CLARIDGE HOMES

3252 NAVAN ROAD

ENVIRONMENTAL IMPACT STATEMENT AND TREE CONSERVATION REPORT

Project No.: 191-15659-00

JANUARY 31, 2020

CONFIDENTIAL

3252 NAVAN ROAD

ENVIRONMENTAL IMPACT STATEMENT AND TREE CONSERVATION REPORT

CLARIDGE HOMES

CONFIDENTIAL

PROJECT NO.: 191-15659-00
DATE: JANUARY 31, 2020

WSP
SUITE 300
2611 QUEENSVIEW DR.
OTTAWA (ONTARIO) K2B 8K2
CANADA

T: +1 613 690-3833
WSP.COM

January 31, 2020

Confidential

Vincent Denomme
Claridge Homes
210 Gladstone Avenue
Ottawa, Ontario K2P 0Y6

Subject: 3252 Navan Road – Environmental Impact Statement and Tree Conservation Report

Dear: Vincent,

The following Scoped Environmental Impact Study (EIS) and Tree Conservation Report (TCR) for the proposed subdivision development at 3252 Navan Road, Ottawa, Ontario has been prepared in accordance with the City of Ottawa's EIS and TCR guidelines.

This report is intended to provide a preliminary assessment of potential impacts and proposed mitigation measures based on the findings from initial ecological field investigations and desktop screenings.

Several candidate natural heritage features identified within this report will require further evaluation in the spring and summer of 2020. These features and associated surveys have been described in this report.

If you have any questions pertaining to the methods, results, or impacts and mitigation presented in the report, please contact me at your convenience.

Yours sincerely,

Alex Zeller
Senior Ecologist

WSP ref.: 191-15659-00

SUITE 300
2611 QUEENSVIEW DR.
OTTAWA (ONTARIO) K2B 8K2
CANADA

T: +1 613 690-3833
wsp.com

SIGNATURES

CONTRIBUTORS

Cody Pytlak, B.A.
Junior Ecologist

Andrea Orr, B.Sc.
Terrestrial Ecologist

REVIEWED BY

Alex Zeller, M.Sc.
Senior Ecologist

This report was prepared by WSP Canada Inc. for the account of Claridge Homes, in accordance with the professional services agreement. The disclosure of any information contained in this report is the sole responsibility of the intended recipient. The material in it reflects WSP Canada Inc's best judgment in light of the information available to it at the time of preparation. Any use which a third party makes of this report, or any reliance on or decisions to be made based on it, are the responsibility of such third parties. WSP Canada Inc. accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report. This limitations statement is considered part of this report.

The original of the technology-based document sent herewith has been authenticated and will be retained by WSP for a minimum of 10 years. Since the file transmitted is now out of WSP's control and its integrity can no longer be ensured, no guarantee may be given with regards to any modifications made to this document.

TABLE OF CONTENTS

TABLES

FIGURES

APPENDICES

EXECUTIVE SUMMARY

WSP Canada Inc. (WSP) was retained by Claridge Homes to undertake an Environmental Impact Statement (EIS) and Tree Conservation Report (TCR) for the proposed residential development, located at 3252 Navan Road in Ottawa, Ontario. The primary objective of this EIS and TCR is to evaluate the environmental impacts associated with the proposed development.

Natural heritage field investigations for the Project was conducted in December 2019 and consisted of: Ecological Land Classification (ELC), tree inventory, significant woodland evaluation, candidate significant wildlife habitat (SWH) identification, candidate Species at Risk (SAR) habitat identification, and incidental wildlife observations. Results from the field investigations are summarized below:

1) Mer Bleue Provincially Significant Wetland (PSW) and Mer Bleue Bog Area of Natural and Scientific Interest (ANSI) are located within the Study Area. However, the proposed development footprint is approximately 100 metres (m) from these features and buffered by deciduous swamp and meadow marsh vegetation communities. Additionally, the proposed development area does not conflict with the Rideau Valley Conservation Authority's (RVCA) regulation limit.
2) At least one headwater drainage feature is located within the Study Area. This will likely require removal or alteration to accommodate development **(Further study is required).**
3) The forest communities within the subject property are not considered locally or provincially significant.
4) The vegetation communities recorded during field investigations are commonly found throughout Ottawa and eastern Ontario **(Further studies are required to document vegetation, including rare species).**
5) Two separate wetland communities were identified within the southern portion of the Study Area **(Further studies are required to delineate wetland boundaries and evaluate function).**
6) Forest communities within the subject property were abundant with young to mid-aged trees and shrubs, representing native and invasive species. Mature trees occurred on occasionally throughout. Twelve trees were identified to be 'Distinctive' [≥ 50 cm diameter at breast height (DBH)]. Overall, tree health was in good condition, although there was evidence of Emerald Ash Borer and the invasive Common Buckthorn (*Rhamnus cathartica*) was abundant throughout the forest communities.
7) Tree mitigation and protection measures have been recommended to limit the number of Distinctive trees requiring removal and to provide suitable protection techniques for trees being retained.
8) Candidate SAR bat habitat was encountered within the proposed subject property. It is anticipated that the removal of this habitat is not limiting for bats due to the lack of suitable habitat of large mature cavity trees. The installation of bat boxes has been recommended to offset any impacts associated with the removal of potential bat roost habitat.
9) Additional mitigation measures have been proposed to limit the development impacts on terrestrial environments and wildlife **(Mitigation measures to be reviewed following the additional field studies).**
10) The removal of a headwater drainage feature may require additional mitigation or compensation **(Further study and consultation with RVCA will be required).**

The compensation measures proposed should mitigate the negative impacts associated with this development while retaining valuable natural heritage assets for the future residential development. The additional negative impacts noted in this report, primarily associated with the construction of the development, can be mitigated with the proposed mitigation measures.

Based on our preliminary review of the site and current understanding of the existing conditions, it is expected that the residual environmental impacts would not prevent the development from proceeding as planned, assuming the mitigation/compensation measures outlined herein are followed.

1 INTRODUCTION

1.1 PURPOSE

Claridge Homes retained WSP Canada Inc. (WSP) to complete an Environmental Impact Statement (EIS) and Tree Conservation Report (TCR) for the proposed subdivision development at 3252 Navan Road (herein known as "the Project"). This property is located on a parcel of land with frontage on Navan Road, in the City of Ottawa, Ontario (**Figure 1**).

This EIS has been prepared to describe the existing natural heritage features within the Study Area and to evaluate the potential environmental impacts associated with the proposed development based on field investigations and desktop screening results. Mitigation measures will be provided to offset the anticipated environmental impacts.

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* (PPS) (Ministry of Municipal Affairs and Housing, 2014) and the accompanying *Natural Heritage Reference Manual* (NHRM) (MNR, 2010).

The "Study Area" for this project includes the subject property, plus a 120 m buffer from this area (see **Figure 1).** In addition, specific species and features will be considered up to two kilometres (km) from the proposed development as it may relate to specific environmental policy or legislation.

1.2 BACKGROUND

Claridge Homes is submitting a Zoning By-law Amendment and a Plan of Subdivision application for the development located at 3252 Navan Road, in Navan, Ottawa, Ontario. The Project will consist of 55 development blocks intended for the construction of single family homes.

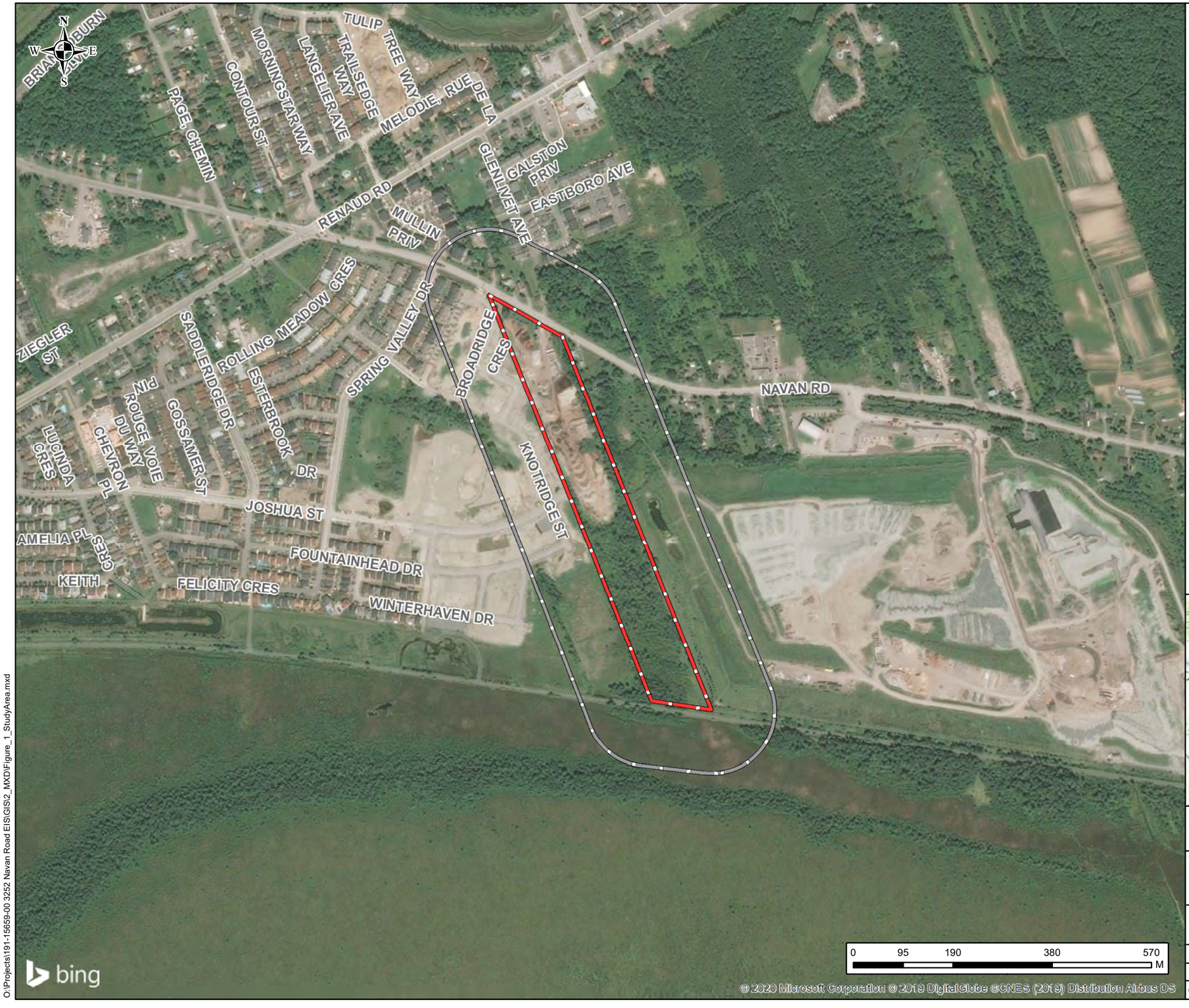
Within the City of Ottawa, an EIS is required when development or site alteration, as defined in Section 4.7.8 of the Official Plan (OP) (City of Ottawa, 2003), is proposed or adjacent to environmentally designated lands or other features of the City's natural heritage system (NHS). This site is located adjacent to the Mer Bleue Provincially Significant Wetland (PSW), which is also part of the City's NHS. In addition to these features, a candidate woodland and an unevaluated wetland are also present within the property. These features triggered the requirement for an EIS and TCR.

This report has been prepared to consider federal, provincial, and municipal policies and regulations from relevant regulatory agencies in order to maintain compliance with the governmental legislation that pertain to the Project.

In addition, this report has been prepared to support the Project in the following ways: 1) to not contravene the *Endangered Species Act, 2007* (ESA); 2) to evaluate environmental impacts; and, 3) to develop a mitigation plan addressing potential impacts.

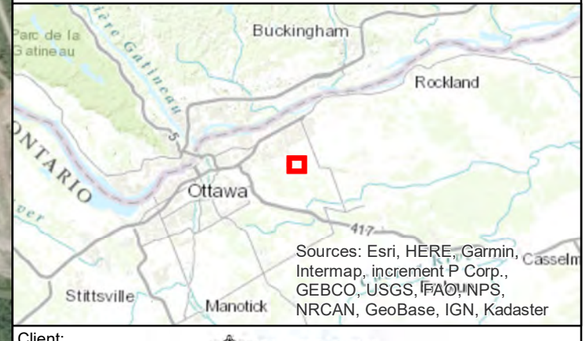
1.2.1 STUDY CONSTRAINTS

Due to the application submission timelines, associated natural heritage field surveys could not be completed during ideal seasonal conditions. This report was written to be as comprehensive as possible given such constraints, however, it is likely that additional field work and evaluations will be required during seasonally appropriate periods (e.g. spring and summer).



Subject Property

Study Area



Client: CLARIDGE HOMES

Title: **3252 Navan Road**
Site Overview

Prepared By: WSP

191-15659-00	1:7,500	Review: AZ
Date: January 2020	**Figure: 1**	
© Queen's Printer for Ontario		

O:\Projects\191-15659-00 3252 Navan Road EIS\GIS\2_MXD\Figure_1_StudyArea.mxd

1.3 PROPERTY INFORMATION

Owner:	Claridge Homes
Address:	3252 Navan Road, Ottawa, Ontario
Lot and concession:	Part of Lot 4, Concession 4
Property Identification Number(s):	043520307
Zoning:	DR – Development Reserve Subzone (Sections 237-238)
Official Plan designation (Schedule B):	General Urban Area
Existing Land Uses:	Industrial/Commercial, Forested Land

1.4 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: 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.

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.

This section will also identify any future permitting or agency authorizations that may be required before the Project may proceed.

Summary and Conclusions: This section provides a summary of the Study's findings, outlines any notable provisions, and provides WSP'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.

2 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.

Table 1 Policies, Legislation and Background Sources

Policy/Regulations	Reference Materials 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: • *Distribution of Aquatic Species at Risk mapping (Accessed: 19/12/2019)*
***Fisheries Act* (1985) (R.S.C., 1985, c. F-14)**	Fisheries and Oceans Canada – online resources
Province of Ontario	
Provincial Policy Statement (2014), under *Planning Act*, R.S.O. (1990) c. P.13 **AND** **Ontario *Endangered Species Act* (2007) (S.O. 2007, c. 6)**	Ministry of Natural Resources and Forestry (MNRF) – Kemptville District
	MNRF Natural Heritage Information Centre (NHIC) – Online (Accessed: 19/12/2019): • *Species at Risk occurrence records* • *Species of Conservation Concern* • *Natural Heritage Features*
	NHRM (MNR, 2010)
	Significant Wildlife Habitat Technical Guide (MNR, 2000): — *Significant Wildlife Habitat Eco-region 6E Criterion Schedules* (MNRF, 2015)
	Ministry of the Environment, Conservation and Parks (MECP): — *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: 19/12/2019)
	Ontario Reptile and Amphibian Atlas (ORAA) – Online (Accessed: 19/12/2019)
	Ontario Butterfly Atlas (OBA) – Online (Accessed: 19/12/2019)
	iNaturalist Observation Records – Online (Accessed: 18/12/2019)
	Atlas of the Mammals of Ontario (AMO) (Dobbyn, 1994)
City of Ottawa	

Policy/Regulations	Reference Materials and Supporting Documents
City of Ottawa Official Plan (2003)	Official Plan; Schedules B (Urban Policy Plan), K (Environmental Constraints), and L1 (Natural Heritage System Overlay (East) – Online (Accessed: 06/12/2019)
	Environmental Impact Statement Guidelines (City of Ottawa, 2015c)
	City of Ottawa Tree Conservation Report Guidelines – Online (Accessed: 06/112/2019)
	Site Alteration By-Law (2018) – Online (Accessed: 06/12/2019)
	Protocol for Wildlife Protection During Construction (2015)
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)	RVCA Regulations Mapping – Online (Accessed: 06/12/2019)

2.1 ONTARIO ENDANGERED SPECIES ACT, 2007

The Ontario ESA prohibits the killing or harming of species identified as Threatened or 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.

3 DESCRIPTION OF THE NATURAL ENVIRONMENT

The following sections provide a desktop screening of the existing natural environment features identified within the Study Area. This section outlines relevant natural heritage background information, which the EIS and TCR will be based.

3.1 HISTORIC LAND USE

A desktop review of recent and historic aerial images highlights the land use within and adjacent to the Study Area (City of Ottawa, 2019) (**Figure 2**). From this review, the landscape has been predominantly agricultural and industrial land use dating back to 1976. Residential developments to the west of the Study Area have expanded beginning around 2005 to present day. Within the 3252 Navan Road property parcel the northern half of the property has been largely used for soil and aggregate storage. The southern half of the property was an agricultural field prior to 1976 and has regenerated into a successional woodland habitat. A multi-use path is present just beyond the southern limit of the property parcel, and was formerly a rail corridor.

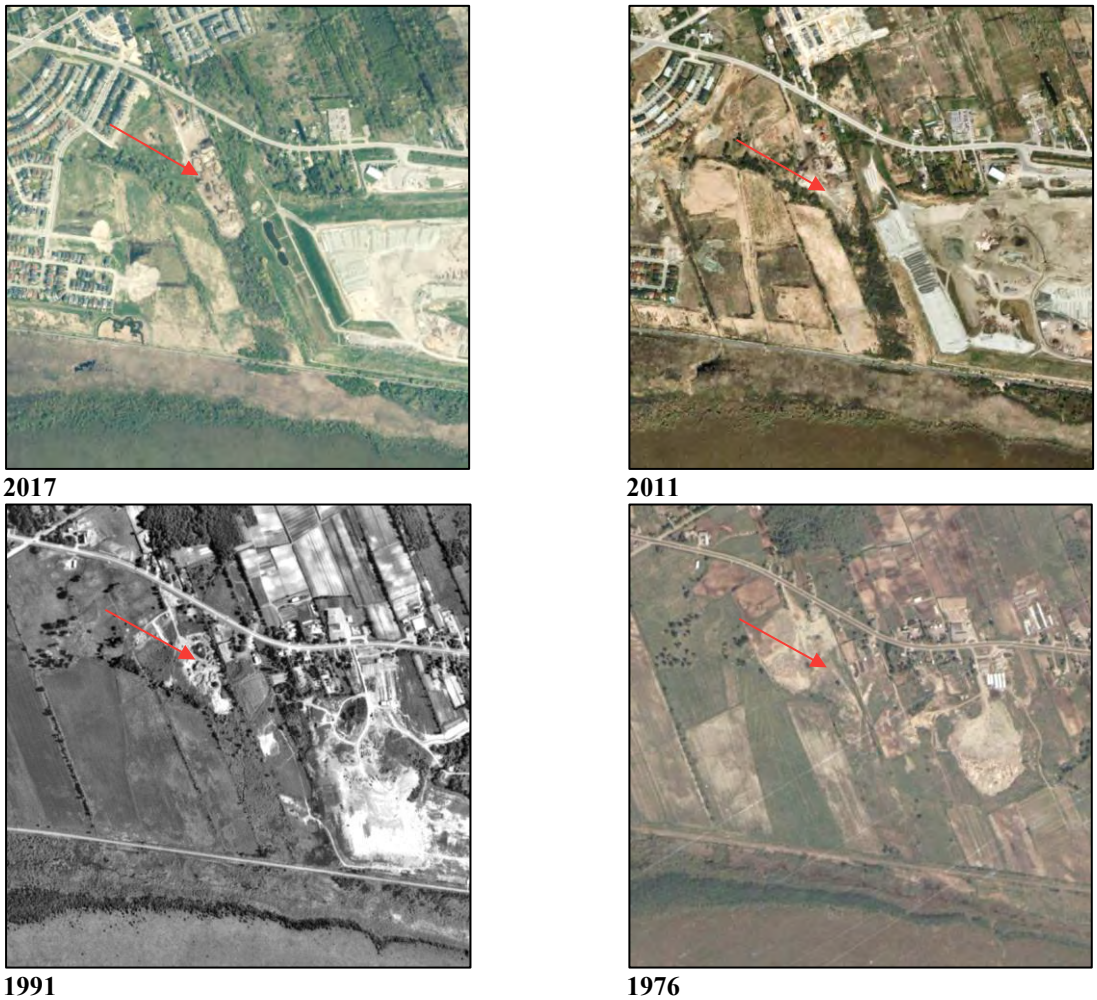


Figure 2 Land Use Change

3.2 LANDFORM, GEOLOGY AND SOILS

The Study Area is situated within the Ottawa Valley Clay Plains physiographic region (Ministry of Northern Development and Mines, 2017). The northern half of the Study Area lies within a Sand Plains physiographic landform, and the southern half of the Study Area is within a Clay Plains physiographic landform (Ministry of Northern Development and Mines, 2017).

The surficial geology of the Study Area is divided between an area of coarse-textured glaciomarine deposits (sand, gravel, minor silt and clay) in the northern half of the Study Area, fine-textured glaciomarine deposits (silt and clay, minor sand and gravel) in the southern half of the Study Area, and a pocket of colluvial deposits (boulders, scree, talus) in the middle of the Study Area (Ministry of Northern Development and Mines, 2017).

The underlying bedrock of the Study Area is part of the Ottawa Formation, consisting of limestone with some shale partings, and some sandstone in basal part (Natural Resources Canada, 2016).

Based on the soil and physiographic conditions of the Study Area, it is likely that the southern half of the Study Area has lower rates of infiltration with damp to wet soils, therefore providing suitable conditions for vegetation with a preference to wet areas. The northern half of the Study Area likely has higher rates of infiltration and is more likely to support vegetation communities with a preference for dry conditions.

3.3 AQUATIC ENVIRONMENT

The Study Area is within the Rideau Valley watershed. More specifically, the Study Area is located within the Ottawa River East sub-watershed and Mud Creek catchment (Rideau Valley Conservation Authority, 2018). This catchment area contains warm water recreational and baitfish fishery with 19 fish species. Mud Creek is a major tributary to Green's Creek as headwaters begin within the Mer Bleue PSW.

3.3.1 FLOODPLAIN AND REGULATED LIMIT

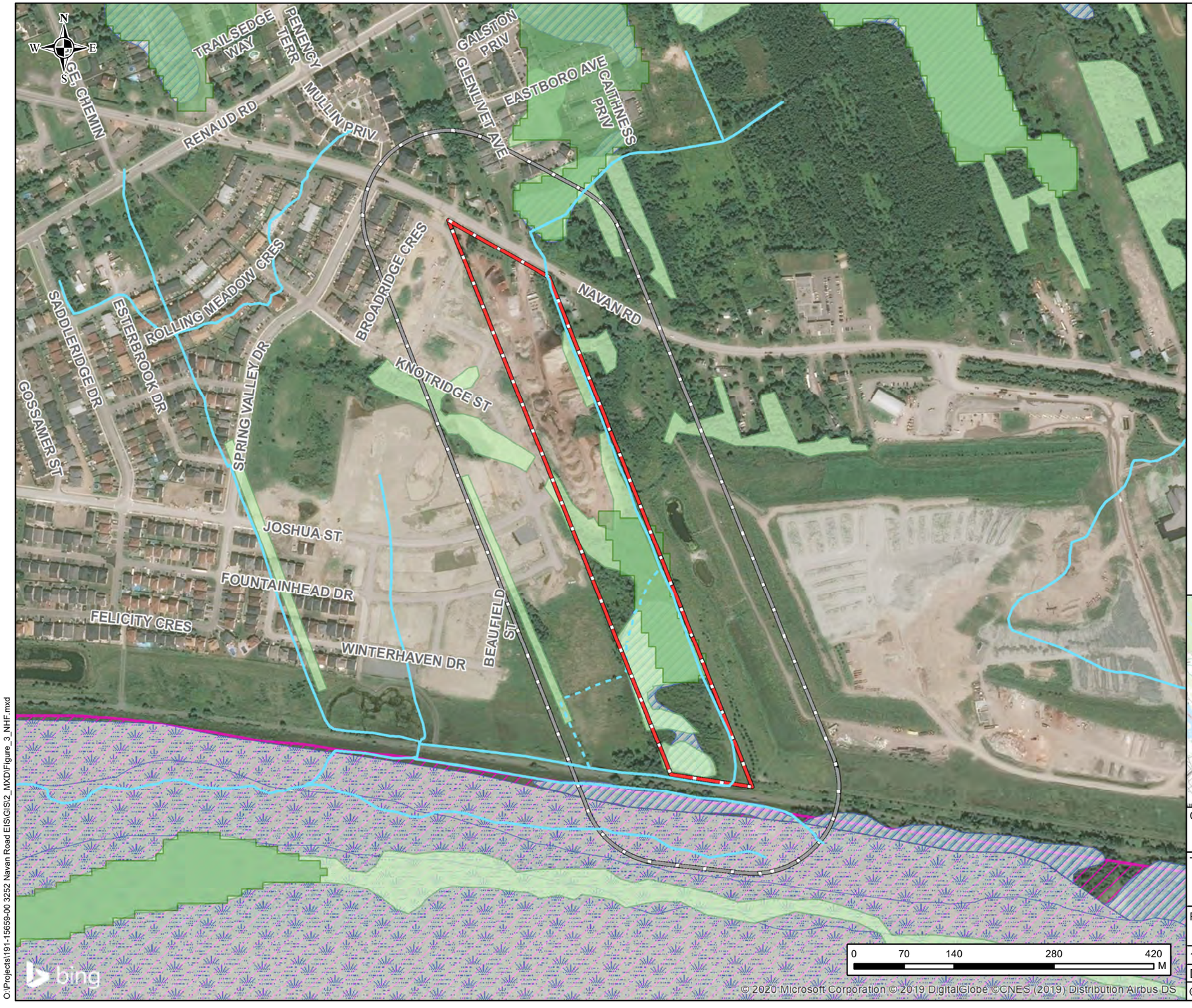
The RVCA is the governing body that regulates flood potential, protects natural heritage features, and enhances the ecosystems within the Rideau Valley watershed. Development within regulated areas is governed by O. Reg. 174/06 *Development, Interference with Wetlands, and Alterations to Shorelines and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

The RVCA has identified Regulated Limits areas throughout the Study Area and bordering the southern limit of the Project footprint (Rideau Valley Conservation Authority, 2019). The Regulation Limit is shown in **Figure 3**.

3.3.2 HEADWATER DRAINAGE FEATURES

Mapping by both the RVCA (Rideau Valley Conservation Authority, 2019) and City of Ottawa (City of Ottawa, 2019) indicate the presence of a watercourse in the subject property. The two mapping sources have discrepancies, as the RVCA mapping suggests that a channelized watercourse runs along the eastern and southern subject property boundaries, whereas the City of Ottawa mapping shows the watercourse flowing southwest across the southern half of the subject property. The watercourse eventually connects into the Mer Bleue wetland south of the subject property. The watercourse alignments are illustrated in **Figure 3**.

The 2018 RVCA report for Mud Creek indicates that a Headwater Drainage Feature (HDF) assessment was completed on this watercourse, around the northern limit of the property parcel where it crosses Navan Road (Rideau Valley Conservation Authority, 2018). The assessment results found that this watercourse is a natural feature with intermittent flows and no channel modifications.



Watercourse (City of Ottawa)

Watercourse (MNRF, 2011)

Area of Natural and Scientific Interest (MNRF, 2007)

Wooded Area (MNRF, 2013)

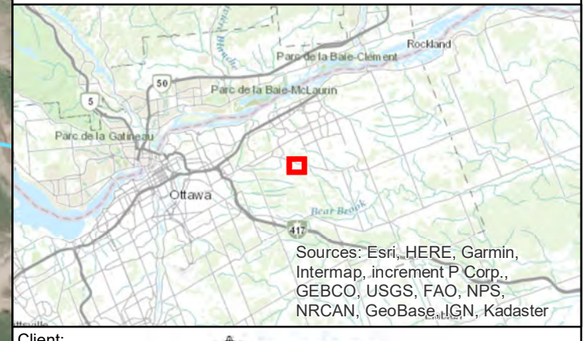
Significant Woodland (MNRF, 2013)

Unevaluated Wetland (MNRF, 2013)

Provincially Significant Wetland (MNRF, 2013)

Subject Property

Study Area



Client: CLARIDGE HOMES

Title: **3252 Navan Road**
Natural Heritage Screening

Prepared By: WSP

191-15659-00	1:5,500	Review: AZ
Date: January 2020	**Figure: 3**	
© Queen's Printer for Ontario		

O:\Projects\191-15659-00 3252 Navan Road EIS\GIS\2_MXD\Figure_3_NHF.mxd

3.4 NATURAL HERITAGE FEATURES

Several specific natural heritage features require consideration for protection under the Ontario PPS (Ministry of Municipal Affairs and Housing, 2014). Protection of these features are 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; and,
- Fish habitat.

The section below provides a review of available background materials to determine the potential presence of these natural heritage features within the Study Area. Where possible, natural heritage features have been illustrated in **Figure 3.**

3.4.1 WETLANDS

A review of the City of Ottawa online mapping service (City of Ottawa, 2019) and provincial natural heritage mapping accessed through the NHIC (MNRF, 2019) indicates the presence of the Mer Bleue PSW within the Study Area and an unevaluated woodland wetland present within the southern half of the subject property.

Mer Bleue PSW is a 7,700-year-old bog, which has been recognized as having international significance under the Ramsar Convention (National Capital Commission, n.d.). The wetland complex provides habitat for many wildlife species and contains regionally rare plants. The Mer Bleue wetland is part of the National Capital Commission's (NCC) Greenbelt, and is managed by the NCC (National Capital Commission, n.d.).

3.4.2 WOODLANDS

Provincial NHIC mapping and aerial photos indicates the presence of wooded areas and significant woodlands present within the subject property and the Study Area. However, a review of historical imagery suggests that this forest community is likely too young (<60 years) to be considered significant under the City of Ottawa's Significant Woodlands policy guidelines (City of Ottawa, 2019).

3.4.3 VALLEYLANDS

No Significant Valleylands were identified within or adjacent to the Study Area.

3.4.4 AREAS OF NATURAL AND SCIENTIFIC INTEREST

The Mer Bleue Bog Life Science and Earth Science ANSIs are present within the southern limit of the Study Area, outside of the subject property.

3.4.5 SIGNIFICANT WILDLIFE HABITAT

No SWH features were identified in NHIC or LIO.

3.4.6 FISH HABITAT

No fish community assessments have been conducted within the watercourse located in the Study Area. However, based on its connection to Mud Creek and a nearby wetland, it is likely that this watercourse provides indirect fish habitat.

3.5 SPECIES AT RISK AND SPECIES OF CONSERVATION CONCERN

Background data was collected and reviewed to identify SAR and SCC with occurrence records within the Study Area. Publicly available databases (**Table 1**) were consulted to develop a list of SAR that have a record within a 1 km^2 or 10 km^2 grid (dependent on the database being consulted) encompassing the Study Area. Due to natural changes and anthropogenic developments in the Project Study Area, the background review collected current records (i.e. ≤ 30 years) that occurred within the Study Area.

Table 2 provides a list of these species along with corresponding federal, provincial, SAR and/or SCC designations (i.e. S-Ranks). S-Ranks are a provincial status used by the NHIC to set protection priorities for rare species and is based on the number of occurrences in Ontario. The MNRF tracks species with S1 to S3 (vulnerable to critically imperiled) designations and are therefore considered provincially rare and/or SCC.

Furthermore, species listed within **Table 2** were further evaluated based on their habitat preferences and likelihood of occurrence for the Study Area. The habitat screening was built on habitat requirements defined by the MNR (2000), background records, and air-photo interpretation in order to identify the presence of suitable habitat for SAR/SCC within the Study Area. The results of the screening are documented in **Appendix D – Species at Risk Screening**.

Table 2 Species at Risk and Species of Conservation Concern Wildlife Records

Scientific Name	Common Name	S-Rank[1]	SARA (Schedule 1)[2]	ESA	Info. Source[2]
Vascular Plants					
Carex folliculata	Northern Long Sedge	S3	---	---	NHIC
Juglans cinerea	Butternut	S3?	END	END	City of Ottawa
Insects					
Danaus plexippus	Monarch	S2N, S4B	SC	SC	OBA
Herpetoza					
Emydoidea blandingii	Blanding's Turtle	S3	THR	THR	ORAA
Lampropeltis triangulum	Eastern Milksnake	S4	SC	NAR	ORAA
Sternotherus odoratus	Eastern Musk Turtle	S3	SC	SC	ORAA
Graptemys geographica	Northern Map Turtle	S3	SC	SC	ORAA
Chelydra serpentina	Snapping Turtle	S3	SC	SC	ORAA, iNat
Pseudacris triseriata	Western Chorus Frog	S3	THR	NAR	ORAA
Birds					
Contopus virens	Bank Swallow	S4B	THR	THR	OBBA
Hirundo rustica	Barn Swallow	S4B	THR	THR	OBBA
Dolichonyx oryzivorus	Bobolink	S4B	THR	THR	OBBA
Chlidonias niger	Black Tern	S3B	---	SC	OBBA
Cardellina canadensis	Canada Warbler	S4B	THR	SC	OBBA
Chaetura pelagica	Chimney Swift	S4B, S4N	THR	THR	OBBA
Chordeiles minor	Common Nighthawk	S4B	THR	SC	OBBA
Sturnella magna	Eastern Meadowlark	S4B	THR	THR	OBBA
Antrostomus vociferus	Eastern Whip-poor-will	S4B	THR	THR	OBBA
Contopus virens	Eastern Wood-pewee	S4B	SC	SC	OBBA

Scientific Name	Common Name	S-Rank[1]	SARA (Schedule 1)[2]	ESA	Info. Source[2]
Coccothraustes vespertinus	Evening Grosbeak	S4B	---	SC	OBBA
Ixobrychus exilis	Least Bittern	S4B	THR	THR	OBBA
Progne subis	Purple Martin	S3, S4B	---	---	OBBA
Asio flammeus	Short-eared Owl	S2N, S4B	SC	SC	OBBA
Hylocichla mustelina	Wood Thrush	S4B	THR	SC	OBBA
Mammals					
Myotis lucifugus	Little Brown Myotis	S3	END	END	AMO
Myotis leibii	Eastern Small-footed Myotis	S2S3	END	END	AMO
Myotis septentrionalis	Northern Myotis	S3	END	END	AMO
Perimyotis subflavus	Tri-colored Bat	S3?	END	END	AMO

[1]S-Rank is an indicator of commonness in the Province of Ontario. A scale between 1 and 5, with 5 being very common and 1 being the least common. [2]END = Endangered; THR = Threatened; SC = Special Concern. [3]Information sources include: NHIC = Natural Heritage Information Centre; OBBA = Ontario Breeding Bird Atlas; ORAA = Ontario Reptile and Amphibian Atlas; OBA = Ontario Butterfly Atlas; AMO = Atlas of the Mammals of Ontario; iNat = iNaturalist; City of Ottawa: MacPherson, 2018; --- denotes no information or not applicable.

3.6 TREES

Aerial photos indicate that the southern half of the subject property contains a deciduous forest community, approximately 3.5 hectares (ha) in area. Woodland communities are also present within the Study Area, north of the proposed subject property. Additionally, the subject property's eastern and western boundaries appear to contain hedgerows with trees and shrubs. A review of the City of Ottawa's Urban Tree By-law (No. 2009-200) indicates that this property is located within the urban boundary and therefore a tree removal permit is likely to be required.

3.7 WILDLIFE HABITAT

In addition to the SAR and SCC noted above in **Table 2**, a review of current and historic aerial photos of the Study Area was 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**: Raccoons (*Procyon lotor*), White-tailed Deer (*Odocoileus virginanus*), Eastern Gray Squirrel (*Sciurus carolinensis*), Eastern Cottontail (*Sylvilagus floridamus*), Red Fox (*Vulpes vulpes*), Eastern Coyote (*Canis latrans* var.), among others.
- **Reptiles & Amphibians:** Eastern Gartersnake (*Thamnophis sirtalis*), Green Frog (*Rana clamitans*), Gray Tree Frog (*Hyla versicolor*), among others.

- **Birds:** American Crow (*Corvus brachyrhynchos*), Black-capped Chickadee (*Poecile atricapillus*), Downy Woodpecker (*Picoides pubescens*), Song Sparrow (*Melospiza melodia*), among others.

3.8 OTHER DEVELOPMENT CONSTRAINTS

The proposed Project footprint is located approximately 100 m north of NCC Greenbelt lands. Due to the proximity to a protected area, consultation with the NCC may be required. Furthermore, a landfill is located in the adjacent property to the east, approximately 200 m from the proposed Project footprint, and may require additional considerations from the City of Ottawa.

4 METHODOLOGY

4.1 SCOPE OF WORK (2019)

Based on the background information of the Project's natural heritage features and wildlife occurrence records, ecological surveys outlined below were conducted to assess the impacts of the Project on the natural environment. These surveys follow industry standard protocols and are intended to establish baseline conditions. Such baseline conditions were then used to evaluate the potential for negative impacts, which may occur as a result of the Project development.

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. Due to project timelines, surveys were completed during winter conditions.

AQUATIC ENVIRONMENT

- Identification of surface water features

NATURAL HERITAGE FEATURES

- Ecological Land Classification (ELC), including:
  - Vegetation survey (preliminary)
  - Woodland delineation
- Identification of potential SWH

SPECIES AT RISK

- Incidental SAR and SAR habitat observations

TREES

- Inventory of trees within the subject property:
  - Distinctive tree assessment

INCIDENTAL WILDLIFE

- Visual and auditory observations of wildlife

4.1.1 PENDING FIELD STUDIES (2020)

AQUATIC ENVIRONMENT

- Headwater drainage feature assessment (expected March 2020)

NATURAL HERITAGE FEATURES

- Vegetation inventory (expected June 2020), including
  - Identification of rare plants and wetland delineation

- Amphibian Breeding Surveys (expected April to June 2020)
- Breeding Bird Surveys (expected May to June 2020)
- Incidental SWH observations

SPECIES AT RISK

- SAR Bat Acoustic Survey (expected June 2020)
- Incidental SAR and SAR habitat observations

INCIDENTAL WILDLIFE

- Visual and auditory observations of wildlife

4.2 AQUATIC ENVIRONMENT

The presence and location of aquatic environment features (watercourses, waterbodies) was confirmed by biologists during the preliminary field investigation. Biologists also recorded any additional information where possible, including riparian vegetation and evidence of water flows and activity.

Headwater Drainage Feature Assessment will be completed in 2020 to further evaluate headwaters present within the Study Area.

4.3 NATURAL HERITAGE FEATURES

4.3.1 VEGETATION COMMUNITIES

Vegetation communities within the Study Area were characterized and mapped using the ELC system for southern Ontario (Lee, et al., 1998). Vegetation communities were first delineated by air-photo interpretation and then verified while on-site.

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 were described to the community level only. 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 for the Project as they are more representative of the vegetation communities within the Study Area.

A preliminary vegetation inventory was completed in conjunction with ELC surveys and a list of vascular plant species was compiled. In addition, this inventory was also used to screen for any SAR and/or provincially rare species 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 (2000 + accessed 2015) and Michigan Flora Online (2015).

A supplemental vegetation inventory will be completed during summer 2020.

4.3.2 WOODLANDS

The woodlands within the Study Area were assessed for significance following the updated guidelines outlined in the City of Ottawa Official Plan Amendment No. 179 [Section 2.4.4 of the Official Plan (City of Ottawa, 2003)].

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*
2. *In the rural area, meeting any one of the criteria in the Natural Heritage Reference Manual (MNR, 2010), as assessed in a subwatershed planning context and applied in accordance with Council-approved guidelines, where such guidelines exist*
3. *In the urban area, any area 0.8 hectares in size or larger, supporting woodland 60 years of age and older at the time of evaluation*

For the woodlands within this Study Area, criteria #1 and #3 will be used to determine significance. The ELC delineation will be used to determine the size of the woodland and historic aerial images will be used to estimate the age.

4.3.3 SIGNIFICANT WILDLIFE HABITAT

AMPHIBIAN BREEDING SURVEYS (PENDING)

Amphibian monitoring to evaluate and confirm candidate Amphibian Breeding SWH will follow the Marsh Monitoring Program protocol (Bird Studies Canada, 2019). In accordance with the survey protocol, three separate surveys will be conducted between April 1st and June 30th, with at least two weeks between each visit. Surveys begin at least one-half hour after sunset during evenings with a minimum night temperature of 5^0C, 10^0C, and 17^0C for each of the three respective surveys. Survey points will align with suitable candidate habitat features (vernal pools, surface water features) within the Study Area.

Each amphibian survey generally involves standing at a predetermined station for three (3) 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 will be recorded as outside the count circle and calling activity will not be not recorded. Calling activity will be 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 day-time surveys. These searches will occur between April and June when amphibians are concentrated around suitable breeding habitat.

BREEDING BIRD SURVEYS (PENDING)

Diurnal breeding bird surveys to evaluate and confirm bird SWH and habitat for SAR and/or SCC birds will be conducted within the Study Area following the methods outlined in the Ontario Breeding Bird Atlas Guide for Participants (Cadman & Kopysh, 2001). These surveys will be completed in May and June 2020.

Each survey consists of ten-minute point counts to establish quantitative estimates of bird abundance in habitat types within the Study Area. To supplement the surveys, area searches of the habitat will be completed using binoculars to observe species presence and breeding activity. Area searches noting all individual bird species and their corresponding breeding evidence will be completed while traversing the habitat on foot.

4.4 SPECIES AT RISK AND SPECIES AT RISK HABITAT

Ecological Land Classification and wildlife surveys will be used to identify candidate habitat for the SAR with potential to occur listed in **Appendix D.** Suitable habitat descriptions are included in the screening table in **Appendix D**.

SAR BAT ACOUSTIC SURVEY (PENDING)

Acoustic monitoring of bat activity will be completed concurrently with evening amphibian surveys in the spring and summer of 2020. Ten-minute surveys will occur at fixed points within the Study Area, using Wildlife Acoustics' EchoMeter Touch 2 Pro and an Android tablet to record and analyze ultrasonic bat calls.

The recording results will be used to compile a species list for the Study Area, including SAR bats, and evaluate general bat activity and habitat usage.

INCIDENTAL SPECIES AT RISK AND SPECIES AT RISK HABITAT OBSERVATIONS

In addition to the habitat for the species noted in Appendix D, 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.

4.5 TREES

Following the City of Ottawa's *Tree Conservation Report Guidelines* (City of Ottawa, 2019), trees > 10 cm DBH were surveyed within the subject property. Large stands of trees were assessed as a group based on species composition and density as per standard protocols. All Distinctive trees (≥50 cm DBH) were surveyed by an approved professional as outlined in the City guidelines. The survey for the Distinctive trees include the species, DBH, condition, height, and location.

4.6 INCIDENTAL WILDLIFE

A wildlife assessment within the property was completed through incidental observations while on site. Any incidental observations of wildlife as well as other wildlife evidence such as dens, tracks, and scat were documented by means of observational notes, photos, and UTM coordinates. Such observations were used to substantiate baseline conditions and gather conclusions on the overall ecological function of the Study Area.

5 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 **Figure 4**.

5.1 SITE INVESTIGATIONS

As required, resumes of key staff involved in the project have been included in **Appendix A**. A total of one site visit was made to assess for the ecological features and functions identified in the background records review. The dates, times, surveyor names, and weather conditions for all surveys are listed in **Table 3.**

Table 3 Field Survey Details (2019)

Date	Surveyor	Start Time	End Time	Weather Conditions	Purpose
December 17th, 2019	A.Orr and C. Pytlak	08:30	15:00	-3°C, slight breeze, variable clouds, light snow in afternoon	Ecological Land Classification Tree Survey General Site Evaluation

5.2 AQUATIC ENVIRONMENT

The biologists confirmed the presence of a channelized watercourse on the eastern limit of the subject property. This channel was frozen and snow-covered at the time of survey. Riparian vegetation was mainly Reed-canary Grass (*Phalaris arundinacea*), which was likely also present in the channel.

Due to snowfall and seasonal conditions biologists could not confirm the presence of a second channel branching west through the middle of the subject property, as indicated in the City of Ottawa's background mapping (see **Figure 3**).

No further evaluation of watercourse functions or aquatic environments could be completed at the time of the initial field survey. Headwater Drainage Feature Assessment to evaluate watercourse feature and function to be completed in 2020.

5.3 NATURAL HERITAGE FEATURES

5.3.1 VEGETATION COMMUNITIES

The ELC survey identified a total of ten vegetation communities within the Study Area, including areas with residential or commercial development. Only four of these communities are present within the proposed Project footprint.

Most of the communities present within the Study Area had evidence of cultural influence from former agricultural uses, recent and on-going residential development, or commercial uses. All vegetation communities surveyed within the Study Area are considered common within Ontario. **Table 4** 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 4**. Reference photos for the vegetation communities are included in **Appendix B**.

VEGETATION SURVEY

The preliminary winter vegetation survey identified 21 species, generally consisting of trees and woody vegetation. The list of vegetation and tree species recorded are included in **Appendix C**. All species encountered occur regularly in the Ottawa area. **No provincial or federal SAR were recorded during the inventory**.

A supplementary vegetation survey will be completed in 2020.

Table 4 Ecological Land Classification Results

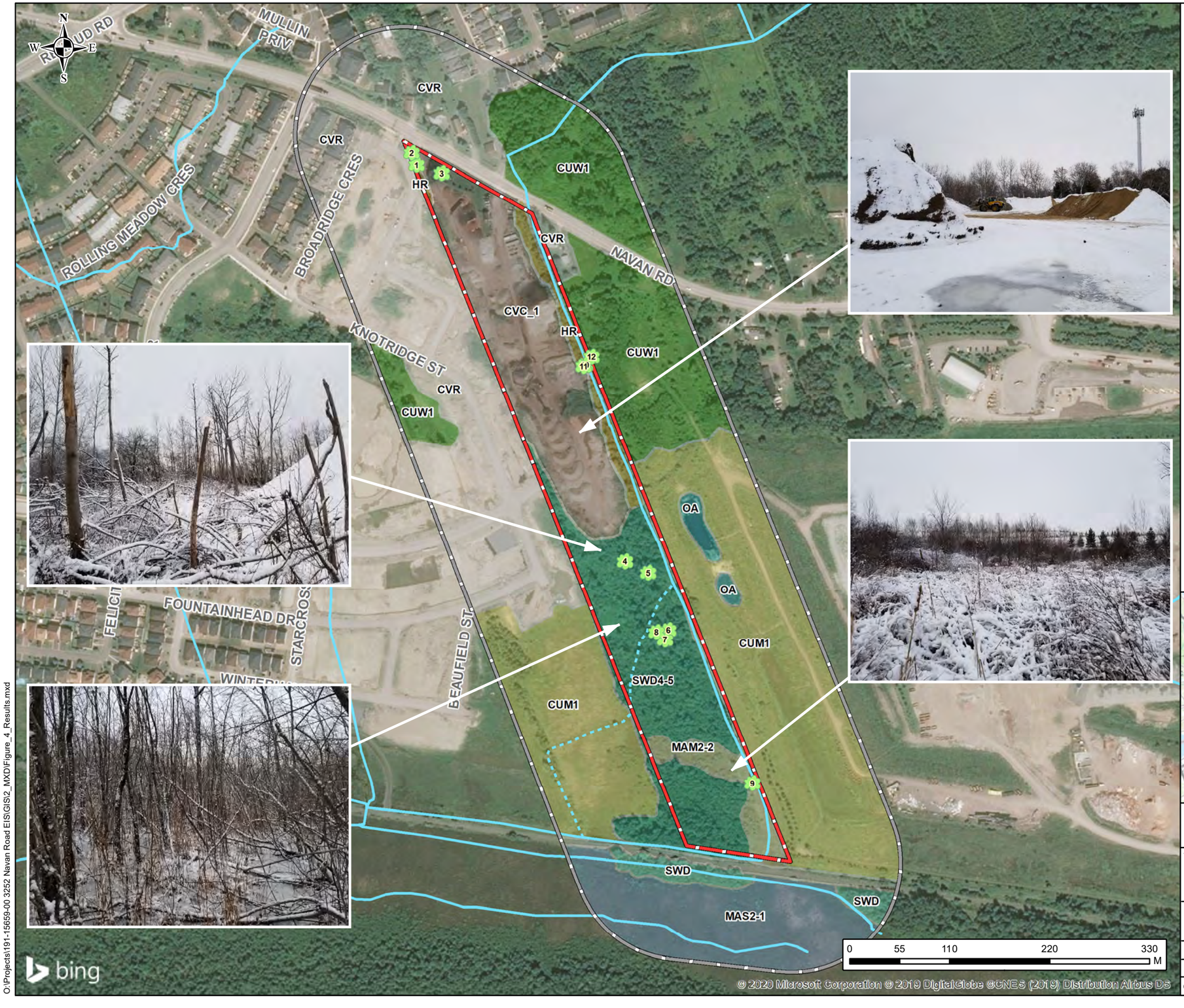
ELC Type	Total Area (ha)	Community Description
Deciduous Swamp (SWD)		
SWD4-5 Poplar Mineral Deciduous Swamp	3.8	This community occurs within the southern portion of the subject property and consists mainly of young, regenerating vegetation. The canopy and subcanopy is dominated by Eastern Cottonwood and Trembling Aspen. The understorey is mainly dominated by dense Common Buckthorn (invasive), with some Red-osier Dogwood and Red Raspberry present. No ground layer species were recorded during time of survey due to seasonal conditions. This community contains small pockets of standing water, which was frozen at the time of survey.
SWD Deciduous Swamp	0.52	This community consists of two small vegetation polygons located outside of the proposed subject property, adjacent to the Mer Bleue PSW.
Cultural (CU)		
CUM1 Mineral Cultural Meadow	8.98	This community occurs on the east and west sides of the subject property. The community to the east of subject property are vacant lands providing a buffer to the adjacent landfill. The community to the west of the subject property are located on lands approved for development.
CUW1 Mineral Cultural Woodland	5	This community occurs in two polygons in the northeast corner of the Study Area. This community contains mainly deciduous tree species.
Meadow Marsh (MAM)		
MAM2-2 Reed-canary Grass Mineral Meadow Marsh	0.18	This feature is associated with the watercourse in the southeastern corner of the subject property and forms a complex with the SWD4-5. This community is dominated by Reed-canary grass. Due to seasonal conditions and snow cover, no additional vegetation species could be identified.
Shallow Marsh (MAS)		

ELC Type	Total Area (ha)	Community Description
MAS2-1 Cattail Mineral Shallow Marsh	2.72	This feature is associated with the Mer Bleue PSW at the southern limit of the Study Area. It is dominated by Cattail species and extends beyond the Study Area.
Hedgerow (HR)		
HR Hedgerow	0.53	This community occurs along the eastern and western boundaries of the subject property and consists mainly of Eastern Cottonwood, Trembling Aspen, and Manitoba Maple in the canopy and sub-canopy.
Commercial and Institutional (CVC)		
CVC_1 Business Sector	3.5	This community occurs within the northern portion of the subject property and is occupied by an active sand and gravel storage and supply business. This community is mainly cleared land with piles of soil, sand, and other materials located throughout, with an office present adjacent to Navan Road.
Residential (CVR)		
CVR Residential	8.71	This community is associated with multiple residential developments located within the Study Area, including single-family homes and rural properties.
Open Water (OA)		
OA Open Aquatic	0.25	This community is represented by two small constructed ponds located on the eastern edge of the Study Area.

5.3.2 WETLANDS

The community of MAM2-2 was identified within the subject property. The meadow marsh community is associated with the watercourse on the western edge. Additionally, an MAS2-1 community was identified and delineated within the Study Area and is part of the larger Mer Bleue PSW, located south of the subject property.

Delineation of the wetland within the subject property will be completed in 2020. Provincially Significant Wetlands (PSW) are present within the Study Area, although located outside of the proposed project footprint.



Distinctive Tree (>50 cm DBH)

CUM1: Mineral Cultural Meadow

CUW1: Mineral Cultural Woodland

CVC_1: Business Sector

CVR: Residential

HR: Hedgerow

MAM2-2: Reed-canary Grass Mineral Meadow Marsh

MAS2-1: Cattail Mineral Shallow Marsh

OA: Open Aquatic

SWD: Deciduous Swamp

SWD4-5: Poplar Mineral Deciduous Swamp

Watercourse (MNRF, 2011)

Subject Property

Study Area

Client: CLARIDGE HOMES

Title:

3252 Navan Road
Site Investigation Results

Prepared By: WSP

191-15659-00	1:4,300	Review: AZ
Date: January 2020	**Figure: 4**	
© Queen's Printer for Ontario		

O:\Projects\191-15659-00 3252 Navan Road EIS\GIS\2_MXD\Figure_4_Results.mxd

5.3.3 WOODLANDS

The southern half of the subject property is forested with a Poplar Mineral Deciduous Swamp (SWD4-5) community (see **Figure 4**). This community meets the requirements to be considered a forest under the *Forestry Act, R.S.O 1990, c.F.26*, and is approximately 3.8 ha in area. However, a review of aerial imagery from 1976 (see **Figure 2**) shows this area cleared for agricultural use, and therefore does not meet the minimum age requirement of 60 years to be considered significant.

The Mineral Cultural Woodlands located outside of the subject property were also evaluated for significance and do not meet the minimum age criteria, based on review of historical aerial imagery.

There are no significant woodlands located within the Study Area.

5.3.4 SIGNIFICANT WILDLIFE HABITAT

The evaluation for candidate SWH was based on the results of the ELC survey and other field observations (i.e. potential vernal pools) in comparison to the SWH criteria defined by the MNRF (MNRF, 2015). **Table 5**, below, summarizes the results of candidate SWH within the Study Area. Much of the candidate SWH that was identified as potentially occurring within the Study Area is associated with the Mer Bleue PSW, which is located approximately 30 m from the proposed development area.

Table 5 Candidate Significant Wildlife Habitat Occurring Within the Study Area

Candidate Significant Wildlife Habitat	Rationale
Specialized Habitat for Wildlife	
Amphibian Breeding Habitat (Woodland & Wetland)	Suitable meadow marsh and swamp communities identified within subject property. Mer Bleue PSW located at southern limit of Study Area likely contains high quality amphibian breeding habitat. **Amphibian breeding surveys to be completed in 2020.**
Turtle Nesting Areas	Mer Bleue PSW and wetland edges likely support suitable nesting areas and conditions for turtle nesting. **Additional search of Study Area to be completed in 2020.**
Marsh Breeding Bird Habitat	Cattail marsh community within Mer Bleue PSW likely supports suitable breeding conditions for marsh birds. **Breeding bird surveys to be completed in 2020.**
Animal Movement Corridor	
Amphibian Movement Corridor	Headwater drainage feature within subject property likely contributes to amphibian movement between various vegetation communities and the Mer Bleue PSW. **However, amphibian SWH needs to be confirmed prior to evaluation for movement corridors. Amphibian surveys to be completed in 2020.**

Candidate Significant Wildlife Habitat	Rationale
Habitat for Species of Conservation Concern	
Habitat for Species of Conservation Concern	Suitable habitat features identified for Black Tern, Eastern Wood-Pewee, Purple Martin, Short-eared Owl, Eastern Milksnake, Eastern Musk Turtle, Northern Map Turtle, Snapping Turtle, Monarch, and Northern Long Sedge. See **Appendix D** for further information. **Amphibian, breeding bird, vegetation, and habitat searches to be completed in 2020.**

5.4 SPECIES AT RISK AND SPECIES AT RISK HABITAT

The evaluation for SAR habitat was based on the results of the ELC survey and other field observations (i.e. suitable cattail marshes to support Least Bittern). Potential habitat for nine (9) SAR species were identified during the ELC assessment. **Table 6** lists the candidate SAR habitat observed within the Study Area. **No SAR or evidence of SAR was observed during the site investigation.**

The deciduous swamp (SWD) communities within the subject property, and adjacent residential homes may provide foraging and roosting opportunities for SAR bats. The cattail marsh community (MAS2-1) associated with Mer Bleue PSW, south of the subject property, may provide suitable habitat for Least Bittern (*Ixobrychus exilis*). Suitable Blanding's Turtle (*Emydoidea blandingii*) habitat may be present in cattail marsh (MAS2-1) and deciduous swamp (SWD) communities.

Table 6 Candidate SAR Habitat Occurring Within the Study Area

Common Name	Description of Suitable Habitat Within Study Area
Bobolink	Mineral Cultural Meadow (CUM1) on western edge of Study Area may provide suitable nesting habitat; however, there is no suitable habitat located within the proposed subject property. **Breeding bird surveys to be completed to evaluate species presence in 2020.**
Eastern Meadowlark	Mineral Cultural Meadow (CUM1) on western edge of Study Area may provide suitable nesting habitat; however, there is no suitable habitat located within the subject property. **Breeding bird surveys to be completed to evaluate species presence in 2020.**
Least Bittern	Large cattail marsh (MAS2-1) at southern limit of Study Area may support suitable breeding and foraging habitats. **Breeding bird surveys to be completed to evaluate species presence in 2020.**
Blanding's Turtle	Cattail marsh (MAS2-1) and swamp communities (SWD4-5, SWD) in southern half of Study Area may provide suitable aquatic and terrestrial habitats. **Additional habitat search to be completed in 2020.**

Common Name	Description of Suitable Habitat Within Study Area
Eastern Small-footed Myotis	Deciduous swamp (SWD4-5, SWD) communities may provide foraging habitat; residential homes and structures may provide roosting habitat. **Acoustic surveys to assess species presence to be completed in 2020.**
Little Brown Myotis	Swamp (SWD4-5) and wetland (MAM2-2, MAS2-1) communities may provide foraging habitats; forest communities and residential homes may provide roosting habitat. **Acoustic surveys to assess species presence to be completed in 2020.**
Northern Myotis	Swamp communities (SWD4-5, SWD) may provide roosting and foraging habitats; residential homes may provide roosting habitat. **Acoustic surveys to assess species presence to be completed in 2020.**
Tri-colored Bat	Swamp communities (SWD4-5, SWD) may provide roosting and foraging habitats; residential homes may provide roosting habitat. **Acoustic surveys to assess species presence to be completed in 2020.**
Northern Long Sedge	Cattail marsh and other wet areas may provide suitable conditions for this species. **Vegetation survey to assess species presence to be completed in 2020.**

5.5 TREES

The general tree count within the project footprint estimated approximately 538 trees (≥10 cm DBH) made up of 15 species. The southern half of the project footprint contained the majority of trees, with less tree abundance on the eastern and western edges of the project footprint. The following species were encountered during the survey:

- American Basswood (*Tilia americana*)
- Ash species (*Fraxiuns* sp.)
- Black Cherry (*Prunus serotina*)
- Common Buckthorn (*Rhamnus cathartica*)
- Crack Willow (*Salix fragilis*)
- Eastern Cottonwood (*Populus deltoides*)
- Elm species (*Ulmus* sp.)
- Locust (*Robinia* sp.)
- Manitoba Maple (*Acer negundo*)
- Maple species (*Acer* sp.)
- Paper Birch (*Betula papyrifera*)
- Poplar species (*Populus* sp.)
- Sugar Maple (*Acer saccharum*)
- Willow species (*Salix* sp.)

The tree community within the southern half of the project footprint is comprised mainly of Poplar species (43%) and Eastern Cottonwood (31%), with lesser amounts of Elm species, Maple species, Manitoba Maple, and Buckthorn. The tree community on the western hedgerow is generally dominated by Manitoba Maple (54%), with even numbers of Poplar species, Basswood, Locust, and Sugar Maple. On the eastern hedgerow, the tree community consists of Manitoba Maple (68%) and Poplar species (32%).

The overall tree health within the poplar deciduous swamp (SWD4-5) was evaluated as good, with most trees being in good health with minimal evidence of injury, disease, or pests. There were dead Ash trees present within the community, with evidence of being affected by Emerald Ash Borer. Several Elm trees encountered during the survey were dead or showed damage to bark and branches. There were numerous dead or dying trees located near the northern limit of the community, adjacent to the business area. Much of the damage appeared to be as a result of changes to anthropogenic disturbance from land alteration, and from pests and disease.

The hedgerow communities on the eastern and western edges of the project footprint showed good tree health. Damage or injury to tree health appeared to be because of land topography alteration.

Twelve distinctive trees were encountered during the survey, while 11 of the trees were located within the subject property, and one Eastern White Pine (*Pinus strobus*) was located immediately outside of the subject property. The distinctive trees were mainly in good health, except for two Maple trees evaluated as in Moderate condition due to dieback, dead branches, and large cavities.

The locations of distinctive trees are shown in **Figure 4**. **Table 7**, below, lists the species, DBH, condition, general observations, and coordinates of distinctive trees within the project footprint. **Appendix C** contains a list of tree species and estimated counts for individuals within the project footprint

Table 7 Distinctive Tree Inventory

Tree ID	Scientific Name	Common Name	DBH (cm)	Condition	Notes	Easting	Northing
01	*Acer* sp.	Maple sp.	61	Moderate	Dead branches, large cavities present, fungus growth along trunk.	460020.6	5030739
02	*Acer* sp.	Maple sp.	68	Moderate	Fused trunks, some dieback.	460015.3	5030753
03	*Populus deltoides*	Eastern Cottonwood	70	Good	Good form.	460048.2	50303730
04	*Populus deltoides*	Eastern Cottonwood	52, 32, 35	Good	Slight lean, multi-stemmed.	460249.9	5030303
05	*Populus deltoides*	Eastern Cottonwood	71	Good	Minimal dead branches.	460275.3	5030290
06	*Populus deltoides*	Eastern Cottonwood	57	Good	Minor number of dead branches.	460297.8	5030227
07	*Populus deltoides*	Eastern Cottonwood	53	Good	n/a	460293.9	5030217
08	*Populus deltoides*	Eastern Cottonwood	53, 20	Good	Slight lean, multi-stemmed.	460284.4	5030225
09	*Populus deltoides*	Eastern Cottonwood	52	Good	n/a	460390.2	5030058
10	*Populus deltoides*	Eastern Cottonwood	60	Good	n/a	460206.1	5030519
11	*Populus deltoides*	Eastern Cottonwood	55	Good	Moderate lean, some dead branches.	460204.3	5030518
12	*Pinus strobus*	Eastern White Pine	55	Good	Outside of property parcel.	460213.2	5030527

5.6 INCIDENTAL WILDLIFE

Biologists recorded direct observations or evidence of several bird species and one mammal species during the site visit, as described in **Table 8**. All the species encountered are common to the Ottawa area, and none are listed under the provincial ESA.

The observations of wildlife suggest that the swamp community within the Study Area is providing suitable wintering conditions for a number of resident bird species, as well as suitable breeding and nesting habitat for at least one species (American Robin). There was no evidence to indicate that White-tailed deer are using the Study Area for wintering habitat.

Table 8 Incidental wildlife observations

Scientific Name	Common Name	Observation Notes
Corvus brachyrhynchos	American Crow	Heard calling east of subject property
Turdus migratorius	American Robin	Old nest
Spizella arborea	American Tree Sparrow	Visual observation on western edge of subject property
Cyanocitta cristata	Blue Jay	Heard calling
Poecile atricapillus	Black-capped Chickadee	Heard calling and observed visually
Corvus corax	Common Raven	Heard calling outside of Subject property
Sturnus vulgaris	European Starling	Small flock observed in trees on eastern hedgerow
Larus sp.	Gull species	Observed flying south of Study Area
Leuconotopicus villosus	Hairy Woodpecker	Visual observation on eastern edge of deciduous poplar swamp
Haemorhous mexicanus	House Finch	Visual observation on western edge of subject property
Dryocopus pileatus	Pileated Woodpecker	Large cavities observed on mature Cottonwoods
Sitta carolinensis	White-breasted Nuthatch	Heard calling
Odocoileus virginianus	White-tailed Deer	Tracks observed on edge of deciduous poplar swamp

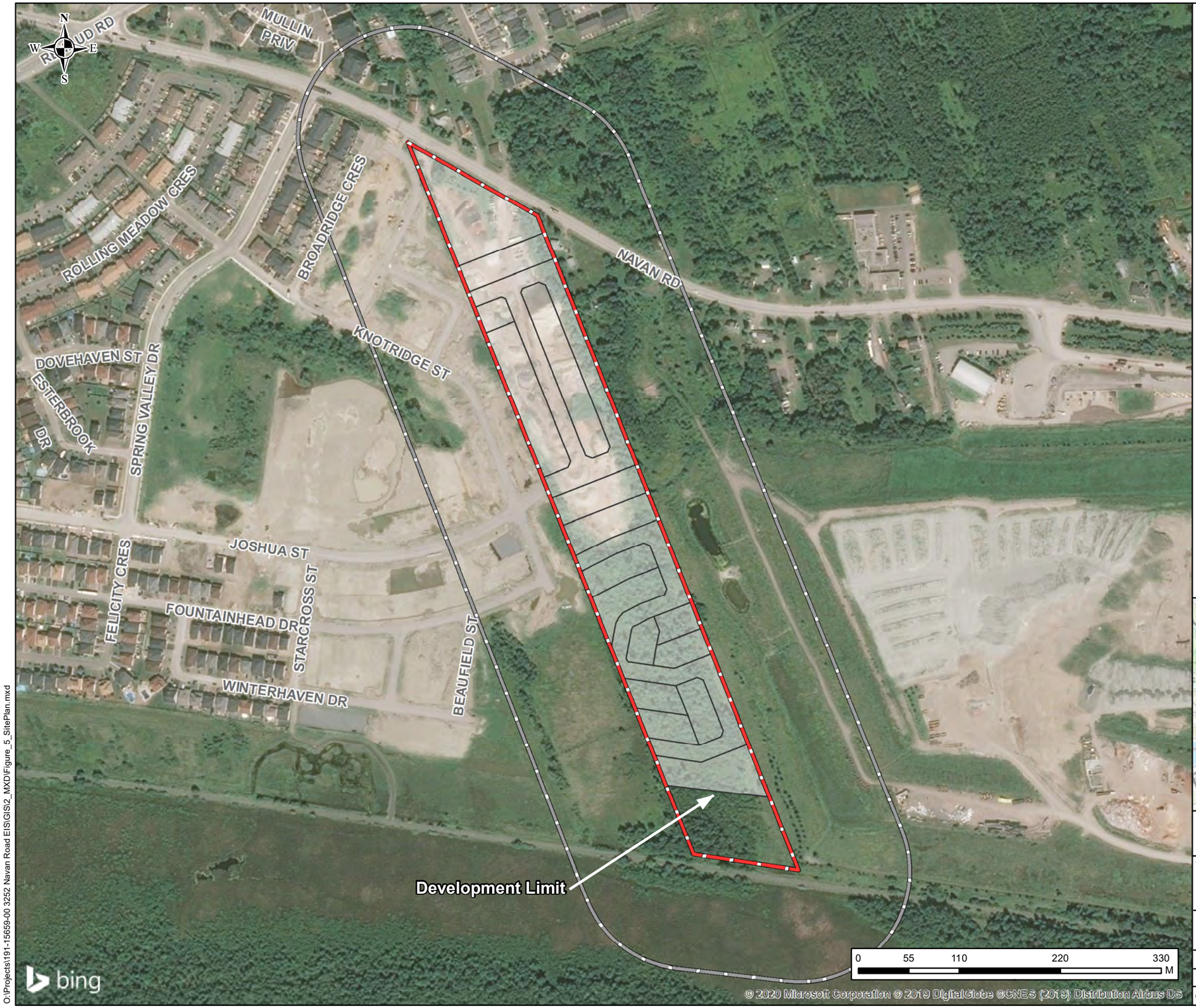
6 DESCRIPTION OF THE PROPOSED PROJECT

Claridge Homes is proposing to develop a residential subdivision intended for the construction of residential homes within the subject property of 3252 Navan Road. The total site area is approximately 7.1 ha. The draft site plan illustrating the proposed layout of the development is shown on **Figure 5**.

6.1 CONSTRUCTION ACTIVITIES

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

- Surveying and staking out the development;
- Clearing, excavation, and grading property to accommodate construction;
- Installation of storm water drainage network and related infrastructure;
- Excavation to accommodate underground utilities including water, sewer, gas, and hydro;
- Construction of buildings, driveways, and access roads;
- Site grading and earth works;
- Construction of individual lots and homes;
- Landscaping and fencing; and,
- On-going usage and maintenance.



Site Plan

Subject Property

Study Area

Client: CLARIDGE HOMES

Title: **3252 Navan Road**
Proposed Site Plan

Prepared By: WSP

191-15659-00	1:4,300	Review: AZ
Date: January 2020	**Figure: 5**	
© Queen's Printer for Ontario		

O:\Projects\191-15659-00 3252 Navan Road EIS\GIS\2_MXD\Figure_5_SitePlan.mxd

7 IMPACT ASSESSMENT AND MITIGATION

The following sections describe the anticipated environmental impacts associated with the proposed development and the general measures that should be considered to mitigate the associated impacts. The impact assessment and associated mitigation considers both construction-related impacts and impacts associated with the occupation of the development. The anticipated impacts are illustrated in **Figure 6.**

Please note that impacts and mitigation are based on the results of a single site visit and background screening and may change based on the results of additional field surveys that may be required.

7.1 AQUATIC ENVIRONMENT

It is expected that construction activities within the Project footprint will negatively impact the watercourse(s) present within the subject property, and potentially affect downstream reaches. Based on the site plan and available watercourse data, up to 830 m of stream(s) will be removed or buried to accommodate construction. This will likely indirectly impact aquatic and fish habitat downstream of the subject property.

It is assumed the following indirect impacts associated with the proposed development and associated construction activities may include the following:

- Overland transport of sediment into the tributary and associated habitats resulting from construction activities;
- Potential impacts on the tributary and other adjacent habitats resulting from spills and other contaminants;
- Sedimentation and erosion impacts resulting from potential dewatering activates that may be required during construction;
- Transport of sediment and other pollutants into the tributary from the proposed development; and,
- Increased amount and rate of storm water runoff from the impermeable surfaces of the proposed development.

Proposed Mitigation Measures – Planning and Design Stage

The following pre-construction mitigation measures are recommended to address impacts on the aquatic environment within and adjacent to the development area:

- ✓ Consultation with RVCA to determine potential compensation requirements for removal of watercourses and aquatic habitat, as well as potential downstream impacts.

Proposed Mitigation Measures – Construction Implementation

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

- ✓ Light-duty silt fencing (OPSD 219.110) and/or other equivalent erosion and sediment control measures should be installed round the perimeter of the work area to clearly demarcate the development area and prevent erosion and sedimentation into adjacent habitats. Erosion and sediment control measures should be monitored regularly to ensure they are functioning properly and if issues are identified should be dealt with promptly
- ✓ Heavy duty silt fencing (OPSD 219.130) and/or other equivalent erosion and sediment control measures should be installed adjacent to the tributary and associated wetland habitats to clearly demarcate the

development area and prevent erosion and sedimentation into adjacent habitats. Erosion and sediment control measures should be monitored regularly to ensure they are functioning properly and if issues are identified should be dealt with promptly

- ✓ Stockpiling of excavated material should not occur outside the delineated work area. If stockpiling is to occur outside of this area, silt fencing should be used to contain any spoil piles to prevent sedimentation into adjacent areas
- ✓ A spill response plan should be developed and implemented as required
- ✓ Avoid the use of heavy equipment in the wetland and watercourse during the winter when fish, amphibians and reptiles may be hibernating
- ✓ It is recommended that dewatering ponds (OPSD219.240) or similar standards should be implemented to avoid sedimentation and erosion in adjacent areas. If dewatering requires more than 50,000 L of water to be pumped per day, appropriate permits must be obtained from the Ministry of the Environment, Conservation and Parks (MECP) prior to the dewatering.
- ✓ Promote use of permeable surfaces in design and construction of roads and homes to limit stormwater runoff.

The impacts and associated mitigation listed above are preliminary and based on a single site visit and background resources. To properly evaluate aquatic environment impacts and develop specific mitigation measures, it is recommended to conduct a Headwater Drainage Feature Assessment in the spring of 2020.

7.2 NATURAL HERITAGE FEATURES

7.2.1 VEGETATION COMMUNITIES

It is anticipated to accommodate the construction of residential homes, including driveways and local roadways, most of the project footprint and associated vegetation communities will be cleared and graded. The impacts associated with this clearing will include:

- The permanent loss of or disturbance to native vegetation is approximately 7 ha of native vegetation (see **Figure 6).** 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:
  - 2.73 ha of Poplar Mineral Deciduous Swamp (SWD4-5);
  - 0.41 ha of Hedgerow (HR);
  - 0.31 ha of Reed-canary Grass Mineral Meadow Marsh (MAM2-2);
  - 0.12 ha of Mineral Cultural Meadow (CUM1);
  - 3.42 ha of Business Sector (CVC_1)
- Accidental damage or loss of trees and other vegetation features because of site alteration or construction activities;
- The permanent loss of habitat for wildlife dependent upon the terrestrial communities;
- Changes in natural drainage;
- 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 vegetation species after development.

The magnitude of these impacts is lessened by the presence of invasive or low value species throughout the subject property. This includes European Buckthorn and Manitoba Maple which dominates the swamp and hedgerow communities and found generally throughout the site.

Proposed Mitigation Measures – Construction Implementation

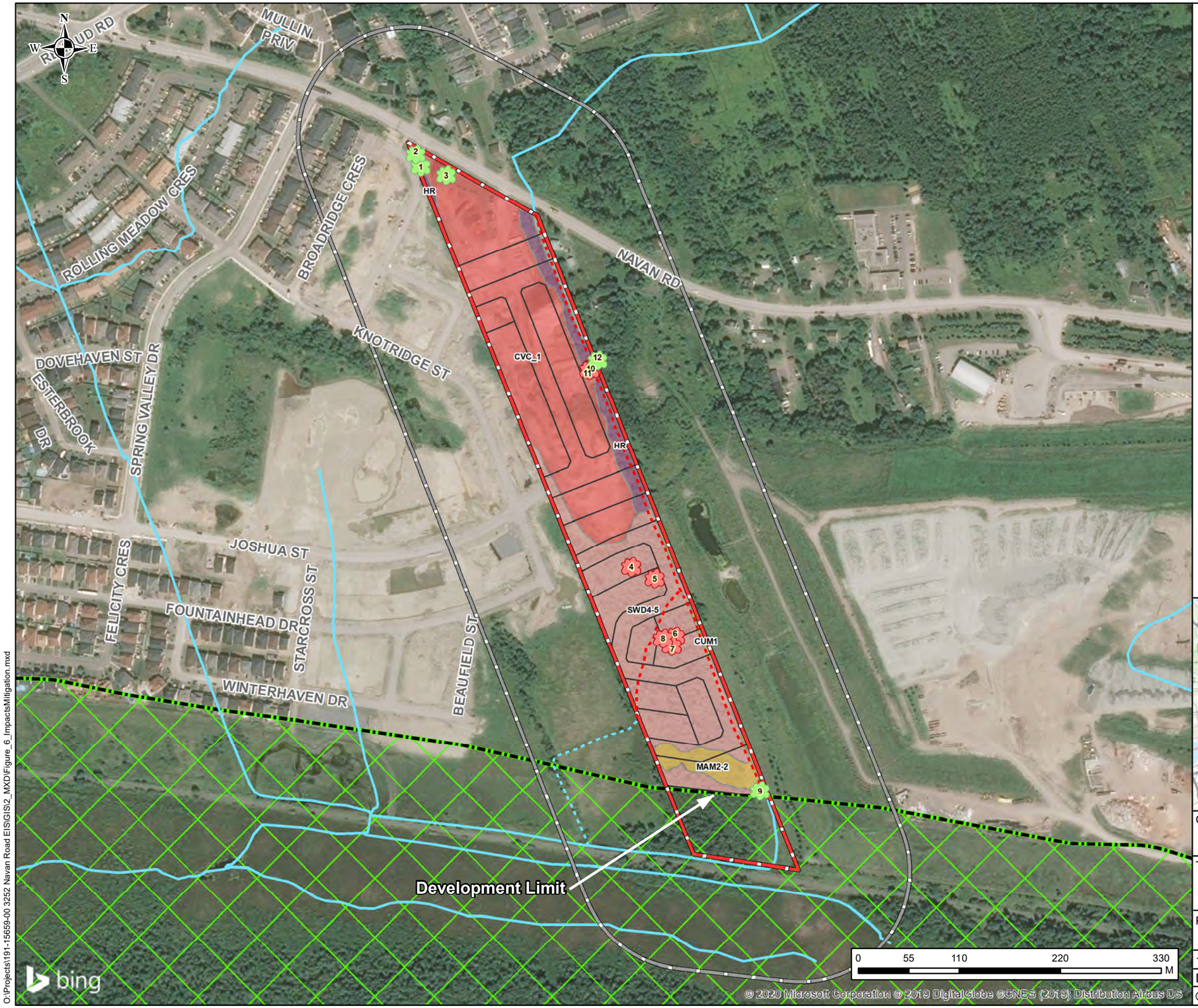
The following general mitigation measures are recommended to address impacts on the terrestrial environment within the project footprint:

- ✓ Orange snow fencing or other suitable security fencing should be used to delineate the construction limits from the adjacent habitat. This will prevent encroachment of construction activities into the adjacent natural features. This fencing should be monitored regularly to ensure it is functioning properly. Any deviancy in the fencing should be dealt with promptly;
- ✓ Erosion and sediment control plan should be implemented to prevent sedimentation outside of work areas;
- ✓ Landscaping plans should consider use of appropriate native species to offset the loss of species and biodiversity from vegetation removals;
- ✓ Machinery will arrive on site in a clean condition and will be free of fluid leaks, invasive species, and noxious weeds; and
- ✓ All excess construction material will be removed from site and the area restored with seeding of native species upon project completion as required.

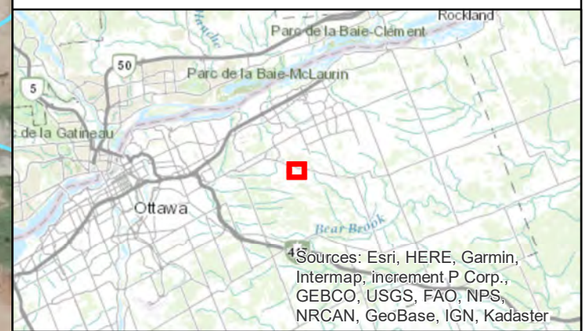
Proposed Mitigation Measures - After Construction

- ✓ Installation of garbage bins in public spaces is recommended to limit trash habitats adjacent to the development area
- ✓ '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 low-quality native terrestrial vegetation is anticipated.



- Distinctive tree (to be removed)
- Distinctive tree (potentially retainable)
- Removed/disturbed watercourse (approximately 840 m)
- Watercourse (MNRF, 2011)
- Watercourse (City of Ottawa)
- Removed/disturbed Business Sector (CVC_1) (3.42 ha)
- Removed/disturbed Hedgerow (HR) (0.49 ha)
- Removed/disturbed Mineral Cultural Meadow (CUM1) (0.12 ha)
- Removed/disturbed Poplar Mineral Deciduous Swamp (SDW4-5) (2.73 ha)
- Removed/disturbed Reed-canary Grass Mineral Meadow Marsh (MAM2) (0.31 ha)
- Site Plan
- Regulation Limit (RVCA)
- Project Area
- Study Area



Client: CLARIDGE HOMES

Title: **3252 Navan Road**
Anticipated Environmental Impacts

Prepared By: WSP

191-15659-00	1:4,300	Review: AZ
Date: January 2020	**Figure: 6**	
© Queen's Printer for Ontario		

O:\Projects\191-15659-00 3252 Navan Road EIS\GIS\2_MXD\Figure_6_ImpactsMitigation.mxd

7.2.2 WETLANDS

It is expected that the Poplar Mineral Deciduous Swamp (SWD4-5) and Reed-canary Grass Mineral Meadow Marsh (MAM2-2) communities will be disturbed or removed to accommodate the construction of local roads and residential homes. **Surveys to evaluate wetland function (i.e. amphibian surveys) have not been completed, and therefore impacts have been assumed and proposed mitigation are preliminary**.

However, based on the preliminary observations it is anticipated that the overall impact to wetlands and wetland functions will be non-limiting based on the proximity to the protected Mer Bleue PSW. Furthermore, the proposed site plan design has maintained a setback from the Mer Bleue PSW and complies with the RVCA's regulation limit (as shown in **Figure 6**).

Based on the initial field and background evaluation the following impacts are expected:

- Disturbance or removal of up to 3.04 ha wetland habitat;
- Accidental damage or loss of trees and other vegetation features as a result of site alteration or construction activities;
- Loss or disturbance to habitat for wildlife dependent upon wetland habitat;
- Changes in natural drainage;
- Decreased biodiversity, reduced number of species, or abundance of species;
- Habitat fragmentation; and,
- Permanent loss of native vegetation due to increased potential for non-native and invasive vegetation species after development

Proposed Mitigation Measures – Planning and Design Stage

- ✓ Consultation with RVCA to discuss potential wetland compensation measures.

Proposed Mitigation Measures - Construction Implementation

- ✓ Orange snow fencing or other suitable security fencing should 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 should be monitored regularly to ensure it is functioning properly. Any deviancy in the fencing should be dealt with promptly;
- ✓ Erosion and sediment control plan should be implemented to prevent sedimentation outside of work areas;
- ✓ Machinery will arrive on site in a clean condition and will be free of fluid leaks, invasive species, and noxious weeds; 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

- ✓ 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 is also recommended.

With the successful implementation of the recommended mitigation, a moderate decrease to wetland habitat is expected.

7.2.3 WOODLANDS

The woodland (SWD4-5) within the Project footprint was deemed not significant based on the City of Ottawa's guidelines. However, it is anticipated that site clearing for construction of the residential dwellings, driveways, and access roads will still result in negative impacts to the woodland within the proposed Project footprint. The impacts include:

- The permanent loss of, or disturbance to, approximately 2.73 ha of woodlands within the proposed project footprint, including;
    - 2.73 ha of Poplar Mineral Deciduous Swamp (SWD4-5);
- Decreased biodiversity, reduced species abundance, and reduced urban canopy;
- The permanent loss of habitat for wildlife dependent upon these woodlands; and,
- Changes in natural drainage.

Proposed Mitigation Measures – Planning and Design Stage

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

- ✓ Retention of healthy, mature and mid-aged trees should be prioritized where possible along the work areas for the proposed driveways and access roads
- ✓ Landscaping plans for areas adjacent to access roads should consider use of appropriate native species to offset loss of species and biodiversity from vegetation removals.

With the successful implementation of the mitigation measures outlined above, it is anticipated there will be a moderate permanent loss of woodlands within the subject property. Tree-specific mitigation measures are described below in Section 7.4

7.2.4 SIGNIFICANT WILDLIFE HABITAT

It is anticipated that the removal of vegetation communities and habitat features such as vernal pools and cavity trees within the proposed development area will negatively impact candidate Significant Wildlife Habitat. Based on the preliminary field evaluation, the following general impacts are anticipated:

BREEDING BIRDS

Based on the incidental observations of birds and nesting evidence in the Study Area, it is expected that the removal and disturbance to swamp, meadow marsh, hedgerow, and meadow habitats within the proposed development area will result in a loss of potential nesting and foraging habitat for birds.

However, based on the preliminary observations and given the availability of suitable natural habitats south of the proposed development, impacts to breeding birds are assumed to be negligible. The following direct and indirect impacts on breeding birds are a possible result of the proposed development:

- The permanent loss of nesting and foraging habitat will likely result from the clearing of vegetation within the property;
- Potential physical harm to birds or birds' nests during clearing and construction activities;
- Reduced composition, distribution, and abundance of a bird species within the area;
- Predation by domestic cats during occupation; and,
- 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 Canadian Standards Association's '*Bird-friendly building design*' (Canadian Standards Association, 2019) guidelines. The City of Ottawa is in the approvals process for bird-friendly design guidelines, which should also be consulted and incorporated following approvals; and,
- ✓ Retention of native vegetation should be prioritized to maintain available nesting and foraging habitat for breeding birds.

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 1st and August 31st. Should any clearing be required during the breeding bird season, nest searches 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; and,
- ✓ Other mitigation measures outlined in the *Protocol for Wildlife Protection during Construction* (City of Ottawa, 2015b) should be considered prior to construction of the proposed development.

With the successful implementation of the recommended mitigation, a minor overall loss of breeding and foraging habitat for birds is expected. Please note that the impacts and associated mitigation may be revised pending results of additional surveys.

AMPHIBIANS

Based on the preliminary site investigation and the presence of candidate amphibian habitat on site, the proposed development is expected to have a negative impact on amphibians within the Study Area.

However, given the availability of high-quality amphibian habitat south of the proposed development, the impact to amphibians is anticipated to be non-limiting. The following impacts on amphibians is possible result from the proposed development:

- — Potential physical harm to amphibians during clearing and construction activities;
- — Potential harm to amphibians resulting from sediments and pollutants transported into wetland habitats;
- — Loss of candidate woodland and wetland amphibian habitat; and,
- — Fragmentation of candidate amphibian habitat and movement corridors.

Proposed Mitigation Measures – Construction Implementation

- ✓ Silt fencing should be installed around the perimeter of the Project area prior to site activities as part of erosion and sediment control measures, to prevent amphibians and other wildlife from entering the site. Fencing should be maintained throughout the life cycle (until land is permanently stabilized) of the project and repaired if damaged by machinery;

- ✓ Fencing installation should be proceeded with a sweep for wildlife to ensure amphibians are safely removed from the anticipated construction areas.
- ✓ Avoid the use of heavy equipment in wetlands and watercourses during the winter when amphibians may be hibernating; and,
- ✓ Other mitigation measures outlined in the 'Protocol for Wildlife Protection during Construction' should be considered prior to construction of the proposed development (City of Ottawa, 2015b).

With the successful implementation of the mitigation measures above, impacts to amphibians from the proposed development is expected to be negligible. However, impacts and mitigation may be revised pending the results of additional surveys.

TURTLE NESTING AREAS SWH

Based on the preliminary site investigation and the proposed site plan, potential suitable areas for turtle nesting are located south of the proposed development (multi-use path, Mer Bleue PSW). Therefore, no direct impacts to turtle nesting areas is anticipated.

However, the subject property may contain areas of suitable aquatic and terrestrial habitat for turtles and the following indirect impacts may include:

- — Potential physical harm to turtles during clearing and construction activities;
- — Potential harm to turtles resulting from sediments and pollutants transported into wetland habitats;
- — Loss of candidate terrestrial and aquatic turtle habitat; and,
- — Fragmentation of candidate turtle habitat and movement corridors.

Proposed Mitigation Measures – Construction Implementation

- ✓ Silt fencing should be installed around the perimeter of the project area prior to site activities as part of erosion and sediment control measures, to prevent amphibians and other wildlife from entering the site. Fencing should be maintained throughout the life cycle (until land is permanently stabilized) of the project and repaired if damaged by machinery;
- ✓ Fencing installation should be proceeded with a sweep for wildlife to ensure turtles are safely removed from the anticipated construction areas.
- ✓ Avoid the use of heavy equipment in wetlands and watercourses during the winter when reptiles may be hibernating; and,
- ✓ Other mitigation measures outlined in the 'Protocol for Wildlife Protection during Construction' should be considered prior to construction of the proposed development (City of Ottawa, 2015b).

With the successful implementation of the mitigation measures above, impacts to turtle nesting area SWH from the proposed development is expected to be negligible. However, impacts and mitigation may be revised pending the results of additional surveys.

HABITAT FOR SPECIES OF CONSERVATION CONCERN

Candidate habitat for ten (10) Species of Conservation Concern was identified within the Study Area. However, several of these habitats and features are located outside of the proposed development area, and are not anticipated to be directly impacted based on the current site plan.

The following impacts to Species of Conservation Concern may occur:

- — Disturbance or removal of candidate habitat for Eastern Wood-Pewee, Purple Martin, Short-eared Owl, Eastern Milksnake, and Monarch.

— Accidental harm or injury to Eastern Wood-Pewee, Purple Martin, Short-eared Owl, Eastern Milksnake, and Monarch during construction activities.

Proposed Mitigation Measures – Planning and Design Stage

- ✓ Pollinator garden consisting of native vegetation plantings should be implemented into landscaping where possible to maintain suitable breeding and feeding habitat for Monarch; and,
- ✓ Development and implementation of invasive species management plan, specifically addressing Dog-strangling Vine, should be implemented to limit risk of harmful plants to Monarch and Species of Conservation Concern birds.

Proposed Mitigation Measures – Construction Implementation

- ✓ Installation of sediment control fencing to prevent Eastern Milksnake from entering work areas;
- ✓ Clearing of vegetation should be avoided between April 1st and September 15th, to avoid potential physical harm to Monarch and Species of Conservation Concern birds during breeding and foraging seasons; and,
- ✓ Construction areas should be pre-stressed during clearing to allow Species of Conservation Concern to safely leave the area.

Proposed Mitigation Measures – Post-Construction

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

With the successful implementation of the mitigation measures outlined above, it is anticipated that there will be negligible impact to Species of Conservation Concern and SCC habitat. However, this is based on preliminary observations and impacts and mitigation may be revised pending the results of additional surveys.

7.2.5 SPECIES AT RISK

Candidate habitat for nine SAR was recorded within the Study Area during the initial field investigation. Candidate habitat for Least Bittern and Blanding's Turtle is associated with the Mer Bleue PSW and is not expected to be directly impacted from the proposed development. Candidate habitat for Bobolink and Eastern Meadowlark is associated with a Cultural Meadow to the west of the proposed project footprint and is not anticipated to be affected by the proposed development. Northern Long Sedge habitat may be present, but would be associated with the cattail marsh within the Mer Bleue PSW.

However, candidate habitat for SAR bats was identified within the deciduous swamp community (SWD4-5) and the following direct and indirect impacts by construction activities are anticipated:

- Permanent loss of potential SAR bat roost trees within the forested habitats from vegetation removals. However, given the proximity of higher quality mature forest and woodland communities north of the Study Area and other small woodlots bordering Mer Bleue PSW, the habitat loss is expected to be non-limiting and will have negligible impact on overall SAR bat habitat availability.
- Accidental displacement, injury, or death of SAR bats which may be using woodlands as either bat maternity colony roosts and/or general roosting.

Proposed Mitigation Measures – Construction Implementation

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

- ✓ Installation of approximately four large bat boxes, placed on two poles; placed in appropriate open areas, adjacent to the retained forested areas in the southern boundaries of the property to enhance potential roosting habitat for resident SAR and non-SAR bats.

With the successful implementation of the mitigation measures outlined above, it is anticipated that the proposed development will result in a negligible impact to SAR bats and SAR bat habitat within the Study Area. However, impacts and associated impacts are preliminary and may be revised pending the results of additional field surveys.

7.3 WILDLIFE

Based on the habitat identified on site and incidental observations recorded, 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
- Outdoor lighting may result in disturbance to wildlife within woodland habitats
- Conflict between wildlife and humans following development, including mortality from vehicles

Proposed Mitigation Measures – Construction Implementation

The best practices outlined in the *Protocol for Wildlife Protection during Construction* (City of Ottawa, 2015b) 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, 2015b)
- ✓ 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, such as the Rideau Valley Wildlife Sanctuary

With the mitigation measures outlined above, it is anticipated that the proposed development will result in a negligible impact to wildlife within the Study Area.

7.4 TREES

The proposed development of residential dwellings and proposed streets will require tree clearing and grading within much of the Project footprint and it is anticipated that the proposed development will have an overall negative impact on tree cover within the Study Area.

It is assumed that construction and tree clearing will be limited to the project footprint and will not extend south into the remaining subject property.

Twelve Distinctive trees were identified during field surveys, and it is anticipated that at least seven of the trees will be removed as a result of the grade raise required for the development. It is possible that the remaining distinctive trees located along the perimeter of the subject property can be retained, however, the feasibility of retention is dependent on grading requirements.

Trees with a sufficient setback from the development footprint are recommended to be preserved. However, these trees would require protection measures due to their proximity to construction activities.

Distinctive trees that will require removal or protection to accommodate the proposed development are shown in **Figure 6**. The trees likely requiring removal have been identified in **Table 7**. The following recommendations are based on standard best management practices.

Proposed Mitigation Measures – Planning and Design Stage

- ✓ The City of Ottawa's 2015-2018 Strategic Plan (City of Ottawa, 2015a) recommends that a 2:1 ratio (or greater) between trees planted and trees removed annually should be followed where possible. Furthermore, the Official Plan (City of Ottawa, 2003) policies 2.4.5 (7) for Green Space and policies 2.7.2 for Protection of Vegetation Cover recommend reaching the City's target of 30% tree cover for the entire City.
- ✓ 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.
- ✓ Landscaping plans for areas adjacent to driveway should consider use of appropriate native species to offset loss of species and biodiversity from vegetation removals.
- ✓ Prior to construction activities, overhanging limbs and any exposed tree roots of trees to be retained 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 retention should be prioritized where possible along the work areas for the proposed driveway and parking facilities
- ✓ Trees to be removed should be clearly marked and work crews should be informed of the importance of only removed marked/approved trees
- ✓ Tree protection fencing should be installed around all trees that will be retained within and around work areas
- ✓ Protection fencing around trees 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:
    - Groups of trees can be fenced together if the fencing still meets the recommended placement described above
    - Fencing should be installed following the City of Ottawa's Tree Protection Specification (City of Ottawa, 2019)

- ✓ Tree protection fencing should be inspected as required to ensure no deviancy from the intended location and to record any deficiencies
- ✓ 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 breeding birds, 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 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 - After Construction

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

With the successful implementation of the mitigation measures recommended above, it is anticipated that the proposed development will result in minimal impacts to trees within the Study Area.

7.5 CUMULATIVE IMPACTS

Cumulative impacts have been considered in the context of the local and regional environment in which the site is situated. The proposed development is located in the Innes ward in eastern Ottawa, which has had moderate residential growth over the past two decades. Much of the land surrounding the proposed development area consists of ongoing development, agricultural fields, and remnant woodland communities. The Project area itself is a remnant development parcel from the adjacent Spring Valley Trails residential community, with residential developments present to the west, and an active landfill present to the west.

At the landscape scale, the subject property is adjacent to the Mer Bleue PSW complex. The Mer Bleue PSW is a highly valuable ecological area for flora and fauna in the region, as well as other ecological benefits and services. Watercourse(s) within the subject property connect into the Mer Bleue PSW and may provide a minor localized linkage for wildlife, and the deciduous swamp and meadow marsh communities appear to be linked to the Mer Bleue PSW. It is anticipated that development of this property will cut-off any linkages to Mer Bleue PSW, although this is based on preliminary observations and evaluations. Further studies will evaluate the impacts associated with disconnecting the watercourse feature to adjacent habitats.

Much of the surrounding landscape is currently undergoing, or has undergone, development of residential dwellings further limiting functional ecological linkages.

It is understood that the Spring Valley Trails development to the west has incorporated and constructed a wetland as compensation for habitat loss due to watercourse removals. This compensation wetland appears to be connected to the same watercourse as the one within the subject property, and is connected into the Mer Bleue PSW.

Based on the preliminary ecological field assessments and available information, the removal of natural heritage features (i.e. SWD4-5, MAM2-2) within the subject property may have a marginal negative impact to adjacent natural heritage features and the overall surrounding landscape due to on-going and existing development and industrial activities in neighbouring property parcels. However, subsequent field surveys in 2020 will further evaluate the potential impacts the removal of these natural heritage features will have on adjacent features and the surrounding lands.

Potential cumulative impacts to the removal of natural heritage features include:

- General loss of biodiversity and available habitat;
- Limiting of ecological linkages to Mer Bleue PSW and surrounding natural heritage features; and,
- Expansion of impervious surfaces will increase 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:

- ✓ Retention and enhancement of the vegetation buffer between the proposed development and the Mer Bleue PSW; and,
- ✓ Promote the use of permeable landscaping materials and rain capture systems like rain barrels.

The anticipated cumulative impacts and proposed mitigation are based on preliminary observations and may be revised pending further surveys and evaluation.

8 NEXT STEPS

Due to project application submission deadlines, and seasonal constraints, ecological surveys to evaluate several candidate natural heritage features have not been completed. It is expected that these surveys will be completed during the spring and early summer of 2020. The results of these surveys will further inform the anticipated impacts and the development or revision of proposed mitigation.

The remaining surveys anticipated to be completed are:

- Headwater Drainage Feature Assessment (expected March & June 2020)
- Amphibian Breeding Surveys (expected April to June 2020)
- Breeding Bird Surveys (expected May to June 2020)
- Bat Acoustic Surveys (expected April to June 2020)
- Vegetation inventory (expected June 2020)
- Incidental wildlife, including SAR and SCC (during all surveys)

In addition to the surveys above, biologists will also record and evaluate candidate SWH and SAR habitat features that were not able to be readily identified during the preliminary winter site investigation.

It is expected that the results of the remaining field surveys and re-evaluation of impacts and mitigation measures will be prepared in an addendum to this report.

9 SUMMARY AND CONCLUSIONS

This report provides an evaluation of the anticipated environmental impacts associated with the construction and long-term occupation of residential dwellings located at 3252 Navan Road **(Figure 1**). The anticipated environmental impacts are based on a single field investigation completed in December 2019 and a desktop screening review. Project timelines and seasonal conditions have limited the opportunity to complete all surveys required to effectively evaluate environmental impacts to natural heritage features.

Notable observations during the field surveys include the presence candidate amphibian breeding SWH associated with Poplar Mineral Deciduous Swamp (SWD4-5) and Reed-canary Grass Mineral Meadow Marsh (MAM2-2) communities, the presence of a watercourse and candidate amphibian corridor, candidate SAR bat habitat, and 12 distinctive trees.

It is expected that the construction activities and occupation of the proposed development will result in the removal of most of the vegetation communities located within the project footprint, which will include areas of candidate amphibian breeding SWH. Approximately 0.85 ha of vegetation (SWD4-5, MAM2-2) along the southern limit of the subject property will be retained to comply with the RVCA's regulation limit.

Furthermore, it is anticipated that construction activities will require removal or alteration (closure) of the watercourse(s) within the project footprint. This will likely result in negative impacts to downstream reaches, outside of the subject property. Evaluation of watercourses and associated impacts could not be completed at the time of field survey. It is expected that further consultation with the RVCA will be required due to the anticipated impacts to watercourses.

Of the 12 distinctive trees encountered, it is anticipated that at least seven will require removal due to the grading raise associated with the development. There is potential for retention of trees along the perimeter of the subject property, but is dependent on specific site-grading requirements which are not known at this time.

Candidate SAR habitat for four bat species was identified within the swamp communities within the project footprint. It is expected that vegetation removals will negatively impact candidate habitat for the SAR bat species. Candidate SAR habitat for five other species was identified in areas outside of the proposed project footprint, and due to the confined nature of construction activities, no negative impacts are anticipated.

The mitigation measures described in this report, and summarized in **Table 9** have been developed to avoid and/or minimize environment impacts associated with the Project.

Completion of the remaining field surveys will further evaluate the anticipated impacts, and assist in developing appropriate mitigation, but based on the current information available, it is our opinion that that this proposed residential development is unlikely to negatively impact the natural heritage system, Species at Risk, or local wildlife. The confirmed and assumed impacts can be mitigated effectively through the measures proposed in this report.

Therefore, we believe this proposed project can be accepted with the conditions that remaining field surveys be completed in 2020, and all mitigation measures recommended herein, and in subsequent assessments, will be implemented.

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

Table 9 Summary of Anticipated Impacts and Mitigation Recommendations

Natural Heritage Feature/Function	Summary of Potential Impacts	Constraint to Development	Summary of Proposed Mitigation	Residual Effect
Aquatic Environment	Loss of natural watercourse	Moderate	Consultation with RVCA for potential mitigation/ compensation	Loss of natural channel within subject property
	Loss of habitat for aquatic wildlife	Low	None required	Permanent loss of aquatic habitat for wildlife
	Erosion and sedimentation	Low	Erosion and sediment control measures should be implemented prior to construction. This typically involves the installation of silt fencing.	No residual effect anticipated.
	Spills and contamination	Low	Development of spill response plan and proper storage and work areas for potentially contaminating activities	No residual effect anticipated
	Increased amount and rate of stormwater runoff	Low	Implement permeable surfaces where possible into design and construction to limit runoff	No residual effect anticipated.
Terrestrial Vegetation	Loss of natural vegetation	Low	None required	Minor permanent loss of native and non-native woodland vegetation
	Loss of habitat for wildlife	Low	None required	Permanent loss of foraging or nesting habitat
	Decreased biodiversity or species abundance	Low	Landscaping plans should consider use of appropriate native species to offset loss of species or general abundance	No residual effect anticipated
	Increased risk of invasive species	Low	Machinery should arrive on site in clean condition; site should be restored with native species where appropriate following construction	No residual effect anticipated
	Changes to natural drainage	Low	None required	Altered drainage patterns within and around the project footprint
	Erosion and sedimentation	Low	Erosion and sediment control measures should be installed prior to construction. This typically involves the installation of silt fencing	No residual effect anticipated
Wetlands	Loss of natural wetlands	Low	Consultation with RVCA for potential compensation	Loss of natural wetland habitat within the subject property
	Loss of habitat for wildlife	Low	None required	Minor permanent loss of foraging and nesting habitat
	Changes to natural drainage	Low	None required	Altered drainage patterns within and around project areas
	Decreased biodiversity	Low	Landscaping plans should consider use of appropriate native species to offset loss of species or general abundance	No residual effect anticipated

Natural Heritage Feature/Function	Summary of Potential Impacts	Constraint to Development	Summary of Proposed Mitigation	Residual Effect
	Habitat fragmentation	Low	None required	No residual effect anticipated
	Increased risk of invasive species	Low	Machinery should arrive on site in clean condition; site should be restored wit native species where appropriate following construction	No residual effect anticipated
Woodlands	Loss of forested habitat and vegetation	Low	Tree retention should be prioritized where possible	Minor permanent loss of trees within woodlands
	Decreased biodiversity or species abundance	Low	Landscaping plans should consider use of appropriate native species	No residual effect anticipated
	Loss of habitat for wildlife	Low	None required	Minor loss of available habitat
	Changes to natural drainage	Low	None required	Altered drainage patterns within and around project areas
Breeding Birds	Loss of nesting and foraging habitat	Low	Clearing of vegetation should be limited to a reasonable footprint to accommodate the proposed site plan	Minor loss of potential habitat
	Physical harm to birds or nests resulting from construction activities	Low	Clearing of vegetation should be avoided during the breeding bird period (April 1st – August 31st). Area should be pre-stressed prior to vegetation clearing.	No residual effect anticipated
	Reduced diversity or species abundance	Low	None required	Minor reduction in bird abundance and diversity
	Physical harm or displacement resulting from construction activities	Low	Clearing of vegetation should be avoided during the breeding bird period (April 1st – August 31st)	No residual effect anticipated
Amphibians	Loss of breeding and general habitat	Low	Clearing of vegetation should be limited to a reasonable footprint to accommodate the proposed site plan	Minor loss of woodland and wetland amphibian breeding habitat – non-limiting
	Physical harm or displacement resulting from construction activities	Low	Silt fencing should be installed around wetlands and watercourses. Avoid the use of heavy equipment in wetlands and watercourses	No residual effect anticipated
	Fragmentation of candidate amphibian movement corridors	Low	None required	Minor loss of potential habitat corridors
Turtles	Physical harm or displacement resulting from construction activities	Low	Silt fencing should be installed around wetlands and watercourses. Avoid the use of heavy equipment in wetlands and watercourses	No residual effect anticipated
	Loss of candidate terrestrial and aquatic turtle habitat	Low	Clearing of vegetation should be limited to a reasonable footprint to accommodate the proposed site plan	Minor loss of terrestrial and aquatic turtle habitat – non-limiting
	Fragmentation of candidate turtle habitat and movement corridors	Low	None required	Minor loss of potential habitat corridors

Natural Heritage Feature/Function	Summary of Potential Impacts	Constraint to Development	Summary of Proposed Mitigation	Residual Effect
Species of Conservation Concern	Disturbance to or removal of candidate SCC habitat	Low	None required	Minor permanent loss of candidate habitat
	Physical harm or displacement resulting from construction activities	Low	Silt fencing should be installed around project areas, vegetation clearing should be avoided during breeding bird period (April 1st – August 31st). Area should be pre-stressed prior to vegetation clearing.	No residual effect anticipated.
Species at Risk – SAR Bats	Loss of candidate roost trees	Low	Installation of 4 bat boxes adjacent to forested areas	Permanent loss of native habitat – Non-limiting
	Physical harm or displacement resulting from construction activities	Low	Clearing of vegetation should be avoided during general active and maternity roosting periods (March 15th to September 15th)	No residual effect anticipated
Trees	Removal of at least 7 Distinctive trees	Low	None required	Permanent loss of distinctive trees
	Injury or harm to retained trees	Low	Implementation of tree protection measures such as protection fencing and pruning	No residual effect anticipated
Wildlife (General)	Physical harm or displacement resulting from construction activities	Low	Perimeter fencing should be installed around the site to prevent wildlife from entering the work area. Work area should be pre-stressed to allow wildlife to safely flee the area. Avoid vegetation clearing during sensitive times of the year.	No residual effect anticipated
	Loss of general natural habitat for wildlife	Low	None required	Minor loss of available habitat
	Disturbance to wildlife resulting from noise and construction activities	Low	Perimeter fencing should be installed around the site to prevent wildlife from entering the work area. Work area should be pre-stressed to allow wildlife to safely flee the area.	No residual effect anticipated
	Conflict between wildlife and humans	Low	Safety and awareness training provided to construction staff	No residual effect anticipated
Cumulative Impacts	General loss of biodiversity and available habitat	Low	Landscaping plans should consider use of appropriate native species	No residual effect anticipated
	Loss of ecological link to Mer Bleue PSW	Low	Maintain and enhance regulation setback from Mer Bleue wetland	No residual effect anticipated
	Increase in impervious surfaces	Low	Promote the use of permeable landscaping materials and rain capture systems	Net increase in impermeable surfaces

10 REFERENCES

Bird Studies Canada. (2001). *Ontario Breeding Bird Atlas: Guide for Participants.* Guelph: University of Guelph. Retrieved from http://www.birdsontario.org

Bird Studies Canada. (2019, March). *Amphibian Surveys Overview*. Retrieved from http://www.birdscanada.org/volunteer/glmmp/index.jsp?targetpg=glmmpfrog

Cadman, M., & Kopysh, N. (2001). *Ontario Breeding Bird Atlas: Guide for Participants.* Guelph: University of Guelph. Retrieved from http://www.birdsontario.org

Canadian Standards Association. (2019). *Bird-friendly building design (CSA A460:19).* Retrieved from https://www.scc.ca/en/standardsdb/standards/29805

City of Ottawa. (2003). Retrieved 2019, from Official Plan and master plans: https://ottawa.ca/en/business/planning-and-development/official-plan-and-master-plans

City of Ottawa. (2003). Retrieved 2019, from Official Plan and master plans: https://ottawa.ca/en/business/planning-and-development/official-plan-and-master-plans

City of Ottawa. (2015a). *City of Ottawa 2015-2018 Strategic Plan.* City of Ottawa. Retrieved from http://documents.ottawa.ca/sites/documents.ottawa.ca/files/documents/2015_2018_strategic_plan_en.pdf

City of Ottawa. (2015b, August). *City of Ottawa Protocol for Wildlife Protection during Construction.* Retrieved January 07, 2020, from http://ottwatch.ca/meetings/file/309612/_Document_1_Protocol_for_Wildlife_Protection_During_Construction_pdf_Item_PROTOCOL_FOR_WILDLIFE_PROTECTION_DURING_CONSTRUCTION_UPDATED_Meeting_Planning_Committee_Date_2015_09_22_09_30_00

City of Ottawa. (2015c, October). *Environmental Impact Statement Guidelines.* Retrieved from Guide to preparing studies and plans: http://documents.ottawa.ca/sites/documents.ottawa.ca/files/documents/eis_guidelines2015_en.pdf

City of Ottawa. (2019). Retrieved 2019, from geoOttawa Webmap Portal: http://maps.ottawa.ca/geoottawa/

City of Ottawa. (2019). *Significant Woodlands: Guidelines for Identification, Evaluation, and Impact Assessment.* Retrieved from City of Ottawa.

City of Ottawa. (2019). *Tree Conservation Report Guidelines.* Retrieved from City of Ottawa: https://ottawa.ca/en/residents/water-and-environment/trees-and-community-forests/tree-protection#tree-conservation-report-guidelines

Dobbyn, J. S. (n.d.). *Atlas of the Mammals of Ontario.* 1994: Federation of Ontario Naturalists. Retrieved April 2019

Government of Canada. (1994). *Migratory Birds Convention Act.* Retrieved from Justice Laws Website: http://laws.justice.gc.ca/eng/acts/M-7.01/

iNaturalist. (2019, December). Retrieved December 2019, from https://www.inaturalist.org

Lee, H., Bakowsky, W., Riley, J., Bowles, J., Puddister, M., Uhlig, P., & McMurray, S. (1998). *Ecological Land Classification for Southern Ontario: First Approximation and its Application.* North Bay, Ontario, Canada: Ontario Ministry of Natural Resources.

Macnaughton, A., Layberry, R., Cavasin, R., Edwards, B., & Jones, C. (n.d.). Ontario Butterfly Atlas. Toronto. Retrieved April 25, 2019, from http://www.butterfly.ontarioinsects.org/atlas/

Ministry of Municipal Affairs and Housing. (2014). *Provincial Policy Statement.* Toronto: Queen's Printer for Ontario. Retrieved from http://www.mah.gov.on.ca/Page10679.aspx

Ministry of Northern Development and Mines. (2017). *OGSEarth*. Retrieved January 2020, from https://www.mndm.gov.on.ca/en/mines-and-minerals/applications/ogsearth

MNR. (2000). *Significant Wildlife Habitat Technical Guide.* Peterborough: Queen's printer for Ontario. Retrieved from https://www.ontario.ca/document/guide-significant-wildlife-habitat

MNR. (2010). *Natural Heritage Reference Manual for Natural Heritage Policies of the Povincial Policy Statement, 2005* (Second ed.). Toronto: Queen's Printer for Ontario.

MNRF. (2015, January). *Significant Wildlife Habitat Criteria Schedules For Ecoregion 6E.* Retrieved from https://www.ontario.ca/document/significant-wildlife-habitat-ecoregional-criteria-schedules-ecoregion-6e

MNRF. (2019, December 10). *Natural Heritage Information Centre*. Retrieved December 19, 2019, from https://www.ontario.ca/page/natural-heritage-information-centre

National Capital Commission. (n.d.). *Mer Bleue*. Retrieved from https://ncc-ccn.gc.ca/places/mer-bleue

Natural Resources Canada. (2016, November 30). *Generalized Bedrock Geology , Ottawa-Hull, Ontario and Quebec*. doi:https://doi.org/10.4095/109223

Ontario Nature. (2019, June 5). Herp Atlas. Toronto, Ontario. Retrieved April 24, 2019, from https://ontarionature.org/oraa/maps/

Rideau Valley Conservation Authority. (2018). *Mud Creek 2018 Catchment Report.* Manotick: Rideau Valley Conservation Authority. Retrieved from https://www.rvca.ca/media/k2/attachments/CSW2018_MUD.pdf

Rideau Valley Conservation Authority. (2019). GeoPortal. Manotick, Ontario, Canada. Retrieved December 09, 2019, from https://gis.rvca.ca/html5/?viewer=rvcageoportal

Stanfield, L. (2017). *Ontario Stream Assessment Protocol Version 10.0.* Peterborough, Ontario: Ontario Ministry of Natural Resources.

Toronto and Region Conservation Authority and Credit Valley Conservation. (2014). *Evaluation, Classification and Management of Headwater Drainage Features Guideline.* Retrieved April 15, 2019

Watt, W. R. (1999). *Managing for snags in the boreal forests of northeastern Ontario.* Ministry of Natural Resources, Northeast Science and Technology.

APPENDIX

A CURRICULUM VITAE

ALEXANDER ZELLER, M.Sc.

Senior Ecologist, Environment

Areas of practice

Environmental Impact Assessments

Environmental Policy and Approvals

Environmental Assessments

SAR Surveys and Permitting

Terrestrial and Aquatic Surveys

Spatial Ecology & GIS

Public Consultation

Indigenous Knowledge Consultation

Languages

English

PROFILE

Alexander is a Project Manager and Senior Ecologist with over seventeen years of professional experience in terrestrial and aquatic ecology, open space planning, and natural heritage authorizations. Alex has led and managed many challenging natural heritage projects throughout eastern Ontario and across Canada, including; land development projects, regional planning studies, environmental monitoring programs, environmental assessments, indigenous knowledge studies, and renewable energy authorizations. His broad knowledge of ecology, environmental policy, and agency consultation has proved a successful complement to multi-disciplined and large-scale environmental planning projects.

EDUCATION

Masters of Science in Biology, Lakehead University	2007
Honours Bachelor Environmental Science, Lakehead University	2003

PROFESSIONAL DEVELOPMENT

Supervisor/Management Training (University of Ottawa)	2019
Expert Witness Training (Gowlings, Toronto)	2015
Ecological Land Classification Certification (MNR)	2010

CAREER

Senior Ecologist, Environment, WSP (Ottawa, ON)	2018 – Present
Associate, Dillon Consulting Limited (Ottawa, ON)	2013 – 2018
Ecologist, Dillon Consulting Limited (Ottawa, ON)	2006 – 2013
Research Technician - Contract Positions, Ontario Ministry of Natural Resources and Forestry (Thunder Bay, ON)	2001 – 2006
Teaching Assistant – Geography and Biology Departments, Lakehead University (Thunder Bay, ON)	2003 – 2005

PROFESSIONAL EXPERIENCE

INFRASTRUCTURE

- Energy Services Acquisition Program, PSPC (2019 – Now): 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 kilometers of district heating/cooling pipeline and associated plants.
- Centre Block Rehabilitation Project, PSPC (2018 - now): Lead Project Ecologist responsible for; all ecological studies, development and management mitigation and compensation measures, reporting requirements, and agency consultation required to facilitate the Centre Block Rehabilitation project, on Parliament Hill in Ottawa.

- Confederation Line Extension light rail, City of Ottawa (2019 – now): Lead Ecologist responsible for the implementing the established management recommendations and facilitating the outstanding permitting requirements to accommodate detail design phase of the project.
- West Transitway Extension, Phase 11 – Stillwater Creek, City of Ottawa (2018): Project manager and lead ecologist for the 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.
- Riverview to Overbrook: transmission line upgrade, Hydro One (2016): Lead Ecologist for an Class Environmental Assessment in support of a transmission line upgrade between Overbrook and Riverview facilities in Ottawa. Alexander was responsible for coordinating and undertaking field surveys, participating in public consultation, reporting writing, impact assessment, and developing mitigation and avoidance measures.
- Innes Road Reinforcement Pipeline Project: Environmental Monitoring and Environmental Awareness Training, Enbridge Gas Distribution Inc. (2014-2016): Project manager and lead biologist for the Environmental monitoring and environmental awareness in support of the 2.8 km pipeline installation along Innes Road in Ottawa. This installation included 580m of 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 on-going environmental monitoring during construction.
- Innes Road Reinforcement Pipeline Project: Environmental Assessment, Enbridge Gas Distribution Inc. (2014): Lead biologist for the class environmental assessment for the 2.8 km Enbridge Gas Distribution pipeline installation along Innes Road in Ottawa. Alexander was responsible for coordinating and undertaking biophysical field surveys, reporting writing, impact assessment, and developing mitigation and avoidance measures.
- Ottawa West Reinforcement Pipeline Environmental Assessment, Enbridge Gas Distribution Inc. (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 of the project. 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.
- GTA Reinforcement Pipeline Environmental Assessment, Enbridge Gas Distribution Inc. (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.

- Infrastructure Master Plan, Town of Perth (2009-2010): Completed the ecological assessment and natural heritage inventory for an infrastructure master plan in the Town of Perth. 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.
- Truck Inspection Station Assessment, Ministry of Transportation, Ontario (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.

LAND DEVELOPMENT

- 760 River Road, Claridge Homes Group of Companies (2019); Project manager and lead ecologist for the environmental impact statement and an Environmental Impact Statement and Tree Conservation Study for a development in south Ottawa. This study was completed in support of plan of subdivision for a residential development.
- 323 Jockvaile Road, Minto Communities (2018); Project manager and lead ecologist for the environmental impact statement and tree conservation report for a proposed residential development in the Barhaven Community. These reports were completed following the City of Ottawa guidelines.
- Riverview Lane, Urbandale Construction (2018 to mow): Project manager and lead ecologist for natural heritage approvals associated with a residential subdivision in Kemptville, Ontario. Scope of work included SAR authorizations, Fisheries authorizations, wetland design and restoration plans; watercourse and fish habitat design and plans, and general agency consultation.
- SAR Permit Implementation and Monitoring, KNL Developments (2017 to now): Project manager and lead biologist for the 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.
- 800 Eagleson Road EIS and TCR, Ironclad Developments (2018): Project manager and lead ecologist responsible for completing an Environmental Impact Statement and Tree Conservation Study for a development in west Ottawa. The proposed project will consist of a six-story rental apartment building with approximately 150 units with access from Eagleson Road.
- Barrhaven South Community Design Plan, Minto (2015-2017): Project manager and lead biologist on the 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.
- Phase 12, 14, 15, and 16; Environmental Impact Statement, Riverside South Development Corporation (2014-2017): Project manager and lead biologist for a series of Environmental Impact Statements and Tree Conservation Studies for a

several primarily residential developments in southern Ottawa. 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, ON (2015-now): Project manager and lead biologist for the natural heritage compliance requirements supporting a multi-phase residential/retirement complex located on McArthur Island within the Mississippi River. This project will include 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.
- Clark Lands Development, Environmental Impact Statement, Minto (2013-2017): Project manager and lead biologist for an Environmental Impact Statement and Tree Conservation Study for a development in west Ottawa. This study was completed in support of plan of subdivision for a residential development.
- Potter's Key Development, Environmental Impact Statement, Minto (2013 to now): Project manager and lead biologist for an Environmental Impact Statement, Tree Conservation Report, Species at Risk Permitting, Fisheries approvals, and on-going environmental monitoring for a development in Stittsville, Ontario (City of Ottawa). The study was completed as part of an application for residential development.
- Fernbank Lands Development Environmental Impact Statement, Richcraft (2013 - 2017): Project manager and lead biologist for an Environmental Impact Statement, Tree conservation Report, and Species at Risk Permitting for a development in Stittsville, Ontario (City of Ottawa). The study was completed as part of an application for residential development.
- Environmental Screening Study, Walton Developments (2012-2014): Project manager and terrestrial ecologist for a natural heritage screening study for Walton Developments. The project is aimed at identifying any natural heritage constraints that may affect the ability to develop a number of properties in southwest Ottawa. Responsibilities include project management, reporting, terrestrial field surveys, avian surveys and GIS mapping.
- Scoped Environmental Impact Statement, City of Ottawa (2011): Project manager for a scoped environmental impact statement. The project was scoped 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.
- Chapman Mills Environmental Impact Statement Addendum, Minto (2011): Project manager for 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.

NATURAL RESOURCES STUDIES

- Kizell Wetland Trail - SAR Authorizations, City of Ottawa (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, ON.

- Goulbourn Wetland Re-delineation, City of Ottawa (2015-2016): Project manager for the re-delineation of the Goulbourn Provincially Significant Wetland, located in west Ottawa. The objective of this project 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 land owners, and reviewing the approach and findings with the city and the Ontario Ministry of Natural resources.
- Feedmill Creek Species at Risk Screening, City of Ottawa (2017): Project manager and lead ecologist for a species at risk screening of Feedmill Creek in support of the proposed restoration efforts. Specific surveys included; bat habitat surveys, Blanding's turtle basking surveys, butternut Screening, and other incidental observations.
- Ecological Land Classification, National Capital Commission (NCC) (2015): Project manager and lead Biologist for project to map all the 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.
- Species at Risk Survey, Defence Construction Canada (DCC) – CFB Shilo Range Training Area (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.
- 2014 Species at Risk Screening, City of Ottawa (2014): Project manager and lead biologist for a Species at Risk screening study for the City of Ottawa's Infrastructure Branch. The objective of this study was to identify the potential threat 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 to assist City project managers.
- Natural Heritage Study, County of Frontenac (2011-2012): Lead landscape ecologist for the County of Frontenac's Natural Heritage Study. This study will form the major piece of the county's Official Plan (OP) and will 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.
- Rideau Canal Landscape Strategy, Parks Canada (2012): Lead ecologist for the 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, GIS mapping, field survey, report writing and communicating with the client.
- Birds Creek Secondary Plan, Municipality of Hastings Highlands (2011-2012): Working with the Municipality of Hastings Highlands 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.

- Solar Farm Site Assessment, SkyPower (2010): Assisting with the environmental impact evaluation of proposed solar farms as part of an environmental assessment for renewable energies. Duties included conducting and writing records review report, amphibian survey, Ecological Land Classification and general ecological field surveys.
- Regional Ecology Planning Framework, Regional Municipality of Wood Buffalo (RMWB) (2008): Working with RMWB 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.
- Terry Fox Drive Environmental Construction Monitoring, City of Ottawa (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.
- Terry Fox Drive Environmental Assessment, City of Ottawa (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.
- Yellowknife Smart Growth Plan: Ecological Preservation Study, City of Yellowknife (2007-2010): 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.
- Satellite Image Classification, Tsuu T'ina First Nation (2007): 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 Land Use Plan, Tlicho Government (2006-2009): Lead Ecologist for the Tlicho Land Use Plan in the Northwest Territories. 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.

- Mathews Lake Habitat Restoration, Public Works Government Services Canada (2008): Assisted with the 2008 post-construction monitoring of the fish habitat enhancement in the Mathews Lake watershead in the Northwest Territories. 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.
- Aquatic Habitat Assessment, Canadian Pacific Rail (2007): Assisting in aquatic habitat assessment for a water crossing along the CPR tracks in Peterborough, Ontario. The objective of the study is to improve habitat for native brook trout and other resident fish by providing in-stream habitat in the vicinity of the crossing.
- Westside Creek and Marsh Reconfiguration, St Mary's Cement (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.

OTHER RELEVANT EXPERIENCE

- Masters of Biology thesis examined understory forest regeneration after wildfire in the boreal forest of northwestern Ontario. The thesis utilized GIS and remote sensing to model landscape characteristics related to species regeneration in the boreal forest.
- Undergraduate thesis utilized GIS to examine the impact of intensive harvesting on littoral deposition rates. A soil erosion model of an intensively harvested watershed was produced in GIS. The results from this model were correlated to measure deposition around the small inland lakes within the watershed.

PUBLICATIONS

- 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

ANDREA ORR, B.Sc.

Terrestrial Ecologist, Environment - Ecology

Areas of practice

Forest and Plant Ecology

Ornithology

Wetland Evaluation

Wildlife Habitat Assessment

Species at Risk legislation

Languages

English

PROFILE

Andrea Orr is a Terrestrial Ecologist who has gained experience and knowledge of ecosystem monitoring techniques and natural heritage field investigations for multiple projects across a variety of development sectors including; transportation, renewable energy, and oil/gas.

As Terrestrial Lead for many projects, Andrea is adept with the ecological components necessary to complete Class Environmental Assessments, Environmental Impact Statements, and Renewable Energy Approvals. She has demonstrated knowledge and experience of federal and provincial acts: *Species at Risk Act*, *Endangered Species Act*, and *Migratory Bird Convention Act*.

Andrea specializes in forest and plant ecology, ornithology, and wildlife habitat assessments. Andrea is certified in the Ontario Ministry of Natural Resources and Forestry (MNRF) Ecological Land Classification (ELC), Ontario Wetland Evaluation System (OWES) and is a certified Butternut Health Assessor (BHA). Her experience ranges from conducting various forestry practices; botanical inventories; soil analysis; entomological surveys; bat habitat assessments and acoustic monitoring; migratory and avian surveys; as well as various Species at Risk (SAR) target surveys and permitting applications.

EDUCATION

Biology and Environmental Studies, B.Sc., Trent University	2008
Forestry Technician, Diploma, Sir Sandford Fleming College	2003

PROFESSIONAL DEVELOPMENT

CPR and First Aid, St. John Ambulance	2019
Butternut Health Assessor, Ministry of the Environment, Conservation and Parks	2019
Ontario Wetland Evaluation System, Ministry of Natural Resources and Forestry	2018
Ecological Land Classification, Ministry of Natural Resources and Forestry	2012

PROFESSIONAL ASSOCIATIONS

Mississippi Valley Field Naturalists, 2018	MVFN
Field Botanists of Ontario, 2013	FBO
Ontario Field Ornithologists. 2013	OFO

CAREER

Terrestrial Ecologist, Environment - Ecology, WSP	2019 – Present

Senior Environmental Scientist, Planning. Parsons, Ottawa, Ontario, Canada	2017 – 2019
Terrestrial Ecologist, Ecology. Stantec, Stoney Creek, Ontario, Canada	2012 - 2017
Natural Areas Inventory Assistant. Credit Valley Conservation, Mississauga, Ontario, Canada	2011 - 2012
Biologist, Renewable Energy. M.K. Ince and Associates Ltd. Dundas, Ontario, Canada	2008 - 2009

PROFESSIONAL EXPERIENCE

Renewable Energy

- Energy Services Modernization Project: Energy Services Acquisition Program, Ottawa, Ontario, Canada (2019): Terrestrial Ecology Lead. Coordinated and scheduled natural heritage field program, which included Ecological Land Classification (ELC), tree inventory, wildlife habitat assessment, breeding bird survey, amphibian breeding survey. Author to the Natural Environment Existing Conditions and Impact Assessment Report that included data analysis and interpretation. Liaised with government agencies on a municipal, provincial, and federal level. Also coordinated and executed permitting applications related to Species at Risk. Client: Public Services and Procurement Canada.
- Port Dover and Nanticoke Wind Project, Haldimand and Norfolk County, Ontario, Canada (2015): Terrestrial Ecologist. Conducted post-construction monitoring of tundra swan migration, amphibian call counts, Bald Eagle (SAR) nest monitoring, and mortality monitoring at turbines (i.e. searcher efficiency trials). Client: Capital Power Corporation.
- Port Ryerse Wind Farm, Haldimand and Norfolk County, Ontario, Canada (2014): Terrestrial Ecologist. Conducted pre-construction field investigations as part of the Natural Heritage Assessment process. Corresponding field surveys included; Bald Eagle (SAR) nest monitoring throughout the breeding and brood rearing process. Client: Boralex.
- Amherst Island Wind Energy Project, Lennox and Addington County, Ontario, Canada (2014): Terrestrial Ecologist. Conducted pre-construction field investigations as part of the Natural Heritage Assessment process. Corresponding field surveys included; weekly winter raptor searches that consisted of driving surveys with point counts, walking surveys with transects to detect Short-eared Owl roosts, and dusk surveys to target active Short-eared Owls. Client: Algonquin Power/Windlectric.
- Niagara Region Wind Corporation, Niagara Region and Haldimand County, Ontario, Canada (2013): Terrestrial Ecologist. Conducted pre-construction field investigations as part of the Natural Heritage Assessment process. Corresponding field surveys included, snake hibernacula observations and Species at Risk identification, bat maternity colony assessments, landbird fall migration surveys, and turtle overwintering habitat assessment for Species at Risk. Client: Boralex.
- Grand Valley Wind Project, Phase 3, Dufferin County, Ontario, Canada (2013): Terrestrial Ecologist. Conducted and coordinated various aspects of the Natural Heritage Assessment process. Including field program coordination, data analysis and contributing author to the Natural Heritage Assessment/Environmental Impact

Study report. Author to the Evaluation of Significance Addendum report. Field surveys included; ELC and mapping, significant wildlife habitat assessment, waterfowl migration and nesting, Species at Risk Butler's Gartersnake cover-board surveys, Species at Risk Bobolink and Eastern Meadowlark breeding bird surveys, and bat maternity colony surveys. Aboriginal consultation and relations with Saugeen-Ojibway Nation was also provided during site-walk visit. Client: Veresen Inc.

- Napier Wind Project, Middlesex County, Ontario, Canada (2012): Terrestrial Ecologist. Agency liaison with MNR included provision of comments regarding Species at Risk report, with focus on wildlife biology and habitat assessment. Client: wpd Canada Corporation.
- Grand Renewable Energy Park, Haldimand County, Ontario, Canada (2012): Terrestrial Ecologist. Managed and conducted terrestrial field surveys which included wetland delineation and mapping, and spring/fall landbird migration surveys. Author to the subsequent Pre-Construction Monitoring Bird Report, which included field data analysis and interpretation. In 2014, participated in environmental monitoring and bird nest sweeps during construction. Client: Samsung Renewable Energy.

Transportation

- Confederation Line Extension Light Rail Transit Project, Ottawa, Ontario, Canada (2019). Terrestrial Ecologist. Conducted tree inventory, bird nest searches and bat acoustic monitoring while provided subsequent memos of survey results and mitigation measures.
- Barrhaven Light Rail Transit and Rail Grade-Separations Environmental Assessment, Ottawa, Ontario, Canada (2019): Senior Environmental Scientist. Coordinated and performed field investigations of ELC and breeding bird surveys. Author to the Natural Environment Existing Conditions Report. Analyzed and incorporated field data into the above report, while providing an assessment for potential impacts to Species at Risk and mitigation measures. Client: City of Ottawa.
- Leitrim Road Realignment and Widening Environmental Assessment, Ottawa, Ontario, Canada (2018): Senior Environmental Scientist. Contributing author to the Natural Sciences Existing Conditions Report. Provided an assessment of significant wildlife habitat based on previous field studies. Client: City of Ottawa.
- Kanata Light Rail Transit Environmental Assessment, Ottawa, Ontario, Canada (2018). Senior Environmental Scientist. Coordinated and performed field investigations of ELC and mapping, significant wildlife habitat assessment, and Species at Risk identification, analysis of habitat suitability and mitigation measures. Contributing author to the Natural Environment Existing Conditions Report. Analyzed and incorporated field data into the above report, while providing an assessment for potential impacts to Species at Risk and mitigation measures. Client: City of Ottawa.
- Earl Armstrong Road Extension Environmental Assessment, Ottawa, Ontario, Canada (2018). Senior Environmental Scientist. Coordinated and performed field investigations of ELC, soil analysis, and delineation mapping; amphibian call surveys; breeding bird and marsh bird call-back surveys to identify sensitive species; significant wildlife habitat assessment; and Species at Risk identification and habitat suitability assessment. Author to the Natural Environment Overview Report, with a

subsequent technical memorandum summarizing field investigation methodologies and results.

- Metrolinx Regional Express Rail – Lakeshore West Infrastructure Improvements, Greater Toronto Area, Ontario, Canada (2018). Coordinated and performed field investigations of ELC and delineation mapping; tree inventories; amphibian call surveys; breeding bird surveys; significant wildlife habitat assessment; and Species at Risk identification and habitat suitability analysis. Contributing author to numerous Natural Environment Screening Memorandums. Analyzed and incorporated field data into the above reports where Species at Risk impacts were also assessed, and mitigation measures developed if applicable. Client: Metrolinx.
- Baseline Road Bus Rapid Transit Corridor, Ottawa, Ontario, Canada (2017): Senior Environmental Scientist. Coordinated and performed field investigations for Species at Risk screening, which included identification, analysis of habitat suitability and mitigation measures. Co-author to the Natural Environment Overview Report. Analyzed and incorporated field data into the above report, while providing an assessment for potential impacts to Species at Risk and mitigation measures. Client: City of Ottawa.
- Slater/Albert/Bronson Street Renewals, Ottawa, Ontario, Canada (2017): Senior Environmental Scientist. Performed field investigations of ELC and mapping, tree inventory, and Species at Risk identification, analysis of habitat suitability and mitigation measures. Author to the Natural Environment Existing Conditions Report. Analyzed and incorporated field data into the above report, while providing an assessment for potential impacts to Species at Risk and mitigation measures. Client: City of Ottawa.
- Dundas Street (Regional Road 5) Widening, Brant Street to Bronte Road, City of Burlington/Town of Oakville, Ontario, Canada (2017). Lead Terrestrial Ecologist. Coordinated and performed field investigations of bat habitat assessment for significant wildlife habitat and Species at Risk habitat using accepted MNRF protocols for cavity tree presence and acoustic monitoring. Client: City of Burlington.
- Highway 401 Reconstruction Chatham-Kent Part B, Contract 2, Southwestern Ontario, Canada (2015). Lead Terrestrial Ecologist. Coordinated and performed field investigations of ELC and mapping, significant wildlife habitat assessment, and Species at Risk identification and mitigation for detailed design. Author to the corresponding report of Terrestrial Ecosystems Existing Conditions and Impact Assessment. Author to the Species at Risk Mitigation Plan required by policy under the *Endangered Species Act*. Client: Ministry of Transportation Ontario (MTO).
- Highway 400 North Canal Rehabilitation, Holland Marsh, Simcoe County, Ontario, Canada (2015). Terrestrial Ecologist. Coordinated and performed field investigations of ELC and mapping, significant wildlife habitat assessment, and Species at Risk identification and mitigation. Client: Ministry of Transportation Ontario (MTO).
- Mega Culverts Rehabilitation/Replacement Contract 3, Southwestern Ontario, Canada (2014). Lead Terrestrial Ecologist. Coordinated and performed field investigations of ELC and mapping, significant wildlife habitat assessment, and Species at Risk identification and mitigation. Author to the Terrestrial Ecosystems Existing Conditions and Impact Assessment Report. Analyzed and incorporated field data into the above report, while providing an assessment for habitat suitability for

species at risk occurring within the study area. Client: Ministry of Transportation Ontario (MTO).

- Highway 17 and Highway 101 Rehabilitation, Wawa, Ontario, Canada (2014). Lead Terrestrial Ecologist. Author to the Terrestrial Ecosystems Existing Conditions and Impact Assessment Report – Detail Design. Coordinated the corresponding field program and performed field surveys of ELC and mapping, significant wildlife habitat assessment, and Species at Risk identification and mitigation. Field data was then analyzed and incorporated into the above report. Client: Ministry of Transportation Ontario (MTO).
- Highway 3 from Carter Road to John Road, Elgin and Oxford County, Ontario, Canada (2014). Lead Terrestrial Ecologist. Author to the Terrestrial Ecosystems Existing Conditions and Impact Assessment Report – Detailed Design. Coordinated the corresponding field program and performed field surveys of ELC and mapping, significant wildlife habitat assessment, and Species at Risk identification and mitigation. Field data was then analyzed and incorporated into the above report. Client: Ministry of Transportation Ontario (MTO).
- Highway 401 from Hespeler Road to Townline Road, Cambridge, Ontario, Canada (2014). Lead Terrestrial Ecologist. Coordinated and performed field investigations of ELC and mapping, significant wildlife habitat assessment, and Species at Risk identification and mitigation for detailed design. Client: Ministry of Transportation Ontario (MTO).
- Highway 401 Reconstruction Chatham-Kent Part A, Contract 1, Southwestern Ontario, Canada (2014). Lead Terrestrial Ecologist. Coordinated and performed field investigations of ELC and mapping, significant wildlife habitat assessment, and Species at Risk identification and mitigation for detailed design. Author to the corresponding report of Terrestrial Ecosystems Existing Conditions and Impact Assessment. Author to the Species at Risk Mitigation Plan required by policy under the *Endangered Species Act.* Client: Ministry of Transportation Ontario (MTO).
- GO Transit Hamilton Expansion – CN Yard Track Expansion, Hamilton, Ontario, Canada (2014). Terrestrial Ecologist. Contributing author to the Environmental Evaluation Report and performed the corresponding field investigations of ELC, mapping, and significant wildlife habitat assessments. Background information, identification, and mitigation for Species at Risk was also provided and incorporated into the above report. Client: Metrolinx.
- Mega Culverts Rehabilitation/Replacement Contract 2, Southwestern Ontario, Canada (2013). Lead Terrestrial Ecologist. Author to the Terrestrial Ecosystems Existing Conditions and Impact Assessment Report. Analyzed and incorporated field data into the above report, while providing an assessment for habitat suitability for species at risk occurring within the study area. Client: Ministry of Transportation Ontario (MTO).
- New North Oakville Transportation Corridor, Halton Region, Ontario, Canada (2013). Terrestrial Ecologist. Assessed Species at Risk Bobolink and Eastern Meadowlark breeding habitat and created survey protocol based on findings. Bobolink and Eastern Meadowlark surveys were conducted with subsequent data analysis and mapping. Client: Town of Oakville.
- Highway 17B CNR Overhead Bridge and Highway 17B Resurfacing, North Bay, Ontario, Canada (2013). Terrestrial Ecologist. Author to the Terrestrial Ecosystems Existing Conditions and Impact Assessment Report. Performed the corresponding

field surveys of ELC and mapping, significant wildlife habitat assessment, and Species at Risk identification and mitigation. Field data was then analyzed and incorporated into the above report. Consultation and engagement to Nipissing First Nations was also provided at time of field investigations. Client: Ministry of Transportation Ontario (MTO).

- Highway 11 Chippewa Creek Bridge and Duchesnay Creek Bridge Replacement/Rehabilitation, North Bay, Ontario, Canada (2013). Terrestrial Ecologist. Author to the Terrestrial Ecosystems Existing Conditions and Impact Assessment Report. Performed the corresponding field surveys of ELC and mapping, significant wildlife habitat assessment, and Species at Risk identification and mitigation. Field Data was then analyzed and incorporated into the above report. Client: Ministry of Transportation Ontario (MTO).
- Holland Drain Canal Bridge Replacement on Highway 9, Ontario, Canada (2012). Terrestrial Ecologist. Contributing author to Existing Conditions and Impact Assessment reports. Performed ELC community classification and mapping, and Species at Risk identification and mitigation, as well as field data analysis and reporting. Client: Ministry of Transportation Ontario (MTO).
- Highway 7 and 35 Structure Replacement/Rehabilitation, Ontario, Canada (2012). Terrestrial Ecologist. Contributing author to Existing Conditions and Impact Assessment reports. Performed ELC community classification and mapping, and Species at Risk identification and mitigation, as well as field data analysis and reporting. Client: Ministry of Transportation Ontario (MTO).
- Highway 6/10 from Chatsworth to Owen Sound, Ontario, Canada (2012). Terrestrial Ecologist. Contributing author to Existing Conditions and Impact Assessment reports. Performed ELC community classification and mapping, and Species at Risk identification and mitigation, as well as field data analysis and reporting. Client: Ministry of Transportation (MTO)

Restoration, Remediation and Redevelopment

- Kizell Wetland Trail: Species at Risk Authorizations, Kanata, Ontario, Canada (2019). Terrestrial Ecologist. Conducted field work to identified Species at Risk (SAR) Butternut trees that may be impacted/avoided by a pedestrian trail network. Client: City of Ottawa.
- Restoration and Vegetation Monitoring of Former Spill Pond, Thorold, Ontario, Canada (2016). Terrestrial Ecologist. Author to the 2016 Vegetation Monitoring and Adaptive Management report. Survivorship data of vegetation was analyzed and incorporated into the above report recommendations of a watering and tending program. Client: Georgia Pacific.
- Annual Monitoring and Adaptive Management of Beaverdams Channel, Thorold, Ontario, Canada (2013). Terrestrial Ecologist. Author to the 2013 Annual Monitoring and Adaptive Management Report and performed the corresponding field investigations of spring and summer vegetation restoration monitoring. Survivorship data of vegetation was collected, analyzed, and incorporated into the above report with invasive species management recommendations. Client: Georgia Pacific.

Utilities, Oil and Gas Pipelines

- Utility Line Rebuilt: Boundary Road and Highway 401, Cornwall, Ontario, Canada (2019). Terrestrial Ecologist. Coordinated and conducted ecological wildlife habitat

assessment to identify the potential for Species at Risk. Author to the subsequent Species at Risk Screening report. Client: Cornwall Electric.

- Energy East Pipeline, Ontario, Canada (2015). Terrestrial Ecologist. Coordinated and prepared field packages/itinerary for vegetation and wildlife surveys from Kenora to Cornwall, Ontario. Performed gap analysis of ELC using ArcGIS and aerial photography to determine survey locations, level of effort, and species at risk analysis. Client: TransCanada Corporation.
- Spencer Creek Pipeline Repair, Flamborough, Ontario, Canada (2014). Terrestrial Ecologist. Conducted field investigations of summer botanical inventory, with a subsequent technical memo. This involved data collected, mitigation measures for regionally rare species, and restoration. Client: Enbridge.
- Integrity Digs – Line 9 between Hilton and Westover, Mississauga, Pickering, Hamilton, Oakville, Ontario, Canada (2013). Terrestrial Ecologist. Conducted tree inventory surveys in various locations along the Line 9 Pipeline. Identified Species at Risk (SAR) Butternut trees and any mid-age to mature trees that may be impacted. Also conducted significant wildlife habitat and turtle habitat assessments. Complete botanical inventories were also conducted at some sites with emphasis on locating regionally rare plant species within the construction area. Technical memos were then created based on findings and mitigation measures were provided as needed. Mitigation measures performed involved transplanting rare plants and ensuring their survival. Client: Enbridge.
- Woodbine and Cedar Ridge Road Exposure, Gormley, Ontario, Canada (2013). Terrestrial Ecologist. Conducted field investigations of ELC and mapping, significant wildlife habitat assessment, and Species at Risk identification and mitigation. A technical memo was then prepared. Client: Union Gas.

Land Development

- Potter's Key Development, Stittsville, Ontario, Canada (2019). Terrestrial Ecologist. Conducted annual spring and summer vegetation restoration monitoring. Survivorship data of vegetation was collected by following a modified version of the Ecological Monitoring and Assessment Network (EMAN) protocol. Client: Minto Group.
- 760 River Road Residential Development Project, Ottawa, Ontario, Canada (2019). Terrestrial Ecologist. Coordinated and performed natural heritage field program, which consisted of ELC, tree inventory, breeding bird survey, amphibian breeding survey, bat acoustic monitoring, and wildlife habitat assessments. Author to the Environmental Impact Statement and Tree Conservation Report, which included data analysis and interpretation, significant wildlife habitat assessment, Species at Risk screening, impact assessment and mitigation measures. Client: Claridge Homes.
- 3596 Old Montreal Road: Orleans Spa Development Project, Ottawa, Ontario, Canada (2019). Terrestrial Ecologist. Conducted ELC and tree inventory. Senior reviewer of the Environmental Impact Statement and Tree Conservation Report. Client: Azur Resort and Spa.
- Kanata North Lands Development, Kanata, Ottawa, Ontario, Canada (2019). Terrestrial Ecologist. Terrestrial Ecologist. Conducted Least Bittern call back survey and Butternut Health Assessment (BHA). Author to the subsequent BHA report. Client: KNL Developments Inc.

APPENDIX

B SITE PHOTOGRAPHS

Photo 1 December 17, 2019 **Notes:** Business Sector (CVC_1) community	
Photo 2 December 17, 2019 **Notes:** Business Sector (CVC_1) community	

Photo 3 December 17, 2019 **Notes:** Border between Business Sector (CVC_1) community and Poplar Mineral Deciduous Swamp (SWD4-5)	
Photo 4 December 17, 2019 **Notes:** Poplar Mineral Deciduous Swamp (SWD4-5)	

Photo 5 December 17, 2019 **Notes:** Reed-canary Grass Meadow Marsh (MAM2-2) community	
Photo 6 December 17, 2019 **Notes:** Reed-canary Grass Meadow Marsh (MAM2-2) community	

Photo 7 December 17, 2019 Notes: Cultural Meadow (CUM1) and residential development (CVR) adjacent to western side of proposed Project Area	
Photo 8 December 17, 2019 **Notes:** Vacant American Robin nest	

Photo 9 December 17, 2019 **Notes:** Snag trees within Reed-canary Grass Meadow Marsh (MAM2-2) community	
Photo 10 December 17, 2019 **Notes:** Woodpecker activity on snag tree.	

APPENDIX

C PLANT AND TREE INVENTORIES

Table C1 Vegetation and Tree Inventory

Common Name	Scientific Name	Conservation Status			Exotic	Coefficients of Conservatism [C]	Wetness Index
		SARA (2012)	ESA (2007)	S-Rank			
American Basswood	*Tilia americana*			S5		4	3
Ash species	*Fraxinus* sp.						
Aster species	*Symphyotrichum* sp.						
Black Cherry	*Prunus serotina var. serotina*			S5		3	3
Broad-leaved Cattail	*Typha latifolia*			S5		1	-5
Common Buckthorn	*Rhamnus cathartica*			SNA	SE5		0
Common Burdock	*Arctium minus*			SNA	SE5		3
Common Milkweed	*Asclepias syriaca*			S5		0	5
Common Red Raspberry	*Rubus idaeus*			S5		2	3
Crack Willow	*Salix euxina*			SNA	SE		0
Eastern Cottonwood	*Populus deltoides*			S5		4	0
Elm species	*Ulmus* sp.						
Goldenrod species	*Solidago* sp.						
Locust species	*Robinia* sp.						
Manitoba Maple	*Acer negundo*			S5		0	0
Maple species	*Acer* sp.						
Paper Birch	*Betula papyrifera*			S5		2	3
Poplar species	*Populus* sp.						
Red-osier Dogwood	*Cornus sericea*			S5		2	-3
Reed Canary Grass	*Phalaris arundinacea var. arundinacea*			S5		0	-3
Riverbank Grape	*Vitis riparia*			S5		0	0
Sugar Maple	Acer saccharum			S5		4	3

Common Name	Scientific Name	Conservation Status			Exotic	Coefficients of Conservatism [C]	Wetness Index
		SARA (2012)	ESA (2007)	S-Rank			
Speckled Alder	*Alnus incana ssp. rugosa*			S5		6	-3
Staghorn Sumac	*Rhus typhina*			S5		1	3
Willow species	*Salix* sp.						

Table C2 Tree Inventory Count Estimates

Common Name	Scientific Name	Area 1 (SWD4-5)	Area 2 (HR – West)	Area 3 (HR - East	Total
American Basswood	*Tilia americana*	0	8	0	8
Ash species	*Fraxinus* sp.	1	0	0	1
Black Cherry	*Prunus serotina var. serotina*	4	0	0	4
Common Buckthorn	*Rhamnus cathartica*	16	0	0	16
Crack Willow	*Salix fragilis*	8	0	0	8
Eastern Cottonwood	*Populus deltoides*	146	0	0	146
Elm species	*Ulmus* sp.	24	0	0	24
Locust species	*Robinia* sp.	0	4	0	4
Manitoba Maple	*Acer negundo*	9	25	11	45
Maple species	*Acer* sp.	12	0	0	12
Paper Birch	*Betula papyrifera*	3	1	0	4
Poplar species	*Populus* sp.	250	5	5	260
Sugar Maple	Acer saccharum	0	3	0	3

Common Name	Scientific Name	Area 1 (SWD4-5)	Area 2 (HR – West)	Area 3 (HR - East	Total
Willow species	*Salix* sp.	3	0	0	3
TOTAL		**476**	**46**	**16**	**538**

Table C3 Distinctive Tree Inventory

Tree ID	Scientific Name	Common Name	DBH (cm)	Condition	Notes	Easting	Northing	Status
01	*Acer* sp.	Maple sp.	61	Moderate	Dead branches, large cavities present, fungus growth along trunk.	460020.6	5030739	Potentially retainable
02	*Acer* sp.	Maple sp.	68	Moderate	Fused trunks, some dieback.	460015.3	5030753	Potentially retainable
03	*Populus deltoides*	Eastern Cottonwood	70	Good	Good form.	460048.2	50303730	Potentially retainable
04	*Populus deltoides*	Eastern Cottonwood	52, 32, 35	Good	Slight lean, multi-stemmed.	460249.9	5030303	Non-retainable
05	*Populus deltoides*	Eastern Cottonwood	71	Good	Minimal dead branches.	460275.3	5030290	Non-retainable
06	*Populus deltoides*	Eastern Cottonwood	57	Good	Minor number of dead branches.	460297.8	5030227	Non-retainable
07	*Populus deltoides*	Eastern Cottonwood	53	Good	n/a	460293.9	5030217	Non-retainable
08	*Populus deltoides*	Eastern Cottonwood	53, 20	Good	Slight lean, multi-stemmed.	460284.4	5030225	Non-retainable

Tree ID	Scientific Name	Common Name	DBH (cm)	Condition	Notes	Easting	Northing	Status
09	*Populus deltoides*	Eastern Cottonwood	52	Good	n/a	460390.2	5030058	Potentially retainable
10	*Populus deltoides*	Eastern Cottonwood	60	Good	n/a	460206.1	5030519	Non-retainable
11	*Populus deltoides*	Eastern Cottonwood	55	Good	Moderate lean, some dead branches.	460204.3	5030518	Non-retainable
12	*Pinus strobus*	Eastern White Pine	55	Good	Outside of property parcel.	460213.2	5030527	Potentially retainable

APPENDIX

D SPECIES AT RISK SCREENING

Scientific Name	Common Name	General Habitat According to the MNRF Significant Wildlife Habitat Technical Guide (MNRF, 2000)	Conservation Status			Source[3]	Potential for Habitat Within Study Area	Rationale
			Federal (SARA, 2002)	Provincial (ESA, 2007)[1]	S-Rank[2]			
Birds								
Contopus virens	Bank Swallow	Sand, clay, or gravel river banks or steep riverbank cliffs; lakeshore bluffs of easily crumbled sand or gravel; gravel pits.	THR	THR	S4B	OBBA	No	Sand and gravel piles present on subject property; however, no evidence of nesting recorded and regular activity around these piles likely to deter nesting.
Hirundo rustica	Barn Swallow	Farmlands or rural areas; cliffs, caves, rock niches; buildings or other man-made structures for nesting; open country near body of water.	THR	THR	S4B	OBBA	No	Suitable structures (storage containers) present on subject property, but no evidence of historical nests. No other candidate habitat features observed.
Dolichonyx oryzivorus	Bobolink	Large, open expansive grasslands with dense ground cover; hayfields, meadows or fallow fields; marshes; requires tracts of grassland >50 ha.	THR	THR	S4B	OBBA	**Yes**	Cultural meadow communities adjacent to property parcel may provide suitable habitat for this species. No suitable habitat identified within the proposed subject property.
Chlidonias niger	Black Tern	Wetlands, coastal or inland marshes; large cattail marshes, marshy edges of rivers, lakes or ponds, wet open fens, wet meadows; returns to same area to nest each year in loose colonies; must have shallow (0.5 to 1 m deep) water and areas of open water near nests; requires marshes >20 ha in size; feeds over adjacent grasslands for insects; also feeds on fish, crayfish and frogs.	---	SC	S3B	OBBA	**Yes**	Large cattail marsh in Mer Bleue PSW may provide suitable foraging and nesting conditions.
Cardellina canadensis	Canada Warbler	An interior forest species; dense, mixed coniferous, deciduous forests with closed canopy, wet bottomlands of cedar or alder; shrubby undergrowth in cool moist mature woodlands; riparian habitat; usually requires at least 30 ha.	THR	SC	S4B	OBBA	No	No interior forest or expansive woodlands present in Study Area.
Chaetura pelagica	Chimney Swift	Commonly found in urban areas near buildings; nests in hollow trees, crevices of rock cliffs, chimneys; highly gregarious; feeds over open water.	THR	THR	S4B, S4N	OBBA	No	No suitable buildings or hollow trees observed within Study Area.
Chordeiles minor	Common Nighthawk	Open ground; clearings in dense forests; ploughed fields; gravel beaches or barren areas with rocky soils; open woodlands; flat gravel roofs.	THR	SC	S4B	OBBA	No	No open woodlands or forest clearings identified within Study Area.
Sturnella magna	Eastern Meadowlark	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	S4B	OBBA	**Yes**	Cultural meadow communities adjacent to property parcel may provide suitable habitat for this species. No suitable habitat identified within the subject property.
Antrostomus vociferus	Eastern Whip-poor-will	Dry, open, deciduous woodlands with small to medium trees; oak or beech with lots of clearings and shaded leaf-litter; wooded edges, forest clearings with little herbaceous growth; pine plantations; associated with >100 ha forests; may require 500 to 1000 ha to maintain population.	THR	THR	S4B	OBBA	No	No dry open deciduous woodlands encountered within Study Area.
Contopus virens	Eastern Wood-pewee	Open, deciduous, mixed or coniferous forest; predominated by oak with little understory; forest clearings, edges; farm woodlots, parks.	SC	SC	S4B	OBBA	**Yes**	Deciduous swamp and hedgerow communities may provide marginal foraging and nesting habitat for this species.
Coccothraustes vespertinus	Evening Grosbeak	Coniferous or mixed forests; deciduous tree stands; parks, orchards.	---	SC	S4B	OBBA	No	No coniferous or mixed forests present within Study Area.
Ixobrychus exilis	Least Bittern	Deep marshes, swamps, bogs; marshy borders of lakes, ponds, streams, ditches; dense emergent vegetation of cattail, bulrush, sedge; nests in cattails; intolerant of loss of habitat and human disturbance.	THR	THR	S4B	OBBA	**Yes**	Large cattail marsh in Mer Bleue PSW may provide suitable foraging and nesting conditions.
Progne subis	Purple Martin	Open, trees areas such as farmland, parks, yards, marshes; usually near large bodies of water; colonial; nests in tree cavities, cliff ledges; most	---	---	S3, S4B	OBBA	**Yes**	Cattail marsh and cultural meadows may provide suitable foraging habitat for this species.

Scientific Name	Common Name	General Habitat According to the MNRF Significant Wildlife Habitat Technical Guide (MNRF, 2000)	Conservation Status			Source[3]	Potential for Habitat Within Study Area	Rationale
			Federal (SARA, 2002)	Provincial (ESA, 2007)[1]	S-Rank[2]			
		common in nest boxes; requires open space for foraging; prefers trees >15 cm DBH.						
Asio flammeus	Short-eared Owl	Grasslands, open areas or meadows that are grassy or bushy; marshes, bogs or tundra; both diurnal and nocturnal habits; ground nester; destruction of wetlands by drainage for agriculture is an important factor in the decline of this species; home range 25 -125 ha; requires 75-100 ha of contiguous open habitat.	SC	SC	S2N, S4B	OBBA	**Yes**	Cattail marsh and cultural meadows may provide adequate foraging habitats; marginal nesting habitat within Study Area.
Hylocichla mustelina	Wood Thrush	Carolinian and Great Lakes-St. Lawrence forest zones; undisturbed moist mature deciduous or mixed forest with deciduous sapling growth; near pond or swamp; hardwood forest edges; must have some trees higher than 12 m.	THR	SC	S4B	OBBA	No	No suitable large, mature deciduous forests present within Study Area.
Herpetoza								
Emydoidea blandingii	Blanding's Turtle	Shallow water marshes, bogs, ponds or swamps, or coves in larger lakes with soft muddy bottoms and aquatic vegetation; basks on logs, stumps, or banks; surrounding natural habitat is important in summer as they frequently move from aquatic habitat to terrestrial habitats; hibernates in bogs; not readily observed.	THR	THR	S3	ORAA	**Yes**	Cattail marsh in Mer Bleue PSW may provide suitable habitat for this species. Watercourses connected to marsh may provide marginal movement corridors.
Lampropeltis triangulum	Eastern Milksnake	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	NAR	S4	ORAA	**Yes**	Cultural meadows and residential homes and structures may provide suitable habitat for this species.
Sternotherus odoratus	Eastern Musk Turtle	Aquatic, except when laying eggs; shallow slow-moving water of lakes, streams, marshes and ponds; hibernate in underwater mud, in banks or in muskrat lodges; eggs are laid in debris or under stumps of fallen logs at waters edge; often share nest sites; sometimes congregate at hibernation sites; not readily observed.	SC	SC	S3	ORAA	**Yes**	Cattail marsh in Mer Bleue PSW may provide suitable habitat for this species. Watercourses connected to marsh may provide marginal movement corridors.
Graptemys geographica	Northern Map Turtle	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; aquatic corridors (e.g. stream) are required for movement.	SC	SC	S3	ORAA	**Yes**	Cattail marsh in Mer Bleue PSW may provide suitable habitat for this species. Watercourses connected to marsh may provide marginal movement corridors.
Chelydra serpentina	Snapping Turtle	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	S3	ORAA, iNat	**Yes**	Cattail marsh in Mer Bleue PSW may provide suitable habitat for this species. Watercourses connected to marsh may provide marginal movement corridors.
Pseudacris triseriata	Western Chorus Frog	Roadside ditches or temporary ponds in fields; swamps or wet meadows; woodland or open country with cover and moisture; small ponds and temporary pools.	THR	NAR	S3	ORAA	**Yes**	Deciduous swamp, meadow marshes, and channelized watercourses may provide suitable breeding and foraging habitat for this species.
Lepidoptera								
Danaus plexippus	Monarch	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.	SC	SC	S2N, S4B	OBA	**Yes**	Milkweed present in meadow marsh on eastern edge of subject property.
Mammals								

Scientific Name	Common Name	General Habitat According to the MNRF Significant Wildlife Habitat Technical Guide (MNRF, 2000)	Conservation Status			Source[3]	Potential for Habitat Within Study Area	Rationale
			Federal (SARA, 2002)	Provincial (ESA, 2007)[1]	S-Rank[2]			
Myotis leibii	Eastern Small-footed Myotis	Roosts in caves, mine shafts, crevices or buildings that are in or near woodland; hibernates in cold dry caves or mines; maternity colonies in caves or buildings; hunts in forests.	END	END	S2S3	AMO	**Yes**	Deciduous swamp may provide foraging habitat; residential homes and structures may provide roosting habitat.
Myotis lucifugus	Little Brown Myotis	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	AMO	**Yes**	Swamp and wetland communities may provide foraging habitats; forest communities and residential homes may provide roosting habitat.
Myotis septentrionalis	Northern Myotis	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, man-made structures but prefers hollow trees or under loose bark; hunts within forests, below canopy.	END	END	S3	AMO	**Yes**	Swamp communities may provide roosting and foraging habitats; residential homes may provide roosting habitat.
Perimyotis subflavus	Tri-colored Bat	Found in a variety of forested habitats during summer, forms day roosts and maternity colonies in older forest and occasionally in barns or other structures; forage over water and along forested streams; hibernates in a cave or underground structure and roost individually.	END	END	S3?	AMO	**Yes**	Swamp communities may provide roosting and foraging habitats; residential homes may provide roosting habitat.
Vegetation								
Juglans cinerea	Butternut	Grows alone or in small groups in deciduous forests; prefers moist, well-drained soil and is often found along streams, also occurs on well-drained gravel sites and rarely on dry rocky soil; does not grow well in shade and will often grow in sunny openings and near forest edges	END	END	S3	NHIC	No	Hedgerows and swamp edges may contain suitable conditions; however, this species was not encountered during the tree inventory.
Carex folliculata	Northern Long Sedge	Damp meadows and forests, marshes, bogs, and swamps.	---	---	S3	NHIC	**Yes**	Cattail marsh and other wet areas may provide suitable conditions for this species.

[1]END = Endangered, THR = Threatened, SC = Special Concern [2]S-Rank is an indicator of commonness in the Province of Ontario. A scale between 1 and 5, with 5 being very common and 1 being the least common. [3]Information sources include: NHIC = Natural Heritage Information Centre; OBBA = Ontario Breeding Bird Atlas; ORAA = Ontario Reptile and Amphibian Atlas; OBA = Ontario Butterfly Atlas; AMO = Atlas of the Mammals of Ontario; City of Ottawa: MacPherson, 2018; --- denotes no information or not applicable.