR	END	S2B	iNaturalist	No	No canyons or rock crags are present in the Study Area.

COMMON NAME	SCIENTIFIC NAME	HABITAT Description ¹	CONSERVATION Status			Source ³	POTENTIAL For HABITAT Within STUDY AREA	
			Federal (SARA, 2002)	Provincial (ESA, 2007)	S-Rank ²			
Reptiles								
Blanding's Turtle	<i>Emydoidea blandingii</i>	Shallow water marshes, bogs, ponds or swamps, or coves in larger lakes with soft, muddy bottoms and aquatic vegetation; they frequently move from aquatic habitat to terrestrial habitats; hibernates in bogs; not readily observed.	END	THR	S3	ON	No	Study Area contains hibernating h... contain shall... or coves of la...
Vascular Plants								
Butternut	<i>Juglans cinerea</i>	Prefers moist, well-drained soil and is often found along streams. It is also found on well-drained gravel sites and rarely on dry rocky soil. Often grows in sunny openings and near forest edges.	END	END	S2	NHIC	Yes	Moist, well-drained... are present...

1 Where Critical Habitat is not defined for a species, the Habitat Description provided is the "General Habitat" according to the MNRF (2000) *Significant Wildlife Habitat Technical Guide*.

2 S-Rank is an indicator of commonness in the Province of Ontario. A scale between 1 and 5, with 5 being very common and 1 being the least common.

3 Information sources include: MNRF = Ministry of Natural Resources and Forestry Response to Information Request; NHIC = Natural Heritage Information Centre; OBBA = Ontario Breeding Bird Atlas; ON = Ontario Nature: Ontario Reptile and Amphibian Atlas; BA = Toronto Entomologists' Association: Butterfly Atlas; DFO = Fisheries and Oceans Canada;

4 Determination based on desktop review and preliminary 2022 site investigations.

5 The Rationale should be revisited following 2023 investigations and this note should be revised at that time.

Species in **bold** text with a green cell indicate those with potential for habitat within the Study Area

No occurrence records were found for amphibian or aquatic Species at Risk.

--- denotes no information or not applicable.