53841 ZION ROAD, WAINFLEET

ENVIRONMENTAL IMPACT STUDY

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Table of Contents

1 INTRODUCTION 1
1.1 Study Objectives 1
1.2 Study Area 1
1.3 Pre-consultation and Study Scope 2
2 STUDY BACKGROUND AND SCOPING 3
2.1 Literature Review 3
2.2 Baseline Data Assessment 3
2.3 Analysis of Significant Features 4
3 POLICY AND LEGISLATIVE FRAMEWORK 5
4 DESCRIPTION OF EXISTING CONDITIONS 7
4.1 Existing Data 7
4.1.1 Site History 7
4.1.2 Physiography, Soils and Drainage 7
4.1.3 Existing Natural Heritage 8
4.2 Field Surveys 9
4.2.1 Ecological Land Classification 9
4.2.2 Botanical Inventory 11
4.2.3 Amphibian Monitoring 12
4.2.4 Reptile Monitoring 12
4.2.5 Avian Monitoring 12
4.2.6 Mammalian Monitoring 13
4.2.7 Significant Wildlife Habitat 14
5 ASSESSMENT OF NATURAL FEATURES AND FUNCTIONS 15
5.1 Environmental Protection Areas 15
5.2 Environmental Conservation Areas 16
5.3 Fish Habitat [Left off] 16
5.4 Species at Risk 17
5.4.1 Endangered or Threatened Species 17
5.4.2 Special Concern Species 18
5.5 Significant Wildlife Habitat 19
5.5.1 Seasonal Concentration Areas 19
5.5.2 Rare or Specialized Habitat 20
5.5.3 Habitat of Species of Conservation Concern 20
5.5.4 Animal Movement Corridors 20
5.6 Corridors and Linkages 20
5.7 Summary 21
6 CONSTRAINTS ANALYSIS 22
6.1 Development Constraints 22
6.2 Areas of No Constraint 23
6.3 Enhancement Opportunities 24
7 ECOLOGICAL IMPACT ASSESSMENT 25
7.1 Description of Proposed Development 25
7.2 Potential Impacts to Natural Heritage Features 26
7.2.1 Potential Impacts 26
7.2.2 Proposed Mitigation 26
7.3 Residual Impacts and Policy Compliance 27

8 RECOMMENDATIONS AND CONCLUSION..... 29
9 LITERATURE REVIEWED..... 31

APPENDICES

Appendix A – Mapping
Appendix B – Agency Correspondence and EIS Scoping
Appendix C – Field Assessments and Survey Protocols
Appendix D – Data Summaries
Appendix E – Site Photos

1 INTRODUCTION

LCA Environmental Consultants were retained by Mr. Ron Pols to evaluate the natural heritage and ecological features on the property located at 53841 Zion Road, Wainfleet to identify any constraints to development on the property. An Environmental Impact Study (EIS) including a Constraints Analysis and Impact Assessment, was completed in accordance with the Regional Municipality of Niagara EIS Guidelines and with regard to the Provincial Policy Statement (2020), and the 2014 Consolidated Regional Official Plan.

The purpose of the EIS was to address the effects of a proposed severance and creation of six rural residential lots on the natural heritage features identified on the site and adjacent lands. These features and their relative functions were assessed through a review of the existing data and current field investigations. The subject lands previously had a single dwelling which has since been removed and currently only a small shed remains on the property. The planning application proposes a severance of the subject property to create six new building lots for single family homes.

1.1 Study Objectives

This report includes a summary of the study approach and relevant background data, a description of the existing natural heritage features on the subject property as well as an assessment of their ecological functions. The constraints associated with the subject property and opportunities for enhancement of natural features are detailed in the report.

The primary objective of this study is to assess the impacts of the proposed lot severance and subsequent construction of six dwellings on the natural heritage features on and adjacent to the property. Mitigation measures will be recommended as appropriate with the goal of maintaining or improving the ecological integrity of the features on or adjacent to the subject property.

1.2 Study Area

The study area exists within the Hendershot Corners Hamlet, according to Schedule B5 of the Official Plan for the Township of Wainfleet and is currently zoned Village Residential with a portion designated as Environmental Protection Area. The subject property is located at 53841 Zion Road, Wainfleet, and is approximately 4.6 hectares in size. It is legally described as ARN: 271400001210100, Township of Wainfleet, Regional Municipality of Niagara, and is part of Lot 38 of Concession 5, Wainfleet Township. The property is located on the west side Zion Road where it intersects with Highway 3. The land surrounding the property is primarily residential and agriculture.

The existing natural heritage features within the study area include Significant Woodlands and a portion of the Marshville Station Clay Plain Provincially Significant Wetland (PSW) Complex, located in the southwest corner of the study area. The PSW is identified as Environmental Protection Area (EPA) in Schedule B5 of the Municipal Official Plan. The Regional Core Natural Heritage Map does not identify the significant woodland or the PSW, however both

satisfy Regional policies to be classified as Environmental Conservation Area (ECA) and EPA, respectively.

The study area and surrounding landscape are shown in Figure 1.

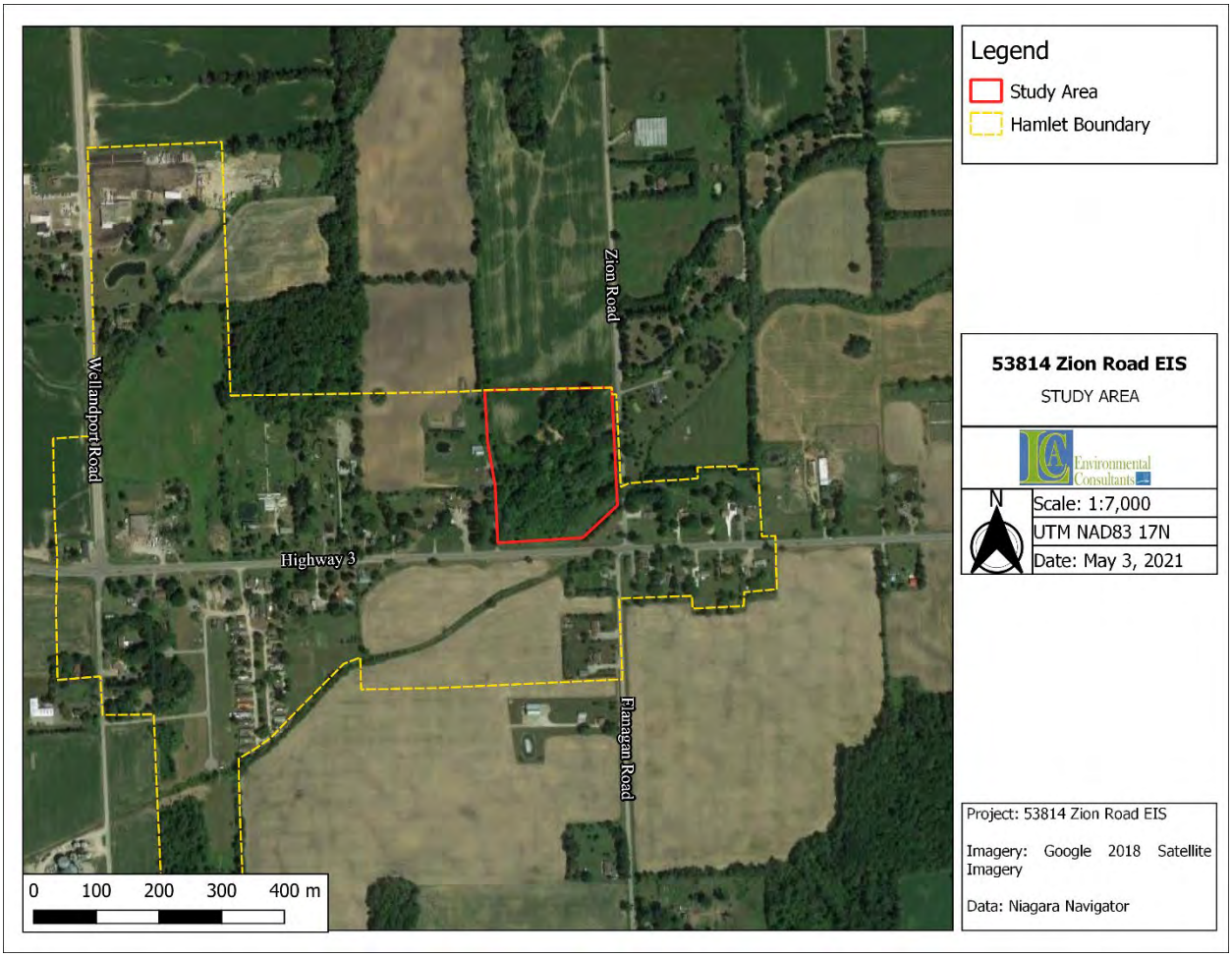


Figure 1: Location of the subject property.

1.3 Pre-consultation and Study Scope

Following a background review of the subject property including identification of the natural features present, LCA Environmental (LCA) prepared Terms of Reference (TORs) for the completion of an EIS. The TORs were sent to Regional Environmental Planning staff as well as the Niagara Peninsula Conservation Authority (NPCA) on April 12, 2021, for review. The Region responded on May 25, 2021, confirming that they were satisfied with the proposed work plan presented in the TORs.

NPCA staff provided further comment via email on June 21, 2021. In their review of the TORs for the EIS, NPCA requested that the watercourse identified on their mapping be assessed as a headwater drainage feature. The purpose was to characterize flow regime, temperature regime and assess habitat within the watercourse as well as connection with watercourses and wetlands within the study area.

The TORs identified the following studies to be included as part of the work plan to address any impacts to the natural heritage features from the proposed severance:

- Ecological Land Classification and mapping
- Two Season Botanical Inventory
- Woodland Boundary verification
- Breeding Bird Surveys
- Reptile /Amphibian Visual Encounter Surveys
- Anuran Call Surveys
- Bat Monitoring
- Wetland boundary verification
- Other Species at Risk surveys

The final report will be submitted to the Region of Niagara and NPCA for review. All correspondence with agencies has been included in Appendix B of this report.

2 STUDY BACKGROUND AND SCOPING

2.1 Literature Review

Background studies reviewed for this EIS include:

- Natural Heritage Information Centre database (MNRF)
- Atlas of the Breeding Birds of Ontario (ABBO)
- iNaturalist.org
- Township of Wainfleet Official Plan (2016)
- Endangered Species Act (2007)
- Consolidated Regional Official Plan (2014)
- Provincial Policy Statement (2020)

Additional references are listed at the end of this report.

The subject property is located within the Big Forks Creek Watershed which is approximately 93 square kilometers in area and is primarily rural and agricultural lands. Ellsworth Drain, a regulated watercourse, flows north along the southeast boundary of the subject property and is mapped as Type 2 Important Fish Habitat, as identified by the MNRF.

The Natural Heritage Information Centre (NHIC) was consulted to search for recent and historical records of provincially significant flora, fauna, and natural heritage features on, and in proximity to the site. Details are provided below.

2.2 Baseline Data Assessment

A Species at Risk (SAR) screening was completed for the subject property to verify whether any additional surveys were required to monitor for SAR which have the potential to occur in the study area. The SAR screening involved cross-referencing the list of species known to occur in the Township of Wainfleet with the habitat present on the subject property to determine potential

for occurrence within the study area. Species tracked by the NHIC that have been observed in the area historically were also included as having potential to occur. A total of twenty-seven (27) SARs were identified as having potential to occur on the subject property (Appendix C) based on habitat requirements and historical records.

Eleven of the species identified as having potential to occur on the property were avian species and Breeding Bird Surveys were completed to monitor for their presence and to document any potential Significant Wildlife Habitat. Five potential SAR were mammalian, including four SAR bats. Acoustic surveys and incidental observations were completed to monitor mammalian species.

Four reptiles were identified as having potential to occur and visual encounter surveys and active hand searches were completed to monitor for their presence. ELC and vegetation surveys were completed to verify the presence or absence of four potential plant SAR. The final three SAR identified as having potential to occur were insect species (Monarch, West Virginia White and Rusty Patched Bumblebee). Incidental observations were completed to monitor for SAR insects.

Field assessments were completed throughout the spring and summer of 2021 by LCA Environmental Consultants to assess natural heritage features and their ecological functions, and to identify any constraints to development or enhancement opportunities present on the property. All field surveys were completed according to current standardized protocols as outlined in the Terms of Reference approved by the Region of Niagara. A summary of the field survey dates and protocols has been included in Appendix C.

2.3 Analysis of Significant Features

Biological field data were evaluated to assess the significance of the natural heritage features on the subject property. Provincial and national status of plants and wildlife was verified according to the Natural Heritage Information Centre (NHIC, 2020) and the COSEWIC database (September 2018). The status of each species within the Region of Niagara was also verified (Oldham, 2017). Status rankings for plants and wildlife are primarily based on the number of occurrences Provincially and Globally.

Potential sensitivity of natural features and functions within the study area was also measured through an assessment of:

- Vegetation communities (habitat quality, degree of disturbance);
- Sensitive species (rare plants or wildlife);
- Significant Wildlife Habitat; and
- Linkage functions and connectivity.

The relative significance of the natural features on the subject property was evaluated with regard to local (Official Plan for the Township of Wainfleet), Regional (Consolidated Regional Official Plan) and Provincial (Provincial Policy Statement) planning documents, Federal and Provincial

Species at Risk legislation, and Significant Wildlife Habitat Criteria for Eco-region 7E (MNRF, 2017).

3 POLICY AND LEGISLATIVE FRAMEWORK

Before the impact assessment can be completed, a constraints analysis must identify the existing conditions and applicable policies and regulations, and field studies should assess the natural heritage and hydrologic features and their functions. A review of the policies and guidelines at the Provincial, Regional, and Municipal level must also be completed. In accordance with the Region of Niagara EIS Guidelines (2018), a summary of applicable policies and regulations has been provided in Table 1 below.

Table 1: Summary of applicable policies and legislations.

Policy Document	**Policy Section**	**Policy Summary**	**Application**
Provincial Policy Statement, 2020	2.1 Natural Heritage	**2.1.5** No development in significant wetlands, woodlands, valleylands, wildlife habitat, or ANSIs unless no negative impacts have been demonstrated	The study area contains Significant Woodlands, Provincially Significant Wetland (PSW), and potential habitat for threatened or endangered species.
		2.1.7 Development not permitted in habitat of endangered/threatened species	
		2.1.8 No development on lands adjacent to natural heritage features unless no negative impacts have been demonstrated.	
Endangered Species Act (2007)	Protection and Recovery of Species	**10.1** Prohibits damage or destruction to the habitat of any species listed as endangered, threatened, or extirpated under SARO.	Twenty-seven SAR with potential to occur. Seventeen threatened or endangered (Section 5.2).
Migratory Bird Convention Act, 1994	Purpose	**4** protect and conserve migratory birds and their nests.	Potential interference of migratory nesting habitat
Niagara Region Official Plan, 2014	7.B The Core Natural Heritage System	**7.B.1.1** Core Natural Heritage (CNH) includes: a. Core Natural Areas (EPA or ECA); b. Potential Natural Heritage Corridors; c. Greenbelt Natural Heritage and Water Resources System; and a. Fish Habitat	Regional Core Natural Heritage mapping identifies Type 2 Important fish habitat adjacent to the study area. PSW meets Regional Core Natural Heritage designation and potential for Significant Woodlands.
		7.B.1.10 Development not permitted within EPAs, except: a. Forest, fish, wildlife management b. Flood or erosion control c. Passive recreational uses	
		7.B.1.11 Development not permitted within ECA unless no negative impact on CNH feature or adjacent land has been demonstrated.	
		7.B.1.13 development should be designed to maintain or enhance ecological functions of Potential Natural Heritage Corridors.	
NPCA Land	8.2.2 Development	**8.2.2.1** no development or site alteration within a	Presence of PSW and

Use Policy Document, 2018	within a wetland	wetland	NPCA-regulated watercourse along the southeast boundary.
	8.2.3 Development in Areas of interference	**8.2.3.1** no development within 30 metres of a wetland	
		8.2.3.4 Lot creation should not be permitted within 30m of wetland. May be permitted between 15 and 30m where items under 8.2.3.3 are addressed.	
		8.2.3.5 No new septic systems permitted within 30m of any wetland.	
	9.2.5 Watercourse Buffer Composition	**9.2.5.1** development and site alteration adjacent to a watercourse requires a natural buffer of 10-15m based on type of stream and habitat present.	
Fish Wildlife Conservation Act, 1997	7 Nests and Eggs	**7.1** no person shall destroy, take or possess the nest or eggs of a wild bird	Potential bird nesting habitat.
Township of Wainfleet (2016)	3.2.1 Environmental Protection Area Designation	**3.2.1.4** Development not permitted within EPAs, except: a. Forest, fish, wildlife management b. Flood or erosion control c. Passive recreational uses d. Existing agriculture	The study area contains Municipal EPA designated lands, in addition to Type 2 Important Fish Habitat. Presence of wooded area has potential for significance.
	3.2.2 Environmental Conservation Area Designation	**3.2.2.1** Environmental Conservation Areas include: a. Significant Woodlands b. Significant Wildlife habitat c. Significant habitat of species of concern d. Regionally significant ANSIs e Other evaluated wetlands f. Significant Valleylands	
		3.2.2.4 Significant Woodlands meet one or more of the following: a. Contain SAR or species of concern b. Be equal or greater than 10 ha in size c. Contain interior habitat d. Contain older growth forest and > 2ha e. Overlap one other significant features (EPA or ECA) f. Abut/be crossed by a watercourse and >2ha	
		3.2.2.5 Within and adjacent to ECA, development or alteration permitted if EIS demonstrates no negative impact on feature or function.	
	3.2.3 Fish Habitat	**3.2.3.3** Naturally vegetated buffer to be maintained along watercourse containing fish habitat. Minimum 30m for Critical habitat, and minimum 15m for important or marginal fish habitat unless EIS demonstrates narrower buffer will not harm fish or their habitat.	

4 DESCRIPTION OF EXISTING CONDITIONS

4.1 Existing Data

4.1.1 Site History

The property has historically been used for agricultural purposes with a farmhouse and orchard in the southern portion of the property as seen in the 1934 aerial photograph (Figure 2). The 1934 farmhouse was removed prior to 1965 and other accessory buildings have been constructed over the years. Currently only one small structure remains on the subject property. The southern portion of the property has been left to naturalize, while the northern portion of the property (outside of the settlement area) remains active agricultural fields. Over the years the some of the surrounding landscape has developed from farmland into rural residential as a result of the Hendershot Corners Hamlet designation. The existing driveway and alterations to site grading indicate the historical disturbance from the farmhouse and other farm related structures.

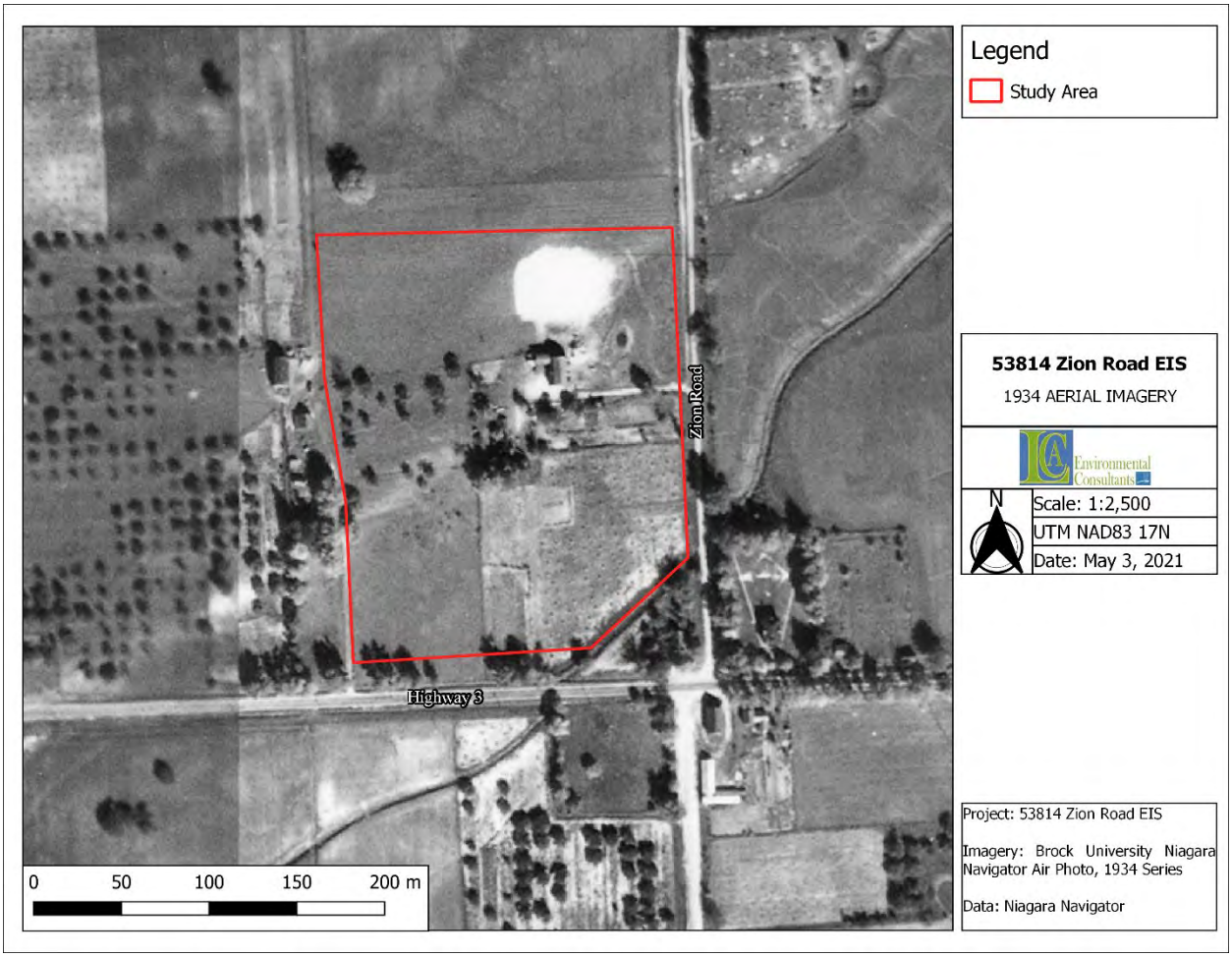


Figure 2: Historical imagery of the study site (1934). Imagery source: Brock University Niagara Air Photo Collection.

4.1.2 Physiography, Soils and Drainage

A preliminary assessment of the soil characteristics and site physiology was conducted through a review of the Soil Survey Report for the Regional Municipality of Niagara, and relevant maps

(Ontario Institute of Pedology, 1989). The subject property is situated North of the Onondaga Escarpment and is located within the Dunnville Sand Plain.

The topography of the site is described as smooth basin to irregular gently sloping, with a 0-9% slope. According to the Soils of Wainfleet Mapping, Walsingham (WAM) and Flamborough (FMB) soils characterize the study area. The study area is primarily composed of WAM soils, with FMB soils occupying a small portion along Ellsworth drain.

WAM soils are composed of mostly eolian fine sand at least a 1 meter in depth. The WAM soils in the study area are associated with the Plainfield Dune Phase soils. WAM soils are imperfectly drained due to the fluctuating water table, are rapidly permeable with low water-holding capacity and exhibit slow surface runoff on flat areas.

FMB soils composed of mainly brownish hued lacustrine fine sandy loam and very fine sandy loam which have poor drainage. FMB soils are moderately to rapidly permeable and have moderate water-holding capacity. Groundwater saturates the soils for varying periods each year and surface runoff tends to be slow for FMB soils.

4.1.3 Existing Natural Heritage

Provincial, Regional and Municipal designations of the natural heritage features on the subject property have been reviewed and described below.

The woodland on the subject property is identified in the Provincial natural heritage mapping as a wooded area, but significance is not assigned at the provincial level. However, the area meets the Regional and Municipal policies for identification as a significant woodland. The wetland in the southwest corner is part of the Marshville Station Clay Plain Provincially Significant Wetland (PSW) Complex which has been evaluated for significance and mapped by the Ministry of Natural Resources (MNRF).

At the Regional level, these features have not been identified on the Core Natural Heritage Map; however, the Niagara Region Official Plan designates Significant Woodlands as Environmental Conservation Areas (ECAs) and PSWs as Environmental Protection Areas (EPAs). Significance of the woodland was determined through field studies.

NPCA mapping shows a regulated watercourse along the southeast boundary of the study area. This watercourse is known as the Ellsworth Drain and flows east to Big Forks Drain. Ellsworth Drain has been assessed as Type 2 Important Fish Habitat and a Municipal drain for the Township of Wainfleet. Additionally, NPCA mapping shows a small unregulated watercourse originating from the PSW on the subject property which outlets into the Ellsworth Drain.

At the Municipal Level, the PSW is mapped as EPA on Schedule B5 of the Township of Wainfleet Official Plan. However, the Municipal Official Plan has not identified the Woodlands as significant.

The existing natural heritage features on or adjacent to the subject property are shown in Figure 3.

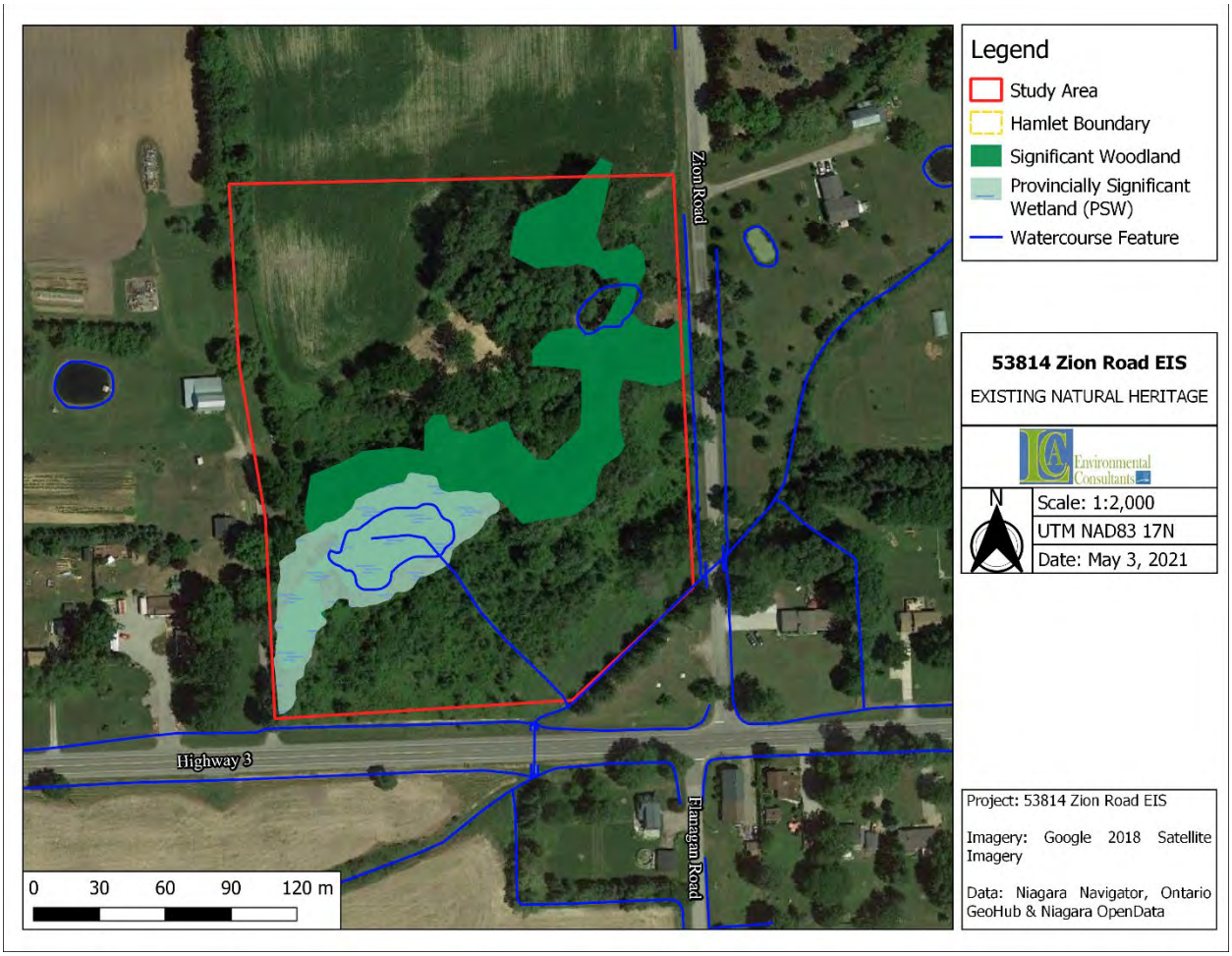


Figure 3: Existing Natural Heritage Features for 53814 Zion Road, Wainfleet (map included in Appendix A).

4.2 Field Surveys

4.2.1 Ecological Land Classification

The vegetation communities on the subject property were evaluated, inventoried, and classified according to the Ecological Land Classification System protocols (Lee et al., 1998) on June 22, and July 23, 2021. Four polygons were identified on the property through analysis of aerial imagery and field reconnaissance. The polygons and their associated Ecological Land Classifications are presented in Figure 4. Table 2 displays the ecosite for each polygon along with its assigned S-rank.

The updated Southern Ontario ELC Vegetation Type List (Lee, 2008) was used to classify the woodland polygon because it provides a wider range of vegetation types and more detailed descriptions of vegetation communities which are common to Southern Ontario. In particular, the updated ELC Vegetation Type List (Lee, 2008) describes many culturally influenced communities, or those with a history of disturbance due to human activity, including details about dominant species and soil types.

Table 2: Summary of Vegetation Communities Identified within the study area

Polygon	Community Class	Ecosite	S-Rank
1	Meadow with Woodland Inclusion	MEMM4 Incl. WOMM4	N/A
2	Swamp	SWDM3-3	S5
3	Woodland	WODM4	N/A
4	Woodland	WODM4	N/A

Polygon 1 was classified as a Fresh-Moist Mixed Meadow with a Mixed Woodland inclusion (MEMM4 incl. WOMM4). This polygon is located around the southern and east edge of the property and represent communities that have developed through natural succession of an orchard. The ground layer was comprised of common species such as Goldenrods, Asters, and grasses with some shrubs, such as Gray Dogwood, Rose, and Silky Dogwood. The mixed woodland inclusion had a sparce ground layer and a canopy composed of deciduous and coniferous trees including Spruce, Elm, and Cottonwood. The soil within the polygon was moist very fine sand with very poor drainage. According to the NHIC list of Ontario Vegetation Communities, cultural communities have not been assigned an S-Rank.

Polygon 2 was classified as a Swamp Maple Deciduous Swamp (SWDM3-3). The polygon is located on the southwest side of the subject property. It is a wetland community which had a vernal pool and a canopy dominated by Freemans (Swamp) Maple with some Elm throughout. The understory was open with a sparsely vegetated ground layer consisting Spotted Jewelweed, Fowl Mana Grass, and Jumpseed. According to the NHIC list of Ontario Vegetation Communities, the SWDM3-3 ecosite has an S-Rank of S5 and is secure in the Province of Ontario. The soils, similar to Polygon 1, were identified as very fine sandy soil, but were very moist in Polygon 2. This community appears to be a result of site alterations associated with construction of accessory buildings in the centre of the study area, creating a low pocket adjacent to a 3m berm.

Polygons 3 and 4 were classified as Dry-Fresh Deciduous Woodlands (WODM4). They are located throughout the center of the subject property and are associated with historical disturbances and succession of former agricultural land. The canopy is comprised of species such as Freemans Maple, Black Walnut, Ash, and Bur Oak, while the subcanopy was made up of species such as White Mulberry, Willows, and Buckthorn. The ground layer in Polygon 3 was similar to Polygon 1 with Goldenrod, Aster, and grasses dominating. However, Polygon 4 had a ground layer including a Horsetail species, Jewelweed and False Nettle. The soil within both woodland polygons was very fresh very fine sand with imperfect drainage.

The remainder of the property, in the northwest portion of the study area, is actively managed or cultivated agricultural land and was not assessed using the ELC protocols.

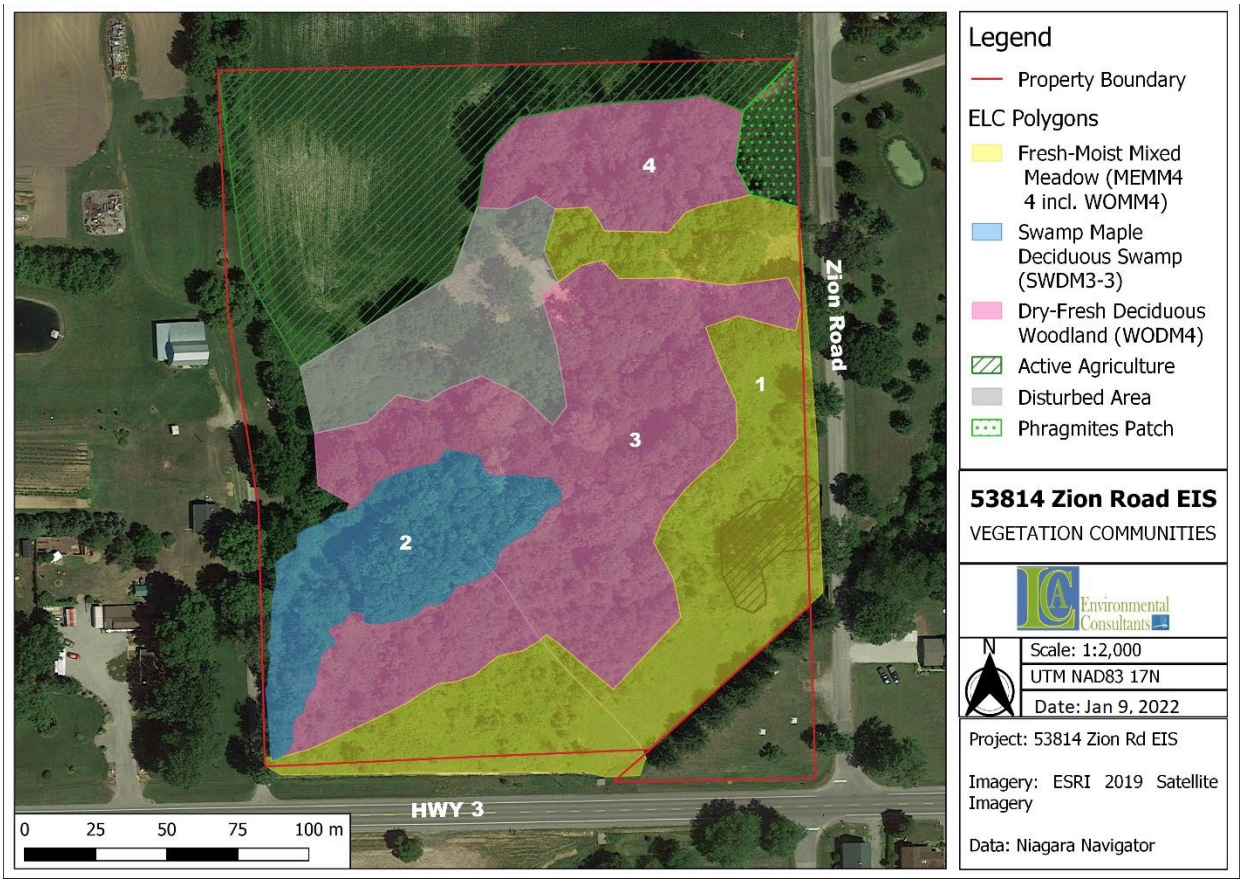


Figure 4: A map of the distribution of community types located in the study area.

4.2.2 Botanical Inventory

A two-season vegetation inventory was completed for each polygon within the study area. Spring vegetation inventories were completed on May 5, 2021, and summer vegetation surveys were completed concurrent with ELC surveys on June 22, 2021. The surveys were carried out as a transect survey, by walking transects through the polygons and identifying all species observed.

A complete list of plant species within the study area was compiled and is included in Appendix D. The Provincial status of each species was classified according to NHIC and Regional status was assessed for the Region of Niagara (Oldham, 2017).

A total of one hundred and seventeen (117) species were recorded in the study area. Thirty-two (32) of the species identified are non-native, or introduced to the Region, while the rest are considered native. All the species identified had an S-rank of S4 (apparently secure), S5 (secure), or SNA (non-native). All native species identified are considered common in the Niagara Region, except for Bur Oak (*Quercus macrocarpa*) which is considered uncommon (Oldham, 2017).

See Appendix D for a full list of species identified on the property.

4.2.3 Amphibian Monitoring

Anuran call surveys were conducted within the study area to provide a general assessment of the composition and densities of the amphibian species within the area, and to identify any possible Species at Risk (SAR) that may be present.

One amphibian monitoring station was surveyed by LCA Environmental Consultants using the current Marsh Monitoring Program (MMP) protocol for monitoring amphibians (Appendix C).

Three surveys were conducted between March 25, 2021 and June 4, 2021 to accommodate the required weather conditions and timing windows. Observations for each survey lasted for a total of three minutes, and the time, weather conditions, species, and calling codes were recorded.

Based on the combined results of the amphibian surveys and incidental observations, including amphibian calls recorded during daytime surveys, four species of amphibians were observed within the study area: American Toad (*Anaxyrus americanus*), Western Chorus Frog (*Pseudacris maculata*), Wood Frog (*Lithobates sylvaticus*) and Gray Treefrog (*Hyla versicolor*). The individual survey station results have been included in Appendix D. All species have an S-Rank of S5 or S4 in the province of Ontario and are considered 'secure' or 'apparently secure', respectively. (NHIC, 2018).

The species observed during the MMP all had the same abundancy; however, a full chorus of Western Chorus Frog was observed during the first survey window. Anuran species were heard calling primarily from the PSW on the subject property.

4.2.4 Reptile Monitoring

Visual searches for reptiles and reptile habitat were completed during site visits and hand searches were completed concurrent with vegetation transect surveys according to Ontario Species at Risk Snakes Survey Protocols. Woody debris and other cover items were inspected during surveys for reptile activity.

One Garter Snake was observed on May 11, 2021. No other reptile species were observed during hand searches or visual searches.

4.2.5 Avian Monitoring

Breeding Bird Surveys were carried out across the study area and were completed June 6 and 29, 2021 using point count methods. A summary of protocols used can be found in Appendix C.

A total of thirty-nine (39) species were observed on the subject property. All species observed are listed as secure (S5) or apparently secure (S4) in the province of Ontario, with the exception of three introduced (SNA) species (House Finch, Rock Pigeon and European Starling). For the full list of species identified on the property, see Appendix D.

The global and provincial status ranking of each species according to NHIC was determined, and status listing under SARO was also noted. Three species identified as Species at Risk were observed during field surveys. Barn Swallow, Eastern Wood-Pewee and Wood Thrush were observed calling on the subject property. Both Eastern Wood-Pewee and Wood Thrush are

designated as Special Concern (SC) and Barn Swallow is designated as threatened (TH) in Ontario (see Table 2).

Table 3: Summary of the Species at Risk observed within the study area and their current provincial status.

Common Name	***Scientific Name***	**SARO Status**
Barn Swallow	*Hirundo rustica*	Threatened
Wood Thrush	*Hylocichla mustelina*	Special Concern
Eastern Wood-Pewee	*Contopus virens*	Special Concern

Barn Swallow and Wood Thrush are also listed as Threatened under federal legislation, however, protections under SARA legislation apply only to federal lands and assessment of significance will reflect Provincial designations. The Provincial Endangered Species Act offers immediate protection from harm and harassment for species designated as threatened or endangered. However, the Natural Environment policies of the Regional Official Plan classifies habitat of species of special concern as ECA.

4.2.6 Mammalian Monitoring

Incidental observations were made during all field visits to identify mammalian species present in the study area. Incidental observations included visual encounters and other signs such as animal tracks, scat, and presence of bones or carcasses. Deer tracks were the only mammalian sign observed during field studies.

Snag surveys were also carried out to identify potential habitat for SAR bats and to determine the need to carry out acoustic monitoring within the study area. The leaf-off snag survey was completed on April 6, 2021 in the woodlot to identify potential bat roost habitat. A snag is defined by the MNRF as any standing, live or dead tree with a DBH >10cm, and which has cracks, crevices, hollows, cavities, and/or loose or naturally exfoliating bark.

Two acoustic monitors were installed, one along the driveway and one in the wetland, on June 2, 2021, in response to the presence of standing snags and the presence of suitable roosting habitat for SAR bats. Bat activity was monitored every night for two weeks between the hours of 8:00pm and 1:00am.

Acoustic monitoring data was analyzed using two software programs. Using the auto-ID feature, manual vetting of files, and statistical analyses in both Sonobat and Kaleidoscope Pro, two species of bats were confirmed within the study area: Big Brown Bat (*Eptesicus fuscus*) and Eastern Red Bat (*Lasiurus borealis*). Results are summarized in Appendix D.

Eastern Red Bat is a migratory species, which spends the summer in Ontario, roosting in trees in open areas near lakes and ponds, then migrating south for the winter. Big Brown Bat is the only resident species identified in the study area. It has a high tolerance for different environmental conditions and will often dwell in buildings in urban settings (batwatch.ca). Both species of bats identified on the site are listed as apparently secure (S4) provincially according to NHIC status rankings.

A summary of mammalian species identified in the study area during field investigations is provided in Table 3, below.

Table 3: Summary of the mammalian species observed in the study area and their current provincial rank.

Common Name	***Scientific Name***	**S-Rank**
White-tailed Deer	*Odocoileus virginianus*	S5
Monarch	*Danaus plexippus*	S2S4
Big Brown Bat	*Eptesicus fuscus*	S4
Eastern Red Bat	*Lasiurus borealis*	S4

4.2.7 Significant Wildlife Habitat

The Significant Wildlife Habitat Technical Guide (MNRF, 2010) provides general information on the identification and assessment of Significant Wildlife Habitat (SWH). The Significant Wildlife Habitat Criteria Schedules for Ecoregion 7E (MNRF, 2015) provides guidance on identifying candidate SWH within a study area and the criteria which must be met in order to confirm the presence of SWH. Information regarding suitable field studies and timing windows are also provided.

SWH can be classified into four different categories: Seasonal Concentration Areas, Rare Vegetation Communities or Specialized Habitat for Wildlife, Habitat of Species of Conservation Concern, and Animal Movement Corridors.

Presence or absence of the candidate SWH was determined through completion of the required field studies as identified in the EIS scoping. The studies and/or assessments were carried out only in areas where suitable habitat existed. The Candidate SWH identified in the EIS scoping is provided in Appendix B.

Results of the ELC evaluations, Species at Risk snake surveys, breeding bird surveys, bat monitoring, anuran call surveys, and area searches completed during 2021 were reviewed to confirm the presence or absence of candidate SWH in the study area. Survey results were assessed against the current SWH Criteria Schedules for EcoRegion 7E (2015). SWH for Special Concern and Rare Wildlife Species was confirmed, as detailed in Section 5.5 of this report. No other SWH was identified on the subject property.

4.2.8 Headwater Drainage Feature Assessment

In accordance with feedback from the NPCA regarding the Terms of Reference, and evaluation of the watercourse on the subject property was completed in accordance with the Evaluation, Classification and Management of Headwater Drainage Features Guidelines (TRCA&CVC, 2014).

The Guidelines define headwater drainage features (HDF) as "*non-permanently flowing drainage features that may not have defined bed or banks; they are first-order and zero-order intermittent and ephemeral channels, swales and connected headwater wetlands"*. The PSW on the subject property is an isolated pocket of wetland which has resulted from changes in site topography, but

it is connected to the Ellsworth Drain downstream via a small swale. The wetland and the small swale associated are therefore evaluated together as an HDF. While the catchment for HDFs is typically a minimum of 2.5 hectares, the catchment for the wetland in this case is less than 2 hectares. However, given the significance of the wetland feature (PSW), an assessment has been completed to classify the HDF and determine the management direction.

The PSW holds water into the summer months and the swale conveys any overflow from the wetland to the Ellsworth Drain. However, flow in the swale was considered ephemeral, carrying surface overflow from the wetland following snow melt and rain events only and surface flow was defined as minimal. The PSW provides amphibian breeding habitat, but the swale does not provide habitat for amphibians or fish, because it is very shallow and does not have sufficient standing water in the channel to provide refuge or breeding habitat.

The riparian habitat along the swale transitions from scrubland in the upstream portion to meadow before it outlets into Ellsworth Drain. The HDF classification is detailed below.

5 ASSESSMENT OF NATURAL FEATURES AND FUNCTIONS

The following analysis pertains to the Policy 2.1 of the Provincial Policy Statement (PPS), which aims to protect natural heritage features and areas for the long term. Only those natural heritage features relevant to this study have been summarized.

The Natural Heritage Information Centre (NHIC, 2020) and the COSEWIC database (December 2019) were consulted to provide verification of any Provincially significant plant, bird, mammalian, or herpetofauna species. Regional significance of vascular plants was verified through review of the Checklist of the Vascular Plants of Niagara Regional Municipality, Ontario (Oldham, 2017).

5.1 Environmental Protection Areas

In the Municipal Official Plan, the Township of Wainfleet has designated the Provincially Significant Wetland (PSW) as Environmental Protection Area (EPAs). The PSW is designated by the Ministry of Natural Resources and Forestry (MNRF) and is regulated by the Niagara Provincial Authority (NPCA). The PSW is also identified as a HDF in accordance with the Evaluation, Classification and Management of Headwater Drainage Features Guidelines (TRCA & CVC, 2014) because it is connected to the downstream Important Fish habitat associated with Ellsworth Drain via a small swale.

Policy 3.2.1.1 of the Township of Wainfleet Official plan states that EPAs include PSWs, Provincially Significant ANSIs, and habitat of endangered and threatened species. Per Policy 3.2.1.4, development and site alteration are not permitted within EP designated land. There are no other designated EPAs at the Municipal or Regional level within the study area.

The PSW on the property satisfies criteria in Regional policy 7.B.1.3 for designation as an EPA. Although the current Regional Core Natural Heritage Mapping does not reflect these conditions,

the area identified and verified in the field as PSW is considered a Regional EPA and assessment of constraints to development will reflect this designation.

5.2 Environmental Conservation Areas

The Region and the Township of Wainfleet assigns Environmental Conservation Area (ECA) designation to significant woodlands, Significant Wildlife Habitat (SWH), habitat of species of concern, Regionally Significant ANSIs, Locally Significant Wetlands (LSWs), significant valleylands, tall grass prairies, savannahs, alvars, and publicly owned conservation lands.

The woodland on the property has been assessed as Significant at the Regional and Municipal level because it satisfies two of the criteria for significance outlined in Policy 7.B.1.5 of the Regional OP and Policy 3.2.2.4 of the Municipal Plan. It is identified as an ECA Significant Woodland because it overlaps with the Marshville Station Clay Plain PSW on the property and provides potential nesting and foraging habitat for Wood Thrush and Eastern Wood-pewee, which are both listed as Special Concern under SARO.

The Regional Core Natural Heritage map and Municipal Schedule B5 have not identified the Woodlands as a designated feature, but in accordance with the findings of this EIS, mapping should be updated to reflect designation as ECA Significant Woodland.

According to Policy 3.2.2.5 of the Municipal Official Plan and Policy 7.B.1.11 of the Regional Plan development is permitted within ECA if it has been demonstrated that there will be no negative impact to the Natural Heritage Feature.

5.3 Fish Habitat

Ellsworth Drain, which traverses the southeast property boundary has been evaluated by the MNRF for fish habitat. It is part of the upper tributaries of Big Forks Creek and has been assessed as Type 2 Important Fish Habitat by the MNRF. Characteristics of Type 2 Important Fish Habitat include feeding areas for adult fish and unspecialized spawning habitat.

Important Fish Habitat is less sensitive than Type 1 Critical fish habitat and requires a moderate level of protection. A minimum 15m naturally vegetated buffer must be maintained from the top of bank along Type 2 important Fish Habitat, in accordance with the Township of Wainfleet Official Plan Policy 3.2.3.3 and 7.B.1.15 of the Regional Official Plan. Reductions in setback may be permitted pending findings of an EIS. However, watercourses are regulated by the NPCA and Policy 9.2.5.1 of the NPCA Policy Document requires a minimum 10m setback from Type 2 Important Fish Habitat.

5.4 Headwater Drainage Feature

In accordance with correspondence from the NPCA, an assessment of the headwater drainage feature associated with the Ellsworth Drain in the southwest portion of the property was assessed under the *Evaluation, Classification and Management of Headwater Drainage Features Guidelines* (TRCA & CVC, 2014).

The following summarizes the classification of the channel and the management recommendation based on the features associated with the channel. The assessment includes classification of hydrological functions, riparian habitat, fish and fish habitat, and terrestrial habitat associated with the headwater feature.

Hydrology

The hydrology of the HDF has been assessed as providing contributing functions. The channel provides minimal flow following rain events but is dry most of the year as evidenced by the poorly formed banks and vegetation growth within the channel. The channel primarily contributes flow and allocthonous material to the downstream reaches of Ellsworth Drain.

Riparian habitat

The riparian habitat was assessed as providing important function because most of the channel and the upstream wetland are surrounding by scrubland habitat on either side. The downstream portion of the swale, closest to the Ellsworth Drain has a riparian habitat composed of meadow habitat, but the riparian classification falls to the higher functioning habitat.

Fish and Fish Habitat

According to the guidelines, fish and fish habitat only require classification when there is a proposed alteration (either positive or negative) to the HDF. No alterations to the channel are proposed. However, based on the existing conditions and lack of standing water in the swale, the HDF is classified as contributing function. There is no direct habitat for fish within the channel, but transport of nutrients to downstream reaches provides indirect functionality.

Terrestrial Habitat

The terrestrial habitat has been classified as important primarily due to the presence of the wetland with amphibian breeding habitat. Four species of amphibians were documented during anuran call surveys, and all were observed calling from the PSW.

Figure 2 in the *Evaluation, Classification and Management of Headwater Drainage Features Guidelines* (TRCA & CVC, 2014) provides guidance on management option for HDFs, and recommendations based on the function of the feature. Based on the above classifications, the HDF associated with Ellsworth drain on the subject property provides connectivity between the PSW and downstream fish habitat, providing important terrestrial habitat and other contributing functions associated with hydrology and fish habitat. The recommendation based on these functions is that the HDF be protected and/or enhanced to maintain hydroperiod and available habitat.

5.5 Species at Risk

5.5.1 Endangered or Threatened Species

One Species at Risk (SAR) was documented within the study area during 2021 field investigations. The Barn Swallow, observed during Breeding Bird Surveys, is designated

as Threatened in the Province of Ontario (SARO, 2018) and is regulated under the Endangered Species Act (ESA, 2007).

Barn Swallows, which build their nests almost exclusively on manmade structures, were observed foraging on the subject property. There is one rundown building on the subject property and other residential and agricultural buildings surrounding the property which provide potential nesting habitat for the species. No nests were observed on or in the vicinity of the study area.

The nests of Barn Swallows are considered Category 1 habitat and are protected under the ESA, Section 10, Subsection (1)(a). Land within 5m of the nest is considered Category 2 and is considered to have moderate tolerance to disturbance. Land within 5 – 200 m of nests is considered Category 3 habitat, being used for various life processes such as rearing, feeding and resting. Category 3 habitat is considered highly tolerant of site alteration.

Nests located within proposed development zones can be removed in accordance with Ontario Regulation 242/08 made under the ESA provided all requirements listed under the Regulation are adhered to.

5.5.2 Special Concern Species

Three species of Special Concern were documented in the study area: Eastern Wood Pewee, Wood Thrush and Monarch. Although species of Special Concern do not receive habitat protection under the Provincial ESA, they are protected Regional Policy 7.B.1.4 as habitat of Species of Concern is identified as ECA. The full extent of the habitat of the Special Concern Species must be given consideration in the assessment of the function of a natural heritage feature. A discussion of each species is provided below.

5.4.2.1 Eastern Wood-Pewee

Eastern Wood-Pewee was observed using the woodlot during Breeding Bird Surveys and was heard calling during other site visits throughout the breeding period. It is an aerial insectivore that prefers intermediate to mature woodlands with closed canopies. It has been found in forests dominated by Sugar Maple, Elms, and Oaks. Eastern Wood-Pewee will select sites that are more open with fewer trees for nesting to optimize foraging.

The woodlots throughout the property exhibit a high degree of historical disturbance, but the gaps in the canopy and edge type habitat that has resulted from the disturbance provides suitable foraging habitat for Eastern Wood-pewee.

5.4.2.2 Wood Thrush

The Wood Thrush is an area-sensitive, forest obligate species, which prefers intermediate to mature forests with vertical stratification. Area-sensitive species are those which either require large areas of suitable habitat for breeding, or breed in higher densities in larger areas. These species generally will not breed in what appears to be suitable habitat if it is not part of a much larger natural area, irrespective of the size of their home ranges. However, Wood Thrush is tolerant of forest fragmentation, provided fragments are clustered within 5km for dispersal. Wood thrush was observed in the woodlot during Breeding Bird Surveys.

The presence of Eastern Wood-Pewee, Wood Thrush, Red-eyed Vireo, White-breasted Nuthatch, and Rose-breasted Grosbeak indicate deep woodlands with interior at least 100m from edge. The woodland on the property is not characteristic of deep woods, as it is approximately 0.5 hectares in area. However, the presence of these species onsite suggests that the property is linked with other woodlots in the landscape, forming a network and thus providing foraging habitat.

South of the subject property, large tracts of the Big Forks Creek Headwaters Wetland Complex are located approximately 650m from the subject property while a large network of the Marshville Station Clay Plain PSW continues north of the subject property along tributaries of Big Forks Creek.

5.4.2.3 Monarch Butterfly

Monarchs are a migratory species, flying south across Lake Erie and Lake Ontario. The annual migration begins in August and continues until mid-October.

Monarch habitat can be found where Milkweed and Wildflowers exist, including on agricultural land, roadside ditches, wooded areas, or any other open space. The Monarch feeds on the nectar from wildflowers and lays its eggs on Milkweed. Milkweed is common in the Niagara Region and was identified throughout the meadow community on the southern boundary of the subject property.

A few Monarchs and one caterpillar were observed in the south meadow area of the subject property, but no butterfly stopover SWH was observed.

5.6 Significant Wildlife Habitat

The Significant Wildlife Habitat Technical Guide (SWHTG), developed by the Ministry of Natural Resources, provides detailed information on the identification, description, and prioritization of Significant Wildlife Habitat (SWH) in accordance with Section 2.3 of the Provincial Policy Statement. It is intended to assist those involved in planning and review process to identify and protect SWH. There are four broad categories of SWH: seasonal concentration areas, rare or specialized habitat, habitat of species of conservation concern, and animal movement corridors.

5.6.1 Seasonal Concentration Areas

Candidate Seasonal Concentration Areas on or in the vicinity of the subject property, as identified in the Terms of Reference included bat maternity colonies, reptile hibernaculum, and colonially-nesting bird breeding habitat (tree/shrub).

Field studies revealed that the subject property did not meet the criteria for any of the above mentioned SWH due to the low snag density, absence of congregations of snakes, and a lack of indicator species for colonially-nesting bird habitat.

The surveys for the candidate SWH were completed in all areas where suitable habitat existed according to the protocols outlined in Appendix C and approved by the Region of Niagara.

5.6.2 Rare or Specialized Habitat

The NHIC list of plant communities was reviewed to determine the status of all communities identified through the ELC classification system for the study area. No rare vegetation communities were identified in the study area as SWH as all except the deciduous swamp with identified as cultural communities.

Other candidate Specialized Habitat for Wildlife within the study area as identified in the SWH screening included Amphibian Woodland Breeding Habitat, Amphibian Wetland Breeding Habitat and Turtle Nesting Areas. No Rare or Specialized Habitat were confirmed on the subject property based on the results of the Marsh Monitoring anuran call surveys and area searches to locate turtle nesting habitat.

5.6.3 Habitat of Species of Conservation Concern

The SWH screening identified candidate Marsh Breeding Bird and Candidate Special Concern and Rare Wildlife species habitat in the study area.

The Provincial ranking of all species on the subject property was reviewed using the NHIC database to determine their status in Ontario and confirm the presence or absence of habitat for Special Concern and Rare Wildlife Species. Three Special Concern Species were identified on the subject property. Eastern Wood-Pewee, Wood Thrush, and Monarch were observed using the site. A description of their respective habitats can be found in Section 5.4 above. Figure 5 outlines the area being used by the avian species, which has been designated as SWH.

Assessment of the wetland habitat available on the site and results of breeding bird surveys indicated that the property is not suitable for most of the indicator species for marsh breeding bird habitat. It is noted that Green Heron was observed on the subject property, but it was not nesting within the study area. Therefore, no Marsh Breeding Bird SWH was confirmed in the study area. No other Species of Conservation Concern SWH were observed during field studies.

5.6.4 Animal Movement Corridors

Animal movement corridors are naturally vegetated parts of the landscape which facilitate dispersal from one habitat to another. Amphibian movement corridors are identified as corridors between their summer terrestrial and breeding habitat, and they should be determined when Amphibian Breeding SWH is confirmed through field studies.

No Amphibian breeding SWH was identified on the subject property, therefore, no Animal Movement Corridor SWH was confirmed.

5.7 Corridors and Linkages

Corridors are naturally vegetated parts of the landscape which are often elongated and allow for dispersal from one habitat to another. Corridors can exist along shorelines, riparian zones, woodlands, or manmade structures such as abandoned roads or rail allowances. Policy 2.1.2 of the Provincial Policy Statement recognizes the significance of corridors, stating that connectivity should be maintained, restored, or enhanced where possible.

The Region of Niagara Core Natural Heritage Map identifies potential corridors throughout the landscape. The Core Natural Heritage Mapping has not identified any potential corridors on or adjacent to the subject property.

The woodland does not provide any direct connectivity to other features in the landscape, as the property is surrounded by agricultural lands. However, as noted by the presence of area-sensitive species, it may be providing some function as a stepping-stone feature in the landscape.

5.8 Summary

The following provides a summary of the natural heritage features identified on the subject property.

- **Significant Woodlands**: The woodland within the study area has not been designated as ECA but meets the criteria for significance and designation as ECA at the Regional and Municipal level because it contains PSW and species of special concern.
- **Provincially Significant Wetlands**: The Marshville Station Clay Plain PSW is designated as EPA at the Municipal level and meets Regional criteria for EPA designation.
- **Fish Habitat**: Ellsworth Drain, which traverses the southeast property boundary contains Type 2 Important Fish habitat as classified by the MNRF. The wetland and small swale have been classified as a headwater drainage feature which provides some important functions. Management recommendations based TRCA/CVC guidelines is to protect the feature.
- **Species at Risk**: General habitat for the Threatened Barn Swallow and Special Concern Eastern Wood-Pewee, Wood Thrush, and Monarch was identified within woodland and meadow on the subject property.
- **Significant Wildlife Habitat**: Species of Special Concern SWH was confirmed on the property. Eastern Wood-Pewee and Wood Thrush general habitat located in the woodland area.
- **Corridor**: No Regional movement corridors identified on or adjacent to the property. Property does not provide direct connectivity to other features but supports a ‘stepping-stone’ type feature in the landscape.

6 CONSTRAINTS ANALYSIS

6.1 Development Constraints

The southern natural area on the subject property contains Provincially Significant Wetland (PSW) and Significant Woodlot. The presence of the PSW presents the highest level of constraint to development on the subject property. Regional Policy 7.B.1.10 and Township of Wainfleet Official Plan policy 3.2.1.4 prohibit development within Environmental Protection Areas (EPAs) and both policy documents define PSWs as EPAs. Pursuant to Regional Policy 7.B.1.11, development adjacent to the PSW will be subject to the findings of an Environmental Impact Study (EIS).

All wetlands in Niagara are regulated by the Niagara Peninsula Conservation Authority (NPCA) under Ontario Regulation 155/06. Development and site alteration within a wetland are not permitted unless otherwise stated under NPCA Policy 8.2.2 *Development and Interference within a Wetland*. A minimum 30m setback from the wetland boundary is required in accordance with NPCA Policy 8.2.3.1 *Development within 30 metres of a Wetland*. However, a reduced buffer may be considered based on criteria listed under Policy 8.2.3.5(c). A reduction in buffer size, to a minimum of 15m, will be considered based on the proposed development and the existing condition of the buffer zone.

Pursuant to NPCA Policy 8.2.3.4, lot creation may be permitted between 15m and 30m of the wetland if there will be no negative impact on the hydrological or ecological function of the wetland. Other permitted uses within the 30m wetland buffer include restoration work, passive recreational uses, and accessory buildings subject to NPCA Policy 8.2.3.3. However, notwithstanding 8.2.3.3, no type of alteration is permitted within 5m of the wetland.

In addition to the wetland, the Headwater Drainage Feature (HDF) was classified in accordance with the *Evaluation, Classification and Management of Headwater Drainage Features Guidelines* (TRCA & CVC, 2014) and the management recommendations based on field assessment of the feature was protection of the feature. The HDF does not provide important fish habitat, but general buffer requirement for watercourses providing marginal *or* important fish habitat is a 10m setback according to NPCA Policy 9.2.5.1. This may be reduced to a minimum 5m setback pursuant to considerations of NPCA Policy 9.2.5.2.

Downstream of the HDF, a portion of Ellsworth Drain traverses the southeast boundary of the study area. The drain is designated as Type 2 Important Fish Habitat (MNRF) and is regulated by the NPCA. Pursuant to NPCA Policy 9.2.5.1, as stated above, a minimum 10m natural buffer must be maintained for Type 2 Fish Habitat.

The PSW and watercourse setbacks represent areas of high constraint to development, with a minimum setback of 15m from the wetland and 10m from the watercourse. Site alteration must not occur within areas identified as high constraint.

The woodland on the subject property was described as ECA Significant Woodland and is subject to Regional Policy 7B.1.11 and Municipal Official Plan Policy 3.2.2.5. Development and

site alteration is permitted with ECA Significant Woodlands if an EIS demonstrates that there will be no significant negative impact to the feature or it ecological functions.

The woodland and the portion of the PSW setback (between 15 and 30m) have been identified as areas of moderate constraint to development. Development should avoid areas of moderate constraint where possible, but development and site alteration may be permitted in these areas if there is no significant impact to the features or their functions. In the case of the Significant Woodlands, there should not be loss in function of SWH, and spatial change in the feature should not exceed 20%.

The woodland provides SWH for Special concern species of birds, including Wood Thrush and Eastern Wood-pewee, providing foraging habitat within the landscape. The total size of the woodland is approximately 1.5 hectares.

The smaller pocket of woodland along the northern boundary of the study area is very small and surrounding by agriculture or recently cleared lands. The Special Concern species were not observed within this small, isolated woodland, which is only 0.3 hectares in size. This woodland pocket has a high degree of disturbance and is not classified as part of the ECA Significant Woodland. However, the Township of Wainfleet does not have a woodland by-law, and it is therefore subject to the Regional Woodland Conservation By-law No. 2020-79. Development that interferes with this woodland need not meet the test of no significant impact, but a Tree Preservation Plan is required to be completed prior to development.

6.2 Areas of No Constraint

The agricultural field in the northwest portion the study area does not contain any natural heritage features and does not present constraints to development. This portion of the property has been actively farmed for over eighty years. Outside of the woodland, the property contains cultural meadow habitat. The meadow provides some habitat for Monarch and other pollinators because it has Milkweed and wildflowers. However, the species present including Milkweed are typical of disturbed areas such as roadside habitats. The cultural meadow habitat has been identified as a low constraint area, but assessment of impacts will take into consideration impacts to fauna that rely on this habitat including the Special Concern Monarch.

See Figure 6 below for map of the constraints associated with the subject property.

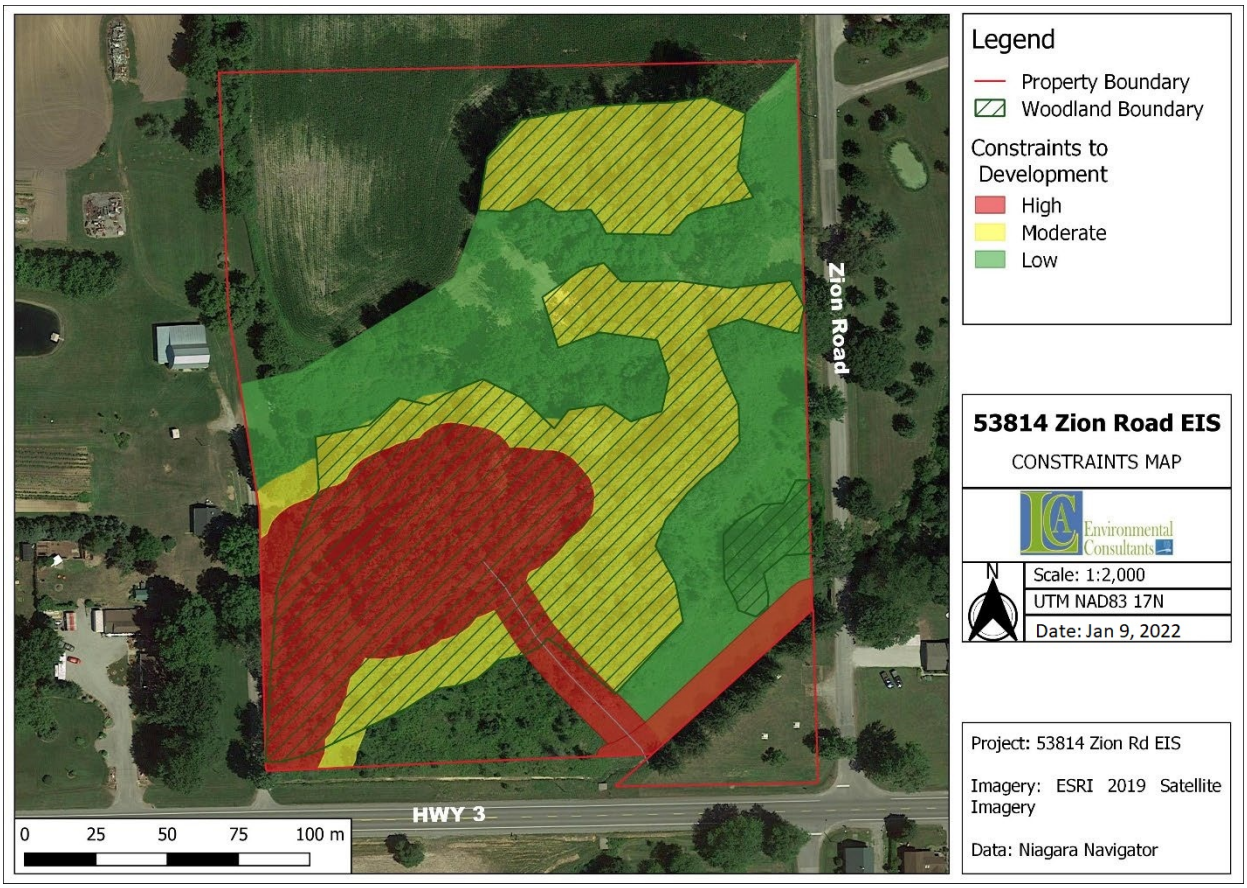


Figure 5: Constraints associated with the subject property.

6.3 Enhancement Opportunities

The small woodland pocket on the northern boundary of the study represents a highly disturbed area with piles of fill and many non-native species present throughout. Additionally, there is a large patch of the invasive Common Reed *(Phragmites australis)* on the east side of the non-significant woodland. Careful removal of Phragmites will help to prevent spread and establishment within the PSW on the property and Fish habitat associated with Ellsworth Drain. Common Reed forms very dense colonies and has the potential to significantly alter habitat within the PSW and its buffer.

A portion of the southern edge of the property is excluded from development potential due to the constraints associated with the HDF and is currently classified as cultural meadow habitat. There may be opportunities to enhance this area through native plantings which could improve the function of the PSW buffer and edge habitat. There are other opportunities to enhance the wetland buffer and woodland edge habitat with native plantings throughout the subject property, especially if the proposed development will impact the existing woodland edge.

7 ECOLOGICAL IMPACT ASSESSMENT

7.1 Description of Proposed Development

The proposed development for the subject property includes severance of the existing property for the creation of five additional rural residential building lots, for a total of six lots. All six lots front onto Zion Road with a minimum frontage of 27.08m.

Lots 1 through 4 will all be approximately 1.35 hectares and lots 5 and 6 will be approximately 1.5 acres and 2.3 acres, respectively. The proposed lot lines of Lot 5 and 6 do not interfere with the PSW but follow the 15m buffer, excluding the PSW and the 15m setback from the residential properties.

Single-family homes will be constructed on each of the proposed lots as well as a private sanitary system to manage waste from the property. All septic bed footprints are located outside of the 30m wetland buffer in accordance with NPCA Policy 8.2.3.5.

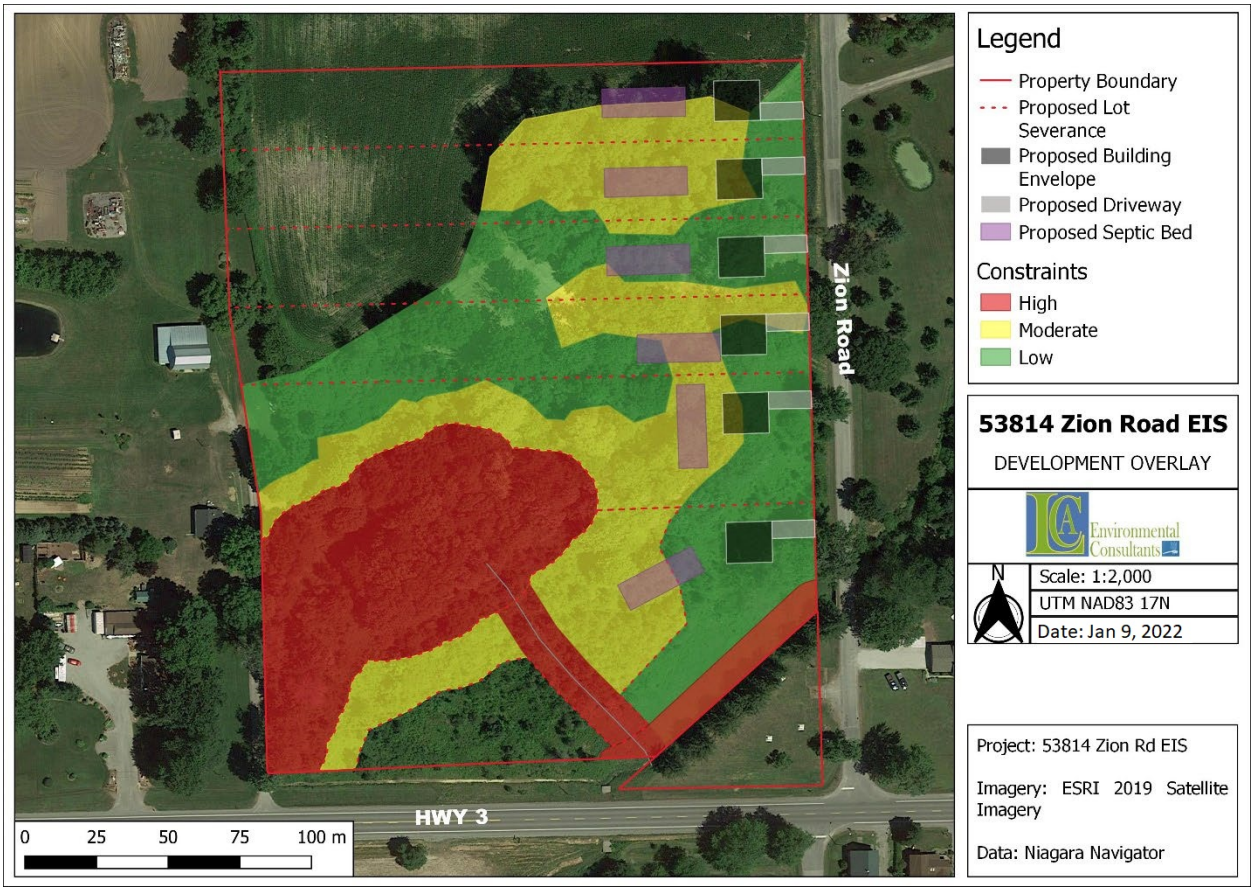


Figure 6: The proposed development for 53814 Zion Road, showing proposed lot lines and building envelopes (map included in Appendix A).

7.2 Potential Impacts to Natural Heritage Features

7.2.1 Potential Impacts

The proposed lot lines are located outside of the PSW and maintain a minimum 15m buffer. All proposed building envelopes and septic bed footprints are also located outside of the 30m PSW buffer in accordance with NPCA Policy Section 8.2.3. The proposed lot lines traverse the ECA Significant Woodland and portions of the proposed development footprints are also located within the woodland boundary.

While direct impacts to natural heritage features are not expected from the location of the proposed lot severance, indirect impacts may result from site occupancy including dumping within the woodland boundary, or future removal of dead or damaged trees in accordance with the Regional Woodland Conservation By-law No. 2020-79. The PSW and 15m buffer are located outside of the proposed residential lots, which will reduce the potential for disturbance and prevent construction of accessory buildings within the 15m buffer in the future.

The construction of six new single-family dwellings on the subject property will result in the removal of approximately 0.15 hectares of ECA Significant Woodland which is approximately 10% of the overall woodland area. However, the portions of the woodland which will be removed to accommodate the building envelopes and septic beds are located at the edge of the habitat, where quality of the woodland is depleted.

Based on the existing site topography, development of Lots 1 through 4 are not expected to have any impacts to the hydrology of the PSW or the adjacent watercourse. However, alterations to the surface drainage of lots 5 and 6, which both border the PSW buffer, may have minor impacts on the quantity and/or quality of surface and groundwater contributions to the PSW and/or the Type 2 Fish habitat associated with Ellsworth Drain.

During the construction stage, there is potential for interference with breeding birds and their nests through vegetation removal and increased noise. Additionally, construction on erodible soil, such as the sandy soils associated with the subject property can increase potential for sediment loading into the PSW and the watercourses through the duration of the construction phase.

7.2.2 Proposed Mitigation

In order to minimize the impacts associated with the proposed development, mitigation is required to ensure retained function of the PSW and its buffer as well as the function of the woodland.

Prior to construction, a Tree Preservation Plan (TPP) should be prepared and approved by the Region to identify trees which can be protected based on the proposed site grading plan. The TPP should identify and assess the trees within the area of disturbance and provide recommendations to protect high quality trees where possible. Protection measures and recommendations of the TPP should be established prior to any removal of vegetation.

To avoid potential impacts to breeding birds and other wildlife, tree and vegetation removal should be completed outside of the breeding period (April 15 – September 15).

To ensure no changes to the hydroperiod of the wetland, site grading plans for lots 5 and 6 should maintain sheet overflow to the wetland. The sandy soils will allow for some infiltration to occur which will contribute to recharge of groundwater resources. However, the overall catchment for the wetland is small, and significant changes to the hydroperiod are not expected.

Throughout the duration of the construction phase, sediment and erosion control fencing should be installed and properly maintained along the boundary of the 30m wetland buffer and the southern limit of disturbance to prevent excess sediment from entering the wetland and the Important Fish Habitat associated with Ellsworth Drain. This fencing will also delineate limit of work in the field and remain in place until completion of construction on Lots 5 and 6 and re-establishment of vegetation.

Following construction, further changes to the woodland and 30m PSW buffer should be avoided, and yard maintenance should be limited to the extent of the septic bed. Where the existing woodland edge has been disturbed to accommodate the development, a forest edge management plan can be developed where feasible. The TPP should identify areas where the disturbed woodland edge would benefit from a forest edge management plan that recommends native plantings and/or monitoring.

7.3 Residual Impacts and Policy Compliance

The potential impacts of development and recommended mitigation measures to offset those impacts were identified with the goal of minimizing residual impacts to the natural features on and adjacent to the subject property. The following summarizes the anticipated residual impacts on the natural features:

- **Regionally Significant Woodlands** – A 10% reduction in size of ECA Significant Woodlands is expected.
- **Provincially Significant Wetlands –** Minimum 15m buffer retained outside of proposed lots. Hydroperiod maintained through site grading. No negative residual impacts expected.
- **Wildlife Habitat** - No significant negative impacts expected. Loss of woodland habitat limited to low quality edge habitat with potential to create an edge management plan where necessary. Foraging habitat for Special Concern birds to be maintained.
- **Wildlife Corridor** – No corridor identified. No negative residual impacts expected.
- **Flora and Fauna** - No loss of significant species; no residual negative impacts expected.

The information gathered through background review and field investigations was assessed against current policies to ensure compliance with Regional, Municipal, and Provincial legislation. Table 5 below provides a summary of the applicable policies identified in Section 3.0

and an assessment of compliance based on current conditions, proposed work, and recommended mitigation.

Table 5: Summary of applicable policies and analysis of compliance of the proposed construction, with consideration to proposed mitigation measures.

Policy Document	**Policy Summary**	**Compliance**
Provincial Policy Statement, 2020	**2.1.5** No development in significant wetlands, woodlands, valleylands, wildlife habitat, or ANSIs unless no negative impacts have been demonstrated	Yes – development proposed outside of PSW. No habitat for endangered or threatened species
	2.1.7 Development not permitted in habitat of endangered/threatened species	
	2.1.8 No development on lands adjacent to natural heritage features unless no negative impacts have been demonstrated.	
Endangered Species Act (2007)	**10.1** Prohibits damage or destruction to the habitat of any species listed as endangered, threatened, or extirpated under SARO.	Yes – only Barn Swallow identified on property, but no negative impacts to foraging habitat.
Migratory Bird Convention Act, 1994	**4** protect and conserve migratory birds and their nests.	Yes- vegetation removal to occur outside of breeding period.
Niagara Region Official Plan, 2014	**7.B.1.10** Development not permitted within EPAs, except: a. Forest, fish, wildlife management b. Flood or erosion control c. Passive recreational uses	Yes – development proposed outside of EPA lands. Proposed disturbance to ECA limited to edge. No significant impacts demonstrated. No impact to natural heritage corridor. Potential to enhance woodland edge pending TPP recommendations.
	7.B.1.11 Development not permitted within ECA unless no negative impact on CNH feature or adjacent land has been demonstrated.	
	7.B.1.13 development should be designed to maintain or enhance ecological functions of Potential Natural Heritage Corridors.	
NPCA Land Use Policy Document, 2018	**8.2.2.1** no development or site alteration within a wetland	Yes – development outside of wetland. Lot located outside of 15m wetland setback. No septic bed or building envelope proposed within 30m setback. Sufficient buffers to fish habitat maintained.
	8.2.3.1 no development within 30 metres of a wetland	
	8.2.3.4 Lot creation should not be permitted within 30m of wetland. May be permitted between 15 and 30m where items under 8.2.3.3 are addressed.	
	8.2.3.5 No new septic systems permitted within 30m of any wetland.	
	9.2.5.1 development and site alteration adjacent to a watercourse requires a natural buffer of 10-15m based on type of stream and habitat	

	present.	
Fish Wildlife Conservation Act, 1997	**7.1** no person shall destroy, take or possess the nest or eggs of a wild bird	Yes – vegetation removal to be completed outside of breeding periods.
Township of Wainfleet (2016)	**3.2.1.4** Development not permitted within EPAs, except: e. Forest, fish, wildlife management f. Flood or erosion control g. Passive recreational uses h. Existing agriculture	Yes – No development proposed within EPA and no negative impact to ECA Significant Woodland demonstrated. Sufficient buffer to fish habitat maintained.
	3.2.2.5 Within and adjacent to ECA, development or alteration permitted if EIS demonstrates no negative impact on feature or function.	
	3.2.3.3 Naturally vegetated buffer to be maintained along watercourse containing fish habitat. Minimum 30m for Critical habitat, and minimum 15m for important or marginal fish habitat unless EIS demonstrates narrower buffer will not harm fish or their habitat.	

8 RECOMMENDATIONS AND CONCLUSION

Field studies were completed to assess the significance of the natural features on and adjacent to the study area. Natural features on the subject property include the Marshville Station Clay Plain Significant Wetland (PSW), Regionally and Municipally EC designated Significant Woodland, and Fish habitat associated with Ellsworth Drain and the small headwater drainage feature. The features were evaluated against current natural heritage policies to determine the constraints to development on the subject property. The proposed development was assessed in relation to the constraints to identify negative impacts to the natural heritage features and significant species and mitigation measures were proposed to minimize the impacts.

Some potential impacts to the wetland have been described, including sedimentation during the construction stages and minor changes to the hydroperiod resulting from changes to site drainage patterns. However, mitigation measures have been recommended which will minimize negative impacts and maintain the wetland in its current condition.

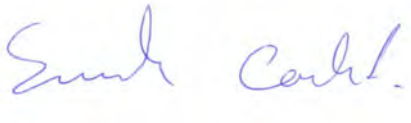
Other impacts include reduction in size of the ECA Significant Woodland by approximately 10%, representing approximately 0.15 hectares. A Tree Preservation Plan should be prepared to identify trees impacted by the proposed development as well as trees that have potential to be preserved. It is recommended that the TPP identify areas where the woodland may benefit from a forest edge management plan and/or native plantings to minimize impacts of vegetation removal. The best management practices for construction and development should be employed to mitigate negative impacts, including removal of vegetation outside of the breeding bird period (April 15 – September 15).

The findings of the EIS and evaluation of compliance with current policies supports the proposed lot severance and development of six dwellings on the property located at 53814 Zion Road in the Township of Wainfleet. Development can be completed with no negative impact to wildlife, the surrounding natural areas or the ecological function of the Significant Woodland and Provincially Significant Wetland.

We trust that the information contained in this report meets your requirements. Should you have any questions, please contact our office.

Report prepared by:

Anne McDonald, B.Sc, EPt
Project Coordinator



Savannah Cowherd, B.Eng, ERPG
Junior Ecologist

Reviewed by:

Lisa Price, M.Sc.
Project Manager

9 LITERATURE REVIEWED

Chapman, L.J. and D.F. Putman. 1984. The Physiography of Southern Ontario – Third edition. Ministry of Natural Resources.

COSEWIC. 2012. COSEWIC assessment and status report on the Eastern Wood-pewee Contopus virens in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. x + 39 pp. (www.registrelep-sararegistry.gc.ca/default_e.cfm).

Endangered Species Act (ESA), 2007, S.O. 2007, c. 6

Fish and Wildlife Conservation Act, 1997, S.O. 1997, c. 41.

iNaturalist: Observations for the Township of Wainfleet online mapping.

Lee, H.T., W.D. Bakowsky, J. Riley, J. Bowles, M. Puddister, P. Uhlig, and S. McMurray. 1998. Ecological Land Classification for southern Ontario: first approximation and its application. Ontario Ministry of Natural Resources, Southcentral Science Section, Science Department and Transfer Branch. SCSS Field Guide FG-02.

Migratory Birds Convention Act (MBCA), 1994 (S.C. 1994, c. 22).

Niagara Peninsula Conservation Authority (NPCA). 2018. NPCA Policy Document: Policies for the Administration of Ontario Regulation 155/06 and the Planning Act.

Niagara Peninsula Conservation Authority (NPCA). 2021. NPCA Watershed Explorer. ArcGIS Online.

Oldham, M.J. 2010. Checklist of the Vascular Plants of Niagara Regional Municipality Ontario. Natural Heritage Information Centre Ministry of Natural Resources. Peterborough, Ontario.

Ontario Breeding Bird Atlas (OBBA). 2021. Ontario Breeding Bird Atlas 2(2001-2005) 10km X 10km Squares.

Ontario Field Ornithologists Checklist of the Birds of Ontario. http://www.ofo.ca/site/page/view/checklist.checklist#top

Ontario Institute of Pedology. 1985. Field manual for describing soils, Third edition. Ontario Institute of Pedology, Guelph, Ontario.

Ontario Institute of Pedology. 1989. Soils of the Regional Municipality of Niagara - Volume 1 – Report No.60. Guelph, Ontario.

Ontario Ministry of Environment, Conservation, and Parks (MECP). 2019. Eastern Wood-pewee. Species Profile Page.

Ontario Ministry of Environment, Conservation, and Parks (MECP). 2019. Wood Thrush. Species Profile Page.

Ontario Ministry of Natural Resources and Forestry. Make a Map: Natural Heritage Areas. Online Tool.

Ontario Ministry of Natural Resources and Forestry (MNRF). 2014. Significant Wildlife Habitat Mitigation Support Tool. OMNRF, Peterborough, Ontario.

Ontario Ministry of Natural Resources (MNRF). 2000. Significant Wildlife Habitat Technical Guide. OMNRF, Peterborough, Ontario. Queen's Printer for Ontario. 151 pp.

Ontario Ministry of Natural Resources (MNRF). 2015. Significant Wildlife Habitat Criteria Schedules for EcoRegion 7E. OMNRF, Peterborough, Ontario.

Ontario Ministry of Natural Resources and Forestry (OMNRF). 2016. Survey Protocol for Ontario's Species at Risk Snakes. Ontario Ministry of Natural Resources and Forestry, Species Conservation Policy Branch. Peterborough, Ontario. ii + 17 pp.

Provincial Policy Statement. 2014. Province of Ontario. Issued under Section 3 of the Planning Act. Came into effect April 30, 2014.

Regional Municipality of Niagara Environmental Impact Study Guidelines v2. Approved January 2018.

Regional Municipality of Niagara. 2014. Consolidated Regional Official Plan.

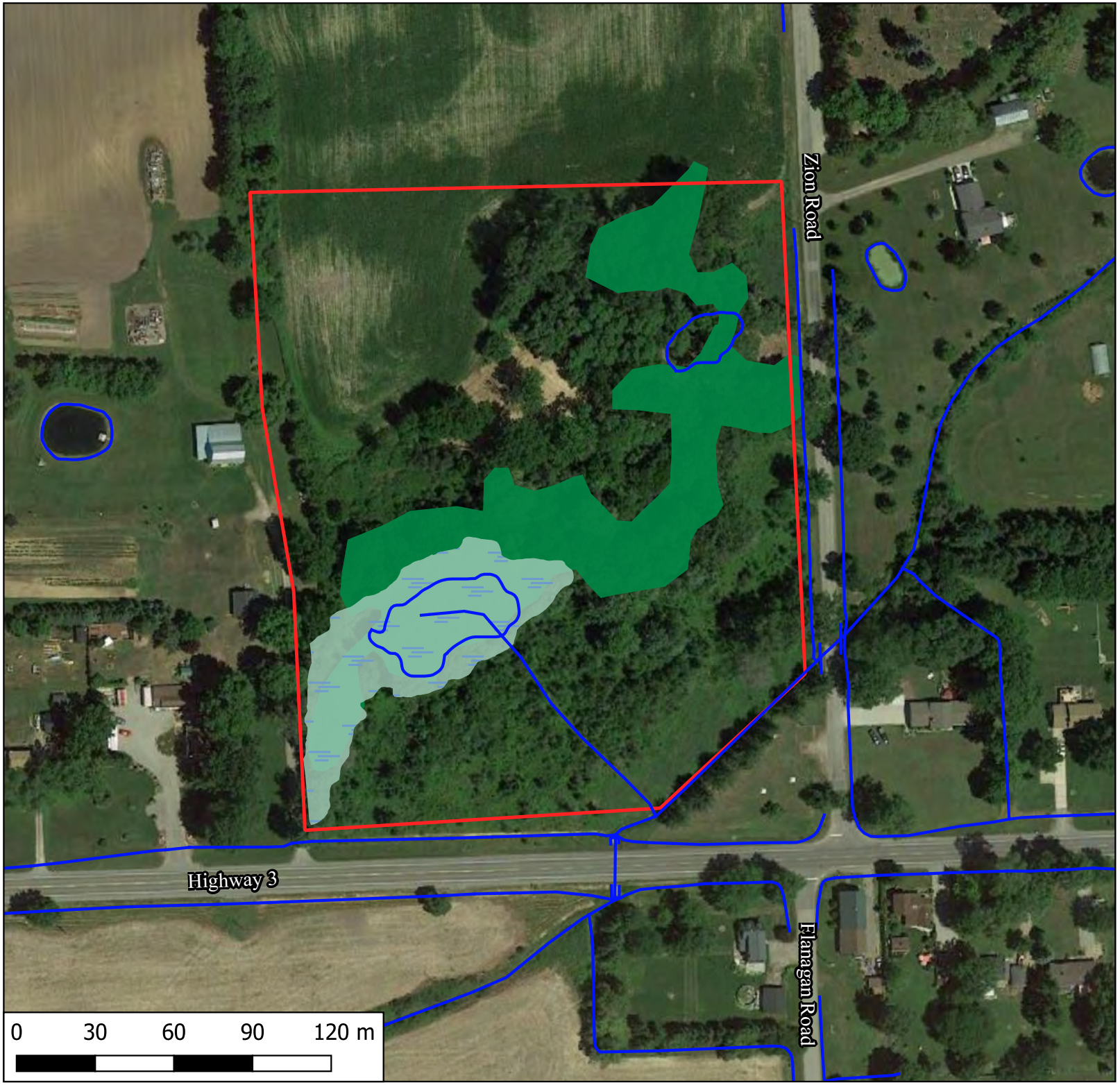
Regional Municipality of Niagara. 2021. Niagara Navigator Online application.

Species at Risk Act (SARA) (S.C. 2002, c. 29)

Township of Wainfleet. 2016. Township of Wainfleet Official Plan. Consolidated, January 2016. Prepared by Sorensen Gravely Lowes Planning Associates Inc., AgPlan Ltd., Cumming and Company, North-South Environmental Inc., and R&R Associates Inc.

Appendix A

Mapping



Legend

- Study Area
- Hamlet Boundary
- Significant Woodland
- Provincially Significant Wetland (PSW)
- Watercourse Feature

53814 Zion Road EIS

EXISTING NATURAL HERITAGE

Environmental Consultants

N

Scale: 1:2,000

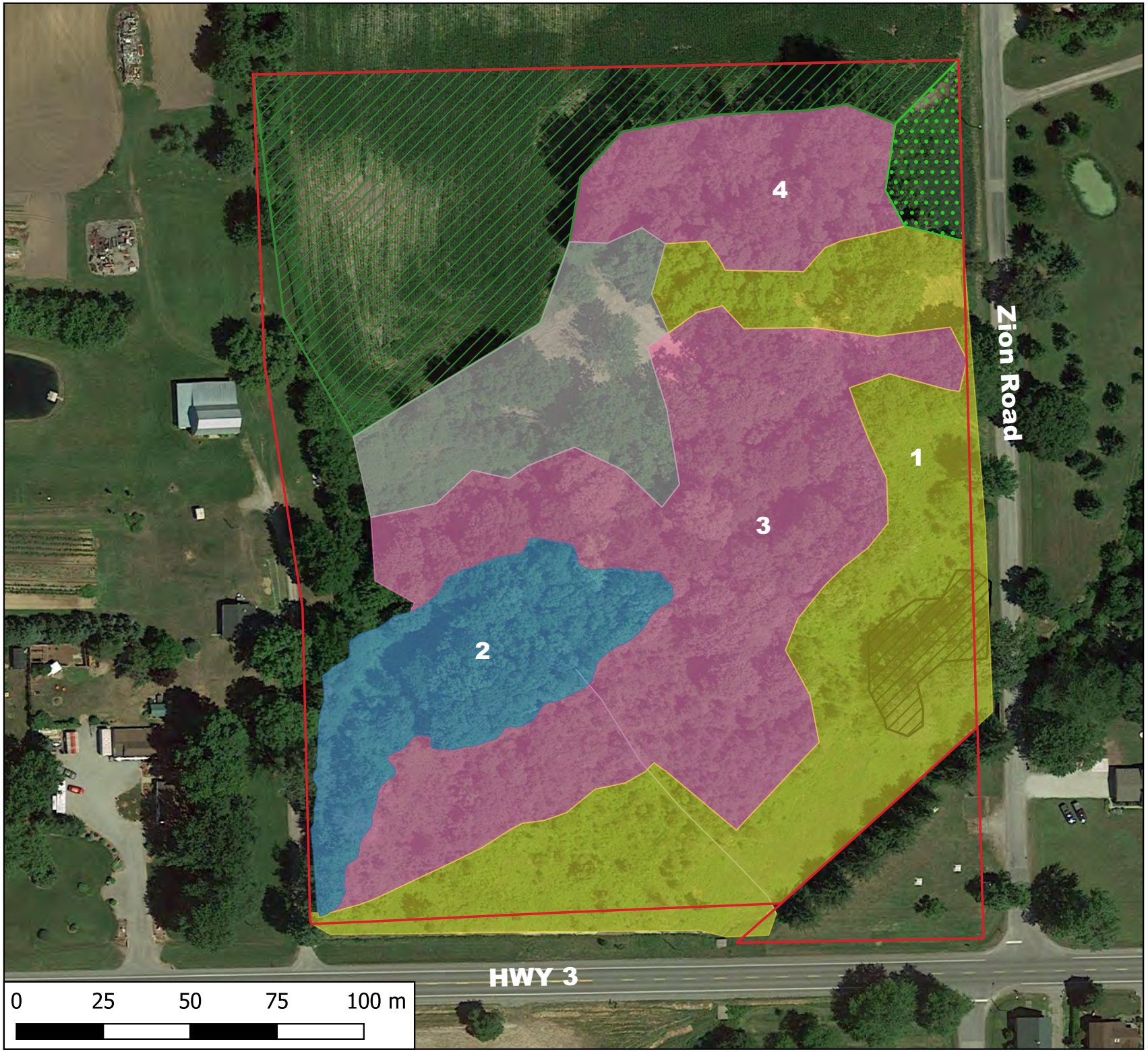
UTM NAD83 17N

Date: May 3, 2021

Project: 53814 Zion Road EIS

Imagery: Google 2018 Satellite Imagery

Data: Niagara Navigator, Ontario GeoHub & Niagara OpenData



Legend

- Property Boundary

ELC Polygons

- Fresh-Moist Mixed Meadow (MEMM4 4 incl. WOMM4)
- Swamp Maple Deciduous Swamp (SWDM3-3)
- Dry-Fresh Deciduous Woodland (WODM4)
- Active Agriculture
- Disturbed Area
- Phragmites Patch

53814 Zion Road EIS

VEGETATION COMMUNITIES

Environmental Consultants

N

Scale: 1:2,000

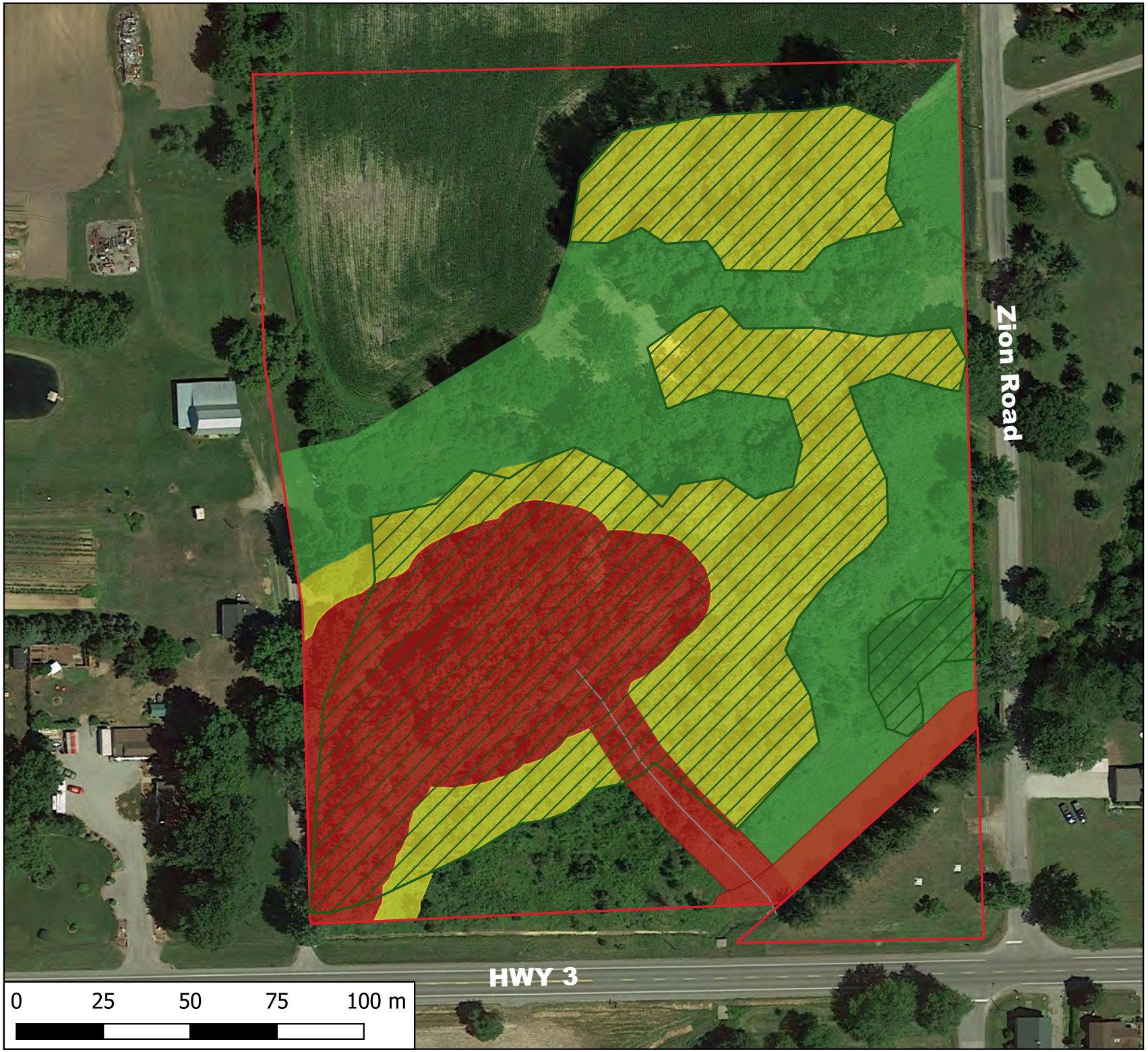
UTM NAD83 17N

Date: Jan 9, 2021

Project: 53814 Zion Rd EIS

Imagery: ESRI 2019 Satellite Imagery

Data: Niagara Navigator



Legend

- Property Boundary
- Woodland Boundary

Constraints to Development

- High
- Moderate
- Low

53814 Zion Road EIS

CONSTRAINTS MAP

Environmental Consultants

N

Scale: 1:2,000

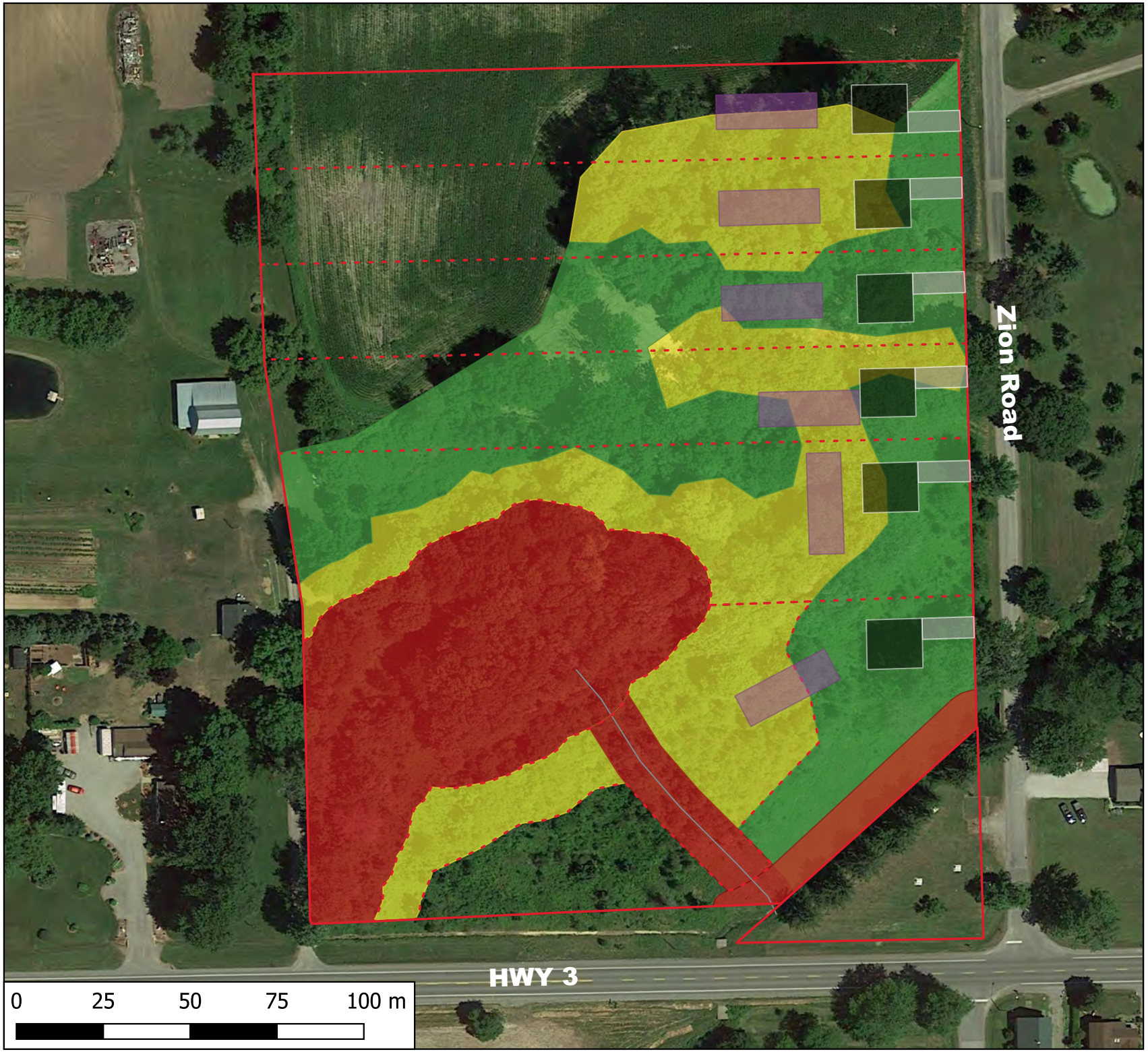
UTM NAD83 17N

Date: Jan 9, 2021

Project: 53814 Zion Rd EIS

Imagery: ESRI 2019 Satellite Imagery

Data: Niagara Navigator



Legend

- Property Boundary
- Proposed Lot Severance
- Proposed Building Envelope
- Proposed Driveway
- Proposed Septic Bed

Constraints

- High
- Moderate
- Low

53814 Zion Road EIS

DEVELOPMENT OVERLAY

Environmental Consultants

N

Scale: 1:2,000

UTM NAD83 17N

Date: Jan 9, 2021

Project: 53814 Zion Rd EIS

Imagery: ESRI 2019 Satellite Imagery

Data: Niagara Navigator

Appendix B

Agency Correspondence and EIS Scoping

April 12, 2021

Cara Lampman
Manager, Environmental Planning
Region of Niagara
1815 Sir Isaac Brock Way
P.O. Box 1042
Thorold, ON L2V 4T7

Dear Ms. Lampman,

Re: Environmental Impact Study Terms of Reference
53814 Zion Road, Wainfleet, ON
Assessment Roll No: 271400001210100

LCA Environmental is pleased to provide the Region of Niagara and the Niagara Peninsula Conservation Authority (NPCA) the following proposed Terms of Reference to outline the intended approach of the Environmental Impact Study (EIS) for proposed development of the above-mentioned property. The property is located at 53814 Zion Road in the Township of Wainfleet and forms part of Lot 38, Concession 5 of Wainfleet Township (Figure 1).

The following Terms of Reference have been prepared in accordance with the Niagara Region's Environmental Impact Study Guidelines (2018). The proposed work will be carried out as part of a comprehensive Environmental Impact Study (EIS), which will provide an analysis of constraints associated with the existing natural heritage features. The constraints will then provide the basis for the assessment of impacts of the proposed development.

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lprice@lcaenvironmental.ca

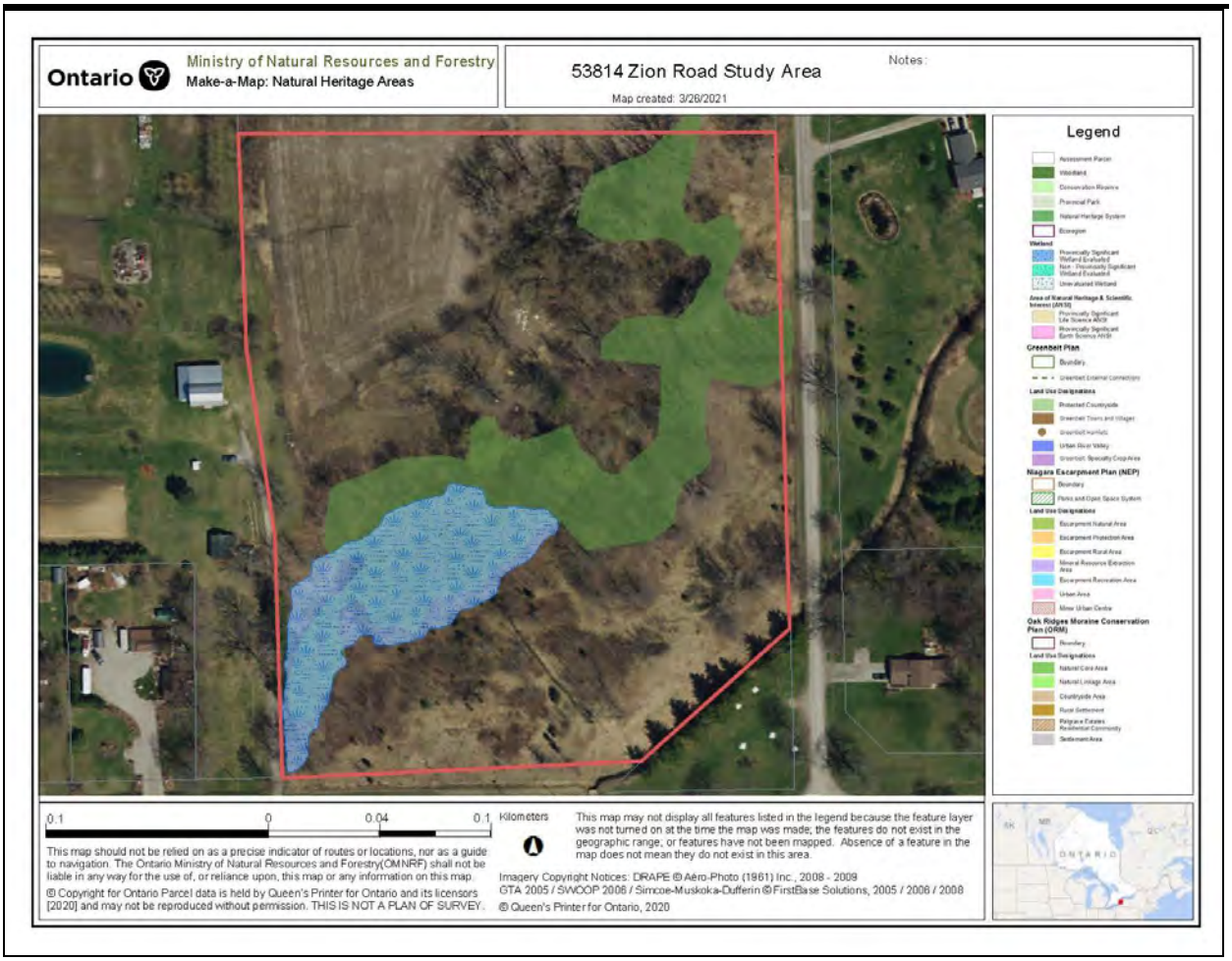

FIGURE 1: LOCATION OF THE STUDY AREA AND ASSOCIATED NATURAL HERITAGE FEATURES.

1.0 Background Information and Literature Review

A background review will be completed for the study in accordance with Sections 3.1 and 3.2 of the Niagara Region EIS Guidelines. This review will include a summary of existing studies and information on the property, as well as a discussion of all policies and regulations applicable to the study area.

An assessment of existing data and natural heritage mapping has been completed to guide the current field schedule. The subject property is located within the Hendershot Corners Hamlet and is currently zoned as village residential and Environmental Protection Area. The following features are located on or within the subject property boundaries:

- Regionally Significant Woodlands
- Marshville Station Clay Plain Provincially Significant Wetland Complex
- NPCA regulated branch of Ellsworth Drain (evaluated as Important Fish Habitat) and an open water feature

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The study area has also been screened for Significant Wildlife Habitat (SWH) and Species at Risk (SAR) to identify the need for additional field studies. Screening involved a review of the Natural Heritage Information Center (NHIC) database, 'Herps of Ontario' (inaturalist.org), and the Atlas of the Breeding Birds of Ontario. The complete SWH and SAR screenings are included in Appendix B.

Resources and databases consulted to obtain relevant natural heritage and policy information will include, but are not limited to:

- Natural Heritage Information Centre database (MNRF)
- Atlas of the Breeding Birds of Ontario (ABBO)
- iNaturalist.org
- Township of Wainfleet Official Plan (2016)
- Endangered Species Act (2007)
- Consolidated Regional Official Plan (2014)
- Provincial Policy Statement (2020)

2.0 Description of Existing Environment and Analysis of Natural Features

To assess constraints in the study area, flora and fauna surveys will be completed according to standardized protocols and acceptable methods. The proposed schedule of field assessments has been summarized in Table 1.

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lprice@lcaenvironmental.ca

TABLE 1: WORK PLAN FOR 5381 ZION ROAD, IN THE TOWNSHIIP OF WAINFLEET

Survey	Protocol/Method	Timing	Notes
Vegetation Surveys			
Ecological Land Classification	Lee et al. (1998)	June through August	
2-season Flora Inventory	Transect surveys and area searches	Spring Ephemeral survey in May Summer vegetation surveys June-August	Concurrent with SAR and/or ELC surveys.
Feature Delineation	Dripline GPS of natural feature(s)	Leaf on summer period	
Species at Risk Survey	Transect surveys	May to September	Concurrent with Flora inventories
Faunal Surveys			
Breeding Bird Survey	Ontario Breeding Bird Atlas Point count method	End of May to July	Include SWH searches
Reptile/amphibian Visual Searches	Milk Snake protocol - hand search	April through August	
Anuran Call Surveys	Marsh Monitoring Program	End of April to June	
Bat Monitoring	MNRF Survey Protocol for Species at Risk Bats	Leaf off survey: April Leaf on survey: May	Acoustic monitoring in June if roosting habitat is present
Incidental Observations	Regularly recorded during site visits	Ongoing	Including searches for SAR
Hydrological Assessments			
Wetland evaluations	Ontario Wetland Evaluation System	June	Verification of wetland boundaries

3.0 Assessment of Features and Functions

All data collected through background review and field studies will be summarized and reviewed in the context of current Provincial and Federal legislation for significance. Site constraints and recommended feature setbacks will be discussed with any opportunities for enhancement of natural features. The Constraints Analysis will then inform the assessment of impacts expected from the proposed development of the property.

The significance of the features identified on the subject property will be evaluated in accordance with Provincial, Regional, and Municipal policies, the Endangered Species Act (2007), SWH Criteria for Ecoregion 7E, and all other applicable natural heritage guidelines. Evaluation of significance will include assessment of potential or existing natural corridors.

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The Significant Woodlands will be reviewed with regard to Regional Policy 7.B.1.5, Policy 3.2.2.4 of the Township of Wainfleet Official Plan and the Regional Woodland Conservation By-law.

4.0 Mapping

The data collected will be compiled and results will be presented in the following maps:

- Vegetation Community Map
- Natural Heritage Features including any identified Significant Wildlife Habitat
- Location of all Threatened or Endangered SAR and Associated Habitat
- Constraints Map
- Proposed development overlay

The above Terms of Reference outline the basis of the Environmental Impact Study to be completed for the proposed development of 53841 Zion Road. We trust that these meet the requirements of the Region of Niagara EIS Guidelines and address the natural heritage features on and adjacent to the site as they appear on Regional and Municipal mapping. Natural heritage mapping for the study area is included in Appendix A.

Sincerely,

Lisa Price, Project Manager
LCA Environmental

Anne McDonald, Project Coordinator
LCA Environmental

104-155 Main Street East, Suite 136, Grimsby, Ontario, Canada L3M 1P2
lprice@lcaenvironmental.ca

Appendix A
Species at Risk and Significant Wildlife Habitat Screenings

104-155 Main Street East, Suite 136, Grimsby, Ontario, Canada L3M 1P2
lprice@lcaenvironmental.ca

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Table 1: Species at Risk Screening for 53841 Zion Road, in the Township of Wainfleet.

Common Name	Species Scientific Name	Potential to occur	Rationale	Survey Required
BIRDS				
Acadian Flycatcher	*Empidonax virescens*	No	Lack of interior Habitat	None
Bank Swallow	*Riparia riparia*	No	Lack of Habitat	None
Barn Owl	*Tyto alba*	Yes	Breeding Bird Atlas	Breeding Bird surveys
Barn Swallow	*Hirundo rustica*	Yes	Breeding Bird Atlas, foraging habitat	Breeding Bird Surveys
Black Tern	*Chlidonias niger*	No	Lack of Habitat	None
Bobolink	*Dolichonyx oryzivorus*	Yes	Habitat Adjacent	Breeding Bird Surveys
Canada Warbler	*Cardellina canadensis*	No	Lack of habitat	None
Chimney Swift	*Chaetura pelagica*	Yes	Breeding Bird Atlas, foraging habitat	Breeding Bird Surveys
Common Nighthawk	*Chordeiles minor*	No	Lack of Habitat	None
Eastern Meadowlark	*Sturnella magna*	Yes	Habitat Adjacent	Breeding Bird Surveys
Eastern Wood-Pewee	*Contopus virens*	Yes	Breeding Bird Atlas	Breeding Bird surveys
Eastern Whip-poor-will	*Caprimlugus vociferous*	No	Lack of Habitat	None
Henslow's Sparrow	*Ammodramus henslowii*	No	Lack of Habitat	None
King Rail	*Rallus elegans*	No	Lack of Habitat	None
Least Bittern	*Ixobrychus exillis*	No	Lack of Habitat	None
Northern Bobwhite	*Colinus virginianus*	Yes	Habitat Adjacent	Breeding Bird Surveys
Peregrine Falcon	*Falco perigrinus*	No	Lack of habitat	None
Red-Headed Woodpecker	*Melanerpes erythrocephalus*	Yes	Breeding Bird Atlas	Breeding Bird Surveys
Short-eared Owl	*Asio flammeus*	Yes	Habitat Adjacent	Breeding Bird Surveys
Wood Thrush	*Hylocichla mustelina*	Yes	Breeding Bird Atlas; NHIC record	Breeding Bird Surveys
Yellow-breasted Chat	*Icteria virens*	Yes	Breeding Bird Atlas	Breeding Bird surveys
INSECTS				
Monarch Butterfly	*Danaus plexippus*	Yes	Habitat availability	Incidental
Rusty-patched Bumble Bee	*Bombus affinis*	Yes	Habitat availability	Incidental
West Virginia White	*Pieris virginiensis*	Yes	Habitat availability	Incidental
MAMMALS				
Eastern Small-footed myotis	*Myotis leibii*	Yes	Potential habitat	MNRF SAR protocols Phase I&II
Gray Fox	*Urocyon cinereoargenteus*	Yes	Habitat availability	Incidental
Little Brown Myotis	*Myotis lucifugus*	Yes	Potential habitat	MNRF SAR protocols Phase I&II
Northern Myotis	*Myotis septentrionalis*	Yes	Potential habitat	MNRF SAR protocols Phase I&II
Tri-colored Bat	*Perimyotis subflavus*	Yes	Potential habitat	MNRF SAR protocols Phase I&II
MOLLUSC				
Snuffbox	*Epioblasma triquetra*	No	Lack of Habitat	None
PLANTS				
Butternut	*Juglans cinerea*	Yes	NHIC, habitat availability	Summer flora inventory

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Common Name	Species Scientific Name	Potential to occur	Rationale	Survey Required
PLANTS				
Common Hoptree	*Ptelea trifoliata*	Yes	Habitat availability	Summer flora inventory
Eastern Flowering Dogwood	*Cornus florida*	Yes	Habitat availability	Summer flora inventory
Swamp Rose-mallow	*Hibiscus moscheutos*	Yes	Habitat availability	Summer flora inventory
White Wood Aster	*Eurybia divaricata*	No	Lack of habitat	None
REPTILES AND AMPHIBIANS				
Blanding's Turtle	*Emydoidea blandingii*	No	Lack of Habitat	None
Eastern Hog-nosed Snake	*Heterodon platirhinos*	Yes	Habitat availability	Hand searches
Eastern Milksnake	*Lampropeltis triangulum*	Yes	NHIC	Hand searches
Eastern Ribbonsnake	*Thamnophis sauritus*	Yes	Habitat availability	Hand searches
Massassauga Rattlesnake	*Sistrurus catenatus*	Yes	Habitat availability	Hand searches
Snapping Turtle	*Chelydra serpentine*	No	Lack of Habitat	None
Spotted Turtle	*Clemmys guttata*	No	Lack of Habitat	None

Table 2: Significant Wildlife Habitat Screening for 53841 Zion Road, in the Township of Wainfleet.

Significant Wildlife Habitat (SWH) Type	Known/Candidate SWH present	Rationale	Field Studies Required
1.1 Seasonal Concentration Areas for Wildlife Species			
Waterfowl Stopover and Staging Areas (Terrestrial)	No	Lack of suitable habitat	None
Waterfowl Stopover and Staging Areas (Aquatic)	No	Lack of suitable habitat	None
Shorebird Migratory Stopover Area	No	>5km from Lake Erie and Lake Ontario	None
Raptor Wintering Area	No	Habitat not available; Small isolated woodlot.	None
Bat Hibernacula	No	Habitat not available (caves, mines, Karsts)	None
Bat Maternity Colonies	Yes	Mature trees in woodland habitat with potential standing snags	MNRF Survey Protocol for SAR Bats within Treed Habitats (MNRF, 2017)
Turtle Wintering Areas	No	Lack of habitat	None
Reptile Hibernaculum	Yes	Potential for slopes and burrows	Milk Snake Protocol – hand searches
Colonially-Nesting Bird Breeding Habitat (Bank and Cliff)	No	Lack of exposed banks or cliffs	None
Colonially-Nesting Bird Breeding Habitat (Tree/Shrubs)	Yes	Potential nesting trees within wetland habitat	Area Searches in accordance with Bird and "Bird Habitats: Guidelines for windpower projects" (MNRF 2011)
Colonially-Nesting Bird Breeding Habitat (Ground)	No	Lack of suitable habitat	None
Migratory Butterfly Stopover Areas	No	>5km from Lake Erie and Lake Ontario	None
Landbird Migratory Stopover Areas	No	>5km from Lake Erie and Lake Ontario	None
Deer Winter Congregation Areas	No	Habitat not available	None
1.2 Rare Vegetation Communities or Specialized Habitat for Wildlife			
Cliffs and Talus Slopes	No	Not Applicable	None
Sand Barren	No	Not Applicable	None
Alvar	No	Not Applicable	None
Old Growth Forest	No	Lack of Habitat	None
Savannah	No	Not Applicable	None
Tall Grass Prairie	No	Not Applicable	None
Other Rare Vegetation Communities	Yes	Variable ELC Ecosites present	ELC surveys
Waterfowl Nesting Area	No	Wetland <0.5ha	None
Bald Eagle and Osprey Nesting, Foraging and Perching Habitat	No	Wetland community not associated with a shoreline or island	None
Woodland Raptor Nesting Habitat	No	Lack of interior habitat	None
Significant Wildlife Habitat (SWH) Type	**Known/Candidate SWH present**	**Rationale**	**Field Studies Required**
Turtle Nesting Areas	Yes	Suitable habitat available	Area searches

Seeps and Springs	No	Lack of forested headwaters	None
Amphibian Breeding Habitat (Woodland)	Yes	Wetland habitat within to woodland	Marsh Monitoring Program
Amphibian Breeding Habitat (Wetlands)	Yes	Presence of wetland habitat	Marsh Monitoring Program
Woodland Area- Sensitive Bird Breeding Habitat	No	No interior habitat available	None
1.3 Habitats of Species of Conservation Concern			
Marsh Breeding Bird Habitat	Yes	Wetland habitat available	Breeding Bird Survey
Open Country Bird Breeding Habitat	No	Lack of grassland habitat	None
Shrub/Early Successional Bird Breeding Habitat	No	Successional habitat <10ha	None
Terrestrial Crayfish	No	Lack of marsh habitat	Search for chimneys or burrows from April – August
Special Concern and Rare Wildlife Species	Yes	MNRF known EOs provided (NHIC). See SAR screening below	Area inventories
1.4 Animal Movement Corridors			
Amphibian Movement Corridor	Yes	Candidate amphibian woodland and wetland breeding habitat identified	Area searches/ road mortality surveys

Anne McDonald

From: Lampman, Cara <Cara.Lampman@niagararegion.ca>
Sent: May 25, 2021 3:08 PM
To: aemcdonald@lcaenvironmental.ca
Cc: 'Jessica Abrahamse'
Subject: RE: Terms of Reference for 53814 Zion Road, Wainfleet
Attachments: 53814 Zion Rd Terms of Reference.pdf

Hi Anne,

Regional staff have reviewed the TOR and have no objection to the proposed work plan. Regional staff would appreciate an invitation to any feature boundary staking.

Cara Lampman
Manager Environmental Planning
Planning and Development Services, Niagara Region
Phone: 905-980-6000 ext. 3430 Toll-free: 1-800-263-7215
Cell: 289-668-4812
www.niagararegion.ca

From: aemcdonald@lcaenvironmental.ca <aemcdonald@lcaenvironmental.ca>
Sent: Monday, April 12, 2021 2:05 PM
To: Lampman, Cara <Cara.Lampman@niagararegion.ca>
Cc: 'Jessica Abrahamse' <jabrahamse@npca.ca>
Subject: Terms of Reference for 53814 Zion Road, Wainfleet

CAUTION: This email originated from outside of the Niagara Region email system. Use caution when clicking links or opening attachments unless you recognize the sender and know the content is safe.

Good afternoon,

Please see attached for the proposed Terms of Reference for an EIS to be completed at 53814 Zion Road in the town of Wainfleet to address impacts of a proposed future development.
The Roll Number for the property is : 271400001210100.

Please let me know if you have any questions or comments.
Thank you,

Anne McDonald
The Regional Municipality of Niagara Confidentiality Notice The information contained in this communication including any attachments may be confidential, is intended only for the use of the recipient(s) named above, and may be legally privileged. If the reader of this message is not the intended recipient, you are hereby notified that any dissemination, distribution, disclosure, or copying of this communication, or any of its contents, is strictly prohibited. If you have

received this communication in error, please re-send this communication to the sender and permanently delete the original and any copy of it from your computer system. Thank you.

Appendix C

Field Assessments and Survey Protocols

104-155 Main Street East, Suite 136, Grimsby, Ontario L3M 1P2,
905-687-4400; lprice@lcaenvironmental.ca

Table C-1: Field Work completed as part of the Environmental Impact Assessment carried out by LCA Environmental for 53814 Zion Road, Wainfleet.

Date	Weather	Survey	Protocol	Surveyors	Findings
March 25, 2021	Temp: 12°C Cloud Cover: 100% Wind: 1	Anuran Call Survey	Marsh Monitoring Program (MMP)	A. McDonald & S. Cowherd	Section 4.2.3 & Appendix C
April 6, 2021	Temp: 17°C Cloud Cover: 25% Wind: 1	Leaf-off Snag Survey	MNRF Protocol for SAR Bats	A. McDonald & S. Cowherd	Section 4.2.6 & Appendix C
		Amphibian and Reptile Survey	Hand Searches		Section 4.2.3, Section 4.2.4 & Appendix D
April 13, 2021	Temp: 8°C Cloud Cover: 100% Wind: 1	Amphibian and Reptile Survey	Hand Searches	A. McDonald & S. Cowherd	Section 4.2.3, Section 4.2.4 & Appendix D
		Movement Corridors	Road Mortality Survey		Section 4.2.8
April 19, 2021	Temp: 13°C Cloud Cover: 50% Wind: 2	Amphibian and Reptile Survey	Hand Searches	A. McDonald & S. Cowherd	Section 4.2.3, Section 4.2.4 & Appendix D
		Movement Corridors	Road Mortality Survey		Section 4.2.8
May 4, 2021	Temp: 13°C Cloud Cover: 100% Wind: 1	Anuran Call Survey	MMP	A. McDonald & S. Cowherd	Section 4.2.3 & Appendix C
May 5, 2021	Temp: 10°C Cloud Cover: 100% Wind: 2	Amphibian and Reptile Survey	Hand Searches	A. McDonald & S. Cowherd	Section 4.2.3, Section 4.2.4 & Appendix D
		Spring Vegetation Survey	Transect Survey		Section 4.2.2 & Appendix D
		Leaf-On Snag Survey	MNRF Protocol for SAR Bats		Section 4.2.6 & Appendix C
		Movement Corridors	Road Mortality Survey		Section 4.2.8
May 11, 2021	Temp: 9°C Cloud Cover: 100% Wind: 2	Amphibian and Reptile Survey	Hand Searches	A. McDonald & S. Cowherd	Section 4.2.3, Section 4.2.4 & Appendix D
		Movement Corridors	Road Mortality Survey		Section 4.2.8
June 2, 2021	Temp: 17°C Cloud Cover: 0% Wind: 1	Bat monitor Installation	MNRF Survey Protocol for SAR Bats	A. McDonald & S. Cowherd	Section 4.2.6
June 4, 2021	Temp: 17°C Cloud Cover: 0% Wind: 1	Anuran Call Survey	MMP	A. McDonald & S. Cowherd	Section 4.2.3 & Appendix C

June 5, 2021	Temp: 15°C Cloud Cover: Wind: 2	Breeding Bird Survey	Ontario Breeding Bird Atlas (OBBA)	N. Litwin & A. Brunning	Section 4.2.5 & Appendix D
June 22, 2021	Temp: 22°C Cloud Cover: 50% Wind: 2	Ecological Land Classification (ELC)	Lee et al. (1998)	A. McDonald & S. Cowherd	Section 4.2.1 & Appendix C
		Summer Vegetation Survey	Transect Survey		Section 4.2.2 & Appendix D
June 29, 2021	Temp: 22°C Cloud Cover: Wind: 1	Breeding Bird Survey	OBBA	N. Litwin & A. Brunning	Section 4.2.5 & Appendix D
June 30, 2021	Temp: 22°C Cloud Cover: Wind: 2	Bat monitor Uninstall	MNRF Survey Protocol for SAR Bats	A. McDonald & S. Cowherd	Section 4.2.6
July 23, 2021	Temp: 25°C Cloud Cover: 10% Wind: 1	ELC	Lee et al. (1998)	A. McDonald & S. Cowherd	Section 4.2.1 & Appendix C

Ecological Land Classification

The vegetation communities on the subject lands are identified and categorized based on the Ecological Land Classification (ELC) System according to the guidelines in the SCSS Field Guide FG-02 (Lee et al. 1998). Ecological Land Classification is a protocol established for Southern Ontario that considers distribution and abundance of plants in combination with related topography and soil conditions to classify plant communities. It was developed for the purpose of creating a comprehensive and consistent province-wide approach for ecosystem description, inventory and interpretation.

Aerial images are consulted to delineate homogeneous polygons within the site. During site visits to these polygons, vegetation communities are classified according to Community Units, which are identified based on the dominant vegetation species present, soil characteristics, and hydrology. Plant lists for each vegetation layer are compiled and vegetation is ranked according to its abundance. The plants are identified to the species level and vouchers are taken for species whose identity is in unknown to be identified at a later date. Representative soil cores are taken using a soil auger to evaluate texture, moisture regime and drainage values. Prism sweeps are conducted to calculate the basal area cover of trees, which allows for determination of the stand composition within each polygon. Trees are also categorized into size classes and estimates are made for prevalence of standing snags and deadfall. The vegetation community of each ELC polygon is then identified based on the data collected.

ELC Community Description & Classification

Site:	53814 Zion Road	Polygon:	1
Surveyors:	A. Mcdonald & S. Cowherd	Date:	22-Jul-21
UTME:	624710	UTMN:	4755616

POLYGON DESCRIPTION

SYSTEM
- [x] TERRESTRIAL
- [ ] WETLAND
- [ ] AQUATIC

SITE
- [ ] OPEN WATER
- [ ] SHALLOW WATER
- [x] SURFICIAL DEP.
- [ ] BEDROCK

SUBSTRATE
- [ ] ORGANIC
- [x] MINERAL SOIL
- [ ] PARENT MIN
- [ ] ACIDIC BEDRK
- [ ] BASIC BEDRK
- [ ] CARB. BEDRK

TOPOGRAPHY
- [ ] LACUSTRINE
- [ ] RIVERINE
- [ ] BOTTOMLAND
- [ ] TERRACE
- [ ] VALLEY SLOPE
- [ ] TABLELAND
- [x] ROLL. UPLAND
- [ ] CLIFF
- [ ] TALUS
- [ ] CREVICE/CAVE
- [ ] ALVAR
- [ ] ROCKLAND
- [ ] BEACH/BAR
- [ ] SAND DUNE
- [ ] BLUFF

HISTORY
- [ ] NATURAL
- [x] CULTURAL

COVER
- [x] OPEN
- [ ] SHRUB
- [ ] TREED

PLANT FORM
- [ ] PLANKTON
- [ ] SUBMERGED
- [ ] FLOATING-LVD
- [ ] GRAMINOID
- [x] FORB
- [ ] LICHEN
- [ ] BRYOPHYTE
- [ ] DECIDUOUS
- [ ] CONIFEROUS
- [ ] MIXED

COMMUNITY
- [ ] LAKE
- [ ] POND
- [ ] STREAM
- [ ] RIVER
- [ ] MARSH
- [ ] SWAMP
- [ ] FEN
- [ ] BOG
- [ ] BARREN
- [x] MEADOW
- [ ] PRAIRIE
- [ ] THICKET
- [ ] SAVANNAH
- [ ] WOODLAND
- [ ] FOREST
- [ ] PLANTATION

STAND DESCRIPTION

LAYER	HT	CVR	SPECIES IN ORDER OF DECREASING DOMINANCE
1 CANOPY	2	1	POPDELT>ACENEGU>JUGNIGR=PICE_SP
2 SUB-CANOPY	3,4	1	FRAX_SP>MALU_SP=MORU_SP>JUNVIRG
3 UNDERSTORY	5	3	FRAX_SP>CORRACE=ROSA_SP>ELAUMBE
4 GRD. LAYER	6,7	4	SOLI_SP=GRASS_SP>MELOFFI>DAUCARO

HT CODES: 1 = >25m; 2 = 10 <HT<25m; 3 = 2<HT<10m; 4 = 1<HT<2m; 5 = 0.5<HT<1m; 6 = 0.2<HT<0.5m; 7 = <0.2m

CVR CODES: 1 = 0%<CVR<10%; 2 = 10%<CVR<25%; 3 = 25%<CVR<60% 4 = CVR>60%

STAND COMPOSITION:	N/a	BA:	0

COMMUNITY AGE: [ ] PIONEER [x] YOUNG [ ] MID-AGE [ ] MATURE [ ] OLD GROWTH

SOIL ANALYSIS

			MOTTLES	GLEY
TEXTURE:	vfS	DEPTH TO MOTTLES / GLEY	>80 cm	80 cm
MOISTURE:	5	DEPTH OF ORGANICS	0	(cm)
		DEPTH TO BEDROCK	> 80	(cm)

COMMUNITY / CLASSIFICATION

COMMUNITY CLASS	Meadow	CODE:	ME
COMMUNITY SERIES	Forb Meadow	CODE:	MEF
ECOSITE	Fresh-Moist Forb Meadow	CODE:	MEFM4
VEGETATION TYPE		CODE:	
[x] INCLUSION	Dry-Fresh Mixed Woodland	CODE:	WOMM4
[ ] COMPLEX		CODE:	

ELC Community Description & Classification

Site:	53814 Zion Road	Polygon:	2
Surveyors:	A. Mcdonald & S. Cowherd	Date:	22-Jul-21
UTME:	624637	UTMN:	4755691

POLYGON DESCRIPTION

SYSTEM
- ☐ TERRESTRIAL
- ☑ WETLAND
- ☐ AQUATIC

SITE
- ☐ OPEN WATER
- ☐ SHALLOW
- ☑ SURFICIAL
- ☐ BEDROCK

SUBSTRATE
- ☐ ORGANIC
- ☑ MINERAL SOIL
- ☐ PARENT MIN
- ☐ ACIDIC BEDRK
- ☐ BASIC BEDRK
- ☐ CARB. BEDRK

TOPOGRAPHY
- ☐ LACUSTRINE
- ☐ RIVERINE
- ☐ BOTTOMLAND
- ☐ TERRACE
- ☐ VALLEY SLOPE
- ☐ TABLELAND
- ☑ ROLL. UPLAND
- ☐ CLIFF
- ☐ TALUS
- ☐ CREVICE/CAVE
- ☐ ALVAR
- ☐ ROCKLAND
- ☐ BEACH/BAR
- ☐ SAND DUNE
- ☐ BLUFF

HISTORY
- ☐ NATURAL
- ☑ CULTURAL

COVER
- ☐ OPEN
- ☐ SHRUB
- ☑ TREED

PLANT FORM
- ☐ PLANKTON
- ☐ SUBMERGED
- ☐ FLOATING-
- ☐ GRAMINOID
- ☐ FORB
- ☐ LICHEN
- ☐ BRYOPHYTE
- ☑ DECIDUOUS
- ☐ CONIFEROUS
- ☐ MIXED

COMMUNITY
- ☐ LAKE
- ☐ POND
- ☐ STREAM
- ☐ RIVER
- ☐ MARSH
- ☑ SWAMP
- ☐ FEN
- ☐ BOG
- ☐ BARREN
- ☐ MEADOW
- ☐ PRAIRIE
- ☐ THICKET
- ☐ SAVANNAH
- ☐ WOODLAND
- ☐ FOREST
- ☐ PLANTATION

STAND DESCRIPTION

LAYER	HT	CVR	SPECIES IN ORDER OF DECREASING DOMINANCE
1 CANOPY	1	4	ACEFREE>>ULMU_SP
2 SUB-CANOPY		2	ACEFREE>>ULMU_SP
3 UNDERSTORY		1	CORAMOM>>RUBIDAE>RHACATH
4 GRD. LAYER		1	GLYSTRIA>EUPPERF=EUTMACU=CAREX_SP

HT CODES: 1 = >25m; 2 = 10 <HT<25m; 3 = 2<HT<10m; 4 = 1<HT<2m; 5 = 0.5<HT<1m; 6 = 0.2<HT<0.5m; 7 = <0.2m

CVR CODES: 1 = 0%<CVR<10%; 2 = 10%<CVR<25%; 3 = 25%<CVR<60% 4 = CVR>60%

STAND COMPOSITION:	$ACEFREE_{91}ULMU\_SP_{9}$	BA:	44

COMMUNITY AGE: ☐ PIONEER ☐ YOUNG ☑ MID-AGE ☐ MATURE ☐ OLD GROWTH

SOIL ANALYSIS

			MOTTLES	GLEY
TEXTURE:	vfS	DEPTH TO MOTTLES / GLEY	>70	50
MOISTURE:	6	DEPTH OF ORGANICS	40	(cm)
WATER TABLE:	5 cm	DEPTH TO BEDROCK	> 70	(cm)

COMMUNITY / CLASSIFICATION

COMMUNITY CLASS	Swamp	CODE:	SW
COMMUNITY SERIES	Deciduous Swamp	CODE:	SWDM
ECOSITE	Maple Mineral Deciduous Swamp	CODE:	SWDM3
VEGETATION TYPE	Swamp Maple Mineral Deciduous Swamp	CODE:	SWDM3-3
☐ INCLUSION		CODE:	
☐ COMPLEX		CODE:	

ELC Community Description & Classification

Site:	53814 Zion Road	Polygon:	3
Surveyors:	A. Mcdonald & S. Cowherd	Date:	22-Jul-21
UTME:	624707	UTMN:	4755715

POLYGON DESCRIPTION

SYSTEM
- [x] TERRESTRIAL
- [ ] WETLAND
- [ ] AQUATIC

SITE
- [ ] OPEN WATER
- [ ] SHALLOW
- [x] SURFICIAL
- [ ] BEDROCK

SUBSTRATE
- [ ] ORGANIC
- [x] MINERAL SOIL
- [ ] PARENT MIN
- [ ] ACIDIC BEDRK
- [ ] BASIC BEDRK
- [ ] CARB. BEDRK

TOPOGRAPHY
- [ ] LACUSTRINE
- [ ] RIVERINE
- [ ] BOTTOMLAND
- [ ] TERRACE
- [ ] VALLEY SLOPE
- [ ] TABLELAND
- [x] ROLL. UPLAND
- [ ] CLIFF
- [ ] TALUS
- [ ] CREVICE/CAVE
- [ ] ALVAR
- [ ] ROCKLAND
- [ ] BEACH/BAR
- [ ] SAND DUNE
- [ ] BLUFF

HISTORY
- [ ] NATURAL
- [x] CULTURAL

COVER
- [ ] OPEN
- [ ] SHRUB
- [x] TREED

PLANT FORM
- [ ] PLANKTON
- [ ] SUBMERGED
- [ ] FLOATING-
- [ ] GRAMINOID
- [ ] FORB
- [ ] LICHEN
- [ ] BRYOPHYTE
- [x] DECIDUOUS
- [ ] CONIFEROUS
- [ ] MIXED

COMMUNITY
- [ ] LAKE
- [ ] POND
- [ ] STREAM
- [ ] RIVER
- [ ] MARSH
- [ ] SWAMP
- [ ] FEN
- [ ] BOG
- [ ] BARREN
- [ ] MEADOW
- [ ] PRAIRIE
- [ ] THICKET
- [ ] SAVANNAH
- [x] WOODLAND
- [ ] FOREST
- [ ] PLANTATION

STAND DESCRIPTION

LAYER	HT	CVR	SPECIES IN ORDER OF DECREASING DOMINANCE
1 CANOPY	1	3	JUGNIG>FRAX_SP>ACEFREE=SALI_SP>
2 SUB-CANOPY	2,3	2	FRAX_SP>RHACATH>>JUNVIRG
3 UNDERSTORY	4,5	4	RHACATH=FRAX_SP>RUBIDAE>>RIBCYNO
4 GRD. LAYER	6,7	4	SOLCANA=VITRIPA>PERVIRG>IMPCAPE

HT CODES: 1 = >25m; 2 = 10 <HT<25m; 3 = 2<HT<10m; 4 = 1<HT<2m; 5 = 0.5<HT<1m; 6 = 0.2<HT<0.5m; 7 = <0.2m

CVR CODES: 1 = 0%<CVR<10%; 2 = 10%<CVR<25%; 3 = 25%<CVR<60% 4 = CVR>60%

STAND COMPOSITION:	$ACEFREE_{66}SALI\_SP_{17}JUGNIGR_{17}$	BA:	12

COMMUNITY AGE: [ ] PIONEER [x] YOUNG [ ] MID-AGE [ ] MATURE [ ] OLD GROWTH

SOIL ANALYSIS

			MOTTLES	GLEY
TEXTURE:	vfS	DEPTH TO MOTTLES / GLEY	>70	>70
MOISTURE:	3	DEPTH OF ORGANICS	0	(cm)
		DEPTH TO BEDROCK	>70	(cm)

COMMUNITY / CLASSIFICATION

COMMUNITY CLASS	Woodland	CODE:	WO
COMMUNITY SERIES	Deciduous Woodland	CODE:	WOD
ECOSITE	Dry-Fresh Deciduous Woodland	CODE:	WODM4
VEGETATION TYPE		CODE:	
[ ] INCLUSION		CODE:	
[ ] COMPLEX		CODE:	

ELC Community Description & Classification

Site:	53814 Zion Road	Polygon:	4
Surveyors:	A. Mcdonald & S. Cowherd	Date:	22-Jul-21
UTME:	624696	UTMN:	4755794

POLYGON DESCRIPTION

SYSTEM
- [x] TERRESTRIAL
- [ ] WETLAND
- [ ] AQUATIC

SITE
- [ ] OPEN WATER
- [ ] SHALLOW
- [x] SURFICIAL
- [ ] BEDROCK

SUBSTRATE
- [ ] ORGANIC
- [x] MINERAL SOIL
- [ ] PARENT MIN
- [ ] ACIDIC BEDRK
- [ ] BASIC BEDRK
- [ ] CARB. BEDRK

TOPOGRAPHY
- [ ] LACUSTRINE
- [ ] RIVERINE
- [ ] BOTTOMLAND
- [ ] TERRACE
- [ ] VALLEY SLOPE
- [ ] TABLELAND
- [ ] ROLL. UPLAND
- [ ] CLIFF
- [ ] TALUS
- [ ] CREVICE/CAVE
- [ ] ALVAR
- [ ] ROCKLAND
- [ ] BEACH/BAR
- [ ] SAND DUNE
- [ ] BLUFF

HISTORY
- [ ] NATURAL
- [x] CULTURAL

COVER
- [ ] OPEN
- [ ] SHRUB
- [x] TREED

PLANT FORM
- [ ] PLANKTON
- [ ] SUBMERGED
- [ ] FLOATING-GRAMINOID
- [ ] FORB
- [ ] LICHEN
- [ ] BRYOPHYTE
- [x] DECIDUOUS
- [ ] CONIFEROUS
- [ ] MIXED

COMMUNITY
- [ ] LAKE
- [ ] POND
- [ ] STREAM
- [ ] RIVER
- [ ] MARSH
- [ ] SWAMP
- [ ] FEN
- [ ] BOG
- [ ] BARREN
- [ ] MEADOW
- [ ] PRAIRIE
- [ ] THICKET
- [ ] SAVANNAH
- [x] WOODLAND
- [ ] FOREST
- [ ] PLANTATION

STAND DESCRIPTION

LAYER	HT	CVR	SPECIES IN ORDER OF DECREASING DOMINANCE
1 CANOPY	2	3	POPDELT>MORALBA=JUGNIGR>>ACENEGU
2 SUB-CANOPY	3	1	FRAX_SP>CRET_SP
3 UNDERSTORY	4,5	3	LONI_SP>RUBOCCI
4 GRD. LAYER	6,7	3	EQUISP>>GLEHEDE=HESMATR=SOLDULC

HT CODES: 1 = >25m; 2 = 10 <HT<25m; 3 = 2<HT<10m; 4 = 1<HT<2m; 5 = 0.5<HT<1m; 6 = 0.2<HT<0.5m; 7 = <0.2m

CVR CODES: 1 = 0%<CVR<10%; 2 = 10%<CVR<25%; 3 = 25%<CVR<60% 4 = CVR>60%

STAND COMPOSITION:	$MORALBA_{50}ACEFREE_{20}JUGNIGR_{20}ACENEGU_{10}$	BA:	20

COMMUNITY AGE: [ ] PIONEER [x] YOUNG [ ] MID-AGE [ ] MATURE [ ] OLD GROWTH

SOIL ANALYSIS

			MOTTLES	GLEY
TEXTURE:	vfS	DEPTH TO MOTTLES / GLEY	65	>70
MOISTURE:	3	DEPTH OF ORGANICS	0	(cm)
		DEPTH TO BEDROCK	> 70	(cm)

COMMUNITY / CLASSIFICATION

COMMUNITY CLASS	Woodland	CODE:	WO
COMMUNITY SERIES	Deciduous Woodland	CODE:	WOD
ECOSITE	Dry-Fresh Deciduous Woodland	CODE:	WODM4
VEGETATION TYPE		CODE:	
[ ] INCLUSION		CODE:	
[ ] COMPLEX		CODE:	

Breeding Bird Survey

Breeding Bird Surveys were conducted using the Ontario Breeding Bird Atlas (OBBA) Point Counts method, which involves standing in one place and recording all the species that are seen or heard for a minimum of five minutes. Surveys should be conducted between May 24th and July 10th, with at least 10 days between each survey. Point count surveys are completed early in the morning, with the best time for coverage occurring within the first five hours after dawn.

Variations to the OBBA Point Count methods were adapted from the Marsh Monitoring Program Bird Survey Protocols. Point Count stations were established a minimum of 250m apart, and surveys were conducted for a total of fifteen minutes, using a fixed distance sample area of a 100m circle.

Area searches are also conducted, which occur in a series of three, twenty-minute point counts, according to the OBBA 2001-2005 list in accordance with the American Ornithologists Union (AOU) 7th Edition (42nd-47th supplements).

Amphibian Surveys Overview (Bird Studies Canada)

For decades, scientific studies have shown that amphibian populations have been in steady decline across North America, and particularly in the heavily populated and industrialized Great Lakes region. Amphibians are very sensitive to environmental stresses, such as air and water pollution, thus their decline or disappearance in a region is indicative of environmental degradation. Consequently, the presence or absence of amphibians in marshes is a good indicator of marsh habitat health. The Marsh Monitoring Program (MMP) uses aural (hearing-based) surveys to detect the presence or absence and relative abundance of calling amphibians (frogs and toads). Data collected by MMP volunteers are used to determine relative annual population trend changes for calling amphibians at local, regional, and Great Lakes basin levels.

To conduct amphibian (frog and toad) surveys:

- Survey three times per year between April and July 5th, with at least fifteen days between each survey;
- Begin surveying one half-hour after sunset and end by midnight during evenings with little wind and minimum night air temperatures of 5ºC (50ºF), 10ºC (50ºF) and 17ºC (63ºF) for each of the three respective survey periods. These temperature requirements are in place because amphibian calling intensity is strongly associated with season, time of day, and weather conditions;
- Establish monitoring stations at least 500 meters apart to minimize the possibility of double-counting calls. Unlike marsh bird survey stations, amphibian survey stations can be placed back-to-back because the amphibian survey protocol is entirely passive (i.e. call responses are not elicited through use of a call broadcast tape/CD;
- Conduct surveys using an unlimited distance semi-circular sampling area. However, in order to associate calls heard within the defined 100 meter area surveyed with habitat composition within these same areas, surveyors are asked to ascertain and record whether calls were heard outside the 100 meter radius or within this radius.
- Complete a 3-minute survey at each station. Call level codes are assigned to all calling frog and toad species:
    - Code 1: individual calls do not overlap and calling individuals can be discretely counted;
    - Code 2: calls of individuals sometimes overlap, but numbers of individuals can still be estimated;
    - Code 3: overlap among calls seems continuous (full chorus), and a count estimate is impossible;

AMPHIBIAN CALL SURVEY 1

Project Name: Zion Road Surveyor(s): A.M / S.C Date: 03/25/21

Weather: 100% cloud & drizzle

Station #	UTM Coordinates		Temperature (˚ C)	Beaufort #	Start Time	End Time
	Easting	Northing				
1	624624	4755585	12	1	9:49	9:53

Species	Station 1	
	Call Code	#
Chorus Frog	3	FC
Wood Frog	2	5-10

AMPHIBIAN CALL SURVEY 2

Project Name: Zion Road Surveyor(s): A.M / S.C Date: 05/04/21

Weather: 100% cloud & dry

Station #	UTM Coordinates		Temperature (˚ C)	Beaufort #	Start Time	End Time
	Easting	Northing				
1	624624	4755585	13	1	8:54	8:58

Species	Station 1	
	Call Code	#
American Toad	1	3
Chorus Frog	1	4

AMPHIBIAN CALL SURVEY 3

Project Name: Zion Road Surveyor(s): A.M / S.C Date: 06/04/21

Weather: 0% and dry

Station #	UTM Coordinates		Temperature (˚ C)	Beaufort #	Start Time	End Time
	Easting	Northing				
1	624624	4755585	17	1	9:36	9:41

Species	Station 1	
	Call Code	#
American Toad	1	1
Gray Treefrog	2	~5

Bat Monitoring Protocols

Snag surveys were completed on the subject property to determine the density and location of suitable maternal roosting habitat in accordance with the MNRF's Survey Protocol for Species at Risk Bats within Treed Habitats, which are summarized below. Following completion of the snag survey, locations for acoustic monitors were selected based on the criteria in the survey protocols to select optimal locations for monitoring stations. The monitoring location plan was submitted to the Ministry and approved prior to the installation of the acoustic monitors.

Full-spectrum Wildlife Acoustics SongMeter SM4™ monitors were installed during the month of June. Monitors are affixed to trees at a height of four – five meters and microphones are extended approximately three feet away from the unit. Microphones are positioned towards a clearing in the canopy or understory to minimize obstruction of calls and ensure high recording quality. The monitors are set to record for five hours each night, and weather was monitored via Buffalo International Airport data. The scheduling and audio settings used on each monitor are summarized in the Table below.

Table: Settings employed for acoustic monitors.

Setting	
Start Time	20:00 est
End Time	01:00 est
Gain Level	12 dB
Sample Rate	256 kHz
Minimum Duration	1.5 ms
Maximum Duration	none
Minimum Trigger Frequency	16 kHz
Trigger Level	12 dB

Based on consultation with Toby Thorne (Bat Biologist), and studies presented by Tyburec and Chenger (2014), which compared the accuracy and reliability of the leading call analysis software programs, SonoBat 4 software was used to process the data compiled from the SM4 monitors. Version 4.2.0 of the software was installed with the Northeast United States regional suite, which includes call repertoires for all species of bats present within Ontario.

Data files from each monitor were processed through batch analysis and classified to species level. Using the batch data, SonoBat will calculate an estimated likelihood of presence for each species known based on the number of classified species and their known overlap and ambiguity of classification. The likelihood estimate

provides a probabilistic estimate and does not convey certainty. The SonoBat Classification Notes document included in this Appendix provides additional information and interpretation of bat acoustic data (SonoBat, 2017).

Manual vetting of files was completed in addition to using the auto-ID feature due to the limitations of the software that results from the inherent variability of bat calls and the overlap that can occur in frequency characteristics between species. A species with similar call characteristics can occasionally (or often depending on the overlap) produce calls with data on the fringes of its parameter space that intrudes into the parameter space of another species, or even falls at the centroid of the other species' parameter space (SonoBat, 2017).

The summary table produced by SonoBat states the caveat that statistical probability of presence requires a sufficient sample size for reliability. For most species, this requires more than ten accepted decisions. As a rule of thumb, any species decision summary count numbering less than ten should be considered to require manual vetting to establish presence. For each batch of files, species with a probability of > 0.80 and with more than ten accepted decisions were considered present on the subject property. Where fewer than ten species decisions were found, call structure and timestamps of individual files were analyzed to determine if there was overlap with other species which had a higher probability of presence on the site

The MNRF approved protocols for the passive monitoring of bats within treed habitats are summarized below.

Survey Protocol for Species at Risk Bats within Treed Habitats

Phase I: Bat Habitat Suitability Assessment

Little Brown Myotis, Northern Myotis and Tri-colored Bat establish maternity roosts in treed areas consisting of deciduous, coniferous or mixed tree species. The study area should be classified using the Ecological Land Classification (ELC) system. Any wooded ecosite containing deciduous, mixed, or coniferous tree species with a diameter at breast height (DBH) >10cm is considered suitable habitat.

If suitable habitat is to be impacted by a proposed activity, project proponents should proceed to Phase II.

Phase II: Identification of Suitable Maternity Roost Trees

The timing of field visits is important in order for an observer to be able to clearly identify tree attributes that are suitable for the establishment of maternity roosts. Field visits during leaf-on season should be conducted so foliage characteristics can be observed, while leaf-off surveys should be conducted to identify trees with cracks or hollows.

i) Tri-colored Bat
Within each ecosite identified as suitable maternity roost habitat in Phase I, the following trees should be documented on the field data sheet:

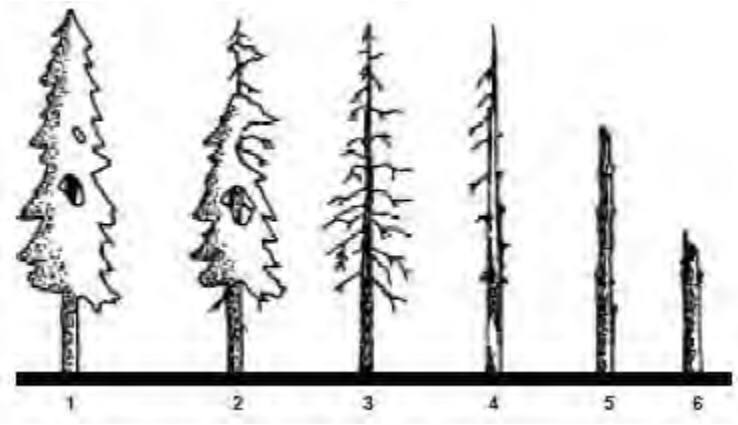
- any oak tree ≥10cm dbh
- any maple tree ≥10cm dbh IF the tree includes dead/dying leaf clusters
- any maple tree ≥25cm dbh

ii) Little Brown Myotis and Northern Myotis
A “snag” is any standing live or dead tree >10cm dbh with cracks, crevices, hollows, cavities, and/or

loose or naturally exfoliating bark. Within each ecosite identified as suitable maternity roost habitat in Phase I, all “snags” should be identified and relevant information recorded on the field data sheet provided

During the field visit, the Decay Class should be noted for each snag (see Figure 1). Snags in an early stage of decay (which also includes healthy, live trees) may be preferred by Little Brown Myotis and Northern Myotis if suitable attributes for roost space are present. However, since SAR bats will also roost in snags outside of Class 1-3, any snag >10cm dbh with suitable roost features should be documented.

Figure 1: Snag classification (Decay Class 1-3 is considered an early decay stage)



1. Healthy, live tree
2. Declining live tree, part of canopy lost
3. Very recently dead, no canopy, bark intact, branches intact
4. Recently dead, bark peeling, only large branches intact
5. Older dead tree, 90 percent of bark lost, few branch stubs, broken top
6. Very old dead tree, advanced decay, no branches, parts of the stem have rotted away

Phase III: Acoustic Surveys

Within each ELC ecosite determined to be suitable maternity roost habitat in Phase I, acoustic surveys are recommended to confirm presence/absence of Little Brown Myotis, Northern Myotis and Tri-colored Bat. As described below, acoustic detectors should be placed in the best possible locations in order to maximize the probability of detecting all three SAR bats species. The data collected in Phase II should be used to select optimal locations for monitoring.

To ensure full coverage of each ecosite, four acoustic monitors per hectare are required. Monitors should be set up 10m from the best potential maternity roosts. The best suitable maternity roosts for Tri-colored bat are live oaks with dead/dying leaf clusters, or dead oaks with retained dead leaf clusters. If oaks are absent, then maples with dead/dying leaf clusters are the best suitable maternity roosts. For Little Brown Myotis and Northern Myotis, the best roosts are the tallest snags, snags with cavities or crevices, and the snags with the largest DBH.

Prior to undertaking acoustic surveys, it is recommended that the proponent discuss the proposed location of acoustic monitoring stations with the MNRF. The best potential

Acoustic surveys should take place on evenings between June 1st and June 30th, commencing after dusk and continuing for 5 hours. Surveys should occur on warm/mild nights (i.e., ambient temperature >10°C) with low wind and no precipitation. At least 10 visits on nights that align with the above conditions where no SAR bat activity is detected are required to confirm absence.

Full spectrum acoustic monitors should be used, and the microphone should be situated away from nearby obstacles to allow for maximum range of detection and angled slightly away from prevailing wind to minimize wind noise. Information on the equipment used should be recorded, including information on all adjustable settings (e.g., gain level), the position of the microphones, and dates and times for each station where recording was conducted.

Analytical software should be used to interpret bat calls and process results. Data should be analyzed to the species level (as opposed to the genus level) in order to confirm presence/absence of SAR bats.

Phase IV: Snag Density Survey

The snag density survey involves a qualitative assessment of the ecosite to determine the density of standing snags present. There is no minimum number of snags for the site to be considered potential roosting habitat, however, a site with 10 or more snags can be considered high quality roosting habitat.

Phase V: Complete an Information Gathering Form

If any species at risk are identified within the ecosite, an Information Gathering Form should be completed and submitted to the OMNRF.

Snag Survey Results

Project Name: 53814 Zion Road EIS **Survey Date:** 06-Apr-21 **Observer(s):** A.M & S.C

Tree #	Tree Species	dbh (cm)	Height Class	Snag Attributes	Easting	Northing	Notes
1	Maple sp.	82.5	2	Crack, Knot Hole, Decay Class 1-3	624760	4755680	
2	Dead Ash	24	3	Loose Bark, Crack, Knot Hole	624742	4755672	
3	Dead Ash	76.5	2	Loose Bark, Crack	624747	4755660	
4	Maple sp.	57	2	Crack, Decay Class 1-3	624703	4755668	Multistem
5	Dead	22.5	4	Crack, Knot Hole, Other Snag Within 10m	624703	4755697	
6	Dead	33.5	3	Cavity, Loose Bark, Crack, Knot Hole, Other Snag Within 10m	624705	4755702	
7	Dead	67	2	Loose Bark, Crack, Other Snag Within 10m	624685	4755697	trifercated
8	Dead	28	2	Loose Bark, Crack, Other Snag Within 10m	624688	4755694	
9	Dead	29	2	Loose Bark, Crack, Other Snag Within 10m	624691	4755696	
10	Maple sp.	93.5	2	Cavity, Knot Hole, Decay Class 1-3	624669	4755700	Bifercated
11	Maple sp.	96	2	Cavity, Loose Bark, Decay Class 1-3	624664	4755701	
12	Maple sp.	103	2	Cavity, Knot Hole, Decay Class 1-3	624654	4755701	
13	Willow sp.	120	1	Cavity, Crack, Decay Class 1-3	624652	4755728	
14	Dead	53	2	Loose Bark, Crack, Knot Hole	624650	4755760	
15	Dead	26.5	3	Cavity, Loose Bark, Crack	624632	4755689	
16	Dead	20	3	Loose Bark, Crack	624641	4755685	
17	Dead	28	3	Loose Bark, Crack, Other Snag Within 10m	624624	4755685	
18	Dead	18	4	Cavity, Loose Bark, Crack, Other Snag Within 10m	624624	4755683	
19	Dead	20	4	Cavity	624619	4755680	
20	Dead	17	3	Cavity, Loose Bark	624615	4755644	
21	Maple sp.	26	2	Cavity, Decay 1-3	624618	4755636	
22	Dead	29.5	3	Loose Bark, Crack	624638	4755667	
23	Dead	30.5	4	Loose Bark, Crack	624638	4755667	
24	Maple sp.	70	2	Loose Bark, Crack	624736	4755763	
25	Dead	58	3	Loose Bark, Crack, Knot Hole	624698	4755756	
26	Maple sp.	48	2	Loose Bark, Knot Hole	624681	4755757	

Appendix D

Data Summaries

Table D-1: Significant Wildlife Habitat Results for 53841 Zion Road, in the Township of Wainfleet.

Significant Wildlife Habitat (SWH) Type	Rationale	Field Studies Completed	SWH Confirmed
1.1 Seasonal Concentration Areas for Wildlife Species			
Bat Maternity Colonies	Mature trees in woodland habitat with potential standing snags	MNRF Survey Protocol for SAR Bats within Treed Habitats (MNRF, 2017)	No
Reptile Hibernaculum	Potential for slopes and burrows	Milk Snake Protocol – hand searches	No
Colonially-Nesting Bird Breeding Habitat (Tree/Shrubs)	Potential nesting trees within wetland habitat	Area Searches in accordance with Bird and "Bird Habitats: Guidelines for windpower projects" (MNRF 2011)	No
1.2 Rare Vegetation Communities or Specialized Habitat for Wildlife			
Other Rare Vegetation Communities	Variable ELC Ecosites present	ELC surveys	No
Turtle Nesting Areas	Presence of open water habitat	Area searches	No
Amphibian Breeding Habitat (Woodland)	Wetland habitat within to woodland	Marsh Monitoring Program	No
Amphibian Breeding Habitat (Wetlands)	Presence of wetland habitat	Marsh Monitoring Program	No
1.3 Habitats of Species of Conservation Concern			
Marsh Breeding Bird Habitat	Wetland habitat available	Breeding Bird Survey	No
Special Concern and Rare Wildlife Species	MNRF known EOs provided (NHIC). See SAR screening below	Area inventories	Yes
1.4 Animal Movement Corridors			
Amphibian Movement Corridor	Candidate amphibian woodland and wetland breeding habitat identified	Area searches/ road mortality surveys	No

Table D-2: Plant list for 53814 Zion Road, Wainfleet

SCIENTIFIC NAME	COMMON NAME	S-RANK	COSEWIC STATUS	SARA STATUS	SARO STATUS	NIAGARA	COEFF CONSER	COEFF WETNESS	Polygon 1	Polygon 2	Polygon 3	Polygon 4
TREES												
Acer negundo	Manitoba Maple	S5				C	0	0	•			•
Acer saccharum	Sugar Maple	S5				C	4	3			•	
Acer x freemanii	Freemans Maple	hyb				SNA	6	-5	•	•	•	•
Crataegus sp	Hawthorn species											•
Fraxinus sp.	Ash species								•	•	•	
Juglans nigra	Black Walnut	S4				C	5	3	•		•	•
Juniperus virginiana	Red Cedar	S5				C	4	3	•		•	
Malus sp.	Fruit species								•			
Morus alba	White Mulberry	SNA				IC	*	0	•		•	•
Picea sp.	Spruce species								•		•	
Populus deltoides	Eastern Cottonwood	S5				C	4	0	•			•
Quercus macrocarpa	Bur Oak	S5				U	5	3	•		•	•
Robinia pseudoacacia	Black Locust	SNA				IC	*	3	•			•
Salix sp	Willow species										•	
Ulmus sp.	Elm species								•	•		
SHRUBS												
Cornus amomum	Silky Dogwood	S5				C	2	-3	•			
Cornus racemosa	Gray Dogwood	S5				C	2	0	•			
Cornus sp.	Dogwood species									•		
Elaeagnus umbellata	Autum Olive	SNA				IU	*	3	•			
Forsythia viridissima	Green-stemmed Forsythia	SNA				IR	*	5			•	
Lonicera sp	Honeysuckle species									•		•
Rhamnus cathartica	Common Buckthorn	SNA				IC	*	0		•	•	
Rhus typhina	Staghorn Sumac	S5				C	1	3	•	•		
Ribes cynosbati	Prickly Gooseberry	S5				C	4	3			•	
Ribes sp.	Currant species										•	
Rosa sp.	Rose species								•		•	
Rubus allegheniensis	Allegheny Blackberry	S5				C	2	3	•			
Rubus idaeus	Common Red Raspberry	S5				C	2	3		•		
Rubus occidentalis	Black Raspberry	S5				C	2	5	•		•	•
Rubus odoratus	Purple-flowering Raspberry	S5				C	3	5			•	
Salix sp	Willow species								•			
Sambucus canadensis	Common Elderberry	S5				C	5	-3			•	
Spiraea alba	White Meadowsweet	S5				C	3	-3	•			
Viburnum recognitum	Southern Arrowwood	S4				C	7	0	•			
Viburnum trilobum	Highbush Cranberry	S5				C	5	-3	•			
HERBS												
Ajuga sp.	Bugleweed species									•		
Alliaria petiolata	Garlic Mustard	SNA				IC	*	0			•	
Allium sp.	Onion species											
Ambrosia artemisiifolia	Common Ragweed	S5				C	0	3	•			
Ambrosia trifida	Great Ragweed	S5				C	0	0				
Anemone quinquefolia	Wood Anemone	S5				C	7	0				
Apocynum cannabinum	Indian Hemp	S5				C	3	0	•			•
Arctium minus	Common Burdock	SNA				IU	*	3	•			
Arisaema triphyllum	Jack-in-the-pulpit	S5				C	5	0			•	
Asclepias syriaca	Common Milkweed	S5				C	0	5	•			
Bidens sp.	Beggarticks species									•		
Boehmeria cylindrica	False Nettle	S5				C	4	-5	•	•	•	•
Carex bebbii	Bebb's Sedge	S5				C	3	-5	•			
Carex sp	Carex species									•		
Carex vulpinoidea	Fox Sedge	S5				C	3	-5	•			
Chelidonium majus	Greater Celandine	SNA				IC	*	5	•			
Circaea canadensis	Enchanter's Nightshade	S5				C	2	3	•		•	
Cirsium sp.	Thistle species								•		•	
Convallaria majalis	European Lily-of-the-valley	SNA				IU	*	5			•	
Convolvulus arvensis	Field Bindweed	SNA				IC	*	5	•			
Crocus sp.	Crocus species								•			
Daucus carota	Wild Carrot	SNA				IC	*	5	•			
Dipsacus fullonum	Common Teasel	SNA				IC	*	3	•			
Dryopteris sp.	Wood Fern species									•	•	
Elymus repens	Quackgrass	SNA				IC	*	3	•			
Equisetum sp.	Horsetail species								•			•
Erigeron philadelphicus	Common Fleabane	S5				C	2	0	•		•	
Eupatorium perfoliatum	Common Boneset	S5				C	2	-3		•		
Eutrochium maculatum	Spotted Joe Pye Weed	S5				C	3	-5		•		
Fragaria sp.	Strawberry species								•		•	
Galium aparine	Cleavers Bedstraw	S5				C	4	3	•		•	•
Geum aleppicum	Yellow Avens	S5				C	2	0		•		
Geum canadense	White Avens	S5				C	1	0		•	•	•
Geum laciniatum	Rough Avens	S4				C	2	-3	•			
Glechoma hederacea	Ground Ivy	SNA				IC	*	3	•			•
Glyceria striata	Fowl Mannagrass	S5				C	3	-5		•	•	
Hesperis matronalis	Dame's Rocket	SNA				IC	*	3	•		•	•
Hyacinthus sp.	Hyacinth species								•			
Hypericum sp.	St. John's-wort species											
Impatiens capensis	Spotted Jewelweed	S5				C	4	-3	•	•	•	•
Lactuca sp	Lettuce species								•		•	
Leonurus cardiaca	Common Motherwort	SNA				IC	*	5	•		•	•
Lepidium campestre	Field Peppergrass	SNA				IC	*	5	•			
Lotus corniculatus	Birdfoot Trefoil	SNA				IC	*	3				
Lunaria annua	Annual Honesty	SNA				IR	*	5			•	
Lycopus americanus	American Water-horehound	S5				C	4	-5	•			
Melilotus officinalis	Yellow Sweet-clover	SNA				IC	*	3	•			
Monarda fistulosa	Wild Bergamot	S5				C	2	3	•			
Myosotis laxa	Smaller Forget-me-not	S5				C	6	-5	•			
Narcissus sp.	Daffodil species								•			
Onoclea sensibilis	Sensitive Fern	S5				C	4	-3	•	•	•	
Osmorhiza claytonii	Hairy Sweet Cicely	S5				C	5	0		•	•	
Oxalis sp.	Wood-sorrel species								•			
Parthenocissus quinquefolia	Virginia Creeper	S5				C	6	3	•		•	
Persicaria virginiana	Jumpseed	S4				C	6	0		•	•	
Phalaris arundinacea	Reed Canary Grass	S5				C	0	-3	•	•		•

Phleum pratense	Common Timothy	SNA	IC	*	3	•			
Plantago lanceolata	English Plantain	SNA	IC	*	3	•			
Poaceae sp.	Grass species					•		•	
Podophyllum peltatum	May-apple	S5	C	5	3			•	
Potentilla recta	Sulphur cinquefoil	SNA	IC	*	5	•			
Rumex crispus	Curly Dock	SNA	IC	*	0	•			
Sanguinaria sp.	Bloodroot species					•			
Solanum dulcamara	Bittersweet Nightshade	SNA	IC	*	0	•			•
Solidago Canadensis	Canada Goldenrod	S5	C	1	3	•	•	•	
Solidago rugosa	Rough-stemmed Goldenrod	S5	C	4	0	•	•		
Solidago sp.	Goldenrod species					•		•	
Sonchus asper	Prickly Sow-thistle	SNA	IC	*	3	•			
Symphyotrichum lanceolatum	Panicled Aster	S5	C	3	-3	•		•	
Symphyotrichum novae-angliae	New England Aster	S5	C	2	-3	•			
Taraxacum officinale	Common Dandelion	SNA	IC	*	3	•			
Toxicodendron radicans	Poison Ivy	S5	C	2	0	•		•	•
Trifolium pratense	Red Clover	SNA	IX	*	3	•			
Trillium erectum	Red Trillium	S5	C	6	3			•	
Tulipa sp.	Tulip species					•			
Tussilago farfara	Coltsfoot	SNA	IC	*	3	•		•	
Urtica dioica	Stinging Nettle	S5	C	2	0			•	
Vicia cracca	Tufted Vetch	SNA	IC	*	5	•			
Vicia sp.	Vetch species							•	
Viola sp.	Violet species					•		•	
Vitis sp.	Grape species					•	•	•	•
TOTAL						80	26	50	23

EESN BIRD INVENTORY 2021
Zion Rd
Survey Dates June 6, June 29
Observers N Litwin, A Brunning
 # Species Observed =39
 # Species at Risk = 3

OBBA: Ontario Breeding Bird Atlas (2001-2005) 10km X 10km Squares
COSEWIC July 2021: LOW, MID, HIGH = Candidate Priority Status
SARA status current to July 2021
SARO status current to July 2021
OPIF (Ontario Partners in Flight) July 2014
OPIF BCR 13 = Bird Conservation Region 13
OPIF Population Objective M = Maintain, I = Increase, R = Recovery, D = Decrease
Area Sensitivity: (V) = uses edge if forest interior also nearby
List in accordance with the American Ornithologists Union (AOU) 7th edition, 61st supplement
Reference Ontario Field Ornithologists Checklist of the Birds of Ontario
http://www.ofo.ca/site/page/view/checklist.checklist#top

COMMON NAME	SCIENTIFIC NAME	OBSERVED	OBBA 17PH25	COSEWIC	SARA	SARO	S RANK	S RANK REASONS	N RANK	G RANK	OPIF BCR13	HABITAT NOTES	AREA SENSITIVITY
Anatidae													
Mallard	Anas platyrhynchos	X adjacent property	CONF				S5	Widespread and common breeding species throughout the province. Trends not known.	N5B,N5N	G5	**M**		
Columbidae													
Rock Pigeon	Columba livia	X	PROB				SNA	Exotic. Widespread and common breeding species around human habitation (cities, towns, rural farmland).	NNA	G5			
Mourning Dove	Zenaida macroura	X	CONF				S5	Common breeding species throughout most of its Ontario range, although more sparsely distributed at the northern edge of its range. Increasing.	N5	G5			
Cuculidae													
Yellow-billed Cuckoo	Coccyzus americanus	X	PROB				S4B	Uncommon to rare breeding species throughout its Ontario range. Stable?	N4B	G5		shrub/successional; caterpillar specialist; sensitive to pesticides	
Charadriidae													
Killdeer	Charadrius vociferus	X	CONF				S5B,S5N	Common and widespread breeding species throughout Ontario, although less common in the north. Stable.	N5B	G5	**I**	open fields	
Ardeidae													
Green Heron	Butorides virescens	X	PROB				S4B	Uncommon breeding species throughout southern Ontario south of the Canadian Shield. Trends not known.	N4B	G5	**I**	small wooded waterbodies	
Cathartidae													
Turkey Vulture	Cathartes aura	roosting in woodlot	POSS				S5B	Uncommon breeding species throughout its Ontario range. Increasing.	N5B	G5			
Alcedinidae													
Belted Kingfisher	Megaceryle alcyon	X 1st visit					S4B	Common and widespread breeding species throughout Ontario, although less common in the far north. Declining?	N5B	G5	**I**	nests are burrows; sensitive to disturbance near nest sites; sensitive to water quality, erosion, flood control measures reduce availability of nesting burrows	
Picidae													
Red-bellied Woodpecke	Melanerpes carolinus	X	CONF				S4	Relatively rare and largely irregular breeding species with a restricted range in Ontario, primarily found in appropriate habitat within the Carolinian Forest zone.	N4	G5		cavity nester	(V)
Downy Woodpecker	Picoides pubescens	X	CONF				S5	Common breeding species throughout most of its Ontario range. Trends not known.	N5	G5		cavity nester	
Northern Flicker	Colaptes auratus	X	CONF				S4B	Common and widespread breeding species throughout Ontario, although less common in the far north. Stable?	N5B	G5	**I**	cavity nester, primary excavator requiring snags >30cm dbh; ant predator	
Tyrannidae													
Eastern Wood-Pewee	Contopus virens	X	CONF		**SC**	**SC**	S4B	Common breeding species throughout most of its Ontario range. Trends not clear.	N5B	G5	**I**	aerial insectivore; intermediate, closed-canopy woodlands; does not nest near development	(V)
Vireonidae													
Warbling Vireo	Vireo gilvus	X	CONF				S5B	Common breeding species throughout its Ontario range. Increasing.	N5B	G5		open woodland	
Red-eyed Vireo	Vireo olivaceus	X	CONF				S5B	Common to abundant, and widespread breeding species. Trends not clear.	N5B	G5		closed canopy woodland	(V)
Corvidae													

Blue Jay	Cyanocitta cristata	X	CONF				S5	Common breeding species throughout most of its Ontario range, becoming less common in the northern portions of its range. Increasing?	N5	G5				
Hirundinidae														
Tree Swallow	Tachycineta bicolor	X (2)	CONF				S4B	Common and widespread breeding species throughout Ontario. Stable?	N5B	G5		aerial insectivore		
Purple Martin	Progne subis	X (6)	CONF	**LOW**			S4B		N5B	G5	**I**	aerial insectivore		
Barn Swallow	Hirundo rustica	X	CONF	**THR**	**THR**	**THR**	S4B	Common breeding species throughout southern Ontario, locally common north to the northern transcontinental railway, and rare in the extreme north. Declini	N5B	G5	**R**	aerial insectivore		
Paridae														
Black-capped Chickade	Poecile atricapillus	X	CONF				S5	Common breeding species throughout most of its Ontario range. Stable.	N5	G5		cavity nester		
Sittidae														
Red-breasted Nuthatch	Sitta canadensis	X					S5	Common breeding species throughout most of its Ontario range, less common in the southern portion of its range. Increasing?	N5	G5		cavity nester	√	
White-breasted Nuthat	Sitta carolinensis	X	CONF				S5	Common breeding species throughout most of its Ontario range, less common in the northern portion of its range. Increasing?	N5	G5		cavity nester	√	
Troglodytidae														
House Wren	Troglodytes aedon	X	CONF				S5B	Common to very common breeding species throughout most of its Ontario range, less common and local in the northern portion of its range. Increasing?	N5B	G5		nests in holes		
Turdidae														
Wood Thrush	Hylocichla mustelina	X	PROB	**THR**	**THR**	**SC**	S4B	Fairly common breeding species throughout most of its Ontario range. Trends not clear.	N4B	G5	**M**	woodland	(V)	
American Robin	Turdus migratorius	X	CONF				S5B	Common and widespread breeding species. Increasing.	N5B,N5N	G5				
Mimidae														
Gray Catbird	Dumetella carolinensis	X	CONF				S4B	Common breeding species throughout its Ontario range. Stable?	N5B	G5		shrubby thickets		
Sturnidae														
European Starling	Sturnus vulgaris	X	CONF				SNA	Exotic. Widespread and common breeding species around human habitation (cities, towns, rural farmland).	NNA	G5		nests in holes		
Bombycillidae														
Cedar Waxwing	Bombycilla cedrorum	X	CONF				S5B	Common and widespread breeding species. Stable.	N5	G5		shrubby thickets, open woodlands		
Fringillidae														
House Finch	Carpodacus mexicanus	X	PROB				SNA		N5	G5				
American Goldfinch	Carduelis tristis	X	PROB				S5B	Common breeding species in the south, less common in the northern portions of its Ontario range. Declining?	N5B,N5N	G5				
Emberizidae														
Chipping Sparrow	Spizella passerina	X	CONF				S5B	Widespread and abundant species which appears to have increased dramatically since the 1960s. Threats minimal.	N5B	G5		urban-tolerant		
Song Sparrow	Melospiza melodia	X	CONF				S5B	Common to abundant, and widespread breeding species. Stable.	N5B,N5N	G5		shrubby thickets		
Icteridae														
Baltimore Oriole	Icterus galbula	X	CONF				S4B	An abundant breeding species in southern Ontario, becoming uncommon to rare and local in the north. Stable or declining.	N5B	G5	**M**	deciduous trees and park-like areas; susceptible to pesticides, vehicular collisions		
Red-winged Blackbird	Agelaius phoeniceus	X	CONF				S4	An abundant breeding species in southern Ontario, becoming uncommon to rare into the Boreal Forest Region. Stable.	N5B,N5N	G5		wetlands		
Brown-headed Cowbird	Molothrus ater	X	CONF				S4B	Common to abundant species in southern Ontario. Declining?	N5B	G5				
Common Grackle	Quiscalus quiscula	X	CONF				S5B	Common to abundant breeding species throughout its Ontario range. Declining?	N5B	G5				
Parulidae														
Yellow Warbler	Setophaga petechia	X	CONF				S5B	Common and widespread breeding species. Increasing.	N5B	G5		shrubby thickets		
Cardinalidae														
Northern Cardinal	Cardinalis cardinalis	X	CONF				S5	Common breeding species throughout its Ontario range. Stable.	N5	G5				
Rose-breasted Grosbea	Pheucticus ludovicianus	X	CONF				S4B	Common breeding species throughout its Ontario range. Declining.	N5B	G5	**M**	woodlands; of conservation concern, may be area-sensitive	(V)	
Indigo Bunting	Passerina cyanea	X	CONF				S4B	Common breeding species throughout its Ontario range. Increasing.	N5B	G5		hedgerows, woodlot edges		

Table D-3: Table showing the call codes recorded at each survey station during Marsh Monitoring Protocols. Call codes were recorded as 1 (individuals can be clearly distinguished), 2 (Some overlap in calls, but number of individuals can be estimated), 3 (full chorus of calls) and NC (no call heard).

Species	Station 1		
	S1	S2	S3
Western Chorus Frog	3	1	NC
Wood Frog	2	NC	NC
American Toad	NC	1	1
Gray Treefrog	NC	NC	2

Table D-4: Summary of the results of bat acoustic monitoring surveys. CONF – confirmed presence; NC – not confirmed; POSS – presence is possible based on results; PROB – presence is probable based on results.

Species	Monitor Results		Presence
	SM-11	SM-9	
Big Brown Bat	100% (1449)	100% (127)	CONF
Eastern Red Bat	100% (60)	37% (2)	CONF
Hoary Bat	0% (28)	-	NC
Silver-haired Bat	0% (28)	1% (2)	NC

Table D-5: Summary of incidental fauna species observations on the subject property

Latin Name	Common Name	Date Observed (2021)
Pseudacris triseriata	Western Chorus Frog	April 6, 13 & 19
Colaptes auratus	Northern Flicker	April 13, May 5 & June 22
Cyanocitta cristata	Blue Jay	April 13
Poecile atricapillus	Black-capped Chickadee	April 13
Cathartes aura	Turkey Vulture	April 13, May 5 & 11
Turdus migratorius	American Robin	May 11
Odocoileus virginianus	White-Tailed deer	May 5 & June 22
Thamnophis sp.	Garter Snake sp.	May 11
Quiscalus quiscula	Common Grackle	June 22
Danaus plexippus	Monarch	June 22

Appendix E

Site Photos

Figure 1: Looking northeast in the southern portion of Polygon 1 (MEMM4 incl. WOMM4) at the woodland inclusion.

Figure 2: Soil sample in Polygon 1

Figure 3: Looking west in the northern portion of Polygon 1 (MEMM4 incl. WOMM4)

Figure 4: Second soil sample in Polygon 1

Figure 5: Polygon 2 (SWDM3-3)

Figure 6: Soil sample in Polygon 2 (SWDM3-3)

Figure 7: Polygon 3 (WODM4)

Figure 8: Soil sample in Polygon 3

Figure 9: Looking east in Polygon 4 (WODM4)

Figure 10: Soil sample in Polygon 4