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South

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Riverside South Development Corporation - Town Centre

Environmental Impact Statement & Tree Conservation Report

Submitted to Riverside South Development Corporation
by Arcadis IBI Group
January 2023

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Environmental Impact Study

Town Centre



Prepared for Riverside South Development Corporation
By Arcadis | IBI Group

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2 Introduction

2.1 Purpose

Arcadis IBI Group (Arcadis IBI) was retained by Riverside South Development Corporation (RSDC) to complete an updated Environmental Impact Study (EIS) and Tree Conservation Report (TCR) for the proposed RSDC Employment Lands development, located at Part 980 Earl Armstrong Road, 4700 Limebank Road, Part 4776 Limebank Road, in the City of Ottawa's Riverside South Community. (**Figure 1**).

This updated EIS and TCR has been prepared to describe the natural heritage features within the Study Area and to evaluate the potential for environmental impacts associated with the proposed development and to recommend mitigation measures to offset those impacts. The findings in this report are based on field investigations and desktop screening results. A previous EIS was prepared by DST Consulting Engineers (2014) but only covered a portion of the Study Area.

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

2.2 Background

It is our understanding that this site has previously received draft approval and the City of Ottawa requires that an updated EIS and TCR be completed to assess the impacts the updated site plan will have on environmentally sensitive lands or other features outlined in the City's Natural Heritage System (NHS). This site is located next to an Urban Natural Feature that corresponds with Armstrong Road South Woods, which is identified within the City's Official Plan Schedule C11-C – Natural Heritage System (East) (City of Ottawa, 2021). In addition to this major feature, there is also an unevaluated wetland located within the Project footprint. This report has been prepared to consider federal, provincial, and municipal policies and regulations that may pertain to the Project.

A pre-consultation meeting was held on February 23rd, 2022, where requirements of the EIS and TCR were discussed with the City of Ottawa. This meeting identified the requirements to complete the following Species at Risk surveys:

- Amphibian Breeding Surveys
- Butternut Search
- Bat Habitat Survey

The EIS and TCR has been prepared to; ensure the development does not contravene the Endangered Species Act (ESA, 2007), support the retention of natural vegetation where possible, evaluate potential environmental impacts, and develop mitigation plans addressing potential impacts.

2.3 Property Information

Owner:	Riverside South Development Corporation
Address:	Part 980 Earl Armstrong Road, 4700 Limebank Road, Part 4776 Limebank Road, Ottawa, Ontario
Lot and concession:	Part Lot 21, Concession 1 Part Lot 22, Concession 1
Zoning:	R5 – Residential Fifth Density Zone GM28 – General Mixed Use Zone L2 – Major Leisure Facility Zone
Traditional Territories:	Anishinaabeg Algonquin territory [un-ceded]
Official Plan designation (Schedule B):	Town Centre/Hub/Evolving Neighbourhood/Mixed Use/Commercial Zones
Existing Land Uses:	Meadow/Forest/Wetland

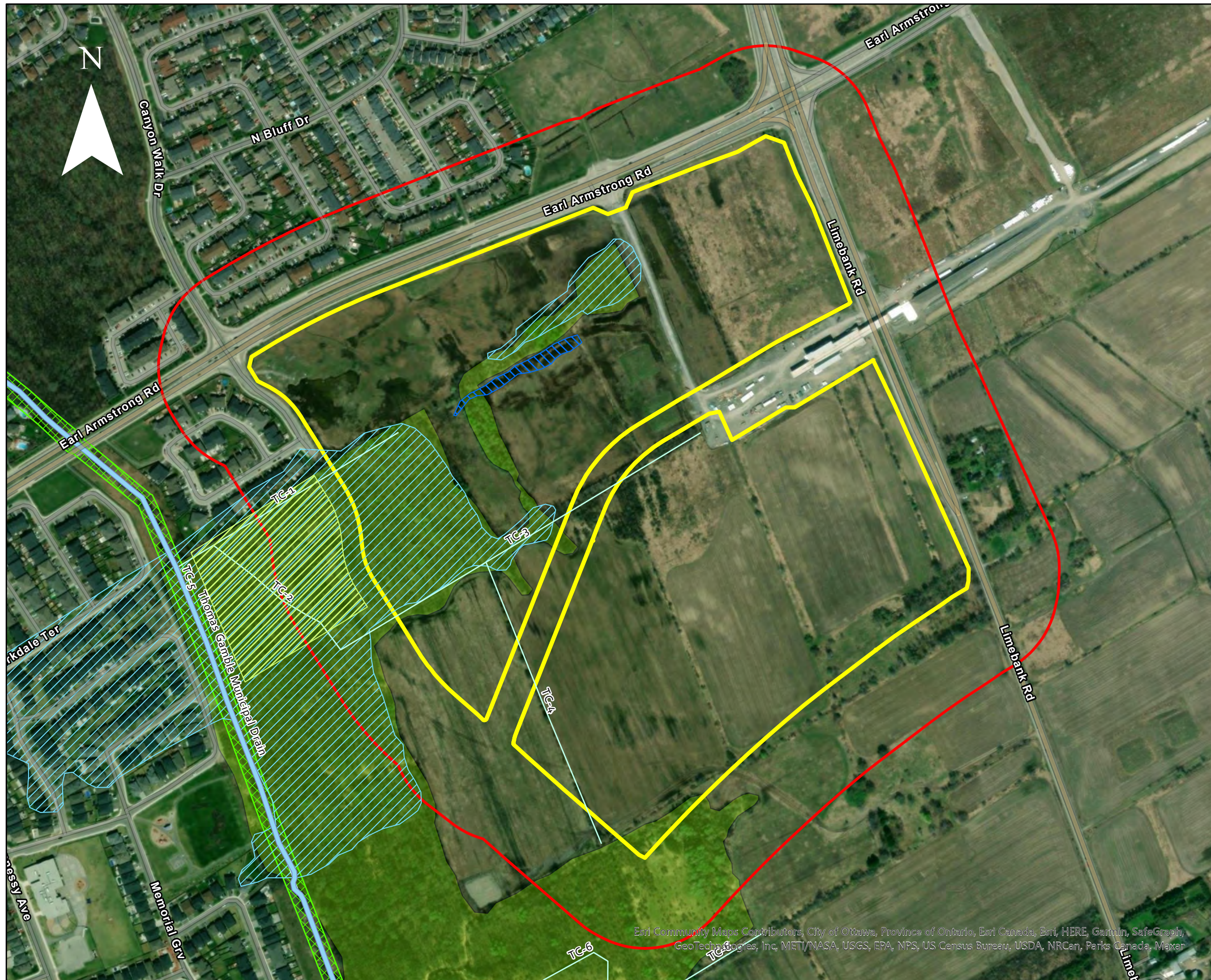
LOCATION

The Study Area discussed in this report is located on the unceded traditional territory of the Algonquin Anishinaabe Peoples.

The Study Area is in the community of Riverside South and is located at Part 980 Earl Armstrong Road, 4700 Limebank Road, and Part 4776 Limebank Road. It is situated at the southwest corner of Earl Armstrong Road and Limebank Road, extending west to Portico Way, and abuts the future Riverside South rail corridor to the south (**Figure 1**).

LAND USE AND ZONING

The Study Area falls within the Riverside South Community Design Plan (CDP), the City of Ottawa’s Official Plan (OP) has designated the Study Area as Town Centre/Hub/Evolving Neighbourhood. The property is zoned as Residential Fifth Density Zone (R5), General Mixed-Use Zone (GM28), and Major Leisure Facility Zone (L2).



Legend

- Headwater Drainage Feature
- Municipal Drain (GeoOttawa)
- Study Area
- Subject Property
- ▨ Open Water Cattail Marsh
- ▨ Regulation Area (RVCA)
- ▨ Wetland - Swamp (LIO)
- ▨ Urban Natural Feature (City of Ottawa)
- ▨ Woodlands

0 0.04 0.07 0.14 0.21 0.28
 Kilometers
 Scale: 1:5,100



Client: **Riverside South Development Corporation (RSDC)**

Title: **RSDC Town Centre: Study Area and Natural Heritage Features**

Prepared By: **ARCADIS | IBI GROUP**


Project: 137705
 Date: 2022-12-22

Figure: 1

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

2.4 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.



Policy Framework:	This section outlines the policies and legislation that apply to the protection of natural heritage features within the Study Area as it relates the Project.
Natural Heritage Screening:	This section provides the detailed background information collected from a variety of publicly accessible resource databases to describe the natural heritage features and significant features that may occur within the Study Area.
Methodology:	This section provides a summary of the specific protocols and methods used to evaluate potential natural heritage features and species identified within the natural heritage screening.
Survey Results:	This section provides the results from the field surveys. This also includes any incidental observations or notable observations made by the field biologists.
Description of the Proposed Project:	This section provides a summary of the Project, including the construction activities and other activities which may have an impact on the natural environment.
Impact Assessment and Mitigation:	<p>This section provides the assessment of potential environmental impacts associated with the Project on the natural heritage system, including the natural heritage features and species surveyed in this study.</p> <p>The mitigation measures proposed in this section are aimed at reducing or eliminating potential impacts to natural heritage features. Where mitigation may not be possible, compensation may be proposed.</p> <p>This section will also identify any future permitting or agency authorizations that may be required before the Project may proceed.</p>
Summary and Conclusions:	This section provides a summary of the Study's findings, outlines any notable provisions, and provides Arcadis IBI's general recommendation on whether this project should proceed as planned.

Tree Conservation Report Requirements



For the purposes of this integrated report, the Tree Conservation Report (TCR) requirements will be addressed throughout this report. To aid in the review, sections which address specific **requirements under the TCR guidelines will be marked with the “tree” symbol** as illustrated to the left.

3 Policy Framework

This study references the regulatory agencies and legislative authorities mandated to protect different elements of the NHS, features, and functions within the City of Ottawa, Ontario, and Canada. **Table 1** provides a list of the applicable policies and legislation for the protection of natural heritage features and SAR either municipally, provincially, and/or federally. The scope of this report evaluates the natural heritage features and SAR governed by the policies outlined in the table below.

The Ontario ESA (Government of Ontario, 2007) prohibits the killing or harming of species identified as Threatened and Endangered under the Act. 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 Act provided the legal requirements of the Act 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.

Table 1: Policies, Legislation and Background Source

POLICY	GUIDELINES AND SUPPORTING DOCUMENTS
Federal Government of Canada	
Migratory Birds Convention Act (MBCA, 1994) (S.C. 1994, c. 22)	Environment and Climate Change Canada (ECCC) – online resources
Species at Risk Act (SARA, 2002) (S.C. 2002, c. 29)	Federal Species at Risk Public Registry: <ul style="list-style-type: none"> - Distribution of Aquatic Species at Risk mapping (Accessed: 04/2022)
Fisheries Act (1985) (R.S.C., 1985, c. F-14)	Fisheries and Oceans Canada – online resources
Province of Ontario	
Provincial Policy Statement (2020)	Ministry of Natural Resources and Forestry (MNRF) – Kemptville District
	MNRF Natural Heritage Information Centre (NHIC) <ul style="list-style-type: none"> - <i>Species at Risk occurrence records</i> - <i>Species of Conservation Concern</i> - <i>Natural Heritage Features</i>
	Significant Wildlife Habitat Technical Guide (MNRF, 2000): <ul style="list-style-type: none"> - Significant wildlife Habitat Eco-region 6E Criterion Schedule (MNRF, 2015).
	Ministry of the Environment, Conservation and Parks (MECP): <ul style="list-style-type: none"> - Species at Risk in Ontario (SARO) List (O.Reg. 230.08)
	Ecological Land Classification for Southern Ontario, First Approximation, and its Application (Lee, et al., 1998)
	Ontario Breeding Bird Atlas (OBBA) – Online (Accessed: 04/2022)
	Ontario Reptile and Amphibian Atlas (ORAA) – Online (Accessed: 04/2022)
	Ontario Butterfly Atlas (OBA) – Online
	iNaturalist Observation Records – Online
	Atlas of the Mammals of Ontario (AMO) (Dobbyn, 1994)
City of Ottawa	
City of Ottawa Official Plan (2022) 	Official Plan
	Environmental Impact Statement Guidelines
	City of Ottawa Tree Conservation Report Guidelines – Online
	Site Alteration By-Law
	Protocol for Wildlife Protection During Construction
Rideau Valley Conservation Authority (RVCA)	
Rideau Valley Conservation Authority: Regulation of Development, Interference with Wetlands and Alterations to Shorelines and Watercourses (Ontario Regulation 174/06), under Conservation Authorities Act, (R.S.O. 1990, c. C.27)	<ul style="list-style-type: none"> - Floodplain mapping - Evaluation, Classification and Management of Headwater Drainage Features Guidelines

4 Description of the Natural Environment

The following sections provide a desktop screening of natural heritage records and background information available within the Study Area. This information provides the background information upon which the EIS and TCR will be based.

A previous EIS report was prepared by DST Consulting Engineers (DST) in 2014 which included a portion of western part of the Study Area being assessed for this assignment. The 2014 DST EIS report largely focused the impacts to the Armstrong South Woods (ARSW), which has since been established as an Urban Natural Feature by the City of Ottawa. Given the land use and the policy / legislative changes since the 2014 DST report was prepared, the findings and conclusions from the DST report were not carried forward. Rather this EIS/TCR report represents a fresh assessment of the natural heritage features within the Study Area.

4.1 Historic Land Use

A review of recent and historic aerial imagery highlights the land uses within and adjacent to the Study Area (City of Ottawa, 2022) (**Figure 2**). From this review, the landscape has been predominantly agricultural dating back to 1976. Residential developments to the west and north of the Study Area have expanded beginning around the mid 1990's to the present day. Within the Property the land use has been used for agricultural purposes, as well as appearing to have been excavated within the northern extent extending from the forest stand to Earl Armstrong Road for materials between 2015 and 2017, related to the construction of the adjacent subdivision. The Study Area has been allowed to re-naturalize and has continued to be a moist meadow with forest stands. Open water habitat south of the forest appears in aerial imagery in 2019, after a shift in land use to the east of the proposed development.



1976



2002



2011



2019

Figure 2 Land Use Change

4.2 Landform, Soils and Geology

The Study Area is situated within the Ottawa Valley Clay Plains physiographic region (Ministry of Northern Development and Mines). The surficial geology of the Study Area is composed of fine-textured glaciomarine deposits that are primarily silt and clay, with minor sand and gravel deposits. This material is generally well drained. The underlying bedrock of the Study Area is part of the Oxford Formation, consisting of dolomite and limestone (Natural Resources Canada, 2016).

Overall, the Study Area is comprised of neutral, fine textured materials, with layers of silty sediments. It is likely that due to the soil and physiographic conditions within the Study Area, that there are lower rates of infiltration, with damp to wet soils.

4.3 Aquatic Environment

4.3.1 Floodplain and Regulated Limit

The RVCA is the governing body that regulates zones with potential for flooding, protects associated natural features, and restores and enhances ecosystems within the Rideau Valley watershed. Development within these regulated areas is governed by *O. Reg. 174/06 Development, Interference with Wetlands, and Alterations to Shorelines and Watercourses*. RVCA also maintains, monitors, and collects information related to water quality/quantity, fisheries resources, forestry, land use, and wetlands.

The Thomas Gamble Municipal Drain and its associated regulated limit is located approximately 225 m southwest of the limit of development and is outside of the Study Area (**Figure 1**). However, many of the surface water features identified within the Study Area are tributaries to the Thomas Gamble Municipal Drain.

4.3.2 Fish Habitat

Open water habitat is present within the Study Area but has low connectivity to surrounding watercourses and may serve as 'contributing fish habitat'.

4.3.3 Headwater Drainage Features

Mapping by the RVCA indicates that the Thomas Gamble Municipal Drain exists approximately 225 m southwest of the proposed development (see **Figure 1**). The City of Ottawa mapping indicates the presence of a Headwater Drainage Feature bisecting the forest within the southwestern extent of the Study Area associated with Thomas Gamble Municipal Drain, as well as several drainage ditches along the eastern and southern extents of the Study Area.

HDF assessments were completed in 2019 by Niblett Environmental Associates Inc (NEA), and the assessment results found that the watercourse bisecting the UNF is "not classified" as a headwater drainage feature. No other headwater drainage features are identified within this Study Area by the 2019 NEA report.

4.4 Natural Heritage Features

Several specific natural heritage features require consideration for protection under the Ontario PPS (Ministry of Municipal Affairs and Housing, 2020). The protection of these features is generally administered by the City of Ottawa, consistent with relevant provincial and federal legislation. These features are:

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

The section below provides a review of available background records to determine the potential presence of these natural heritage features within the Study Area. Where possible, natural heritage features have been illustrated in **Figure 1**.

4.4.1 Wetlands

A review of the City of Ottawa online mapping services (geoOttawa) and provincial natural heritage mapping (NHIC) indicates the presence of unevaluated wetlands within, and adjacent to the Study Area (see **Figure 1**) which correspond with the woodlots and mapped watercourses.

Wetland identification and delineation were completed through the Ecological Land Classification process.

4.4.2 Woodlands

A review of the City of Ottawa online mapping services and provincial natural heritage mapping indicates the presence of woodlands within the Study Area that correspond with the mapped wetlands (**Figure 1**).



4.4.3 Valleylands

No Valleylands are present within or adjacent to the Study Area.

4.4.4 Areas of Natural and Scientific Interest

No ANSI's are present within or adjacent to the Study Area.

4.4.5 Significant Wildlife Habitat

The MNR has identified four categories of SWH within the SWH Criteria Schedules for Ecoregion 6E (MNR, 2015b). They include:

- Seasonal Concentration Areas of Animals
- Rare Vegetation Communities or Specialized Habitat for Wildlife
- Habitat for Species of Conservation Concern (excluding Endangered or Threatened Species)
- Animal Movement Corridors

A preliminary assessment of candidate SWH categories to be found within the Study Area was conducted prior to field surveys in order to design an ecological field program for the Project. The potential for candidate SWH was reviewed using MNRF (2015), available background information, and air-photo interpretation. From the preliminary assessment, there is potential for candidate SWH of: *Seasonal Concentration Areas of Animals, Specialized Habitat for Wildlife, and Habitat for Species of Conservation Concern.*

SEASONAL CONCENTRATION AREAS OF ANIMALS

Seasonal Concentration Areas are where a large abundance of a species gathers at one time of year, or where several species congregate (MNRF, 2015). Based on the criteria established for Candidate SWH, the following seasonal concentration areas of animals may be found within or adjacent to the Study Area:

- Bat Maternity Colonies: The presence of mature woodlands with large cavity trees may provide suitable conditions for maternity colonies of SAR and non-SAR bats.

SPECIALIZED HABITAT FOR WILDLIFE

Specialized Habitat for Wildlife are areas that provide suitable habitat for the species' long-term survival and require contiguous areas that are not fragmented. 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 meadows, open wetlands, and swamp-like forest community and headwater drainage features that may be ephemeral in nature may provide habitat for amphibian breeding.

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, 2007). A review of background data suggests that candidate SWH for breeding birds and reptiles may occur within or adjacent to the Study Area. Those species identified have potential to be associated with the forest and meadow community. **Table 2** provides a list of Species of Conservation Concern with occurrence records within and/or adjacent to the Study Area.

Table 2: Species of Conservation Concern with records of occurrences within the Study Area

COMMON NAME	SCIENTIFIC NAME	CRITICAL HABITAT DESCRIPTION	CONSERVATION STATUS			SOURCE ³
			Federal (SARA, 2002)	Provincial (ESA, 2007)	S-Rank ²	
Birds						
Eastern Wood-Pewee	<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
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	S4	OBBA
Pileated Woodpecker	<i>Dryocopus pileatus</i>	Extensive tracts of mature deciduous or mixed forest with water and large diameter (40+ cm) trees for cavity construction; both lowland, upland forests; sometimes found in more open agricultural areas and parks with large trees; area sensitive species requiring 40-260 ha; requires trees >25 cm DBH for nesting and trees 40+cm DBH for roosting	SC	SC	S4/S5	OBBA
Herpetofauna						
Eastern Milksnake	<i>Lampropeltis triangulum</i>	Habitat generalists, prefer open habitats including outcrops and meadows; require suitable microhabitats for egg laying, hibernation and thermoregulation; well known for occupying barns, sheds, and houses in rural landscapes; abundance of species appears to correlate with regions where forest cover is relatively high.	SC	--	S4	ON

4.5 Species at Risk and Species at Risk Habitat

A desktop review identified the potential for several Species at Risk (SAR) to occur within and 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 species, agencies have defined general habitat descriptions that provide science-based criteria for the habitat to be protected for some SAR species.

A review of aerial imagery was used to identify general candidate habitat for SAR based on the description of habitat provided. **Table 3** provides a list of species identified as having potential to occur within the vicinity of the Study Area, and an assessment of habitat potential based on the MNR's habitat description. Based on the habitat requirements described in the table, the following species may be present within the Study Area:

- Barn Swallow (*Hirundo rustica*)
- Bobolink (*Dolichonyx oryzivorus*)
- Eastern Meadowlark (*Sturnella magna*)
- Red Headed Woodpecker (*Melanerpes erythrocephalus*)
- Monarch (*Danaus plexippus*)
- Butternut (*Juglans cinerea*)
- Little Brown Bat (*Myotis lucifugus*)
- Northern Myotis (*Myotis septentrionalis*)
- Tri-coloured Bat (*Perimyotis subflavus*)



4.6 Trees

A review of aerial imagery suggests that the Study Area contains a forested area that contains a mix of mature native trees and shrubs. Hedgerows exist between abandoned agricultural fields throughout the Study Area, as well as a woodlot associated with a wetland at the northeast extend of the Study Area.

4.7 Wildlife Habitat

In addition to the SAR noted above, 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 City of Ottawa 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*), Eastern Cottontail (*Sylvilagus floridanus*), among others.
- **Reptiles & Amphibians:** Eastern Garter Snake (*Thamnophis sirtalis*), Leopard Frog (*Lithobates pipiens*), Gray Tree Frog (*Hyla versicolor*), among others.
- **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*), Song Sparrow (*Melospiza melodia*), among others.

Table 3: Species at Risk with records of occurrence within the Study Area

COMMON NAME	SCIENTIFIC NAME	HABITAT DESCRIPTION	CONSERVATION STATUS			SOURCE	POTENTIAL FOR HABITAT WITHIN STUDY AREA	RATIONALE
			Federal (SARA, 2002)	Provincial (ESA, 2007)	S-Rank			
Birds								
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	Foraging habitat may be present, however no structures for nesting were observed within the Study Area. Buildings located outside of the property boundary may provide nesting habitat.
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	NHIC	Yes	Some grassland meadow habitat with dense ground cover is present within the Study Area.
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 and cultivated land greater than 10 ha is present within the Study Area.
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	END	END	S3	OBBA	Yes	Open deciduous wooded swamps with scattered large trees with little understory are present within the Study Area.
HERPETOZOA								

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	Permanent water features within the Study Area are relatively small and lack connectivity to other permanent water features.
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; not readily observed	SC	SC	S3	ON	No	The Study Area does not provide suitable aquatic habitat, or appropriate nesting habitat 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	No	Permanent water features within the Study Area are relatively small and lack connectivity to other permanent water features.
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 a presence of milkweed plants that potentially provide feeding and breeding habitat.
Vascular Plants								
Butternut	<i>Juglans cinerea</i>	In Ontario, Butternut usually grows alone or in small groups in deciduous forests. It 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. This species does not do well in the shade, and often grows in sunny openings and near forest edges.	END	END	S2	NHIC	Yes	Deciduous forests with moist soils and sunny openings near forest edges are present within the Study Area.

MAMMALS								
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.

4.8 Ecological Linkages

A review of aerial photos suggests that the forest within the Study Area may provide a functional ecological linkage. However, as this linkage lacks connectivity any established 'core natural areas', the function is likely limited to the general movement of wildlife throughout the landscape. Additionally, this property is not identified within an ecological linkage by the City of Ottawa (City of Ottawa, 2013).

4.9 Other Development Constraints

A review of the City of Ottawa's Official Plan Schedule C11-C – Natural Heritage System (East) mapping (2021) identified an Urban Natural Feature within the western extent of the Study Area, associated with the forested swamp area (**Figure 1**).

5 Methodology

5.1 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.

These surveys are used to evaluate the potential for negative impacts which may occur as a result from the proposed development project. Surveys were undertaken only within the subject property. If possible, natural features within the larger Study Area were evaluated from a distance or via air-photo interpretation.

AQUATIC ENVIRONMENT

- Headwater Drainage Feature Assessment

NATURAL HERITAGE FEATURES

- Ecological Land Classification (ELC), including:
 - Vegetation survey
 - Wetland identification
 - Woodland delineation and evaluation
- Identification of potential SWH, including:
 - Breeding Bird Surveys
 - Amphibian Breeding Surveys
 - General habitat assessment for Species of Conservation Concern
 - Incidental SWH observations

SPECIES AT RISK

- Identification of potential Species at Risk and Species at Risk habitat



TREES

- Tree inventory and assessment

INCIDENTAL WILDLIFE

- Visual and auditory observations of wildlife during all field studies

5.2 Aquatic Environment

The Headwater Drainage Features (HDF) assessment will follow the Toronto and Region Conservation Authority and Credit Valley Conservation protocol, 'Evaluation, Classification and Management of Headwater Drainage Features Guidelines' (Toronto and Region Conservation Authority and Credit Valley Conservation, 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).

5.3 Natural Heritage Features

5.3.1 Vegetation Community

Vegetation communities within the Study Area were characterized and mapped using the ELC system for Southern Ontario (Lee, et al., 1988). The ecological community boundaries were determined through the review of aerial photography and then further refined through on-site vegetation surveys as specified by the protocol. For areas where access was not granted, observations were conducted from either the road right-of-way or the property edge to the extent visible.

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 or disturbed/planted vegetation have been described to the community level only or have been 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 was used.

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

Vegetation Survey

Vegetation was inventoried in tandem with ELC surveys, and a corresponding vascular plant list was compiled (**Appendix B**). All other plant species identified from other survey results are also included in the list. In addition, the vascular plants observed at the time of survey have been used to screen for any provincially rare species or SAR not previously identified within the Study Area.

Scientific nomenclature, English colloquial names, and scientific binomials 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 (2015).

5.3.2 Wetlands

There is a wetland identified throughout the Study Area. Delineation of these features was completed through the ELC survey methods outlined in Section 4.3.1.

5.3.3 Woodlands

The woodlands within the Study Area were assessed for significance following the updated guidelines provided by the City of Ottawa in the Significant Woodlands: Guidelines for Identification, Evaluation, and Impact Assessment. In the urban expansion areas, significant woodlands are evaluated using criteria under the 'Established Urban Process' (City of Ottawa, 2019). If the following criteria is met, the woodland is considered significant:

1. *Any treed area meeting the definition of woodlands in the Forestry Act, R.S.O 1990, c.F.26 or forest in Ecological Land Classification for Southern Ontario; and*
2. *In the rural area, meeting any one of the criteria in the Natural Heritage Reference Manual, as assessed in a subwatershed planning context and applied in accordance with Council-approved guidelines, where such guidelines exist; or*



3. *In the urban area, any contiguous area 0.8 hectares in size or larger, supporting woodland 60 years of age and older at the time of evaluation.*

The significance of woodlands within this Study Area will be determined using criteria #1 and #3. The ELC delineation was used to determine the size of woodlands and historic aerial imagery and tree inventories were used to estimate the age.

However, as outlined in the City's *Significant Woodlands: Guidelines for Identification, Evaluation, and Impact Assessment* (2019), new significant woodlands will not be identified in urban areas where the NHS was already identified through Secondary Plans. As no Secondary Plans exist for this site, this policy would not apply.

5.3.4 Significant Wildlife Habitat

Breeding bird, amphibian breeding, and bat echolocation surveys were conducted in order to establish baseline conditions within the Study Area.

BREEDING BIRD SURVEY

Diurnal breeding bird surveys conducted within the Study Area followed the methods outlined in the *Ontario Breeding Bird Atlas Guide for Participants* (Cadman et al 2007) and were completed between late May and early July (three surveys). Specifically, breeding bird surveys consisted of three-minute point counts that were used to establish quantitative estimates of bird abundance in habitat types within the Study Area (see **Figure 3** for survey locations). To supplement the surveys, area searches of the habitat were completed using binoculars to observe species presence and breeding activity. Area searches involved noting all individual bird species and their corresponding breeding evidence while traversing the habitat on foot.

AMPHIBIAN BREEDING SURVEY

Amphibian monitoring will follow *the Marsh Monitoring Program Participant's Handbook for Surveying Amphibians protocol* (Bird Studies Canada, 2009 Edition). In accordance with the survey protocol, three different surveys will be conducted between April 15th and June 30th, with at least two weeks between each visit (see **Figure 3** for survey locations). Surveys begin at least one-half hour after sunset during evenings with a minimum night temperature of 5°C, 10°C, and 17°C for each of the three respective surveys.

Each amphibian survey generally involves standing at a predetermined station for three minutes and listening for frog calls. The calling activity of individuals estimated to be within 100 m of the observation point is documented. All individuals beyond 100 m are recorded as outside the count circle and calling activity was not recorded. Calling activity is then ranked using one of the three abundance code categories:

- Code 1: Calls not simultaneous, number of individuals can be accurately counted;
- Code 2: Some calls simultaneous, number of individuals can be reliably estimated; and,
- Code 3: Calls continuous and overlapping, number of individuals cannot be estimated.

In areas where candidate amphibian habitat exists, vernal pools will be visually examined for egg masses and amphibian larvae in conjunction with other field surveys. These searches will occur between April and June when amphibians were concentrated around suitable breeding habitat.

BAT ACOUSTIC MONITORING

To assess for candidate bat maternity colony habitat, a snag/cavity tree count will be conducted within the forested habitats and follow the methodology outlined in the *Bat Survey Methodology – Hibernacula and Maternity Roosts informal publication distributed by the MNRF* (MNRF, 2015).

The survey is intended to count snag/cavity trees to ascertain whether the habitat is candidate SWH for maternity colony habitat for several non-SAR bats as well as SAR bats, including; Little Brown Myotis (*Myotis lucifungus*), Eastern Small-footed Myotis (*Myotis leibii*), Northern Myotis (*Myotis septentrionalis*), and Tri-colored Bat (*Perimyotis subflavus*) The four bat SAR are listed as Endangered, federally and provincially.

This survey is conducted in forested areas, during the leaf-off period, using a fixed area circular plot of a 12.6 metre radius, this equates to 0.05 ha. The presence of each snag/cavity tree equal to or greater than (\geq) 25 cm DBH is recorded within each circular plot. The formula πr^2 is applied to determine the number of snags/cavity trees per ha. If the snag density within the surveyed area is calculated to be ≥ 10 snags per ha, then the area should be considered candidate SWH for bat maternity colony habitat.

To supplement the snag density surveys, an acoustic survey for bats will be conducted using a Wildlife Acoustic's Echo Meter Touch 2 Pro ultrasonic module. The survey will involve listening for bat calls in conjunction with amphibian breeding surveys at determined locations within the Study Area. The survey will be conducted a half-hour after sunset when bats typically emerge from roosts to forage.

The results of the acoustic surveys were used to identify bat species present within the Survey Area.

HABITAT FOR SPECIES OF CONSERVATION CONCERN

In addition to the targeted wildlife and vegetation community surveys described above, general habitat observations will be noted as it relates to the habitat requirements for Species of Conservation Concern identified in **Table 2**.

INCIDENTAL OBSERVATIONS OF SIGNIFICANT WILDLIFE HABITAT

Incidental observation of other candidate SWH were also undertaken during all site visits. Specifically, the presence of features that are not easily identifiable via aerial photography. This included; the presence of candidate reptile hibernacula, seeps/springs, turtle nesting areas, and stick nests. If required, species-specific surveys will be conducted following consultation with the MNRF and the City of Ottawa.

5.4 Species at Risk and Species at Risk Habitat

Targeted SAR surveys for Bobolink, Eastern Meadowlark, Butternut, and SAR bats were completed. The surveys also included general breeding bird surveys to record any potential SAR birds, specifically grassland birds. The bird survey is described in section 4.4.4.

MONARCH

Monarch detection and habitat assessment surveys were completed throughout the Study Area. The survey focused on areas with suitable habitat conditions (e.g. areas with abundant Milkweed (*Asclepias* sp.) and nectar producing plants. Surveys were completed between June and July 2022.



BUTTERNUT

Arcadis IBI biologist conducted systematic searches for Butternut throughout the Study Area between September and October 2022. In addition, searches for Butternuts were also simultaneously completed during wildlife and vegetation surveys within Study Area during the 2022 field program.

The survey consisted of walking throughout the Study Area and identifying Butternut specimens. Once located, qualified biologist performed a preliminary Butternut Health Assessment (BHA) and followed guidelines outlined in Butternut Health Assessor's Field Guide (MNR, 2015) and Butternut Assessment Guidelines: Assessment of Butternut Tree Health for the Purposes of the Endangered Species Act, 2007 (MNR, 2014).

SAR BATS

The presence or absence of SAR bat habitat was evaluated by using methods described in Section 4.3.4. Subsequently, two rounds of acoustic monitoring were performed to determine the likelihood of SAR bats roosting within the Study Area. Suitable bat maternity colony habitat is present in the Study Area in the form of woodlands with multiple large diameter cavity trees.

INCIDENTAL SPECIES AT RISK AND SPECIES AT RISK HABITAT OBSERVATIONS

In addition to those species' surveys noted above, incidental SAR and SAR habitat observations were noted during all site visits.

Should any SAR or SAR habitat be identified within or adjacent to the site during field surveys, appropriate measures will be proposed to reduce or eliminate the impact of the proposed development on the observed species or habitat. This may include further consultation with the MECP and/or additional species-specific surveys.



5.5 Trees

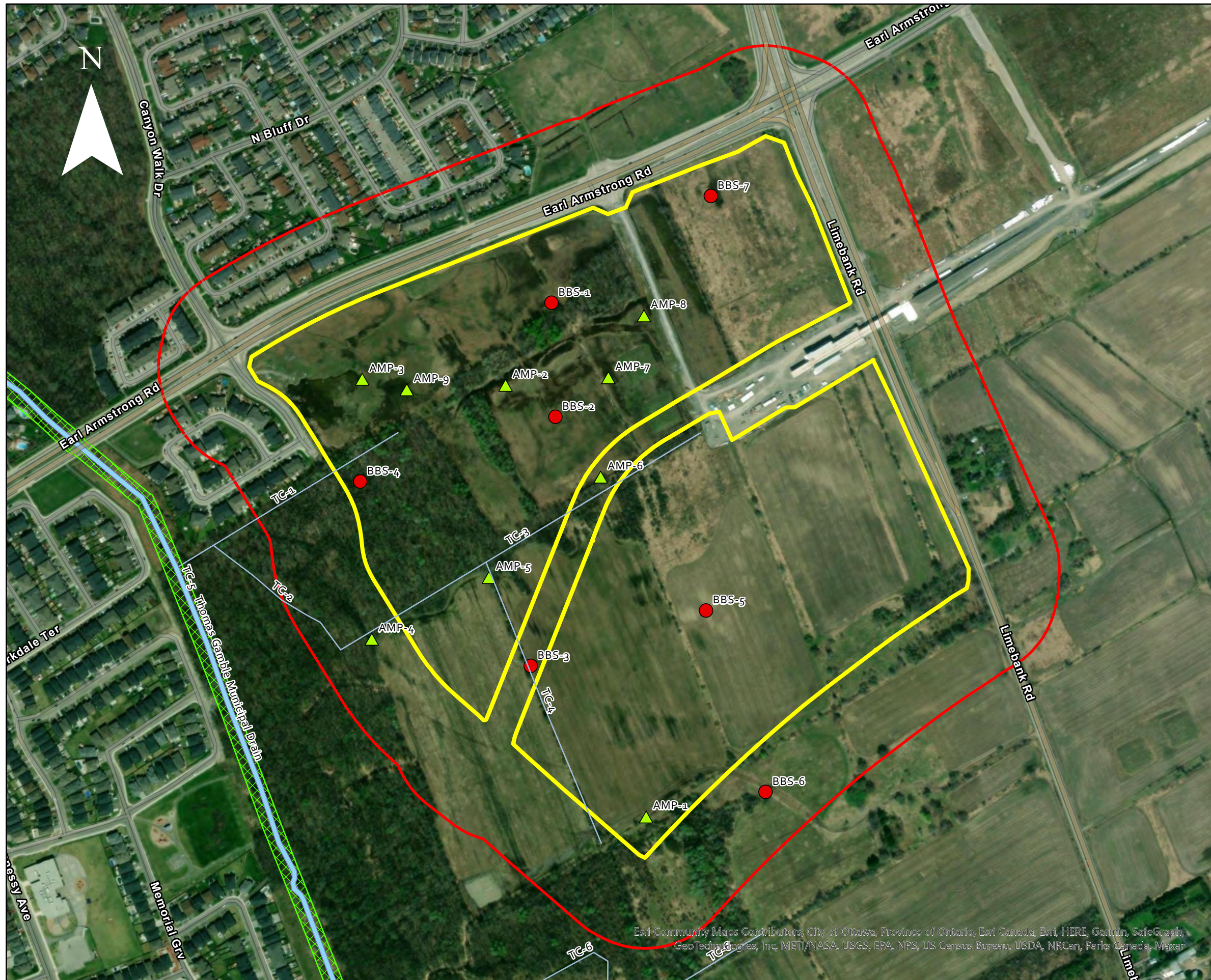
Following the City of Ottawa's *Tree Conservation Report Guidelines* (City of Ottawa, 2019a), a tree inventory was completed in September and October 2022. As the entirety of the Study Area is dominated by either woodland or forest vegetation communities, a tree inventory was conducted by sampling nine (9) 10 metre x 10 metre randomly selected plots.

Within each plot, any tree or shrub species that were 10 cm diameter at breast height (DBH) or greater were recorded and assessed. Each tree assessment recorded the following: species, DBH, health condition (trunk integrity, canopy structure, canopy vigor), UTM coordinate, and any other defects.

To identify Distinctive trees (≥ 50 cm DBH) on site, the Study Area was scoped on foot by walking transects throughout and recording the location, species, DBH, and health conditions of all Distinctive trees. Such surveys were conducted by an approved professional as outlined in the City guidelines.

5.6 Incidental Wildlife

A wildlife assessment within the property was 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 were documented by means of observational notes, and photographed. Such observations help validate our conclusions on the ecological function of the Study Area.



Legend

- Headwater Drainage Feature
- Municipal Drain
- Study Area
- Subject Property
- RVCA Regulation Area
- ▲ Amphibian Breeding Survey
- Breeding Bird Survey

0 0.04 0.07 0.14 0.21 0.28
 Kilometers
 Scale: 1:5,100



Client: **Riverside South Development Corporation (RSDC)**

Title: **RSDC Town Centre: Field Survey Points**

Prepared By: **ARCADIS | IBI GROUP**

Project: 137705
 Date: 2022-12-22

Figure: 3

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

6 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 and 9**, depending on survey context.

6.1 Site Investigation

Fieldwork conducted for the EIS and TCR took place between May 2022, and October 2022, when weather conditions and timing were deemed suitable based on the survey protocols being implemented. Fieldwork consisted of ELC of vegetation communities, Tree Inventory, HDF Assessment, breeding bird surveys, and amphibian breeding surveys. Any incidental wildlife 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 4**.

Table 4: Summary of field visits and conditions.

Purpose of Visit	Date	time	IBI Staff	Weather Conditions	Air Temp (C)
Headwater Drainage Feature Assessment	29/04/2022	9:00 AM - 12:30 PM	L.Jackson	Sunny, moderate breeze	13
Amphibian Survey #1	11/05/2022	8:30 PM - 00:00 AM	L.Jackson	Clear skies, calm winds	23
Headwater Drainage Feature Assessment	12/5/2022	8:30 AM – 2 PM	L. Jackson & B.Semmler	Clear skies, calm winds	30
Breeding Bird Point Count Survey #1/ELC	25/05/2022	8:00 AM - 10:00 AM	L. Jackson & B.Semmler	Partly Cloudy, Slight breeze.	15
Amphibian Survey #2, Bat Survey #1	26/05/2022	8:30 PM - 00:00 AM	L.Jackson & B.Semmler	Night, 100% Cover, Moderate, Breeze	22
Amphibian Survey #3, Bat Survey #2	14/06/2022	9:30 PM – 00:00 AM	L. Jackson & B.Semmler	Clear skies, calm winds	18
Breeding Bird Point Count Survey #2	22/06/2022	8:00 AM - 10:00 AM	L.Jackson	Partly cloudy, calm breeze	20
Breeding Bird Point Count Survey #3	28/06/2022	8:00 AM - 10:00 AM	L.Jackson	Cloudy/overcast, calm breeze	20
Tree Inventory/Butternut Assessment/ELC	30/09/22 & 5/10/22	8:00 AM -4:00 PM	L. Jackson & B.Semmler	Sunny, moderate breeze	14

6.2 Aquatic Environment

6.2.1 Floodplain and Regulated Limit

The Thomas Gamble Municipal Drain (Class F Municipal Drain) is situated approximately 100 m to the west of the Study Area, with water draining northwards. No regulated limits were identified within the Study Area.

6.2.2 Fish Habitat

Drainage features throughout the property were determined to be ephemeral, most having no flowing waters, and limited to damp surfaces by early summer. This suggests that these features may provide some indirect fish habitat, but likely no direct fish habitat. The presence of breeding Spring Peepers and Grey Tree Frogs within this area provided further evidence that these features do not provide suitable direct fish habitat.

6.2.3 Headwater Drainage Features

The assessment of the headwater drainage features was conducted to confirm findings from the *Headwater Drainage Features and Fisheries Existing Conditions Report* by Niblett Environmental Associates Inc. (NEA) (2012). No HDFs were identified within the property boundaries in the NEA report.

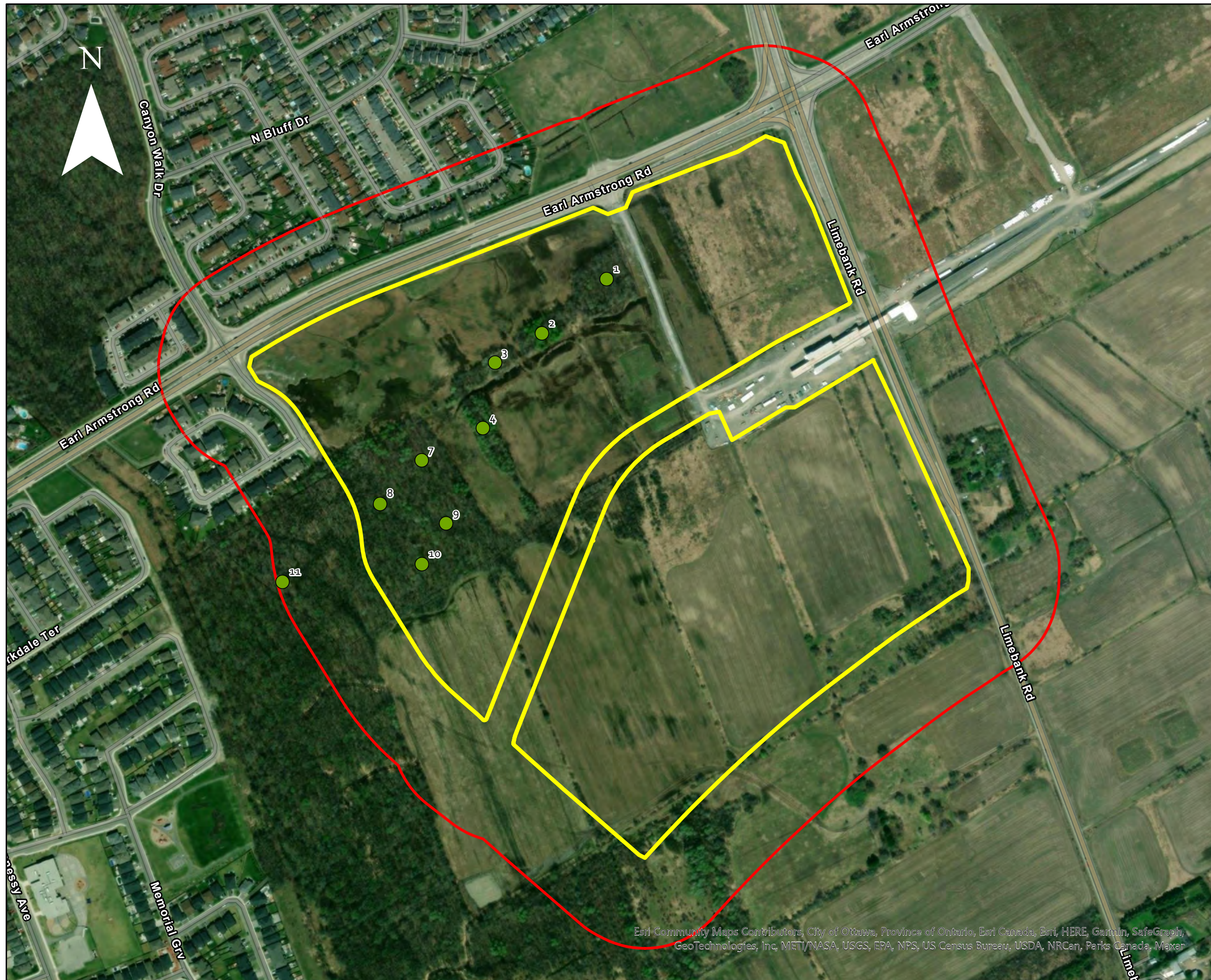
The topography of the site suggests that the Study Area drains to the west, towards the Thomas Gamble Municipal Drain. The initial site visit, intended to confirm the findings from the NEA HDF assessment, identified the presence of several ephemeral drainage features in the western portion of the Study Area (**Figure 4**). As these features were not noted in the NEA report, a new naming convention was applied.

Ephemeral Headwater Drainage Features (HDF) were observed predominantly within or adjacent to the Urban Natural Feature (UNF) (**Figure 1**). These features generally connect to an east-west backyard swale (TC-1) that flows west into the Thomas Gamble Municipal Drain. An undefined channel (TC-2) flows through the UNF to the north towards the backyard swale (TC-1). Another ephemeral HDF (TC-3), flows west from the edge of a construction access road into the undefined channel in the UNF (TC-2). The final drainage feature observed (TC-4) was an agricultural drainage feature that bisected a fallow agricultural field, draining north into TC-2.

Table 5 below provides a summary of the management recommendations based the observed characteristics of the features. **Figure 4** illustrates the headwater drainage features throughout the Study Area. Data sheets for the single site visit are included in **Appendix B**.

Table 5: Headwater Drainage Feature Assessment results.

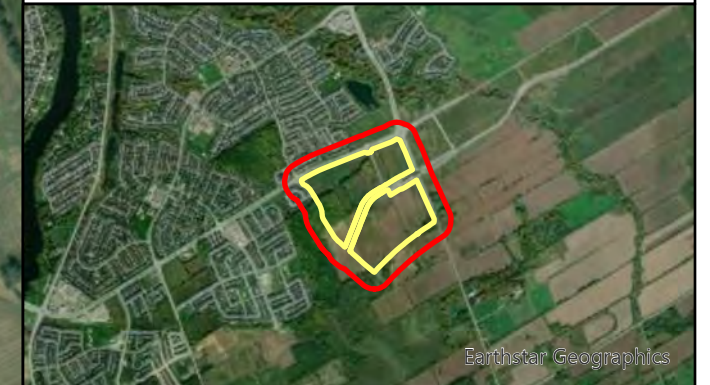
NEA Feature Segment	Drainage Feature Segment	Step 1		Step 2	Step 3	Step 4	Management Recommendation
		Hydrology	Modifiers	Riparian Habitat	Fish Habitat	Terrestrial Habitat	
N/A	TC-1	Contributing Functions: Contains ephemeral flows and storage fed by snowmelt, precipitation, and drainage from adjacent Urban Natural Feature and backyards. Surface damp by mid-May. Fairy shrimp observed during field visit.	Flows within a swale adjacent to backyards. Historical imagery suggests heavy alteration within adjacent lands to the north and east of this feature, including grading and earth works.	Important Function: Feature occurs at the edge of an Urban Natural Feature that is mapped as a swamp type wetland and riparian corridor categories are dominated by forest community and wetland.	Contributing Functions: swale/ditch provides allochthonous transport through feature to downstream habitat. No fish were observed within reach, and HDF is not classified in the NEA report.	Valued Function: Steppingstone habitat that connect to amphibian breeding habitat. No breeding amphibians within this reach were observed during surveys.	Conservation
No HDF	TC-2	Contributing Functions: Contains ephemeral flows and storage fed mostly by snowmelt, some precipitation, and drainage from adjacent meadow. Surface damp by mid-May. Fairy shrimp observed during field visit.	Flows within Urban Natural Feature in a defined channel. Historical imagery suggests heavy alteration within adjacent lands to the north and east of this feature, including grading and earth works as well as the construction of a Light-Rail Station.	Important Function: Feature occurs at the edge of an Urban Natural Feature that is mapped as a swamp type wetland and riparian corridor categories are dominated by forest community and wetland.	Contributing Functions: Defined channel provides allochthonous transport through feature to downstream habitat. No fish were observed within reach, and HDF is classified as "No HDF" in the NEA report.	Valued Function: Steppingstone habitat that connects to amphibian breeding habitat. No breeding amphibians within this reach were observed during surveys.	Conservation
N/A	TC-3	Contributing Functions: Contains ephemeral flows fed by snowmelt, precipitation, and drainage from adjacent meadows and road drainage/construction area. Surface damp by mid-May. No invertebrates observed during field visit.	Flows within forested buffer bisecting abandoned agricultural fields.	Valued Function: Meadow Habitat is dominant in the area to the south of the feature (@ 10-30m).	Contributing functions: abandoned agricultural field ditch provides allochthonous transport through feature to downstream habitats. No fish were observed within reach, and HDF is not classified in the NEA report.	Valued Function: Steppingstone habitat that connects to amphibian breeding habitat. No breeding amphibians within this reach were observed during surveys.	Mitigation
N/A	TC-4	Valued Functions: Contains intermittent flows fed by ground water inputs, snowmelt, precipitation, and drainage from agricultural features.	Flows within a drainage ditch that bisect agricultural fields and meadows.	Valued Function: Meadow habitat to the west, and plowed habitat to the east.	Contributing Functions: Small channel originating west of the agricultural field, adjacent to a dirt mound. NEA document does not identify this HDF.	Contributing Function: Connects forests upstream and downstream and allows for wildlife movement.	Mitigation



Legend

- Study Area
- Subject Property
- Tree Inventory Survey Point

0 0.04 0.07 0.14 0.21 0.28
 Kilometers
 Scale: 1:5,100



Client: **Riverside South Development Corporation (RSDC)**

Title: **RSDC Town Centre: Tree Inventory**

Prepared By: **ARCADIS | IBI GROUP**

Project: 137705

Date: 2022-12-22

Figure: 4

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

6.3 Natural Heritage Features

6.3.1 Vegetation Community

The ELC survey identified a total of six vegetation communities within the Study Area, in addition to three communities that are associated with transportation, agricultural, or residential.

The prominent vegetation communities within the Survey Area were wet meadow communities along with woodlands. All vegetation communities surveyed within the Survey Area are considered common within Ontario. **Table 6** below outlines the communities documented during ELC surveys and summarizes the abundant vegetation cover. The location, type, and boundaries of vegetation communities are delineated in **Figure 5**. Reference photos for the vegetation communities are included in **Appendix C**.

VEGETATION SURVEY

The vegetation survey identified 83 vegetation species within the Survey Area. 85% of the species identified were evaluated as being common within Ontario, having S-Ranks of S4 or S5. 14% of the species identified are considered as non-native or invasive in Ontario. Butternut was observed on site and contains as S-Rank of S2 (i.e. imperiled in Ontario).

Butternut, which is a provincial and federal SAR was within the Study Area within the edges of the forested swamp communities. This species has an S-Rank of S2 and is currently listed as Endangered by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) and has protections under both SARA and the ESA. Vascular plant species observed within the Study Area are listed in **Appendix D**.



Legend

- HDF: Conservation
- HDF: Mitigation
- Municipal Drain
- Study Area
- Subject Property
- RVCA Regulation Area
- HDF Survey Point

0 0.040.07 0.14 0.21 0.28
 Kilometers
 Scale: 1:5,100



Client: **Riverside South Development Corporation (RSDC)**

Title: **RSDC Town Centre: Headwater Drainage Features**

Prepared By: **ARCADIS | IBI GROUP**

Project: 137705
 Date: 2022-12-22

Figure: 5

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

Table 6: Summary of Ecological Land Classification vegetation communities within the Study Area.

ELC TYPE	TOTAL AREA WITHIN STUDY LIMITS	COMMUNITY DESCRIPTION
Annual Row Crops		
OAGM1	15 ha	Agricultural practices still occur throughout a portion of the Study Area. Row Crops of soybeans are planted within soils dominated with clay and silt at the southeastern extent of the Study Area.
Deciduous Swamp		
SWDM3-2 Silver Maple Mineral Deciduous Swamp	7.7 ha	This community includes the area between the mixed mineral meadow marsh ecosite and the existing residential development and encompasses the UNF. The canopy is composed of Silver Maple, Red Maple, Sugar Maple, with the sub-canopy being composed of basswood, American Elm, American Beech and Bitternut Hickory. The understory is composed of Green Ash, American Beech, Round Leaved Dogwood, Nannyberry, Swamp Red-currant, Glossy Buckthorn and Common Buckthorn. Ground cover included Woodland Horsetail, Marsh Horsetail, Marsh Marigold, Woodland Strawberry, Poison Ivy, Stinging Nettle, Canada Mayflower, Large False Solomon's Seal, Sensitive Ferns, Northern Lady Fern, and Ostrich Fern.
SWDM4-5 Poplar Mineral Deciduous Swamp	2.8 ha	This community includes the centrally located forest stand, that extends parallel to Earl Armstrong Road, and is surrounded by mixed mineral meadow marsh. The canopy is composed of Trembling Aspen, Silver Maple, Freeman's Maple, Basswood, and Red Maple, while the sub-canopy is composed of Silver Maple, Basswood, Trembling Aspen, Swamp White Oak, Red Maple, Ironwood, and Green Ash. The understory is composed of Green Ash, Red Osier Dogwood, Canada Plum, Common Buckthorn, Apple and Hawthorn species. Ground cover is composed of Marsh Horsetail, Bladder Sedge, Dewberry, Blue-Flag Iris, Sasparilla, Woodland Strawberry, Sensitive Fern, Northern Lady Fern.
Woodland		
WODM5 Fresh-Moist Deciduous Woodland	3.4 ha	Located at the southwestern extent of the Study Area, this woodlot community appears to be a mix of regenerating forest stand and shrub thicket communities. The canopy consists of; Trembling Aspen, Silver Maple, American Elm, Basswood, Norway Spruce, Manitoba Maple, and Sugar Maple. Sub-canopy is composed of Crack Willow, Common Buckthorn, Honeysuckle species, Hawthorn species, regenerative Green Ash, Choke Cherry, Sensitive Fern, White Meadowsweet, Common Red Raspberry, Canada Goldenrod, Aster species, Bedstraw species, Daises, Sow Thistle, Toadflax, and Carex species.
Deciduous Forest		
FODM11 Naturalized Deciduous Hedge-Row	1.2 ha	Native and non-native naturalized tree and shrub species dominate the community. Deceased hedgerows of Ash species and American Elm border the northern edge of a driveway that leads west from Limebank Road to an old foundation. The landscape in this community has historically been used for a

		variety of agriculture practices. The canopy is composed of Red Maple, Sugar Maple, Trembling Aspen, Green Ash, American Elm, and Basswood. The understory contains; Wild Cucumber, Common Buckthorn, Honeysuckle species, Common Red Raspberries, Green Ash, Nannyberry, Virginia Creeper, and various Carex species.
Meadow Marsh		
MAMM3 Mixed Mineral Meadow Marsh *includes a 0.2 ha inclusion of Cattail Mineral Shallow Marsh	13.6 ha	This community includes meadows that have regenerated in areas that have been subject to grading and site alteration. There are no trees associated with these communities, and the shrub cover is less than 25%. Flooding in these meadows is seasonal, with the soils flooded in spring, and moist to dry by summer. Shrubs present within this community included regenerating Red Maple, Trembling Aspen, Bebb's Willow, Meadow Willow, and Red Osier Dogwood. Ground cover included vegetation such as New England Aster, Lance-leaved Aster, Grass-leaved Goldenrod, Common Rush, Blue Vervain, Bladder Sedge and Common Fox Sedge.
Meadow		
MEMM4 Fresh-Moist Mixed Meadow	26.2 ha	This community is situated in abandoned and regenerating agricultural fields throughout the Study Area. Now in the process of naturalization, this community's ground cover consists of; regenerative Green Ash, Common Dandelion, Common Red Raspberry, Toadflax, various grasses and sedges, Sow Thistle, Yellow Clover, Mustard species, Reed Canary Grass, Bedstraw species, Goldenrod species, Aster species, and Common Vetch.
MEMM3 Dry-Fresh Mixed Meadow	2.2 ha	A naturalized meadow inclusive of Canada Goldenrod, Common Vetch, Common Dandelion, Poison Ivy, Wild Strawberry, Field Horsetail, Field Mustard and a variety of Carex species. This area was noted to have been maintained throughout the field season.
Transportation and Utilities (CVI)		
CVI_1 Transportation	10.8 ha	This area consists of a gravel access road for the construction of the Earl Armstrong/Bowesville Light Rail Transit Station, Earl Armstrong Road to the north, and Limebank Road to the east.
CVR_3 Single Family Residential	6.7 ha	This area consists of single-family home dwellings backing onto the Urban Natural Feature at the north-western edge of the Study Area, as well as to the north or Earl-Armstrong Road.

6.3.2 Wetlands

There are unevaluated wetlands mapped in the NHIC database throughout the Study Area (**Figure 1**). Field investigations confirmed that the mapped wetlands are located within the forested areas (Silver Maple swamp and Poplar swamp). These areas hold waters seasonally, mostly snow melt, likely due to the high clay content within the soils within the Study Area. Ephemeral pools were evident throughout the forested areas within the Study Area, specifically the Silver Maple swamp with defined channels extending east to west at the southern edge of the Study Area. Approximately 28% of the vegetation within the Silver Maple swamp is considered to be facultative species, 37% of the vegetation is considered to be facultative wetland species, and 7% of the vegetation considered to be obligate wetland species. It was confirmed that the unevaluated wetland covers approximately 10.5 ha of the Study Area.

In addition to the mapped wetlands, a mixed meadow marsh community was identified within the Study Area. The mixed meadow marsh is dominated by cultural species and non-native vegetation and covers approximately 13.6 ha. This community includes an inclusion of a shallow open water cattail marsh along the southern edge of the poplar swamp (see **Figure 5**). Approximately 13% of the vegetation within the mixed meadow marsh is considered to be facultative species, 26% of the vegetation is considered to be facultative wetland species, and 30% of the vegetation considered to be obligate wetland species.

The shallow open water cattail marsh inclusion was the only area that had open water persisting into September and covers approximately 0.2 hectares of the Study Area.

A review of historical aerial imagery suggests that heavy site alteration occurred between 2015 and 2017, including what appears to have been earth works such as topsoil removal that may have altered the drainage throughout the Study Area, allowing for the retention of snowmelt on-site and creating wet meadow habitat observed.



6.3.3 Woodlands

Both the Silver Maple deciduous swamp and poplar deciduous swamp forests within the Study Area are likely to meet the prerequisite woodland designation as set out in the Forestry Act, R.S.O 1990, c.F.26.

In reviewing historic earliest possible aerial imagery on geoOttawa, dating back to 1976 (46 years, current to 2022), the Study Area was dominated by agricultural land use, with inclusions of woodlands bisecting the property, and connecting to what is now considered an Urban Natural Feature (UNF). The imagery suggests that the woodlands present within the Study Area are likely exceed 60 years in age, and therefore are likely to meet the minimum age requirement to be considered significant.

The aerial imagery from 1976 suggests that there are 2 distinct sections of woodlands that could be 60 years of age or older, both wooded communities (Silver Maple deciduous swamp and Poplar deciduous swamp) areas are greater than 0.8 ha in size in 1976, with the Poplar deciduous swamp covering an area of approximately 1.8 ha, and the entirety of the Silver Maple swamp covering an area of approximately 20.4 hectares in 1976, therefore meet the minimum size requirements to be considered significant.

The earliest available imagery (1976) suggests that these woodlands were well established and have likely persisted within the Study Area for 60 years or more and are greater than 0.8 ha. Additionally, the City's Natural Heritage Mapping designates a portion of the Silver Maple swamp as an Urban Natural Feature. **Both the Silver Maple deciduous swamp and Poplar deciduous swamp forest types within the Study Area are considered significant.**

The other woodlands identified within the Study area were not present in 1976, and therefore does not meet the age criteria to be considered significant according to the City of Ottawa Significant Woodland Guidelines.

6.3.4 Significant Wildlife Habitat

Breeding bird, amphibian breeding, and bat echolocation surveys were conducted in order to establish baseline conditions within the Study Area.

Breeding Bird Survey

A total of 62 bird species were recorded during the surveys, and an additional two were recorded incidentally during other field surveys. A record of the bird species observed within the Study Area, and their conservation status can be found in **Appendix E**. Of the species recorded, the majority exhibited probable or confirmed breeding evidence.

Many of the birds recorded are common within the City of Ottawa. Only one SAR bird species, (Bobolink) was recorded during the breeding bird surveys, and one additional SAR bird (Eastern Meadowlark) was observed incidentally during other field visits. Some birds were considered to be fly overs, with limited suitable nesting habitat located within the Study Area. Most birds observed on-site are common in Ottawa and have generally secure populations within Ontario.

Meadows with dense ground cover are present within the Study Area, making the area suitable for Bobolink, or Eastern Meadowlark nesting, though suitable nesting habitat was limited to approximately 4 ha of fresh-moist mixed meadow communities within the Study Area which is generally considered to be too small an area for either species.

Pileated Woodpeckers were also observed during breeding bird surveys, as well as other site visits, specifically within the Silver Maple deciduous swamp community. Though no targeted nest surveys were completed, evidence of foraging in dead or decaying trees was found throughout the woodlots within the Study Area. No nests were visually observed within the Study Area, however there is a likelihood that the mature woodlots within the Study Area provide suitable nesting or roosting habitat for Pileated Woodpeckers.

Based on surveys conducted by Arcadis IBI, the Study Area contains suitable habitat conditions to support breeding birds common to Ottawa and eastern Ontario. However, the results indicate that the Study Area is not considered SWH for breeding birds.

Amphibian Breeding Survey

In accordance with the Ecoregion 6E Criterion Schedule (MNR, 2015b), three amphibian breeding surveys were completed to determine the presence of Amphibian Breeding Habitat throughout the Study Area (**Figure 3**). Amphibian Breeding Surveys were conducted for ephemeral and permanent water features that occurred within the 120 m Study Area.

Seven stations were monitored on three separate occasions for frog calls to determine abundance of breeding frog populations. Species observed during these auditory surveys included four species: American Toad (*Anaxyrus americanus*), Gray Tree Frog (*Hyla versicolor*), Green Frog (*Lithobates clamitans*) and Spring Peepers (*Pseudacris crucifer*). Breeding male Gray Tree Frogs were also observed. A summary of species recorded, and call abundance can be found in **Table 7**.

During subsequent field visits, an abundance of tadpoles were observed within the wetted mixed meadow marsh ecosite communities. Field visits confirmed the presence of adult Northern Leopard Frogs (*Lithobates pipiens*) as well as Wood Frogs (*Lithobates sylvaticus*) within the Study Area, however no breeding populations were audibly recorded during targeted surveys.

Candidate significant woodland amphibian breeding habitat is described as being the presence of a wetland, pond, or woodland pool greater than 500 m², within or adjacent to a woodland (ELC Community FOC, FOD, FOM, SWC, SWD, SWM). Studies confirmed that there was the presence of two of the listed frog species (Spring Peeper and Gray Tree Frog) within the Ecoregion 6E Criterion Schedule (MNR, 2015b), both of which had a Call Level Code of 3 at Station RSDC #8. The open water cattail marsh area adjacent to the woodlands has presence of water persisting into September.

Based on surveys conducted by Arcadis IBI, the Study Area contains approximately 0.2 ha of significant amphibian breeding habitat (woodland) within the open water cattail marsh inclusion mapped in **Figure 5**.

Bat Acoustic Monitoring

Minimal candidate cavity snag trees were observed within the Silver Maple swamp and Poplar swamp communities during the ELC and a tree inventory. Additionally, during acoustic monitoring conducted in the summer of 2022, three bat species were recorded within the Study Area, including Hoary Bat (*Lasiurus cinereus*), Silver-haired Bat (*Lasionycteris noctivagans*) and Big-Brown Bat (*Eptesicus fuscus*). Bat species recorded within the study area are known to thrive in urban settings.

Based on the results of the acoustic surveys, it is likely that the woodland and adjacent meadow habitats provide suitable foraging habitat. Given the limited abundance of snag/cavity trees observed during the ELC surveys and tree inventory, the proximity to residential areas (candidate roost habitat) and the Rideau River (foraging and roosting habitat), it is unlikely that the woodlands within the Study Area provide Bat Maternity Colony SWH. Additionally, a portion of the woodlot adjacent to the Study Area will be retained as it is part of an Urban Natural Feature, allowing for the preservation of mature trees that may provide roosting habitat for the species observed within the Study Area.

Habitat for Species of Conservation Concern

In addition to the targeted wildlife and vegetation community surveys described above, general habitat observations will be noted as it relates to the habitat requirements for Species of Conservation Concern identified in **Table 2**.

Incidental Observations of Significant Wildlife Habitat

There were no incidental observations of SWH during field surveys, or site visits.

Table 7: Amphibian Breeding Survey results.

STATION ID #	SURVEY #	SPECIES	CALL LEVEL
RSDC-1	1	No Calls	N/A
	2	Spring Peeper	1
	3	No Calls	N/A
RSDC-4	1	No Calls	N/A
	2	No Calls	N/A
	3	No Calls	N/A
RSDC-5	1	Spring Peeper	2
	2	Spring Peeper	1
		Gray Tree Frog	2
	3	No Calls	N/A
RSDC-6	1	Spring Peeper	2
		Gray Tree Frog	1
	2	Gray Tree Frog	2
	3	No Calls	N/A
RSDC-7	1	Spring Peeper	3
		Gray Tree Frog	2
		American Toad	1
	2	Gray Tree Frog	3
	3	No Calls	N/A
RSDC-8	1	Spring Peeper	3
		Gray Tree Frog	3
	2	Gray Tree Frog	3
	3	Green Frog	1
RSDC-9	1	Spring Peeper	2
		Gray Tree Frog	3
	2	Gray Tree Frog	2
	3	Gray Tree Frog	2
RSDC-10	1	Spring Peeper	3
		American Toad	3
		Gray Tree Frog	2
	2	Gray Tree Frog	2
	3	Gray Tree Frog	2

6.3.5 Species at Risk and Species at Risk Habitat

The following section describes the findings of the targeted SAR surveys.

Barn Swallow

No appropriate nesting structures were identified within the Study Area, and no Barn Swallows were observed during breeding bird surveys.

Bobolink

In total, six male Bobolink were observed during Survey 1 of breeding bird surveys completed at BBS-1, BBS-4 and BBS-5 (May 20th, 2022, and May 25th, 2022). Bobolinks were not heard or observed at survey 2 or survey 3 (June 22nd, 2022, June 28th, 2022, July 3, 2022). No breeding pairs were observed during any of the field visits. It was therefor determined that suitable nesting habitat is not present within the Study Area and that those individuals observed were not using the habitat for nesting or mating. In addition, shrub density and the presence of edges separating suitable habitat throughout the Study Area are characteristics that are not suitable Bobolink nesting habitat.

Eastern Meadowlark

One male Eastern Meadowlark was observed incidentally during headwater drainage feature assessments. No other Eastern Meadowlarks were heard or observed in subsequent surveys, and it was determined that suitable nesting habitat was not present within the Study Area.

Red-headed Woodpecker

Requires cavity trees larger than 40 cm DBH for nesting, though some larger diameter trees were present within the Study Area, no appropriate cavity trees were observed to provide nesting habitat within the Study Area. No Red-headed Woodpeckers were observed during field visits or breeding bird surveys.

Monarch

No Monarchs were visibly observed during site visits. Some milkweed plants were noted within the meadow habitat; however, its presence was not abundant. The site provides limited opportunity for breeding and feeding for Monarchs.

Butternut

A scan for Butternut trees was completed during the tree inventory. A total of 18 Butternut trees were identified and assessed within the Study Area (see **Figure 9** for location). The following is a summary of the health categories for each tree assessed:

- Category 1 (non-retainable) = 14 trees
- Category 2 (retainable) = 4 trees
- Category 3 (retainable and archivable) = 0 trees

A detailed summary of Butternut tree health conditions can be found in **Appendix F**.

SAR Bats

No SAR bat species were identified during acoustic monitoring surveys. Some marginal roosting habitat for SAR bats was observed in the mature forests found in the Study Area.



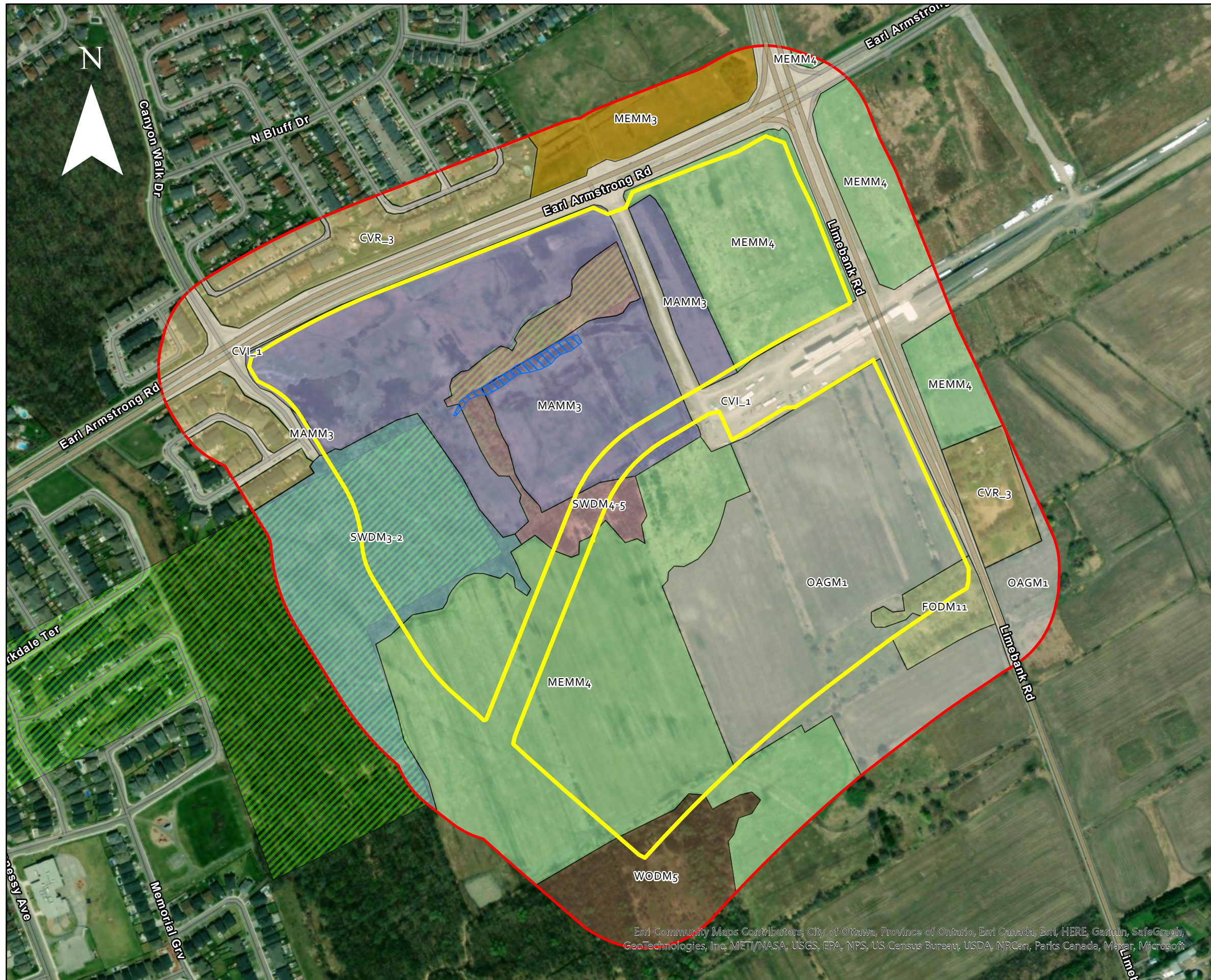
6.4 Trees

An inventory of tree species, general health and conditions and abundance within the property was completed in September 2022. Twenty-six (26) species were observed within the subject property and are listed below (tree species marked with an asterisk (*) are non-native or invasive):

- **American Basswood** (*Tilia americana*)
- **American Beech** (*Fagus grandifolia*)
- **American Elm** (*Ulmus americana*)
- **Amur Maple** (*Acer ginnala*)*
- **Apple spp.*** (*Malus spp.*)
- **Balsam Fir** (*Abies balsamea*)
- **Bebb's Willow** (*Salix bebbiana*)
- **Bitternut Hickory** (*Carya cordiformis*)
- **Black Walnut** (*Juglans nigra*)
- **Butternut** (*Juglans cinerea*)
- **Canada Plum** (*Prunus nigra*)
- **Choke Cherry** (*Prunus virginiana*)
- **Common Buckthorn** (*Rhamnus cathartica*)*
- **Freeman's Maple** (*Acer x freemanii*)
- **Glossy Buckthorn** (*Frangula alnus*)*
- **Green Ash** (*Fraxinus pennsylvanica*)
- **Ironwood** (*Ostrya virginiana*)
- **Red Maple** (*Acer rubrum*)
- **Sugar Maple** (*Acer saccharum*)
- **Silver Maple** (*Acer saccharinum*)
- **Swamp White Oak** (*Quercus bicolor*)
- **Trembling Aspen** (*Populus tremuloides*)
- **White Birch** (*Betula papyrifera*)
- **White Willow** (*Salix alba*)
- **Yellow Birch** (*Betula alleghaniensis*)

Randomly selected inventory plots (100 m²) were surveyed within the wooded communities (**Figure 6**). The survey results show that within the Poplar swamp the dominant tree species is trembling aspen (69% occupancy), followed by Silver Maple (18% occupancy) and basswood (13% occupancy). Trees in this community were mature, with the average DBH being 24, and the tree condition being evaluated as good overall. Some dead Ash trees were noted during the tree inventory, with signs of Emerald Ash Borer being apparent throughout the woodlot, as well as Butternut canker on inventoried Butternut trees.

Within the Silver Maple swamp community, the dominant species was Silver Maple (58% occupancy), followed by Basswood (13% occupancy), while Ironwood, Green Ash, Bitternut Hickory, Swamp White Oak, and Trembling Aspen were recorded equally. Trees within this community were generally mature with the average DBH being 27, and the tree condition being evaluated as good overall. Evidence of Emerald Ash Borer was noted within the woodlot, as well as Butternut canker on inventoried Butternut trees.



Legend

Subject Property	Mixed Mineral Meadow Marsh (MAMM3)
Study Area	Dry-Fresh Mixed Meadow (MEMM3)
Open Water Cattail Marsh	Fresh-Moist Mixed Meadow (MEMM4)
Significant Woodlot Imagry (1976)	Annual Row Crops (OAGM1)

Ecological Land Classification

Transportation (CVI_1)	Silver Maple Mineral Deciduous Swamp (SWDM3-2)
Single Family Residential (CVR_3)	Poplar Mineral Deciduous Swamp (SWDM4-5)
Naturalized Deciduous Hedge-Row (FODM11)	Fresh-Moist Deciduous Woodland (WODM5)

0 0.04 0.07 0.14 0.21 0.28
 Kilometers
 Scale: 1:5,100



Client: **Riverside South Development Corporation (RSDC)**

Title: **RSDC Town Centre: Ecological Land Classification**

Prepared By: **ARCADIS | IBI GROUP**

Project: 137705

Date: 2022-12-22

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

6.5 Ecological Linkages

The function of the Study Area as an ecological linkage is limited to the general movement of common Ottawa wildlife through the landscape. The Study Area provides amphibian breeding habitat and provides a terrestrial linkage to the Thomas Gamble Municipal Drain, allowing for greater connectivity to wetlands, permanent water, and woodlands present downstream.

6.6 Incidental Wildlife

In addition to incidental bird observations listed in Section 5.3.4, the following incidental wildlife observations were made during site visits:

- Eastern Coyotes were heard calling, and visibly observed during breeding bird and amphibian breeding surveys,
- Evidence of deer (scat and hoof tracks), and deer bedding (depressed grass and vegetation),
- Beaver skull and evidence of beaver damage to trees,
- Gray squirrel,
- Meadow Vole,
- Wood Frog,
- Northern Leopard Frog, and
- North American Porcupine.

7 Description of the Proposed Project

Riverside South Development Corporation is proposing to develop a multi-land use development for which a draft site plan proposes the construction of medium density residential units, commercial units, a school, and a district park (**Figure 7**). The total development footprint is approximately 29 ha. This EIS assumes impact and total removal of all Natural Heritage Features withing the development footprint.





7.1 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, sewer, gas, and hydro;
- Construction of buildings, driveways, and access roads;
- Site grading and earth works;
- Paving parking areas and access roads;
- Landscaping and fencing; and
- On-going usage and maintenance.



Legend

-  Site Plan
-  Subject Property
-  Study Area
-  Urban Natural Feature

0 0.04 0.07 0.14 0.21 0.28
 Kilometers
 Scale: 1:5,100



Client: **Riverside South Development Corporation (RSDC)**

Title: **RSDC Town Centre: Site Plan**

Prepared By: **ARCADIS | IBI GROUP**

Project: 137705
 Date: 2022-12-22

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

8 Impact Assessment and Mitigation

The following section will describe the anticipated environmental impacts associated within the proposed development under the assumption that the site plan would remove all Natural Heritage Features within the development footprint. General measures to be considered throughout the design and planning, construction, and post-construction phases have been included to address impacts with long-term occupation of the development. The associated impacts are illustrated in **Figure 8**.

8.1 Aquatic Environment

Headwater drainage features will be impacted within the proposed development footprint, including approximately 100 m of TC-1 (Conservation), approximately 450 m of TC-3 (Mitigation) and approximately 175 m of TC-4 (Mitigation). The permanent removal is expected to have a limited ecological affect on aquatic habitat within the Study Area or in the surrounding landscape by reducing seasonal flow inputs to downstream reaches, specifically related to snow-melt and the spring-freshet.

It is understood that flows from the Study Area will be redirected to existing stormwater pond north of Earl Armstrong Road, as well as to the planned stormwater infrastructure block south of the Study Area that will drain into the Thomas Gamble Drain.

The following impacts to aquatic habitat from the proposed development and associated construction activities expected:

- Permanent removal of approximately 1,030 m of headwater drainage features from the subject property; and
- Reduction of natural drainage features and patterns, specifically as potential inputs to downstream municipal drain, and woodland wetlands cells.

Proposed Mitigation Measures – Planning and Design Stage

- ✓ Stormwater retention, site grading, and quality control measures should be designed to appropriately direct stormwater and surface flows to maintain the function of the HDF features identified as “Mitigation”.
- ✓ Preservation of flows to Urban Natural Feature to ensure the seasonal hydration of ephemeral wetland cells.
- ✓ Retention of HDF TC-1 and TC-2 to allow opportunity for hydration of downstream features as well as water storage during snowmelt and major precipitation events. These features may be realigned to accommodate the proposed park infrastructure but must retain a natural corridor.
 - A 15m setback is recommended for the retained HDF features.
 - If any realignment is required, a ‘Restoration and Monitoring Plan’ would be required ensure the restoration design meets the established restoration objectives and offsets the loss of ecological function.
 - An environmental monitoring program for the re-aligned channel and associated habitat will also be a required. The framework shall ensure that all water features are monitored for 5 years post-construction. ‘Smart’ goals shall be developed to ensure that all desired outcomes and conservation targets can be evaluated.

- ✓ A detailed Erosion and Sediment Control Site Plan shall be developed for implementation during construction to prevent impacts from all associated activities to adjacent water features.

Proposed Mitigation Measures – Construction Implementation

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

- ✓ Heavy-duty silt fencing (OPSD 219.130) and/or other equivalent erosion and sediment control measures shall be installed around the Project footprint, adjacent to the footprint of the drainage feature, and associated wetland habitats to clearly demarcate the development area and prevent erosion and sedimentation into water features. Erosion and sediment control (ESC) measures shall be monitored weekly to ensure they are functioning properly and if issues are identified should be dealt with 48-hours of notice.
- ✓ Refuelling of all equipment shall be conducted 30 m or more from any water feature. Storage of fuel and refueling shall be conducted within an area identified by the environmental monitor and the contract administrator.
- ✓ 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.
- ✓ Drip pans shall be used under stationary equipment using fuel products such as generators, and similar equipment to ensure no deleterious substances enter water features.
- ✓ Heavy equipment shall not enter active watercourses or wetlands at any time.
- ✓ A spill response plan shall be developed by the contractor and implemented as required.

Proposed Mitigation Measures – After Construction

- ✓ All ESC measures shall remain in place until vegetation is re-established, as directed by the environmental monitor.

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 limited in the context of the greater watershed due. These impacts are unlikely to impact water quantity being directed to the Thomas Gamble Municipal Drain. No significant amphibian breeding habitat was detected within the UNF wetland.

8.2 Natural Heritage Features

8.2.1 Vegetation Communities

It is anticipated that to accommodate the proposed development, the vegetation communities will be cleared and graded. The impacts associated with the clearing will include:

- The permanent loss to native vegetation is approximately 23.8 ha of meadow and deciduous forests and woodlots as well as 11.2 ha of agricultural fields. This disturbance is directly associated with the clearing required to accommodate the Project. The area of vegetation planned for removal is separated below per ELC community:
 - 13.2 ha of mixed meadow marsh
 - 16.5 ha of fresh-moist mixed meadow
 - 3.8 ha of Silver Maple swamp
 - 2.8 ha of Poplar deciduous swamp
 - 0.3 ha of fresh-moist deciduous woodland
 - 0.4 ha of naturalized deciduous hedge-row
 - 11.2 ha of cropped agricultural lands
- Accidental damage or loss of trees and other vegetation features because of site alteration or construction activities;
- Permanent loss of habitat for wildlife dependent of terrestrial communities;
- Changes in natural drainage, evapotranspiration and infiltration processes;
- Decreased biodiversity, reduced number of species, or abundance of species;
- Erosion and sedimentation into adjacent vegetation communities; and
- Permanent loss of native vegetation due to increased potential for non-native and invasive species after development.

Proposed Mitigation Measures – Planning and Design Stage

- ✓ Landscaping plans shall incorporate naturalized features with native vegetation seeding and plantings where feasible, specifically within the proposed district park. For example, a naturalized pollinator gardens and rain gardens should be designed and planted adjacent to parking lots to provide native vegetation within the proposed residential, commercial and school blocks, as well as an opportunity for infiltration of stormwater run.
- ✓ Where development encroaches into the Urban Natural Feature habitat, a forest Edge Management and Restoration Plan shall be developed to replace removed native trees and shrubs and re-establish a functional forest edge. This shall include a monitoring plan to monitor the establishment of non-native and invasive species.
- ✓ Development and implementation of invasive species management plan for vegetation removals and landscaping, specifically to address abundant species such as Buckthorn. This management plan should be consistent with federal standards under the federal Invasive alien species strategy (Environment Canada, 2004)

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 shall be used to delineate the construction limits from the adjacent habitat of the existing Natural Heritage Feature. This will prevent encroachment of construction activities into the adjacent natural feature. This fencing should be monitored weekly to ensure it is functioning properly. Any deficiency in the fencing should be dealt with within 48 hours of notification.
- ✓ Erosion and sediment control plan shall be implemented to prevent sedimentation outside of work areas, specifically within the Urban Natural Feature.
- ✓ Landscaping plans shall make use of appropriate native species to offset the loss of species and biodiversity from vegetation removals.
- ✓ Invasive species to be removed shall be done so using species-appropriate methods to prevent further contamination and comply with invasive species legislation.
- ✓ Machinery will arrive on site in a clean condition and will be free of fluid leaks, invasive species, and noxious weeds.
- ✓ Machinery shall remain within the limit of development and shall be stored in an area that is isolated from the Urban Natural Feature to ensure that no deleterious substances enter the wetlands; and
- ✓ All excess construction material will be removed from site and the area restored with seeding of native species upon project completion as required.

Proposed Mitigation Measures – Post-Construction

- ✓ Naturalized features such as pollinator gardens, rain gardens and native tree and shrub planting shall be monitored according to the developed monitoring plans;
- ✓ Installation of garbage bins in public spaces is recommended to limit trash habitats adjacent to the development area; and
- ✓ 'No Littering' signage is recommended around the property to discourage littering.

With the successful implementation of the mitigation measures outlined above, a moderate decrease in vegetation communities is anticipated due to the removal of vegetation within the Study Area.

8.2.2 Wetlands

It is anticipated that approximately 6.6 ha of unevaluated forested swamp wetland, and 13.2 of mixed meadow marsh wetland will be removed to accommodate the proposed development. The permanent removal is expected to have a moderate ecological impact within the Study Area or in the surrounding landscape by reducing the availability of amphibian breeding habitat.

Wetland removal in this area will negatively impact the abundance and diversity of native woodland vegetation, decrease permeable surfaces, and reduce available habitat for wildlife. The removal of the wetland also functionally eliminates 0.2 ha of significant amphibian breeding habitat (woodland).

The following impacts to wetland habitat from the proposed development and associated construction activities are expected:

- Permanent removal of approximately 0.2 ha of significant amphibian breeding habitat (woodland).
- Reduction of overall natural wetland features, including 6.6 ha of mapped, unevaluated forested swamp wetland.

- Reduction in natural infiltration, and saturation of adjacent UNF which could lead to a change in species composition over time due to the increase in impervious surface throughout the Study Area.

Proposed Mitigation Measures – Planning and Design Stage

- ✓ Prepare an edge management plan that addresses the removed native trees and shrubs along the edge of the urban natural feature to be retained. This shall include a monitoring plan to monitor the establishment of non-native and invasive species.
- ✓ Wildlife exclusion fencing shall be designed and installed between the edge of the urban natural feature and the future Canyon Walk Drive extension, adjacent to the proposed district park. The fencing design shall be approved by a qualified biologist.
- ✓ An environmental monitoring program will be required for the constructed wetland. The framework shall ensure that all water features are monitored for 5 years post-construction. Smart goals shall be developed to ensure that all desired outcomes and conservation targets can be evaluated.
- ✓ Construction of features that provide hydration to the UNF to ensure that the habitat isn't impacted by the land use change within the Study Area.
- ✓ Further consultation with the RVCA and the City of Ottawa to confirm habitat compensation plan and environmental monitoring programs requirements and associated permitting.

Proposed Mitigation Measures – Construction Implementation

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

- ✓ Orange snow fencing shall be used to delineate the construction limits from the adjacent habitat. This will prevent encroachment of construction activities into remaining adjacent natural features. This fencing shall be monitored weekly to ensure it is functioning properly. Any deficiencies noted in the fencing upon inspection shall be addressed within 48 hours of notice.
- ✓ Light-duty silt fencing (OPSD 219.110) and / or other equivalent erosion and sediment control measures should be installed around the perimeter of the development footprint to clearly demarcate the development area and prevent erosion and sedimentation into adjacent habitats. 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.
- ✓ Machinery will arrive on-site in a clean condition and will be free of fluid leaks, invasive species, and noxious weeds.
- ✓ 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.

Proposed Mitigation Measures – Post-Construction

- ✓ Compensation features such as wetland features and created habitat features shall be monitored according to the developed monitoring plans.

With the successful implementation of the mitigation measures outlined above, impacts from the proposed development on wetlands is expected to be permanent, but limited in terms of the greater watershed. These impacts are likely to impact water quantity being directed to the Thomas Gamble Municipal Drain through the UNF adjacent to the development footprint.

Significant amphibian breeding habitat (woodland) associated with a 0.2 ha shallow open water cattail marsh will be permanently removed.

The majority of the wetlands throughout the Study Area primarily function as water storage during spring freshet and to a lesser degree, major precipitation events.

8.2.3 Woodlands

It is expected that at least 7.4 ha of woodlands will be cleared to accommodate site remediation, development of the proposed mixed-use development.

The woodlands throughout the Study Area have a number of large, mature and healthy tree, with widespread evidence of Emerald Ash Borer damage to mature ash trees throughout the woodland. Additionally, there is a large presence of Common Buckthorn, and Butternut trees impacted by Butternut canker have been identified within this woodland.

Woodland removal in this area will negatively impact the abundance and diversity of native woodland vegetation, decrease canopy cover and permeable surfaces, and reduce available terrestrial habitat for wildlife. The removal of the woodlot will also limit the amount of interior forest habitat available for local wildlife.

The anticipated impacts to woodlands include:

- The permanent loss of approximately 6.6 ha of significant woodlands within the proposed development area, including;
 - 3.8 ha of Silver Maple deciduous swamp
 - 2.8 ha of Poplar deciduous swamp
- The permanent loss of approximately 0.7 ha of non-significant woodlands within the proposed development area, including;
 - 0.3 ha of fresh-moist deciduous woodland
 - 0.4 ha of naturalized deciduous hedge-row
- Decreased biodiversity, reduced number of species, or abundance of species;
- The permanent loss of habitat for wildlife dependent upon these woodlands;
- Decrease of permeable surfaces and surface drainage;
- Reduced canopy cover; and,
- Erosion and sedimentation into adjacent habitats.

Proposed Mitigation Measures – Planning and Design Stage

- ✓ An enhanced planting and edge management plan favouring native trees and shrubs is recommended to offset the loss of woodlands within the Study Area. This plan can be incorporated into the landscape design for the site or in the above noted restoration plans.
 - Re-planting and vegetating the edge of forest with native vegetation with appropriate native species would improve the biodiversity and ecological functions of these areas.
 - The development of a planting plan should be done in coordination with the City of Ottawa to identify targets for planting and appropriate species.
- ✓ Development of enhanced tree planting and reforestation plan to off set for the loss of urban tree canopy. This can be included in the landscape plans for the area.

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; and,
- ✓ 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 an overall reduction of woodland habitat within the property, although this will be offset by an increase of native plant diversity and a large reduction of non-native vegetation.

8.2.4 Significant Wildlife Habitat

BREEDING BIRDS

It is expected that the 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 birds.

The Study Area provides suitable nesting habitat for Pileated Woodpeckers. Though Pileated Woodpeckers were observed foraging throughout the Study Area; no nests were observed during field survey.

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 destruction of pileated woodpecker nests.
- 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.

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:

- ✓ General building design should incorporate the [City of Ottawa’s bird-friendly design guidelines](#) where possible (City of Ottawa, 2020);
- ✓ Where possible, retain suitable trees 40 cm DBH or greater within the proposed development (ie. park and institutional lands, near stormwater management facilities), including deadwood stands to provide nesting and foraging opportunities for birds;
- ✓ Where possible, retain suitable trees 40 cm DBH or greater within the proposed development for the creation of wildlife trees (ie. park and institutional lands, near stormwater management facilities), to provide nesting and foraging opportunities for birds; and
- ✓ 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.
- ✓ Other mitigation measures outlined in the [Protocol for Wildlife Protection during Construction](#) (City of Ottawa, 2015) should be considered prior to construction of the proposed development.

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

BAT MATERNITY COLONY SWH

Based on the Draft Site Plan, it is anticipated that bat habitat will be negatively impacted throughout the Study Area, including maternity roosting habitat, and foraging habitat. With the implementation of tree planting throughout the district park, it is likely that these areas may provide suitable habitat in the future once planted trees grow to maturity. In addition, artificial roosting structures such as bat boxes can be constructed to provide immediate available roosting habitat within the district park area.

The following impacts on bat maternity roost habitat are possible:

- Permanent loss of 6.6 ha of candidate roost habitat within forested habitat from vegetation removals.
- Permanent loss of candidate foraging area within meadow habitat from vegetation removals and construction activities.
- Permanent loss of woodland habitat; and,
- Accidental displacement, injury, or death of bats which may be using woodlands as temporary roosting habitat during roosting period.

Proposed Mitigation Measures – Planning and Design

- ✓ Implementation of bat boxes (4 boxes) throughout the edge of district park; placed in appropriate open areas.
- ✓ Implement bat friendly lighting practices where possible especially in proximity to the Urban Natural Feature, in order to protect roosting habitat.
- ✓ Where possible, retain large mature cavity trees to maintain available roosting habitat, specifically within parkland dedication.

Proposed Mitigation Measures – Construction Implementation

- ✓ Enhanced tree planting measures should be implemented into the landscape design. Planted trees may provide suitable roosting habitat upon reaching maturity.
- ✓ Installation of four (4) large bat boxes (two (2) per post); placed in appropriate open areas, associated the edge of forest.
- ✓ 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 permanent negative impact to bats and bat habitat due to the loss of both roosting and nesting habitat, as well as foraging habitat within the Study Area.

WOODLAND AMPHIBIAN BREEDING SWH

Based on the Draft Site Plan, it is anticipated that 0.2 ha of woodland amphibian breeding SWH will be removed within the Study Area. Mitigation addressing this habitat is detailed in **Section 7.2.2** above.

HABITAT FOR SPECIES OF CONSERVATION CONCERN

Habitat for three Species of Conservation Concern (SCC) (Monarch, Eastern Wood-Peewee, Pileated Woodpecker) was encountered on-site during field investigations and candidate habitat for one other Species of Conservation Concern (Eastern Milksnake) was identified within the Study Area. The following impacts to Species of Conservation Concern are expected:

- Disturbance or removal of suitable marginal breeding and feeding habitat for Monarch.
- Accidental harm or injury to Monarch during construction activities.
- Disturbance or removal of suitable breeding, roosting and feeding habitat for Pileated Woodpecker.
- Accidental harm or injury to Pileated Woodpeckers or their nests during construction activities.
- Disturbance or removal of suitable breeding and feeding habitat for Eastern Wood-Peewee.
- Accidental harm or injury to Eastern Wood-Peewee or their nests during construction activities.
- Disturbance or removal of suitable marginal breeding and feeding habitat for Eastern Milksnake.
- Potential accidental harm or injury to Eastern Milksnake during construction activities.

Proposed Mitigation Measures – Planning and Design Stage

- ✓ Development and implementation of invasive species management plan, specifically addressing dog strangling vine (*Cynanchum rossicum*), should be implemented to limit risk of harmful plants to Monarch and SCC birds and reptiles; and
- ✓ Environmental awareness information package should be delivered to construction staff to make them aware of potential presence of SCC, and protocols if SCC are found incidentally during work activities.

Proposed Mitigation Measures – Construction Implementation

- ✓ Clearing of vegetation should be avoided between April 15th and August 31th, to avoid potential physical harm to Monarch and Species of Conservation Concern birds and reptiles during active seasons;
- ✓ Other mitigation measures outlined in the [Protocol for Wildlife Protection during Construction](#) (City of Ottawa, 2015) should be considered prior to construction of the proposed development.
- ✓ Construction areas should be pre-stressed during clearing to allow Species of Conservation Concern to safely leave the area; and
- ✓ Light-duty silt fencing (OPSD 219.110) or other equivalent shall be installed to ensure that Eastern Milksnakes do not enter the construction area.

Proposed Mitigation Measures – Post-Construction

- ✓ Pesticide use should be limited, or avoided, when possible, in landscape maintenance to reduce risk of exposure to Species of Conservation Concern.

With the successful implementation of the mitigation measures outlined above, it is anticipated that the proposed development will result in a permanent negative impact to Species of Conservation Concern habitat due to the loss of nesting, roosting, and foraging habitat within the Study Area.

8.3 Species at Risk

18 Butternut trees (listed as Endangered both federally and provincially) were observed within the Study Area at the time of field investigations and therefore, have a high potential to be impacted by the proposed construction activities. Summary of impacts for Butternuts have been summarized within a table and **Figure 9 in Appendix F** displays the impact to Butternuts, provides the general condition, DBH, presence of cankers, and anticipated impacts.

Butternut is protected under the ESA. Section 9 of the ESA includes prohibitions against activities, such as killing or harming a living Butternut specimen. Section 10 of the ESA includes prohibitions against damage or destruction of Butternut habitat. However, the ESA and Ontario Regulation (O. Reg.) 242/08 includes exemptions that would otherwise be prohibited by the Act. O. Reg. 242/08 provides conditional exemptions from prohibitions for certain activities that may affect Butternut.

For most activities that involve killing or harming a species, a proponent's eligibility for exemptions is dependent on the Category of a tree, which has been assigned by a Butternut Health Assessor. For example, Category 1 (non-retainable) trees are exempted from clause 9 (1) (a) of the ESA, and trees under this category can be killed, harmed, or taken without authorization if all the exemption provisions have been met (s. 23.7 of O. Reg. 242/08). This also applies to Category 2 (retainable) trees, where ≤ 10 trees are proposed to be killed, harmed, or taken. If greater than 10 trees are proposed for removal, an ESA authorization will be required and exemption provisions under s. 23.7 of O. Reg 242/08 does not apply. Exemption provisions under s. 23.7 of O. Reg 242/08 does not apply to Category 3 (retainable and archivable) trees and proponents must seek an ESA authorization.

Category 1 and 2 trees are eligible for exemption under the Act, while the Category 3 trees will require an ESA authorization. A preliminary assessment those trees found within the Study Area suggests they are Category 2 and eligible for an exemption under the Act. However, further butternut health assessments are required to confirm prior to the removal of these trees.

Proposed Mitigation Measures – Planning and Design Stage

- ✓ Prior to the removal of Butternut trees the Submission of Butternut Health Assessment report to MECP as a “registration” will be required to Kill or Harm any Butternut tree.
- ✓ Retention of Butternut trees within the Project footprint, plus a 50 m buffer, until activities have been registered or a permit has been issued.

Proposed Mitigation Measures – Construction Implementation

- ✓ 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.
- ✓ Butternut clearing should occur when construction activities (e.g. grading, excavation) are imminent to reduce the potential for new seedlings to regenerate.

An ESA registration will be required prior to the removal of the Butternut trees on this property. Site alteration within the 50m buffer around each tree must be avoided until approval to remove these trees is granted by MECP.

Bobolink and Eastern Meadowlark.

It is anticipated that vegetation clearing and construction within the meadow habitat within the development area will result in the permanent but non-limiting removal of foraging habitat for Bobolink and Eastern Meadowlark habitat. It is also possible that vegetation clearing may result

in the displacement, injury, or death of Bobolink or Eastern Meadowlark which may occur within the Survey Area.

Mitigation During Construction

- ✓ Vegetation clearing should be avoided between April 15th and August 31st to avoid potential physical harm to Bobolink and Eastern Meadowlark; and

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

SAR BATS

It is expected that the proposed development will have a permanent negative impact to SAR bats within the Study Area. The tree clearing proposed will remove candidate roost trees and disturbance to meadow habitats will remove potential foraging habitat. Impacts include:

- Permanent loss of candidate roost trees within forest 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.

Mitigation During Construction

- ✓ Clearing of woodland habitat 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 7.2.4.

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.



8.4 Trees

It is understood that the site development will require grading and will therefore require tree clearing, including all distinctive trees throughout the Study Area. The tree removals will result in a permanent decrease in tree biodiversity, as well as a loss of young, mid-aged, and mature trees. As described in **Section 5.4**, the tree community within the limit of development consists mainly of native species with an average DBH of 26 cm. Older trees are predominantly located within the Silver Maple swamp forest community, with trees in the poplar swamp community being composed of some mature canopy trees, but largely understory and sub-canopy level trees and less suitable/invasive canopy cover, such as Glossy Buckthorn and Common Buckthorn.

To offset the loss of trees within the subject property, it is recommended to incorporate tree plantings throughout the development, as well as encouraging retention of mature trees where possible. This includes streetscape, parkland, and institutional lands, as well as increased tree planting within the district park, and in appropriate areas around the development. Replanting native trees throughout the subject property will increase the overall diversity, mitigate against the encroachment, and spread of non-native tree and shrub species such as Buckthorn, and generally improve the long-term health and function of trees.

Proposed Mitigation Measures – Planning and Design Stage

- ✓ The landscape plan should include tree planting recommendations consistent with the City of Ottawa's target for increased canopy cover to the extent possible within the property.
- ✓ Invasive species, such as Buckthorn should be prioritized for removal and replacement with suitable native species.
- ✓ Prior to construction activities, overhanging limbs and any exposed tree roots of trees to be retained (property boundary) should be pruned in a manner that minimizes physical damage and promotes quick wound closure and regeneration. Maintenance of roots or limbs should be carried out by an ISA Certified Arborist or a tree care specialist under the supervision of an ISA Certified Arborist.

Proposed Mitigation Measures – Construction Implementation

- ✓ Tree removals should occur throughout the subject property at the same time rather than in a phased approach.
- ✓ Trees protection fencing should be installed around all trees that will be retained (i.e. property boundary) within and around work areas;
 - 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; and
 - Groups of trees can be fenced together as long as 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 1st to August 31) to limit disturbance to nesting birds and their nests or young and comply with the MBCA, 1994.
 - If trees are to be removed during the breeding bird season, it should be preceded by a nest survey by a qualified avian biologist. Surveys should be undertaken a maximum of 48 hours prior to the commencement of removals. If nests are found during a survey, or during construction, an appropriate buffer must be applied, and the nest must not be disturbed until the young have fledged.
- ✓ 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.
- ✓ A health assessment of preserved trees should be conducted within 12 months of construction. 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.

8.5 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 – Planning and Design Stage

The best practices outlined in the *Protocol for Wildlife Protection during Construction* (City of Ottawa, 2015) should be followed 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 located within the construction area will be relocated to an area outside of the development into an area of appropriate habitat by a qualified professional, as necessary.

- ✓ 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 net loss of urban wildlife habitat.

8.6 Cumulative Impacts

The proposed development is located within a sub-urban area of Ottawa and cumulative impacts must be considered in the context of the local and regional environment in which the site is situated. Much of the land surrounding the Study Area is a mix of residential, commercial, industrial and agricultural uses, with most of the impacts to the larger natural heritage system occurring during area development over the last 20 years. The subject property itself had previously been used for agricultural land-use with portions being naturalized following the discontinuation of agricultural land-use practices throughout portions of the Study Area.

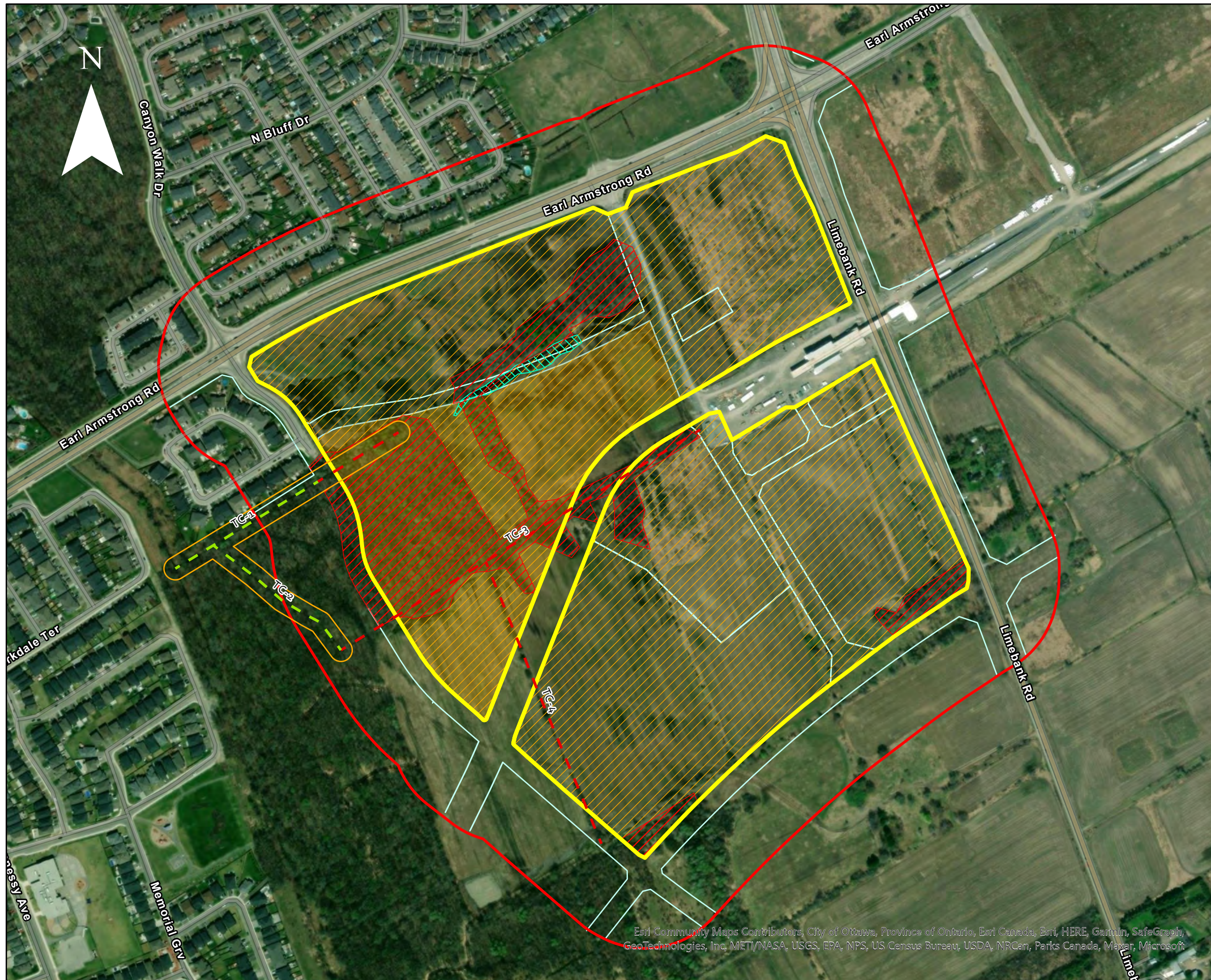
Based on field assessments and available information, the removal of the natural heritage features within the subject property will have a moderate impact on the natural heritage system. Potential cumulative impacts to the natural heritage system resulting from the proposed development include the following:

- General loss of biodiversity and available habitat.
- Loss of wetland habitat features, including 0.2 ha of significant amphibian breeding habitat (woodland).
- Increase in impervious surfaces increasing runoff potential.

Proposed Mitigation Measures – Planning and Design Stage

In addition to the mitigation measures listed above, the following mitigation should be considered to address the cumulative impacts resulting from the proposed development:

- ✓ Landscaping plans should intend to compensate for the removal of natural heritage features and vegetation; and,
- ✓ Promote the use of permeable landscaping materials and rain capture systems like rain gardens and permeable pavers.



Legend

- HDF: Conservation
- HDF: Conservation Buffer
- HDF: Removal
- Site Plan
- Subject Property
- Study Area
- Woodland/Swamp Habitat Removal
- Vegetation Removal
- Amphibian Breeding SWH
- Possible Tree Retention Area

0 0.040.07 0.14 0.21 0.28
 Kilometers
 Scale: 1:5,100



Client: **Riverside South Development Corporation (RSDC)**

Title: **RSDC Town Centre: Anticipated Impacts**

Prepared By: **ARCADIS | IBI GROUP**

Project: 137705
 Date: 2022-12-22

Figure: 8

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

9 Summary and Conclusions

This report provides an evaluation of the anticipated impacts associated with the construction and long-term occupation of the proposed subdivision development located at Part 980 Earl Armstrong Road, 4700 Limebank Road, Part 4776 Limebank Road, Ottawa, Ontario (**Figure 1**). The environmental impacts and mitigation are based off field investigations completed in 2022, HDF assessments completed by Niblett Environmental (2019), and a review of available desktop and background information.

Notable observations during IBI's field investigations include the presence of **wetlands and significant woodlands** within throughout the Study Area. Additionally, **Headwater Drainage Features** (HDF) were noted bisecting the property at the north and south of the UNF wetland features, as well as bisecting abandoned agricultural fields within Study Area. These HDF's were not identified within the study completed by NEA in 2019 and have not undergone a full evaluation. Based off a single site visit and referencing the previous HDF study by Niblett, two of the HDFs were categorized as Conservation (TC-1 and TC-2), and two of the HDFs were categorized at Mitigation (TC-3 and TC-4). The realignment of TC-1 and TC-2 may be required to accommodate the proposed park. TC-3 and TC-4 will likely be removed with the primary function of these features being captured by the stormwater management of the site.

The SAR study found confirmed presence of one SAR (Butternut) and habitat for three Species of Conservation Concern (Monarch, Eastern Wood Peewee and Pileated Woodpecker). The **Butternuts** were located within the swamp communities, with most showing signs of impact from canker. Monarch habitat was observed was recorded in the meadows throughout the Study Area. Eastern Wood-Peewees were observed throughout the Study Area during breeding bird surveys and are confirmed to be using the woodlots for nesting and foraging. **Pileated Woodpeckers** were observed foraging throughout the Study Area; however no nests were observed during field survey.

Significant Wildlife Habitat within the Study Area includes 0.2 ha of significant woodland amphibian breeding habitat, with surveys confirming the presence of Grey Tree Frogs, American Toads, Spring Peepers and Green Frogs using the open cattail marsh habitat for breeding. It is expected that this SWH will be permanently removed.

Significant Woodlands are present within the Study Area based on size and age criteria within the City of Ottawa's Significant Woodland Guidelines (2019). The woodlands within the Study Area show signs of disturbance due to the presence of invasive Buckthorn. Furthermore, there is widespread evidence of Emerald Ash Borer, and Butternut Canker throughout the woodlands.

The ELC survey noted six vegetation communities, plus an additional three that are associated with urban and cultural uses. All of the ELC communities identified are common within Ottawa. The vegetation survey results indicate an abundance of non-native species within the property in concentrated areas, invasive and non-native species comprise approximately 14% of the vegetation species recorded.

Twenty-six species of **trees** were recorded in the Study Area. Trees that are predicted to be impacted are generally mid-aged (average DBH 26 cm). The most abundant species are primarily Trembling Aspen, Silver Maple and Basswood. Evidence of tree pests (Emerald Ash Borer) are evident throughout the Study Area. **Distinctive Trees** were located throughout the woodlots, though were not individually recorded, all of which are predicted to be removed.

The field evaluation suggests that natural features provide connectivity to adjacent natural features, however the linkage does not have any significant function, likely serving as general movement corridors for urban wildlife, specifically breeding amphibians.

Based on this evaluation, there are opportunities for habitat enhancement, particularly within the proposed district park and institutional land use, there is also opportunity for enhancement of the edge of the UNF located to the west of the Study Area. This includes the following:

- Enhanced tree planting and reforestation along the forest edge of the UNF. Additional tree planting will increase diversity and canopy cover, reduce invasive species abundance, and provide habitat for urban wildlife.
- Wildlife exclusion fencing adjacent to the UNF.
- Installation of bat boxes to compensate for loss of candidate roost and maternity colony habitat and support urban bat populations.
- Creation of pollinator habitat and rain gardens where possible to enhance habitat for wild bees and other pollinators species as well as provide opportunity for infiltration.

The mitigation and compensation measures described in this report have been developed to avoid or manage negative environmental impacts associated with the proposed development. Based on the information available, it is our opinion that this proposed development, on what is functionally disturbed land with draft approval, makes sound use of land which generally provides marginal ecological value. However, this project will functionally remove features with local significance including the Amphibian Breeding SWH noted above.

This study was completed by Lindsay Jackson and reviewed by Alex Zeller, MSc. with technical and field assistance provided by; Brittany Semmler. HBSc. Resumes of key staff are included in **Appendix A**. The results and findings of this study have been reported without bias or prejudice. The conclusions of this study are based on our own professional opinion, substantiated by the findings of this study, and have not been influenced in any way.

Written by:	Reviewed by:
	
Lindsay Jackson, HBSc <i>Sr. Ecologist</i>	Alex Zeller, M.Sc. <i>Associate Manager, Natural Systems</i>

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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

HDF Data Sheets

DATE	REACH NAME	AIR TEMP (C)	DISCHARGE TYPE	UPSTREAM FEATURE TYPE	FLOW CONDITIONS	SEDIMENT DEPOSITION	FEATURE WIDTH (M)	FEATURE DEPTH (MM)	BANKFULL WIDTH (M)	SEDIMENT TYPE	FEATURE VEGETATION CATEGORY	VEGETATION LEFT BANK (0-1.5M)	VEGETATION RIGHT BANK (0-1.5M)	VEGETATION LEFT BANK (1.5-10M)	VEGETATION RIGHT BANK (1.5-10M)	VEGETATION LEFT BANK (10-30M)	VEGETATION RIGHT BANK (10-30M)
2022-04-29	TC-1	10	Freshet	Wetland	Minimal Surface Flow	Moderate	1.3	150	3	Organics	Forest	Forest	Forest	Manicured Lawn	Forest	Manicured Lawn	Forest
2022-04-29	TC-2	10	Freshet	Wetland	Minimal Surface Flow	Substantial	1.25	125	1.5	Organics	Forest	Forest	Forest	Forest	Forest	Forest	Forest
2022-04-29	TC-3	10	Freshet	Wetland	Minimal Surface Flow	Substantial	1.1	140	1.5	Organics	Forest	Forest	Forest	Forest	Meadow	Forest	Meadow
2022-04-29	TC-4	10	Freshet	No Defined Features	Standing Water	Minimal	0.6	60	0.6	Organics	Meadow	Scrubland	Scrubland	Meadow	Meadow	Meadow	Meadow

SITE VISIT	PRECIPITATION ACCUMULATION PAST 24 HRS (MM)	PRECIPITATION ACCUMULATION PAST 72 HRS (MM)	PRECIPITATION ACCUMULATION PAST 7 DAYS (MM)	DESCRIPTION OF SASONAL CONDITIONS
2022-04-29	0	7.3	16.9	Spring freshet conditions with precipitation and melting events occurring – trace amounts of snowfall in the last 7 days.

APPENDIX C

Photo Record

Photo 1:

September 30, 2022

Notes: Southeastern Extent of Mixed Mineral Meadow Marsh Ecosite (MAMM3) with the Silver Maple Mineral Deciduous Swamp Type (SWDM3-2) in the background.



Photo 2:

September 30, 2022

Notes: Northeastern extent of the Poplar Mineral Deciduous Swamp Type (SWDM4-5).



Photo 3:

August 12, 2022

Notes: Western extent of the Poplar Mineral Deciduous Swamp Type (SWDM4-5).



Photo 4:

September 30, 2022

Notes: Butternut sappling (*Juglans cinerea*) Located along the western edge of the Mixed Mineral Meadow Marsh Ecosite (MAMM3).



Photo 5:

September 30, 2022

Notes: Understory and Groundcover Vegetation in the Silver Maple Mineral Deciduous Swamp Ecosite (SWDM3).

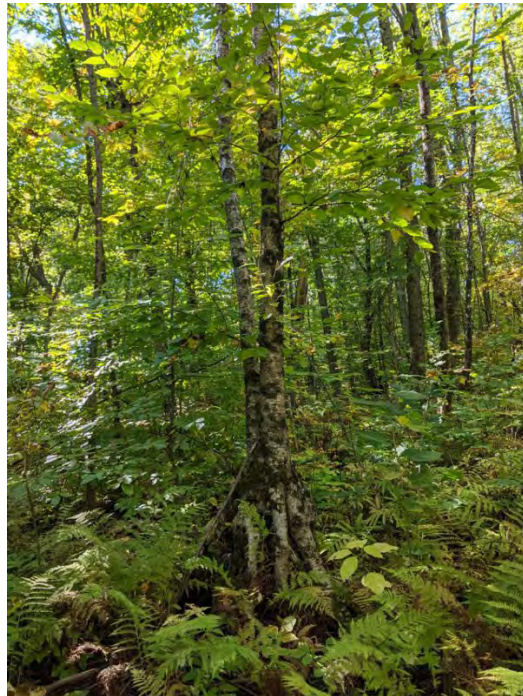


Photo 6:

May 25, 2022

Notes: Early vegetation emergence in the southern extent of the Fresh-Moist Mixed Meadow Ecosite (MEMM4).



Photo 7:

April 29, 2022

Notes: Open Water Cattail Marsh inclusion within the Mixed Mineral Meadow Marsh Ecosite (MAMM3) during spring headwater drainage feature site visit. Tadpoles were observed in this community into June.



Photo 9:

April 29, 2022

Notes: Eastern extent of the Open Water Cattail Marsh Inclusion within the mixed mineral meadow marsh ecosite (MAMM3) during spring headwater drainage feature site visit. Tadpoles were observed in this community into June.



Photo 11:

April 29, 2022

Notes: Poplar Mineral Deciduous Swamp (SWDM4-5) during spring headwater drainage feature site visit. Fairy shrimps were observed throughout these pools.



Photo 12:

April 29, 2022

Notes: Silver Maple Mineral Deciduous Swamp Ecosite (SWDM3-2) during spring headwater drainage feature site visit. Fairy shrimps were observed throughout these pools.



Photo 13:

June 23, 2022

Notes: Northern extent of the Mixed Mineral Meadow Marsh Ecosite (MAMM3) with the Poplar Mineral Deciduous Swamp (SWDM4-5) ecosite in the background.



Photo 14:

May 26, 2022

Notes: Grey Treefrog (*Dryophytes versicolor*) within the Mixed Mineral Meadow Marsh Ecosite (MAMM3) During Night Surveys.



APPENDIX D

Vascular Plant List

SCIENTIFIC NAME	COMMON NAME	CONSERVATION STATUS			COEFFICIENT OF CONSERVATISM	COEFFICIENT OF WETNESS
		Federal (SARA, 2002)	Provincial (ESA, 2007)	S-Rank ¹		
<i>Tilia americana</i>	American Basswood	---	---	S5	4	3
<i>Fagus grandifolia</i>	American Beech	---	---	S4	6	3
<i>Ulmus americana</i>	American Elm	---	---	S5	3	-3
<i>Lonicera maackii</i>	Amur Honeysuckle	---	---	SNA	---	5
<i>Acer tataricum ssp. ginnala</i>	Amur Maple	---	---	SNA	---	5
<i>Malus spp.</i>	Apple Spp.	---	---	---	---	---
<i>Abies balsamea</i>	Balsam Fir	---	---	S5	5	-3
<i>Salix bebbiana</i>	Bebb's Willow	---	---	S5	4	-3
<i>Carya cordiformis</i>	Bitternut Hickory	---	---	S5	6	0
<i>Ilex verticillata</i>	Black Holly	---	---	S5	5	-3
<i>Juglans nigra</i>	Black Walnut	---	---	S4	5	3
<i>Carex intumescens</i>	Bladder Sedge	---	---	S5	6	-3
<i>Iris virginica</i>	Blue Flag	---	---	S5	5	-5
<i>Verbena hastata</i>	Blue Vervain	---	---	S5	4	-3
<i>Quercus macrocarpa</i>	Bur Oak	---	---	S5	5	3
<i>Linaria vulgaris</i>	Butter-and-eggs	---	---	SNA	---	5
<i>Juglans cinerea</i>	Butternut	END	END	S2	6	3
<i>Solidago canadensis</i>	Canada Goldenrod	---	---	S5	1	3
<i>Prunus nigra</i>	Canada Plum	---	---	S4	4	3
<i>Asarum canadense</i>	Canada Wild-ginger	---	---	S5	6	5
<i>Carex spp.</i>	Carex spp.	---	---	---	---	---
<i>Prunus virginiana</i>	Choke Cherry	---	---	S5	2	3
<i>Viola sororia</i>	Common blue violet	---	---	S5	4	0
<i>Rhamnus cathartica</i>	Common Buckthorn	---	---	SNA	---	-4
<i>Taraxacum officinale</i>	Common Dandelion	---	---	SNA	---	3
<i>Carex vulpinoidea</i>	Common fox sedge	---	---	S5	3	-5
<i>Athyrium filix-femina</i>	Common Lady Fern	---	---	S5	4	0
<i>Rubus idaeus</i>	Common Red Raspberry	---	---	SNA	---	3
<i>Juncus effusus</i>	Common rush	---	---	S5	4	-5
<i>Sonchus oleraceus</i>	Common Sow-thistle	---	---	SNA	---	3
<i>Vicia sativa</i>	Common Vetch	---	---	SNA	---	3
<i>Salix euxina</i>	Crack Willow	---	---	SNA	---	0
<i>Viburnum opulus</i>	Cranberry Viburnum	---	---	S5	5	-3
<i>Rubus pubescens</i>	Dewberry	---	---	S5	4	-3

<i>Ostrya virginiana</i>	Eastern Hop-hornbeam	---	---	S5	4	3
<i>Brassica rapa</i>	Field Mustard	---	---	---	---	5
<i>Sonchus arvensis</i>	Field Sow-thistle	---	---	SNA	---	3
<i>Frangula alnus</i>	Glossy Buckthorn	---	---	SNA	---	0
<i>Solidago</i>	Goldenrod Spp.	---	---	---	---	---
<i>Gramineae spp.</i>	Grass Spp.	---	---	---	---	---
<i>Euthamia graminifolia</i>	Grass-leaved Goldenrod	---	---	S5	2	0
<i>Fraxinus pennsylvanica</i>	Green Ash	---	---	S4	3	-3
<i>Polygonatum pubescens</i>	Hairy Solomon's Seal	---	---	S5	5	5
<i>Maianthemum canadense</i>	Hairy Wild Lily-of-the-valley	---	---	S5?	5	-3
<i>Crataegus Spp.</i>	Hawthorn Spp.	---	---	---	---	---
<i>Symphotrichum cordifolium</i>	Heart-leaved Aster	---	---	S5	5	5
<i>Tiarella cordifolia</i>	Heart-leaved Foam-flower	---	---	S5	6	3
<i>Eleocharis spp.</i>	Horsetail spp.	---	---	---	---	---
<i>Symphotrichum lanceolatum</i>	Lance-leaved Aster	---	---	S5	3	-3
<i>Maianthemum racemosum</i>	Large False Solomon's Seal	---	---	S5	4	3
<i>Populus grandidentata</i>	Large-toothed Aspen	---	---	S5	5	5
<i>Equisetum palustre</i>	Marsh Horsetail	---	---	S5	10	-3
<i>Caltha palustris</i>	Marsh Marigold	---	---	S5	5	-5
<i>Salix petiolaris</i>	Meadow Willow	---	---	S5	3	-5
<i>Viburnum lentago</i>	Nannyberry	---	---	S5	4	0
<i>Typha angustifolia</i>	Narrow-leaved Cattail	---	---	SNA	---	-5
<i>Symphotrichum novae-angliae</i>	New England Aster	---	---	S5	2	-3
<i>Alisma triviale</i>	Northern Water-plantain	---	---	S5	1	-5
<i>Picea abies</i>	Norway Spruce	---	---	SNA	---	5
<i>Matteuccia struthiopteris var. pennsylvanica</i>	Ostrich Fern	---	---	S5	5	0
<i>Leucanthemum vulgare</i>	Oxeye Daisy	---	---	SNA	---	5
<i>Betula papyrifera</i>	Paper Birch	---	---	S5	2	3
<i>Toxicodendron radicans</i>	Poison Ivy	---	---	S5	2	0
<i>Ribes cynosbati</i>	Prickly Gooseberry	---	---	S5	4	3
<i>Agalinis purpurea</i>	Purple False Foxglove	---	---	S4S5	8	-3
<i>Trifolium pratense</i>	Red Clover	---	---	SNA	---	3
<i>Acer rubrum</i>	Red Maple	---	---	S5	4	0
<i>Trillium erectum</i>	Red Trillium	---	---	S5	6	3
<i>Cornus sericea</i>	Red-osier Dogwood	---	---	S5	2	3

<i>Phalaris arundinacea</i>	Reed Canary Grass	---	---	S5	0	-3
<i>Vitis riparia</i>	Riverbank Grape	---	---	S5	0	0
<i>Galium spp.</i>	Rough Bedstraw	---	---	SNA	---	---
<i>Cornus rugosa</i>	Round-leaved Dogwood	---	---	S5	6	-3
<i>Scirpus pendulus</i>	Rufous Bulrush	---	---	S5	3	-5
<i>Prunella vulgaris</i>	Self-heal	---	---	S5	0	0
<i>Onoclea sensibilis</i>	Sensitive Fern	---	---	S5	4	-3
<i>Acer saccharinum</i>	Silver Maple	---	---	S5	5	-3
<i>Scirpus microcarpus</i>	Small-fruited Bullrush	---	---	S5	4	-5
<i>Urtica dioica</i>	Stinging Nettle	---	---	S5	2	0
<i>Hypericum perforatum</i>	St-johns Wort	---	---	SNA	---	5
<i>Acer saccharum</i>	Sugar Maple	---	---	S5	4	3
<i>Ribes triste</i>	Swamp Red Currant	---	---	S5	6	-5
<i>Quercus bicolor</i>	Swamp White Oak	---	---	S4	8	-3
<i>Thalictrum pubescens</i>	Tall Meadow-rue	---	---	S5	5	-3
<i>Populus tremuloides</i>	Trembling Aspen	---	---	S5	2	0
<i>Parthenocissus quinquefolia</i>	Virginia Creeper	---	---	S4	6	3
<i>Spiraea alba</i>	White Meadowsweet	---	---	S5	3	-3
<i>Trillium grandiflorum</i>	White Trillium	---	---	S5	5	3
<i>Salix alba</i>	White Willow	---	---	SNA	---	-3
<i>Maianthemum canadense</i>	Wild Lily-of-the-valley	---	---	S4	5	3
<i>Echinocystis lobata</i>	Wild Mock-cucumber	---	---	S5	3	-3
<i>Pastinaca sativa</i>	Wild Parsnip	---	---	SNA	---	5
<i>Aralia nudicaulis</i>	Wild Sarsaparilla	---	---	S5	4	3
<i>Aralia nudicaulis</i>	Wild Sarsaparilla	---	---	S5	4	3
<i>Fragaria virginiana</i>	Wild Strawberry	---	---	S5	2	3
<i>Ilex verticillata</i>	Winterberry	---	---	5	5	-3
<i>Equisetum sylvaticum</i>	Woodland Horsetail	---	---	S5	7	-3
<i>Fragaria vesca</i>	Woodland Strawberry	---	---	S5?	4	3
<i>Betula alleghaniensis</i>	Yellow Birch	---	---	S5	6	0
<i>Trifolium aureum</i>	Yellow Clover	---	---	SNA	---	5
<i>Viola pubescens</i>	Yellow-forest violet	---	---	S5?	5	3

<p>¹S-Rank (Provincial Status (NHIC))</p>	<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>	
<p>²Coefficient of Conservatism</p> <p><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></p>	<p>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.</p>	
<p>³Coefficient of Wetness</p> <p><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></p>	<p>-5 -4 -3 -2 -1 0 1 2 3 4 5</p>	<p>Obligate Wetland - Occurs almost always in wetlands under natural conditions (99% probability)</p> <p>Facultative Wetland - Usually occurs in wetlands, but occasionally found in non-wetlands (67-99%)</p> <p>Facultative - Equally likely to occur in wetlands or non-wetlands (34-66%)</p> <p>Facultative Upland - Occasionally occurs in wetlands, but usually occurs in non-wetlands (1-33%)</p> <p>Upland - Occurs almost never in wetlands under natural conditions (<1%)</p>

APPENDIX E

Breeding Bird Species List

COMMON NAME	SCIENTIFIC NAME	CONSERVATION STATUS		
		Federal (SARA, 2002)	Provincial (ESA, 2007)	S-Rank ¹
Alder Flycatcher	<i>Empidonax alnorum</i>	N/A	N/A	S5B
American Crow	<i>Corvus brachyrhynchos</i>	N/A	N/A	S5
American Goldfinch	<i>Carduelis tristis</i>	N/A	N/A	S5B
American Redstart	<i>Setophaga ruticilla</i>	N/A	N/A	S5
American Robin	<i>Turdus migratorius</i>	N/A	N/A	S5B
American Woodcock	<i>Scolopax minor</i>	N/A	N/A	S4B
Barn Swallow	<i>Hirundo rustica</i>	THR	THR	S5B
Black-capped Chickadee	<i>Parus atricapillus</i>	N/A	N/A	S5
Black-and-white Warbler	<i>Mniotilta varia</i>	N/A	N/A	S5B
Blue Jay	<i>Cyanocitta cristata</i>	N/A	N/A	S5
Bobolink	<i>Dolichonyx oryzivorus</i>	THR	THR	S4B
Brown Thrasher	<i>Toxostoma rufum</i>	N/A	N/A	S4B
Brown-headed Cowbird	<i>Molothrus ater</i>	N/A	N/A	S4B
Cedar Waxwing	<i>Bombycilla cedrorum</i>	N/A	N/A	S5B
Chestnut-sided warbler	<i>Setophaga pensylvanica</i>	N/A	N/A	S5B
Chimney Swift	<i>Chaetura pelagica</i>	THR	THR	S4B
Chipping Sparrow	<i>Spizella passerina</i>	N/A	N/A	S5B
Clay-coloured sparrow	<i>Spizella pallida</i>	N/A	N/A	S4B
Common Grackle	<i>Quiscalus quiscula</i>	N/A	N/A	S5B
Common Raven	<i>Corvus corax</i>	N/A	N/A	S5
Common Yellowthroat	<i>Geothlypis trichas</i>	N/A	N/A	S5B
Dark eyed Junco	<i>Junco hyemalis</i>	N/A	N/A	S5B
Downy woodpecker	<i>Picoides pubescens</i>	N/A	N/A	S5B
Eastern Meadowlark	<i>Sturnella magna</i>	THR	THR	S4B
Eastern Wood-Pewee	<i>Contopus virens</i>	N/A	N/A	S5B
European Starling	<i>Sturnus vulgaris</i>	N/A	N/A	SNA
Golden-crowned Kinglet	<i>Regulus satrapa</i>	N/A	N/A	S5B
Great Crested Flycatcher	<i>Myiarchus crinitus</i>	N/A	N/A	S4B
Gray Catbird	<i>Dumetella carolinensis</i>	N/A	N/A	S5B
Hermit Thrush	<i>Catharus guttatus</i>	N/A	N/A	S5B
House Finch	<i>Haemorhous mexicanus</i>	N/A	N/A	SNA
House Sparrow	<i>Passer domesticus</i>	N/A	N/A	SNA

House Wren	<i>Troglodytes aedon</i>	N/A	N/A	S5B
Indigo Bunting	<i>Passerina cyanea</i>	N/A	N/A	S4B
Killdeer	<i>Charadrius vociferus</i>	N/A	N/A	S5B
Mallard	<i>Anas platyrhynchos</i>	N/A	N/A	S5
Northern Cardinal	<i>Cardinalis cardinalis</i>	N/A	N/A	S5
Northern Flicker	<i>Colaptes auratus</i>	N/A	N/A	S4B
Northern Harrier	<i>Circus hudsonius</i>	N/A	N/A	S4B
Ovenbird	<i>Seiurus aurocapilla</i>	N/A	N/A	S4B
Pileated Woodpecker	<i>Dryocopus pileatus</i>	N/A	N/A	S5
Purple Finch	<i>Haemorhous purpureus</i>	N/A	N/A	S4B
Red-eyed Vireo	<i>Vireo olivaceus</i>	N/A	N/A	S5B
Red-tailed Hawk	<i>Buteo jamaicensis</i>	N/A	N/A	S5
Red-winged Blackbird	<i>Agelaius phoeniceus</i>	N/A	N/A	S5B
Rose-breasted Grosbeak	<i>Pheucticus ludovicianus</i>	N/A	N/A	S4B
Savannah Sparrow	<i>Passerculus sandwichensis</i>	N/A	N/A	S5B
Sharp-shinned hawk	<i>Accipiter striatus</i>	NAR	NAR	S5
Song Sparrow	<i>Melospiza melodia</i>	N/A	N/A	S5B
Spotted Sandpiper	<i>Actitis macularius</i>	N/A	N/A	S5
Swamp Sparrow	<i>Melospiza georgiana</i>	N/A	N/A	S5B
Turkey Vulture	<i>Cathartes aura</i>	N/A	N/A	S5B
Veery	<i>Catharus fuscescens</i>	N/A	N/A	S4B
Vesper Sparrow	<i>Pooecetes gramineus</i>	N/A	N/A	S4B
Warbling Vireo	<i>Vireo gilvus</i>	N/A	N/A	S5B
White-breasted Nuthatch	<i>Sitta carolinensis</i>	N/A	N/A	S5
Wild Turkey	<i>Meleagris gallopavo</i>	N/A	N/A	S5
Wilson's Snipe	<i>Gallinago delicata</i>	N/A	N/A	S5B
Yellow Warbler	<i>Dendroica petechia</i>	N/A	N/A	S5B
Yellow-bellied sapsucker	<i>Sphyrapicus varius</i>	N/A	N/A	S5B

¹S-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. SNA indicates species is not native to province.

APPENDIX F

Butternut Health Assessment

TREE ID	COMMON NAME	SCIENTIFIC NAME	DBH (CM)	CATEGORY	CONDITION	CANKERS PRESENT ?	ANTICIPATED IMPACT	NORTHING	EASTING
BN-1	Butternut	<i>Juglans cinerea</i>	1	2	Good	No	Killed	5014024.54	447342.05
BN-2	Butternut	<i>Juglans cinerea</i>	1	2	Good	No	Killed	5014002.27	447294.26
BN-3	Butternut	<i>Juglans cinerea</i>	1	2	Good	No	Killed	5013931.5	447281.12
BN-4	Butternut	<i>Juglans cinerea</i>	1	1	Fair	Yes	Killed	5013821.48	447324.05
BN-5	Butternut	<i>Juglans cinerea</i>	1	1	Good	Yes	Killed	5013821.48	447324.83
BN-6	Butternut	<i>Juglans cinerea</i>	5	1	Poor	Yes	Killed	5013797.47	447339.77
BN-7	Butternut	<i>Juglans cinerea</i>	11	1	Poor	Yes	Killed	5013785.97	447345.56
BN-8	Butternut	<i>Juglans cinerea</i>	8	1	Poor	Yes	Killed	5013796.72	447363.3
BN-9	Butternut	<i>Juglans cinerea</i>	5	1	Poor	Yes	Killed	5013796.93	447364.48
BN-10	Butternut	<i>Juglans cinerea</i>	9	1	Poor	Yes	Killed	5013775.5	447375.67
BN-11	Butternut	<i>Juglans cinerea</i>	23	1	Poor	Yes	Killed	5013739.6	447178.09
BN-12	Butternut	<i>Juglans cinerea</i>	1	1	Fair	Yes	Killed	5013900.94	447148.85
BN-13	Butternut	<i>Juglans cinerea</i>	16	1	Poor	Yes	Killed	5013904.4	447133.34
BN-14	Butternut	<i>Juglans cinerea</i>	1	1	Poor	Yes	Harmed	5013686.72	447084.3
BN-15	Butternut	<i>Juglans cinerea</i>	1	2	Good	No	Killed	5013777.78	447235.91
BN-16	Butternut	<i>Juglans cinerea</i>	36	1	Poor	Yes	Retained	5013472.1	447148.24
BN-17	Butternut	<i>Juglans cinerea</i>	40	1	Dead	Yes	Retained	5013459.81	447156.14
BN-18	Butternut	<i>Juglans cinerea</i>	38	1	Dead	Yes	Retained	5013429.91	447171.19



Legend

- Subject Property
- Study Area
- Site Plan
- Butternut Protection Buffer
- ▲ Butternut Tree

0 0.04 0.07 0.14 0.21 0.28
 Kilometers
 Scale: 1:5,100



Client: **Riverside South Development Corporation (RSDC)**

Title: **RSDC Town Centre: Butternut Tree Locations**

Prepared By: **ARCADIS | IBI GROUP**

Project: 137705

Date: 2022-12-22

Figure: 9

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