



Corlon Properties

Sunningdale North Environmental Impact Study

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1. Introduction

Ecosystem Recovery Inc. (ERI) has been retained by Corlon Properties Inc. to provide consulting services in support of the proposed redevelopment of a portion of the Sunningdale Golf Club north of Sunningdale Road and east of Wonderland Road. ERI has undertaken the required investigations to prepare an Environmental Impact Study (EIS) for the Sunningdale Golf Club property. The preparation of the EIS is an integral step in the municipal planning process and is a requirement of the City of London Official Plan (OP) and the new The London Plan policies. As this project is considered development and site alteration, completion of the EIS in accordance with the City's policy is required.

This report has been prepared in accordance with the requirements of the City of London's Environmental Management Guidelines (2007) and is consistent with the Provincial Policy Statement (2020), the Natural Heritage Reference Manual (2010) and other relevant Provincial and Federal legislation, policies, and regulations.

1.1 Study Area and Surrounding Land Use

The study area for this EIS Report includes lands north of Sunningdale Road, east of Wonderland Road and confined by the Medway Creek on the west. The study area includes lands which are part of the Sunningdale Golf & Country Club's active golf operations, active agricultural lands, and the Medway Valley. The study area and surrounding land uses are shown in Figure 1-1.

As per the London Plan's Map 1 Place Types, the majority of the lands are designated as green space and neighbourhood. Natural Heritage Map 5 of the London Plan outlines the natural heritage system features present within the study area to include valleyland, significant corridor, significant valleyland, unevaluated vegetation patches, unevaluated corridor, potential naturalization areas. These natural heritage system features are presented on Figure 1-2.

1.2 Proposed Development

As per Map 1 of the London Plan (2019), the proposed development lands are predominately designated as Green Space with approximately 10 hectares of land along Wonderland Road designated as Neighbourhood. The partial redevelopment of the Sunningdale Golf and Country Club lands is proposed to be designated Neighbourhood, while Natural Heritage Features will be designated as Green Space through an Official Plan Amendment process.

Under the London Plan, the Neighbourhood Place Type allows a list of permitted uses ranging from low density (i.e. single detached houses) to medium density (stacked townhomes, low-rise apartments). The type of residential development permitted with the

Neighbourhood Place Type is determined by the classification of roadway that the development fronts.

The Sunningdale North Development is anticipated to be predominately low-density residential. Smaller areas of medium density housing may be included within the lands fronting Sunningdale Road and Wonderland Road. Open Space will be designated for the Axford Drain corridor, in addition to any lands dedicated for parkland. The proposed draft plan of the subdivision is presented in Appendix A.

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Corlon Properties
Sunningdale North EIS

Figure 1-1
Study Area

- Legend**
- Study Area
 - Study Area 120 m Buffer
 - City of London Municipal Boundary

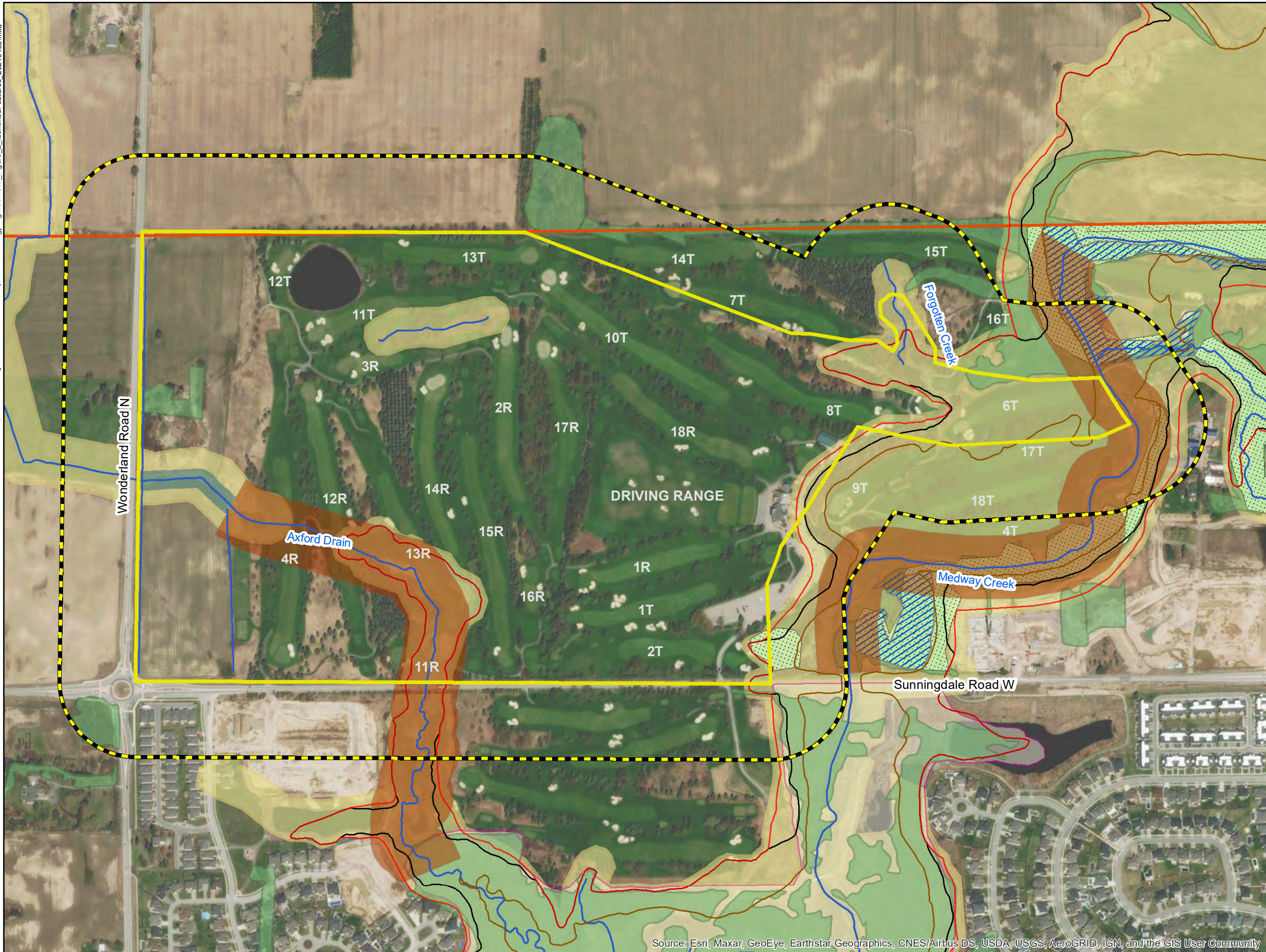
Golf Course Green Legend
T - Thompson Course
R - Robinson Course



NAD 1983 UTM 17	1:5,750
Project: 1817 Corlon Properties Date: 2021/04	

Data Sources: Ecosystem Recovery Inc., 2021; The London Plan - City of London, ESRI World Imagery

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Corlon Properties
Sunningdale North EIS

Figure 1-2
Identified Features and
Hazard Limits

- Legend**
- Study Area
 - Study Area 120 m Buffer
 - Maximum Hazard Line (CoL)
 - Regulatory Floodline (CoL)
 - Erosion Hazard Limit for Confined Systems (CoL)
 - Watercourse
 - City of London Boundary
 - Significant Corridor (CoL)
 - Unevaluated Stream/Ravine Corridor (CoL)
 - Unevaluated Wetland (CoL)
 - Unevaluated Vegetation Patches (CoL)
 - Woodland (MNRF)
 - ESA (CoL)
 - UTRCA Regulation Limit

Golf Course Green Legend
T - Thompson Course
R - Robinson Course



NAD 1983 UTM 17	1:5,750
Project: 1817 Corlon Properties Date: 2021/04	

Data Sources: Ecosystem Recovery Inc., 2021;
The London Plan - City of London, Ministry of Natural Resources and Forestry, ESRI World Imagery

1.3 Agency Correspondence

The Ministry of Natural Resources and Forestry (MNRF) Aylmer District was consulted to request available natural heritage information including species at risk (SAR) records, fish dot information and relevant wildlife records. The MNRF was contacted on July 24th, 2018, and a response was received on December 20th, 2018. The response letters from the MNRF correspondence are provided in Appendix B.

The Upper Thames Conservation Authority (UTRCA) was consulted to request aquatic and terrestrial records for the study area and surrounding lands on September 9th, 2018 and a response was received on September 17th, 2018. The response letter and the UTRCA correspondence are provided in Appendix B.

The Ministry of Environment, Conservation and Parks (MECP) was not consulted as part of this project as the project commenced prior to April 1, 2019, in which the administration of the Endangered Species Act (2007) transitioned responsibility from the MNRF to the MECP. MNRF correspondence was completed prior to the transition of responsibility.

The Department of Fisheries and Oceans (DFO) has been contacted to discuss the preliminary stages of the proposed Axford Drain creek and corridor realignment. DFO indicated that the submission of a Request for Review for the proposed project will be required as it is located in a watercourse identified as aquatic SAR habitat and realignment of the watercourse will occur. A Request for review will be submitted once the Axford Drain corridor concept is finalized. DFO's review of the proposed project will provide recommendations on any requirements, additional field surveys or permitting requirements necessary for the project.

2. Relevant Policies and Legislation

The evaluation of the Sunningdale North lands requires consideration of legislation and policies at all three levels of government; municipal, provincial, and federal. An outline of the legislation and policies relevant to natural heritage features and functions as they relate to lands within the study area is presented in Table 2-1.

Table 2-1. Relevant Legislation, Policies and Guidelines.

Type	Legislation	Policies/Regulations	Guidelines
Federal	Fisheries Act (2019)	Policy for the Management of Fish	
Federal	Migratory Birds Convention Act (1994)	Regulations Respecting the Protection of Migratory Birds	
Federal	Species at Risk Act (2002)		
Provincial	Conservation Authorities Act (1990)	Ontario Regulation 150/06	Upper Thames River Conservation Authority Policies for the Development, Interference, with Wetlands and Alterations to Shorelines and Water Courses Regulation/UTRCA Environmental Planning Policy Manual
Provincial	Endangered Species Act (2007)	Ontario Regulation 230/08 updated July 2013	
Provincial	Planning Act (1990)	Provincial Policy Statement (2020)	Natural Heritage Reference Manual (1999)
Municipal	City of London Official Plan – The London Plan (2016)	Environmental Policies	Environmental Management Guidelines (2007)

2.1 Federal

2.1.1 Fisheries Act

As one of the oldest acts in Canada, the federal Fisheries Act gives the Minister of Fisheries and Oceans the legislative authority to protect fish and fish habitat from destructive activities in marine and inland waters. It is a sound tool for the management of Canada's fisheries resources and supporting habitat, and the Department of Fisheries and Oceans Canada (DFO) has the constitutional responsibility to enforce the Act. There are two main provisions outlined in the Act. The first provision directs the management of threats to fish and fish habitat, by managing threats to fish that are part of or support commercial, recreational, or Aboriginal fisheries, with the goal of ensuring their productivity and ongoing sustainability. The second provision relates to pollution prevention, by prohibiting the "deposit of deleterious substances into water frequented by fish, unless authorized by regulations under the Fisheries Act or other federal legislation."

Fish habitat is the environment that fish need to live, grow, and reproduce. It is defined under Section 34 (1) as spawning grounds and nursery, rearing, food supply and migration areas on which fish depend directly or indirectly, to carry out their life processes.

Prior to recent changes to DFO policy, a DFO self-assessment was required to be undertaken at the commencement of the project by a qualified environmental professional for any projects near water which have the potential to cause harm to fish, or fish habitat. After these changes, the assessment process has been updated and all projects near or in water, which have potential to cause harm to fish or fish habitat, require review from DFO. If the project cannot avoid serious harm to fish or is likely to contravene to the Species at Risk Act (SARA) prohibitions with respect to aquatic species, the project requires a review by DFO.

2.1.2 Migratory Birds Convention Act

The federal Migratory Birds Convention Act (MBCA), (MBCA 1994), is applied through The Regulations Respecting the Protection of Migratory Birds that states, "[...] no person shall disturb, destroy or take a nest, egg [...] of a migratory bird." This law protects all birds aside from the introduced species European Starling, House Sparrow, and Rock Pigeon. Bird nests that are destroyed during the course of construction and other related activities is referred to as "incidental take" and is illegal except under the authority of a permit obtained through the Canadian Wildlife Service (CWS, 2014).

Requirements under the MBCA may apply to the proposed works at the time of pre-construction vegetation clearing and during construction. No vegetation clearing will be permitted during the breeding bird nesting period. Generally, the period during which vegetation clearing is prohibited is between April 1st and August 31st (CWS, 2014).

2.1.3 Species at Risk Act

The term SAR is used to encompass species that are designated Extirpated, Endangered (END), Threatened (THR) or Special Concern (SC) under the SARA and/or Endangered Species Act (ESA), in Canada and Ontario, respectively. SAR designations under SARA are based on scientific recommendations from the Committee on the Status of Endangered Wildlife in Canada (COSEWIC). SARA incorporates a number of prohibitions to protect individuals listed under the *Act* where they occur on federal lands. Although some species designated by COSEWIC are not protected under SARA, they may be under consideration for up-listing, and may need additional protection at that time.

On privately owned or provincial lands in Ontario, species classified as Endangered or Threatened on the Species at Risk in Ontario (SARO) list are given protection under the *ESA*. Notwithstanding, prohibitions given under SARA still apply to aquatic species listed under Schedule 1 of SARA and protected under the Fisheries Act; and migratory birds protected by the MBCA listed on Schedule 1, unless otherwise recommended by the Minister of the Environment to the Governor in Council (as per Section 34, 58 and 61 of the Act). These activities will require a DFO review under the Fisheries Act Protocol and/or will require consultation and appropriate permitting with the local MNR.

2.2 Provincial

2.2.1 Planning Act- Provincial Policy Statement

The Provincial Policy Statement (PPS) (Ontario Ministry of Municipal Affairs and Housing (OMMAH), 2020) is a planning document that provides the framework for, and governs development within, the Province of Ontario. Development lands must be assessed for the presence of natural heritage features and sensitive hydrological features prior to construction to preserve various ecological resources. Natural heritage, surface water and groundwater features are protected under the PPS. Under Section 2.2.2 of the PPS, the diversity and connectivity of natural heritage features and the long-term ecological function of natural heritage systems be maintained, restored or improved where possible.

Natural heritage features are defined by the PPS (OMMAH, 2014) to include:

- Fish Habitat;
- Habitat of Endangered Species;
- Natural Heritage Systems;
- Significant Wildlife Habitat;
- Significant Wetlands;
- Significant Coastal Wetlands;

- Significant Woodlands in Ecoregions 6E and 7E;
- Significant Valleylands in Ecoregions 6E and 7E; and
- Natural Heritage Systems.

The PPS (2014) states:

- “1. Development and site alteration is not permitted in fish habitat, habitat of endangered species and threatened species except in accordance with provincial and federal requirements.
2. Development and site alteration is not permitted on adjacent lands to the natural heritage features and areas identified above (Items a to f), unless the ecological function of the adjacent lands has been evaluated and it has been demonstrated that there will be no negative impacts on the natural features or on their ecological functions.
3. Development and site alteration is restricted in or near sensitive surface water features and sensitive ground water features in order to protect the hydrologic functions of the feature. Mitigation and/or alternative development approaches may be required in order to protect, improve or restore sensitive surface water features, sensitive ground water features, and their hydrologic functions.”

Development and site alteration in or near sensitive features, such as groundwater, surface water, and natural heritage features should be restricted to provide protection, improvement and/or restoration of these features and their hydrologic function, as well as the quality and quantity of water within the watershed.

2.2.2 Conservation Authorities Act

The Conservation Authorities Act gives individual conservation authorities the power to regulate development and activities in or adjacent to river and stream valleys, watercourses, wetlands, hazardous lands in the Great Lakes and large inland lakes, and shorelines. Under the Conservation Authorities Act, regulations such as Development, Interference with Wetlands and Alterations to Shorelines and Watercourse are regulated by individual conservation authorities. The regulations apply to:

- Hazardous lands;
- Lands within 120m of a Provincially Significant Wetland;
- Wetlands greater than two hectares;
- Lands within 30m of non-provincially significant wetlands;
- Lands within river or stream valleys;

- Floodplains;
- Watercourses; and
- Wetlands.

Sunningdale Golf Course, Medway Creek and associated lands are within the Upper Thames River Conservation Authority (UTRCA) jurisdiction. Work must be conducted in accordance with Ontario Regulation 157/06 made under the Conservation Authorities Act and meet the requirements of the UTRCA. The UTRCA Regulation Limit is provided in the 'Hazard Limits' Figure 1-2.

2.2.3 UTRCA Environmental Planning Policy Manual

UTRCA Environmental Planning Policy Manual (UTRCA, 2006) includes policies for the protection of natural hazards and natural heritage features within their jurisdiction. This applies to UTRCA's Development with Wetlands and Alterations to Shorelines and Watercourses Regulation. The intent of the policy is to protect life, property from flood, erosion, ensure water quality, preserve, and manage natural areas, and provide outdoor recreational opportunities (UTRCA, 2006). This aligns similarly to the PPS.

2.2.4 Ontario Ministry of Natural Resources and Forestry

The MNRF is responsible for setting timing restriction windows for in water works. Timing windows are based on known fish species within waterbody and their spawning timing. This is the most important period within a fish's life cycle and are most vulnerable to influences.

2.2.5 Ministry of Environment, Conservation and Parks

Recent changes to the ESA involved the changing of the government agency responsible for administration of the ESA. The MECP has accepted responsibility of the ESA, which includes policy, legislation, regulations, and standards. The MECP is also responsible for the administration of Ontario's Drive Clean and Clean Water Act.

2.2.6 Endangered Species Act

The ESA is provincial legislature affording legal protection to SAR flora and fauna listed as Extirpated, Endangered, Threatened, Special concern on Schedule 1 of the Act, and are based on the scientific recommendations of the Committee on the Status of Species at Risk in Ontario (COSSARO).

ESA, 2007 (Government of Ontario) outlines the methods for the classification of Species at Risk in Ontario, and provides for their protection and recovery. The habitat of some species at risk is also protected under the ESA. The ESA defines the significant habitat of Endangered or Threatened species as the habitat that is necessary for maintenance, survival

and/or recovery of a naturally occurring or reintroduced population of Endangered or Threatened species and where those areas of occurrences are occupied or habitually occupied by the species during all or any part(s) of their life cycle.

The ESA (Subsection 9(1)) states:

“No person shall,

(a) kill, harm, harass, capture or take a living member of a species that is listed on the Species at Risk in Ontario List as an extirpated, endangered or threatened species;

(b) possess, transport, collect, buy, sell, lease, trade or offer to buy,

(i) a living or dead member of a species that is listed on the Species at Risk in Ontario List as an extirpated, endangered or threatened species,

(ii) any part of a living or dead member of a species referred to in subclause (i),

(iii) anything derived from a living or dead member of a species referred to in subclause (i); or

(c) sell, lease, trade or offer to sell, anything that the person represents to be a thing described in subclause (b) (i), (ii) or (iii).”

Clause 10(1) (a) of the *ESA* states:

“No person shall damage or destroy the habitat of a species that is listed on the Species at Risk in Ontario list as an endangered or threatened species.”

The *ESA* also includes preparation of recovery strategies for species ranked as Threatened or Endangered, and management plans for those ranked as Special Concern. An authorization or permit between the proponent and MNRF is required to authorize activities that would otherwise be prohibited by subsection 9(1) and 10(1) of the *ESA*. Although some species designated by COSEWIC and COSSARO are not protected under SARA and *ESA*, they may be under consideration for up-listing, and may need additional protection at that time.

2.3 Municipal

2.3.1 The London Plan

The London Plan (2018) provides “recognition and protection of natural features and ecological processes that are important to the sustainability of healthy urban and rural environments.” The components of the City of London Natural Heritage System are identified in the Environmental Policies Section of the London Plan, and include Natural Heritage Features which are identified as Green Space Place Type on Map 1 (Place Types) or are identified on Map 5 (Natural Heritage) and Map 6 (Hazards and Natural Resources) of the London Plan. These features are identified on Figure 1-2.

Features identified on Map 1 as Green Space Place Types represent significant natural features and ecological that receive protection. This includes the following:

- Fish Habitat;
- Habitat of Endangered and Threatened Species;
- Provincially Significant Wetlands, Wetlands and Unevaluated Wetlands;
- Significant Woodlands and Woodlands;
- Significant Valleylands;
- Significant Wildlife Habitat;
- Earth Science and Life Science Areas of Natural and Scientific Interest (ANSIs);
- Water Resource System;
- Environmentally Sensitive Areas (ESAs);
- Upland Corridors;
- Potential Naturalization Areas; and
- Adjacent Lands.

Additionally, the following features included in the Environmental Review Place Type require investigation for consideration for inclusion as a protected natural heritage features and include the following:

- Unevaluated Wetlands;
- Unevaluated Vegetation Patches;
- Other Vegetation Patches larger than 0.5 ha;
- Valleylands; and
- Potential Environmentally Significant Areas (ESAs).

Natural heritage areas that are within the Green Space Place Type represent significant natural features and ecological functions. Development and site alteration shall not be permitted within these areas unless an EIS demonstrates that there will be no negative impacts on natural heritage features and areas, and their ecological function and SARA

provisions have been addressed. This EIS has been prepared to determine the Natural Heritage Features within the study area.

2.4 Background Review

2.4.1 Secondary Source Review

A summary of available secondary sources of information collected and reviewed to determine existing Natural Environment conditions within the study area is outlined in Table 2-2.

Table 2-2. Information Reviewed.

Titles
Aerial Photographs and Satellite Images
Atlas of the Mammals of Ontario
City of London Environmental Impact Studies Guidelines and Checklist (2015)
City of London Official Plan & The London Plan (2018)
Conservation Authorities Act, Ontario Regulation 157/06 Upper Thames River Conservation Authority (Government of Ontario, 2006)
Ecological Land Classification for Southern Ontario, 1 st Approximation (Lee et al., 2008)
Endangered Species Act, 2007 (Government of Ontario, 2007)
Fisheries and Oceans Canada Species at Risk Fish and Mussel Maps
Medway Valley Natural Heritage Forest ESA Natural Heritage Inventory and Evaluation (Dillon, 2015)
Middlesex Natural Heritage systems Study 2014 (UTRCA, 2014)
Ministry of Natural Resources and Forestry Species at Risk
Natural Heritage Features Data layers from Land Information Ontario
Natural Heritage Information Centre
Natural Heritage Reference Manual for Natural Heritage Policies of the PPS, 2005 (MNRF, 2010)
Ontario Breeding Bird Atlas

Titles
Ontario Butterfly Atlas
Ontario Mammal Atlas
Ontario Odonata Atlas
Ontario Reptile and Amphibian Atlas
Ontario Wetland Evaluation System, southern manual, 3 rd Edition (MNRF, 2013)
Provincial Policy Statement (OMMAH, 2020)
Species at Risk Correspondence from Aylmer District
Significant Wildlife Habitat: Technical Guide (MNRF, 2000)
Slope Assessment Sunningdale Golf and Country Club (LDS, 2018)
Species at Risk Public Registry (Government of Canada, 2016)
Species at Risk Ontario List (Government of Ontario, 2016)
Upper Thames River Conservation Authority 2012 London Watershed Report Cards (UTRCA, 2012)

2.4.2 Significant Species Screening

Species at Risk

A screening exercise was completed to identify provincially and federally designated SAR and Species of Conservation Concern (SCC) that are known from the study area vicinity (i.e., within 10km) and have potential to occur in the study area. The screening was carried out by comparing the preferred habitats of SAR and SCC known in the region and identified as having been recorded in the vicinity of the study area through information gathered in various wildlife atlases, to the habitats present within the study area.

Species of Conservation Concern

Species identified by the MNRF as SCC, are defined as the following:

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

- Species that are designated federally as Endangered or Threatened by COSEWIC, but not provincially by COSSARO. If these species are listed under SARA, Schedule 1, then they are protected federally under SARA, but not provincially by the ESA.

More details on the results of the SAR and SWH screenings are provided below in Sections 4.2.1 and 4.2.2.

2.4.3 Previous Studies

Within the study area, a geomorphic assessment was previously completed in 2018 and 2019, but no ecological assessments have been completed. Directly adjacent to the south and east of the study area, EIS's have been previously completed by two consulting firms. These properties are client owned, with similar habitat conditions such as age and land use (golf course operations), as the land within the study area. As these adjoining habitats are connected to the natural features within the study area, similar species composition and habitat was found between the studies. It is speculated that the wildlife identified within the previous EIS, are likely using the habitat present within the Sunningdale North property.

3. Field Investigations

ERI staff conducted field investigations during 2018 and 2019 to provide a comprehensive inventory of ecological features, communities, and species. The field investigations included: aquatic habitat assessment, vegetation community delineation using MNRF Ecological Land Classification System (Lee et al., 1998), wetland community delineation and evaluation using MNRF's Wetland Evaluation guidelines for Southern Ontario (MNRF, 2013), floral species inventory, breeding bird surveys, anuran call surveys, reptile basking survey, winter raptor surveys, as well as significant wildlife habitat and SAR habitat assessments.

Investigations were conducted during the appropriate seasons in 2018 and 2019. Prior to the field program, satellite images of the property, land use and topographical maps were reviewed to identify the presence of natural heritage features, available habitat and the potential for SAR and SCC within the study area.

Background review/secondary sources including the NHIC data were reviewed for records of Areas of Natural and Scientific Interest (ANSI), SAR, Wildlife Concentration Areas, Provincially Significant Wetlands and Significant Plant Communities within the study area.

Dates and locations of specific surveys are present in Table 3-1 and their locations are presented on Figure 3-1.

Table 3-1. Survey Dates and Locations.

Field Investigation/Survey	Protocol	Date
Aquatic Habitat Assessment	OSAP (2013)	October 25, 2018
Ecological Land Classification	Lee et. al (2008)	June 14 / July 4 / Sept 18 / Sept 20, 2018
Vascular Flora Inventory	Systematic search by ELC polygon	June 14 / July 4 / Sept 18 / Sept 20, 2018, June 28 2019
Breeding Bird Survey	OBBA (2001)	June 14, 2018 / July 6, 2018
Fisheries Assessment	OSAP (2013)	December 4, 2018
Amphibian Call Survey	Marsh Monitoring Program (2018)	May 3, May 25 and June 12, 2018 / May 2, 2019
Wetland Boundary Delineation	OWES (2013)	Sept 20, 2018
Wetland Evaluation	OWES (2013)	June 28, 2019

Field Investigation/Survey	Protocol	Date
Reptile Basking Survey	MNRF Blanding Turtle Survey Protocol 2015	August 29, 2019
Winter Raptor Survey	MNRF 2011; Birds and Bird Habitat: Guidelines for Wind Power Projects/Inventory Methods for Raptors BC MSRM	February 22 / March 1 /March 12, 2019

3.1 Physiography and Soil Conditions

The study area has two distinct surficial deposits: stone-poor, carbonate-derived silty to sandy till and modern alluvial deposits. Modern alluvial deposits mainly are concentrated along water tributaries and stone-poor, carbonate-derived silty to sandy till covers most of the study area. The soils map is presented on Figure 3-2.

3.2 Natural Heritage Features

Within the limits of the study area, many natural heritage features exist as documented in the City's 1989 Official Plan and their new Official Plan, "The London Plan." The following is a list of identified natural heritage features:








- Unevaluated wetlands;
- Unevaluated vegetation patches;
- Unevaluated corridors; and
- Significant corridors.

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Corlon Properties
Sunningdale North EIS

Figure 3-1
Survey Locations


Legend

-  Study Area
-  Study Area 120 m Buffer
-  Breeding Bird Survey Location
-  Amphibian Survey Location
-  Watercourse
-  Aquatic Reach Breaks
-  Pond



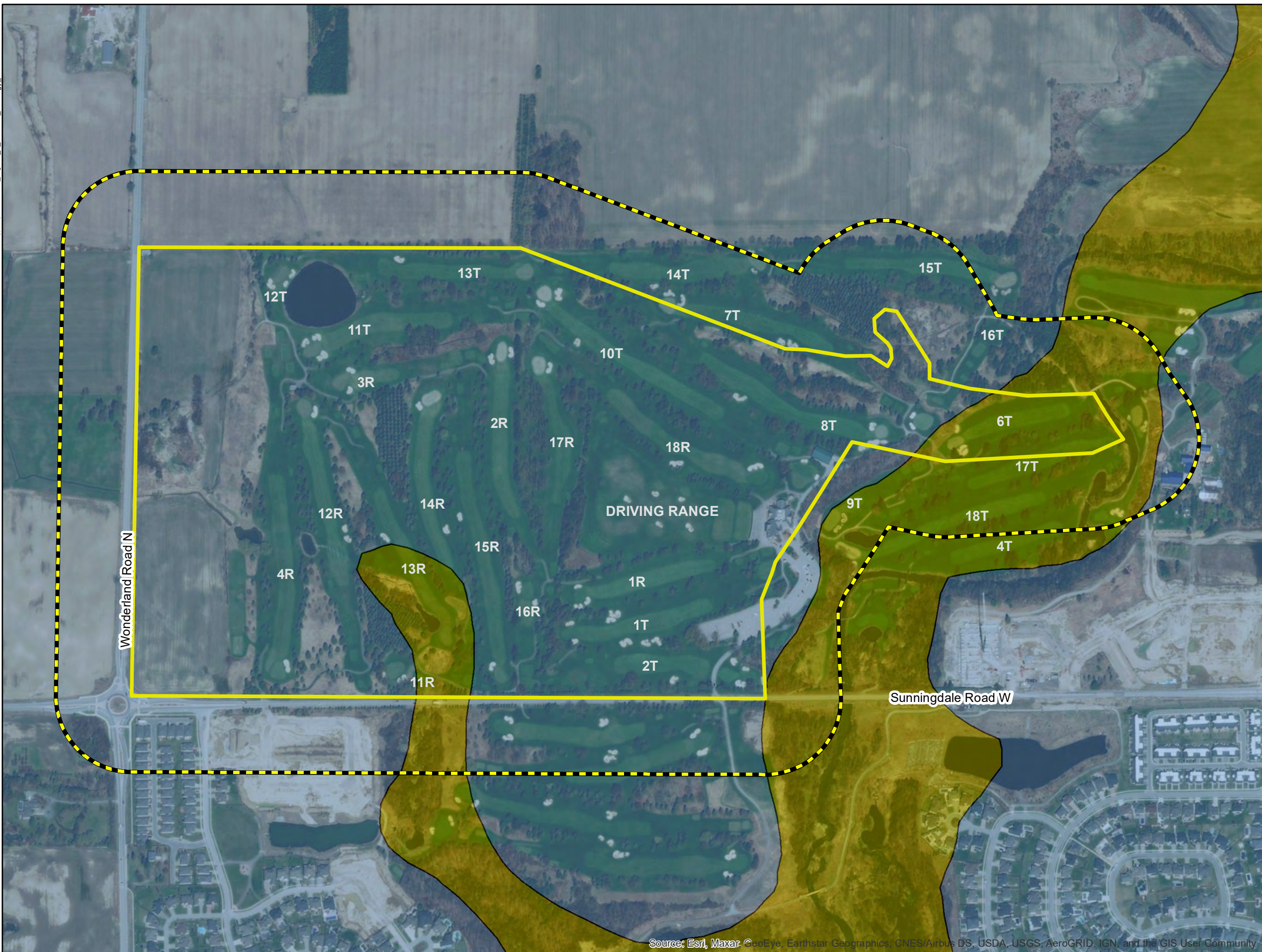
Golf Course Green Legend
T - Thompson Course
R - Robinson Course



NAD 1983 UTM 17	1:5,750
Project: 1817 Corlon Properties Date: 2021/04	

Data Sources: Ecosystem Recovery Inc., 2021;
The London Plan - City of London, ESRI World Imagery

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Corlon Properties
Sunningdale North EIS

Figure 3-2
Surfacial Geology

- Legend**
- Study Area
 - Study Area 120 m Buffer
- Geologic Deposit**
- Alluvium
 - Glacial deposits; Huron Lobe

Golf Course Green Legend
T - Thompson Course
R - Robinson Course



NAD 1983 UTM 17	1:5,750
Project: 1817 Corlon Properties Date: 2021/04	

Data Sources: Ecosystem Recovery Inc., 2021; The London Plan - City of London, Surficial Geology of Southern Ontario (MRD128-REV), ESRI World Imagery

3.3 Ecological Land Classification

Vegetation communities were characterized and mapped using the Ecological Land Classification (ELC) system for southern Ontario (Lee et. al., 1998) during four site visits on June 14th, 2018, July 4th, 2018, September 18th and 20th, 2018. The ELC system standardizes community classification across southern Ontario through the evaluation of a multi-layer vegetation inventory, inclusive of the canopy, sub-canopy, understory, and ground cover vegetation based on species composition, dominance and uncommon species or features.

The vegetation inventory was compiled and refined by incidental observations recorded throughout all site visits. Specific to wetland communities, boundaries were delineated, using the 50/50 rule as per the Ministry of Natural Resources Wetland Evaluation Guidelines for Southern Ontario (MNRF, 2013). Wetlands were also evaluated following MNRF's Wetland Evaluation guidelines for Southern Ontario (MNRF, 2013). A detailed description of this evaluation is present within Section 3.6 of this report.

Terminology used to describe each vegetation community is based on ELC sampling protocols that collect information on four vegetation layers in each community. The four layers are:

- 1) Canopy consists of tall vegetation which reaches the light first; typically composed of tall trees (in a forest community);
- 2) Sub-canopy includes vegetation growing just under the canopy; vegetation that receives filtered sunlight through the canopy; typically composed of trees and tall shrubs (in a forest community);
- 3) Understory includes vegetation growing below the sub-canopy; typically composed of both tall and low growing shrubs; and
- 4) Ground consists of vegetation which is closest to and covering the ground; typically composed of herbaceous vegetation.

3.4 Ecological Land Classification Results and Discussion

The study area is largely located on a golf course that has been established for 84 years, which has influenced the landscape of the property. The lands are divided into two courses known as the Thompson (T) and Robinson (R) courses. Alteration to the historic natural landscape has been ongoing since the existence of the golf course and has included changes to stream channel orientation, piping of watercourses, installation of agricultural drains, vegetation community removals and alteration, tree plantings, and site grading. Ongoing site maintenance including lawn mowing, dead tree removals, pesticide use and irrigation has influenced the current existing site conditions. The ELC classification is shown in Figure 3-3.

3.4.1 Terrestrial

Within the study area, a total of 18 terrestrial ecological land classification community classes are represented and include agricultural land, cultural meadow, open water, golf course, deciduous forest, conifer plantation and wetland (as shown in the ELC Figure 3-3).

Characteristics of each of the identified community types are provided in the following paragraphs. A full list of species observed can be found in Appendix C and a representative photolog in Appendix D.

Agriculture (AG)



























Two agriculture fields are present within the study area that are currently actively farmed. This past growing season seed corn was planted in the southern part of the agriculture field, north of Sunningdale Road.

Within these fields, two small meadow marsh inclusions were observed. These small open communities are influenced by runoff, contain mineral soils displaying gley and mottles within the top 25 cm. Dominant species observed include reed canary grass (*Phalaris arundinacea*), Canada mint (*Mentha canadensis*), spotted joe-pye weed (*Eutrochium maculatum*), spotted touch me not (*Impatiens capensis*), narrow-leaved cattail (*Typha angustifolia*), sedge species, redtop grass (*Agrostis gigantea*), blue vervain (*Verbena hastata*), purple loosestrife (*Lythrum salicaria*), goldenrod (*Solidago* spp), teasel (*Dipsacus fullonum*), and dame's rocket (*Hesperis matronalis*) around the periphery.

Corlon Properties
Sunningdale North EIS

Figure 3-3
Ecological Land Classification

Legend

-  Study Area
-  Study Area 120 m Buffer
- Upland**
-  AG: Agricultural
-  CGL-1: Golf Course
-  CUM1: Mineral Cultural Meadow
-  CUM1-1: Dry-Moist Old Field Meadow
-  CUP3: Coniferous Plantation
-  FOD: Deciduous Forest
-  FOD4-2: Dry-Fresh White Ash Deciduous Forest
-  FOD5: Dry-Fresh Sugar Maple Deciduous Forest
-  FOD7: Fresh-Moist Lowland Deciduous Forest
-  FOD7-3: Fresh-Moist Willow Lowland Deciduous Forest
-  FOD7-4: Fresh-Moist Black Walnut Lowland Deciduous Forest
-  FOD7-5: Fresh-Moist Black Maple Lowland Deciduous Forest
-  FOM9-1*: Dry-Fresh Scots Pine-Poplar-Sugar Maple Mixed Forest
-  FOM9-2*: Dry-Fresh Spruce-Norway Maple Mixed Forest
-  H: Hedgerow
- Cultural**
-  CVI-1: Transportation
-  CVR-1: Low Density Residential
- Wetland**
-  MAM2: Mineral Meadow Marsh
-  MAM2-11: Reed Canary-Spotted Jewelweed Mineral Meadow Marsh
-  MAM2-2: Reed Canary Grass Mineral Meadow Marsh Type
-  MAM2-5: Narrow-Leaved Sedge Mineral Meadow Marsh
-  MAM3: Organic Meadow Marsh
-  MAS2: Mineral Shallow Marsh
-  OA: Open Aquatic

*Ecologist defined new Ecological Community

Golf Course Green Legend

T - Thompson Course R - Robinson Course



NAD 1983 UTM 17

1:5,750

Project: 1817 Corlon Properties
Date: 2021/04



Data Sources: Ecosystem Recovery Inc., 2021;
The London Plan - City of London, ESRI World Imagery

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Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Mineral Cultural Meadow (CUM1)

There are nine small CUM1 communities spread throughout the study area. One is located in the middle of the study area north of 2R, two are found in the northeast corner surrounding 7T, 8T, 15T and 16T near Forgotten Tributary, 4 are located along the western edge of the study area and the remaining two are located in the southern corner close to the Medway Creek.

All of these communities are generally comprised of the same meadow species; however, may slightly differ in species abundances. Species observed include grass species (*Poa* spp.), aster species (*Symphyotrichum* spp), goldenrod species (*Solidago* sp.), common milkweed (*Asclepias syriaca*), meadow horsetail (*Equisetum pratense*), dame's rocket (*Hesperis matronalis*), English plantain (*Plantago lanceolata*), common teasel (*Dipsacus fullonum*), Philadelphia fleabane (*Erigeron philadelphicus*), field sow-thistle (*Sonchus arvensis*), European stinging nettle (*Urtica dioica*), riverbank grape (*Vitis riparia*), oxeye daisy (*Leucanthemum vulgare*), black eyed susan (*Rudbeckia hirta*), annual fleabane (*Erigeron annuus*), and true forget-me-not (*Myosotis scorpioides*). Sporadic mature trees were observed throughout the communities and included black walnut (*Juglans nigra*), white ash (*Fraxinus americana*), scots pine (*Pinus sylvestris*), willow (*Salix* sp.), eastern white cedar (*Thuja occidentalis*), Colorado blue spruce (*Picea pungens*) and Norway spruce (*Picea abies*). Occasional shrub species were observed and included of gray dogwood (*Cornus racemosa*), red-osier dogwood (*Cornus sericea*) and European buckthorn (*Rhamnus cathartica*).

Coniferous Plantation (CUP3)

Three small CUP3 communities are located throughout the study area, one is located on the northeast side adjacent to holes 14T and 7T near Forgotten Creek. The other two small communities are found on the western side of the study area near 3R, 13R and 14R and between 11R, 12R, and 13R.

All three plantation communities are comprised of the same tree species. This includes Colorado blue spruce, white spruce (*Picea glauca*), scots pine (*Pinus sylvestris*), Norway spruce (*Picea abies*), Manitoba maple (*Acer negundo*), bur oak (*Quercus macrocarpa*), black walnut and European buckthorn. The subcanopy and understory were comprised of common buckthorn, tartarian honeysuckle (*Lonicera tatarica*), speckled alder (*Alnus incana*), rose species (*rosa* sp.), and red osier dogwood. Groundcover is sporadic and includes grass species, common milkweed, goldenrod species, red raspberry (*Rubus ideaus*), riverbank grape, English plantain, great burdock (*Arctium lappa*), perennial sow-thistle, garlic mustard (*Alliaria petiolata*), bittersweet nightshade (*Solanum dulcamara*) and meadow horsetail.

A small portion of the CUP3 community located near Forgotten Creek conveys water after rain events, as wetland species are present within the lowlands. This water outlets into a culvert, which flows east. A small cart pathway runs through this community and evidence of human influence is present and observed by species composition.

Deciduous Forest (FOD)

This small forest is located adjacent to the golf course property on the southwest corner of the intersection of Sunningdale Road and Wonderland Road. This property was not assessed as part of the study as it is on private property and owned by others and will not be affected by proposed works.

Dry-fresh White Ash Deciduous Forest (FOD4-2)

This community is located along most of the valley slopes along the Medway. Species observed include white ash in association with sugar maple (*Acer saccharum*), beech (*Fagus grandifolia*), hop horn beam (*Carpinus caroliniana*) and black cherry (*Prunus serotina*). Other species include Norway maple (*Acer platanoides*), black walnut, scots pine, trembling aspen (*Populus tremuloides*), eastern white cedar, elm species (*Ulmus* sp.), silver maple (*Acer saccharinum*), black locust (*Robinia pseudoacacia*), American basswood (*Tilia americana*), eastern red cedar (*Juniperus virginiana*) and pine species (*Picea* sp.). This community varies throughout its extent and has been influenced by golf course operations. The Understorey species include choke cherry (*Prunus virginiana*), ash saplings, European buckthorn, tatarian honeysuckle, white ash, staghorn sumac (*Rhus typhina*), red osier dogwood, alternate leaved dogwood (*Cornus alternifolia*), and red and black raspberry (*Rubus occidentalis*).

Ground vegetation varied along the community, but dominants included crown vetch (*Securigera varia*), goldenrod species (*Solidago* sp.), garlic mustard, common burdock (*Arctium minus*), common dandelion (*Taraxacum officinale*), inserted Virginia creeper (*Parthenocissus inserta*), zig-zag goldenrod (*Solidago flexicaulis*), field sow thistle, birds-foot trefoil (*Lotus corniculatus*), English ivy (*Hedera helix*), amongst others.

A small MAM2: Mineral Meadow Marsh inclusion (<0.5 Ha) is located near the southern extent of Forgotten Creek. It has mineral soils, displaying gley and mottles within the top 25 cm. It is an open community and is influenced by runoff. Reed canary grass dominates this community with graminoid species, Canada mint (*Mentha canadensis*), spotted joe-pye weed, spotted touch me not, red-osier dogwood, sedge species, goldenrod, and teasel around the periphery. ERI field verified this vegetation community, which was previously characterised unit by another consultant in 2017 as part of an EIS in the local vicinity.

Dry-fresh Maple Deciduous Forest (FOD5)

This community is found on a steep slope on the northeast corner of the study area with signs of erosion and slope slumping. Seeps were present within the slope. This previously characterized community was field verified by ERI's ecologist.

Of all ecological units, this community is the least disturbed and most natural. The canopy of this mid-aged community consists of sugar maple, Norway maple, basswood, and white ash with lesser amounts of scots pine and Manitoba maple. Common buckthorn and riverbank grape (*Vitis riparia*) were found throughout the understorey along with young white ash and black walnut. Goldenrod, asters, orchard grass, quack grass (*Elymus repens*), false

Solomon's seal (*Maianthemum racemosum*), alternate leaved dogwood, bloodroot (*Sanguinaria canadensis*) and avens were the groundcover.

Another FOD5 community is also present within the study area, but on private property owned by others so access was not possible for this assessment. It is a mature sugar maple forest, dense canopy casting shade on the lower canopy and ground layer, reducing the groundcover present within this community.

Fresh-Moist Lowland Deciduous Forest (FOD7)

This mature lowland forest is located south of Sunningdale Road and is dominated by a mix of deciduous species such as cottonwood (*Populus deltoides*) and basswood (particularly in the sub-canopy) and also contained sugar maple. A small Creek ran through the centre of this community and canopy cover varied from moderate to high throughout. The understory was dense with buckthorn species (glossy and common) while the ground layer consists of various species including jewelweed and riverbank grape (Stantec, 2017). This community was verified by ERI's ecologist.

Fresh-Moist Willow Lowland Deciduous Forest (FOD7-3)

Two small FOD7-3 communities are located within the study area adjacent to the Medway Creek. The smaller community appears to be continuation of the larger community located south of Sunningdale Road. The sparsely treed canopy is dominated by willow and black walnut trees. Green ash, Manitoba maple and Norway maple are also present within the canopy. The understory has introduced exotics influencing the community composition, including tatarian honeysuckle, Norway maple, white ash, common buckthorn and Russian olive (*Elaeagnus angustifolia*). The ground layer is composed of many different species as part of its composition but is dominated by avens species (*Geum* sp.), aster species (*Symphyotrichum* sp.), goldenrod species, common teasel, common burdock, red raspberry, reed canary grass and riverbank grape.

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

This sparse lowland community, also associated with Medway creek was similar in composition to FOD7-3 but dominated by black walnut instead of willow. Green ash and to a lesser extent Manitoba maple were present within the canopy. The understory was common buckthorn and alternate leaved dogwood. Riverbank grape and chokecherry composed the ground layer (Stantec, 2017). ERI verified this previously delineated unit. ERI field verified portions of this vegetation community, which was previously characterised unit by another consultant in 2017 as part of an EIS in the local vicinity.

Fresh-Moist Black Maple Lowland Deciduous Forest (FOD7-5)

A mature forest community located on a valley slope and the canopy dominated by black maple (*Acer nigrum*), with chokecherry and white ash in the understory. Riverbank grape and chokecherry composed the ground layer (Stantec, 2017). ERI verified the previously classified unit during field surveys.

Dry-fresh Scots Pine-Poplar-Sugar Maple Mixed Forest (FOM9-1)

This mid-aged community was found on a section of steep slope of the Medway Creek.

The canopy contains Scots pine, sugar maple, Norway maple, common hackberry, cottonwood, elm, Norway spruce and black walnut. Glossy buckthorn, white ash was present in the understory and goldenrods and asters found within the ground cover.

Evidence of golf course tree planting includes smaller red oak (*Quercus rubra*), eastern white pine (*Pinus strobus*), common hackberry (*Celtis occidentalis*), amongst others. ERI field verified this vegetation community, which was previously characterised unit by another consultant in 2017 as part of an EIS in the local vicinity.

Dry-fresh Spruce-Norway Maple Mixed Forest (FOM9-2)

This community is located on a slope on the east side of the golf course near 6 and 16T, and a small area between the driving range and 17R.

Norway spruce and Norway maple dominant the canopy with eastern white cedar, silver maple, scots pine, American basswood crimson king Norway maple (*Acer platanoides* 'Crimson King') also being present within the canopy and sub canopy. European buckthorn, white ash saplings and green ash saplings, and dogwood dominated the understory and red raspberry, field sow thistle, ash saplings, and goldenrod species dominate the ground cover. Overall this community is slightly fragmented and shows evidence of disturbance from the golf course. This community was verified based on the results 2017 Stantec EIS report.

Golf Course (CGL-1)

This ecosite has been altered since the inception of the golf course. Continued maintenance of the property to golf course standards has included weekly mowing, installation of drainage tile, sodding, tree planting, and other forms of site alteration. All watercourses on the property have altered orientations, installation of ponds, and periodic dredging.

Site grading originally occurred at the inception of the golf course, removing natural environment vegetation and features. Most of the tree species within the study area appear to be planted and manicured planting beds of nursery non-native species is present, to increase the aesthetic appeal for the golfers.

Overall, the golf course is a relatively open environment, with sporadic trees and shrubs, and small areas of natural vegetation, highly influenced by invasive and non-native species. The dominant tree species found on site included scots pine, black walnut, Colorado blue spruce and eastern white pine. Other trees found within the golf course include bitternut hickory (*Carya cordiformis*), white ash, Norway maple, eastern white cedar, willow species, balsam poplar (*Populus balsamifera*), white spruce, silver maple and staghorn sumac.

Manicured grass dominated the golf course, with portions left to grow referred to as rough. The rough included many grass species, goldenrod, red clover (*Trifolium pratense*), spotted knapweed (*Centaurea stoebe*), dame's rocket and common teasel.

Mineral Meadow Marsh (MAM2)

This community is located near a large woodland and is fed by Forgotten tributary, which originated from drainage tile in agricultural field north of the golf course property and from overland flow. There is also catchbasins above and below this wetland which transport water through underground drainage systems, showing historical and existing human disturbance to the wetland. This small wetland includes wetland species including bebb's sedge, reed canary grass, dark green bulrush and other graminoid species. Shrub species include red-osier dogwood, alternate leaved dogwood, and gray dogwood. The direct surrounding habitat is meadow and woodland, which have many non-native species.

Reed-canary Grass Mineral Meadow Marsh Type (MAM2-2)

This community is present at 3 locations within the study area. It is located south of Sunningdale Road West and also located along portions of Axford Drain and in a small area of the old, abandoned farmyard, which is now used by the golf course material storage. Reed-Canary Grass Mineral Meadow Marsh is associated with the Axford Drain corridor. Reed canary grass dominated the community with spotted joe-pye weed and mint present. Scattered willow shrubs and buckthorn also occurred (Stantec, 2017). ERI verified the previously classified unit by another consultant.

Reed-Canary-Spotted Joe –Pye Weed Mineral Meadow Marsh (MAM2-11)

This community contained abundant amounts of reed canary grass, spotted joe-pye weed, and purple-stemmed aster (*Symphotrichum puniceum*). Lesser amounts of turtlehead and swamp milkweed (*Asclepias incarnata*) were also in this layer. This community was crossed by golf course driveways and impacted by debris and garden waste dumping. ERI field verified this vegetation community, which was previously characterised unit by another consultant in 2017 as part of an EIS in the local vicinity.

Organic Meadow Marsh (MAM3)

This small wetland originated at the west side of Tributary A, likely fed from drainage tile from the irrigation pond. Water was stagnant within the pond and was surrounded by thick red raspberry bushes and dogwood species. Reed canary grass, duckweed (*Lemna minor*), watercress (*Nasturtium officinale*), and other emergent vegetation was present within this community.

Mineral Shallow Marsh (MAS2)

This shallow marsh is connected to the Medway Creek and is a small offshoot to the creek where sediment has formed. It is a large open water feature and vegetation include narrow-leaved cattail, white water lily, spotted water hemlock, spotted joe pyeweed, soft rush, and other wetland plants.

Transportation (CVI-1)

This polygon is at the entrance to the golf course clubhouse and parking lot. It features an asphalt paved parking lot, clubhouse, cart barn and small gardens with many planted exotic species. Beyond the gardens, no vegetative community is present.

3.4.2 Description of Aquatic Ecological Land Classification Communities

Open Aquatic (OA)

Open aquatic habitat is present within the study area as Axford Drain, Tributary A, Forgotten tributary, and Ponds A through D.

All open aquatic habitat have low densities of emergent or free floating aquatic vegetation including white water lily (*Nymphaea odorata*), soft rush (*Juncus effusus*), pondweed species (*Potamogeton* sp.), variegated pond lily (*Numphar variegata*), green fruited burreed (*Sparaganium emersum*), spotted water hemlock (*Cicuta maculata*) and water parsnip (*Sium suave*).

Depths of the open aquatic habitat varied between tributaries and ponds. Along the banks of the open water the vegetation includes mature willow trees, Manitoba maple, black walnut, American basswood, and silver maple are present along the banks of Medway Creek.

The sub-canopy includes tatarian honeysuckle, European buckthorn, common elderberry (*Sambucus canadensis*), red osier dogwood, gray dogwood, and mountain ash (*Sorbus* sp.). Ground cover includes riverbank grape, reed canary grass, common teasel, Philadelphia fleabane, common burdock, wild carrot (*Daucus carota*), perennial sow thistle, swamp milkweed, spotted joe pye weed, jewelweed, birds-foot-trefoil, and garlic mustard.

This community likely experiences flooding in the spring months.

An inclusion wetland inlet (MAS2) is also present along the Medway near 18 Thompson. It is a shallow marsh with cattail, arrowhead, white water lily, pondweed, and rush species.

3.5 Vegetation Surveys

3.5.1 Background

Prior to and concurrent with field investigations, a background review of existing information from available resources was completed. This allowed for a better understanding of the current features and site conditions present within the defined study area and surrounding landscape. Resources reviewed included the Natural Heritage Information Centre database (NHIC), Medway Creek Watershed Report Card 2018, Lands Information Ontario database, The London Plan Mapping, Sunningdale Court Scoped Environmental Impact Study Final Report (Stantec 2017), Sunningdale Golf and Country Club LTD Scoped Environmental Impact Study (Stantec 2012), and Sunningdale Scoped Environmental Impact Study (Stantec 2017).

Community sensitivity analysis, and ELC, have been completed.

Community Sensitivity Analysis Methods

Vegetation community sensitivity has been determined based on the calculation of the Mean Coefficient of Conservation, the Coefficient of Wetness, and the Floristic Quality Index and Weediness Index for all vegetation communities present within the study area. These four parameters are intended to be used together in order to assign an ecological community sensitivity ranking based on plant species composition. This is meant to explain a community's overall sensitivity towards disturbance based on groupings of plants present within the community.

Coefficient of Conservatism (CC): Values range from 0 (low) to 10 (high) and are based on species tolerance of disturbance and fidelity to a specific habitat.

Vegetation species and community sensitivity were assessed through the application of conservatism values, assigned to each native species in southern Ontario (Oldham, et al, 1995). These values range from 0 (low) to 10 (high), and the occurrence of species with a CC of 9 or 10 can be good indicators of undisturbed conditions such as mature forests, woodlands, bogs or fens. General habitat values associated with the CC values are:

- 0-3: Species found in a severely to moderately disturbed habitat, likely caused by anthropogenic disturbances;
- 4-6: Species associated with a specific community, but can tolerate moderate disturbance;
- 7-8: Species found in a natural area, with the potential for minor disturbance; and
- 9-10: Species found in high quality natural areas.

Floristic Quality Index (FQI):

A standardized tool to express "quality" of natural area and replace subjective assessments and provide a useful number for comparing various natural areas. The FQI assigns plant species a rating which reflects the fundamental conservatism that the species exhibits for natural habitats. A native species that exhibits specific adaptation to a narrow spectrum of the environment is given a high rating and an introduced, ubiquitous species that exhibits adaptation to a broad spectrum of environmental variables is given a low rating.

Weediness Index (WEED):

Weediness is evaluated using the weediness scores provided for non-native species in the Floristic Quality Assessment System for Southern Ontario (Oldham et al. 1995). Weediness scores range from -1 (low impact of species on natural areas) to -3 (high impact of the species on natural areas). Weedy species richness is calculated by total number of species,

with the weediness score per site. In combination with percentage of non-native plants, it can be used as an indicator of disturbance.

The sensitivity of natural areas can be assessed through the application of the Weediness Index. The Weediness Index quantifies the potential invasiveness of non-native plants and in combination with the percentage of non-native plants, can be used as an indicator of disturbance. Values (ranging from 1 to 3) have been assigned to most non-native species based on the potential impact each species can have in natural areas:

- 1: Little to no impact on natural areas (most non-native plants are in this category);
- 2: Occasional impacts on the natural areas, generally infrequent or localized; and
- 3: Major potential impacts on natural areas.

Coefficient of Wetness (CW):

Coefficient of Wetness is a determination of the estimated probability for which a species is likely to occur in wetland soils. Negative signs (-) indicating a wet tendency and positive signs (+) indicating a dry tendency and are attached to three “facultative” categories. A wetness index using only native species is a stronger indicator of wetland status than a wetness index that uses adventive species (Floristic Quality Assessment for Michigan). The codes used in assigning a Coefficient of Wetness to a particular species is shown in Table 3-2.

Table 3-2. Wetland Category Definitions of Coefficients of Wetness (W).

Wetland Category	Symbol	Coefficients of Wetness	Definition
Upland	UPL	5	Occur almost never in wetlands under natural conditions (est. <1% probability)
Facultative Upland	FACU	3	Occasionally occurs in wetlands, but usually occur in non-wetlands (est. 1%-33% probability)
Facultative	FAC	0	Equally likely to occur in wetlands or non-wetlands (est. 34%-66% probability)
Facultative Wetland	FACW	-3	Usually occurs in wetlands, but occasionally found in non-wetlands (est. 67%-99% probability)

Wetland Category	Symbol	Coefficients of Wetness	Definition
Obligate Wetland	OBL	-5	Occurs almost always in wetlands under natural conditions (est. >99% probability)

3.5.2 Community Sensitivity Results and Discussion

All vegetation and vegetative communities within the study area, for the purposes of allocating community sensitivity are being considered contiguous and assessed together.

Within the Sunningdale study area, a total of 228 plant species were observed within the 24 ELC communities which are present within the study area. Of the entire plant community present, 61% non-native and 39% native.

The Floristic Quality Index is 46.99, which identifies the overall health/significance of the landscape based on the flora found within the study area. The Floristic Summary Assessment for the study area is presented in Table 3-3.

Table 3-3. Floristic Summary Assessment for Study Area.

ELC Community	Total # of Species	# Exotic Species	# Native Species	FQI
Total Study Area	228	138	90	46.99
FOD7-4	55	32	23	21.39
CUP3	56	31	25	17.78
FOM9-2	71	38	33	19.30
FOD4-2	107	63	44	29.61
CUM1	79	35	44	14.37
FOD7-3	50	29	21	16.16
CUM1-1	32	13	19	9.15
FOD5	37	27	10	25.21
FOM9-1	53	41	12	32.48
CGL_1	79	40	39	21.98

ELC Community	Total # of Species	# Exotic Species	# Native Species	FQI
MAM2	42	29	13	16.71
MAM2-2	44	24	20	14.08
MAM3	22	13	9	6.38
MAM2-11	21	13	8	12.20
PONDS	49	26	23	11.77
MAS2	27	21	6	13.97

For a further breakdown of the Weediness Index, Coefficient of Conservation, Coefficient of Wetness and Floristic Quality Index refer to Appendix C.

Sensitive species found within the study area include:

Highest Sensitivity

- Two-flowered Dwarf Dandelion (*Krigia biflora*), CC10
- Twinleaf (*Jeffersonia diphylla*), CC10

High Sensitivity

- Water Horsetail (*Equisetum fluviatile*), CC7
- Canada Yew (*Taxus canadensis*), CC7 – Planted specimen
- Black Maple (*Acer nigrum*), CC7
- Fragrant Sumac (*Rhus aromatica*), CC8
- Thin-leaved Sunflower (*Helianthus decapetalus*), CC7
- Pale Touch-me-not (*Impatiens pallida*), CC7
- Downy Arrow-wood (*Viburnum rafinesqueanum*), CC7
- Eastern Redbud (*Cercis canadensis*), CC8 – planted specimen
- Tulip Tree (*Liriodendron tulipifera*), CC8 -Planted specimen
- American Sycamore (*Platanus occidentalis*), CC8 – planted specimen

- White Turtlehead (*Chelone glabra*), CC7
- Common Hackberry (*Celtis occidentalis*), CC8 – planted specimen
- Summer Grape (*Vitis aestivalis*), CC7
- Skunk Cabbage (*Symplocarpus foetidus*), CC7

No provincially rare or SAR plant species beyond a single Butternut and potential sapling were observed during field investigations.

3.5.3 Coefficient of Wetness Results and Discussion

All vegetation and vegetative communities within the study area, for the purposes of allocating community sensitivity are being considered contiguous and assessed together.

The average wetness value for all plant species within the study area is 0.90, which falls into the facultative category. Upland species composes 18% of the species, 38% are facultative upland, 14% facultative, 17% facultative wetland and 13% obligate wetland. This aligns with the ecological habitat communities found within the study area.

3.5.4 Flora Assessment Methods

Detailed vegetation inventories over all ecosites were conducted over multiple site visits in the summer of 2018 and 2019 which resulted in a total of 228 species of vascular flora being identified on site. The vascular flora inventories were conducted in conjunction with the ELC on June 14th, July 4th, September 18th and September 20th, 2018 and June 28th, 2019.

An ERI ecologist systematically searched each ELC community and documented all species observed within each species level unless a lack of distinguishing features for the flora was present. Plant status was evaluated using the rankings within Middlesex Natural Heritage Study (UTRCA, 2003) and the Regionally Rare Plants of Middlesex County Updated 2002 (UTRCA, 2002) for regional significance.

3.5.5 Flora Assessment Results and Discussion

Overall, many introduced species are present within this study area. Of the identified species observed within the study area, 90 (39%) are native species and 138 (61%) were non-native. Locally significant flora observed was very limited with five species being significant including pearly everlasting (*Anaphalis margaritacea*), sallow sedge (*Carex lurida*), red-tinged bulrush (*Scirpus microcarpus*), watershield (*Brasenia schreberi*), and stiff marsh bedstraw (*Galium tinctorium*).

One butternut (*Juglans cinerea*) and a potential sapling was found within the 120 m study area, which is a species at risk and classified as Endangered. No butternut health assessment or genetic testing was undertaken on this tree as it is not anticipated to be

affected by the proposed works. Most of the study area is manicured lawn, and most trees are planted, but some may be naturally occurring.

Portions of the study area in close proximity to the Medway Valley are naturally occurring but are still influenced by golf course operations and human proximity by the presence of escaped ornamental plants, non-native species, and invasive species, and sometimes dominating the vegetation communities.

The majority of the plant species identified through the vegetation field surveys are widespread, common in Ontario and globally. A list of species identified during the vegetation field investigations is presented in Appendix C along with their S rank, G rank, COSEWIC, COSSARO status, and native/non-native status.

3.6 Wetland Delineation and Wetland Evaluation

3.6.1 Background

Correspondence with golf course representatives, using historical air photo interpretation and physical evidence on the golf course identifies how land use changed from a natural environment to the current golf course lands. This has included grading, removal of natural habitat, tree planting and most importantly, changes to drainage features including culverts, drainage tile, sumps, and pumps. The drainage alterations have disrupted historical wetlands and tributaries that may have been present within the study area. Field investigations have been completed to determine the presence of wetland features on the site.

Wetlands are identified by the UTRCA as areas that are seasonally or permanently flooded by shallow water, as well as areas where the water table is close to the surface. The four major types of wetlands are swamps, marshes, bogs and fens. No wetlands within the study area have previously been evaluated, prior to the undertaking of this study.

3.6.2 Field Investigation Methods

Following the Ministry of Natural Resources and Forestry Wetland Evaluation Manual for Southern Ontario (3rd edition), an ERI ecologist completed a field visit to assess for the presence of wetland communities within the study area limits. Wetland boundaries were delineated using soil characteristics (mottles and gley), topography and vegetation communities. The wetland boundary limits using vegetation communities were determined based on the 50/50 rule for upland and wetland plant species.

Each wetland was evaluated using the current Ontario Wetland Evaluation System, and the wetland grouping was also under consideration for a complexing.

3.6.3 Results and Discussion

After review of NHIC, the London Plan Schedules, and UTRCA correspondence, no wetland communities larger than 0.5 ha were identified nor are there any evaluated wetlands within 750 m of the Study Area.

The onsite wetlands are small in nature consisting of 9 small wetland patches and 5 ponds (see Table 3-4 below for sizes and Figure 3-3).

In most cases, they are a result of golf course topography and site alteration creating low lying areas where water accumulates. The extensive drainage tile and the alteration of the landscape to create more aesthetic golf course greens, fairways and tees has greatly impacted the movement of water both above and below ground. Many of the wetland features are dry in the summer months and are only saturated during the wet seasons. Forgotten Creek which feeds a wetland feature, originates from a drainage tile in a farmer's field north of the golf course property and is piped to the wetland.

The wetlands consist of a combination of meadow marsh, streams, ponds, and open aquatic habitat heavily influenced by the golf operations. Dominant species observed within the meadow marsh communities include reed canary grass, red-osier dogwood, grey dogwood, spotted touch-me-not, watercress, water horsetail (*Equisetum fluviatile*), willow species, sedge species (*Carex* sp.), common reed (*Phragmites australis*), water plantain (*Alisma plantago-aquatica*), lesser duckweed, soft rush (*Juncus effusus*), iris species (*Iris* sp.).

All of the pond features within the study area have minimal aquatic plant growth, are highly turbid, filled with sediment and are considered degraded open aquatic habitats. These features were all historically constructed to improve golf course aesthetics, provide water hazards and to meet golf course irrigation needs. These ponds are also highly influenced by runoff from pesticide applications and historically, a large release of cow manure into the Axford Drain from an upstream property. These ponds were not intended to provide natural habitat for wildlife species and are occasionally drained and dredged as part of golf course operations. The largest pond referred to as the irrigation pond is a man-made feature, which gets its water from Medway Creek has been stocked with bass. Water from this pond is pumped for irrigation and therefore is affected by fluctuating water levels.

The onsite wetlands, and even some upland features, do contain some groundwater indicator species and influences from surface water runoff; however, these species are likely only present due to the ongoing and historical disruption to soil characteristics. These wetlands are highly altered, dominated by non-native species and do not function as typical wetlands within a natural landscape.

Typically, wetland features smaller than 2 ha are not evaluated; however, smaller wetlands may provide some benefit to the environment and can be evaluated provided supporting rationale is presented. Additionally, not all wetlands located in proximity to one another should be complexed. Justification must also be provided demonstrating the individual wetland units have similar biological, social or hydrological functions and provide some ecological benefit to the area in order to be considered as a complex (OMNR, 2014).

Table 3-4. Assessed Wetlands.

Assessed Wetlands	Area (ha)	ELC Community	Ability to Be Designated as PSW
Wetland A	0.061	MAM2	No
Wetland B	0.124	MAM2-2	No
Wetland C	0.071	MAM2-5	No
Wetland D	0.069	MAM2-2	No
Wetland E	0.085	MAM3	No
Wetland F	0.104	MAM2	No
Wetland G	0.086	MAS2	No
Wetland H	0.139	MAM2-11	No
Wetland I	0.147	MAM2-2	No
Total Wetland Size	0.886		
Pond A	0.074	OA Pond	No
Pond B	0.058	OA Pond	No
Pond C	0.101	OA Pond	No
Pond D	0.100	OA Pond	No
Irrigation Pond	0.904	OA Pond	No
Total Pond Size	1.237		

Wetland patches A through I total 0.89 ha in size, and Ponds A through D as well as the irrigation pond total 1.24 ha in size. These wetland patches and ponds do not meet the requirements to be considered as a complex, as they are not hydrologically connected or show similarities in biological or social function. Additionally, these wetlands do not present any added ecological benefit to the environment warranting the completion of an evaluation. With that said, these features will be replaced as part of the restoration and compensation plan being prepared for the rehabilitation of the Axford Drain corridor that will create more valuable wetland habitat through the planting of native species.

Discussion on the potential loss/and or replacement of these wetland features based on the proposed development will be discussed in Section 4.3.5 and Section 6.2 in this report.

3.7 Breeding Bird Surveys

As an indicator used to assess sustainability and ecosystem health, breeding bird surveys are an important component of a baseline environmental study, supporting an understanding of abundance, composition and breeding activity within a study area.

3.7.1 Background

Prior to breeding bird surveys, background data from the Ontario Breeding Bird Atlas (OBBA), eBird, and previous studies in the local area was collected to identify the species of birds that have been recorded in close proximity to the study area. Data obtained from the OBBA square (17MH76) covering the study area identified a total of 89 species with various levels of breeding evidence. Breeding bird surveys were completed based on the Ontario Breeding Bird Atlas (Bird Studies Canada et al, 2006) and the Forest Bird Monitoring Protocol (FBMP).

These protocols outline the methods to be conducted in order to obtain representative and unbiased data, outlines proper site selection, timing, and weather conditions. Breeding surveys were conducted between May 24th and July 10th as recommended by the OBBA.

Appropriate stations were selected in the study area where 10-minute point counts were conducted for both visual and audible documentation of species present, including the highest level of breeding evidence exhibited for each species recorded. Incidental observations were also recorded during travel between stations, and also during all other field surveys on site for the duration of the project. The point count locations are shown on the Ecological Studies Figure 3-1.

When completing the surveys, breeding evidence was noted for each species. Breeding evidence is divided into four categories:

- Confirmed breeding (CONF) is identified as observations of any of the following:
 1. A distraction display or injury feigning; or
 2. Used nest or eggshell found (occupied or laid within the period of study); or
 3. Recently fledged young or downy young, including young incapable of sustained flight; or
 4. Adults entering or leaving nest site in circumstances indicating occupied nest (e.g., adult carrying fecal sac; adult carrying food for young); or
 5. Nest containing eggs, or nests with young seen or heard.

- Possible breeding (POSS) is indicated by the presence of a singing male (or breeding calls heard) in suitable habitat or the presence of a bird observed in suitable breeding habitat in its breeding season.
- Probable breeding (PROB) is defined as an observation of the following:
 1. A pair in breeding season in suitable habitat;
 2. Permanent territory presumed through registration of a territorial song at least two days a week or more apart, at the same location;
 3. Courtship or display between a male and female or two males, including courtship feeding, copulation; visiting probable nest site; agitated behaviour or anxiety calls of an adult; brood patch on an adult female or cloacal protuberance on an adult male; nest building or excavation of a nest hole.
- Observed (OBS) is defined as a species observed in its breeding season, outside its nesting habitat (no evidence of breeding).

3.7.2 Field Investigation Methods

The intent of the breeding bird survey is to determine the species composition of the entire study area. Breeding bird surveys were conducted on June 14th, 2018 and July 4th, 2018 at 8 stations within the study area. The stations were selected in a variety of habitats to gather a representation of all habitats on site and cover the entire study area.

As outlined in the OBBA and Canadian Wildlife Service (CWS) protocols, two point-count surveys were completed at each station during the breeding period between May 24th and July 10th. Surveys are completed between 5:00am and 10:00am under appropriate weather conditions (i.e. no precipitation, calm to light winds (CWS, 2009). There is no historical survey data available for the site.

3.7.3 Results and Discussion

A total of 52 bird species were detected during the breeding surveys and as incidental observations. Of these species, 3 were recorded as probable and 42 as confirmed, 3 probable, 1 possible, and 9 undesignated within the study area. Based on the Middlesex Locally Significant Bird Species list, only one bird, the red-bellied woodpecker (*Melanerpes carolinus*) was identified as L1. Eight bird species, scarlet tanager (*Piranga olivacea*), purple martin (*Progne subis*), northern rough-winged swallow (*Stelgidopteryx serripennis*), mourning warbler (*Geothlypis trichas*), Nashville warbler (*Oreothlypis ruficapilla*), red-shouldered hawk (*Buteo lineatus*), bald eagle (*Haliaeetus leucocephalus*) and yellow-bellied sapsucker (*Sphyrapicus varius*). All other species fell into the S3, S4 or unranked category.

Based on background review, three SAR bird species were identified as having potential to occur within the study area based on existing records in the vicinity and presence of appropriate habitat on-site. These species were also observed within the limits of the study area. (BSC 2006). These species are provided below in Table 3-5.

Table 3-5. SAR and SCC Potential Bird Species Within Study Area.

Scientific Name	Common Name	SRANK	MNRF	COSEWIC	SARA
<i>Chaetura pelagica</i>	Chimney Swift	S4B/S4N	THR	THR	Schedule 1
<i>Contopus virens</i>	Eastern Wood-pewee	S4B	SC	SC	No Schedule
<i>Hirundo rustica</i>	Barn Swallow	S4B	THR	THR	No Schedule

A summary of the species detected along with evidence of breeding is provided in Appendix E. A list of all bird species known from the background data collection is also included in Appendix F.

Partners in Flight (PIF) is a coalition with 150 partners, government, conservation groups, academic institutions, and industry engaged in landbird conservation from science, research, planning, policy development, land management and monitoring (PIF, 2019). The goal is to halt and reverse population declines. In Ontario, PIF is led by MNRF, Ontario Region CWS in partnership with Bird Studies Canada (PIF, 2008). The first North American Landbird Conservation Plan, a comprehensive landbird species vulnerability assessment for the US and Canada was produced in 2004.

The Lower Great Lakes/St. Lawrence Plain North American Bird Conservation Region 13 provides a guide for landbird conservation efforts in Ontario that lie within Bird Conservation Region 13 (PIF, 2008). While not afforded legal protection, these bird species can be used as indicators for ecosystem health. Of the 52 species of birds observed during the breeding bird surveys and as incidentals, none are classified as Parts of Flight Conservation Priority.

Within the subject lands, the habitat is diverse and includes meadow, open areas, golf course, forest, marsh, and open aquatic communities, providing a diverse set of habitats for birds.

3.8 Winter Raptor Surveys

Winter raptor surveys are important to assess roosting, foraging and resting habitats for wintering raptor populations. These surveys are a requirement to determine if there is a combination of forest and upland habitat of at least 20 ha combined with the Significant Wildlife Habitat Technical Guide (SWHTG, MNRF 2000), indicating 15 ha of upland habitat should be present.

3.8.1 Background

A background review of the Ontario Breeding Bird Atlas, eBird records and previously completed local EIS's adjacent to the study area were collected to identify records of raptor species identified in the local area historically. Discussions with golf course greens crew outlined recent and historical raptor observation records for the golf course, which included bald eagle (*Haliaeetus leucocephalus*), osprey (*Pandion haliaetus*), red-tailed hawk (*Buteo jamaicensis*) and other accipiter species.

3.8.2 Field Investigation Records

Survey methods are adapted from the British Columbia Ministry of Sustainable Resource Management Inventory Methods for Raptors (2001). Daytime surveys are conducted on days of no rain or heavy snow, with a Beaufort wind speed of 3 or less (<20 km/hr). The raptor surveys were completed during the winter months using transects across the study area, which incorporate suitable habitat, including 10-minute point count surveys. Monitoring of the stations and transects occurs 10 days apart, totalling three visits in January and February. Date selection is based on weather conditions. All surveys are conducted with enough time to thoroughly scan the woodland edges, field and individual trees for indication of raptor perching or foraging. All surveys are conducted using binoculars that are suitable for observing bird activity and identifying species composition from the vantage point. Data collection to standardize area searches include:

- Level of effort identified (start and end time);
- Weather and site conditions;
- Description of habitats or areas scanned during the survey;
- Walking route and point count locations identified;
- Location of raptors observed; and
- List of incidental wildlife species.

3.8.3 Results and Discussion

During the three surveys completed on February 22nd, March 1st and March 12th, 2019, four species of raptors were documented within the study area. These species include cooper's hawk, red-tailed hawk, red-shouldered hawk, and bald eagle. The bald eagle that was observed flying high in the sky over the site and likely is not using the study area as part of its life cycle. Based on the findings of the survey, the study area is not identified as significant wildlife habitat, as it does not meet the requirements of the Significant Wildlife Habitat Technical Guide (2000). Table 3-6 outlines the results of the winter raptor surveys conducted in 2019.

Table 3-6. Winter Raptor Survey 2019.

Winter Raptor Survey	Common Name	Scientific Name	SRANK	MNRF	COSEWIC	SARA	OBBA	Middlesex Local Significance	Middlesex S rank	Notes
Survey #1 Feb. 22 10:15 - 13:30	Red-tailed Hawk	Buteo jamaicensis	S5		NAR	-	CO	0	S5	Call heard near Bass Pond
Survey #1 Feb. 22 10:15 - 13:30	Cooper's Hawk	Accipiter cooperii	S4	NAR	NAR	-	CO	L3	S4	Visual of male perched in tree, calling in cultural meadow
Survey #1 Feb. 22 10:15 - 13:30	Red-tailed Hawk	Buteo jamaicensis	S5		NAR	-	CO	0	S5	Visual of female outside of study area boundary
Survey #2 March 1 9:30 - 12:15	Red-tailed Hawk	Buteo jamaicensis	S5		NAR	-	CO	0	S5	Female flying low over golf course near Medway Creek
Survey #2 March 1 9:30 - 12:15	Red-shouldered Hawk	Buteo lineatus	S4B		NAR	-		L1	S4B	Large female perched in tree and calling near driving range
Survey #3 March 12 10:00 - 12:30	Bald Eagle	Haliaeetus leucocephalus	S2N/S4B		NAR	-		L1	S2N,S4B	Adult flying over golf course at high elevation

3.9 Amphibian Call Surveys

Amphibian call surveys are an important component of environmental studies, as they are an indicator of wetland and ecosystem health. These studies are typically included in baseline environmental studies to develop an understanding of species composition, abundance, and breeding activity of anuran species, which are typically sensitive to environmental effects.

3.9.1 Background

Prior to completing the amphibian call surveys, a background review of the Ontario Reptile and Amphibian Atlas (Ontario Nature) was collected to identify species of amphibians that have been recorded in close proximity to the study area. No significant amphibian species were identified as occurring within the study area, as part of the background review.

Historical records within the last 40 years of reptile SAR within the local area are present and include snapping turtle (*Chelydra serpentina*), and eastern hog-nosed snake (*Heterodon platirhinos*).

3.9.2 Field Investigation Methods

Following the Marsh Monitoring Program Participant's Handbook from Bird Studies Canada for surveying Amphibians, three surveys must be completed between April 1st and June 30th in the appropriate timing, season, and weather conditions. Surveys are three minutes in duration and commence not earlier than one-half hour after sunset and ends before midnight.

Surveys must take place during evenings with little wind and a minimum night temperature of 5°C, 10°C and 17°C for each of the three respective survey periods. It should be noted, call surveys can be conducted at lower temperatures if there is strong calling activity observed. Surveys were conducted using a semi-circular sampling area at each site.

The surveys typically face a waterbody or wetland. Subsequent surveys must be conducted at the same survey locations. For each call heard, the approximate distance to each call is recorded as being greater than or less than 100 m from the survey location and call level codes were assigned as follows:

- Code 0: None heard;
- 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; and
- Code 3: Overlap among calls seems continuous, and count estimate is impossible.

Three amphibian surveys were conducted by ERI on May 3rd, May 25th and June 12th. As it was a late spring, after an extended winter, these surveys were delayed until optimal

temperatures for conducting the surveys and calling activity was active. The surveys were completed during suitable weather conditions and commenced no earlier than 30 minutes after sunset, in compliance with the protocol. No individual searches for egg masses were completed as part of this project. American bullfrog were confirmed in Pond A, but no additional summer surveys (late June-early July) were undertaken during the American bullfrog breeding season.

Sites near open water were observed for basking turtles during daytime wildlife surveys and incidental observations were recorded for all sites. The start time and end time of the survey was recorded along with air temperature, wind speed and level of precipitation during the survey. Amphibian species, general location of calling and call codes are recorded per the monitoring protocols.

3.9.3 Results and Discussion

A total of five species of amphibians were recorded by ERI at all stations throughout the study area. No provincially listed SAR were observed at any of the stations during the ERI field surveys. A list of the herpetofauna species observed for each station can be found in Table 3-7. A list of all the amphibian and reptile species known from the background data collection is included in Appendix G.

Station A was located facing a large irrigation pond on the northwest corner of the study area and included a small wetland near the west portion of Tributary A. This station had little call activity. It was noted that this pond has been stocked with small-mouth bass, which may limit the amphibian populations.

Station B is located facing west towards Pond C. This station had green frog, gray tree frog, and American toad calling. This pond has a small periphery of vegetation, with some floating and emergent vegetation present.

Station C faced east towards Pond C. This station recorded many American toads, green frog, and gray tree frogs' calls. A raccoon was present foraging in the water, multiple times at this station. Over 20 individuals from over two species of frogs and toads were observed during these surveys. Discussion on this implication to Significant Wildlife Habitat will be outlined in Section 4.3.4.

Station D faced southwest towards Pond A facing a forest. This is a deep pond with little emergent, or submergent vegetation present. American toad, green frog and bullfrog were heard calling during the surveys. The presence of American bullfrog designates this habitat as SWH. Further discussion on this topic is presented in Section 4.3.4.

Table 3-7. Amphibian Call Results.

Stn.	Date	Start Time	End Time	Background Noise	Temp. (C)	Precipitation	Cloud Cover	Beaufort Scale	Species Observed within 100m of Station (count/code)	Species Observed within 200m of Station (count/code)
Round 1										
A	03-May-18	21:23	21:24	2 (road noise/moving water)	13	Damp/Haze/Fog	10%	2	None	American Toad (2-2), Spring Peeper (1-1)
B	03-May-18	21:36	21:39	2 (road noise/moving water)	13	Damp/Haze/Fog	10%	2	American Toad (5-2)	None
C	03-May-18	21:46	21:49	2 (road noise/moving water)	13	Damp/Haze/Fog	10%	1	American Toad (15-0) (Swimming not calling)	Spring Peeper
D	03-May-18	22:02	22:05	2 (road noise)	12	Damp/Haze/Fog	10%	1	American Toad (2-1)	None
Round 2										
A	25-May-18	21:45	21:48	2	21	dry	10%	1	None	Gray Tree Frog
B	25-May-18	21:57	22:00	3	21	dry	10%	1	Green Frog (1-1)/Gray Tree Frog (2-1)/American Toad (1-1)	None
C	25-May-18	22:08	22:11	2	21	dry	10%	2	Gray Tree Frog (1-1)/Green Frog (2-1)	None
D	25-May-18	22:17	22:20	2	21	dry	10%	1	Green Frog (8-1)/American Toad (5-2)	None
Round 3										
A	12-Jun-18	21:40	21:43	2	23	dry	75%	3	None	None
B	12-Jun-18	21:45	21:48	2	22	dry	75%	3	American Toad (1-2), Green Frog (4-1), Gray Tree Frog (3-1)	None
C	12-Jun-18	21:55	21:58	2	21	dry	75%	2	Green Frog (3-1)	None
D	12-Jun-18	22:05	22:08	3	22	dry	75%	2	Green Frog (5-1), Bullfrog (1-1)	None

Stn.	Date	Start Time	End Time	Background Noise	Temp. (C)	Precipitation	Cloud Cover	Beaufort Scale	Species Observed within 100m of Station (count/code)	Species Observed within 200m of Station (count/code)
Round 1 (2019)										
A	02-May-19	21:08	21:11	2	14.2	drizzle	100%	1	American Toad (1-1)	American Toad (1-1) Spring Peeper (1-1)
B	03-May-19	21:21	21:24	2	13.9	drizzle	100%	1	American Toad (1-1)	American Toad (2-1)
C	04-May-19	21:26	21:29	2	13.9	drizzle	100%	1	None	None
D	05-May-19	21:37	21:40	2	13.7	rain	100%	1	2 mating American Toads found and 1 Green Frog, but no calling activity.	None

3.10 Reptile Basking Survey

Reptile Basking Survey is a standard practice to identify the presence of basking turtles within an area. All species of turtles and reptiles cannot be identified using this technique however, background species records from the surrounding local area have identified the species likely to be present within the study area community types. These studies are typically included in baseline environmental studies to develop an understanding of species composition and abundance.

Of note, no snake surveys have been completed as part of this study as this requirement was not identified as part of the EIS scoping checklist. Incidental observations of all reptile species were recorded during field visits.

3.10.1 Background

A background review of the Ontario Reptile and Amphibian Atlas (Ontario Nature) was collected to identify species of reptiles that have been historically recorded in close proximity to the study area. Historical records within the last 40 years of SAR reptile within the local area are present and include snapping turtle (*Chelydra serpentina*) and eastern hog-nosed snake (*Heterodon platirhinos*). Golf course turf maintenance staff have identified snapping turtle using sand bunkers for laying eggs historically year after year in areas just outside of the study area.

3.10.2 Field Investigations Methods

Following a modified version of the Survey Protocol for Blanding's Turtle in Ontario and applied it for all turtle species. ERI's wildlife biologist completed a visual encounter survey for basking turtles along all water features within the study area, which include wetlands, ponds, creeks, and drains. This survey was completed during the appropriate season and weather conditions. Familiarity with the sites is important and all sites have been previously investigated to determine the likely spots for turtle basking within the study area. This allows the surveyor to access the site in a quiet and least disruptive manner and not scare any turtles. The surveyors use binoculars to scan the entire perimeter of the shoreline and all potential basking sites. The survey sites were accessed from multiple locations and the shoreline walked. All sites are viewed from the sunlit side. On average each pond was surveyed for 0.5 hr and each channel for 0.25 hr. After completion of the survey, a search for any signs including tracks for turtles was completed. Incidental records of all other wildlife species are recorded during the surveys.

3.10.3 Results and Discussion

After completing a turtle basking survey and all incidental site visits, no turtles were found within the study area. Discussions with golf course greens crew identified recent observations of snapping turtle on the property adjacent to the study area, but no records

were found within the study area. Many of the watercourses and wetland habitat are disturbed daily during the spring, summer and fall months as golf course maintenance operations are on-going, such a mowing and golfers playing on course, which likely limits the number of turtles on the course due to the constant disturbance to wildlife. As snapping turtles have been identified adjacent to the site (to the south of Sunningdale Road and east of Medway Creek), it is likely at some point during the season this species has used the water features or sand traps on the course, even as a movement corridor or nesting habitat. Overwintering habitat for turtles is present within Ponds A, B, C and the Irrigation pond due to the soft substrate, deep water levels and open water features.

3.11 Mammals

3.11.1 Background

According to the Mammal Atlas of Ontario (Dobbyn, 1994), 18 mammal species are reported from within 10 km of the study area.

Background information and SAR / SCC screening identified that potential habitat for 4 SAR mammals may be present within the study area, eastern small-footed myotis (*Myotis leibii*), little brown myotis (*Myotis lucifugus*), northern myotis (*Myotis septentrionalis*), and tri-colored Myotis (*Perimyotis subflavus*). Bats are typically found in areas with mature trees and forest, a watercourse and trees exhibiting typical bat maternity habitat including leaf clusters, tree species of oak and maples, exfoliating bark, dead snags, and tree cavities. All mature forest land can be assumed to have bat habitat, until studies determine they are not present.

No federally or provincially significant mammal species were observed by ERI during the field surveys of the study area.

Refer to Appendix H for a full list of mammals known from and observed within the study area.

3.11.2 Field Investigation Methods

No specific field investigations were performed to search for mammals within the study area, but incidental wildlife observations were recorded during all field assessments.

3.11.3 Results and Discussion

Incidental wildlife observations were recorded during field visits for the site rather than targeted mammal surveys. Provincially listed SAR were not observed during the 2018 and 2019 field surveys.

A number of mammal species were observed incidentally during field assessments and include eastern cottontail (*Sylvilagus floridanus*), woodchuck (*Marmota monax*), muskrat (*Ondatra zibethicus*), eastern grey squirrel (*Sciurus carolinensis*), red squirrel (*Tamiasciurus*

hudsonicus), coyote (*Canis latrans*), house mouse (*Mus musculus*), eastern chipmunk (*Tamias striatus*), striped skunk (*Mephitis mephitis*), northern raccoon (*Procyon lotor*), white-tailed deer (*Odocoileus virginianus*) and a bat species (*Myotis* sp.).

During field investigations domestic dogs (*Canis lupus* ssp. *familiaris*) were also observed within the study area being walked by their owners.

3.12 Butterflies

3.12.1 Background

Records from the Ontario Butterfly Atlas from the Toronto Entomologists Association within a 10km square report 25 species of butterfly being present within the study area and surrounding landscape.

Background data available from NHIC, UTRCA and MNRF did not identify any SAR butterflies within the study area.

3.12.2 Field Investigation Methods

No specific field investigations were performed to search for butterflies within the study area, but incidental wildlife observations were recorded during all field assessments.

3.12.3 Results and Discussion

During field investigations, 5 species of butterflies were identified on site including monarch (*Danaus plexippus*), dion skipper (*Euphyes dion*), mustard white (*Pieris oleracea*), cabbage white (*Pieris rapae*), and European skipper (*Thymelicus lineola*). Monarchs are classified as Endangered (END in Canada and Special Concern (SC) under SARA). Monarch's life cycle depends on common milkweed, which was present in multiple locations throughout the site, typically on forest edges or meadow habitats.

Refer to Appendix I for a full list of butterfly species known from and observed within the study area.

3.13 Aquatic Habitat Assessment and Fisheries

The following sections provide the details of the fisheries and aquatic habitat assessment for the study area.

3.13.1 Background

Prior to completing an aquatic habitat assessment, background review of all available resources was completed including information from the MNRF and the UTRCA, refer to Appendix B for details. This information was used to confirm existing conditions and aided in

the determination of data gaps prior to field-based assessments. The following documents and data sources were reviewed prior to field surveys:

- Natural Heritage Information Centre NHIC;
- DFO Species at Risk Mapping;
- UTRCA Fish Records; and
- MNRF Records.

Natural Heritage Information Centre Make-a-Map: Natural Heritage Areas Application

NHIC Make-a-Map application was used to query SAR records within the study area. NHIC searches are based on 1 km grid squares. Due to the size of the site, four grid squares were queried to identify all SAR within the study area. All SAR identified to be historically present within, or adjacent to the study area.

Department of Fisheries and Oceans Species at Risk Mapping

A review of the Department of Fisheries and Oceans SAR mapping for the study area, including Medway Creek indicates SAR have been identified historically in close proximity to the study area within Medway Creek, refer to Table 3-8 and Table 3-9.

Table 3-8. Medway Creek Aquatic Species at Risk Records.

Common Name	Scientific Name	SRank	SARO Status	COSEWIC	Source
Kidneyshell	<i>Ptychobranchnus fasciolaris</i>	S1	Endangered	Endangered	NHIC/DFO
Rainbow Mussel	<i>Villosa iris</i>	S2/S3	Threatened	Endangered	NHIC/DFO
Greater Redhorse	<i>Moxostoma valenciennesi</i>	S3			NHIC
Wavy-rayed Lampmussel	<i>Lampsilis fasciola</i>	S1	Threatened	Endangered	NHIC/DFO

Upper Thames Fish Records**Table 3-9. UTRCA Records for Mussels in Medway Creek.**

Common Name	Scientific Name	Evidence
Creeper	<i>Strophitus undulatus</i>	Relict Shell
Spike	<i>Elliptio dilatata</i>	Relict Shell
Creek Heelsplitter	<i>Lasmigona compressa</i>	Relict Shell
Wabash Pigtoe	<i>Fusconaia flava</i>	Relict Shell

Upper Thames Conservation Authority Benthic Records

UTRCA completed benthic macroinvertebrate sampling within the Medway Creek north of Sunningdale Golf Course and within Axford Drain on the golf course property. Results of the benthic sampling within Axford Drain, are presented in Table 3-10.

Table 3-10. Axford Drain Benthic Macroinvertebrate Sampling.

Common Name	Scientific Name	Life Stage	# in Subsample	Biotic Index
Water Mite	Acariformes	A	19	6
Crawling Mayfly	Caenidae	N	29	6
Biting Midge	Caratopogonidae	L	5	6
Midge	Chironomidae	L	163	6
Riffle Beetle	Elmidae	A	3	5
Riffle Beetle	Elmidae	L	4	5
Dance Fly	Empididae	L	1	6
Mayfly	Ephemerelellidae	N	1	2
Net-spinning Caddisfly	Hydropsychidae	L	73	5
Micro-caddisfly	Hydroptilidae	L	3	6
Thread Worm	Nematoda	A	3	5
Aquatic Worm	Oligochaeta	A	6	8

Common Name	Scientific Name	Life Stage	# in Subsample	Biotic Index
Finger-net Caddisfly	Philopotamidae	L	3	4
Fingernail Clam	Pisidiidae	A	4	6
Flatworm	Turbellaria	A	2	6
Family Biotic Index: 6.82	Stream Health: POOR			

3.13.2 Aquatic Habitat Field Investigations Methods

An aquatic habitat assessment was completed on October 25th, 2018 in order to document existing aquatic habitat conditions for all tributaries within the study area.

No assessment was completed on the Medway Creek as background data for this tributary is available from the UTRCA. The assessment was completed using a standardized protocols document by the province in the Ontario Stream Assessment Protocol 2017.

Various characteristics, including stream morphology and riparian features contribute to the overall condition of the watercourse. Detailed aquatic habitat assessments were undertaken on the entire length of the watercourses within the study area.

The following information was documented during the aquatic habitat assessment:

- Substrate type and composition (i.e., silt, sand, clay, cobble, gravel, boulder, detritus, muck);
- Riffles / Pools / Flats / Runs;
- Riparian and aquatic vegetation;
- Potential fish habitat or presence of fish;
- Water temperature;
- Flow conditions;
- Adjacent lands (vegetation community type, riparian habitat, canopy cover, land use, etc.);
- Instream vegetation type;
- Channel morphology;
- Instream habitat and cover; and
- Basic field parameters such as pollution sources.

There were seven assessment reaches, shown on Figure 3-1, within the study area and are located within Axford Drain, Forgotten Tributary, Tributary A and ponds. It should be noted these reaches are similar to the reaches of the geomorphic assessment.

A fish community assessment was performed for all tributaries and ponds within the study area limits, not including Medway Creek.

Water Quality Parameters

Water quality and flow monitoring measurements were performed at the downstream and upstream sections of the study area on October 25th, 2018. Water quality was monitored using a Horiba U-22 Multi-parameter, which measures pH, conductivity, dissolved oxygen (DO), oxidation reduction potential (ORP), turbidity, temperature, salinity, and total dissolved solids (TDS). Data collected was in accordance with Provincial Water Quality Objectives (PWQO).

Water Temperature

Water temperature is an important indicator of thermal regime within a waterbody and influences the fish species composition, benthic composition, and aquatic vegetation community. In general:

- Warmwater Stream (> 25 ° C);
- Coolwater Stream (19° C to 25° C); and
- Coldwater Stream (19° C).

pH

The PWQO acceptable range for pH is between 6.5 and 8.5 (MOEE, 1994).

Dissolved Oxygen

DO is directly influenced by temperature and the PWQO acceptable range is variable. A table of acceptable PWQO parameters for DO are shown in Table 3-11.

Table 3-11. Acceptable PWQO for Dissolved Oxygen.

Temperature (C)	Cold Water Saturation (% Saturation)	Cold Water Biota (mg/L)	Warm Water Biota (% Saturation)	Warm Water Biota (mg/L)
0	54	8	47	7
5	54	7	47	6
10	54	6	47	5

Temperature (C)	Cold Water Saturation (% Saturation)	Cold Water Biota (mg/L)	Warm Water Biota (% Saturation)	Warm Water Biota (mg/L)
15	54	6	47	5
20	57	5	47	4
25	63	5	48	4

Conductivity

Conductivity is a measure of TDS, where higher TDS values represent more dissolved salts. There is no acceptable range for TDS and measurement is used for baseline investigations to track changes to the TDS values over time.

3.13.3 Aquatic Habitat Results and Discussion

The study area is located along Medway Creek within the UTRCA and falls within the jurisdiction of UTRCA. The Medway Creek watershed encompasses 6% of the Upper Thames River basin with approximately 31% of the watercourses occurring naturally, 26% buried and 43% channelized. The watershed consists of approximately 6% urban, 12% natural, 82% agriculture, <1% aggregate and <1% water. It has a watershed area of 206 km².

Previous studies within the watershed have been performed to determine fish species presence within the watershed. In total, 54 species of fish have been documented. UTRCA records for the Medway Creek in close proximity to the study area have 37 fish species and 4 mussel species.

Fish background data records are presented in Appendix J. Aquatic SAR records found within Medway Creek include kidneyshell (*Ptychobranchus fasciolaris*), rainbow mussel (*Villosa iris*), and wavy-rayed lampmussel (*Lampsilis fasciola*).

An ERI biologist completed a detailed aquatic habitat assessment on October 25th, 2018 to characterize aquatic features in the study area. The entire length of Axford Drain, Forgotten Creek, Tributary A and the associated ponds were assessed and detailed notes and photos were recorded, and are included in Appendix K.

The water quality parameters collected from the tributaries and ponds within the study area are presented in Table 3-12 and Table 3-13, respectively.

Water quality parameters for watercourse are important for biological health of the streams as they support aquatic benthic and fish communities. Canadian Council of Ministers of the Environment (CCME) standard guidelines for DO is 5.5 mg/l. DO levels below this value can have negative impacts on aquatic health. WT8 and Tributary A fall below the guideline and

were a static system. The pH levels within all aquatic habitats were relatively a neutral pH, which is typical of a natural system. Overall, the water quality measurements within the reaches and ponds part of the aquatic habitat assessment are considered standard, compared against what is typically found in a warmwater watercourse within southern Ontario. The Medway Creek 2017 Watershed Report Card outlines surface water quality within the Medway Creek, and the creek has received a grade level D. This grade level reflects high phosphorous levels and low benthic scores (Family Biotic Index), which is a strong indicator of stream health. Results for the aquatic habitat assessment show the Axford Drain, Tributary A, Forgotten Creek, and associated ponds to have water temperatures of typical range found within a warmwater fisheries community. This is validated by the results of the fish community assessment as many warmwater minnow and fish species were documented.

Table 3-12. Tributary Water Quality Parameters.

Tributary Reach	Air Temperature (°C)	Water Temperature (°C)	Conductivity (µS/cm)	Dissolved Oxygen (mg/L)	pH	Oxidation Reduction Potential (mV)	Total Dissolved Solids (ppm)	Turbidity (NTU)
WT6	3	8.18	0.919	10.12	7.79	226	0.588	-
WT7-a	5	8.77	0.880	9.31	7.95	208	0.564	5.9
WT7-b	5	8.29	0.780	7.79	7.95	232	0.614	321.7
WT7-c	5	12.37	1.050	9.37	8.00	249	0.673	4.6
WT8	5	11.30	0.724	3.27	7.67	70	0.463	11.2
Tributary A	5	7.82	0.838	2.70	7.49	263	0.537	-
FC	5	12.04	0.712	8.74	7.87	160	0.456	464.0

Table 3-13. Pond Water Quality Parameters.

Pond	Air Temperature (°C)	Water Temperature (°C)	Conductivity (µS/cm)	Dissolved Oxygen (mg/L)	pH	Oxidation Reduction Potential (mV)	Total Dissolved Solids (ppm)	Turbidity (NTU)
Pond A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Pond B	-	8.45	1.00	8.00	7.97	227	0.642	23.5
Pond C	-	8.13	0.918	7.58	7.92	237	0.587	620.0
Irrigation Pond	-	9.84	0.642	8.28	8.03	120	0.411	1.1

Reach WT6

Reach WT6 starts 185 m downstream of Sunningdale Road and extends to the perched culvert under Sunningdale Road and is a total length of 278 m. The watercourse channel ranges from 1.55 to 2.95 m in width and is relatively shallow ranging from 0.15 to 0.33 m in depth. Undercutting has occurred on both banks from 0.17 to 0.5 m.

Overall, the tributary was a meandering channel, with areas of channel braiding, heavily vegetated banks and with multiple log jams throughout. Watercress, an indicator of potential groundwater inputs, was observed at multiple locations throughout the channel. Evidence of human impact was observed by garbage (propane tanks, sports ball and food wrappers) being present within the channel.

Directly downstream of the perched culvert under Sunningdale Road, a large pool was present measuring at 4.4 m in width and ranging from 0.44 to 0.52 m in depth. The substrate was dominated by gravel, with cobble and silt being the second dominant substrates.

Emergent, filaments, attached algae, slimes and crusts were present within the channel. But no other aquatic macrophytes and algae were present. Woody debris is present and detritus is abundant within the stream. Scrubland and deciduous forest surrounds the stream and canopy cover is 25 to 50 %. Hydraulic head was measured as 0.001 cm and velocity as 0.17 m/s. Fish and minnow species were noted in the pool just below the perched culvert under Sunningdale Road.

Reach WT7-a

Reach WT7-a originated at a 0.3 m Corrugated Steel Pipe (CSP) culvert with two drainage tiles flowing beneath 12 Robinson Fairway from Pond B and flows downstream, in a southeastern direction to the culvert under Sunningdale Road. Its total length of the reach is 293 m. This tributary is piped underground through a variety of sections and has many barriers to fish passage including a Ditch Inlet Culvert Basin (DICB), perched culverts, and underground piping. The reach varies in shape from the downstream to the upstream due to human influences, including alterations by the golf course with rounded cobble riffles and bank armouring present.

Evidence of historical piping of the water is observed, with discarded culverts present within and on the banks of the channel. There are small areas of multi thread channel with heavily vegetated banks. Channel width is relatively uniform and includes riffle, pool riffle sequences and vegetated banks, but demonstrates human influence in its design.

On both sides of the stream channel there is manicured golf course, meadow and forest habitat surrounding the channel, with canopy cover being 0 to 24 %. The dominate substrate of the channel is cobble, silt being the second dominate and angular gravel the third. Gravel is the dominate substrate, rounded cobble the second dominant and silt the third. The hydraulic head ranged from 0 to 2 cm and velocity measures at 0.17 m/s. The stream banks were heavily vegetated and stable. Watercress are a potential indicator of groundwater inputs and was present throughout the channel. The perched culvert upstream and the DICB

downstream are barriers to fish migration. Water is piped through multiple culverts to this stream from an upstream Pond B to the golf course.

Woody debris is present and detritus is abundant within the channel. Minnows were found within the tributary, but no aquatic mussels. The wetted width of the channel ranges between 0.95 to 1.55 m. Depth within this channel ranges from 0.125 to 0.27 m. The pond at the downstream portion of this channel is over 3 m in depth, has a large build-up of sediment, detritus, and woody debris. The water depth made it unsafe to assess the pond from beyond the periphery. Golf course maintenance staff outlined that all ponds on the property are cleaned out every 10 to 15 years. This pond has not been dredged in over 10 years.

Reach WT7-b

Reach WT7-b originated from two 300 mm CSP culverts which flow into Pond C and is a total length of 212 m. This pond is a large man-made pond, with vegetated banks and a riser pipe outlet structure. The substrate is soft and has a build-up of detritus and woody debris. Aquatic vegetation is present within this pond, mostly floating and emergent vegetation types. Water turbidity is high within the pond. The water is piped underground into Pond B, which is located across 4 Robinson fairway.

Pond C is an open aquatic habitat with little vegetation present within the pond, but a narrow strip of vegetation buffer from around the pond separates the pond from the maintained golf course. The substrate is soft muck, with a large build-up of detritus and woody debris. A riser pipe outlet structure also outlets the water into underground pipe and to Reach WT7-a. Most of this portion of the Reach is piped underground, thus poor aquatic habitat. Low numbers of minnows were found within both ponds.

Reach WT7-c

The downstream portion of this watercourse is Pond C, which is a large pond between 1.8 to 2.4 m in depth and has a total length of 178 m. The channel originates from a large 1.2 m CSP running under Wonderland Road. The drainage channel itself is relatively straight in orientation and consistent in depth and width throughout its length. This channel has been cleaned out on regular intervals historically. Silt is the dominant substrate and sand is the second dominant. The wetted width ranges between 1.15 to 2.1 m and depth between 0.09 to 0.2 m.

Emergent and rooted floating vegetation is present within the pond and channel, but all other aquatic macrophytes and algae are absent. The surrounding land use is golf course lands, meadow and agricultural lands. All banks are stable and heavily vegetated. Canopy cover is minimal and is between 0 to 24 %. Heavy build-up of sediment, detritus and woody debris was present within the channel. The upstream extent of the drainage channel is a large culvert, which runs under Wonderland Road. No fish were observed within the channel at the time of the aquatic habitat assessment. There was not hydraulic head within the channel and velocities were 0.02 m/sec.

WT8

This tributary originates upstream of the farmers pasture, flows through an active cow pasture, and exits through a 1.2 m CSP culvert under Wonderland Road. The length of the channel is 155 m. Water was flowing clear through this watercourse, and aquatic submergent and emergent vegetation was present including watercress. The channel was relatively straight in orientation with a very soft and fine sediment, sand, and muck substrate. Water velocity was low within the channel at 0.03 m/sec and an average channel width of 3.77 m. The channel depths ranging between 0.25 to 0.28 m. Surrounding land use was meadow pasture and there is evidence of cattle impacting the watercourse. Watercress are a potential indicator of groundwater inputs and was present throughout the channel. No fish were visible during the assessment.

Reach Tributary A

Tributary A drainage swale is fairly uniform from the upstream small wetland feeding the drain, to its outlet into a culvert and runs a length of 200 m. It is straight in orientation with little fall as evidence by the pooling of water and areas without water. The drain's uniform characteristics provide evidence that it is manmade and occasionally cleaned out.

A high amount of leaf litter and detritus is present within the channel. The banks of the channel are vegetated and surrounded initially by meadow and then golf course. Canopy cover is 25 - 50%. The substrate is clay and sand. At the time of assessment there was no flow, but water depths ranged from 0.14 to 0.20 m. Emergent and floating vegetation was low, but present in rush species, watercress, and duckweed. Watercress, which are a potential indicator of groundwater inputs is present throughout the channel.

Reach Forgotten Creek

This tributary originates from two perched 300 mm drainage culverts running beneath 15 Thompson fairway and is 132 m in length. It flows south through a deciduous forest and thicket, and outlets into a wetland, which eventually outlets underground through drainage piping. This permanent stream has a cobble and gravel substrate, and a wetted width ranging between 0.75 to 1.75 m, and is shallow in depth ranging between 0.075 to 0.12 m. Velocity within the channel was measured as 0.04 m/sec.

Attached algae, emergent vegetation, slimes, and crust are present within this channel, but all other aquatic macrophytes and algae are absent from the channel. Watercress, which are a potential indicator of groundwater inputs was present throughout the channel.

The channel banks are vegetated, but slightly unstable within undercutting of 0.2 to 0.3 m present. Evidence of previous piping of the channel is observed, with non-functioning old drainage till being present on the banks and within the channel. Canopy cover ranged between 25 to 50 % and nutrient loading is likely occurring from drainage runoff from the agricultural fields.

3.13.4 Fish Community Methods

No previous fish community studies have been completed for these waterbodies, however background records downstream and with Medway Creek have been provided by UTRCA.

A License to Collect Fish for Scientific Purposes was obtained from the MNRF Aylmer District prior to the completion of the fish community survey.

A fish community assessment was conducted on December 4th, 2018 for the Axford Drain, Irrigation Pond, Pond A, B, C, Forgotten Creek and Tributary A. The fish community was completed by two ERI biologists using a HT2000 backpack electrofishing unit.

The entire lengths of all streams were assessed. All pond edges were electrofished where it was safe to do so due to water depth and soft substrate. The backpack electrofishing unit was set to a frequency of 80 Hz and a voltage ranging between 100 to 150 V and shocking took place for 3643 shocking seconds. All ponds had short-set minnow traps set for between 4 to 6 hours and baited with bread.

3.13.5 Fish Community Results and Discussion

Fish and minnow species found within the fish community assessment include creek chub (*Semotilus atromaculatus*), fathead minnow (*Pimephales promelas*), pumpkinseed (*Lepomis gibbosus*), rock bass (*Ambloplites rupestris*), largemouth bass (*Micropterus salmoides*) and goldfish (*Carassius auratus*).

4. Assessment of Significance

The features found within the study area have been assessed using federal, provincial, and municipal ranking, and evaluation systems as outlined by the COSEWIC, ESA, the MNRF, UTRCA, and the City of London. The following provides a summary of the identified significant features found within the study area.

4.1 Federally Recognized Features and Species

Two watercourses including the Medway Creek and Axford Tributary were found to contain direct fish habitat and are afforded protection under the Fisheries Act, as discussed further in Section 4.3.1.

No federally applicable terrestrial lands or features were identified within the study area.

4.2 Provincially Recognized Features and Species

No provincially recognized terrestrial or aquatic features were identified within the study area during the initial background review. However, several provincially regulated SAR and potentially significant habitat were identified during the investigation (See Section 4.2 below).

4.2.1 Significant Wildlife Habitat

Background

Significant Wildlife Habitat is identified under Section 2.3 of the PPS as areas where plants, animals and other organisms live and find adequate amounts of food, water, shelter, and space needed to sustain their populations. Specific wildlife habitats of concern may include areas where species concentrate at a vulnerable point in their annual or life cycle; and areas which are important to migratory or non-migratory species. Wildlife habitat is considered significant where it is ecologically important in terms of features, functions, representation or quantity, and contributing to the quality and diversity of an identifiable geographic area or Natural Heritage System.

Defining wildlife habitat significance for Ecoregion 7E, in which the subject property is located, is described in the SWHTG Addendum (MNRF, 2015b). SWH is protected under the Ontario Provincial Policy Statement (OMMAH 2014).

Wildlife habitat is divided into four broad categories as described in the OMNR's Significant Wildlife Habitat Technical Guide (SWHTG, OMNR 2000), as follows:

1. Seasonal concentration areas;
2. Rare vegetation communities or specialized habitats for wildlife;
3. Habitats of species of conservation concern, excluding the habitats of endangered and threatened species; and
4. Animal movement corridors.

Significant Wildlife Habitat Screening

Based on further analysis following field investigations for ELC, flora, breeding birds, anuran, and reptiles, a screening exercise for SWH Ecoregion 7E was completed to confirm or identify potential (i.e. "candidate") SWH that may occur within the study area. Individual SWH types within the four broad categories were assessed as either not present, candidate, or confirmed for the study area based on comparison of significance criteria against information obtained from relevant background documents and field surveys.

A summary of the SWH screening results are provided in the following sections and the detailed analysis is provided in Appendix L.

Candidate Significant Wildlife Habitat

The SWH screening found that the criteria for candidate SWH were met for the following three categories:

- Bat Maternity Colonies - Woodland and forest communities are present within the study area, some with old, damaged, and decaying trees with the potential for cavities. A single bat was observed foraging during the anuran surveys but was not identified to species. A tree cavity assessment for potential bat maternity is recommended to be completed during the leaf off season of 2022 or prior to development.
- Turtle Nesting Habitat- The habitat for turtle nesting is present along the banks of Medway Creek and on the golf course bunkers for snapping turtle. No snapping turtles were observed during field assessments, but records of snapping turtle within the local area and conversations with golf course staff mention turtles have nested in bunkers on the south side of Sunningdale Road. A survey for turtle nesting is recommended along creek banks, ponds, and golf course bunkers during the months of May to June prior to development.
- Turtle Wintering Area – Turtle wintering habitat is present within the study at multiple locations including Pond A, B and C and the Irrigation Pond. No turtles were observed within at these locations, but historical records, and golf course staff communication identify snapping turtle have been historically present within the golf course lands south of Sunningdale Rd. Snapping turtle are able to travel long distances over land in search of food, mates, and wintering habitat.

Candidate SWH requires field survey assessments to verify the presence or absence of the species and habitat. This is to be conducted in accordance with accepted protocols within the appropriate season and conditions.

Confirmed Significant Wildlife Habitat

The SWH screening found that the criteria for confirmed SWH were met for the following categories:

- Special Concern and Rare Wildlife Species: Birds – Eastern Wood Pewee was observed during the breeding bird surveys in a Dry-Fresh Scots Pine-Poplar-Sugar Maple Mixed Forest (FOM9-1) in close proximity to Medway Creek.
- Special Concern and Rare Wildlife Species: Insects – Monarch were observed flying on site in multiple areas of the golf course and meadow lands. Common milkweed, a plant species required by Monarchs for its juvenile life stage was found within the study area.
- Amphibian Breeding Habitat (Wetland) – Bullfrogs were observed during amphibian breeding survey in Pond A and call activity for American toads and green frogs for Pond C met SWH qualification.
- Amphibian Movement Corridors – Amphibian movement habitat is present within the study area and is relatively connected in most cases. Results of the amphibian call survey confirm the study area contains amphibian movement corridors.

The confirmed SWH requires protection, and no development can occur within these habitats, unless they can demonstrate the development has no negative impacts on the natural heritage functions and features of the SWH.

4.2.2 Species at Risk, Species of Conservation Concern Habitat

Background

The status of flora and fauna species in Ontario and Canada are determined through COSSARO and COSEWIC based on scientific and traditional knowledge. For the purposes of this report, protection is afforded to Threatened and Endangered species under the ESA for provincially listed species, and federally under SARA for aquatic SAR and federally listed birds protected under the MBCA (1994). Furthermore, species listed as Special Concern provincially are considered Species of Conservation Concern under the Natural Heritage Reference Manual and their habitat is frequently considered SWH.

Species at Risk and Species of Conservation Concern Habitat Screening

Prior to field investigation, a desktop review of secondary source information was completed to determine the potential for SAR, SCC and their habitats in the study area (as described in

Section 2.4.2). Table 4-1 identifies the SAR records for the study area and local surrounding area provided by local governing agencies.

Table 4-1. Species at Risk Records for the Study Area.

Common Name	Scientific Name	S-Rank	COSEWIC	ESA/ COSSARO	SARA	Source
Little Brown Myotis	<i>Myotis lucifungus</i>	S5	END	END	END	MNRF
Northern Myotis	<i>Myotis septentrionalis</i>	S3	END	END	END	MNRF
Tri-coloured Bat	<i>Perimyotis subflavus</i>	S3?	END	END	END	MNRF
Small-footed Myotis	<i>Myotis leibii</i>	S2/S3?	END	END		MNRF
Barn Swallow	<i>Hirundo rustica</i>	S4B	THR	THR	THR	MNRF
Chimney Swift	<i>Chaetura pelagica</i>	S4B, S4N	THR	THR	THR	MNRF
White-eyed Vireo	<i>Vireo griseus</i>	S2B				MNRF
Eastern Wood-pewee	<i>Contopus virens</i>	S4B	SC	SC	SC	MNRF
Purple Twayblade	<i>Liparis liliifolia</i>	S2/S3	THR	THR	THR	NHIC/ MNRF
Eastern False Rue-anemone	<i>Enemion biternatum</i>	S2	THR	THR	THR	NHIC/ MNRF
Lowland Brittle Fern	<i>Cystopteris protrusa</i>	S2/S3				MNRF
Slim-flowered Muhly	<i>Muhlenbergia tenuiflora</i>	S2				MNRF
Striped Cream Violet	<i>Viola striata</i>	S3				MNRF
Eastern Green-violet	<i>Hybanthus concolor</i>	S2				MNRF

Common Name	Scientific Name	S-Rank	COSEWIC	ESA/ COSSARO	SARA	Source
Butternut	Jugland cinerea	S3?	END	END	END	MNRF
Greater Redhorse	Moxostoma valenciennesi	S3				NHIC/MNRF
Silver Shiner	Notropis photogenis	S2/S3	THR	THR	SC	MNRF
Greenside Darter	Etheostoma blennioides	S4		NAR	SC	MNRF
Black Redhorse	Moxostoma duquesnei	S2	THR	THR		MNRF
Herpetofauna						
Eastern Hog-nosed Snake	Heterodon platirhinos	S3	THR	THR	THR	MNRF
Snapping Turtle	Chelydra serpentina	S3	SC	SC	SC	MNRF
Kidneyshell	Ptychobranchus fasciolaris	S1	END	END	END	NHIC/ MNRF/DFO
Rainbow Mussel	Villosa iris	S2/S3	SC	SC	END	MNRF
Wavy-rayed Lampmussel	Lampsilis fasciola	S1	SC	THR	SC	MNRF

A total of 24 SAR and SCC species were identified as potentially occurring in the study area during the background review of historical records. Of these species, 6 were listed as Endangered, 8 were listed as Threatened and 3 were listed as Special Concern. A detailed analysis of potential for SAR presence within the study area is provided in the SAR screening table, Appendix M.

Candidate Habitat

Although species listed as Special Concern are not legally protected under the ESA, their habitats may qualify for protection as SWH, and any SC species should be considered as having potential for up listing. Habitat suitability was determined through aerial photograph interpretation and verified through field investigations to determine if appropriate habitat

within the study area is present for the species. A total of 19 species have been identified as having habitat potential, or are verified to occur within the study area are listed below:

- Northern myotis (END) is considered Endangered federally and provincially. These bats hibernate in caves or abandoned mines and roost under loose bark of dead or live trees, crevices, hollows, in the cavities of trees. They typically locate these maternity sites near forest gaps and switch maternity roosts more frequently than other SAR bats species (i.e., every 1-5 days) (MNRF, 2017). It is found throughout forested areas in southern Ontario to the north of superior. White-nose syndrome has impacted the population of this bat species.
- Eastern small-footed myotis (END) is considered Endangered federally and provincially. Small footed myotis roost in a variety of habitats, including rock outcrops, hollow trees, bridges, buildings, and caves and hibernate in caves and mines. They forage in a broad range of habitats. White-nose syndrome is a fungal disease that has reduced small footed myotis. White-nose syndrome has impacted the population of this bat species.
- Little brown myotis (END) is considered Endangered federally and provincially. The most widespread of the Ontario bats, this species hibernate in caves and mines in the winter and roost in buildings, and tree cavities, and forages close to wetlands, lakes, and streams during the summer. It can be found in a variety of habitats. They forage over water in open areas between water and forest, and in agricultural environments along hedgerows (MNRF, 2017). White-nose syndrome has impacted the population of this bat species.
- Tri-coloured bat (END) is considered Endangered federally and provincially. Tri-coloured bat established maternity roots within live and dead foliage within or below the canopy, typically in oak or maple trees. They also on occasion use dogwood leaves, pine needles, squirrel nests and in tree cavities. They have a high site fidelity to their roosts. Maternity roost locations vary from dense woods to more open areas, but typically not in deep woods (MNRF, 2017). They typically forage along forested riparian corridors, over water and in gaps in forest communities.
- Silver shiner (THR) is found in deep riffles or pools in medium to large streams with moderate to high gradients and prefer substrates from course boulder, gravel, and pebbles to fine sand, mud, and clay.
- Greater redhorse is found in habitats from medium to large size rivers that have substantial flows with course substrate. They cannot tolerate polluted waters.
- Black redhorse (THR) is present in pool and riffle areas of medium sized rivers and streams usually less than 2 m deep. Few aquatic plants, moderate to fast current and sandy or gravel bottom are typical characteristics of habitat. It is considered threatened federally and provincially.

- Greenside Darter (SC) is considered Special Concern under SARA and is widely distributed in a variety of habitats, but prefers creeks, small to medium rivers with abundant gravel and rubble riffles and associated with filamentous algae.
- Snapping turtle (SC) is considered Special Concern federally and provincially and listed under Schedule 1 of SARA. Snapping turtle use multiple types of habitat including any freshwater habitat, typically slow-moving water with soft mud or sand bottom with abundant vegetation.
- Eastern hog-nosed snake (THR) is considered Threatened federally and provincially. This snake prefers sandy well drained habitats such as beaches, meadows, and dry deciduous forests. Its common food source is toads and is found where these populations exist.
- Rainbow mussel (END) is found in small to medium sized rivers with a moderate to strong current, and sand, rocky or gravel bottoms. Found in or near riffle areas, in long vegetation with water less than 1 metre deep.
- Wavy-rayed lampmussel (END) is found in small to medium rivers with clear water. Lives in shallow riffle areas with clean gravel or sand bottoms.
- Kidneyshell (END) is found in small to medium sized rivers with shallow, clear, swift-moving water with gravel and sand.
- Eastern false rue-anemone (THR) is threatened federally and provincially. It is typically found in deciduous forest and thickets with rich, moist soil, often in valleys, floodplains, and ravine bottoms. Typically, near mature watercourses and within mature forests with a composition of maple and beech trees.
- Purple twayblade (THR) is found in a variety of habitats including open oak woodland, savannah, mixed deciduous forest, thicket shrub, shrub alvar, deciduous swamp and conifer plantations.
- Lowland brittle fern has a S-rank of S2/S3. Its habitats include moist to mesic deciduous woodlands, edges of wooded bluffs, shaded banks of rivers, wooded areas along rocky streams, upper slopes of ravines and shaded areas along cliffs. Maple-basswood and oak oak-hickory woodlands.
- Striped Cream Violet is found in moist to mesic deciduous woodlands, banks of rivers and streams in shaded areas, open woodlands, woodland borders, moist meadows, shrubby hedges, and ditches.

- Eastern Green-violet has an S-rank of S2 and found in moist to mesic deciduous woodlands, wooded slopes, shaded terraces along streams and damp ravines with calcareous rocks.
- Slim-flowered muhly has an S-rank of S2 and its habitat includes upland areas of hilly woodlands, rocky woodlands, upland savannas, bluffs, wooded slopes, and banks of rivers. Prefers deciduous trees, especially oaks.

Confirmed Species Observations:

Species identified as having confirmed habitat within the study area are listed below:

- Eastern wood-pewee (SC) is considered a SCC in Ontario. It is listed as SC both provincially and federally. The eastern Wood-pewee occurs throughout southern Ontario, breeding most often in deciduous woods, and sometimes in more open habitats, with a preference for open habitats (such as open water, roadways, and clearings) adjacent to nesting sites. The MNR (OMNR 2000) further describes the habitat of eastern wood-pewee as open, deciduous, mixed, or coniferous forest. Typically found in the mid canopy layer of forest clearings and edges of deciduous and mixed forests. It is most abundant in intermediate age mature forest stands with little understory vegetation (MNR, 2018). They are found calling and foraging within the Dry-Fresh Scots Pine-Poplar Sugar Maple Mixed Forest.
- Chimney swift (THR) is considered Threatened provincially and federally. One quarter of its breeding range is located in Canada. As an aerial forager, which concentrates near water, chimney swift are now associated with urban and rural settings, and typically use chimneys as roosting and nesting habitat (COSEWIC, 2007). Species were found flying across study area high in the air, but not using the site. Nesting habitat does not exist within the study area.
- Barn swallow (THR) is considered Threatened provincially and federally. Barn swallow occurs throughout Canada, with distribution in close association with human rural settlements. They prefer various open habitats for foraging including grassy fields, pastures and agricultural crops, lake, and river shorelines, cleared rights-of-way, islands, farmland and wetlands (COSEWIC, 2011). They were found using the cart bridges over Medway Creek as nesting sites.
- Butternut (END) is considered endangered provincially and federally. The range of butternut extends through most of southern Ontario and eastern mixed deciduous forests in Ontario. Butternut is intolerant of shade and can be found scattered individually or in small groups within mixed hardwood stands, along fence lines or in open fields. The species is threatened by butternut canker disease, which is the leading cause of decline of the species population. One large mature butternut was confirmed on site within the study area, within the FOD7-4 Community near the golf course parking

lot and cart pathway. Potentially, a young butternut sapling is also near the identified mature butternut.

- Monarch (SC) is found in areas with milkweed species. Milkweed is important for the life cycle of monarchs and were found on forest edges, and in meadows on site. Monarchs were noted multiple times within the study area boundaries.

4.3 Municipally Recognized Features and Species

As per the London Plan and corresponding Maps 1 and 5, protection is provided for recognized components of the Natural Heritage System. Additional components of the Natural Heritage system such as potential / unevaluated features are considered Environmental Review Place Type features and require evaluation in accordance with provincial requirements. The following Natural Heritage features were identified through background desktop review and confirmed through field investigation:

Green Space Place Type:

- Fish Habitat;
- Habitat of Endangered Species and Threatened Species;
- Woodlands;
- Significant Wetlands and Wetlands;
- Significant Woodlands and Woodlands;
- Significant Valleylands;
- Significant Wildlife Habitat; and
- Environmentally Significant Areas.

Environmental Review Type:

- Unevaluated vegetation patches; and
- Valleylands.

No other significant natural heritage features are identified to occur within the study area.

4.3.1 Fish Habitat

The Fisheries Act (1985) and the London Plan (2018) prohibit the harmful alteration, disruption or destruction of fish habitat as defined under the DFO. The extent and

significance of aquatic habitat may be determined in consultation with the MNRF, UTRCA and DFO.

Two fish bearing watercourses were identified on Map 5 of the London Plan and confirmed within the study area, including Medway Creek and Axford Tributary, which is a tributary of the Medway Creek. Medway Creek is a large creek within the Medway Creek watershed with a high diversity of fish species, which includes many SAR mussel, fish, and reptile species.

As fish habitat is considered Green Space Place Type, alteration to these features is prohibited under the London Plan without review by all relevant agencies prior to any works within these tributaries. This includes a DFO request for review and relevant permitting by UTRCA and MNRF.

4.3.2 Significant Woodlands and Woodlands

Both the PPS (OMMAH, 2014) and the London Plan provide for the protection of Significant Woodlands within the City of London. The Natural Heritage Reference Manual states no development and site alteration in significant woodlands or adjacent lands can occur unless there will be no negative impact on the feature or its ecological functions.

The City of London defines Significant Woodlands as wooded areas within London that are >0.5 ha and fit the evaluation criteria for woodland qualities listed in Section 1340 of the London Plan. Woodland means tree areas that provide environmental and economic benefits such as erosion prevention, water retention, and provision of habitat, recreation and the sustainable harvest of woodland products. The significance of a woodland is determined using the scoring system outlined in the City Council's Guidelines for the Evaluation of Ecologically Significant Woodlands are based on the considerations of the Ministry of Natural Resources and Forestry's Natural Heritage Reference Manual (2010). Woodland areas that meet the suggested standards for one or more of the factors as follows can be considered significant: ecological functions (shape, linkages, habitat value, woodland diversity, landscape integrity), uncommon characteristics, woodland size, and economic and social values.

No Significant Woodlands are mapped on Map 5 of the London Plan within the study area. However, several unevaluated woodland patches are present, some of which fall under the Unevaluated Vegetation Patches category and are included in the Environmental Review Place Type. These patches were assessed following the Cities Guidelines for the Evaluation of Ecologically Significant Woodlands and determined two significant woodlands were present. Assessment of the woodland patches is presented in Appendix N and shown on Figure 4-1.

The first Significant Woodland (Woodland C) is located behind the golf course clubhouse towards Medway Creek and runs along the valley slope. It is identified as Significant Woodland and SWH due to its proximity to Medway Creek, steep slope and Butternut, a species at risk being present within it. No impacts to the natural features within this area can occur. Development should avoid this area.

The second Significant Woodland (Woodland E) is located along a valley slope, beside the Medway Creek and is in the northeast corner of the study area. It is classified as Significant Woodland and SWH due to its close proximity to the Medway Creek, steep slope, and the presence of seeps in close proximity, connectivity, and the presence of eastern wood-pewee, which is classified as SC. No impacts to the natural features within this area can occur. Development should avoid this area.

4.3.3 Significant Valleylands and Valleylands

Significant Valleylands and Valleylands are protected under the PPS (OMMAH, 2014) and the London Plan. Valleylands are defined as natural areas occurring in a valley or other landform depression which contains water (either flowing or standing), such as rivers, streams, watercourses, or ravines.

Identification of significance is based on the evaluation of their ecological, hazard protection, recreational, aesthetic and water resources management functions. This could include the following based on Section 1347 of the London Plan;

1. The valleyland performs surface drainage, groundwater recharge or discharge, filtering of sediment or is located in a headwater area;
2. Contains distinctive, unusual natural communities or high-quality landforms
3. Provides linkage or a corridor between significant natural heritage features or areas;
4. Represents mostly continuous, large natural areas that provide wildlife movement, linkages and connections that could extend beyond the city or subwatershed;
5. Serves as a visual amenity by providing a physical separation or buffer between incompatible forms of development
6. Provides opportunities to create linkages or corridors and rehabilitation opportunities for landform to a natural state or support natural communities;
7. The valleyland has physical characteristics related to size, depth and slope gradient that are susceptible to slope instability or erosion that are expected to present constraints to development; and
8. Provide logical extensions to City's trail and pathway systems;

Further criteria for Significant Valleylands are detailed in the Ministry of Natural Resources and Forestry's Natural Heritage Reference Manual (2010). The minimum width of significant valleylands will be generally compromised of 30m on each side of the watercourse measured from the high water mark. Widths will be determined on a case by case basis.

Several watercourses have been confirmed within the study area (Medway Creek, Axford Drain), as identified on Map 5 of the London Plan and through field investigation. Two Significant Valleylands (Axford drain and Medway Creek) and valleyland (Axford drain) of the valleylands are present within the study area. According to the Medway Creek SWS, the Medway Creek valley is considered a significant valleyland connection / natural corridor between the ESA to the south and the lands north of the golf course.

The City of London has identified Significant Valleylands and offers protection to these areas under the Official Plan as these features are recognized and protected as a locally important feature.

An evaluation of an unevaluated corridor (an extension of Axford Drain) was undertaken to assess if it is to be assessed as significant valleyland. The assessment identified the existing conditions of the site to be a straightened drainage ditch running alongside an agricultural field and an upland meadow. Discussions with the golf course identified that periodically this channel is dredged mechanically using an excavator as it fills with sediment. The channel itself is straight, offers poor fish habitat with no instream habitat, very slow water velocities, is exposed to full sunlight and its banks show areas of erosion. It originated at a culvert under Wonderland Road and ends at a small, damaged culvert directly upstream of Pond C. The surrounding topography around the drain is relatively flat. Watercress was observed within the channel, outlining some groundwater outputs are present. Based on the finding of the evaluation, the corridor should not be designated significant.

4.3.4 Significant Wildlife Habitat

The London Plan, Section 1353 outlines no development or site alteration shall be permitted in significant wildlife habitat unless it has been demonstrated that there will be no negative impacts on the natural features and their ecological functions. Using the Ministry of Natural Resources and Forestry's Significant Wildlife Habitat Technical Guide, the Natural Heritage Reference Manual and associated Ecoregion 7E Criteria Schedule, the significance of wildlife habitat will be assessed. Significant wildlife habitat as ecologically important in terms of features, functions, representation, or amount contributing to the quality and diversity of an identifiable geographic area or Natural Heritage System.














Significant wildlife habitat was identified within the study area at multiple locations as presented in Appendix L and as shown on Figure 4-1. These include Pond A due to the presence of American bullfrog, Pond C due to the number of species of amphibians observed during amphibian call surveys, Woodland C and E scoring as Significant Woodlands.

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Corlon Properties
Sunningdale North EIS

Figure 4-1
Environmental Constraints

Legend

-  Study Area 120 m Buffer
-  Study Area
-  Wetland Feature
-  Amphibian Movement Corridor
-  Significant Woodland
-  Open Aquatic Habitat
-  Woodland Area
-  Significant Woodlands Buffer (10 m)
-  Wetland Buffer (30 m)
-  Watercourse
-  Watercourse Buffer (30 m)
-  Significant Valleyland
-  Significant Valleyland Buffer (30 m)

Golf Course Green Legend

- T - Thompson Course
- R - Robinson Course

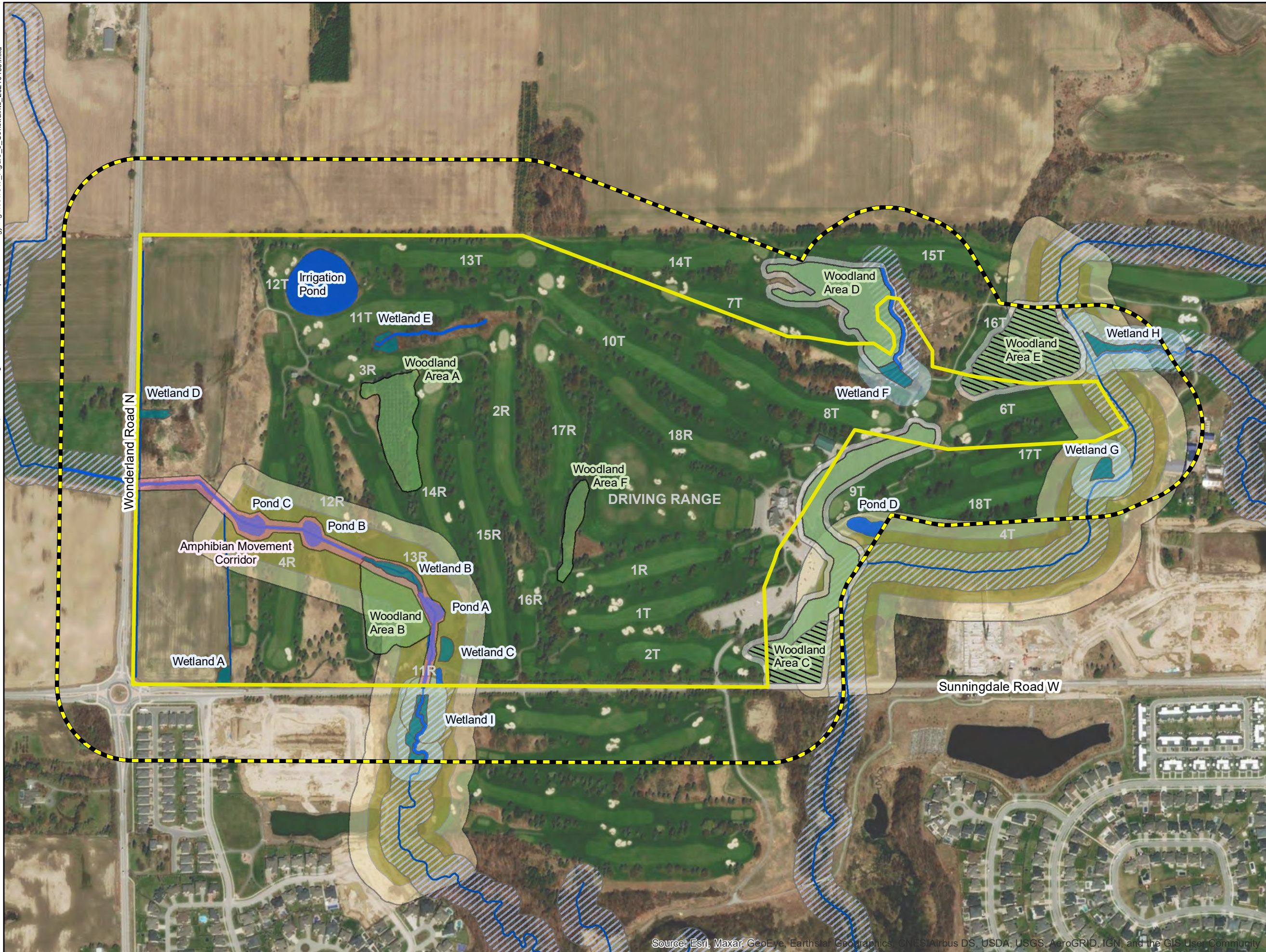


NAD 1983 UTM 17
Project: 1817 Corlon Properties
Date: 2021/04

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Data Sources: Ecosystem Recovery Inc., 2021;
The London Plan - City of London, ESRI World Imagery



4.3.5 Provincially Significant Wetlands and Wetlands

The PPS (OMMAH, 2014) and the London Plan (2018) stipulate the protection of Significant Wetlands and all Wetlands within the City of London, respectively. According to the Ontario Wetland Evaluation System (MNRF, 2014), wetland type is determined on the basis of the major plant associations and physical substrate and hydrological information obtained. The minimum size of a wetland for mapping purposes is typically 0.5 ha, unless mapping a specialized community. Wetlands found within the community are smaller than the 0.5 ha, thus are included as inclusions within other ELC units.

As stated in the London Plan, development is not permitted in provincially significant wetlands. Similarly, development cannot occur in any other wetland type unless it can be compensated adequately and to the standards of the City. Wetlands are also subject to regulation under UTRCA and Human-made Hazard policies in the City of London OP. No provincially significant wetlands are found within the study area, but unevaluated wetlands have been identified on site (Environmental Review Place Type), which are not significant. The wetlands were each visited to gather the general characteristics of each wetland. This included a wetland delineation and observations of any significant features.

No provincially significant wetlands were identified within the study area. However, this has not been verified by MNRF. Onsite wetlands are heavily influenced by golf course activities and consist of 9 individual wetland patches totaling 0.88 ha in size, and 5 man made ponds having a total area of 1.24 ha with no connectivity to each other. Any development proposed shall provide for no net loss of wetland features, or functions within the study area. Replacement wetlands can be considered after consultation with UTRCA and the City (London OP, 2018). See **Section 6.2** for discussion on wetland compensation as part of the Axford Drain Corridor concept.

4.3.6 Unevaluated Vegetation Patches

The London Plan (2018) identifies unevaluated vegetation patches under the natural heritage features and areas included in the Environmental Review Place Type, as presented on Map 5. These features require confirmation and identification of presence / absence and further evaluation in accordance with provincial and municipal requirements and for significance. These features may, or may not be present on Map 5, but all areas proposed for development through the planning and development application require assessment are. Any identified vegetation patches matching the criteria will be included as an amendment to the London Plan Map 1 and 5. As per Section 1385 of the London Plan, in addition to areas that are included in Environmental Review or Green Space Place Types, all vegetation patches larger than 0.5 hectares are to be evaluated to determine significance of vegetation and identify the need for protection planning and development approvals.

One unevaluated vegetation patch (Woodland C) was identified within the study area on the London Plan Map 5. After assessment, this was identified as SWH. Another woodland

(Woodland E) not identified on City of London mapping was discovered on site during field assessments and designated as SWH.

4.3.7 Summary

The following summarizes the species confirmed within the study area during field investigations conducted in 2018 and are provincially recognized features:

- One butternut tree was observed within the study area, and potentially a young sapling near the edge of the cart pathway on a slope;
- One individual chimney swift was observed flying over the site;
- An eastern wood-pewee was observed foraging and calling on site within the woodlands on the north portion of the study area; and
- Barn swallows were observed many times on site throughout the field investigations. Barn swallow nests were observed under the bridges across the Medway Creek.
- Monarch were observed at multiple locations within the study area boundaries.

The confirmed SWH and SAR within the study area have been identified in Appendix L and Appendix M. These features require protection and development is not allowed to occur within the areas of these features, and have applicable ecological buffers associated to ensure the protection of these features.

An EIS will identify the ecological buffer limits for these features. These will require field verification by UTRCA and the City of London staff and influences proposed development design. As these features are sensitive to surrounding environmental factors, no negative impacts can occur within the habitat of these features.

The following provincially ranked species will require further investigations to confirm the quality of available habitat within the study area:

- Tri-colored Myotis;
- Eastern Small-footed Bat;
- Northern Myotis; and
- Little Brown Myotis.

5. Opportunities and Constraints

5.1 Opportunities

As a result of the development of the study area, improvements to the natural environment and its features may be obtained through net benefit compensation. Currently, land use practices negatively impact the natural environment via historical and continued alteration of the land for recreational activities, golf course operations, alteration to watercourses, monoculture, and removal of natural habitat.

Within the Axford Drain corridor, a potential future development provides an opportunity to deliver a net benefit to the existing degraded corridor, which currently has limited habitat for wildlife species, is impacted by pesticides, fertilizers, and manicured lawns. Wildlife use of the existing corridor is low due to the historic alterations to the landscape and the existing surrounding land use as an active golf course. A net benefit would be achieved through a natural channel restoration to create an “integrated corridor” that provides a continuous natural area for the movement of stormwater, wildlife, and people. The integrated corridor would consist of a linear natural heritage area that would provide enhanced wildlife habitat, protection from natural hazards, stormwater management, and a pathway system. Elements of an integrated corridor could include the following:

- Open the currently enclosed piped watercourse;
- Remove other fish barriers including DICB, perched culverts, and piping;
- Provide connectivity through rehabilitation of the length of entire Axford Drain from Wonderland Road to Sunningdale Road;
- Consolidate isolated vegetation patches and provide continuous vegetation along entire Axford Drain watercourse corridor;
- Compensate for removed non-significant wetlands within the study area that are not connected to each other by designing a variety of wetland habitats with a larger total footprint than the removed habitat. These would be specifically designed for species identified on the existing landscape. This would include bullfrog and other frog habitat, snapping turtle and other turtle habitat, monarch habitat. These wetlands will have varying depths, natural features including basking logs and large rocks, and be connected by the Axford Drain to each other to provide wildlife movement within a natural, unimpacted system.
- Remove and replace man made online pond water bodies with fish enhancement features within the watercourse corridor to promote connectivity and fish usage;

- Improve water quality through removal of herbicides and pesticide applications, increase watercourse buffer widths, reduce sediment and erosion potential and cool water temperatures through the planting of appropriate shade vegetation;
- Bank protection measures;
- Flow energy reduction;
- Protect existing significant vegetation features and woodlands where feasible;
- Increase vegetated buffer along the entire corridor using native plant species selected for pollinators and wildlife;
- Incorporate a combination of wildlife habitat enhancement features such as bird nest boxes, bat boxes, bee boxes, snake hibernaculum, brush piles, snag creation etc.;
- Restore creek orientation to natural pre-development stage;
- As part of planting design, select milkweed plants to create habitat for known Monarch populations that currently use the study area and plant and seed species should be native and as wildlife food and pollinator friendly; and
- Opportunity exists within the channel corridor to restore channel function and flow attenuation through floodplain storage to supplement stormwater management.

5.2 Constraints

Constraints to the potential future development plans are based upon existing information, liaison with City of London, MNRF, and UTRCA staff and field surveys presented in the EIS. Future development plans must mitigate any negative impacts to these identified natural heritage features. The following are the areas of constraint;

Feature/Species located within the immediate subject lands:

- Fish habitat (Axford Drain, ponds);
- Significant wildlife habitat in Woodland F (FOM9-2) (potential bat maternity habitat);
- Amphibian breeding habitat (Wetland) – Ponds A and C;
- Amphibian movement corridor – Axford Drain;
- Wetlands – multiple wetlands limits identified within the study area;
- Turtle overwintering habitat – Pond A, B, C, and Irrigation Pond;

- Significant valleylands – along Axford Drain; and
- Habitat for Special Concern Species – monarch (SC).

Feature/Species located within the study area (120 m buffer), not anticipated to be affected by the proposed development:

- Significant woodlands (2 significant woodlands);
- Fish habitat (Medway Creek);
- Significant wildlife habitat (potential bat maternity habitat, SAR tree habitat (Woodland C and E);
- Amphibian movement corridor – Medway Creek;
- Wetlands – multiple wetlands limits identified within the study area;
- Bird habitat for Special Concern species (within FOM9-1);
- Turtle overwintering habitat – Medway Creek and South of Sunningdale Road;
- Significant Valleylands – Medway Creek; and
- Habitat for SAR and Special Concern Species – butternut (END), barn swallow (THR), monarch (SC); and Eastern wood-pewee (SC).

No development can occur in features or habitat of the species identified above unless proven no negative impact on the features or ecological functions. Restoration of the Axford Drain Corridor will be designed to compensate for any potential impacts to the above listed features/species and are discussed in Section 6.2. These are presented on the Assessed Natural Heritage Features Figure 4-1. Associated buffer and setbacks for these valuable natural resources are required.

6. Proposed Development

6.1 Neighbourhood Development

Map 1 of the London Plan (2019) identifies the subject lands for the proposed development as Open Space due to its present use as a golf course, with approximately 10 hectares of land along Wonderland Road designated as Neighbourhood. The partial redevelopment of the Sunningdale Golf and Country Club lands is proposed to be designated Neighbourhood, while the identified Natural Heritage Features within this EIS will be designated as Green Space, through an Official Plan Amendment process.

Under The London Plan, the Neighbourhood Place Type allows a list of permitted uses ranging from low density (i.e. single detached houses) to medium density (stacked townhomes, low-rise apartments). The type of residential development permitted with the Neighbourhood Place Type is determined by the classification of roadway that the development fronts.

The Sunningdale North Development is anticipated to be predominately low-density residential. Smaller areas of medium density housing have been included within the lands fronting Sunningdale Road and Wonderland Road. Green Space will be designated for the Axford Drain corridor, in addition to any lands dedicated for parkland.

The proposed Sunningdale North development lands occupy approximately 51 ha of lands currently utilized and maintained as golf course, with an additional 2.6 ha block on the existing golf course lands to the east allotted for SWMF 10. The development area will primarily be residential with some park and green space blocks included. The northwest quadrant of the development will be dedicated as future school lands. The Axford Drain is proposed to be realigned and restored along a continuous open space block that bisects the development lands. Proposed area of impact is shown on Figure 6-1.

Stormwater management facility 6C (East and West) will be located within the Axford Drain corridor. These facilities will provide stormwater erosion control and partial water quality and quantity control for the south half of the development lands discharging to the Axford Drain. Stormwater management facility 10 will be located on the Sunningdale Golf Course lands east of the development. This facility will provide erosion control, water quality control and partial water quantity control for the north half of the development lands discharging to Medway Creek.

Although the Draft Plan of Subdivision has not been completed at this time, the proposed development is anticipated to be comprised of the following components:

- Green space block associated with the realigned Axford Drain corridor with appropriate buffers (approximately 5.9 ha);
- SWMF 6C located wholly within the Axford Drain corridor (approximately 0.9 ha total);







- SWMF 10 located on the existing golf course lands east of the development limit (approximately 2.6 ha);
- Neighbourhood lands including parkland dedications (approximately 37.0 ha); and
- School dedication lands (approximately 8.1 ha).

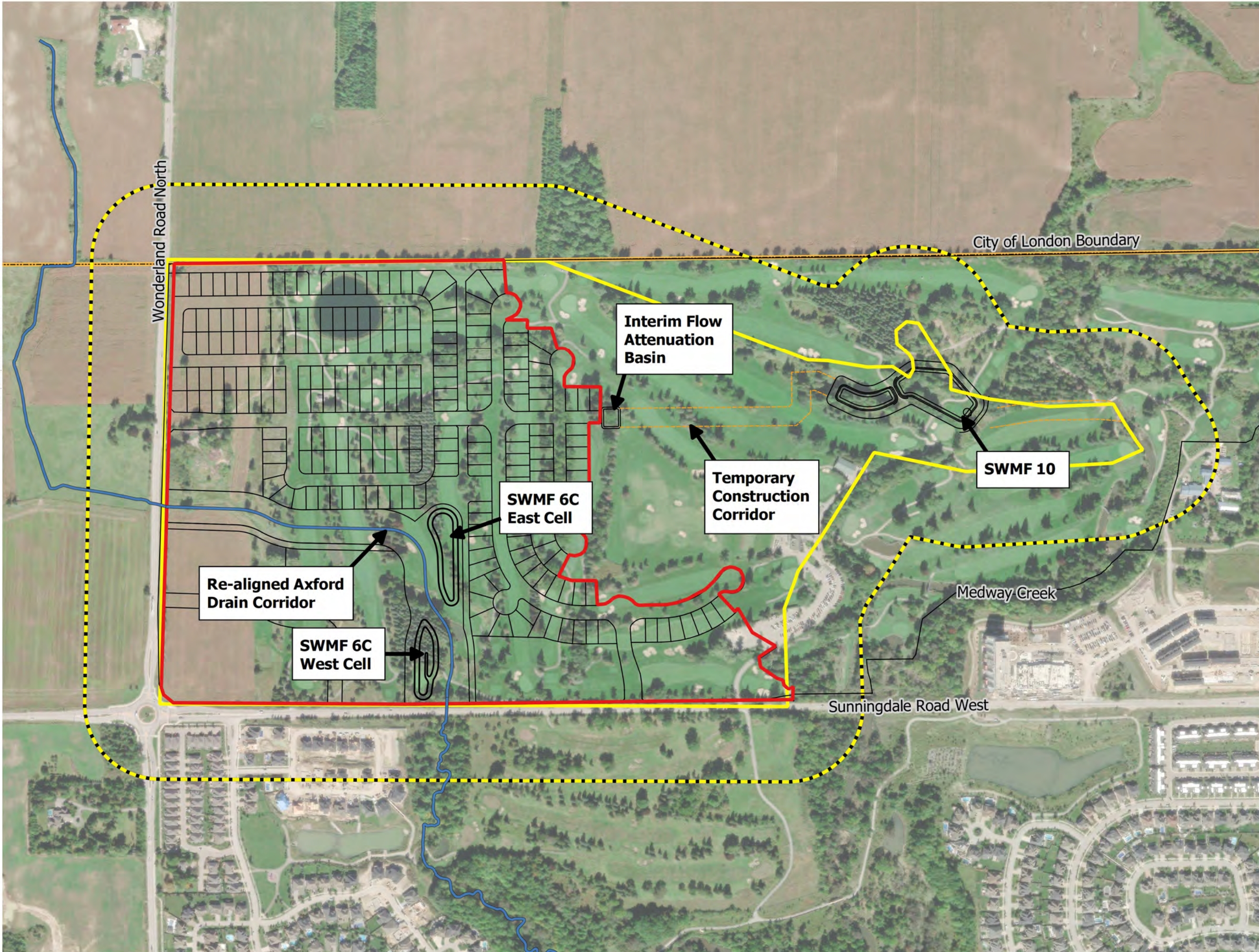
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Corlon Properties Sunningdale North Environmental Impact Study

Figure 6-1 Draft Plan Concept - Impacts

Legend

-  Study Area
-  Study Area 120m Buffer
-  City of London Boundary
-  Proposed Subdivision Limit
-  Draft Plan (LDS, 2022)
-  Axford Drain Re-alignment



NAD83 UTM 17N 1:5,750

Project Name: Sunningdale North
Date: 10/2022



Data Sources: Ecosystem Recovery Inc.
LDS (2022)

6.2 Axford Drain Corridor Enhancement

As part of the proposed development, the current degraded system of Axford Drain from Wonderland Road to Sunningdale Road will be rehabilitated to a more natural system promoting fish passage. As the drain is currently piped throughout portions, has online ponds, sediment accumulation and overall poor aquatic habitat. The draft Axford Drain corridor concept is presented on Figure 6-2, Figure 6-3 and Figure 6-4.

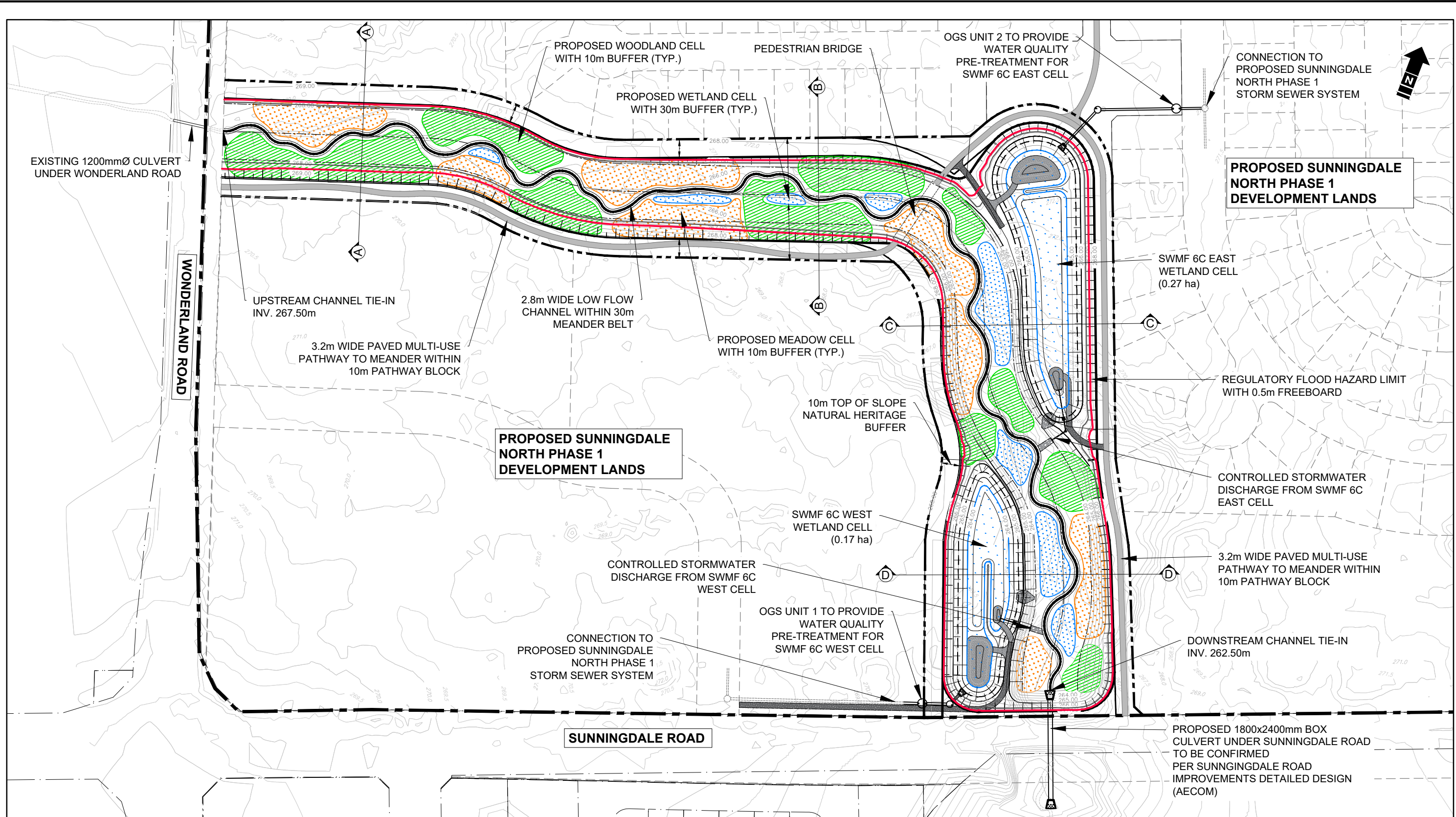
The new corridor will provide:

- Improve natural riparian habitat along Axford Drain through the installation of large natural buffers including woodland, wetland and meadow habitat;
- Increase diversity and quality of proposed natural features through the planting of native species of trees, shrubs and seeds that provide benefits to pollinators and other wildlife species. Native shrub selection will be in accordance with the Guide for Plant Selection for Natural Heritage Areas and Buffers (City of London 1994);
- Shrub and tree planting with native trees including: staghorn sumac, sycamore, red osier dogwood, gray dogwood, willow, sycamore and red oak, etc. will line the corridor in groupings, leaving areas for meadow habitat;
- To compensate for wetland loss, wetland features within the Axford Drain corridor will be created to provide multiple wetlands of different shapes, sizes, water depths and functions to support breeding amphibian habitat, wildlife use and turtle overwintering habitat. It is acknowledged the total wetland areas removed is greater than the total wetland area created, but the quality and function of the created wetlands is greater than the functions provided in the removed degraded wetland;
- Improve wildlife movement and natural habitat linkages between natural habitats outside of the subject lands;
- Enhance breeding bird habitat through the selection of native tree species for nesting, habitat design to include foraging habitat, nest box installation for bird species known to be present within the local area, and plant selection for food sources;
- Maximize woodland habitat through reforestation using native tree and shrub species, including Carolinian species appropriate for the site conditions;
- Increase diversity within the subject lands through the control and removal of invasive species;
- Create wildlife habitat features to promote use of the natural habitat including snake hibernaculum, turtle basking logs, raptor perch poles, osprey platforms, brush piles, bee boxes and nest boxes;

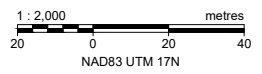
- Removal of fish passage barriers and the creation of instream aquatic habitat for fish and SAR habitat and be designed specifically for aquatic species of fish and mussels found within Medway Creek;
- Careful consideration in design for snapping turtle and American bullfrog habitat; and
- During construction, existing phragmites patches will be removed and the entire corridor will be planted with a native seed mix.

The channel itself will involve the removal of all piping, the installation of riffle-pool-riffle sequences in a meandering creek, fish spawning habitat and cover, and an overall increase in stream length and ecological function. The above compensation features will offset the loss of existing natural features within the landscape by providing a diverse and native habitat for wildlife. The net benefit provided within the restoration and enhancement plan will compensate for the loss of existing habitat proposed for removal as part of the development. The detailed plan will identify the plant species selection, location and quantities to be planted within the Axford Drain corridor and will include wildlife habitat creation.

Within the study area based on conceptual design, there will be an overall increase in woodland habitat, wetland area, meadow habitat and stream length. The existing habitat present within the golf course is degraded, has many non-native species and is not providing a strong ecological function. Removing golf course lands and agricultural fields will reduce pesticide use, reduce soil erosion and sediment runoff. The restoration design will improve natural habitat within the study area and provide a more ecological diverse habitat for wildlife species.

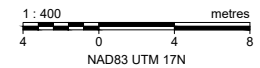
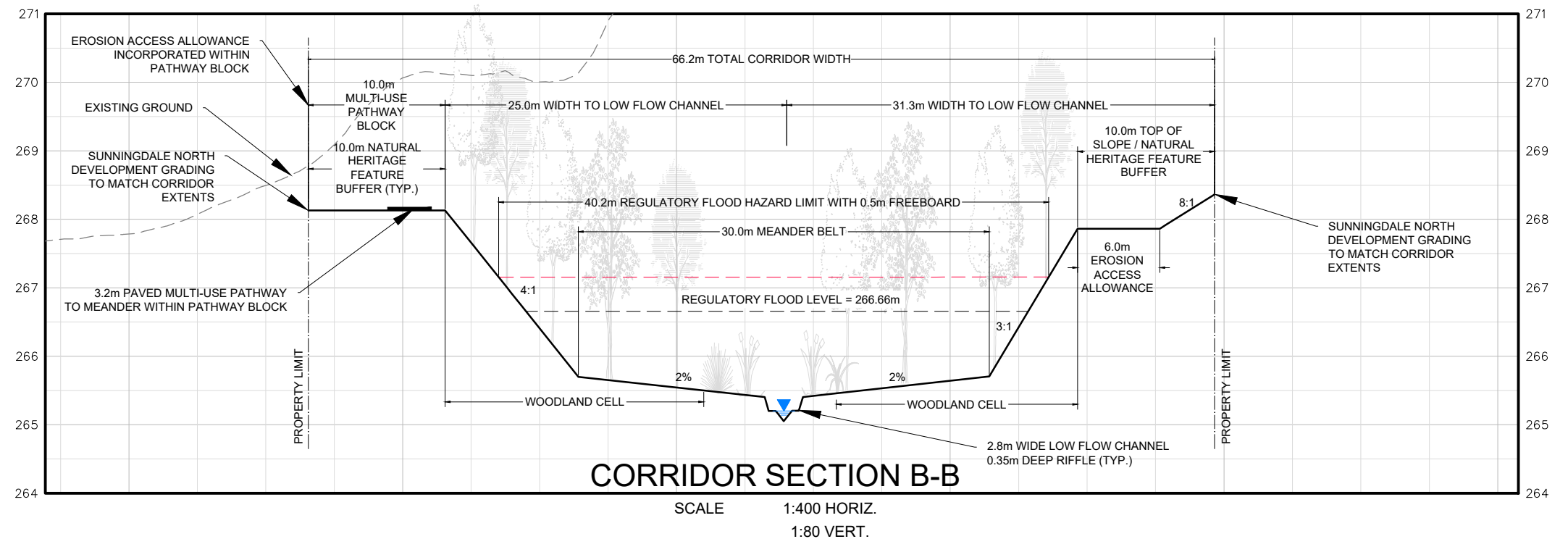
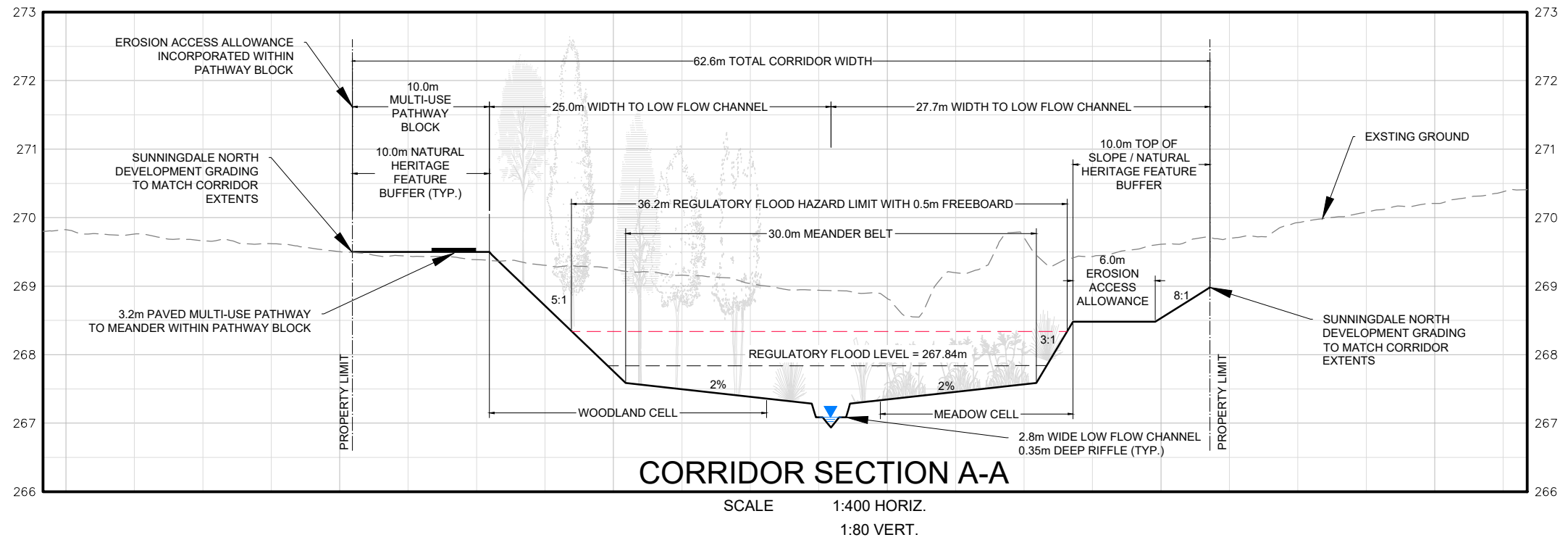


- LEGEND**
- STUDY AREA
 - - - SUNNINGDALE NORTH DRAFT PLAN
 - - - PROPOSED AXFORD DRAIN CORRIDOR EXTENTS
 - PROPOSED REGULATORY FLOOD HAZARD LIMIT
 - PROPOSED TOP OF SLOPE
 - - - PROPOSED AXFORD DRAIN MEANDER BELT
- PROPOSED COMPENSATION CELLS**
- MEADOW CELL (0.78 ha)
 - WETLAND CELL (0.24 ha)
 - WOODLAND CELL (0.94 ha)



NOTE: FIGURE(S) MUST BE USED IN CONJUNCTION WITH THE ATTACHED REPORT AND IS SUBJECT TO THE LIMITATIONS AND CONDITIONS STATED IN THE REPORT.

 	SUNNINGDALE NORTH - ENVIRONMENTAL IMPACT STUDY			
	CORLON PROPERTIES INC.			
AXFORD DRAIN CORRIDOR PLAN				
Date: SEPTEMBER 2022	Project: 1817	Submitter: J. TEEPLE	Reviewer: K. KEELE	
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			Figure 6-2	

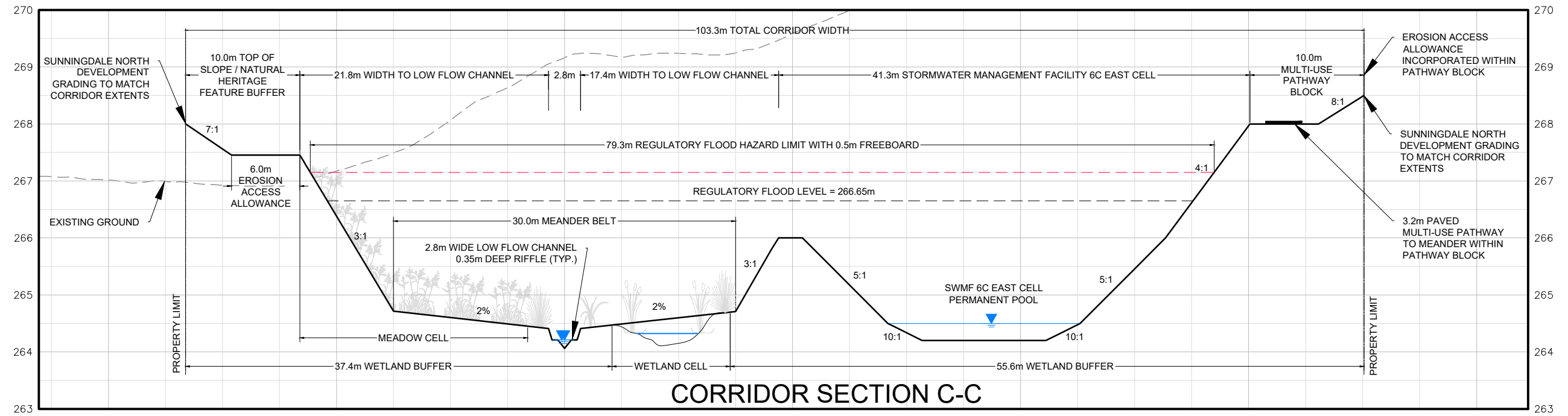


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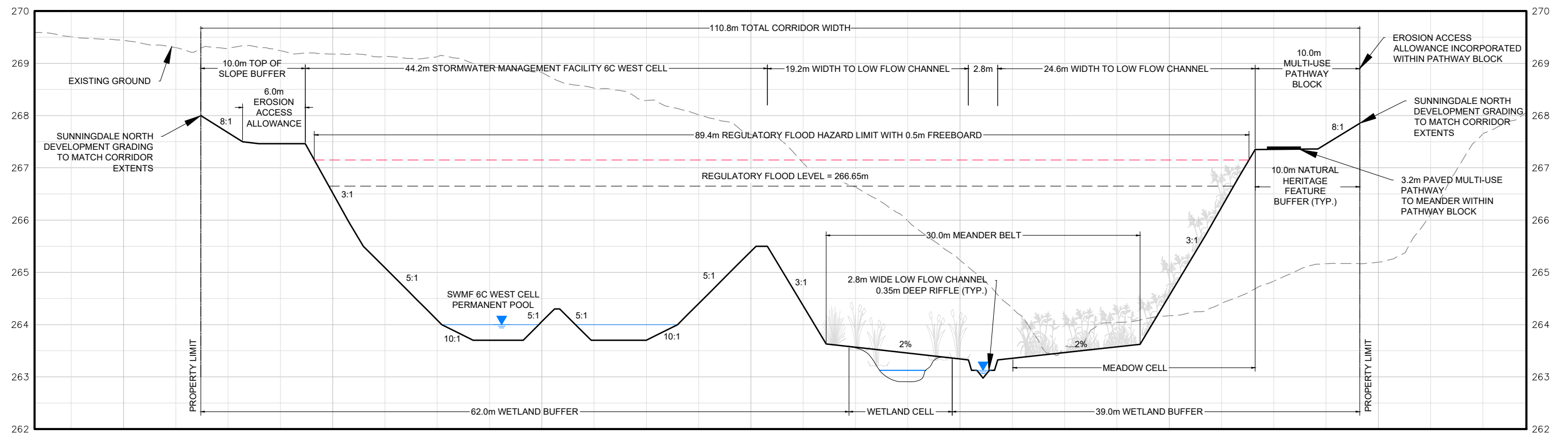
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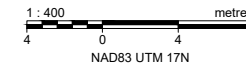
SUNNINGDALE NORTH - ENVIRONMENTAL IMPACT STUDY			
CORLON PROPERTIES INC.			
AXFORD DRAIN CORRIDOR SECTION A & B			
Date: SEPTEMBER 2022	Project: 1817	Submitter: J. TEEPLE	Reviewer: K. KEELE
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SCALE 1:400 HORIZ. 1:80 VERT.



SCALE 1:400 HORIZ. 1:80 VERT.



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SUNNINGDALE NORTH - ENVIRONMENTAL IMPACT STUDY CORLON PROPERTIES INC.			
AXFORD DRAIN CORRIDOR SECTION C & D			
Date: SEPTEMBER 2022	Project: 1817	Submitter: J. TEEPLE	Reviewer: K. KEELE

6.3 Stormwater Management Plan

The Sunningdale North development will be serviced by two stormwater management (SWM) facilities, 6C and 10.

6.3.1 SWMF 6C

Stormwater management facility 6C will be comprised of two wetland cells providing erosion control and partial water quality and quantity control for the development lands draining to the Axford Drain. A cell will be located on either side of the realigned Axford Drain within the Axford Drain open space corridor. The cells of 6C will incorporate wetland plantings to provide enhanced habitat connectivity with the creek corridor.

Stormwater quality control will be achieved through a treatment train approach to achieve enhanced suspended solids removal. Oil and grit separators installed on the tablelands will provide pre-treatment of the stormwater and water quality storage within the wetland cells will provide the remaining treatment, to a combined total of 80% TSS removal. The facilities will incorporate sediment forebays to minimize sedimentation and invasive maintenance such as sediment removals in the main wetland cells.

6.3.2 SWMF 10

Stormwater management facility 10 will be a hybrid stormwater wet pond / irrigation pond located on the Sunningdale Golf Club lands east of the proposed development. Inlet and outlet conveyance paths are proposed over Sunningdale Golf Club Lands east of the proposed development. The pond will provide erosion control, water quality control and partial water quantity control for proposed development lands draining to Medway Creek. The pond will be operated by Sunningdale Golf and function as an irrigation water reservoir for the golf course, as well as provide erosion control before discharging to the Medway Creek.

SWMF 10 will collect runoff from the development lands draining to Medway Creek to be harvested and used to supplement the golf course irrigation. This will reduce the overall demand for water takings from Medway Creek and provide a stormwater volume control to Medway Creek that will enhance the provided erosion control.

6.4 Conceptual Restoration and Enhancement Plan

The restoration and enhancement of natural features will be recommended whenever possible to provide a net benefit to the existing study area and include development of existing lands. Mitigation measures will include:

- Crime prevention through environmental design (CPTED);
- Sediment and erosion controls;

- Tree protection;
- Timing of vegetation removal;
- Naturalization of Axford Drain corridor;
- Ecological function linkages; and
- Incorporating trail design into the natural corridor.

7. Assessment of Potential Impacts

The following section identifies, describes, and discusses the existing and potential impacts to the identified natural heritage features from the proposed works on Sunningdale North Golf Course Lands. The construction stage of the project will have short-term impacts, which are temporary and are preventable through proper construction practices and site inspection. Long term impacts are related to post-construction activities, which can be mitigated by careful planning, construction design and good environmental management practices.

7.1 Existing Environmental Impacts

In order to properly assess the potential impacts of a proposed development within a study area, it is necessary to identify existing impacts that are currently present prior to the initiation of the proposed work. The identification of these impacts will assist in determining whether, following construction, impacts are a result of the proposed works or a result of previous activities within the study area. Additionally, some existing impacts may provide an opportunity to implement restoration as part of the environmental management plan.

The environmental field investigations completed in 2018 and 2019 have identified the following existing impacts:

- Fragmentation of Natural Vegetation and Habitat – Through the development of the golf course, which is maintained on the landscape, the surrounding landscape has been heavily influenced by human clearing for agriculture and golf course operations. This has resulted in fragmentation of local natural heritage features and a reduction in the size of natural communities.
- Watercourse Degradation – Based on historical aerial imagery, the Axford Drain watercourse over time has undergone many changes to its natural form. Previously it was a small meandering tributary with large, naturalized buffers along its banks. Over time the channel has been straightened, piped underground in portions, culvers and weirs installed, online ponds installed, dredging, and mowing directly to the edge of the channel's banks. Upstream of the study area on the west side of Wonderland Road, farming practices allowed cows to wander into the drain causing further channel degradation. The culvert installed under Sunningdale Road has also seasonally restricted fish movement within the system. All of these actions have led to a degraded system, with little natural habitat and many non-native and invasive species lining the channel banks.
- Noise Pollution – Noise levels within the study area are moderate and include local traffic, mowing operations, tree removal operations and general golf course activity. This disruption from noise levels likely negatively influences the relative abundance of wildlife species, specifically ones that are sensitive to noise. More generalist species may be better adapted to live within these conditions.

- Introduction of Non-native Species – The golf course is actively managed and includes the planting of many non-native seeds, shrub, and tree species within the property. This is especially evident in the forest plantations, which have changed the landscape. Other non-natives have escaped due to proximity to humans, farming, and golf course operations. The plant community's composition reflects a disturbed system in proximity to an urban environment.
- Soil Compaction – Over time, golf course maintenance and golf course activities have compacted the golf course lands. This includes constant cart use by members of the golf course, lawn tractors, and other maintenance machinery daily driving across the site. This has been ongoing since the golf course first opened, and included digging and disturbance of soils, and backfilling operations for the installation of drainage tile and irrigation.
- Golf Course Maintenance Activities – Daily mowing, pesticide spraying, tree removal, landscaping with non-native plants, course reconfigurations, watercourse alterations, irrigation installation, installation of non-permeable parking lots and pathways, all have had a very negative impact on the natural heritage features and natural conditions of this site historically.

7.2 Potential Short-term Impacts

Construction activities as part of the proposed works will potentially have short-term environmental effects. The environmental effects that have the potential to occur because of the proposed works on adjacent natural heritage features are discussed below.

- Impacts to the root zone of trees due to grading and construction activities;
- Soil compaction and soil contamination potential as a result of heavy machinery operation, and spills or leaks;
- Short-term water quality impacts from runoff from construction area allowing sediment to enter the watercourse and increase turbidity of the water;
- Disturbance to wildlife by increased noise, increase disturbance from construction traffic, and human activity;
- Increase level of sediment and erosion potential, impacting adjacent natural areas;
- Introduction of non-native species from equipment, increase site activity and disturbance to site;
- Temporary disruption to wildlife movement due to construction zone exclusion fencing and taking portions of the watercourse offline during restoration activities temporarily.

Through the implementation of mitigation measures, the above listed potential impacts are preventable. Ongoing maintenance to ensure all controls and mitigation measures are monitored for effectiveness will reduce the potential for negative impacts to the natural heritage features. Non-compliance with the environmental management plan and all of the associated mitigation measures will result in long-term impacts and significant damage to the ecological features and their functions.

7.3 Potential Long-term Impacts

Potential long-term impacts will be associated with site clearing and grubbing activities, site grading, design layout for the proposed subdivision, and alterations to the Axford Drain watercourse.

7.3.1 Development Layout

The proposed development layout will impact a large area of current golf course lands and total an area of 55.4 ha. The proposed restoration of the Axford Drain Corridor will create 3.38 ha natural habitat along the corridor and include native trees, shrubs, seeding, wetlands and features to benefit local wildlife species. Of note, in close proximity and within the Medway Creek corridor south of Sunningdale Road, there is more than 85 hectares of forested land providing natural habitat for wildlife species in more pristine conditions than the proposed development area as part of this project. For the proposed development area, the potential effects to the natural environment include:

- Potential to impact amphibian breeding habitat;
- Loss of wetland habitat within the current golf course lands, but proposed installation of new wetlands in overall large area along the Axford Drain corridor designed to meet the habitat requirements of amphibian, reptile and wildlife species;
- Loss of upland forest habitat, but proposed tree planting plan within the Axford Drain corridor is designed to compensate for the loss of trees with a replacement value larger than the removals. Short term, while the trees grow, there will be a loss of mature forest habitat within the property, even if the removed trees are typical of a plantation and non-native;
- Loss of meadow habitat within the golf course property, but compensation planting of native species within the Axford Drain corridor will provide a more biodiverse habitat for wildlife species;
- Potential positive effect through the installation of a snake hibernaculum within the Axford Drain corridor;
- Potential positive effect through the installation of brush piles for wildlife habitat;

- Potential positive effect through the removal of invasive species through the property and replacement with native trees, shrubs and seeds;
- Potential positive effects of fish and mussel passage within the Axford Drain by the realignment of Axford Drain, daylighting of piped watercourse, removal of fish barriers, installation of small wetland habitats, installation of riffle-pool-riffle sequences, and spawning habitat;
- Potential positive effects through the installation of wildlife movement corridor including large buffer along Axford Drain with a variety of habitats for different wildlife species;
- Potential positive effect to local wildlife with the installation of bird and bat boxes;
- Potential positive effect to monarch butterflies through seeding of common milkweed;
- Potential negative effect to Axford Drain tributary through increased exposure to pedestrian traffic leading to disturbances.

Table 7-1 outlines the areas of impact for the proposed development.

Table 7-1. Impact for the Proposed Development.

Type	Area	ELC Community / Feature	Size (ha)	Impact to Feature
Wetland	Wetland Area A	MAM2	0.061	Removed
Wetland	Wetland Area B	MAM2-2/SWH amphibian movement	0.124	Removed
Wetland	Wetland Area C	MAM2-5/SWH amphibian movement	0.071	Removed
Wetland	Wetland Area D	MAM2-2	0.069	Removed
Wetland	Wetland Area E	MAM3	0.085	Removed
Wetland	Wetland Area F	MAM2	0.104	Removed
Wetland	Wetland Area G	MAS2	0.086	Retain
Wetland	Wetland Area H	MAM2-11	0.139	Retain
Wetland	Wetland Area I	MAM2-2	0.147	Retain
		Total Wetland Area Removed	0.514 ha	

Type	Area	ELC Community / Feature	Size (ha)	Impact to Feature
		Total Wetland Area Preserved	0.372 ha	
Pond	Pond A	OA/SWH Bullfrog & Amphibian movement	0.074	Remove
Pond	Pond B	OA/SWH Amphibian movement	0.058	Remove
Pond	Pond C	OA/SWH Amphibian Breeding & movement	0.101	Remove
Pond	Pond D	OA	0.100	Retain
Pond	Irrigation Pond	OA	0.904	Remove
		Total Pond Area Removed	1.137 ha	
		Total Pond Area Preserved	0.100 ha	
Woodland	Woodland A	CUP3	1.039	Remove
Woodland	Woodland B	CUP3/SWH Amphibian movement	1.139	Remove
Woodland	Woodland C	FOD4-2/FOD7-4/FOD7-3/Significant Woodland	2.306	Retain
Woodland	Woodland D	CUP3	0.236	Remove
Woodland	Woodland E	CUP3	1.277	Retain
Woodland	Woodland F	FOM9-2/Significant Woodland	0.117	Remove
Woodland	Woodland G	FOM9-1/FOM9-2/Significant Woodland	1.502	Retain
Woodland	Woodland H	FOM9-2	0.352	Remove
		Total Woodland Area Removed	2.883 ha	
		Total Woodland Area Preserved	5.085 ha	

Type	Area	ELC Community / Feature	Size (ha)	Impact to Feature
		Total Area of Removals Within Study Area	4.534 ha	
		Total Area of Natural Heritage Feature Protection	5.557 ha	

7.3.2 Potential to Affect Species at Risk

Short term effects to SAR are anticipated with respect to the proposed development and Axford Drain realignment. The following discusses the SAR with the potential to be impacted by the proposed development.

Butternut (END) - Butternut trees were found during field vegetation inventories located in the FOD7 community. The proposed development footprint will be outside of FOD7 community and a large distance away from the butternut trees. No anticipated negative impacts to butternut are anticipated as part of the proposed development.

SAR Bats (END) - (Little Brown Myotis, Northern Myotis, Eastern Small-footed Myotis and Tri-coloured Bat) – Removal of marginal candidate bat habitat to accommodate the proposed development is anticipated. The removal of coniferous plantations and non-native trees are not anticipated to cause a significant impact to the species or its habitat and contravene the ESA, as the function of the habitat within the landscape, along the Medway Creek Corridor, will not be impaired or eliminated allowing the species to continue carrying out all its life processes. Furthermore, through the restoration of the Axford Drain corridor additional habitat will be created through the addition of bat boxes and the design of wetlands containing native species. It is recommended for cavity tree inventories to be completed to understand compensation ratios.

Chimney Swift (THR) - A chimney swift was observed during a breeding bird survey flying overhead of the golf course. Chimney swift nest breed in hollow tree cavities, caves, and chimneys. Habitat present for breeding is not present within the golf course lands, but foraging habitat does exist. No negative impact to chimney swift breeding habitat is anticipated as part of the proposed works.

Barn Swallow (THR) - Barn swallows were observed during breeding bird surveys and as incidental observations foraging within the site and were found nesting under cart bridges over Medway Creek. Typically barn swallows prefer foraging in open areas like suburban parks, agricultural field, and over open water (MNRF, 2017). As part of the proposed development, areas of upland foraging habitat will be lost, but a large area of foraging habitat over the remaining golf course lands will remain untouched. Barn swallow nesting sites will remain undisturbed, as they are not in close proximity to the proposed development. No impact to barn swallow is anticipated as a result of the proposed development. Will explore opportunities at detailed design to incorporate nest cups into the design of the trail bridge.

Monarch (SC) - Monarch butterflies were observed at multiple locations within the study area. Common milkweed (*Asclepias syriaca*) and other species in the family are used exclusively by monarch butterfly larvae. Common milkweed is found in most non-maintained portions of the golf course including edges of woodlands, forests, meadows, and edges of wetlands. The proposed development will remove portions of the host species within the uplands habitats. To compensate for this, common milkweed seed will be planted throughout the Axford Drain corridor to provide habitat for monarch butterfly. Other native species will also be planted as monarchs are not discriminating browsers.

Eastern-Wood-pewee (SC) - Eastern-wood-pewee was observed calling during the breeding bird survey. They prefer wooded habitat, specifically deciduous forest near clearings and along forest edges. The area within the study area where pewee were found is outside of the construction limits and no anticipated negative impacts to pewee are anticipated, beyond minor noise level increases due to heavy equipment machinery within the local area.

7.3.3 Potential to Affect Significant Wildlife Habitat

The following SWH habitats may be affected by the proposed development.

Special Concern and Rare Wildlife Species: Birds (Eastern wood pewee) - See Section 7.3.2 for a description on the potential to impact eastern wood pewee.

Special Concern and Rare Wildlife Species: Insects (monarch) - See section 7.3.2 for a description on the potential to impact monarch butterfly.

Amphibian Movement Corridor - Amphibian movement corridors were confirmed within the study area after conducting the amphibian call surveys. Multiple species of frogs and toads were observed. Short-term impacts to amphibian habitat is anticipated during construction works as multiple wetlands will be removed and the Axford Drain realigned. Wetland removal will be compensated with wetland creation along the Axford Drain, specifically targeting amphibian breeding habitat for the species known to inhabit the area. The Axford Drain will provide a large amphibian movement corridor, much larger than the existing site corridor and habitat by providing connectivity to upstream and downstream natural areas. No long-term negative impacts to amphibian movement are anticipated and expectations for improved amphibian movement due to the restoration design are anticipated.

Amphibian Breeding Habitat (Wetland) - Wetland breeding habitat was confirmed to be present within the study area. Amphibian breeding habitat will be removed, and or altered as part of the proposed development design. Compensation for the removal of amphibian breeding habitat will be in the form of wetland creation in greater total area along the Axford Drain corridor. This wetland creation design will be established specifically for species found within the study area during the amphibian call surveys and include multiple wetlands of different size, shapes, water depths, water inundation timing and levels, and native plant species. While the removal of the wetlands are required as part of the development design, the creation of wetlands as part of the Axford Drain Corridor design will compensate for the

removed wetlands. These will be designed to include turtle overwintering habitat, amphibian movement and different sizes, shapes, and depths to allow for wildlife use.

Turtle Overwintering Habitat - Turtle overwintering habitat is present within the subject lands. Turtle wintering habitat will be removed, and or altered as part of the proposed development design. Compensation for the removed overwintering turtle habitat will be in the form of pond wetland creation within the Axford Drain corridor and include wetlands that provide the appropriate depth and substrate to allow for turtle overwintering.

Bat Maternity Habitat – Candidate bat maternity habitat is present within the study area in small, non-contiguous features due to large mature trees species being present throughout the golf course. Due to golf course maintenance activities, active removal of mature trees, snags and hazard limbs is ongoing to reduce the risk of public safety on the golf course. This limits the amount of bat habitat present within the study area. Outside of the study area limits, but in close proximity to the study area along the Medway Creek corridor, more suitable maternity habitat exists for bats. As part of the Axford Drain Corridor concept restoration efforts, habitat for bats will be created through the planting of tree species preferred by bat species for maternity habitat, enhancement of the Axford drain watercourse and installation of bat boxes. This will offset and compensate for any bat habitat that is removed as part of the proposed project.

7.3.4 Significant Woodlands

Two significant woodlands have been identified within the study area. These habitats are identified as significant because of their proximity to a watercourse. A small portion (0.12 Ha) of Woodland E is required for the installation of SWMF 10. No other removals of significant woodland are anticipated to be removed as part of construction activities as they are not within the construction limits. These are identified on Figure 4-1.

7.3.5 Site Grading

Drainage patterns within the site have the potential to be impacted due to the site grading activities. The grading design will incorporate surface water flows across the areas proposed for construction and redirected these flows to existing natural heritage features, including the proposed Axford Drain realignment. Grading exercises will also involve the removal of natural vegetation, forest, and meadow habitat. Grading exercise has the potential to impact adjacent vegetation communities. Construction mitigation measures that should be implemented include sediment and erosion control measures and ongoing maintenance of mentioned controls. This will limit the potential impact of the proposed works.

8. Avoidance, Mitigation and Compensation

8.1 Avoidance

The avoidance of potential negative impacts of the proposed development is linked to the identification and protection of natural heritage features within the study area. The limits for the proposed development are designed to protect, where feasible, the major features identified within the study area. Through the proposed development, impacts to some existing golf course features will occur; however, will avoid impacts the Medway Creek valleyland, which contains features with the highest sensitivity and are the most diverse and ecologically valuable lands within the direct local area.

Habitat features proposed to be impacted by development include:

- Significant Wildlife Habitat (Amphibian movement corridor, turtle overwintering habitat, amphibian wetland breeding habitat, etc);
- SAR habitat;
- Significant Valleylands (along Axford Drain and Medway Creek); and
- Wetlands (A-F, Pond A, Pond B, Pond C, Irrigation Pond).

8.2 Mitigation

Measures to reduce or eliminate potential impacts to natural features include standard mitigation and construction mitigation measures. These mitigation measures are established for infrastructure or development projects and are typically applied during the construction stage of a project. For the Sunningdale North proposed development project, the following measures should be implemented to mitigate against any potential impacts.

8.2.1 Standard Mitigation

Timing Restrictions

Wildlife are active during certain seasons and are more sensitive to disturbance during certain times of the year. Sensitive disturbance time of the year is typically the breeding season. Restricted timing for construction activities is required to avoid these sensitive times. Vegetation clearing should occur outside of the April 1st to October 15th to avoid impacts to breeding birds and bats during the roosting season, and to snakes during sensitive times prior to hibernation. In water restricted timing windows are between March 15th and July 15th to avoid impact to fish during spawning.

Buffers and Setbacks

Buffers and setbacks are used around existing natural heritage features to be retained or proposed natural heritage features to be constructed. Examples include woodlands, wetlands, significant wildlife habitats and watercourse to protect them from a proposed development and reduce or prevent impacts post-construction. Development buffers and setbacks are incorporated into the natural channel design of the Axford Drain corridor and for the all-natural features of significance identified within the study area. Buffer guidelines are set based on the specifications in the City of London Guidelines for Determining Setbacks and Ecological Buffers (2004) and Environmental Management Guidelines from the City of London (January 2007). Setbacks are presented in Table 8-1 and illustrated on Figure 4-1. Appropriate sediment and erosion controls will be implemented to manage surface water runoff during and post construction.

Table 8-1. Minimum Natural Heritage Buffers and Setbacks.

Natural Heritage Feature	Buffer/Setback Distance
Woodlands	10m from dripline
Wetlands	30m
Permanent Watercourse	30m from high water mark
Intermittent Watercourse	15m from high water mark
Valleylands/Ravines	10m from top of bank
Fish Habitat	30m

Tree Preservation and Compensation

A tree preservation plan will be developed as a condition of the draft plan approval. This tree management plan will document the general extents and number of trees. The tree management plan will also outline all management requirements for tree removal, and tree protection measures (tree protection fencing, signage, new works within the critical root zone, etc.) that are required for all trees that will be retained and incorporated into the restoration and development plan. The tree management plan will also outline the compensation planting quantity, size and species.

8.2.2 Construction Mitigation

In-water Work Timing Window

Any works within or with the potential to impact water quality during the sensitive period of fish life cycles will have timing restrictions enforced. The in-water timing window for the local London area, specifically identified for the Axford Drain is March 15th to July 15th. This is identified based on the fish communities spawning periods and the identified thermal regime of the waterbody. All in water works is to occur outside of this timing window without exception.

Vegetation Clearing and Grubbing Restriction

Vegetation clearing including tree, shrubs and grasses is required to comply with the timing restrictions of the Migratory Convention Act applied through regulations and by respecting the protection. Migratory Birds states, “no person shall disturb, destroy, or take a nest, egg...of a migratory bird.” This law protects all birds aside from the introduced species European

starling, house sparrow, and rock pigeon. Bird nests that are destroyed during construction activities, or other related activities is referred to as “incidental take” and is illegal except under the authority of a permit obtained through the CWS (Canadian Wildlife Service).

Requirements under the Migratory Birds Convention Act will apply to the Sunningdale North project as construction works and removals must occur outside of the breeding bird nesting timing window (April 1st to August 31st). No vegetation clearing activities will be permitted during the breeding bird nesting period. In the event that woody vegetation clearing is required within this restricted window, an avian biologist will be retained to conduct migratory bird nest sweeps of the area prior to works. The biologist will search for nests (or signs of nests) or migratory birds to avoid destruction of nests protected by the Migratory Convention Act, 1994.

Erosion and Sediment Management

Erosion and sediment control are a key concern for land development and creek restoration design projects. These projects involve a multi-barrier approach to sediment control involving the following components:

- Construction scheduling – no construction works are permitted in the channel during sensitive migration and breeding times for resident fish species.
- Creek bypass during construction – no construction is permitted to occur in the creek while flows are present. The flows are dammed at the upstream end of the construction area, and are pumped, piped, or otherwise diverted around the construction area back into the channel.
- Dewatering of the bypassed construction area – before commencing construction in the bypassed area, any remaining water is removed through pumping into a sediment trap placed a minimum of 15 m away from the creek (where space is available).
- Sediment control fencing – sediment control fence is placed along access routes, around staging areas encompassing the work area, and along the watercourses and sensitive features to mitigate the potential for sediment-laden runoff moving off site or entering a watercourse. Installation of heavy duty and light duty sediment control fencing is to be established before any construction works commence, maintained throughout and followed construction until the disturbed areas have been stabilized with grasses and other vegetation. Regular monitoring and repair is required.
- Erosion control blanket – all slopes greater than 3:1, or with the high potential for erosion should have erosion blankets installed to mitigate for the potential of sediment runoff.
- Effective contractor practice – the contractor will be coached in effective use of access paths and staging areas, proper vehicle cleanliness and maintenance, and effective construction phasing to minimize the potential for sediment to enter the creek.

- Soil Management – all soil stockpiling, importation of soil and movement of soil will follow the appropriate soil management guidelines

Construction Within Channel

Any construction work completed in the channel are to be undertaken in dry conditions. Construction will proceed in stages progressing downstream. The contractor is to isolate the work area by installing coffer dams at the upstream and downstream end of the work area, and then pump / pipe / bypass creek flows around the isolated area. Once isolated, the work area will be dewatered with appropriate sedimentation controls to permit all work to be completed in dry conditions. The construction specifications will include the following regarding the creek bypass and dewatering:

“This work shall include all labour, equipment and materials necessary to install and ultimately remove the temporary bypass of the creek, as well as to dewater construction areas to permit work in dry conditions. This item includes the placement and maintenance of the temporary coffer dams to effectively, and to the satisfaction of the engineer, bypass the channel as required to accommodate the construction process in dry conditions as detailed in the contract drawings. The dewatering outlet is to be located outside of the channel and shall discharge into a sediment trap. The contractor must maintain awareness of the five-day weather forecast in order to keep the site in a functioning condition in the event of heavy rainfall during and outside of the workday hours. At the end of each working day the site is to be left in a safe condition including all necessary safety barricades for pedestrians. Fish within the area to be dewatered are to be removed without harm. If continuous pumping is required for the work site dewatering, the contractor shall assign an after-hours technician to ensure the treatment system, including pumping equipment and stream diversion, is functioning properly. This lump sum price shall include the diversions and dewatering as necessary to facilitate all phases of the construction.”

The release of deleterious substances into a watercourse can be considered a Harmful Alteration, Disruption or Destruction (HADD) of aquatic habitat under the *Fisheries Act* and is therefore a critical consideration in design. Stream rehabilitation works must necessarily take place in a watercourse, requiring special controls to permit construction to occur without the release of sediments into the stream. A key mitigation measure is the bypass of creek flows to allow construction in dry conditions. In addition, the control of erosion from excavated areas will be achieved through the use of silt fences, temporary stabilization (i.e., seeding of exposed areas), and through careful control of dewatering effluent.

The construction specifications will include the following regarding sediment and erosion control:

“Temporary erosion and sediment control features shall be installed as per OPSS 805.

A 100 m stand-by supply of prefabricated silt fence barrier, in addition to silt fence requirements specified elsewhere in the Contract and on the Contract Drawings, shall be

maintained at the construction site prior to commencement of the work and throughout the duration of the contract.

Cut and fill earth slopes and ditches shall be stabilized, including over-winter, until treated with the specified cover material (seed and mulch, seed and erosion control blanket, seed and sod, rip rap, etc.). Stabilization shall consist of temporary erosion and sediment control measures. Commencement of a cut, fill or ditching operation shall be considered to have occurred when the original stabilizing ground cover has been removed, including grubbing, or has been covered with fill material. Run-off from construction materials and any stockpiles shall be contained and discharged so as to prevent entry of sediment to watercourses. Where dewatering is required, the effluent shall be discharged in a manner that prevents the entry of sediment to watercourses, or scouring and erosion at the outlet. The location of the dewatering pump and treat system shall be adjusted as necessary or by direction from the Engineer.

Erosion and sedimentation control measures shall not be placed in watercourses unless otherwise specified in the Contract or directed by the Engineer.”

Watercourse and Fisheries Protection

The following specification will be included in the construction contract documents to support erosion and sediment control efforts.

At all times, operations shall be controlled so as to prevent the entry of deleterious materials to the watercourse. Controls shall include, but not be restricted to, the following:

- Erosion and sedimentation control, and protection of environmentally sensitive areas, shall be in compliance with requirements that may be specified elsewhere in the Contract.
- Watercourses shall not be diverted or blocked, and temporary watercourse crossings shall not be constructed or utilized, unless otherwise specified in the Contract.
- Where the Contract does not require work in watercourses or on watercourse banks, equipment shall not be operated within such areas.
- Where the Contract requires work in watercourses or on watercourse banks, such work shall comply with operational constraints specified elsewhere in the Contract.
- Construction material, excess material, construction debris, and empty containers shall be stored away from watercourses and watercourse banks.
- All equipment maintenance and refuelling shall be controlled so as to prevent any discharge of petroleum products. Vehicular maintenance and refuelling shall be conducted away from watercourses and watercourse banks.

- In the event that controls are unacceptable, those operations which are causing the entry of deleterious material to the watercourse shall cease. Such operations shall remain suspended until otherwise directed in writing.

Where the Contract requires work in watercourse or on watercourse banks, operation of equipment within such areas shall:

- Be kept to the minimum necessary to perform the specified work;
- Be free of fluid leaks and externally cleaned / degreased to prevent deleterious substances from entering the water;
- Comply with operational constraints that may be specified elsewhere in the Contract; and
- Otherwise proceed in a continuous fashion so as to minimize the duration of such work.

Such measures shall be taken and such protection system or systems provided to ensure the following:

- Water flow shall be isolated from the work area; and
- Entry to the open portion of watercourses, of material that results from the work or that are disturbed by works shall be prevented.

The protection system or systems shall cover the following:

- All phases of the work, and transitions between phases of work;
- Installation, operation, and removal of the protection system and transition between any adjacent environmental protection systems;
- Interfaces between the permanent watercourse and temporary water passage systems; and
- Stabilization of disturbed fill and earth materials, including over-wintering, until treatment with the specified cover material (seed and mulch, seed and erosion control blanket, sod, rip rap etc.)

The protection system or systems shall consist of the following:

- One or a combination of temporary water passage systems; and
- Temporary erosion and sedimentation control measures to isolate temporary water passage systems from the work area.

- Any instream work, diversions or any operation impacting any watercourse or its tributary receiving waters in any way shall be prohibited from March 15th to July 15th. These timing constraints apply regardless of the timing of the Contract.

All instream work shall be completed in the dry by dewatering the work area and diverting and / or pumping the flows around the limits of the work area, subject to the following conditions:

- Existing stream flows shall be maintained downstream of the dewatered work area;
- Flow dissipaters and / or filter bags or equivalent, shall be placed at water discharge points to prevent erosion and sediment release;
- Sediment laden dewatering discharge shall be pumped to a settling basin away from the watercourse and allowed to settle and / or filter through the riparian vegetation before re-entering the watercourse of the construction area;
- The work area shall be stabilized against the impacts of high flow events at the end of each work-day;
- Work in the channel and floodplain shall be suspended and the work area stabilized when there is a high probability of a convective rainfall event and during warm winter periods when there is a high likelihood of a snowmelt runoff;
- Sandbags used for cofferdam construction shall be filled with clean pea gravel free of particulates; and
- Silt or debris that has accumulated around the temporary cofferdams shall be removed prior to their removal.

Where water flow is to be intercepted upstream of the work area and pumped back to the watercourse downstream of the work area, the following shall apply:

- Screening shall be provided so as to prevent entry or damage to fish at the water intake; and
- Discharge shall be directed so as to avoid erosion of the watercourse bed and banks at the water outlet.

During closure of the permanent watercourse channel or the temporary water passage system, stranded fish shall be released to the open portion of the watercourse without harm by a qualified biologist.

Notice must be given to the Engineer at the Pre-Construction meeting providing details and descriptions, working drawings and schedules that detail the sequence of the in-stream work, and the provision of temporary water passage associated with the construction.

Permission to proceed with the above will be provided if the Engineer determines that the details of the notice meet the requirements of this special provision.

Upper Thames Conservation Authority (UTRCA) shall be notified of the scheduled initiation of work within a watercourse, and on watercourse banks.

Whenever the permitted proposals to proceed with work are found by the Engineer to be ineffective, changes shall immediately be made so as to ensure watercourse / fisheries protection.

Spill Containment and Response

The potential exists for spills during construction exists, likely due to refueling of heavy equipment. The potential impact of a spill could include the contamination of the soil, groundwater or surface water. Mitigation measures can be implemented to reduce the risk of these occurrences and controls in place to mitigate to potential damage a spill could impact. Mitigation measures to avoid spills include:

- Refueling of vehicles is not allowed within 30m of a watercourse, or wetland feature;
- Regular inspection heavy equipment is required. If leaks found, they shall be repaired immediately upon detection, or the equipment removed from the site;
- Emergency spill kits shall be kept on site during all phases of the construction project;
- Implement and develop an emergency response plan, including a posted contact information for all required agency contacts (MOECC Spills Action Centre); and
- If spill occurs, immediate contact of MOECC Spills Action Centre is required.

8.3 Compensation

The Axford Drain Corridor Concept is designed to compensate for the proposed removals as part of the development. Proposed compensation includes wetlands, woodland habitat, meadow habitat, natural channel and wildlife enhancement features.

Table 8-2 outlines the areas of the identified existing natural heritage features to be removed for development and the areas of the proposed compensation features.

Table 8-2. Axford Drain Compensation Table.

Feature	Removal Area (ha)	Compensation Area (ha)
Wetlands		
Wetland A (MAM2)	0.061	
Wetland B (MAM2-2)	0.124	
Wetland C (MAM2-5)	0.071	
Wetland D (MAM2-2)	0.069	
Wetland E (MAM3)	0.085	
Wetland F (MAM2)	0.104	
Axford Drain corridor (wetland cells)		0.24
Total Wetland Area	0.514	0.24
Ponds		
Pond A (OA)	0.074	
Pond B (OA)	0.058	
Pond C (OA)	0.101	
Irrigation Pond (OA)	0.904	
SWMF 6C East and West		0.45
SWMF 10		0.97
Total Pond Area	1.137	1.42
Woodlands		
Woodland A (CUP3)	1.039	
Woodland B (CUP3)	1.139	
Woodland D (CUP3)	0.236	
Woodland E (FOM9-2)	0.117	

Feature	Removal Area (ha)	Compensation Area (ha)
Woodland F (FOM9-2)	0.352	
Axford Drain Corridor (woodland cells)		0.94
Total Woodland Area	2.883	0.94
Meadow Habitat		
Axford Drain Corridor (meadow cells)		0.78
Axford Drain Corridor (meadow transition mix applied throughout corridor)		1.97
Total Meadow Area		2.75
Aquatic Habitat		
Aquatic Habitat (OA - degraded)	0.147	
Axford Drain low flow channel (enhanced)		0.21
Total Aquatic Habitat Area	0.147	0.21
Totals	4.68 ha	5.56 ha

8.3.1 Wetland

Development will require the removal of wetlands A, B, C, D, E and F totalling an area of 0.51 ha and removal of Ponds A, B, C, and Irrigation Pond totalling an area of 1.14 ha within the study area. The existing habitat is small, degraded and not connected to each other. Compensation for the removed wetland and pond habitat will be provided by wetland habitat within the Axford Drain Corridor at a total an area of 0.69 ha. This will include eight wetlands and two SWMF facilities that are connected by the Axford Drain. These wetlands are designed to function as natural wetlands, each designed in different shapes, depths and have additional wildlife features incorporated into them. Native vegetation plantings and seeding will occur within the wetlands to promote diversity within the corridor. These wetlands will provide habitat for a variety of wildlife including amphibians, turtles, birds and small mammals.

8.3.2 Woodland

Development will involve the removal of Woodland A, B, F and portions of D and E. Woodland habitats total removal area of 2.88 ha. Most of the woodland habitat proposed for removal is cultural plantation, with low species diversity and composed of non-native species. Compensation will be in the form of native tree and shrub planting totalling 0.94 ha. Tree and shrub plantings will include native species suited for the local growing conditions and increase the diversity of the natural habitat. Species selection incorporates the planting of wildlife beneficial species to promote use of the species by wildlife. Native tree and shrub selection will be in accordance the Guide for Plant Selection for Natural Heritage Areas and Buffers (City of London 1994). Meadow habitat is also proposed to be incorporated into the compensation and total an area of 0.78 ha. In addition to the meadow planting cells, a transitional meadow seed mix is proposed to be applied throughout the Axford Drain corridor increasing meadow habitat and diversity, totalling approximately 1.97 ha. Planting of trees will understandably not be able to compensate initially for mature tree loss, but over time will grow to mature into native woodland. The increase in native species and increased habitat diversity along with the removals of non-native species in the landscape promotes increased wildlife habitat and use of the corridor.

8.3.3 Aquatic Habitat

The existing habitat of the Axford Drain within the study area is degraded and provides poor aquatic habitat. portions have been straightened, have periodic dredging completed, have online pond features, are piped underground, in proximity to heavy land use and pesticide applications which likely make their way into the watercourse and have barriers to fish movement including perched culverts and weirs.

The total length of the existing channel is 662 m with 215m of this being piped underground. The proposed realignment of the channel will extend the length of the channel to be 767 m. The proposed Axford Drain watercourse will range between 1 to 2.8 m in width, which is generally wider than the existing channel. The realignment and restoration of the channel will

remove fish passage barriers and include the creation of instream aquatic habitat for fish, mussel and SAR habitat. This has been designed specifically for aquatic species of fish and mussels found within Medway Creek. The physical features of the channel include riffle pool riffle sequences, inclusion of bank stability, rock within the channel to increase in stream habitat diversity and the inclusion of wood debris and log habitat features for fish habitat.

8.3.4 Wildlife Habitat

The intent of the Axford Drain Corridor concept is to compensate for removed natural features and wildlife habitat. All features within the corridor concept are designed to create wildlife habitat. This includes the use of native species planting to promote use of the corridor by wildlife as all plant species selection will have wildlife benefits from pollinators, birds, mammals and fish. Multiple wetlands are designed to provide habitat for amphibians, reptiles and fish. Specific consideration, by providing water depth of at least 1.5 m, for turtle overwintering habitat for snapping turtle, amphibian breeding habitat for American bullfrog and the corridor itself being an amphibian movement corridor was incorporated into the design. Its intent is also to improve wildlife movement and natural habitat linkages between natural habitat outside of the corridor. Meadow and forest habitat will provide habitat for foraging and nesting for many bird species throughout all seasons. Monarch habitat will also be created in the corridor meadow features by the planting of milkweed species, to compensate for the removal of upland habitat.

Additional wildlife habitat enhancement features including snake hibernaculum, turtle basking logs, brush piles, bee boxes and nest boxes will be incorporated to promote use of this habitat by wildlife species.

9. Net Effects

Net environmental impacts are the conditions that remain after the establishment of avoidance standard mitigation and enhancement mitigation measures. The City of London Environmental Management Guidelines (2007) requires a Net Effects Assessment Table be provided to evaluate the effects of the proposed development and its impact on the natural heritage features and environment.

NO net effect - identifies no measurable impact to any natural features and their functions.

LOW net effect - identifies the loss of common habitat types possessing limited potential value, or the loss of a portion of an identified habitat; however, not resulting in long-term impacts such as a reduction or loss in function to the habitat being protected or to the ability of local species to carry out life processes.

MEDIUM net effect - identifies the loss of uncommon habitat that may result in long-term impacts to remaining habitat or linkages, reduction in local size of population that may have an impact on other species life cycles, longer or more frequent interruptions to animal behaviour activities and change or replacement of a system with some loss of ecological function.

HIGH net effect - identified the loss of rare or unusual habitat types that will result in long-term and cumulative impacts on remaining habitat and linkages, significant reduction in the local size of a population that will impact species life cycles, long term continuous interruptions of animal behaviour activities that results in the loss of productivity and or death of young while animal is away and change or replacement of a cultural system with complete loss of ecological function.

The net effects of the proposed works and associated mitigation measures are presented in Table 9-1.

Table 9-1. Net Effects of the Proposed Works.

Potential Impact	Potential Effects	Recommendations/Mitigation Measures	Nets Effects
1.0 Potential Short-term Impacts- Construction			
1A) Damage to Adjacent Natural Features	<ul style="list-style-type: none"> • Removal of golf course trees, shrubs and ground vegetation will be required • Soil compaction by heavy equipment in areas adjacent to natural features • Impacts to root zones of trees and structural damage of vegetation including tree limbs due to grading and construction activities 	<ul style="list-style-type: none"> • Installation of tree protection fencing and construction area limits fencing • Root pruning, limb pruning of adjacent trees • Follow soil management practices • Inspection of all construction fencing and erosion and sediment controls 	<ul style="list-style-type: none"> • LOW NET EFFECT • Proper installation of tree protection fencing, erosion control fencing and monitoring of these protective fencing can reduce the risk of potential impacts. • All vegetation removal will be compensated for in the Axford Drain Corridor Concept

Potential Impact	Potential Effects	Recommendations/Mitigation Measures	Nets Effects
<p>1B) Disturbance and Impacts to Wildlife</p>	<ul style="list-style-type: none"> • Disturbance to breeding birds, and other wildlife due to noise and vibration • Impacts to animal movement through Axford Drain Corridor due to construction activities and erosion and sediment controls • Increase amount of human activity to site during construction activities 	<ul style="list-style-type: none"> • Restrict construction activities to daytime hours (sunrise to sunset) • Adhere to restricted in water timing windows and avoid breeding bird & bat roosting timing windows for vegetation clearing • Ensure sediment and erosion control measures are installed appropriately and are maintained to avoid wildlife from entering construction area. • Clearly identify work limits and maintain distance away from sensitive natural features 	<ul style="list-style-type: none"> • NO NET EFFECT • Construction timing restrictions based on breeding bird & bat roosting timing window and the restricted in water timing windows will minimize disturbance to birds and wildlife. Wildlife movement can move around the construction site limits and construction timing will be outside of most species movement seasons.

Potential Impact	Potential Effects	Recommendations/Mitigation Measures	Nets Effects
1C) Construction Equipment	<ul style="list-style-type: none"> • Leaks and spills may cause damage to adjacent natural features including waterways • Soil compaction • Introduction of non-native or invasive species into the project limits 	<ul style="list-style-type: none"> • Ensure machinery in proper working order and has regular maintenance performed • Maintenance and refueling of machinery is to be performed >30m in drainage features, or natural features in a contained environment. A spill response kit is required on site at all times. • Adherence to the Clean Equipment Protocol for industry • Use appropriate soil management procedures 	<ul style="list-style-type: none"> • NO NET EFFECT • Proper maintenance of machinery and refueling and maintenance station >30m away from a watercourse or drain will limit the potential impacts due to leaks or spills. Machinery maintenance and cleaning prior to arriving on site will limit the potential spread of invasive species.
1D) Soil Management/Compaction	<ul style="list-style-type: none"> • Dust accumulation on vegetation within surrounding natural habitats affecting plants ability to photosynthesize • Heavy machinery may cause soil compaction and soil layer mixing to existing soils within the work area and access route 	<ul style="list-style-type: none"> • Use of dust suppressants and water adjacent vegetation when dust accumulation occurs • Follow proper storage and stripping methods when excavating topsoil 	<ul style="list-style-type: none"> • LOW NET EFFECT • Occasional watering and the use of dust suppressants can reduce the risk of dust accumulation on the surrounding landscape. Implementing proper topsoil storage and handling procedure can reduce the potential for soil compaction.

Potential Impact	Potential Effects	Recommendations/Mitigation Measures	Nets Effects
1E) Sediment and Erosion	<ul style="list-style-type: none"> Release and deposition of sediment into surrounding natural habitats and waterways 	<ul style="list-style-type: none"> Installation of erosion and sediment control (ESC) measures Regular inspection of erosion and sediment controls by a qualified individual 	<ul style="list-style-type: none"> NO NET EFFECT Through the use of appropriate sediment and erosion controls, regular inspection and maintenance for these controls can reduce the risk to sediment depositions outside of the construction limits into the surrounding natural environment
2.0 Potential Long-term Impacts			
2A) Alterations to Groundwater Functions	<ul style="list-style-type: none"> Development construction may alter groundwater functions (existing groundwater features are highly disturbed due to subdrain tiles and irrigation systems currently functioning within the golf course) 	<ul style="list-style-type: none"> Pumping from Medway Creek for irrigation of the golfcourse lands will be reduced as the course moves from 36 to 18 holes. Irrigation needs will be supplemented with water taken from SWM 10. As part of grading works, subdrain drainage tile will be removed 	<ul style="list-style-type: none"> MEDIUM NET EFFECT Construction is anticipated to affect groundwater functions based on grading activities and the realignment of the Axford Drain tributary have the potential to impact groundwater features.

Potential Impact	Potential Effects	Recommendations/Mitigation Measures	Nets Effects
<p>2B) Loss of Vegetation</p>	<ul style="list-style-type: none"> • The removal of low-quality vegetation across the subject lands will result in the loss of terrestrial habitat, understanding the upland habitat functions as a golf course, and is not highly diverse • Removal of Woodland Area A (1.04 ha) and B (1.14 ha); however, these features are identified a CUP3 and dominated by non-native species. Woodland D (0.236 ha), Woodland E (0.117 ha) and Woodland F (0.355 ha) all have portions of the woodlands removed. See Section 3.1.1.1 and 7.3.1 for a description of the proposed removed woodland habitat. 	<ul style="list-style-type: none"> • The Axford Drain Corridor will be planted with native tree, shrubs and native seed to increase biodiversity as compensation for loss of existing terrestrial habitat • Invasive species control will be implemented during construction activities to limit the spread and impact of invasive species (common buckthorn, phragmites, etc) 	<ul style="list-style-type: none"> • NO NET EFFECT • The potential impact is considered neutral as existing disturbed and non-native communities vegetation communities will be removed as part of development and be compensated for in the Axford Drain Corridor Concept. This will include native tree plantings, shrub plantings, and native seed mixes

Potential Impact	Potential Effects	Recommendations/Mitigation Measures	Nets Effects
<p>2C) Loss of Wetland Habitat</p>	<ul style="list-style-type: none"> • Removal of Wetland A (0.061 ha) • B (0.124 ha) • C (0.071 ha) • D (0.069 ha) • E (0.085 ha) • F (0.104 ha) • Pond A (0.074 ha) • Pond B (0.058 ha) • Pond C (0.101 ha) • Irrigation Pond (0.904 ha) 	<ul style="list-style-type: none"> • Compensation wetland areas within Axford Drain Corridor designed for existing wildlife species will be integrated into the corridor. • Existing wetland and periphery are dominated by non-native vegetation and compensation vegetation will be solely non-native. Newly created wetlands will be planted with native species increasing diversity in the area. • Wetland compensation with the Axford Drain Corridor will be connected to each other allowing for a wildlife movement corridor planted with native wildlife and connected by a watercourse 	<ul style="list-style-type: none"> • NO NET EFFECT • The potential impact associated is considered neutral as wetland loss will be compensated for in the Axford Drain Corridor Concept and include wetland habitat designed for amphibian breeding, American bullfrog and overwintering habitat of turtles. These will all be connected by a natural system creating an amphibian and wildlife movement corridor

Potential Impact	Potential Effects	Recommendations/Mitigation Measures	Nets Effects
<p>2D) Loss of Amphibian Breeding Habitat and Turtle Nesting, and Hibernation Habitat</p>	<ul style="list-style-type: none"> Removal of Wetland A, B, C, D, E, F and Ponds A, B, C and Irrigation Pond 	<ul style="list-style-type: none"> Wetland compensation with the Axford Drain Corridor will be connected to each other allowing for a wildlife movement corridor planted with native wildlife and connected by a watercourse Design of wetland compensation will include amphibian breeding habitat, turtle hibernation and nesting habitat 	<ul style="list-style-type: none"> NO NET EFFECT The potential impact associated is considered neutral as wetland loss will be compensated for in the Axford Drain Corridor Concept and include wetland habitat designed for amphibian breeding, American bullfrog and overwintering habitat of turtles. These will all be connected by a natural system creating an amphibian and wildlife movement corridor

Potential Impact	Potential Effects	Recommendations/Mitigation Measures	Nets Effects
2E) Increase of Pedestrian Foot Traffic	<ul style="list-style-type: none"> Increase of pedestrian foot traffic has the potential to disrupt wildlife species, increase garbage and debris in the corridor and increase the potential spread of non-native or invasive vegetation species 	<ul style="list-style-type: none"> Installation of a walking pathway will limit the area of impact by increase use of pedestrian foot traffic Vegetation selection and placement will limit the ability to leave the designated pathway Planting of native vegetation and establishment will limit potential impacts from non-native vegetation species Multi-use trail is located adjacent to the Axford Drain corridor in compliance with City of London guidelines. 	<ul style="list-style-type: none"> LOW NET EFFECT The installation of a walking pathway in the Axford Drain corridor will keep pedestrian traffic on the trail using specific dense vegetation and the orientation will avoid wetlands and sensitive features to limit impacts on the natural environment and wildlife
2F) Alteration to Surface Water Flows	<ul style="list-style-type: none"> Site grading activities will disrupt the existing surface waterflows 	<ul style="list-style-type: none"> Grading plan design will incorporate the existing surface water flows and direct them to appropriate directions and incorporate stormwater management to not impact inputs into existing drainage features 	<ul style="list-style-type: none"> LOW NET EFFECT Grading activities will alter the surface water flows within the site limits and direct flows to drainage features and watercourses

Potential Impact	Potential Effects	Recommendations/Mitigation Measures	Nets Effects
<p>2G) Potential Loss of Significant Wildlife Habitat</p>	<ul style="list-style-type: none"> Significant Wildlife Habitat was identified along Axford Drain corridor in for amphibian movement corridor, American bullfrog habitat and amphibian breeding habitat (Wetland) 	<ul style="list-style-type: none"> Removal of this SWH habitat during construction activities, but restoration design of the Axford Drain corridor will incorporate habitat to compensate for the loss of SWH by including habitat for American bullfrog, turtle overwintering habitat, amphibian breeding habitat (wetland) and connectivity of all watercourse and wetland features allowing for amphibian movement. 	<ul style="list-style-type: none"> NO NET EFFECT The loss of SWH will be compensated for in the Axford Drain Corridor Concept. This will include an amphibian movement corridor, American bullfrog habitat, and wetland amphibian breeding habitat
<p>2H) Potential loss of Rare and Special Concern Wildlife</p>	<ul style="list-style-type: none"> Monarch butterfly have been identified on site and its host plant common milkweed in multiple locations throughout the subject lands All other SAR (butternut) and SC species (Eastern wood pewee) habitat will not be impacted as part of construction works 	<ul style="list-style-type: none"> Removal of milkweed and meadow habitat typically associated with monarch will be completed as part of construction works Salvage milkweed seed from existing milkweed plants on site and from surrounding area to spread in the Axford Drain Corridor 	<ul style="list-style-type: none"> NO NET EFFECT Removal of milkweed and monarch habitat will be compensated for in the Axford Drain Corridor Concept and include planting of milkweed plants and harvesting existing milkweed seed from the subject lands for spread within the Axford Drain

10. Policy Compliance

The City of London's Natural Heritage System of natural heritage features, areas and linkages intended to provide connectivity at the regional or site level and support natural processes. The London Plan identifies and protects a Natural Heritage System through the designation of natural heritage features as Green Space. This Scoped EIS was prepared in accordance with the London Plan Policies and proposed development will not negatively impact the natural features and ecological functions on, or adjacent to the study area.

Following the London Official Plan & London Plan and the Natural Heritage Reference Manual, and City of London Guidelines for Determining Setbacks and Ecological Buffers document, buffers and setbacks have been identified and are presented on Figure 4-1. These are designed to protect natural heritage features and ecological functions in the area. Through the establishment of these setbacks and implementation of the mitigation measures presented herein, impacts to the watercourse, wetlands, woodlands, and associated features in the area are anticipated to be minimal.

In accordance with UTRCA's Environmental Planning Policy Manual (2006), no development is allowed within wetland, watercourse, or floodplain areas. The proposed development will impact some low/poor quality onsite features; however, the proposed compensation and restoration plan will provide a net benefit as the Axford Creek corridor will be enhanced through the planting of native species and development of several wildlife habitat features. In addition, any natural feature recommended for protection have adequate setbacks established as shown on Figure 4-1.

11. Monitoring

Environmental monitoring is recommended to verify all proposed mitigation measures have been constructed, to ensure environmental management systems are installed and performing as designed. Additionally, to also document changes to the biophysical environment over time as the study area is developed.

The background studies as part of the EIS are intended to be used as the established baseline site conditions of predevelopment. Monitoring during development will verify the environmental management systems (SWM, erosion and sediment controls, restoration seed and plant survivorship) have been implemented and are functioning as intended. Once development ceases, post-development monitoring is to commence to evaluate the current conditions and confirm the environmental management systems performance. It is recommended that monitoring be undertaken during all phases of the project to ensure compliance. Remedial action should be undertaken as soon as possible where discrepancies are identified.

Ecosystem Recovery Inc. shall develop a pre-development, development and post development monitoring plan at the Detailed Design stage of the project. The intent is to monitor the biophysical parameters and environmental management systems throughout the project. This environmental monitoring plan will be prepared in consultation with the UTRCA and City of London staff.

11.1 Pre-construction Monitoring

A pre-construction general site assessment should be completed prior to the commencement of construction to identify and flag the limits of construction, access areas and any sensitive areas requiring protection. A photolog of all areas of the site should be completed to document pre-construction conditions.

11.2 Construction Monitoring

11.2.1 Inspection Monitoring

Inspection monitoring reports should be prepared and include site conditions, works undertaken, weather, assessment of erosion and sediment controls, any nonconformances and include a photolog. These should be submitted to Corlon Properties and City of London.

- a) Sufficient precautions shall be taken, as outlined in the Guidelines on Erosion and Sediment Control for Urban Construction Sites (Dec 2006) prepared by the Ministry of Natural Resources, to prevent erosion resulting from development of this Plan, all to the satisfaction of the City Engineer.
- b) The Owner shall have its Professional Engineer monitor the erosion and sediment control measures installed in accordance with the above-noted Guidelines and accepted engineering drawings and submit to the City Engineer monitoring reports with log dates

when facilities were inspected, the condition of the facilities at that time, and what remedial action, if any, was needed and taken. The Owner shall correct any deficiencies of the erosion and sediment control measures forthwith. The monitoring reports are to be submitted to the City Engineer by April 1, July 1 and November 1 of each year until all works and services in this Plan are assumed by the City.

11.3 Post Construction Monitoring

The development of a detailed ecological restoration plan for the Axford Drain provides mitigation for the subject lands. A key component of this plan will include a Post-Construction Monitoring Plan. An Invasive Species and a Natural Features Management and Protection Plan. The details of these plans should be determined once the detailed design has been finalized and approved by the City of London.

The monitoring plan will provide both a quantitative and qualitative assessment of the restoration efforts established as part of the design. The post construction monitoring plan should include;

- Vegetation Plot Monitoring – Permanent plots will be identified (minimum of 6 plots), staked and georeferenced along the Axford Drain Corridor and within Significant Woodland C & E. This will include fixed point photo-monitoring, a quantitative/qualitative species assessment and count within the plots and general comments about the vegetation in the corridor. This will occur annually for a period of five years post-construction.
- Breeding Bird Surveys - Annual breeding bird survey (two per year) of the subject property, Axford Drain corridor and Significant Woodland C & E. Breeding bird locations will be established for replication during annual monitoring for a period of 5 years. Breeding bird surveys were completed based on the Ontario Breeding Bird Atlas (Bird Studies Canada et al, 2006) and the Forest Bird Monitoring Protocol (FBMP).
- Surveys for Amphibians and Reptiles (within the wetland and pond habitats within Axford Drain Corridor and SWMF10) - Three amphibian call surveys per season will be completed in the spring to early summer following the Marsh Monitoring Program Participants Handbook from Bird Studies Canada appropriate protocols during the appropriate season and weather conditions. This station will be established and used annually to determine changes within the call activity. A total of 5 seasons of amphibian monitoring is proposed. Reptile Basking surveys following standard practice will be completed in spring and early summer 5 times annually for a period of 5 years post construction.
- Invasive Species Monitoring – A site assessment will be completed annually in the appropriate season to identify invasive species presence and delineate and georeference the limits of the invasive species over time. A memo will be created outline the results of the assessment, document the limits of the invasive species and develop

recommendations for the management of the species. This monitoring will be completed for a period of 5 years post-construction.

- General Site Assessments - This will include comments on vegetation establishment, survival, hazard trees, invasive species presence, identified areas of safety risk, erosion potential and restoration failures (invasive species documentation, vegetation planting survivorship, erosion and sediment, human safety hazards)

Monitoring of restoration sites is a key component in assessing the effectiveness, progress, and overall success of restoration efforts relative to the original goals. Establishment of a monitoring protocol will provide a valuable tool for assessment of the success of the restoration effort over time. It will also provide a valuable resource to document success and failures of restoration, and the guiding reasoning behind the result. The established monitoring protocol can be applied to future restoration projects across the City.

12. Environmental Management Recommendations

ERI recommends the following measures to ensure that natural heritage features and wildlife habitat is protected where possible, or otherwise compensated for appropriately.

The Natural Heritage Areas that require protection & enhancement within the subject lands include:

- Significant Woodland C;
- Significant Woodland E;
- Medway Creek Corridor; and
- Axford Drain Corridor.

Recommendation 1:

In association with the Official Plan Amendment, which will be necessary to implement the appropriate Place Types on Map 1 of the London Plan for the subject lands, it is recommended that Map 5 (Natural Heritage) of the London Plan should be amended to recognize Woodland C and E as “Significant Woodlands.”

Recommendation 2:

That the general layout of the proposed development is respected complete with the recommended buffers delineated on Figure 4-1, subject to fine-tuning through the draft plan approval process in consultation with the City of London. That the final development limit as approved by the City of London be respected, i.e. that no grading or construction should occur beyond the development limit, except for work associated with implementing the approved buffer rehabilitation planting plan, as appropriate the SWM outlet to SWMF10 and the outlet from this facility to Medway Creek.

Recommendation 3:

The recommended buffers of the Axford Drain corridor will be planted with native species of shrubs, trees and seed to create and enhance and ecological diverse habitat for local wildlife and further protect existing wildlife habitat within the Significant Woodlands. Detailed planting recommendations shall be included as part of detailed design drawings and contract specifications.

Recommendation 4:

A tree inventory is recommended to be completed prior to or at the detailed design stage once the details of the subdivision are finalized. The inventory should be completed by a certified arborist.

As a condition of draft plan approval, a detailed tree inventory shall be undertaken for the lands within the proposed draft plan of subdivision. The tree inventory shall identify all trees with a diameter of breast height (DBH) of greater than or equal to 10 cm, their georeferenced

location, species, crown radius, crown and structural condition (based upon accepted arboricultural techniques and best practices using a limited visual inspection) and general comments. In addition, all trees shall be surveyed and inventoried as per the Phase 2 Survey Protocol for SAR Bats within Treed Habitats to identify trees which exhibit characteristics (cavities or suitable bark crevices) which could serve as suitable bat maternity roosts.

Recommendation 5:

As a condition of draft plan approval, the Owner shall have a qualified consultant prepare and submit, as part of Focused Design Studies, a tree preservation report and plan for lands within and directly adjacent to the proposed draft plan of subdivision. The tree preservation plan shall be focused on the preservation of quality specimen trees within lots and blocks and shall be completed in accordance with current approved City of London guidelines for the preparation of tree preservation reports and tree preservation plans, to the satisfaction of the City of London. Tree preservation shall be established first and grading/servicing design shall be developed to accommodate maximum tree preservation as per the Council approved Tree Preservation Guidelines.

Recommendation 6:

As a condition of draft approval, the owner agrees to implement all recommendations of the approved tree preservation plan (protective fencing, etc.) and the approved sediment and erosion control plan prior to commencing any earthworks or site alteration. In the event in which the tree preservation plan identifies the removal of trees immediately adjacent to other trees that will be preserved, as tree removal occurs, the trees recommended for preservation will be assessed to ensure no hazard will be created. Hazard trees will be immediately removed, based upon the recommendation of a certified arborist.

Recommendation 7:

As a condition of draft approval, vegetation clearing / tree removal should occur outside of April 1st to October 15th to avoid impacts to breeding birds (as per the Migratory Birds Convention Act), bats during the roosting season, and to snakes during sensitive times prior to hibernation.

Recommendation 8:

That the general layout of the proposed realignment / reconstruction of the Axford Drain, as outlined within the EIS, and as ultimately draft approved by the City of London be respected. As a condition of draft approval, a detailed restoration / enhancement plan will be prepared for the entire realigned Axford Drain corridor which incorporates the two wetland cells (east and west) associated with storm water management facility 6C. The detailed restoration / enhancement plan will include wetland plantings within the cells, providing enhanced habitat connectivity with the balance of the creek corridor. In addition, the detailed restoration / enhancement plan will include wetland, woodland and meadow features that incorporate a snake hibernaculum, turtle basking logs, brush piles, habitat logs, rock piles, bee boxes, bird nest boxes and the planting of milkweed seed to promote use of this habitat by various wildlife species. The detailed design process will also consider the inclusion of raptor perch poles,

osprey platforms and barn swallow nesting cups underneath the multi-use trail bridge, if appropriate, for this size of the restored green space corridor.

Recommendation 9:

Prepare and submit a Request for Review to the Department of Fisheries and Oceans (DFO) to confirm permitting and/or additional survey requirements associated with in water works associated with the realignment to the Axford Drain. Implement all requirements of the DFO, as appropriate.

In water restricted timing windows are between March 15th and July 15th to avoid impact to fish during spawning.

Recommendation 10:

As a condition of draft approval, the Owner shall retain a qualified consultant to undertake a turtle nesting survey at the appropriate time (May - June) in advance of development, along the creek banks, ponds and golf course bunkers within the limits of development. In the event that turtle are identified within the limits of development a wildlife relocation plan will be prepared and submitted to the City of London for approval. The wildlife relocation plan will be implemented prior to the commencement of any earthworks or site alteration.

A detailed Wildlife Management Plan will be developed prior to construction. Wildlife incidentally encountered during construction activities will not be knowingly harmed and will be allowed to move away passively, where possible. The EMP should address the procedures for who to contact should in the event wildlife is encountered (e.g. Site Supervisor will contact NDMNRF). Wildlife Management Plan will assist in the mitigation of impacts to study area habitats and wildlife by providing recommendations for protection and contingency measures for these ecosystem components.

The Wildlife Management Plan when developed will include alternate protection and mitigation measures should the clearing works not be conducted in the recommended season. An ERI ecologist should be involved in the development and implementation of these plans to provide mitigation of the potential impacts to habitats and wildlife in the vicinity.

Recommendation 11:

It is recommended the installation of permanent wildlife exclusion fencing on the north and south side of Sunningdale Road in the vicinity of the new culvert running under Sunningdale Road along Axford Drain. Fencing should be installed using protocols outlined in the MNR Species at Risk Best Practices Technical Notes for Reptiles and Amphibians Exclusion Fencing version 1.1 (July 2013).

Recommendation 12:

A five-year Environmental Monitoring Plan should be developed to monitor the success of the implementation of protection and mitigation measures outlined in this report. The plan should include restoration or enhancement area monitoring, invasive species monitoring, vegetation monitoring, and corrective measures where applicable. The plan should be prepared prior to the initiation of construction.

As a condition of draft approval, the Owner agrees to retain a qualified professional to complete qualitative vegetation monitoring (in the appropriate season) of the realigned / constructed Axford Drain, annually for five years after planting / seeding has been completed. The purpose of the qualitative vegetation monitoring is to ensure the viability and healthy establishment of the seeded areas planted specimens in accordance with the rehabilitation detailed restoration / enhancement plan approved for the Axford Drain corridor. The annual monitoring reports will include recommendations for replacement plantings (in the event that some trees / shrubs have not survived), additional seeding requirements (in the event that original seeding has not taken / established itself), installation of plant protection (rodent / deer guards and removal of invasive species. Annual monitoring reports will be submitted to the City of London and will be followed by a report which outlines / confirms that actions taken to address the matters identified in each monitoring report.

The surveys will document the invasive species found within the study area, delineate the limits of the species, georeferenced the location and update mapping of the species. An annual memo will document the findings of the survey and provide management recommendations. This plan should also comply with the City of London Invasive Species Management Strategy.

Recommendation 13:

As a condition of draft plan approval, in the event that the tree preservation plan identifies trees that cannot be preserved in-situ, compensation for the removed trees will be provided on a 3:1 ratio for. All compensation trees and shrubs will be native species selected based on site growing conditions and will be located within the realigned / reconstructed Axford Drain corridor, as per the detailed naturalization planting plans.

Recommendation 14:

As a condition of draft plan approval, in the event that the tree preservation plan identifies trees with cavities or suitable bark crevices, which could serve as suitable bat roosts, the detailed naturalization plans for the realigned / reconstructed Axford Drain, will include 1.5 bat boxes for each of these trees that cannot be preserved in-situ.

Recommendation 15:

As a condition of draft approval, a sediment and erosion control (SEC) plan be prepared by a qualified engineer to identify the appropriate SEC measures to be implemented / installed prior to the commencement of construction and maintained throughout all phases of the proposed development. The SEC measures shall be maintained and should not be removed until all disturbed soils have been stabilized and adequately protected through the re-establishment of the approved ground cover.

Recommendation 16:

That sediment and erosion control (SEC) compliance monitoring reports be prepared and submitted to the City of London April 1, July 1 and November 1 of each year while the site is actively being developed constructed until assumption. The compliance monitoring reports

shall include a log of dates when these SEC measures were inspected, the condition of the SEC measures at the time and remedial actions taken, if any.

Recommendation 17:

That a permanent fence with no gates be established along the property lines, of all lots and blocks which back onto the realigned / reconstructed Axford Drain corridor, in order prevent direct access to this re-naturalized corridor and control access to the proposed multi-use pathway system, as draft approved.

Recommendation 18:

That prior to construction, development or other alteration associated with the proposed development within the Regulation Limit defined by the UTRCA, a Development, Interference with Wetlands and Alterations to Shorelines and Watercourses Permit be issued by the UTRCA pursuant to O. Reg 157/06.

13. Conclusion

This Draft EIS report provides the required supporting documentation for the proposed Sunningdale North development. This report provides:

- A description of the existing natural heritage conditions within the Study Area as delineated through a combination of field investigations and review of available background information.
- The identification of vegetation communities, plants, wildlife, and natural heritage features.
- An assessment of significance and evaluation based on federal, provincial, and municipal criteria for the delineated natural heritage features.
- An assessment of potential impacts on natural heritage features and functions; and,
- A summary of environmental recommendations (Section 8, 9, 10, 11 and 12) to protect natural heritage features, where feasible, including recommended mitigation measures to reduce or avoid risk of impacts on natural features, compensation for loss of vegetation, and the restoration of degraded habitats within the Study Area.

Based on the above evaluations of the aquatic and terrestrial environments, the Sunningdale North Development will result in the loss of habitat of low ecological value given its disturbed and anthropogenically influenced setting and will not result in a net negative impact. The loss of habitat and vegetation communities can be mitigated through the planting of native trees, shrubs and herbaceous species along the Axford Drain corridor maintaining the overall habitat coverage and ecological function for any resident wildlife. With the implementation of the proposed mitigation and the realignment/naturalization of the Axford Drain corridor, a net environmental benefit is anticipated as a result of the proposed works.

Future design plans should adhere to the environmental recommendations of this report.

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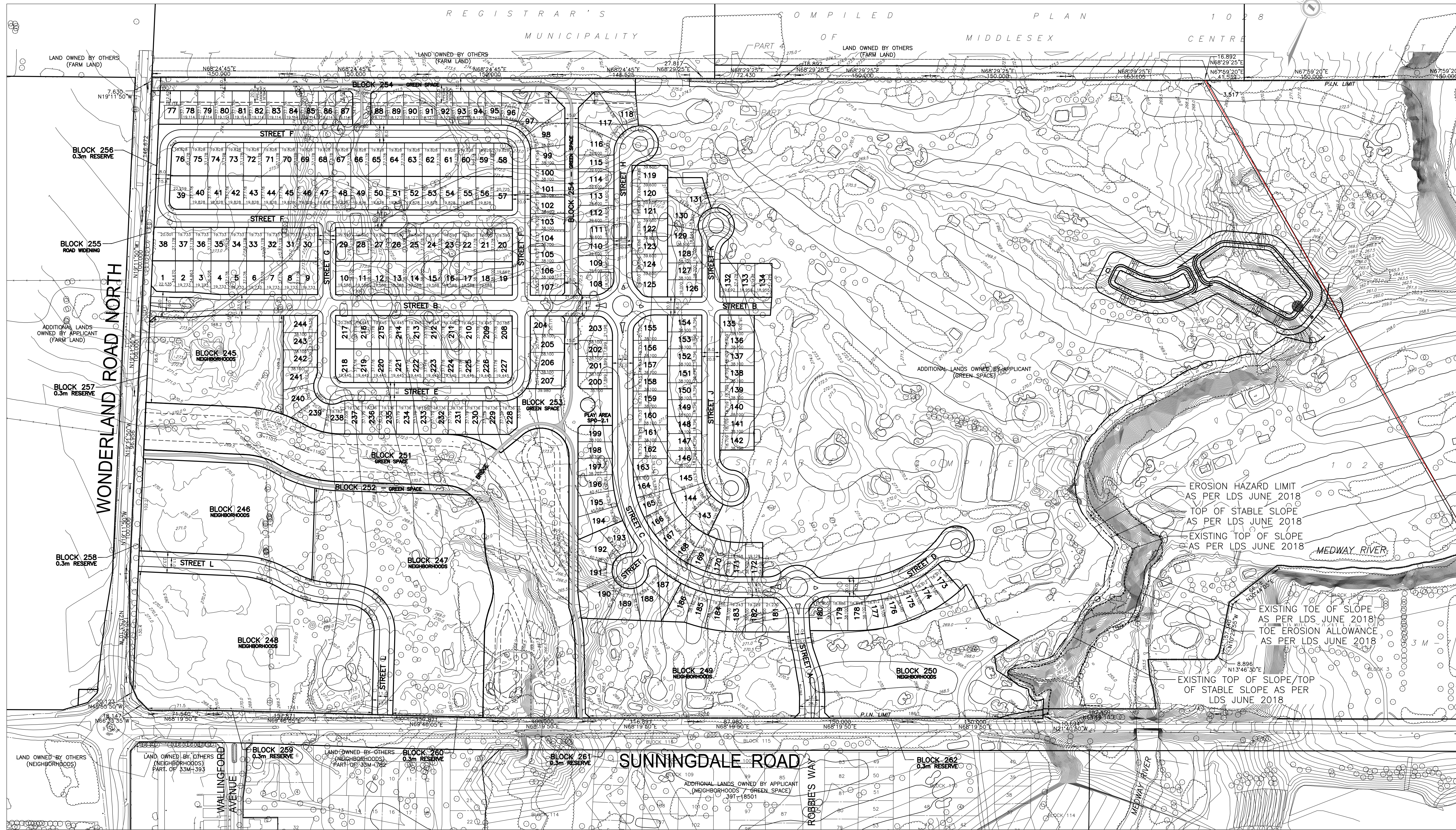
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Appendix A

Draft Plan of Proposed Subdivision (LDS, 2022)



DRAFT PLAN OF PROPOSED SUBDIVISION

PART OF LOTS 16
REGISTRAR'S COMPILED PLAN 1028
CITY OF LONDON
COUNTY OF MIDDLESEX

OWNER'S CERTIFICATE

I HEREBY AUTHORIZE LDS CONSULTANTS INC. TO SUBMIT THIS PLAN FOR APPROVAL.

DATE: _____
I have the authority to bind the Corporation
G. THOMPSON
PRESIDENT
CORLON PROPERTIES INC.

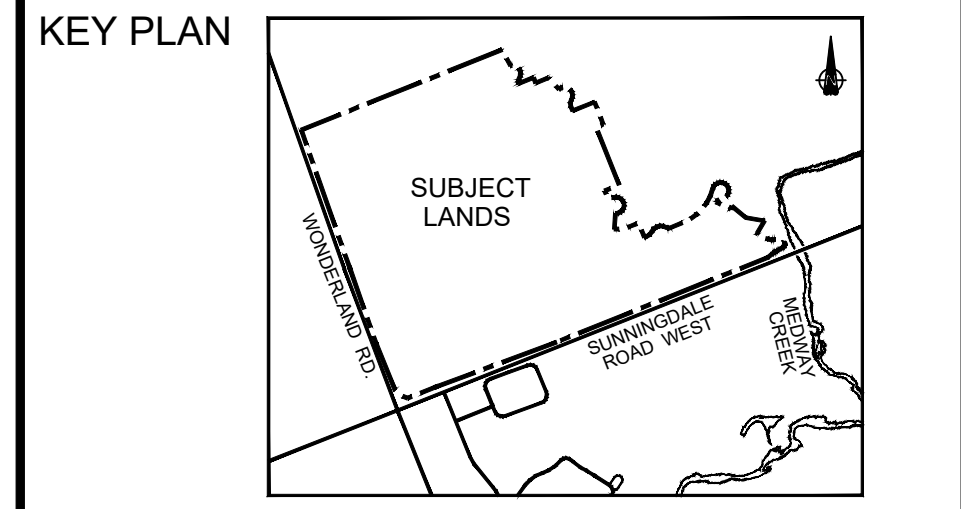
SURVEYOR'S CERTIFICATE

I HEREBY CERTIFY THAT THE BOUNDARIES OF THE LAND TO BE SUBDIVIDED ON THIS PLAN AND THEIR RELATIONSHIP TO THE ADJACENT LANDS ARE ACCURATELY AND CORRECTLY SHOWN.

DATE: _____
PETER G. MORETON O.L.S.
CALLON DIETZ INC.

ADDITIONAL INFORMATION REQUIRED UNDER SECTION 51(17) OF THE PLANNING ACT R.S.O. 1990, c.P.13

- | | | |
|---------------------------|-----------------------------|--------------------|
| A. AS SHOWN | B. AS SHOWN | C. AS SHOWN |
| D. RESIDENTIAL OPEN SPACE | E. AS SHOWN | F. AS SHOWN |
| G. AS SHOWN | H. MUNICIPAL WATER | I. SILTY CLAY TILL |
| J. AS SHOWN | K. ALL SERVICES AS REQUIRED | L. AS SHOWN |



DESCRIPTION	LOTS/ BLOCKS	LOT#	UNITS	AREA (sq.)
NEIGHBORHOODS	1 - 244	244	244	18,698
NEIGHBORHOODS	245	1	1	1,495
NEIGHBORHOODS	246	1	1	1,939
NEIGHBORHOODS	247	1	1	3,469
NEIGHBORHOODS	248	1	1	3,652
NEIGHBORHOODS	249	1	1	2,400
NEIGHBORHOODS	250	1	1	2,379
GREEN SPACE	251	1	1	5,031
GREEN SPACE	252	1	1	0,360
GREEN SPACE	253	1	1	0,992
GREEN SPACE	254	1	1	1,231
ROAD WIDENING	255	1	1	0,602
ROADS				8,744
TOTAL		261	243	51,032

DENSITY = 4.781 units/ha

SUBJECT LANDS 10 20 30 40 (SCALE IN METERS)

Approval Stamp: _____

NOTES:
1. SPACING INTERVAL 0.5 METRE. ALL SPACING INTERVALS ARE IN METRES UNLESS OTHERWISE SHOWN.
2. SCALE 1:2,000
3. DRAWN: _____
4. DATE: _____



23-161-001-01 - Sunningdale North Preliminary Design (A01) 01-14 - Draft - 2020/02/16
 2020-01-21-21 11:27:50 AM by Scott Banks

Appendix B

Agency Correspondence

Kierian Keele

From: ESA-Aylmer (MNR) <ESA.Aylmer@ontario.ca>
Sent: December-20-18 2:44 PM
To: Kierian Keele
Subject: RE: Species at Risk Screening: Sunningdale Golf Course

Hi Kierian,

Sorry for the delayed response.

The Ministry of Natural Resources and Forestry (MNR) understands that Ecosystem Recovery Inc is conducting an information request for the proposed Sunningdale North Development located in the northwest quadrant of the City of London identified in the information provided.

MNR provides the following natural heritage information in response to your request.

Species at Risk (SAR)

The Species at Risk in Ontario (SARO) List (<https://www.ontario.ca/laws/regulation/080230>) is Ontario Regulation 230/08 issued under the Endangered Species Act, 2007 (ESA). The ESA came into force on June 30, 2008, and provides both species protection (under section 9) and habitat protection (under section 10) to species listed as endangered or threatened on the SARO List.

An initial SAR (Endangered and Threatened species) screening has been completed for the above-noted property.

There are known occurrences of SAR on the property and in the general project area, including:

- Kidneyshell
- Rainbow Mussel
- Greater Redhorse
- Kidneyshell
- Wavy-rayed Lampmussel
- Eastern False Rue-anemone
- Purple Twayblade
- Silver Shiner
- Eastern Hog-nosed Snake

Please note that this is an initial screening for SAR and the absence of an element occurrence does not indicate the absence of species. The province has not been surveyed comprehensively for the presence or absence of SAR and MNR data relies on observers to report sightings of SAR. Field assessments by a qualified professional may be necessary if there is a high likelihood for SAR species and/or habitat to occur within the project footprint and potentially be impacted.

It is important to note the following:

- The Committee on the Status of Species at Risk in Ontario (COSSARO) meets regularly to evaluate new species for listing and/or re-evaluate species already on the SARO List.
- As a result, species designations may change and changes may occur in both species and habitat protection which could affect the level of protection they receive under the ESA 2007 and whether proposed projects may have adverse effects on SAR.
- Habitat protection provisions for a species may change if a species-specific habitat regulation comes into effect.

If an activity or project will result in adverse effects to endangered or threatened species and/or their habitat, additional action would need to be taken in order to remain in compliance with the ESA. Additional action could be applying for an authorization under section 17(2)(c) of the ESA, or completing an online registry for an ESA regulation and following the rules in regulation if the project is eligible (<http://www.ontario.ca/environment-and-energy/natural-resources-approvals>).

Questions about the registry process should be directed to MNRF's Registry and Approval Services Centre at 1-855-613-4256 or at mnr.rasc@ontario.ca. Please be advised that applying for an authorization does not guarantee approval and the process can take several months.

Significant Wildlife Habitat (SWH)

Significant wildlife habitat (SWH) may be present on or adjacent to the above-noted subject lands (within 120 m). Please consult the Significant Wildlife Habitat Technical Guide (SWHTG, OMNR 2000), the Natural Heritage Reference Manual (NHRM) and the Ecoregion Criteria Schedules for criteria on identifying and determining significance of wildlife habitat. SWH is identified by planning authorities using the criteria and processes recommended in the SWHTG and Ecoregion Criteria Schedules.

Link to the SWHTG: <https://www.ontario.ca/environment-and-energy/guide-significant-wildlife-habitat>

Link to Ecoregion 7E criteria schedule:

http://publicdocs.mnr.gov.on.ca/View.asp?Document_ID=21843&Attachment_ID=45645

MNRF completed a screening for S1-S3, SH and special concern species and the following have known occurrences in the general project area:

- Snapping Turtle (SC, S3)

The habitat of provincially rare (S1-S3, SH) and Special Concern species is considered SWH under the category of 'Special Concern and Rare Wildlife Species' in the SWHTG Ecoregion Criteria Schedules. Therefore, consideration should be given to these species and whether their habitat occurs on or within 120 m of the subject lands.

Areas of Natural and Scientific Interest (ANSIs)

There are no Provincially or Regionally Significant Earth or Life Science ANSI's within or adjacent to the proposed subject lands.

Significant Woodlands

There appears to be woodland located adjacent to the project area. We recommend you refer to applicable Official Plans for criteria to determine the significance of woodlands near the project locations. The NHRM also contains information and criteria for determining significant woodlands.

Significant Wetlands

There are no MNRF evaluated wetlands within the proposed project area. Site-specific investigation within the study area may find existing wetlands within such ELC communities that have not yet been evaluated or designated. Consideration and delineation of wetland areas should be determined using criteria and methodology as outlined in the Ontario Wetland Evaluation System (OWES) and submitted to MNRF for review.

Significant Valleylands

MNRF does not possess significant valleylands mapping. The NHRM provides guidance and evaluation criteria for determining significant valleylands. Conservation authorities should be contacted to inquire about information pertaining to significant valleylands if they have not been identified in the applicable Official Plan.

Fish and Fish Habitat

There appear to be watercourses within and adjacent to the project area; however, no information on fish and fish habitat or mussel and mussel habitat is available.

There are occurrences of Greenside Darter (Special Concern) in the general project area as well as Black Redhorse and Silver Shiner.

MNRF recommends you contact the appropriate conservation authority and DFO for up-to-date fisheries, mussel, and drain information.

Natural Heritage Systems

Policy 2.1.2 of the PPS states that the diversity and connectivity of natural features in an area, and the long-term ecological function and biodiversity of natural heritage systems (NHS), should be maintained, restored or, where possible, improved, recognizing linkages between and among natural heritage features and areas, surface water features and ground water features.

Applicable natural heritage studies (e.g. in an EIS) should identify and recognize natural heritage systems and the linkages between and among natural heritage features and areas associated with the proposed development and site alteration. Based on the local NHS/linkages identified, or those specifically identified in an Official Plan, an EIS should outline potential impacts to the NHS and consider ways of maintaining, restoring, and/or improving linkages between and among natural heritage features and areas.

Conservation Authorities and Official Plans may provide additional natural heritage information for this study.

Please be advised that it is your responsibility to be aware of and comply with all relevant federal or provincial legislation, municipal by-laws or other agency approvals.

If you have any questions or require additional information, please feel free to contact me.

Thanks,

Jason Webb

Management Biologist
Ministry of Natural Resources and Forestry
Aylmer District
(519) 773-4744
Jason.webb@ontario.ca

From: Kierian Keele [mailto:kierian.keele@ecosystemrecovery.ca]
Sent: July-24-18 2:28 PM
To: ESA-Aylmer (MNRF) <ESA.Aylmer@ontario.ca>
Cc: Chris Moon <chris.moon@ecosystemrecovery.ca>
Subject: Species at Risk Screening: Sunningdale Golf Course

Hello,

Please find attached the Information Request Form and Site figure. I am working on behalf of the Corlon Properties Inc. as part of an Environmental Assessment Study for low-medium residential development project located at Sunningdale Golf Course, 465 Sunningdale Road West, London, ON, N6G 5B9. I am requesting a Species at Risk Screening for SAR, fish data and associated habitat for the site and surrounding area. I have attached a map of the site location and project description. Should you require any further information, please do not hesitate to contact me, 519-998-0475.

Thank you,

Kierian

Kierian Keele, B.Sc.
Environmental Scientist, Certified Arborist
Tel: (519) 621-1500
Cell: (519) 998-0475

Ecosystem Recovery Inc.
80 Courtland Ave. East, Unit 2
Kitchener, Ontario, N2G 2T8
Tel: (519) 621-1500 | Fax: (226) 240-1080
www.ecosystemrecovery.ca

Kierian Keele

From: Cari Ramsey <ramseyc@thamesriver.on.ca>
Sent: October-17-18 2:19 PM
To: Kierian Keele
Subject: Re: Information Request: Sunningdale Golf Course
Attachments: Benthic Records - Sunningdale Golfcourse.pdf; Fish Records - Sunningdale Golfcourse.pdf; Mussels Records - Sunningdale Golfcourse.pdf; Regulations Mapping.pdf

Follow Up Flag: Follow up
Flag Status: Flagged

Hi Kierian;

Attached are the fish, mussel and benthic records we have for this site. I also attached the UTRCA regulations mapping. This site has SARA species, as well as ESA species so you should contact both the Ministry of Environment, Conservation and Parks (MOCP) and Ministry of Natural Resources and Forestry (MNRF) to discuss that process. Critical mussel habitat is just outside the subject property.

If you require any additional information or have any questions, please feel free to contact me.

Thanks!
Cari

Cari Ramsey
Environmental Regulations Technician/ Health and Safety Specialist
UTRCA
1424 Clarke Side Road
London, ON
N5V 5B9
(519)451-2800 ext. 289
ramseyc@thamesriver.on.ca

>>> Kierian Keele <kierian.keele@ecosystemrecovery.ca> 09/10/2018 2:13 PM >>>
Hello,

Please find attached a figure of the Study Area for the Corlon Sunningdale Golf Course Project. We are requesting any aquatic, or terrestrial information you may have of the study area, or surrounding landscape to be useful as background data for the EIS. We are aware there may be fish records, or previous benthic studies within the Medway, or its tributaries. This information will be used to better define the scope, outline data gaps and be useful in background review.

If you have any questions, please do not hesitate to contact me.

Thank you,

Kierian

Kierian Keele, B.Sc.

Environmental Scientist, Certified Arborist

Tel: (519) 621-1500

Cell: (519) 998-0475

Ecosystem Recovery Inc.

80 Courtland Ave. East, Unit 2

Kitchener, Ontario, N2G 2T8

Tel: (519) 621-1500 | Fax: (226) 240-1080

www.ecosystemrecovery.ca

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APPENDIX A

Environmental Impact Study
ISSUES SUMMARY CHECKLIST REPORT

Application Title: Sunningdale North Development

Date Submitted: June 26 2018

Proponent: Corlon Properties Inc.

Qualifications

Primary Consultant: Ecosystem Recovery Inc.

Key Contact Person: Chris Moon

Other Consultants/field personnel:
Hydrogeology / Hydrology : Land Development Solutions

Geotechnical : Land Development Solutions

Biological - Flora Ecosystem Recovery Inc.

Biological - Fauna Ecosystem Recovery Inc.

Other: _____

Context for Background Information

Subwatershed : Medway Creek Subwatershed

Tributary Fact Sheet Number : _____

Planning/Policy Area: Sunningdale

Technical Advisory Review Team

- Ecologist Planner
- Planner for the File
- EEPAC (invite to meetings)
- Conservation Authority UTRCA
- Ministry of Natural Resources
- Ministry of Energy and Environment
- Ministry of Municipal Affairs and Housing
- Ministry of Agriculture and Food

Other Review Groups (eg. Community Associations, Field Naturalists)

Subject land status report
SOR based on London Official Plan
- identify features
- move on to EIS
- channel - natural heritage
* follow this report

1.0 DESCRIPTION OF THE ENVIRONMENT (Features)

Purpose: To have a clear understanding of the current status of the land, and the proposed "development" or land use change.

1.1 Mapping (Location and Context)

(current aerial photographs, preferably ortho-images, 1:2000 Ontario Base Map, NTS 1:50,000 maps)

- Land Use - Excerpts of the Official Plan for the City of London Ontario Schedules A, B, showing a 5-10km radius of subject site
- Terrain setting @ 1:10,000 – 1:15,000 scale showing landscape features, subwatershed divides
- Existing Environmental Resources @ 1:2,000 -1:5,000 showing Vegetation, Hydrology, contours, linkages
- Environmental Plan or Strategy from Subwatershed reports (tributary fact sheet), Community (Area) Plans, or other

1.2 Description of Site, Adjacent lands, Linkage with Natural Heritage System *List all supporting studies and reports available to provide background summary (e.g. sub-watershed, hydrological, geo-technical, natural heritage etc.); check the first box if it is relevant to the subject area and surrounding landscape, and check the second box if it is determined that sufficient information is available.*

- Sunningdale Court Scoped Environmental Impact Study (Stantec, 2017)
- Soils Assessment - Sunningdale Golf and Country Club (LDS, 2013)
- City of London Sunningdale Area Storm Drainage & Stormwater Management Servicing for Undeveloped Lands (hecum, 2009)
- Functional Stormwater Management Report - Sunningdale Court (LDSS, 2013)
- Neighbours of Sunningdale - Sunningdale Court (Corlon Properties Inc. 2018)
- London Plan - 50% of board resolution *

subject land policy report

1.2.1 Terrain Setting

<i>Relevant</i>	<i>Information</i>
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/> Soils (surface & subsurface)
<input type="checkbox"/>	<input type="checkbox"/> Glacial geomorphology- landform type
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/> Sub-watershed
<input checked="" type="checkbox"/>	<input type="checkbox"/> Topographic features
<input checked="" type="checkbox"/>	<input type="checkbox"/> Ground water discharge
<input checked="" type="checkbox"/>	<input type="checkbox"/> Shallow ground water/baseflow
<input checked="" type="checkbox"/>	<input type="checkbox"/> Ground water recharge/aquifer
<input checked="" type="checkbox"/>	<input type="checkbox"/> Aggregate resources

hydrogeo study to address existing conditions

1.2.2 Hydrology

- Hydrological catchment boundary
- Surface drainage pattern
- Watercourses (Permanent, Intermittent)
- Stream order (Headwater, 1st, 2nd, 3rd or higher)
- Agricultural drains *- city can provide **
- Downstream receiving watercourse *Medway Creek (UTRCA data)*

reference to abandoned

1.2.3 Natural Hazards

- 100 year Erosion Line *250 yr*
- Floodline mapping
- Fill line mapping

1.2.4 Vegetation

- Vegetation Patch number _____
- System (Terrestrial, Wetland, Aquatic)
- Cover (Open, Shrub, Treed)
- Community Type(s)
- ELC Community Class (Bluff, Forest, Swamp, Tallgrass Prairie, Savannah & Woodland, Fen, Bog, Marsh, Open Water, Shallow Water)
- ELC Community Series
- Rare Vegetation Communities

1.2.5 Flora

- Flora (inventory dates, source)
2011-2012 *reference conservation*
_____ *- 3 season inventory required*

- Rare flora (National, Provincial, Regional)

1.2.6 Fauna

- Fauna (inventory dates; source)
- Breeding Birds 2011
- Migratory Birds incidental
- Amphibians 2011, 2012 *3 season*
- Reptiles _____ *no specific surveys - basking-sets surveys!*
- Mammals incidental
- Butterflies incidental
- Odonata incidental
- Other Bats *- habitat assessment - snags/cavity*
- Bird Species of Conservation Priority *↳ no acoustic required*

- Rare Fauna

1.2.7 Wildlife habitat

- Species-At-Risk critical habitat mapping _____
 - Winter habitat for deer, wild turkey
 - Waterfowl Habitat (wetlands, poorly drained landscape – bottomlands, beaver ponds, seasonally flooded areas, staging areas, feeding areas) *-no active nesting SWH? -determine if SWH*
 - Colonial Birds Habitat
 - Hibernacula *incorporate hibernacula, compensate*
 - Habitat for Raptors _____ *-winter nest-survey (snag)*
 - Forests with springs or seeps
 - Ephemeral ponds
 - Wildlife trees (snags, cavities, x-large trees > 65 cm dbh)
 - Forest Interior Birds
- _____
- _____
- tree inventory??*
- Area-sensitive birds
- _____
- _____
- _____

1.2.8 Aquatic Habitat
(SWS Aquatic Resources Management Reports)

- Fish communities *2011 Aquatic survey & electrofishing*
 - Fish spawning areas
 - Fish migration routes *- perched culvert*
 - Thermal refuge for fish
 - Thermal Regime (cold, cool, warm)
 - Benthic inventory
- _____
- _____
- Substrate _____
 - Riparian habitat (extent and type)
- _____
- _____
- _____

** talk to UTRCA for records*

changing culvert size
↳ UTRCA will follow up
↳

Mark will ask about electrofishing

crayfish
↳ check

Section 4 emg

1.2.9 Linkages and Corridors

(The diversity of natural features in an area, and the natural connections between them should be maintained, and improved where possible. Provincial Policy Statement 2.3.3).

- Valleylands
- Significant Watercourses (Thames River, Stoney Creek, Medway Creek, Dingman Creek, Pottersburg Creek, Wabano Creek, Mud Creek, Stanton Creek (Drain), Kelly Creek (Drain))
- Upland Corridors / migration routes
- Big Picture Cores and Corridors
- Linkages between aquatic and terrestrial areas (riparian habitat, runoff)
- Groundwater connections
- Patch clusters (mosaic of patches in the landscape)

1.3 Social Values

1.3.1 Human Use Values

- Recreational linkages for hiking, walking
- Nature appreciation, aesthetics
- Education, research
- Cultural / traditional heritage
- Social (parks and open space)
- Resource Products (e.g. timber, fish, furbearers, peat)
- Aggregate Resources

1.3.2 Land Use-Cultural

- Archaeological (pre 1500)
- Historical (post 1500-present)
- Adjacent historical and archeological
- Future

1.3.3 Land Use-Active

- Current
- Historical (past 50-100 years)
- Adjacent lands
- Future

1.3.4 Other _____

2.0 EVALUATION OF SIGNIFICANCE


Components of the Natural Heritage System

The policies in Section 15.4 apply to recognized and potential components of the natural heritage system as delineated on Schedule "B", or features that may be considered for inclusion on Schedule "B". They also address the protection of environmental quality and ecological function with respect to water quality, fish habitat, groundwater recharge, headwaters and aquifers.

1.1 Environmentally Significant Areas

- Identified Environmentally Significant Areas
(Recognized in Official Plan (Schedule "B" and/or Section 15.4.1.1)
Name _____
- Potential Environmentally Significant Areas –
Expansion of (Recognized in Section 15.4.1.2
and Schedule "B")
Name _____
- Potential Environmentally Significant Areas
(Recognized in Section 15.4.1.5 and Schedule
"B")
Name _____

1.2 Wetlands

- Provincially Significant Wetlands
- Locally Significant Wetlands
- Unevaluated Wetlands 

1.3 Areas of Natural and Scientific Interest

- Provincial Life Science ANSI
- Regional Life Science ANSI
- Earth Science ANSI

1.4 Habitat of Species-At-Risk (SAR)

- Endangered
- Threatened
- Vulnerable

1.5 Woodlands

- Significant Woodlands
- Unevaluated Vegetation Patches

2.6 Corridors and Linkages

- River, Stream and Ravine Corridors
- Upland Corridors
- Naturalization and Anti-fragmentation Areas

3.0 IDENTIFICATION AND DESCRIPTION OF FUNCTIONS

Ecological Functions The natural processes, products or services that species and non-living environments provide or perform within or between ecosystems and landscapes. Check those functions that will be required to assess for the study (key and supporting functions).

3.1 Biological Functions

- habitat (provision of food, shelter for species)
- limiting habitat
- species life histories (reproduction and dispersal)
- habitat guilds
- indicator species
- keystone species
- introduced species
- predation / parasitism
- population dynamics
- vegetation structure, density and diversity
- food chain support
- productivity
- diversity
- carbon cycle
- energy cycling
- succession and disturbance processes (natural and man-made)
- relationships between species and communities

aquatic - based on upgrade

3.2 Hydrological and Wetland Functions

- ground water recharge and discharge (hydrogeology)
- water storage and release (fluvial geomorphology)
- maintaining water cycles (water balance)
- water quality improvement
- flood damage reduction
- shoreline stabilization / erosion control
- sediment trapping
- nutrient retention and removal / biochemical cycling
- aquatic habitat (fish, macroinvertebrates)

3.3 Landscape Features and Functions

- size
- connections, corridors and linkages
- proximity to other areas / natural heritage features (e.g. woodlands, wetlands, valleylands, water, etc.)
- fragmentation

3.4 Functions, Benefits and Values of Importance to Humans

- contributing to healthy and productive landscapes
- improving air quality by supplying oxygen and absorbing carbon dioxide
- converting and storing atmospheric carbon
- providing natural resources for economic benefit
- providing green space for human activities
- aesthetic and quality-of-life benefit
- environmental targets and/or environmental management strategies

Appendix C

Plant List

Common Name	Botanical Name	Coefficient of Conservatism	Wetness Index	Weediness Index	Invasive Species Ontario	FOD7-4	CUP3	FOM9-2	FOD4-2	CUM1	FOD7-3	CUM1-1	FOD5	FOM9-1	CGL-1	MAM2	MAM2-2	MAM3	MAM2-11	Ponds	MAS2	Provincial L Rank	ESA Status	COSEWIC Status	SARA Status	Global Rank	Regional Status 7E - Carolinian Zone - 2017 (Oldham 2017)	Local Status Middlesex (Oldham 2017)
Common Hackberry	Celtis occidentalis	8	1			x		x					x	x	x							S4			G5	C	X	
American Elm	Ulmus americana	3	-2				x		x													S5			G5	C	C	
Siberian Elm	Ulmus pumila		5	-1	2				x													SE3			GNR	IX	IR	
Nettle Family	Urticaceae							x	x	x	x				x	x	x			x					G5	C	X	
Canadian Wood Nettle	Laportea canadensis	6	-3					x	x	x	x					x					x				G5	C	X	
Stinging Nettle	Urtica dioica ssp. dioica		-1	-1	3			x	x	x	x				x		x				x				G515?	IR	IR	
Vervain Family	Verbenaceae								x	x		x			x						x				G5	C	C	
Blue Vervain	Verbena hastata	4	-4						x	x		x									x				G5	C	C	
White Vervain	Verbena urticifolia	4	-1						x						x						x				G5	C	X	
Violet Family	Violaceae															x	x								G5	C	X	
Woolly Blue Violet	Viola sororia	4	1													x	x								G5	C	X	
Grape Family	Vitaceae					x	x	x	x	x	x	x	x	x	x	x	x	x			x				G5	C	X	
Virginia Creeper	Parthenocissus quinquefolia	6	1			x	x	x	x	x	x	x	x	x	x	x	x							S4?	G5	U	X	
Summer Grape	Vitis aestivalis	7	3						x						x										S4	G5	C	R
Riverbank Grape	Vitis riparia	0	-2			x	x	x	x	x	x	x	x	x	x	x	x				x				S5	G5	C	C
Monocots	Monocotyledons					x	x	x	x	x	x	x	x	x	x	x	x	x			x	x						
Water-plantain Family	Alismataceae																											
Broad-leaved Arrowhead	Sagittaria latifolia	4	-5																						G5	C	C	
Northern Water-plantain	Alisma triviale																										X	X
Arum Family	Araceae													x	x	x												
Jack-in-the-pulpit	Arisaema triphyllum	5	-2													x										G5	C	C
Skunk Cabbage	Symplocarpus foetidus	7	-5											x	x											G5	C	C
Calamus	Acorus calamus		-5	-1																		x			G4?	IR	IR	
Sedge Family	Cyperaceae													x	x	x	x	x			x							
Bebb's Sedge	Carex bebbii	3	-5					x								x										G5	C	C
Green Bulrush	Scirpus atrovirens	3	-5													x										G5?	C	C
Shallow Sedge	Carex lurida	6	-5										x	x						x	x					G5	U	R
Awl-fruited Sedge	Carex stipitata	3	-5													x	x									G5	C	C
Iris Family	Iridaceae																											
Harlequin Blue-flag	Iris versicolor	5	-5																							G5	C	X
Yellow Iris	Iris pseudacorus		-5	-2	4																					GNR	IU	IR
Rush Family	Juncaceae																											
Dudley's Rush	Juncus dudleyi	1	0													x	x	x			x	x				G5	C	C
Soft Rush	Juncus effusus															x	x				x	x				G5	C	X
Path Rush	Juncus tenuis	0	0													x	x	x			x	x				G5	C	X
Duckweed Family	Lemnaceae																											
Lesser Duckweed	Lemna minor	2	-5																							G5	C	X
Lily Family	Liliaceae																											
European Lily-of-the-valley	Convallaria majalis		5	-2	3	x			x		x		x	x	x											G5	IX	IR
Orange Day-lily	Hemerocallis fulva		5	-3		x			x																	GNA	IU	IX
Orange Lily	Lilium bulbiferum				4				x						x											GNR		
Large False Solomon's Seal	Maianthemum racemosum	4	3					x	x				x	x												G5	C	X
Grass Family	Poaceae					x	x		x	x	x	x	x	x	x	x	x	x			x	x						
Redtop	Agrostis gigantea		0	-2		x				x	x	x				x	x									G4G5	IC	IC
Smooth Brome	Bromus inermis		5	-3	4					x																G5TNR	IC	IC
Blue-joint Grass	Calamagrostis canadensis	4	-5							x																G5	C	X
Orchard Grass	Dactylis glomerata		3	-1	3					x																GNR	IC	IC
Large Barnyard Grass	Echinochloa crus-galli															x											IC	IC
Quack Grass	Elymus repens		3	-3	3											x	x									GNR	IC	IC
Fowl Manna Grass	Glyceria striata	3	-5							x		x										x				G5	C	X
Witch Grass	Panicum capillare	0	0							x																G5	C	X
Reed Canary Grass	Phalaris arundinacea	0	-4			x				x	x	x				x	x	x			x	x				G5	C	X
Timothy	Phleum pratense		3	-1			x			x		x				x	x									GNR	IC	IC
European Reed	Phragmites australis ssp. australis															x											IC	IC
Annual Blue Grass	Poa annua		1	-2						x						x										GNR	IC	IC
Canada Blue Grass	Poa compressa	0	2							x		x														GNR	IC	IX
Fowl Blue Grass	Poa palustris	5	-4									x				x	x									G5	C	X
Pondweed Family	Potamogetonaceae																				x	x						
Pondweed species	Potamogeton sp.																				x	x						
Bur-reed Family	Sparganiaceae																											
Stemless Bur-reed	Sparganium emersum	5	-5																							G5	U	R
Cattail Family	Typhaceae																											
Narrow-leaved Cattail	Typha angustifolia	3	-5													x										G5	IC	IX

Table 2 Study Area Floristic Summary & Assessment

Species Diversity		
Total Species	228	
Native Species	138	60.53%
Exotic Species	90	39.47%
Total Taxa in Region (List Region, Source)	10,000	
% Regional Taxa Recorded	2.28%	
Regionally Significant Species	7	
S1-S3 Species	1	
S4 Species	14	
S5 Species	112	
Coefficient of Conservatism and Floral Quality Index		
Co-efficient of Conservatism (CC) (average)	4.00	
CC 0 to 3 (lowest sensitivity)	54	39.13%
CC 4 to 6 (moderate sensitivity)	68	49.28%
CC 7 to 8 (high sensitivity)	14	10.14%
CC 9 to 10 (highest sensitivity)	2	1.45%
Floral Quality Index (FQI)	46.99	
Presence of Weedy & Invasive Species		
mean weediness	-1.77	
weediness = -1 (low potential invasiveness)	44	48.89%
weediness = -2 (moderate potential invasiveness)	23	25.56%
weediness = -3 (high potential invasiveness)	23	25.56%
Presence of Wetland Species		
average wetness value	1.06	
upland	53	23.25%
facultative upland	70	30.70%
facultative	45	19.74%
facultative wetland	36	15.79%
obligate wetland	26	11.40%

Table 3 FOD7-4 Plant List

Common Name	Botanical Name	Coefficient of Conservatism	Wetness Index	Weediness Index	Invasive Species Ontario	FOD7-4	Provincial L Rank	ESA Status	COSEWIC Status	SARA Status	Global Rank	Regional Status 7E - Carolinian Zone - 2017 (Oldham 2017)	Local Status Middlesex (Oldham 2017)
Ferns & Allies	Pteridophytes					x							
Cedar Family	Cupressaceae					x							
Eastern Red Cedar	Juniperus virginiana	4	3			x	S5				G5	C	X
Dicots	Dicotyledons					x							
Maple Family	Aceraceae					x							
Norway Maple	Acer platanoides		5	-3	2	x	SNA				GNR	IU	IU
Black Maple	Acer nigrum	7	3			x	S4?				G5	C	C
Carrot or Parsley Family	Apiaceae					x							
Wild Carrot	Daucus carota		5	-2		x	SE5				GNR	IC	IC
Dill	Anethum graveolens		5	-1		x	SE1?				GNR	IR	IR
Dogbane Family	Apocynaceae					x							
Common Periwinkle	Vinca minor		5	-2	2	x	SE5				GNR	IX	IR
Composite or Aster Family	Asteraceae					x							
Great Burdock	Arctium lappa		3			x	SE5				GNR	IU	IR
Common Burdock	Arctium minus		3	-2		x	SE5				GNR	IC	IC
Calico Aster	Symphyotrichum lateriflorum	3	0			x	S5				G5	C	C
New England Aster	Symphyotrichum novae-angliae	2	-3			x	S5				G5	C	C
Bull Thistle	Cirsium vulgare		3	-1		x	SE5				GNR	IC	IX
Philadelphia Fleabane	Erigeron philadelphicus	1	-3			x	S5				G5	C	C
Canada Goldenrod	Solidago canadensis var. canadensis	1	3			x	S5				G5	C	X
Common Dandelion	Taraxacum officinale		3	-2		x	SE5				G5	IC	IC
Honeysuckle Family	Caprifoliaceae					x							
Tartarian Honeysuckle	Lonicera tatarica		3	-3	1	x	SE5				GNR	IC	IX
Maple-leaved Viburnum	Viburnum acerifolium	6	5			x	S5				G5	C	X
Nannyberry	Viburnum lentago	4	-1			x	S5				G5	C	C
European Cranberrybush	Viburnum opulus		0	-1		x	SNA				G5		IR
Downy Arrow-wood	Viburnum rafinesqueanum	7	5			x	S5				G5	C	X
Pink Family	Caryophyllaceae					x							
Maidenstears	Silene vulgaris		5	-1		x	SE5				GNR	IC	IX
Staff-tree Family	Celastraceae					x							
Winged Spindle Tree	Euonymus alatus		5	-1	3	x	SE2				GNR	IR	IR
Dogwood Family	Cornaceae					x							
Alternate-leaved Dogwood	Cornus alternifolia	6	5			x	S5				G5	C	X
Red-osier Dogwood	Cornus sericea	2	-3			x	S5				G5	C	C
Gourd Family	Cucurbitaceae					x							
Wild Cucumber	Echinocystis lobata	3	-2			x	S5				G5	C	X
Teasel Family	Dipsacaceae					x							
Fuller's Teasel	Dipsacus fullonum		5	-1	3	x	SE5				GNR	IC	IC
Oleaster Family	Elaeagnaceae					x							
Russian Olive	Elaeagnus angustifolia		4	-1	3	x	SE3				GNR	IU	IR
Pea Family	Fabaceae					x							
Black Locust	Robinia pseudoacacia		4	-3	2	x	SE5				G5	IC	IC
Water-leaf Family	Hydrophyllaceae					x							
Virginia Water-leaf	Hydrophyllum virginianum	6	-2			x	S5				G5	C	C
Walnut Family	Juglandaceae					x							
Butternut	Juglans cinerea	6	2			x	S2?	END	END	END	G4	U	X

Common Name	Botanical Name	Coefficient of Conservatism	Wetness Index	Weediness Index	Invasive Species Ontario	FOD7-4	Provincial L Rank	ESA Status	COSEWIC Status	SARA Status	Global Rank	Regional Status 7E - Carolinian Zone - 2017 (Oldham 2017)	Local Status Middlesex (Oldham 2017)
Black Walnut	Juglans nigra	5	3			x	S4?				G5	C	X
Olive Family	Oleaceae					x							
White Ash	Fraxinus americana	4	3			x	S4				G5	C	C
Smartweed Family	Polygonaceae					x							
Curly-leaf Dock	Rumex crispus		-1	-2		x	SE5				GNR	IC	IC
Primrose Family	Primulaceae					x							
Creeping Jenny	Lysimachia nummularia		-4	-3	2	x	SE5				GNR	IC	IX
Buttercup Family	Ranunculaceae					x							
Tall Thimbleweed	Anemone virginiana var. virginiana	4	5			x	S5				G5T5	C	C
Buckthorn Family	Rhamnaceae					x							
Common Buckthorn	Rhamnus cathartica		3	-3	1	x	SE5				GNR	IC	IC
Ninebark	Physocarpus opulifolius	5	-2			x	S5				G5	U	X
Rose Family	Rosaceae					x							
Tall Hairy Agrimony	Agrimonia gryposepala	2	2			x	S5				G5	C	C
Downy Serviceberry	Amelanchier arborea	5	3			x	S5				G5	C	C
Hawthorn species	Crataegus sp.	4	5			x							X
Wild Strawberry	Fragaria virginiana	2	1			x	S5				G5	C	C
Yellow Avens	Geum aleppicum	2	-1			x	S5				G5	C	X
White Avens	Geum canadense	3	0			x	S5				G5	C	X
Canada Plum	Prunus nigra	4	4			x	S4				G4G5	U	X
Black Cherry	Prunus serotina	3	3			x	S5				G5	C	C
Common Blackberry	Rubus allegheniensis	2	2			x	S5				G5	C	C
American Red Raspberry	Rubus idaeus var. idaeus					x						IR	
Willow Family	Salicaceae					x							
White Willow	Salix alba		-3	-2	3	x	SE4				G5	IX	IX
Crack Willow	Salix fragilis		-1	-3	3	x	SE				GNR	IC	IX
Bittersweet Nightshade	Solanum dulcamara		0	-2	3	x	SE5				GNR	IC	IC
Linden Family	Tiliaceae					x							
American Basswood	Tilia americana	4	3			x	S5				G5	C	C
Elm Family	Ulmaceae					x							
Common Hackberry	Celtis occidentalis	8	1			x	S4				G5	C	X
Grape Family	Vitaceae					x							
Virginia Creeper	Parthenocissus quinquefolia	6	1			x	S4?				G5	U	X
Riverbank Grape	Vitis riparia	0	-2			x	S5				G5	C	C
Monocots	Monocotyledons					x							
Lily Family	Liliaceae					x							
European Lily-of-the-valley	Convallaria majalis		5	-2	3	x	SNA				G5	IX	IR
Orange Day-lily	Hemerocallis fulva		5	-3		x	SNA				GNA	IU	IX
Grass Family	Poaceae					x							
Redtop	Agrostis gigantea		0	-2		x	SNA				G4G5	IC	IC
Reed Canary Grass	Phalaris arundinacea	0	-4			x	S5				G5	C	X

Table 4 FOD7-4 Floristic Summary & Assessment

Species Diversity		
Total Species	55	
Native Species	32	58.18%
Exotic Species	23	41.82%
Total Taxa in Region (List Region, Source)	10000	
% Regional Taxa Recorded	0.55%	
Regionally Significant Species	0	
S1-S3 Species	0	
S4 Species	3	
S5 Species	24	
Co-efficient of Conservatism and Floral Quality Index		
Co-efficient of Conservatism (CC) (average)	3.78	
CC 0 to 3 (lowest sensitivity)	14	43.75%
CC 4 to 6 (moderate sensitivity)	15	46.88%
CC 7 to 8 (high sensitivity)	3	9.38%
CC 9 to 10 (highest sensitivity)	0	0.00%
Floral Quality Index (FQI)	21.39	
Presence of Weedy & Invasive Species		
mean weediness	-2.00	
weediness = -1	7	30.43%
weediness = -2	9	39.13%
weediness = -3	7	30.43%
Presence of Wetland Species		
average wetness value	1.80	
upland	14	25.45%
facultative upland	0	36.36%
facultative	12	21.82%
facultative wetland	10	18.18%
obligate wetland	0	0.00%

Table 5 CUP-3 Plant List

Common Name	Botanical Name	Coefficient of Conservatism	Wetness Index	Weediness Index	Invasive Species Ontario	CUP3	Provincial L Rank	ESA Status	COSEWIC Status	SARA Status	Global Rank	Regional Status 7E - Carolinian Zone - 2017 (Oldham 2017)	Local Status Middlesex (Oldham 2017)
Ferns & Allies	Pteridophytes					x							
Pine Family	Pinaceae					x							
Norway Spruce	Picea abies		5	-1		x	SNA				G5	IX	IX
White Spruce	Picea glauca	6	3			x	S5				G5	U	IR
Blue Spruce	Picea pungens		3			x	SNA				G5	IR	IX
Eastern White Pine	Pinus strobus	4	3			x	S5				G5	C	X
Dicots	Dicotyledons					x							
Maple Family	Aceraceae					x							
Manitoba Maple	Acer negundo	0	0		1	x	S5				G5	C	C
Norway Maple	Acer platanoides		5	-3	2	x	SNA				GNR	IU	IU
Silver Maple	Acer saccharinum	5	-3			x	S5				G5	C	C
Carrot or Parsley Family	Apiaceae					x							
Wild Carrot	Daucus carota		5	-2		x	SE5				GNR	IC	IC
Milkweed Family	Asclepiadaceae					x							
Common Milkweed	Asclepias syriaca	0	5			x	S5				G5	C	C
European Swallow-wort	Vincetoxicum rossicum		5	-3	1	x	SE5				GNR	IX	IR
Composite or Aster Family	Asteraceae					x							
Common Burdock	Arctium minus		3	-2		x	SE5				GNR	IC	IC
Calico Aster	Symphyotrichum lateriflorum	3	0			x	S5				G5	C	C
New England Aster	Symphyotrichum novae-angliae	2	-3			x	S5				G5	C	C
Canada Thistle	Cirsium arvense		3	-1	1	x	SE5				GNR	IC	IC
Philadelphia Fleabane	Erigeron philadelphicus	1	-3			x	S5				G5	C	C
Tall Goldenrod	Solidago altissima	1	3			x	S5				G5	C	U
Canada Goldenrod	Solidago canadensis var. canadensis	1	3			x	S5				G5	C	X
Zig-zag Goldenrod	Solidago flexicaulis	6	3			x	S5				G5	C	X
Giant Goldenrod	Solidago gigantea	4	-3			x	S5				G5	C	X
Field Sow-thistle	Sonchus arvensis ssp. arvensis		3	-1		x	SE5				GNR	IC	IX
Rock Dandelion	Taraxacum erythrospermum		5	-1		x	SE5				GNR	IX	IR
Common Dandelion	Taraxacum officinale		3	-2		x	SE5				G5	IC	IC
Yellow Salsify	Tragopogon dubius		5	-1		x	SE5				GNR	IC	IX
Touch-me-not Family	Balsaminaceae					x							
Jewelweed	Impatiens capensis	4	-3			x	S5				G5	C	C
Mustard Family	Brassicaceae					x							
Garlic Mustard	Alliaria petiolata		0	-3	1	x	SE5				GNR	IC	IC
Field Penny-cress	Thlaspi arvense		5	-1		x	SE5				GNR	IC	IC
Honeysuckle Family	Caprifoliaceae					x							
Tartarian Honeysuckle	Lonicera tatarica		3	-3	1	x	SE5				GNR	IC	IX
Nannyberry	Viburnum lentago	4	-1			x	S5				G5	C	C
European Cranberrybush	Viburnum opulus		0	-1		x	SNA				G5		IR
Dogwood Family	Cornaceae					x							
Alternate-leaved Dogwood	Cornus alternifolia	6	5			x	S5				G5	C	X
Gray Dogwood	Cornus racemosa	2	-2			x	S5				G5	C	X
Red-osier Dogwood	Cornus sericea	2	-3			x	S5				G5	C	C
Morning-glory Family	Convolvulaceae					x							
Field Bindweed	Convolvulus arvensis		5	-1	3	x	SE5				GNR	IC	IX
Gourd Family	Cucurbitaceae					x							
Wild Cucumber	Echinocystis lobata	3	-2			x	S5				G5	C	X
Pea Family	Fabaceae					x							
Crown-vetch	Securigera varia		5	-2	1	x	SE5				GNR	IX	IX
Black Medick	Medicago lupulina		1	-1	4	x	SE5				GNR	IC	IC
Alsike Clover	Trifolium hybridum		1	-1		x	SE5				GNR	IC	IX
Beech Family	Fagaceae					x							

Common Name	Botanical Name	Coefficient of Conservatism	Wetness Index	Weediness Index	Invasive Species Ontario	CUP3	Provincial L Rank	ESA Status	COSEWIC Status	SARA Status	Global Rank	Regional Status 7E - Carolinian Zone - 2017 (Oldham 2017)	Local Status Middlesex (Oldham 2017)
Bur Oak	Quercus macrocarpa	5	1			x	S5				G5	C	C
Walnut Family	Juglandaceae					x							
Bitternut Hickory	Carya cordiformis	6	0			x	S5				G5	C	X
Black Walnut	Juglans nigra	5	3			x	S4?				G5	C	X
Olive Family	Oleaceae					x							
Green Ash	Fraxinus pennsylvanica	3	-3			x	S4				G5	C	C
Wood Sorrel Family	Oxalidaceae					x							
Common Yellow Oxalis	Oxalis stricta	0	3			x	S5				G5	C	X
Plantain Family	Plantaginaceae					x							
English Plantain	Plantago lanceolata		0	-1		x	SE5				G5	IC	IC
Common Plantain	Plantago major		-1	-1		x	SE5				G5	IC	IC
Buttercup Family	Ranunculaceae					x							
Canada Anemone	Anemone canadensis	3	-3			x	S5				G5	C	C
Buckthorn Family	Rhamnaceae					x							
Common Buckthorn	Rhamnus cathartica		3	-3	1	x	SE5				GNR	IC	IC
Glossy Buckthorn	Frangula alnus		-1	-3		x	SE5				GNR	IU	IU
Rose Family	Rosaceae					x							
Downy Serviceberry	Amelanchier arborea	5	3			x	S5				G5	C	C
Yellow Avens	Geum aleppicum	2	-1			x	S5				G5	C	X
White Avens	Geum canadense	3	0			x	S5				G5	C	X
Multiflora Rose	Rosa multiflora		3	-3	1	x	SE5				GNR	IC	IX
American Red Raspberry	Rubus idaeus var. idaeus					x						IR	
Willow Family	Salicaceae					x							
Willow species	Salix species					x							
Bittersweet Nightshade	Solanum dulcamara		0	-2	3	x	SE5				GNR	IC	IC
Linden Family	Tiliaceae					x							
American Basswood	Tilia americana	4	3			x	S5				G5	C	C
Elm Family	Ulmaceae					x							
American Elm	Ulmus americana	3	-2			x	S5				G5	C	C
Grape Family	Vitaceae					x							
Virginia Creeper	Parthenocissus quinquefolia	6	1			x	S4?				G5	U	X
Riverbank Grape	Vitis riparia	0	-2			x	S5				G5	C	C
Monocots	Monocotyledons					x							
Grass Family	Poaceae					x							
Timothy	Phleum pratense		3	-1		x	SNA				GNR	IC	IC

Table 6 CUP-3 Floristic Summary & Assessment

Species Diversity		
Total Species	56	
Native Species	31	55.36%
Exotic Species	25	44.64%
Total Taxa in Region (List Region, Source)	10000	
% Regional Taxa Recorded	0.56%	
Regionally Significant Species	0	
S1-S3 Species	0	
S4 Species	1	
S5 Species	28	
Co-efficient of Conservatism and Floral Quality Index		
Co-efficient of Conservatism (CC) (average)	3.19	
CC 0 to 3 (lowest sensitivity)	17	54.84%
CC 4 to 6 (moderate sensitivity)	14	45.16%
CC 7 to 8 (high sensitivity)	0	0.00%
CC 9 to 10 (highest sensitivity)	0	0.00%
Floral Quality Index (FQI)	17.78	
Presence of Weedy & Invasive Species		
mean weediness	-1.76	
weediness = -1	13	52.00%
weediness = -2	5	20.00%
weediness = -3	7	28.00%
Presence of Wetland Species		
average wetness value	1.35	
upland	0	19.64%
facultative upland	18	32.14%
facultative	16	28.57%
facultative wetland	12	21.43%
obligate wetland	0	0.00%

Table 7 FOM9-2 Plant List

Common Name	Botanical Name	Coefficient of Conservatism	Wetness Index	Weediness Index	Invasive Species Ontario	FOM9-2	Provincial L Rank	ESA Status	COSEWIC Status	SARA Status	Global Rank	Regional Status 7E - Carolinian Zone - 2017 (Oldham 2017)	Local Status Middlesex (Oldham 2017)
Ferns & Allies	Pteridophytes					x							
Cedar Family	Cupressaceae					x							
Eastern Red Cedar	Juniperus virginiana	4	3			x	S5				G5	C	X
Pine Family	Pinaceae					x							
Norway Spruce	Picea abies		5	-1		x	SNA				G5	IX	IX
Blue Spruce	Picea pungens		3			x	SNA				G5	IR	IX
Dicots	Dicotyledons					x							
Maple Family	Aceraceae					x							
Manitoba Maple	Acer negundo	0	0		1	x	S5				G5	C	C
Norway Maple	Acer platanoides		5	-3	2	x	SNA				GNR	IU	IU
Silver Maple	Acer saccharinum	5	-3			x	S5				G5	C	C
Sumac or Cashew Family	Anacardiaceae					x							
Staghorn Sumac	Rhus typhina	1	3			x	S5				G5	C	C
Carrot or Parsley Family	Apiaceae					x							
Wild Carrot	Daucus carota		5	-2		x	SE5				GNR	IC	IC
Milkweed Family	Asclepiadaceae					x							
Common Milkweed	Asclepias syriaca	0	5			x	S5				G5	C	C
European Swallow-wort	Vincetoxicum rossicum		5	-3	1	x	SE5				GNR	IX	IR
Composite or Aster Family	Asteraceae					x							
Common Ragweed	Ambrosia artemisiifolia	0	3			x	S5				G5	C	C
Giant Ragweed	Ambrosia trifida	0	0			x	S5				G5	C	C
Great Burdock	Arctium lappa		3			x	SE5				GNR	IU	IR
Common Burdock	Arctium minus		3	-2		x	SE5				GNR	IC	IC
Heart-leaved Aster	Symphyotrichum cordifolium	5	5			x	S5				G5	C	C
Heath Aster	Symphyotrichum ericoides	4	3			x	S5				G5	C	C
Nodding Thistle	Carduus nutans		3	-1	3	x	SE5				GNR	IX	
Spotted Knapweed	Centaurea stoebe				3	x						IC	IX
Ox-eye Daisy	Leucanthemum vulgare		5	-1		x	SE5				GNR	IC	IC
Chicory	Cichorium intybus		5	-1		x	SE5				GNR	IC	IC
Canada Thistle	Cirsium arvense		3	-1	1	x	SE5				GNR	IC	IC
Bull Thistle	Cirsium vulgare		3	-1		x	SE5				GNR	IC	IX
Eastern Daisy Fleabane	Erigeron annuus	0	3			x	S5				G5	C	C
Spotted Joe-pye-weed	Eutrochium maculatum	3	-5			x	S5				G5	C	C
Grass-leaved Goldenrod	Euthamia graminifolia	2	0			x	S5				G5	C	C
Black-eyed Susan	Rudbeckia hirta	0	3			x	S5				G5	C	C
Tall Goldenrod	Solidago altissima	1	3			x	S5				G5	C	U
Canada Goldenrod	Solidago canadensis var. canadensis	1	3			x	S5				G5	C	X
Zig-zag Goldenrod	Solidago flexicaulis	6	3			x	S5				G5	C	X
Field Sow-thistle	Sonchus arvensis ssp. arvensis		3	-1		x	SE5				GNRTNR	IC	IX
Rock Dandelion	Taraxacum erythrospermum		5	-1		x	SE5				GNR	IX	IR
Coltsfoot	Tussilago farfara		3	-2		x	SE5				GNR	IC	IC
Birch Family	Betulaceae					x							
Yellow Birch	Betula alleghaniensis	6	0			x	S5				G5	C	X
Mustard Family	Brassicaceae					x							
Garlic Mustard	Alliaria petiolata	0		-3	1	x	SE5				GNR	IC	IC
Dame's Rocket	Hesperis matronalis	5		-3	1	x	SE5				G4G5	IC	IX
Honeysuckle Family	Caprifoliaceae					x							
Tartarian Honeysuckle	Lonicera tatarica		3	-3	1	x	SE5				GNR	IC	IX
Staff-tree Family	Celastraceae					x							
Winged Spindle Tree	Euonymus alatus		5	-1	3	x	SE2				GNR	IR	IR
Dogwood Family	Cornaceae					x							
Alternate-leaved Dogwood	Cornus alternifolia	6	5			x	S5				G5	C	X

Common Name	Botanical Name	Coefficient of Conservatism	Wetness Index	Weediness Index	Invasive Species Ontario	FOM9-2	Provincial L Rank	ESA Status	COSEWIC Status	SARA Status	Global Rank	Regional Status 7E - Carolinian Zone - 2017 (Oldham 2017)	Local Status Middlesex (Oldham 2017)
Gray Dogwood	Cornus racemosa	2	-2			x	S5				G5	C	X
Red-osier Dogwood	Cornus sericea	2	-3			x	S5				G5	C	C
Teasel Family	Dipsacaceae					x							
Fuller's Teasel	Dipsacus fullonum		5	-1	3	x	SE5				GNR	IC	IC
Pea Family	Fabaceae					x							
Black Medick	Medicago lupulina		1	-1	4	x	SE5				GNR	IC	IC
Alsike Clover	Trifolium hybridum		1	-1		x	SE5				GNR	IC	IX
Red Clover	Trifolium pratense		2	-2	4	x	SE5				GNR	IC	IX
Walnut Family	Juglandaceae					x							
Bitternut Hickory	Carya cordiformis	6	0			x	S5				G5	C	X
Black Walnut	Juglans nigra	5	3			x	S4?				G5	C	X
Mint Family	Lamiaceae					x							
American Wild Mint	Mentha arvensis	3	-3			x	S5				G5	C	X
Olive Family	Oleaceae					x							
White Ash	Fraxinus americana	4	3			x	S4				G5	C	C
Green Ash	Fraxinus pennsylvanica	3	-3			x	S4				G5	C	C
European Privet	Ligustrum vulgare		1	-2	4	x	SE5				GNR	IX	IX
Plantain Family	Plantaginaceae					x							
English Plantain	Plantago lanceolata		0	-1		x	SE5				G5	IC	IC
Common Plantain	Plantago major		-1	-1		x	SE5				G5	IC	IC
Smartweed Family	Polygonaceae					x							
Japanese Knotweed	Fallopia japonica		3	-1	2	x	SE5				G?	IX	IU
Curly-leaf Dock	Rumex crispus		-1	-2		x	SE5				GNR	IC	IC
Primrose Family	Primulaceae					x							
Creeping Jenny	Lysimachia nummularia		-4	-3	2	x	SE5				GNR	IC	IX
Buttercup Family	Ranunculaceae					x							
Tall Thimbleweed	Anemone virginiana var. virginiana	4	5			x	S5				G5T5	C	C
Tall Buttercup	Ranunculus acris		-2	-2		x	SE5				G5	IC	IC
Buckthorn Family	Rhamnaceae					x							
Common Buckthorn	Rhamnus cathartica		3	-3	1	x	SE5				GNR	IC	IC
Glossy Buckthorn	Frangula alnus		-1	-3		x	SE5				GNR	IU	IU
Rose Family	Rosaceae					x							
Woodland Strawberry	Fragaria vesca ssp. americana	4	4			x	S5				G5T5	U	X
Wild Strawberry	Fragaria virginiana	2	1			x	S5				G5	C	C
Canada Plum	Prunus nigra	4	4			x	S4				G4G5	U	X
Black Cherry	Prunus serotina	3	3			x	S5				G5	C	C
Multiflora Rose	Rosa multiflora		3	-3	1	x	SE5				GNR	IC	IX
American Red Raspberry	Rubus idaeus var. idaeus					x						IR	
Black Raspberry	Rubus occidentalis	2	5			x	S5				G5	C	C
Willow Family	Salicaceae					x							
Balsam Poplar	Populus balsamifera	4	-3			x	S5				G5	U	X
Hybrid Willow	Salix X rubens Schrank					x							
Common Mullein	Verbascum thapsus		5	-2		x	SE5				GNR	IC	IC
Linden Family	Tiliaceae					x							
Little Leaf Linden	Tilia cordata				4	x	SE1				GNR	IR	
Elm Family	Ulmaceae					x							
Common Hackberry	Celtis occidentalis	8	1			x	S4				G5	C	X
Nettle Family	Urticaceae					x							
Canadian Wood Nettle	Laportea canadensis	6	-3			x	S5				G5	C	X
Stinging Nettle	Urtica dioica ssp. dioica		-1	-1	3	x	SE2				G5T5?	IR	IR
Grape Family	Vitaceae					x							
Virginia Creeper	Parthenocissus quinquefolia	6	1			x	S4?				G5	U	X
Riverbank Grape	Vitis riparia	0	-2			x	S5				G5	C	C

Common Name	Botanical Name	Coefficient of Conservatism	Wetness Index	Weediness Index	Invasive Species Ontario	FOM9-2	Provincial L Rank	ESA Status	COSEWIC Status	SARA Status	Global Rank	Regional Status 7E - Carolinian Zone - 2017 (Oldham 2017)	Local Status Middlesex (Oldham 2017)
Monocots	Monocotyledons					x							
Sedge Family	Cyperaceae					x							
Bebb's Sedge	Carex bebbii	3	-5			x	S5				G5	C	C
Lily Family	Liliaceae					x							
Large False Solomon's Seal	Maianthemum racemosum	4	3			x	S5				G5	C	X

Table 8 FOM9-2 Floristic Summary & Assessment

Species Diversity		
Total Species	71	
Native Species	38	53.52%
Exotic Species	33	46.48%
Total Taxa in Region (List Region, Source)	0	
% Regional Taxa Recorded	0.71%	
Regionally Significant Species	0	
S1-S3 Species	0	
S4 Species	4	
S5 Species	32	
Co-efficient of Conservatism and Floral Quality Index		
Co-efficient of Conservatism (CC) (average)	3.13	
CC 0 to 3 (lowest sensitivity)	20	52.63%
CC 4 to 6 (moderate sensitivity)	17	44.74%
CC 7 to 8 (high sensitivity)	1	2.63%
CC 9 to 10 (highest sensitivity)	0	0.00%
Floral Quality Index (FQI)	19.30	
Presence of Weedy & Invasive Species		
mean weediness	-1.79	
weediness = -1	16	48.48%
weediness = -2	8	24.24%
weediness = -3	9	27.27%
Presence of Wetland Species		
average wetness value	1.77	
upland	16	22.54%
facultative upland	28	39.44%
facultative	17	23.94%
facultative wetland	10	14.08%
obligate wetland	2	2.82%

Table 9 FOD4-2 Plant List

Common Name	Botanical Name	Coefficient of Conservatism	Wetness Index	Weediness Index	Invasive Species Ontario	FOD4-2	Provincial L Rank	ESA Status	COSEWIC Status	SARA Status	Global Rank	Regional Status 7E - Carolinian Zone - 2017 (Oldham 2017)	Local Status Middlesex (Oldham 2017)
Ferns & Allies	Pteridophytes					x							
Cedar Family	Cupressaceae					x							
Eastern Red Cedar	Juniperus virginiana	4	3			x	S5				G5	C	X
Pine Family	Pinaceae					x							
Norway Spruce	Picea abies		5	-1		x	SNA				G5	IX	IX
White Spruce	Picea glauca	6	3			x	S5				G5	U	IR
Yew Family	Taxaceae					x							
Canada Yew	Taxus canadensis	7	3			x	S4				G5	U	X
Dicots	Dicotyledons					x							
Maple Family	Aceraceae					x							
Manitoba Maple	Acer negundo	0	0		1	x	S5				G5	C	C
Norway Maple	Acer platanoides		5	-3	2	x	SNA				GNR	IU	IU
Red Maple	Acer rubrum	4	0			x	S5				G5	C	C
Sumac or Cashew Family	Anacardiaceae					x							
Fragrant Sumac	Rhus aromatica	8	5			x	S4				G5	R	R
Eastern Poison-ivy	Toxicodendron radicans var. radicans					x						C	C
Staghorn Sumac	Rhus typhina	1	3			x	S5				G5	C	C
Carrot or Parsley Family	Apiaceae					x							
Wild Carrot	Daucus carota		5	-2		x	SE5				GNR	IC	IC
Wild Parsnip	Pastinaca sativa		5	-3		x	SE5				GNR	IU	IX
Dogbane Family	Apocynaceae					x							
Indian Hemp	Apocynum cannabinum	3	0			x	S5				G--T5?	C	C
Common Periwinkle	Vinca minor		5	-2	2	x	SE5				GNR	IX	IR
Ginseng Family	Araliaceae					x							
English Ivy	Hedera helix					x						IR	
Duchman's-pipe Family	Aristolochiaceae					x							
Wild Ginger	Asarum canadense	6	5			x	S5				G5	C	C
Milkweed Family	Asclepiadaceae					x							
Common Milkweed	Asclepias syriaca	0	5			x	S5				G5	C	C
Composite or Aster Family	Asteraceae					x							
Common Ragweed	Ambrosia artemisiifolia	0	3			x	S5				G5	C	C
Giant Ragweed	Ambrosia trifida	0	0			x	S5				G5	C	C
Western Pearly Everlasting	Anaphalis margaritacea	3	3			x	S5				G5	R	R
Common Burdock	Arctium minus		3	-2		x	SE5				GNR	IC	IC
Calico Aster	Symphyotrichum lateriflorum	3	0			x	S5				G5	C	C
New England Aster	Symphyotrichum novae-angliae	2	-3			x	S5				G5	C	C
Devil's Beggar-ticks	Bidens frondosa	3	-3			x	S5				G5	C	X
Nodding Thistle	Carduus nutans		3	-1	3	x	SE5				GNR	IX	
Spotted Knapweed	Centaurea stoebe				3	x						IC	IX
Chicory	Cichorium intybus		5	-1		x	SE5				GNR	IC	IC
Canada Thistle	Cirsium arvense		3	-1	1	x	SE5				GNR	IC	IC
Bull Thistle	Cirsium vulgare		3	-1		x	SE5				GNR	IC	IX
Eastern Daisy Fleabane	Erigeron annuus	0	3			x	S5				G5	C	C
Philadelphia Fleabane	Erigeron philadelphicus	1	-3			x	S5				G5	C	C
Grass-leaved Goldenrod	Euthamia graminifolia	2	0			x	S5				G5	C	C
Thin-leaved Sunflower	Helianthus decapetalus	7	3			x	S4				G5	R	X
Black-eyed Susan	Rudbeckia hirta	0	3			x	S5				G5	C	C
Tall Goldenrod	Solidago altissima	1	3			x	S5				G5	C	U
Canada Goldenrod	Solidago canadensis var. canadensis	1	3			x	S5				G5	C	X
Field Sow-thistle	Sonchus arvensis ssp. arvensis		3	-1		x	SE5				GNR	IC	IX
Rock Dandelion	Taraxacum erythrospermum		5	-1		x	SE5				GNR	IX	IR
Common Dandelion	Taraxacum officinale		3	-2		x	SE5				G5	IC	IC

Common Name	Botanical Name	Coefficient of Conservatism	Wetness Index	Weediness Index	Invasive Species Ontario	FOD4-2	Provincial L Rank	ESA Status	COSEWIC Status	SARA Status	Global Rank	Regional Status 7E - Carolinian Zone - 2017 (Oldham 2017)	Local Status Middlesex (Oldham 2017)
Touch-me-not Family	Balsaminaceae					x							
Pale Touch-me-not	Impatiens pallida	7	-3			x	S4				G5	C	X
Barberry Family	Berberidaceae					x							
Japanese Barberry	Berberis thunbergii		4	-3	3	x	SE5				GNR	IX	IX
May-apple	Podophyllum peltatum	5	3			x	S5				G5	C	X
Birch Family	Betulaceae					x							
Speckled Alder	Alnus incana					x						U	U
Yellow Birch	Betula alleghaniensis	6	0			x	S5				G5	C	X
Mustard Family	Brassicaceae					x							
Garlic Mustard	Alliaria petiolata		0	-3	1	x	SE5				GNR	IC	IC
Honeysuckle Family	Caprifoliaceae					x							
Tartarian Honeysuckle	Lonicera tatarica		3	-3	1	x	SE5				GNR	IC	IX
American Black Elderberry	Sambucus nigra ssp. canadensis	5	-2			x	S5				G5T5	C	X
Maple-leaved Viburnum	Viburnum acerifolium	6	5			x	S5				G5	C	X
Nannyberry	Viburnum lentago	4	-1			x	S5				G5	C	C
European Cranberrybush	Viburnum opulus		0	-1		x	SNA				G5		IR
Staff-tree Family	Celastraceae					x							
Running Strawberry-bush	Euonymus obovatus	6	5			x	S4				G5	C	C
Dogwood Family	Cornaceae					x							
Alternate-leaved Dogwood	Cornus alternifolia	6	5			x	S5				G5	C	X
Red-osier Dogwood	Cornus sericea	2	-3			x	S5				G5	C	C
Morning-glory Family	Convolvulaceae					x							
Field Bindweed	Convolvulus arvensis		5	-1	3	x	SE5				GNR	IC	IX
Teasel Family	Dipsacaceae					x							
Fuller's Teasel	Dipsacus fullonum		5	-1	3	x	SE5				GNR	IC	IC
Pea Family	Fabaceae					x							
Crown-vetch	Securigera varia		5	-2	1	x	SE5				GNR	IX	IX
Bird's-foot Trefoil	Lotus corniculatus		1	-2	2	x	SE5				GNR	IC	IX
White Sweet-clover	Melilotus albus		3	-3	2	x	SE5				G5	IC	IC
Yellow Sweet-clover	Melilotus officinalis		3	-1		x	SE5				GNR	IC	IC
Black Locust	Robinia pseudoacacia		4	-3	2	x	SE5				G5	IC	IC
Alsike Clover	Trifolium hybridum		1	-1		x	SE5				GNR	IC	IX
Red Clover	Trifolium pratense		2	-2	4	x	SE5				GNR	IC	IX
White Clover	Trifolium repens		2	-1	4	x	SE5				GNR	IC	IX
Cow Vetch	Vicia cracca		5	-1	2	x	SE5				GNR	IX	IX
Beech Family	Fagaceae					x							
American Beech	Fagus grandifolia	6	3			x	S4				G5	C	C
White Oak	Quercus alba	6	3			x	S5				G5	C	C
Bur Oak	Quercus macrocarpa	5	1			x	S5				G5	C	C
Red Oak	Quercus rubra	6	3			x	S5				G5	C	C
Walnut Family	Juglandaceae					x							
Bitternut Hickory	Carya cordiformis	6	0			x	S5				G5	C	X
Black Walnut	Juglans nigra	5	3			x	S4?				G5	C	X
Mint Family	Lamiaceae					x							
Ground Ivy	Glechoma hederacea		5	-2	4	x	SE5				GNR	IC	IX
Mulberry Family	Moraceae					x							
White Mulberry	Morus alba		0	-3	1	x	SE5				GNR	IC	IX
Olive Family	Oleaceae					x							
White Ash	Fraxinus americana	4	3			x	S4				G5	C	C
Green Ash	Fraxinus pennsylvanica	3	-3			x	S4				G5	C	C
European Privet	Ligustrum vulgare		1	-2	4	x	SE5				GNR	IX	IX
Common Lilac	Syringa vulgaris		5	-2	2	x	SE5				GNR	IX	IX
Poppy Family	Papaveraceae					x							

Common Name	Botanical Name	Coefficient of Conservatism	Wetness Index	Weediness Index	Invasive Species Ontario	FOD4-2	Provincial L Rank	ESA Status	COSEWIC Status	SARA Status	Global Rank	Regional Status 7E - Carolinian Zone - 2017 (Oldham 2017)	Local Status Middlesex (Oldham 2017)
Bloodroot	Sanguinaria canadensis	5	4			x	S5				G5	C	X
Plantain Family	Plantaginaceae					x							
English Plantain	Plantago lanceolata		0	-1		x	SE5				G5	IC	IC
Smartweed Family	Polygonaceae					x							
Curly-leaf Dock	Rumex crispus		-1	-2		x	SE5				GNR	IC	IC
Buttercup Family	Ranunculaceae					x							
Red Baneberry	Actaea rubra	5	5			x	S5				G5	C	C
Tall Thimbleweed	Anemone virginiana var. virginiana	4	5			x	S5				G5T5	C	C
Yellow Marsh-marigold	Caltha palustris	5	-5			x	S5				G5	C	C
Virginia Virgin's-bower	Clematis virginiana	3	0			x	S5				G5	C	C
Buckthorn Family	Rhamnaceae					x							
Common Buckthorn	Rhamnus cathartica		3	-3	1	x	SE5				GNR	IC	IC
Glossy Buckthorn	Frangula alnus	0	-1	-3		x	SE5				GNR	IU	IU
Rose Family	Rosaceae					x							
Wild Strawberry	Fragaria virginiana	2	1			x	S5				G5	C	C
Yellow Avens	Geum aleppicum	2	-1			x	S5				G5	C	X
White Avens	Geum canadense	3	0			x	S5				G5	C	X
Rough-fruited Cinquefoil	Potentilla recta		5	-2		x	SE5				GNR	IC	IX
Sweet Cherry	Prunus avium		5	-2	4	x	SE4				GNR	IR	IR
Black Cherry	Prunus serotina	3	3			x	S5				G5	C	C
Multiflora Rose	Rosa multiflora		3	-3	1	x	SE5				GNR	IC	IX
Common Blackberry	Rubus allegheniensis	2	2			x	S5				G5	C	C
American Red Raspberry	Rubus idaeus var. idaeus					x						IR	
Black Raspberry	Rubus occidentalis	2	5			x	S5				G5	C	C
Mountain Ash sp.	Sorbus sp.					x							
Madder Family	Rubiaceae					x							
Cleavers	Galium aparine	4	3			x	S5				G5	C	X
Willow Family	Salicaceae					x							
White Poplar	Populus alba		5	-3	2	x	SE5				G5	IU	IX
Eastern Cottonwood	Populus deltoides ssp. deltoides	4	-1			x	S5				G5T5	C	X
Large-tooth Aspen	Populus grandidentata	5	3			x	S5				G5	C	X
Trembling Aspen	Populus tremuloides	2	0			x	S5				G5	C	X
Willow species	Salix species					x							
Linden Family	Tiliaceae					x							
American Basswood	Tilia americana	4	3			x	S5				G5	C	C
Elm Family	Ulmaceae					x							
American Elm	Ulmus americana	3	-2			x	S5				G5	C	C
Siberian Elm	Ulmus pumila		5	-1	2	x	SE3				GNR	IX	IR
Nettle Family	Urticaceae					x							
Canadian Wood Nettle	Laportea canadensis	6	-3			x	S5				G5	C	X
Stinging Nettle	Urtica dioica ssp. dioica		-1	-1	3	x	SE2				G5T5?	IR	IR
Vervain Family	Verbenaceae					x							
White Vervain	Verbena urticifolia	4	-1			x	S5				G5	C	X
Grape Family	Vitaceae					x							
Virginia Creeper	Parthenocissus quinquefolia	6	1			x	S4?				G5	U	X
Summer Grape	Vitis aestivalis	7	3			x	S4				G5	C	R
Riverbank Grape	Vitis riparia	0	-2			x	S5				G5	C	C

Common Name	Botanical Name	Coefficient of Conservatism	Wetness Index	Weediness Index	Invasive Species Ontario	FOD4-2	Provincial L Rank	ESA Status	COSEWIC Status	SARA Status	Global Rank	Regional Status 7E - Carolinian Zone - 2017 (Oldham 2017)	Local Status Middlesex (Oldham 2017)
Monocots	Monocotyledons					x							
Lily Family	Liliaceae					x							
European Lily-of-the-valley	Convallaria majalis		5	-2	3	x	SNA				G5	IX	IR
Orange Day-lily	Hemerocallis fulva		5	-3		x	SNA				GNA	IU	IX
Orange Lily	Lilium bulbiferum				4	x	SNA				GNR		
Large False Solomon's Seal	Maianthemum racemosum	4	3			x	S5				G5	C	X

Table 10 FOD4-2 Floristic Summary & Assessment

Species Diversity		
Total Species	107	
Native Species	63	58.88%
Exotic Species	44	41.12%
Total Taxa in Region (List Region, Source)	10000	
% Regional Taxa Recorded	1.07%	
Regionally Significant Species	3	
S1-S3 Species	0	
S4 Species	9	
S5 Species	52	
Co-efficient of Conservatism and Floral Quality Index		
Co-efficient of Conservatism (CC) (average)	3.73	
CC 0 to 3 (lowest sensitivity)	28	44.44%
CC 4 to 6 (moderate sensitivity)	30	47.62%
CC 7 to 8 (high sensitivity)	5	7.94%
CC 9 to 10 (highest sensitivity)	0	0.00%
Floral Quality Index (FQI)	29.61	
Presence of Weedy & Invasive Species		
mean weediness	-1.91	
weediness = -1	17	38.64%
weediness = -2	14	31.82%
weediness = -3	13	29.55%
Presence of Wetland Species		
average wetness value	2.12	
upland	28	26.17%
facultative upland	40	37.38%
facultative	28	26.17%
facultative wetland	10	9.35%
obligate wetland	1	0.93%

Table 11 CUM1 Plant List

Common Name	Botanical Name	Coefficient of Conservatism	Wetness Index	Weediness Index	Invasive Species Ontario	CUM1	Provincial L Rank	ESA Status	COSEWIC Status	SARA Status	Global Rank	Regional Status 7E - Carolinian Zone - 2017 (Oldham 2017)	Local Status Middlesex (Oldham 2017)
Ferns & Allies	Pteridophytes					x							
Pine Family	Pinaceae					x							
Norway Spruce	<i>Picea abies</i>		5	-1		x	SNA				G5	IX	IX
Blue Spruce	<i>Picea pungens</i>		3			x	SNA				G5	IR	IX
Dicots	Dicotyledons					x							
Maple Family	Aceraceae					x							
Manitoba Maple	<i>Acer negundo</i>	0	0		1	x	S5				G5	C	C
Black Maple	<i>Acer nigrum</i>	7	3			x	S4?				G5	C	C
Silver Maple	<i>Acer saccharinum</i>	5	-3			x	S5				G5	C	C
Carrot or Parsley Family	Apiaceae					x							
Wild Carrot	<i>Daucus carota</i>		5	-2		x	SE5				GNR	IC	IC
Milkweed Family	Asclepiadaceae					x							
Swamp Milkweed	<i>Asclepias incarnata</i>	6	-5			x	S5				G5	C	C
Common Milkweed	<i>Asclepias syriaca</i>	0	5			x	S5				G5	C	C
Composite or Aster Family	Asteraceae					x							
Common Burdock	<i>Arctium minus</i>		3	-2		x	SE5				GNR	IC	IC
Calico Aster	<i>Symphotrichum lateriflorum</i>	3	0			x	S5				G5	C	C
New England Aster	<i>Symphotrichum novae-angliae</i>	2	-3			x	S5				G5	C	C
Nodding Thistle	<i>Carduus nutans</i>		3	-1	3	x	SE5				GNR	IX	
Spotted Knapweed	<i>Centaurea stoebe</i>				3	x						IC	IX
Ox-eye Daisy	<i>Leucanthemum vulgare</i>		5	-1		x	SE5				GNR	IC	IC
Canada Thistle	<i>Cirsium arvense</i>		3	-1	1	x	SE5				GNR	IC	IC
Canadian Horseweed	<i>Conyza canadensis</i>	0	1			x	S5				G5		
Eastern Daisy Fleabane	<i>Erigeron annuus</i>	0	3			x	S5				G5	C	C
Philadelphia Fleabane	<i>Erigeron philadelphicus</i>	1	-3			x	S5				G5	C	C
Boneset	<i>Eupatorium perfoliatum</i>	2	-3			x	S5				G5	C	C
Spotted Joe-pye-weed	<i>Eutrochium maculatum</i>	3	-5			x	S5				G5	C	C
Grass-leaved Goldenrod	<i>Euthamia graminifolia</i>	2	0			x	S5				G5	C	C
Canadian Lettuce	<i>Lactuca canadensis</i>	3	3			x	S5				G5	U	X
Black-eyed Susan	<i>Rudbeckia hirta</i>	0	3			x	S5				G5	C	C
Tall Goldenrod	<i>Solidago altissima</i>	1	3			x	S5				G5	C	U
Canada Goldenrod	<i>Solidago canadensis</i> var. <i>canadensis</i>	1	3			x	S5				G5	C	X
Giant Goldenrod	<i>Solidago gigantea</i>	4	-3			x	S5				G5	C	X
Field Sow-thistle	<i>Sonchus arvensis</i> ssp. <i>arvensis</i>		3	-1		x	SE5				GNRTNR	IC	IX
Common Tansy	<i>Tanacetum vulgare</i>		5	-1		x	SE5				GNR	IX	IX
Rock Dandelion	<i>Taraxacum erythrospermum</i>		5	-1		x	SE5				GNR	IX	IR
Common Dandelion	<i>Taraxacum officinale</i>		3	-2		x	SE5				G5	IC	IC
Yellow Salsify	<i>Tragopogon dubius</i>		5	-1		x	SE5				GNR	IC	IX
Coltsfoot	<i>Tussilago farfara</i>		3	-2		x	SE5				GNR	IC	IC
Touch-me-not Family	Balsaminaceae					x							
Jewelweed	<i>Impatiens capensis</i>	4	-3			x	S5				G5	C	C
Birch Family	Betulaceae					x							
Speckled Alder	<i>Alnus incana</i>					x						U	U
Borage Family	Boraginaceae					x							
True Forget-me-not	<i>Myosotis scorpioides</i>		-5	-1	4	x	SE5				G5	IX	IX
Mustard Family	Brassicaceae					x							

Common Name	Botanical Name	Coefficient of Conservatism	Wetness Index	Weediness Index	Invasive Species Ontario	CUM1	Provincial L Rank	ESA Status	COSEWIC Status	SARA Status	Global Rank	Regional Status 7E - Carolinian Zone - 2017 (Oldham 2017)	Local Status Middlesex (Oldham 2017)
Garlic Mustard	Alliaria petiolata		0	-3	1	x	SE5				GNR	IC	IC
Black Mustard	Brassica nigra		5	-1		x	SE5				GNR	IR	IX
Spreading Wallflower	Erysimum repandum		5	-1		x	SE2				GNR	IR	IR
Dame's Rocket	Hesperis matronalis		5	-3	1	x	SE5				G4G5	IC	IX
Field Pepperweed	Lepidium campestre		5	-1		x	SE5				GNR	IC	IX
Field Penny-cress	Thlaspi arvense		5	-1		x	SE5				GNR	IC	IC
Honeysuckle Family	Caprifoliaceae					x							
Tartarian Honeysuckle	Lonicera tatarica		3	-3	1	x	SE5				GNR	IC	IX
Pink Family	Caryophyllaceae					x							
Maidenstears	Silene vulgaris		5	-1		x	SE5				GNR	IC	IX
Dogwood Family	Cornaceae					x							
Red-osier Dogwood	Cornus sericea	2	-3			x	S5				G5	C	C
Morning-glory Family	Convolvulaceae					x							
Field Bindweed	Convolvulus arvensis		5	-1	3	x	SE5				GNR	IC	IX
Teasel Family	Dipsacaceae					x							
Fuller's Teasel	Dipsacus fullonum		5	-1	3	x	SE5				GNR	IC	IC
Pea Family	Fabaceae					x							
Bird's-foot Trefoil	Lotus corniculatus		1	-2	2	x	SE5				GNR	IC	IX
Black Medick	Medicago lupulina		1	-1	4	x	SE5				GNR	IC	IC
St. John's-wort Family	Guttiferae					x							
Common St. John's-wort	Hypericum perforatum		5	-3	4	x	SE5				GNR	IC	IC
Walnut Family	Juglandaceae					x							
Black Walnut	Juglans nigra	5	3			x	S4?				G5	C	X
Mint Family	Lamiaceae					x							
American Wild Mint	Mentha arvensis	3	-3			x	S5				G5	C	X
Mallow Family	Malvaceae					x							
Velvet-leaf	Abutilon theophrasti		4	-1	3	x	SE5				GNR	IC	IC
Olive Family	Oleaceae					x							
White Ash	Fraxinus americana	4	3			x	S4				G5	C	C
Evening-primrose Family	Onagraceae					x							
Common Evening-primrose	Oenothera biennis	0	3			x	S5				G5	C	X
Plantain Family	Plantaginaceae					x							
Common Plantain	Plantago major		-1	-1		x	SE5				G5	IC	IC
Smartweed Family	Polygonaceae					x							
Curly-leaf Dock	Rumex crispus		-1	-2		x	SE5				GNR	IC	IC
Buckthorn Family	Rhamnaceae					x							
Common Buckthorn	Rhamnus cathartica		3	-3	1	x	SE5				GNR	IC	IC
Glossy Buckthorn	Frangula alnus		-1	-3		x	SE5				GNR	IU	IU
Rose Family	Rosaceae					x							
Queen-of-the-prairie	Filipendula rubra		-4	-1		x	SNA				G4G5	IR	
Common Apple	Malus pumila		5	-1		x	SNA				G5	IC	IX
American Red Raspberry	Rubus idaeus var. idaeus					x						IR	
Willow Family	Salicaceae					x							
Eastern Cottonwood	Populus deltoides ssp. deltoides	4	-1			x	S5				G5T5	C	X
Trembling Aspen	Populus tremuloides	2	0			x	S5				G5	C	X
White Willow	Salix alba		-3	-2	3	x	SE4				G5	IX	IX
Willow species	Salix species					x							

Common Name	Botanical Name	Coefficient of Conservatism	Wetness Index	Weediness Index	Invasive Species Ontario	CUM1	Provincial L Rank	ESA Status	COSEWIC Status	SARA Status	Global Rank	Regional Status 7E - Carolinian Zone - 2017 (Oldham 2017)	Local Status Middlesex (Oldham 2017)
Crack Willow	Salix fragilis		-1	-3	3	x	SE				GNR	IC	IX
Hybrid Crack Willow	Salix X rubens		-4	-3		x	hyb				HYB	hyb	hyb
Common Mullein	Verbascum thapsus		5	-2		x	SE5				GNR	IC	IC
Bittersweet Nightshade	Solanum dulcamara		0	-2	3	x	SE5				GNR	IC	IC
Linden Family	Tiliaceae					x							
American Basswood	Tilia americana	4	3			x	S5				G5	C	C
Nettle Family	Urticaceae					x							
Canadian Wood Nettle	Laportea canadensis	6	-3			x	S5				G5	C	X
Stinging Nettle	Urtica dioica ssp. dioica		-1	-1	3	x	SE2				G5T5?	IR	IR
Vervain Family	Verbenaceae					x							
Blue Vervain	Verbena hastata	4	-4			x	S5				G5	C	C
Grape Family	Vitaceae					x							
Riverbank Grape	Vitis riparia	0	-2			x	S5				G5	C	C
Monocots	Monocotyledons					x							
Grass Family	Poaceae					x							
Redtop	Agrostis gigantea		0	-2		x	SNA				G4G5	IC	IC
Smooth Brome	Bromus inermis		5	-3	4	x	SNA				G5TNR	IC	IC
Blue-joint Grass	Calamagrostis canadensis	4	-5			x	S5				G5	C	X
Orchard Grass	Dactylis glomerata		3	-1	3	x	SNA				GNR	IC	IC
Fowl Manna Grass	Glyceria striata	3	-5			x	S5				G5	C	X
Witch Grass	Panicum capillare	0	0			x	S5				G5	C	X
Reed Canary Grass	Phalaris arundinacea	0	-4			x	S5				G5	C	X
Timothy	Phleum pratense		3	-1		x	SNA				GNR	IC	IC
Annual Blue Grass	Poa annua		1	-2		x	SNA				GNR	IC	IC
Canada Blue Grass	Poa compressa	0	2			x	SNA				GNR	IC	IX

Table 12 CUM-1 Floristic Summary & Assessment

Species Diversity		
Total Species	79	
Native Species	35	44.30%
Exotic Species	44	55.70%
Total Taxa in Region (List Region, Source)	10000	
% Regional Taxa Recorded	0.79%	
Regionally Significant Species	0	
S1-S3 Species	0	
S4 Species	1	
S5 Species	31	
Co-efficient of Conservatism and Floral Quality Index		
Co-efficient of Conservatism (CC) (average)	2.43	
CC 0 to 3 (lowest sensitivity)	23	65.71%
CC 4 to 6 (moderate sensitivity)	11	31.43%
CC 7 to 8 (high sensitivity)	1	2.86%
CC 9 to 10 (highest sensitivity)	0	0.00%
Floral Quality Index (FQI)	14.37	
Presence of Weedy & Invasive Species		
mean weediness	-1.66	
weediness = -1	24	54.55%
weediness = -2	11	25.00%
weediness = -3	9	20.45%
Presence of Wetland Species		
average wetness value	1.11	
upland	19	24.05%
facultative upland	23	29.11%
facultative	18	22.78%
facultative wetland	15	18.99%
obligate wetland	5	6.33%

Table 13 FOD7-3 Plant List

Common Name	Botanical Name	Coefficient of Conservatism	Wetness Index	Weediness Index	Invasive Species Ontario	FOD7-3	Provincial L Rank	ESA Status	COSEWIC Status	SARA Status	Global Rank	Regional Status 7E - Carolinian Zone - 2017 (Oldham 2017)	Local Status Middlesex (Oldham 2017)
Ferns & Allies	Pteridophytes					x							
Cedar Family	Cupressaceae					x							
Eastern Red Cedar	Juniperus virginiana	4	3			x	S5				G5	C	X
Dicots	Dicotyledons					x							
Maple Family	Aceraceae					x							
Manitoba Maple	Acer negundo	0	0		1	x	S5				G5	C	C
Norway Maple	Acer platanoides		5	-3	2	x	SNA				GNR	IU	IU
Black Maple	Acer nigrum	7	3			x	S4?				G5	C	C
Silver Maple	Acer saccharinum	5	-3			x	S5				G5	C	C
Sumac or Cashew Family	Anacardiaceae					x							
Eastern Poison-ivy	Toxicodendron radicans var. radicans					x						C	C
Carrot or Parsley Family	Apiaceae					x							
Wild Carrot	Daucus carota		5	-2		x	SE5				GNR	IC	IC
Composite or Aster Family	Asteraceae					x							
Giant Ragweed	Ambrosia trifida	0	0			x	S5				G5	C	C
Common Burdock	Arctium minus		3	-2		x	SE5				GNR	IC	IC
Calico Aster	Symphyotrichum lateriflorum	3	0			x	S5				G5	C	C
New England Aster	Symphyotrichum novae-angliae	2	-3			x	S5				G5	C	C
Spotted Knapweed	Centaurea stoebe				3	x						IC	IX
Ox-eye Daisy	Leucanthemum vulgare		5	-1		x	SE5				GNR	IC	IC
Philadelphia Fleabane	Erigeron philadelphicus	1	-3			x	S5				G5	C	C
Spotted Joe-pye-weed	Eutrochium maculatum	3	-5			x	S5				G5	C	C
Canada Goldenrod	Solidago canadensis var. canadensis	1	3			x	S5				G5	C	X
Field Sow-thistle	Sonchus arvensis ssp. arvensis		3	-1		x	SE5				GNR	IC	IX
Common Dandelion	Taraxacum officinale		3	-2		x	SE5				G5	IC	IC
Yellow Salsify	Tragopogon dubius		5	-1		x	SE5				GNR	IC	IX
Coltsfoot	Tussilago farfara		3	-2		x	SE5				GNR	IC	IC
Touch-me-not Family	Balsaminaceae					x							
Jewelweed	Impatiens capensis	4	-3			x	S5				G5	C	C
Honeysuckle Family	Caprifoliaceae					x							
Tartarian Honeysuckle	Lonicera tatarica		3	-3	1	x	SE5				GNR	IC	IX
Nannyberry	Viburnum lentago	4	-1			x	S5				G5	C	C
Pink Family	Caryophyllaceae					x							
Maidenstears	Silene vulgaris		5	-1		x	SE5				GNR	IC	IX
Teasel Family	Dipsacaceae					x							
Fuller's Teasel	Dipsacus fullonum		5	-1	3	x	SE5				GNR	IC	IC
Oleaster Family	Elaeagnaceae					x							
Russian Olive	Elaeagnus angustifolia		4	-1	3	x	SE3				GNR	IU	IR
Pea Family	Fabaceae					x							
Red Clover	Trifolium pratense		2	-2	4	x	SE5				GNR	IC	IX

Common Name	Botanical Name	Coefficient of Conservatism	Wetness Index	Weediness Index	Invasive Species Ontario	FOD7-3	Provincial L Rank	ESA Status	COSEWIC Status	SARA Status	Global Rank	Regional Status 7E - Carolinian Zone - 2017 (Oldham 2017)	Local Status Middlesex (Oldham 2017)
Walnut Family	Juglandaceae					x							
Black Walnut	Juglans nigra	5	3			x	S4?				G5	C	X
Mint Family	Lamiaceae					x							
American Wild Mint	Mentha arvensis	3	-3			x	S5				G5	C	X
Mulberry Family	Moraceae					x							
White Mulberry	Morus alba		0	-3	1	x	SE5				GNR	IC	IX
Olive Family	Oleaceae					x							
White Ash	Fraxinus americana	4	3			x	S4				G5	C	C
Green Ash	Fraxinus pennsylvanica	3	-3			x	S4				G5	C	C
European Privet	Ligustrum vulgare		1	-2	4	x	SE5				GNR	IX	IX
Evening-primrose Family	Onagraceae					x							
Common Evening-primrose	Oenothera biennis	0	3			x	S5				G5	C	X
Plantain Family	Plantaginaceae					x							
Common Plantain	Plantago major		-1	-1		x	SE5				G5	IC	IC
Smartweed Family	Polygonaceae					x							
Curly-leaf Dock	Rumex crispus		-1	-2		x	SE5				GNR	IC	IC
Buttercup Family	Ranunculaceae					x							
Virginia Virgin's-bower	Clematis virginiana	3	0			x	S5				G5	C	C
Buckthorn Family	Rhamnaceae					x							
Common Buckthorn	Rhamnus cathartica		3	-3	1	x	SE5				GNR	IC	IC
Rose Family	Rosaceae					x							
Hawthorn species	Crataegus sp.	4	5			x							X
Wild Strawberry	Fragaria virginiana	2	1			x	S5				G5	C	C
Yellow Avens	Geum aleppicum	2	-1			x	S5				G5	C	X
White Avens	Geum canadense	3	0			x	S5				G5	C	X
Black Cherry	Prunus serotina	3	3			x	S5				G5	C	C
Common Blackberry	Rubus allegheniensis	2	2			x	S5				G5	C	C
American Red Raspberry	Rubus idaeus var. idaeus					x						IR	
Willow Family	Salicaceae					x							
White Willow	Salix alba		-3	-2	3	x	SE4				G5	IX	IX
Willow species	Salix species					x							
Crack Willow	Salix fragilis		-1	-3	3	x	SE				GNR	IC	IX
Hybrid Willow	Salix X rubens Schrank					x							
Common Mullein	Verbascum thapsus		5	-2		x	SE5				GNR	IC	IC
Figwort Family	Scrophulariaceae					x							
White Turtlehead	Chelone glabra	7	-5			x	S5				G5	C	X
Nettle Family	Urticaceae					x							
Canadian Wood Nettle	Laportea canadensis	6	-3			x	S5				G5	C	X
Grape Family	Vitaceae					x							
Virginia Creeper	Parthenocissus quinquefolia	6	1			x	S4?				G5	U	X
Riverbank Grape	Vitis riparia	0	-2			x	S5				G5	C	C
Monocots	Monocotyledons					x							
Lily Family	Liliaceae					x							
Orange Lily	Lilium bulbiferum				4	x	SNA				GNR		
Grass Family	Poaceae					x							
Reed Canary Grass	Phalaris arundinacea	0	-4			x	S5				G5	C	X

Table 14 FOD7-3 Floristic Summary & Assessment

Species Diversity		
Total Species	50	
Native Species	29	58.00%
Exotic Species	21	42.00%
Total Taxa in Region (List Region, Source)	10000	
% Regional Taxa Recorded	0.50%	
Regionally Significant Species	0	
S1-S3 Species	0	
S4 Species	2	
S5 Species	23	
Co-efficient of Conservatism and Floral Quality Index		
Co-efficient of Conservatism (CC) (average)	3.00	
CC 0 to 3 (lowest sensitivity)	18	62.07%
CC 4 to 6 (moderate sensitivity)	9	31.03%
CC 7 to 8 (high sensitivity)	2	6.90%
CC 9 to 10 (highest sensitivity)	0	0.00%
Floral Quality Index (FQI)	16.16	
Presence of Weedy & Invasive Species		
mean weediness	-1.90	
weediness = -1	7	33.33%
weediness = -2	9	42.86%
weediness = -3	5	23.81%
Presence of Wetland Species		
average wetness value	0.90	
upland	8	16.00%
facultative upland	0	32.00%
facultative	14	28.00%
facultative wetland	10	20.00%
obligate wetland	2	4.00%

Table 15 CUM1-1 Plant List

Common Name	Botanical Name	Coefficient of Conservatism	Wetness Index	Weediness Index	Invasive Species Ontario	CUM1-1	Provincial L Rank	ESA Status	COSEWIC Status	SARA Status	Global Rank	Regional Status 7E - Carolinian Zone - 2017 (Oldham 2017)	Local Status Middlesex (Oldham 2017)
Dicots	Dicotyledons					x							
Maple Family	Aceraceae					x							
Manitoba Maple	Acer negundo	0	0		1	x	S5				G5	C	C
Silver Maple	Acer saccharinum	5	-3			x	S5				G5	C	C
Milkweed Family	Asclepiadaceae					x							
Swamp Milkweed	Asclepias incarnata	6	-5			x	S5				G5	C	C
Composite or Aster Family	Asteraceae					x							
Common Burdock	Arctium minus		3	-2		x	SE5				GNR	IC	IC
Nodding Thistle	Carduus nutans		3	-1	3	x	SE5				GNR	IX	
Ox-eye Daisy	Leucanthemum vulgare		5	-1		x	SE5				GNR	IC	IC
Canada Thistle	Cirsium arvense		3	-1	1	x	SE5				GNR	IC	IC
Eastern Daisy Fleabane	Erigeron annuus	0	3			x	S5				G5	C	C
Spotted Joe-pye-weed	Eutrochium maculatum	3	-5			x	S5				G5	C	C
Field Sow-thistle	Sonchus arvensis ssp. arvensis		3	-1		x	SE5				GNR/TNR	IC	IX
Yellow Salsify	Tragopogon dubius		5	-1		x	SE5				GNR	IC	IX
Touch-me-not Family	Balsaminaceae					x							
Jewelweed	Impatiens capensis	4	-3			x	S5				G5	C	C
Mustard Family	Brassicaceae					x							
Garlic Mustard	Alliaria petiolata		0	-3	1	x	SE5				GNR	IC	IC
Field Penny-cress	Thlaspi arvense		5	-1		x	SE5				GNR	IC	IC
Morning-glory Family	Convolvulaceae					x							
Field Bindweed	Convolvulus arvensis		5	-1	3	x	SE5				GNR	IC	IX
Teasel Family	Dipsacaceae					x							
Fuller's Teasel	Dipsacus fullonum		5	-1	3	x	SE5				GNR	IC	IC
Pea Family	Fabaceae					x							
Bird's-foot Trefoil	Lotus corniculatus		1	-2	2	x	SE5				GNR	IC	IX
Black Medick	Medicago lupulina		1	-1	4	x	SE5				GNR	IC	IC
St. John's-wort Family	Guttiferae					x							
Common St. John's-wort	Hypericum perforatum		5	-3	4	x	SE5				GNR	IC	IC
Mint Family	Lamiaceae					x							
American Wild Mint	Mentha arvensis	3	-3			x	S5				G5	C	X
Mallow Family	Malvaceae					x							
Velvet-leaf	Abutilon theophrasti		4	-1	3	x	SE5				GNR	IC	IC
Rose Family	Rosaceae					x							
Common Apple	Malus pumila		5	-1		x	SNA				G5	IC	IX
American Red Raspberry	Rubus idaeus var. idaeus					x						IR	
Willow Family	Salicaceae					x							
Willow species	Salix species					x							
Common Mullein	Verbascum thapsus		5	-2		x	SE5				GNR	IC	IC
Vervain Family	Verbenaceae					x							
Blue Vervain	Verbena hastata	4	-4			x	S5				G5	C	C
Grape Family	Vitaceae					x							
Riverbank Grape	Vitis riparia	0	-2			x	S5				G5	C	C

Common Name	Botanical Name	Coefficient of Conservatism	Wetness Index	Weediness Index	Invasive Species Ontario	CUM1-1	Provincial L Rank	ESA Status	COSEWIC Status	SARA Status	Global Rank	Regional Status 7E - Carolinian Zone - 2017 (Oldham 2017)	Local Status Middlesex (Oldham 2017)
Monocots	Monocotyledons					x							
Grass Family	Poaceae					x							
Redtop	Agrostis gigantea		0	-2		x	SNA				G4G5	IC	IC
Orchard Grass	Dactylis glomerata		3	-1	3	x	SNA				GNR	IC	IC
Fowl Manna Grass	Glyceria striata	3	-5			x	S5				G5	C	X
Reed Canary Grass	Phalaris arundinacea	0	-4			x	S5				G5	C	X
Timothy	Phleum pratense		3	-1		x	SNA				GNR	IC	IC
Canada Blue Grass	Poa compressa	0	2			x	SNA				GNR	IC	IX
Fowl Blue Grass	Poa palustris	5	-4			x	S5				G5	C	X

Table 16 CUM1-1 Floristic Summary & Assessment

Species Diversity		
Total Species	32	
Native Species	13	40.63%
Exotic Species	19	59.38%
Total Taxa in Region (List Region, Source)	10000	
% Regional Taxa Recorded	0.32%	
Regionally Significant Species	0	
S1-S3 Species	0	
S4 Species	0	
S5 Species	12	
Co-efficient of Conservatism and Floral Quality Index		
Co-efficient of Conservatism (CC) (average)	2.54	
CC 0 to 3 (lowest sensitivity)	8	61.54%
CC 4 to 6 (moderate sensitivity)	5	38.46%
CC 7 to 8 (high sensitivity)	0	0.00%
CC 9 to 10 (highest sensitivity)	0	0.00%
Floral Quality Index (FQI)	9.15	
Presence of Weedy & Invasive Species		
mean weediness	-1.42	
weediness = -1	13	68.42%
weediness = -2	4	21.05%
weediness = -3	2	10.53%
Presence of Wetland Species		
average wetness value	0.97	
upland	8	25.00%
facultative upland	9	28.13%
facultative	5	15.63%
facultative wetland	7	21.88%
obligate wetland	3	9.38%

Table 17 FOD-5 Plant List

Common Name	Botanical Name	Coefficient of Conservatism	Wetness Index	Weediness Index	Invasive Species Ontario	FOD5	Provincial L Rank	ESA Status	COSEWIC Status	SARA Status	Global Rank	Regional Status 7E - Carolinian Zone - 2017 (Oldham 2017)	Local Status Middlesex (Oldham 2017)
Ferns & Allies	Pteridophytes					x							
Pine Family	Pinaceae					x							
White Spruce	<i>Picea glauca</i>	6	3			x	S5				G5	U	IR
Dicots	Dicotyledons					x							
Maple Family	Aceraceae					x							
Norway Maple	<i>Acer platanoides</i>		5	-3	2	x	SNA				GNR	IU	IU
Composite or Aster Family	Asteraceae					x							
Common Burdock	<i>Arctium minus</i>		3	-2		x	SE5				GNR	IC	IC
Heath Aster	<i>Symphyotrichum ericoides</i>	4	3			x	S5				G5	C	C
Ox-eye Daisy	<i>Leucanthemum vulgare</i>		5	-1		x	SE5				GNR	IC	IC
Eastern Daisy Fleabane	<i>Erigeron annuus</i>	0	3			x	S5				G5	C	C
Barberry Family	Berberidaceae					x							
Twinleaf	<i>Jeffersonia diphylla</i>	10	5			x	S4				G5	R	R
May-apple	<i>Podophyllum peltatum</i>	5	3			x	S5				G5	C	X
Birch Family	Betulaceae					x							
Blue Beech	<i>Carpinus caroliniana</i> ssp. <i>virginiana</i>	6	0			x	S5				G5T5		
Ironwood	<i>Ostrya virginiana</i>	4	4			x	S5				G5	C	C
Mustard Family	Brassicaceae					x							
Garlic Mustard	<i>Alliaria petiolata</i>		0	-3	1	x	SE5				GNR	IC	IC
Honeysuckle Family	Caprifoliaceae					x							
European Cranberrybush	<i>Viburnum opulus</i>		0	-1		x	SNA				G5		IR
Dogwood Family	Cornaceae					x							
Alternate-leaved Dogwood	<i>Cornus alternifolia</i>	6	5			x	S5				G5	C	X
Pea Family	Fabaceae					x							
Hog Peanut	<i>Amphicarpaea bracteata</i>	4	0			x	S5				G5	C	C
Beech Family	Fagaceae					x							
American Beech	<i>Fagus grandifolia</i>	6	3			x	S4				G5	C	C
Red Oak	<i>Quercus rubra</i>	6	3			x	S5				G5	C	C
Walnut Family	Juglandaceae					x							
Bitternut Hickory	<i>Carya cordiformis</i>	6	0			x	S5				G5	C	X
Olive Family	Oleaceae					x							
White Ash	<i>Fraxinus americana</i>	4	3			x	S4				G5	C	C
Poppy Family	Papaveraceae					x							
Bloodroot	<i>Sanguinaria canadensis</i>	5	4			x	S5				G5	C	X
Smartweed Family	Polygonaceae					x							
Bitter Dock	<i>Rumex obtusifolius</i>		-3	-1		x	SE5				GNR	IX	IX
Buttercup Family	Ranunculaceae					x							
Red Baneberry	<i>Actaea rubra</i>	5	5			x	S5				G5	C	C
Early Meadow-rue	<i>Thalictrum dioicum</i>	5	2			x	S5				G5	C	X
Buckthorn Family	Rhamnaceae					x							
Common Buckthorn	<i>Rhamnus cathartica</i>		3	-3	1	x	SE5				GNR	IC	IC
Glossy Buckthorn	<i>Frangula alnus</i>		-1	-3		x	SE5				GNR	IU	IU
Rose Family	Rosaceae					x							
Tall Hairy Agrimony	<i>Agrimonia gryposepala</i>	2	2			x	S5				G5	C	C
Black Cherry	<i>Prunus serotina</i>	3	3			x	S5				G5	C	C
Multiflora Rose	<i>Rosa multiflora</i>		3	-3	1	x	SE5				GNR	IC	IX
Common Blackberry	<i>Rubus allegheniensis</i>	2	2			x	S5				G5	C	C
Black Raspberry	<i>Rubus occidentalis</i>	2	5			x	S5				G5	C	C

Common Name	Botanical Name	Coefficient of Conservatism	Wetness Index	Weediness Index	Invasive Species Ontario	FOD5	Provincial L Rank	ESA Status	COSEWIC Status	SARA Status	Global Rank	Regional Status 7E - Carolinian Zone - 2017 (Oldham 2017)	Local Status Middlesex (Oldham 2017)
Willow Family	Salicaceae					x							
Large-tooth Aspen	Populus grandidentata	5	3			x	S5				G5	C	X
Crack Willow	Salix fragilis		-1	-3	3	x	SE				GNR	IC	IX
Linden Family	Tiliaceae					x							
American Basswood	Tilia americana	4	3			x	S5				G5	C	C
Elm Family	Ulmaceae					x							
Common Hackberry	Celtis occidentalis	8	1			x	S4				G5	C	X
Grape Family	Vitaceae					x							
Virginia Creeper	Parthenocissus quinquefolia	6	1			x	S4?				G5	U	X
Monocots	Monocotyledons					x							
Arum Family	Araceae					x							
Skunk Cabbage	Symplocarpus foetidus	7	-5			x	S5				G5	C	C
Sedge Family	Cyperaceae					x							
Shallow Sedge	Carex lurida	6	-5			x	S5				G5	U	R
Lily Family	Liliaceae					x							
Large False Solomon's Seal	Maianthemum racemosum	4	3			x	S5				G5	C	X

Table 18 FOD-5 Floristic Summary & Assessment

Species Diversity		
Total Species	37	
Native Species	27	72.97%
Exotic Species	10	27.03%
Total Taxa in Region (List Region, Source)	10000	
% Regional Taxa Recorded	0.37%	
Regionally Significant Species	2	
S1-S3 Species	0	
S4 Species	4	
S5 Species	22	
Co-efficient of Conservatism and Floral Quality Index		
Co-efficient of Conservatism (CC) (average)	4.85	
CC 0 to 3 (lowest sensitivity)	5	18.52%
CC 4 to 6 (moderate sensitivity)	19	70.37%
CC 7 to 8 (high sensitivity)	2	7.41%
CC 9 to 10 (highest sensitivity)	1	3.70%
Floral Quality Index (FQI)	25.21	
Presence of Weedy & Invasive Species		
mean weediness	-2.30	
weediness = -1	3	30.00%
weediness = -2	1	10.00%
weediness = -3	6	60.00%
Presence of Wetland Species		
average wetness value	1.97	
upland	6	16.22%
facultative upland	19	51.35%
facultative	9	24.32%
facultative wetland	1	2.70%
obligate wetland	2	5.41%

Table 19 FOM9-1 Plant List

Common Name	Botanical Name	Coefficient of Conservatism	Wetness Index	Weediness Index	Invasive Species Ontario	FOM9-1	Provincial L Rank	ESA Status	COSEWIC Status	SARA Status	Global Rank	Regional Status 7E - Carolinian Zone - 2017 (Oldham 2017)	Local Status Middlesex (Oldham 2017)
Ferns & Allies	Pteridophytes					x							
Pine Family	Pinaceae					x							
Norway Spruce	Picea abies		5	-1		x	SNA				G5	IX	IX
White Spruce	Picea glauca	6	3			x	S5				G5	U	IR
Eastern White Pine	Pinus strobus	4	3			x	S5				G5	C	X
Dicots	Dicotyledons					x							
Maple Family	Aceraceae					x							
Black Maple	Acer nigrum	7	3			x	S4?				G5	C	C
Red Maple	Acer rubrum	4	0			x	S5				G5	C	C
Carrot or Parsley Family	Apiaceae					x							
Cow-parsnip	Heracleum maximum	3	-3			x	S5				G5	U	X
Composite or Aster Family	Asteraceae					x							
Common Ragweed	Ambrosia artemisiifolia	0	3			x	S5				G5	C	C
Large-leaved Aster	Eurybia macrophylla	5	5			x	S5				G5	C	C
Two-flowered Dwarf Dandelion	Krigia biflora	10	3			x	S2				G5	R	
Canada Goldenrod	Solidago canadensis var. canadensis	1	3			x	S5				G5	C	X
Zig-zag Goldenrod	Solidago flexicaulis	6	3			x	S5				G5	C	X
Barberry Family	Berberidaceae					x							
Giant Blue Cohosh	Caulophyllum giganteum	6	5			x	S4S5				G4G5	X	X
Twinleaf	Jeffersonia diphylla	10	5			x	S4				G5	R	R
May-apple	Podophyllum peltatum	5	3			x	S5				G5	C	X
Birch Family	Betulaceae					x							
Yellow Birch	Betula alleghaniensis	6	0			x	S5				G5	C	X
Mustard Family	Brassicaceae					x							
Garlic Mustard	Alliaria petiolata		0	-3	1	x	SE5				GNR	IC	IC
Honeysuckle Family	Caprifoliaceae					x							
European Cranberrybush	Viburnum opulus		0	-1		x	SNA				G5		IR
Staff-tree Family	Celastraceae					x							
Winged Spindle Tree	Euonymus alatus		5	-1	3	x	SE2				GNR	IR	IR
Dogwood Family	Cornaceae					x							
Silky Dogwood	Cornus amomum ssp. obliqua					x						C	X
Oleaster Family	Elaeagnaceae					x							
Russian Olive	Elaeagnus angustifolia		4	-1	3	x	SE3				GNR	IU	IR
Pea Family	Fabaceae					x							
Hog Peanut	Amphicarpaea bracteata	4	0			x	S5				G5	C	C
Beech Family	Fagaceae					x							
American Beech	Fagus grandifolia	6	3			x	S4				G5	C	C
White Oak	Quercus alba	6	3			x	S5				G5	C	C
Bur Oak	Quercus macrocarpa	5	1			x	S5				G5	C	C
Red Oak	Quercus rubra	6	3			x	S5				G5	C	C
Witch-hazel Family	Hamamelidaceae					x							
Witch-hazel	Hamamelis virginiana	6	3			x	S4S5				G5	C	C
Walnut Family	Juglandaceae					x							
Bitternut Hickory	Carya cordiformis	6	0			x	S5				G5	C	X
Magnolia Family	Magnoliaceae					x							
Tulip Tree	Liriodendron tulipifera	8	2			x	S4				G5	C	U
Olive Family	Oleaceae					x							
White Ash	Fraxinus americana	4	3			x	S4				G5	C	C
European Privet	Ligustrum vulgare		1	-2	4	x	SE5				GNR	IX	IX

Common Name	Botanical Name	Coefficient of Conservatism	Wetness Index	Weediness Index	Invasive Species Ontario	FOM9-1	Provincial L Rank	ESA Status	COSEWIC Status	SARA Status	Global Rank	Regional Status 7E - Carolinian Zone - 2017 (Oldham 2017)	Local Status Middlesex (Oldham 2017)
Evening-primrose Family	Onagraceae					x							
Small Enchanter's Nightshade	Circaea alpina	6	-3			x	S5				G5	C	X
Smartweed Family	Polygonaceae					x							
Bitter Dock	Rumex obtusifolius		-3	-1		x	SE5				GNR	IX	IX
Buttercup Family	Ranunculaceae					x							
Red Baneberry	Actaea rubra	5	5			x	S5				G5	C	C
Yellow Marsh-marigold	Caltha palustris	5	-5			x	S5				G5	C	C
Virginia Virgin's-bower	Clematis virginiana	3	0			x	S5				G5	C	C
Early Meadow-rue	Thalictrum dioicum	5	2			x	S5				G5	C	X
Buckthorn Family	Rhamnaceae					x							
Common Buckthorn	Rhamnus cathartica		3	-3	1	x	SE5				GNR	IC	IC
Glossy Buckthorn	Frangula alnus		-1	-3		x	SE5				GNR	IU	IU
Rose Family	Rosaceae					x							
Canada Plum	Prunus nigra	4	4			x	S4				G4G5	U	X
Black Cherry	Prunus serotina	3	3			x	S5				G5	C	C
Multiflora Rose	Rosa multiflora		3	-3	1	x	SE5				GNR	IC	IX
Willow Family	Salicaceae					x							
Eastern Cottonwood	Populus deltoides ssp. deltoides	4	-1			x	S5				G5T5	C	X
Trembling Aspen	Populus tremuloides	2	0			x	S5				G5	C	X
White Willow	Salix alba		-3	-2	3	x	SE4				G5	IX	IX
Bittersweet Nightshade	Solanum dulcamara		0	-2	3	x	SE5				GNR	IC	IC
Figwort Family	Scrophulariaceae					x							
White Turtlehead	Chelone glabra	7	-5			x	S5				G5	C	X
Linden Family	Tiliaceae					x							
American Basswood	Tilia americana	4	3			x	S5				G5	C	C
Elm Family	Ulmaceae					x							
Common Hackberry	Celtis occidentalis	8	1			x	S4				G5	C	X
Grape Family	Vitaceae					x							
Virginia Creeper	Parthenocissus quinquefolia	6	1			x	S4?				G5	U	X
Riverbank Grape	Vitis riparia	0	-2			x	S5				G5	C	C
Monocots	Monocotyledons					x							
Arum Family	Araceae					x							
Jack-in-the-pulpit	Arisaema triphyllum	5	-2			x	S5				G5	C	C
Skunk Cabbage	Symplocarpus foetidus	7	-5			x	S5				G5	C	C
Sedge Family	Cyperaceae					x							
Shallow Sedge	Carex lurida	6	-5			x	S5				G5	U	R
Lily Family	Liliaceae					x							
Large False Solomon's Seal	Maianthemum racemosum	4	3			x	S5				G5	C	X

Table 20 FOM9-1 Floristic Summary & Assessment

Species Diversity		
Total Species	53	
Native Species	41	77.36%
Exotic Species	12	22.64%
Total Taxa in Region (List Region, Source)	10000	
% Regional Taxa Recorded	0.53%	
Regionally Significant Species	2	
S1-S3 Species	1	
S4 Species	6	
S5 Species	30	
Co-efficient of Conservatism and Floral Quality Index		
Co-efficient of Conservatism (CC) (average)	5.07	
CC 0 to 3 (lowest sensitivity)	7	17.07%
CC 4 to 6 (moderate sensitivity)	27	65.85%
CC 7 to 8 (high sensitivity)	5	12.20%
CC 9 to 10 (highest sensitivity)	2	4.88%
Floral Quality Index (FQI)	32.48	
Presence of Weedy & Invasive Species		
mean weediness	-1.92	
weediness = -1	5	41.67%
weediness = -2	3	25.00%
weediness = -3	4	33.33%
Presence of Wetland Species		
average wetness value	1.17	
upland	0	11.32%
facultative upland	22	41.51%
facultative	15	28.30%
facultative wetland	6	11.32%
obligate wetland	4	7.55%

Table 21 CGL-1 Plant List

Common Name	Botanical Name	Coefficient of Conservatism	Wetness Index	Weediness Index	Invasive Species Ontario	CGL-1	Provincial L Rank	ESA Status	COSEWIC Status	SARA Status	Global Rank	Regional Status 7E - Carolinian Zone - 2017 (Oldham 2017)	Local Status Middlesex (Oldham 2017)
Ferns & Allies	Pteridophytes					x							
Cedar Family	Cupressaceae					x							
Eastern Red Cedar	Juniperus virginiana	4	3			x	S5				G5	C	X
Pine Family	Pinaceae					x							
Norway Spruce	Picea abies		5	-1		x	SNA				G5	IX	IX
White Spruce	Picea glauca	6	3			x	S5				G5	U	IR
Dicots	Dicotyledons					x							
Maple Family	Aceraceae					x							
Norway Maple	Acer platanoides		5	-3	2	x	SNA				GNR	IU	IU
Silver Maple	Acer saccharinum	5	-3			x	S5				G5	C	C
Sumac or Cashew Family	Anacardiaceae					x							
Staghorn Sumac	Rhus typhina	1	3			x	S5				G5	C	C
Carrot or Parsley Family	Apiaceae					x							
Wild Carrot	Daucus carota		5	-2		x	SE5				GNR	IC	IC
Wild Parsnip	Pastinaca sativa		5	-3		x	SE5				GNR	IU	IX
Cow-parsnip	Heracleum maximum	3	-3			x	S5				G5	U	X
Dogbane Family	Apocynaceae					x							
Indian Hemp	Apocynum cannabinum	3	0			x	S5				G--T5?	C	C
Common Periwinkle	Vinca minor		5	-2	2	x	SE5				GNR	IX	IR
Milkweed Family	Asclepiadaceae					x							
Common Milkweed	Asclepias syriaca	0	5			x	S5				G5	C	C
Composite or Aster Family	Asteraceae					x							
Common Ragweed	Ambrosia artemisiifolia	0	3			x	S5				G5	C	C
Common Burdock	Arctium minus		3	-2		x	SE5				GNR	IC	IC
Ox-eye Daisy	Leucanthemum vulgare		5	-1		x	SE5				GNR	IC	IC
Canadian Horseweed	Conyza canadensis	0	1			x	S5				G5		
Philadelphia Fleabane	Erigeron philadelphicus	1	-3			x	S5				G5	C	C
Black-eyed Susan	Rudbeckia hirta	0	3			x	S5				G5	C	C
Canada Goldenrod	Solidago canadensis var. canadensis	1	3			x	S5				G5	C	X
Giant Goldenrod	Solidago gigantea	4	-3			x	S5				G5	C	X
Rock Dandelion	Taraxacum erythrospermum		5	-1		x	SE5				GNR	IX	IR
Common Dandelion	Taraxacum officinale		3	-2		x	SE5				G5	IC	IC
Yellow Salsify	Tragopogon dubius		5	-1		x	SE5				GNR	IC	IX
Barberry Family	Berberidaceae					x							
Japanese Barberry	Berberis thunbergii		4	-3	3	x	SE5				GNR	IX	IX
Mustard Family	Brassicaceae					x							
Garlic Mustard	Alliaria petiolata		0	-3	1	x	SE5				GNR	IC	IC
Black Mustard	Brassica nigra		5	-1		x	SE5				GNR	IR	IX
Dame's Rocket	Hesperis matronalis		5	-3	1	x	SE5				G4G5	IC	IX
Field Pepperweed	Lepidium campestre		5	-1		x	SE5				GNR	IC	IX
Field Penny-cress	Thlaspi arvense		5	-1		x	SE5				GNR	IC	IC
Honeysuckle Family	Caprifoliaceae					x							
Tartarian Honeysuckle	Lonicera tatarica		3	-3	1	x	SE5				GNR	IC	IX
Nannyberry	Viburnum lentago	4	-1			x	S5				G5	C	C
Pink Family	Caryophyllaceae					x							
Maidenstears	Silene vulgaris		5	-1		x	SE5				GNR	IC	IX
Staff-tree Family	Celastraceae					x							
Winged Spindle Tree	Euonymus alatus		5	-1	3	x	SE2				GNR	IR	IR

Common Name	Botanical Name	Coefficient of Conservatism	Wetness Index	Weediness Index	Invasive Species Ontario	CGL-1	Provincial L Rank	ESA Status	COSEWIC Status	SARA Status	Global Rank	Regional Status 7E - Carolinian Zone - 2017 (Oldham 2017)	Local Status Middlesex (Oldham 2017)
Dogwood Family	Cornaceae					x							
Alternate-leaved Dogwood	Cornus alternifolia	6	5			x	S5				G5	C	X
Morning-glory Family	Convolvulaceae					x							
Field Bindweed	Convolvulus arvensis		5	-1	3	x	SE5				GNR	IC	IX
Gourd Family	Cucurbitaceae					x							
Wild Cucumber	Echinocystis lobata	3	-2			x	S5				G5	C	X
Teasel Family	Dipsacaceae					x							
Fuller's Teasel	Dipsacus fullonum		5	-1	3	x	SE5				GNR	IC	IC
Pea Family	Fabaceae					x							
Eastern Redbud	Cercis canadensis	8	3			x	SX				G5	H	IR
Black Medick	Medicago lupulina		1	-1	4	x	SE5				GNR	IC	IC
Alsike Clover	Trifolium hybridum		1	-1		x	SE5				GNR	IC	IX
Red Clover	Trifolium pratense		2	-2	4	x	SE5				GNR	IC	IX
White Clover	Trifolium repens		2	-1	4	x	SE5				GNR	IC	IX
St. John's-wort Family	Guttiferae					x							
Common St. John's-wort	Hypericum perforatum		5	-3	4	x	SE5				GNR	IC	IC
Hydrangea Family	Hydrangeaceae					x							
Paniculate Hydrangea	Hydrangea paniculata					x	SE1				GNR	IR	IR
Walnut Family	Juglandaceae					x							
Bitternut Hickory	Carya cordiformis	6	0			x	S5				G5	C	X
Black Walnut	Juglans nigra	5	3			x	S4?				G5	C	X
Mint Family	Lamiaceae					x							
Obedient Plant	Physostegia virginiana					x						R	R
Magnolia Family	Magnoliaceae					x							
Tulip Tree	Liriodendron tulipifera	8	2			x	S4				G5	C	U
Mulberry Family	Moraceae					x							
White Mulberry	Morus alba		0	-3	1	x	SE5				GNR	IC	IX
Olive Family	Oleaceae					x							
White Ash	Fraxinus americana	4	3			x	S4				G5	C	C
Common Lilac	Syringa vulgaris		5	-2	2	x	SE5				GNR	IX	IX
Wood Sorrel Family	Oxalidaceae					x							
Common Yellow Oxalis	Oxalis stricta	0	3			x	S5				G5	C	X
Plane-tree Family	Platanaceae					x							
American Sycamore	Platanus occidentalis	8	-3			x	S4				G5	C	C
Smartweed Family	Polygonaceae					x							
Japanese Knotweed	Fallopia japonica		3	-1	2	x	SE5				G?	IX	IU
Curly-leaf Dock	Rumex crispus		-1	-2		x	SE5				GNR	IC	IC
Primrose Family	Primulaceae					x							
Creeping Jenny	Lysimachia nummularia		-4	-3	2	x	SE5				GNR	IC	IX
Buttercup Family	Ranunculaceae					x							
Littleleaf Buttercup	Ranunculus abortivus	2	-2			x	S5				G5	C	C
Buckthorn Family	Rhamnaceae					x							
Common Buckthorn	Rhamnus cathartica		3	-3	1	x	SE5				GNR	IC	IC
Ninebark	Physocarpus opulifolius	5	-2			x	S5				G5	U	X
Rose Family	Rosaceae					x							
Downy Serviceberry	Amelanchier arborea	5	3			x	S5				G5	C	C
Wild Strawberry	Fragaria virginiana	2	1			x	S5				G5	C	C
Yellow Avens	Geum aleppicum	2	-1			x	S5				G5	C	X
White Avens	Geum canadense	3	0			x	S5				G5	C	X

Common Name	Botanical Name	Coefficient of Conservatism	Wetness Index	Weediness Index	Invasive Species Ontario	CGL-1	Provincial L Rank	ESA Status	COSEWIC Status	SARA Status	Global Rank	Regional Status 7E - Carolinian Zone - 2017 (Oldham 2017)	Local Status Middlesex (Oldham 2017)
Sweet Cherry	Prunus avium		5	-2	4	x	SE4				GNR	IR	IR
Black Cherry	Prunus serotina	3	3			x	S5				G5	C	C
Multiflora Rose	Rosa multiflora		3	-3	1	x	SE5				GNR	IC	IX
Common Blackberry	Rubus allegheniensis	2	2			x	S5				G5	C	C
American Red Raspberry	Rubus idaeus var. idaeus					x						IR	
Black Raspberry	Rubus occidentalis	2	5			x	S5				G5	C	C
Madder Family	Rubiaceae					x							
Cleavers	Galium aparine	4	3			x	S5				G5	C	X
Willow Family	Salicaceae					x							
Willow species	Salix species					x							
Crack Willow	Salix fragilis		-1	-3	3	x	SE				GNR	IC	IX
Common Mullein	Verbascum thapsus		5	-2		x	SE5				GNR	IC	IC
Figwort Family	Scrophulariaceae					x							
Orange-eye Butterfly-bush	Buddleja davidii					x						IR	
Linden Family	Tiliaceae					x							
American Basswood	Tilia americana	4	3			x	S5				G5	C	C
Elm Family	Ulmaceae					x							
Common Hackberry	Celtis occidentalis	8	1			x	S4				G5	C	X
Nettle Family	Urticaceae					x							
Stinging Nettle	Urtica dioica ssp. dioica		-1	-1	3	x	SE2				G5T5?	IR	IR
Vervain Family	Verbenaceae	0				x							
White Vervain	Verbena urticifolia	4	-1			x	S5				G5	C	X
Grape Family	Vitaceae					x							
Virginia Creeper	Parthenocissus quinquefolia	6	1			x	S4?				G5	U	X
Summer Grape	Vitis aestivalis	7	3			x	S4				G5	C	R
Riverbank Grape	Vitis riparia	0	-2			x	S5				G5	C	C
Monocots	Monocotyledons					x							
Lily Family	Liliaceae					x							
Orange Lily	Lilium bulbiferum				4	x	SNA				GNR		
Grass Family	Poaceae					x							
Timothy	Phleum pratense		3	-1		x	SNA				GNR	IC	IC
Annual Blue Grass	Poa annua		1	-2		x	SNA				GNR	IC	IC
Canada Blue Grass	Poa compressa	0	2			x	SNA				GNR	IC	IX

Table 22 CGL-1 Floristic Summary & Assessment

Species Diversity		
Total Species	79	
Native Species	40	50.63%
Exotic Species	39	49.37%
Total Taxa in Region (List Region, Source)	10000	
% Regional Taxa Recorded	0.79%	
Regionally Significant Species	2	
S1-S3 Species	0	
S4 Species	5	
S5 Species	31	
Co-efficient of Conservatism and Floral Quality Index		
Co-efficient of Conservatism (CC) (average)	3.48	
CC 0 to 3 (lowest sensitivity)	20	50.00%
CC 4 to 6 (moderate sensitivity)	15	37.50%
CC 7 to 8 (high sensitivity)	5	12.50%
CC 9 to 10 (highest sensitivity)	0	0.00%
Floral Quality Index (FQI)	21.98	
Presence of Weedy & Invasive Species		
mean weediness	-1.87	
weediness = -1	17	43.59%
weediness = -2	10	25.64%
weediness = -3	12	30.77%
Presence of Wetland Species		
average wetness value	2.14	
upland	23	29.11%
facultative upland	28	35.44%
facultative	18	22.78%
facultative wetland	10	12.66%
obligate wetland	0	0.00%

Table 23 MAM2 Plant List

Common Name	Botanical Name	Coefficient of Conservatism	Wetness Index	Weediness Index	Invasive Species Ontario	MAM2	Provincial L Rank	ESA Status	COSEWIC Status	SARA Status	Global Rank	Regional Status 7E - Carolinian Zone - 2017 (Oldham 2017)	Local Status Middlesex (Oldham 2017)
Ferns & Allies	Pteridophytes					x							
Wood Fern Family	Dryopteridaceae					x							
Sensitive Fern	Onoclea sensibilis	4	-3			x	S5				G5	C	X
Horsetail Family	Equisetaceae					x							
Field Horsetail	Equisetum arvense	0	0			x	S5				G5	C	C
Dicots	Dicotyledons					x							
Carrot or Parsley Family	Apiaceae					x							
Wild Carrot	Daucus carota		5	-2		x	SE5				GNR	IC	IC
Composite or Aster Family	Asteraceae					x							
Devil's Beggar-ticks	Bidens frondosa	3	-3			x	S5				G5	C	X
Boneset	Eupatorium perfoliatum	2	-3			x	S5				G5	C	C
Goldenrod species	Solidago sp.					x							
Touch-me-not Family	Balsaminaceae					x							
Jewelweed	Impatiens capensis	4	-3			x	S5				G5	C	C
Mustard Family	Brassicaceae					x							
Garden Yellowrocket	Barbarea vulgaris		0	-1	3	x	SE5				GNR	IC	IC
Honeysuckle Family	Caprifoliaceae					x							
Tartarian Honeysuckle	Lonicera tatarica		3	-3	1	x	SE5				GNR	IC	IX
Dogwood Family	Cornaceae					x							
Gray Dogwood	Cornus racemosa	2	-2			x	S5				G5	C	X
Red-osier Dogwood	Cornus sericea	2	-3			x	S5				G5	C	C
Gourd Family	Cucurbitaceae					x							
Wild Cucumber	Echinocystis lobata	3	-2			x	S5				G5	C	X
Teasel Family	Dipsacaceae					x							
Fuller's Teasel	Dipsacus fullonum		5	-1	3	x	SE5				GNR	IC	IC
Mint Family	Lamiaceae					x							
Common Motherwort	Leonurus cardiaca					x						IC	IC
American Wild Mint	Mentha arvensis	3	-3			x	S5				G5	C	X
Common Heal-all	Prunella vulgaris ssp. vulgaris		0	-1		x	SE3				G5TU	IR	
Loosestrife Family	Lythraceae					x							
Purple Loosestrife	Lythrum salicaria		-5	-3	1	x	SE5				G5	IC	IC
Olive Family	Oleaceae					x							
Green Ash	Fraxinus pennsylvanica	3	-3			x	S4				G5	C	C
Evening-primrose Family	Onagraceae					x							
Small Enchanter's Nightshade	Circaea alpina	6	-3			x	S5				G5	C	X
Wood Sorrel Family	Oxalidaceae					x							
Common Yellow Oxalis	Oxalis stricta	0	3			x	S5				G5	C	X
Plantain Family	Plantaginaceae					x							
Common Plantain	Plantago major		-1	-1		x	SE5				G5	IC	IC
Smartweed Family	Polygonaceae					x							
Curly-leaf Dock	Rumex crispus		-1	-2		x	SE5				GNR	IC	IC
Buttercup Family	Ranunculaceae					x							
Early Meadow-rue	Thalictrum dioicum	5	2			x	S5				G5	C	X
Rose Family	Rosaceae					x							
Multiflora Rose	Rosa multiflora		3	-3	1	x	SE5				GNR	IC	IX
American Red Raspberry	Rubus idaeus var. idaeus					x						IR	
Willow Family	Salicaceae					x							
Balsam Poplar	Populus balsamifera	4	-3			x	S5				G5	U	X
Figwort Family	Scrophulariaceae					x							
White Turtlehead	Chelone glabra	7	-5			x	S5				G5	C	X
Nettle Family	Urticaceae					x							
Canadian Wood Nettle	Laportea canadensis	6	-3			x	S5				G5	C	X

Common Name	Botanical Name	Coefficient of Conservatism	Wetness Index	Weediness Index	Invasive Species Ontario	MAM2	Provincial L Rank	ESA Status	COSEWIC Status	SARA Status	Global Rank	Regional Status 7E - Carolinian Zone - 2017 (Oldham 2017)	Local Status Middlesex (Oldham 2017)
Violet Family	Violaceae					x							
Woolly Blue Violet	Viola sororia	4	1			x	S5				G5	C	X
Monocots	Monocotyledons					x							
Arum Family	Araceae					x							
Jack-in-the-pulpit	Arisaema triphyllum	5	-2			x	S5				G5	C	C
Sedge Family	Cyperaceae					x							
Bebb's Sedge	Carex bebbii	3	-5			x	S5				G5	C	C
Green Bulrush	Scirpus atrovirens	3	-5			x	S5				G5?	C	C
Shallow Sedge	Carex lurida	6	-5			x	S5				G5	U	R
Awl-fruited Sedge	Carex stipata	3	-5			x	S5				G5	C	C
Rush Family	Juncaceae					x							
Dudley's Rush	Juncus dudleyi	1	0			x	S5				G5	C	C
Path Rush	Juncus tenuis	0	0			x	S5				G5	C	X
Grass Family	Poaceae					x							
Redtop	Agrostis gigantea		0	-2		x	SNA				G4G5	IC	IC
Orchard Grass	Dactylis glomerata		3	-1	3	x	SNA				GNR	IC	IC
Large Barnyard Grass	Echinochloa crus-galli					x						IC	IC
Quack Grass	Elymus repens		3	-3	3	x	SNA				GNR	IC	IC
Fowl Manna Grass	Glyceria striata	3	-5			x	S5				G5	C	X
Reed Canary Grass	Phalaris arundinacea	0	-4			x	S5				G5	C	X
Timothy	Phleum pratense		3	-1		x	SNA				GNR	IC	IC
European Reed	Phragmites australis ssp. australis					x						IC	IC
Canada Blue Grass	Poa compressa	0	2			x	SNA				GNR	IC	IX
Fowl Blue Grass	Poa palustris	5	-4			x	S5				G5	C	X
Cattail Family	Typhaceae					x							
Narrow-leaved Cattail	Typha angustifolia	3	-5			x	SNA				G5	IC	IX

Table 24 MAM2 Floristic Summary & Assessment

Species Diversity		
Total Species	42	
Native Species	29	69.05%
Exotic Species	13	30.95%
Total Taxa in Region (List Region, Source)	10000	
% Regional Taxa Recorded	0.42%	
Regionally Significant Species	1	
S1-S3 Species	0	
S4 Species	1	
S5 Species	26	
Co-efficient of Conservatism and Floral Quality Index		
Co-efficient of Conservatism (CC) (average)	3.10	
CC 0 to 3 (lowest sensitivity)	18	62.07%
CC 4 to 6 (moderate sensitivity)	10	34.48%
CC 7 to 8 (high sensitivity)	1	3.45%
CC 9 to 10 (highest sensitivity)	0	0.00%
Floral Quality Index (FQI)	16.71	
Presence of Weedy & Invasive Species		
mean weediness	-1.85	
weediness = -1	6	46.15%
weediness = -2	3	23.08%
weediness = -3	4	30.77%
Presence of Wetland Species		
average wetness value	-1.26	
upland	2	4.76%
facultative upland	8	19.05%
facultative	9	21.43%
facultative wetland	15	35.71%
obligate wetland	8	19.05%

Table 25 MAM2-2 Plant List

Common Name	Botanical Name	Coefficient of Conservatism	Wetness Index	Weediness Index	Invasive Species Ontario	MAM2-2	Provincial L Rank	ESA Status	COSEWIC Status	SARA Status	Global Rank	Regional Status 7E - Carolinian Zone - 2017 (Oldham 2017)	Local Status Middlesex (Oldham 2017)
Ferns & Allies	Pteridophytes					x							
Wood Fern Family	Dryopteridaceae					x							
Sensitive Fern	<i>Onoclea sensibilis</i>	4	-3			x	S5				G5	C	X
Horsetail Family	Equisetaceae					x							
Field Horsetail	<i>Equisetum arvense</i>	0	0			x	S5				G5	C	C
Dicots	Dicotyledons					x							
Carrot or Parsley Family	Apiaceae					x							
Spotted Water-hemlock	<i>Cicuta maculata</i>	6	-5			x	S5				G5	C	X
Composite or Aster Family	Asteraceae					x							
Purple-stemmed Aster	<i>Symphyotrichum puniceum</i>					x						C	X
Devil's Beggar-ticks	<i>Bidens frondosa</i>	3	-3			x	S5				G5	C	X
Boneset	<i>Eupatorium perfoliatum</i>	2	-3			x	S5				G5	C	C
Spotted Joe-pye-weed	<i>Eutrochium maculatum</i>	3	-5			x	S5				G5	C	C
Touch-me-not Family	Balsaminaceae					x							
Jewelweed	<i>Impatiens capensis</i>	4	-3			x	S5				G5	C	C
Mustard Family	Brassicaceae					x							
Garden Yellowrocket	<i>Barbarea vulgaris</i>		0	-1	3	x	SE5				GNR	IC	IC
Field Pepperweed	<i>Lepidium campestre</i>		5	-1		x	SE5				GNR	IC	IX
Field Penny-cress	<i>Thlaspi arvense</i>		5	-1		x	SE5				GNR	IC	IC
Honeysuckle Family	Caprifoliaceae					x							
Tartarian Honeysuckle	<i>Lonicera tatarica</i>		3	-3	1	x	SE5				GNR	IC	IX
American Black Elderberry	<i>Sambucus nigra</i> ssp. <i>canadensis</i>	5	-2			x	S5				G5T5	C	X
Pink Family	Caryophyllaceae					x							
Bouncing-bet	<i>Saponaria officinalis</i>		3	-3	3	x	SE5				GNR	IC	IX
Dogwood Family	Cornaceae					x							
Alternate-leaved Dogwood	<i>Cornus alternifolia</i>	6	5			x	S5				G5	C	X
Gray Dogwood	<i>Cornus racemosa</i>	2	-2			x	S5				G5	C	X
Red-osier Dogwood	<i>Cornus sericea</i>	2	-3			x	S5				G5	C	C
Morning-glory Family	Convolvulaceae					x							
Field Bindweed	<i>Convolvulus arvensis</i>		5	-1	3	x	SE5				GNR	IC	IX
Teasel Family	Dipsacaceae					x							
Fuller's Teasel	<i>Dipsacus fullonum</i>		5	-1	3	x	SE5				GNR	IC	IC
Pea Family	Fabaceae					x							
Crown-vetch	<i>Securigera varia</i>		5	-2	1	x	SE5				GNR	IX	IX
Hybrid Bush-clover	<i>Lespedeza X nuttallii</i>					x	hyb				GNA	hyb	
Cow Vetch	<i>Vicia cracca</i>		5	-1	2	x	SE5				GNR	IX	IX
Mint Family	Lamiaceae					x							
American Wild Mint	<i>Mentha arvensis</i>	3	-3			x	S5				G5	C	X
Common Heal-all	<i>Prunella vulgaris</i> ssp. <i>vulgaris</i>		0	-1		x	SE3				G5TU	IR	
Olive Family	Oleaceae					x							
Green Ash	<i>Fraxinus pennsylvanica</i>	3	-3			x	S4				G5	C	C
Wood Sorrel Family	Oxalidaceae					x							
Common Yellow Oxalis	<i>Oxalis stricta</i>	0	3			x	S5				G5	C	X
Plantain Family	Plantaginaceae					x							
Common Plantain	<i>Plantago major</i>		-1	-1		x	SE5				G5	IC	IC
Smartweed Family	Polygonaceae					x							
Curly-leaf Dock	<i>Rumex crispus</i>		-1	-2		x	SE5				GNR	IC	IC
Rose Family	Rosaceae					x							
American Red Raspberry	<i>Rubus idaeus</i> var. <i>idaeus</i>					x						IR	
Willow Family	Salicaceae					x							
Willow species	<i>Salix</i> species					x							
Bittersweet Nightshade	<i>Solanum dulcamara</i>		0	-2	3	x	SE5				GNR	IC	IC
Nettle Family	Urticaceae					x							
Stinging Nettle	<i>Urtica dioica</i> ssp. <i>dioica</i>		-1	-1	3	x	SE2				G5T5?	IR	IR
Violet Family	Violaceae					x							

Common Name	Botanical Name	Coefficient of Conservatism	Wetness Index	Weediness Index	Invasive Species Ontario	MAM2-2	Provincial L Rank	ESA Status	COSEWIC Status	SARA Status	Global Rank	Regional Status 7E - Carolinian Zone - 2017 (Oldham 2017)	Local Status Middlesex (Oldham 2017)
Woolly Blue Violet	Viola sororia	4	1			x	S5				G5	C	X
Grape Family	Vitaceae					x							
Riverbank Grape	Vitis riparia	0	-2			x	S5				G5	C	C
Monocots	Monocotyledons					x							
Sedge Family	Cyperaceae					x							
Shallow Sedge	Carex lurida	6	-5			x	S5				G5	U	R
Awl-fruited Sedge	Carex stipata	3	-5			x	S5				G5	C	C
Iris Family	Iridaceae					x							
Yellow Iris	Iris pseudacorus		-5	-2	4	x	SNA				GNR	IU	IR
Rush Family	Juncaceae					x							
Dudley's Rush	Juncus dudleyi	1	0			x	S5				G5	C	C
Soft Rush	Juncus effusus					x						C	X
Grass Family	Poaceae					x							
Redtop	Agrostis gigantea		0	-2		x	SNA				G4G5	IC	IC
Smooth Brome	Bromus inermis		5	-3	4	x	SNA				G5TNR	IC	IC
Blue-joint Grass	Calamagrostis canadensis	4	-5			x	S5				G5	C	X
Orchard Grass	Dactylis glomerata		3	-1	3	x	SNA				GNR	IC	IC
Quack Grass	Elymus repens		3	-3	3	x	SNA				GNR	IC	IC
Fowl Manna Grass	Glyceria striata	3	-5			x	S5				G5	C	X
Reed Canary Grass	Phalaris arundinacea	0	-4			x	S5				G5	C	X
Timothy	Phleum pratense		3	-1		x	SNA				GNR	IC	IC
Canada Blue Grass	Poa compressa	0	2			x	SNA				GNR	IC	IX
Fowl Blue Grass	Poa palustris	5	-4			x	S5				G5	C	X

Table 26 MAM2-2 Floristic Summary & Assessment

Species Diversity		
Total Species	44	
Native Species	24	54.55%
Exotic Species	20	45.45%
Total Taxa in Region (List Region, Source)	10000	
% Regional Taxa Recorded	0.44%	
Regionally Significant Species	1	
S1-S3 Species	0	
S4 Species	1	
S5 Species	22	
Co-efficient of Conservatism and Floral Quality Index		
Co-efficient of Conservatism (CC) (average)	2.88	
CC 0 to 3 (lowest sensitivity)	15	62.50%
CC 4 to 6 (moderate sensitivity)	9	37.50%
CC 7 to 8 (high sensitivity)	0	0.00%
CC 9 to 10 (highest sensitivity)	0	0.00%
Floral Quality Index (FQI)	14.08	
Presence of Weedy & Invasive Species		
mean weediness	-1.65	
weediness = -1	11	55.00%
weediness = -2	5	25.00%
weediness = -3	4	20.00%
Presence of Wetland Species		
average wetness value	-0.27	
upland	8	18.18%
facultative upland	7	15.91%
facultative	10	22.73%
facultative wetland	12	27.27%
obligate wetland	7	15.91%

Table 27 MAM3 Plant List

Common Name	Botanical Name	Coefficient of Conservatism	Wetness Index	Weediness Index	Invasive Species Ontario	MAM3	Provincial L Rank	ESA Status	COSEWIC Status	SARA Status	Global Rank	Regional Status 7E - Carolinian Zone - 2017 (Oldham 2017)	Local Status Middlesex (Oldham 2017)
Ferns & Allies	Pteridophytes					x							
Wood Fern Family	Dryopteridaceae					x							
Sensitive Fern	Onoclea sensibilis	4	-3			x	S5				G5	C	X
Dicots	Dicotyledons					x							
Carrot or Parsley Family	Apiaceae					x							
Water Parsnip	Sium suave	4	-5		3	x	S5				G5	C	C
Composite or Aster Family	Asteraceae					x							
Eastern Daisy Fleabane	Erigeron annuus	0	3			x	S5				G5	C	C
Tall Goldenrod	Solidago altissima	1	3			x	S5				G5	C	U
Canada Goldenrod	Solidago canadensis var. canadensis	1	3			x	S5				G5	C	X
Goldenrod species	Solidago sp.					x							
Common Dandelion	Taraxacum officinale		3	-2		x	SE5				G5	IC	IC
Touch-me-not Family	Balsaminaceae					x							
Jewelweed	Impatiens capensis	4	-3			x	S5				G5	C	C
Mustard Family	Brassicaceae					x							
Water-cress	Nasturtium officinale		-5	-1		x	SE				GNR	IX	IX
Honeysuckle Family	Caprifoliaceae					x							
European Cranberrybush	Viburnum opulus		0	-1		x	SNA				G5		IR
Dogwood Family	Cornaceae					x							
Gray Dogwood	Cornus racemosa	2	-2			x	S5				G5	C	X
Red-osier Dogwood	Cornus sericea	2	-3			x	S5				G5	C	C
Teasel Family	Dipsacaceae					x							
Fuller's Teasel	Dipsacus fullonum		5	-1	3	x	SE5				GNR	IC	IC
Mint Family	Lamiaceae					x							
Common Heal-all	Prunella vulgaris ssp. vulgaris		0	-1		x	SE3				G5TU	IR	
Loosestrife Family	Lythraceae					x							
Purple Loosestrife	Lythrum salicaria		-5	-3	1	x	SE5				G5	IC	IC
Plantain Family	Plantaginaceae					x							
Common Plantain	Plantago major		-1	-1		x	SE5				G5	IC	IC
Smartweed Family	Polygonaceae					x							
Curly-leaf Dock	Rumex crispus		-1	-2		x	SE5				GNR	IC	IC
Rose Family	Rosaceae					x							
Multiflora Rose	Rosa multiflora		3	-3	1	x	SE5				GNR	IC	IX
American Red Raspberry	Rubus idaeus var. idaeus					x						IR	
Willow Family	Salicaceae					x							
Willow species	Salix species					x							
Grape Family	Vitaceae					x							
Riverbank Grape	Vitis riparia	0	-2			x	S5				G5	C	C
Monocots	Monocotyledons					x							
Sedge Family	Cyperaceae					x							
Bebb's Sedge	Carex bebbii	3	-5			x	S5				G5	C	C
Rush Family	Juncaceae					x							
Path Rush	Juncus tenuis	0	0			x	S5				G5	C	X
Duckweed Family	Lemnaceae					x							
Lesser Duckweed	Lemna minor	2	-5			x	S5				G5	C	X
Grass Family	Poaceae					x							
Reed Canary Grass	Phalaris arundinacea	0	-4			x	S5				G5	C	X

Table 28 MAM3 Floristic Summary & Assessment

Species Diversity		
Total Species:	22	
Native Species:	13	59.09%
Exotic Species	9	40.91%
Total Taxa in Region (List Region, Source)	10000	
% Regional Taxa Recorded	0.22%	
Regionally Significant Species	0	
S1-S3 Species	0	
S4 Species	0	
S5 Species	13	
Co-efficient of Conservatism and Floral Quality Index		
Co-efficient of Conservatism (CC) (average)	1.77	
CC 0 to 3 (lowest sensitivity)	10	76.92%
CC 4 to 6 (moderate sensitivity)	3	23.08%
CC 7 to 8 (high sensitivity)	0	0.00%
CC 9 to 10 (highest sensitivity)	0	0.00%
Floral Quality Index (FQI)	6.38	
Presence of Weedy & Invasive Species		
mean weediness	-1.67	
weediness = -1	5	55.56%
weediness = -2	2	22.22%
weediness = -3	2	22.22%
Presence of Wetland Species		
average wetness value	-1.09	
upland	1	4.55%
facultative upland	5	22.73%
facultative	5	22.73%
facultative wetland	6	27.27%
obligate wetland	5	22.73%

Table 29 MAM2-11 Plant List

Common Name	Botanical Name	Coefficient of Conservatism	Wetness Index	Weediness Index	Invasive Species Ontario	MAM2-11	Provincial L Rank	ESA Status	COSEWIC Status	SARA Status	Global Rank	Regional Status 7E - Carolinian Zone - 2017 (Oldham 2017)	Local Status Middlesex (Oldham 2017)
Ferns & Allies	Pteridophytes					x							
Wood Fern Family	Dryopteridaceae					x							
Sensitive Fern	Onoclea sensibilis	4	-3			x	S5				G5	C	X
Dicots	Dicotyledons					x							
Carrot or Parsley Family	Apiaceae					x							
Wild Carrot	Daucus carota		5	-2		x	SE5				GNR	IC	IC
Wild Parsnip	Pastinaca sativa		5	-3		x	SE5				GNR	IU	IX
Cow-parsnip	Heracleum maximum	3	-3			x	S5				G5	U	X
Milkweed Family	Asclepiadaceae					x							
Swamp Milkweed	Asclepias incarnata	6	-5			x	S5				G5	C	C
Composite or Aster Family	Asteraceae					x							
Common Yarrow	Achillea millefolium		3	-1		x	SE				G5	IX	
Great Burdock	Arctium lappa		3			x	SE5				GNR	IU	IR
Purple-stemmed Aster	Symphyotrichum puniceum					x						C	X
Devil's Beggar-ticks	Bidens frondosa	3	-3			x	S5				G5	C	X
Spotted Joe-pye-weed	Eutrochium maculatum	3	-5			x	S5				G5	C	C
Tall Goldenrod	Solidago altissima	1	3			x	S5				G5	C	U
Canada Goldenrod	Solidago canadensis var. canadensis	1	3			x	S5				G5	C	X
Goldenrod species	Solidago sp.					x							
Touch-me-not Family	Balsaminaceae					x							
Jewelweed	Impatiens capensis	4	-3			x	S5				G5	C	C
Pale Touch-me-not	Impatiens pallida	7	-3			x	S4				G5	C	X
Mustard Family	Brassicaceae					x							
Garden Yellowrocket	Barbarea vulgaris		0	-1	3	x	SE5				GNR	IC	IC
Honeysuckle Family	Caprifoliaceae					x							
Tartarian Honeysuckle	Lonicera tatarica		3	-3	1	x	SE5				GNR	IC	IX
Pink Family	Caryophyllaceae					x							
Bouncing-bet	Saponaria officinalis		3	-3	3	x	SE5				GNR	IC	IX
Teasel Family	Dipsacaceae					x							
Fuller's Teasel	Dipsacus fullonum		5	-1	3	x	SE5				GNR	IC	IC
Plantain Family	Plantaginaceae					x							
Common Plantain	Plantago major		-1	-1		x	SE5				G5	IC	IC
Rose Family	Rosaceae					x							
Yellow Avens	Geum aleppicum	2	-1			x	S5				G5	C	X
Willow Family	Salicaceae					x							
Eastern Cottonwood	Populus deltoides ssp. deltoides	4	-1			x	S5				G5T5	C	X
Willow species	Salix species					x							
Monocots	Monocotyledons					x							
Sedge Family	Cyperaceae					x							
Shallow Sedge	Carex lurida	6	-5			x	S5				G5	U	R
Grass Family	Poaceae					x							
Reed Canary Grass	Phalaris arundinacea	0	-4			x	S5				G5	C	X

Table 30 MAM2-11 Floristic Summary & Assessment

Species Diversity		
Total Species:	21	
Native Species:	13	61.90%
Exotic Species	8	38.10%
Total Taxa in Region (List Region, Source)	10000	
% Regional Taxa Recorded	0.21%	
Regionally Significant Species	1	
S1-S3 Species	0	
S4 Species	1	
S5 Species	12	
Co-efficient of Conservatism and Floral Quality Index		
Co-efficient of Conservatism (CC) (average)	3.38	
CC 0 to 3 (lowest sensitivity)	7	53.85%
CC 4 to 6 (moderate sensitivity)	5	38.46%
CC 7 to 8 (high sensitivity)	1	7.69%
CC 9 to 10 (highest sensitivity)	0	0.00%
Floral Quality Index (FQI)	12.20	
Presence of Weedy & Invasive Species		
mean weediness	-1.88	
weediness = -1	4	50.00%
weediness = -2	1	12.50%
weediness = -3	3	37.50%
Presence of Wetland Species		
average wetness value	-0.18	
upland	3	14.29%
facultative upland	6	28.57%
facultative	4	19.05%
facultative wetland	6	28.57%
obligate wetland	3	14.29%

Table 31 Ponds Plant List

Common Name	Botanical Name	Coefficient of Conservatism	Wetness Index	Weediness Index	Invasive Species Ontario	Ponds	Provincial L Rank	ESA Status	COSEWIC Status	SARA Status	Global Rank	Regional Status 7E - Carolinian Zone - 2017 (Oldham 2017)	Local Status Middlesex (Oldham 2017)
Ferns & Allies	Pteridophytes					x							
Horsetail Family	Equisetaceae					x							
Field Horsetail	Equisetum arvense	0	0			x	S5				G5	C	C
Water Horsetail	Equisetum fluviatile	7	-5			x	S5				G5	U	U
Dicots	Dicotyledons					x							
Carrot or Parsley Family	Apiaceae					x							
Wild Parsnip	Pastinaca sativa		5	-3		x	SE5				GNR	IU	IX
Dogbane Family	Apocynaceae					x							
Spreading Dogbane	Apocynum androsaemifolium	3	5			x	S5				G5	C	C
Milkweed Family	Asclepiadaceae					x							
Swamp Milkweed	Asclepias incarnata	6	-5			x	S5				G5	C	C
Common Milkweed	Asclepias syriaca	0	5			x	S5				G5	C	C
European Swallow-wort	Vincetoxicum rossicum		5	-3	1	x	SE5				GNR	IX	IR
Composite or Aster Family	Asteraceae					x							
Great Burdock	Arctium lappa		3			x	SE5				GNR	IU	IR
Purple-stemmed Aster	Symphotrichum puniceum					x						C	X
Devil's Beggar-ticks	Bidens frondosa	3	-3			x	S5				G5	C	X
Spotted Knapweed	Centaurea stoebe				3	x						IC	IX
Chicory	Cichorium intybus		5	-1		x	SE5				GNR	IC	IC
Bull Thistle	Cirsium vulgare		3	-1		x	SE5				GNR	IC	IX
Eastern Daisy Fleabane	Erigeron annuus	0	3			x	S5				G5	C	C
Philadelphia Fleabane	Erigeron philadelphicus	1	-3			x	S5				G5	C	C
Spotted Joe-pye-weed	Eutrochium maculatum	3	-5			x	S5				G5	C	C
Black-eyed Susan	Rudbeckia hirta	0	3			x	S5				G5	C	C
Tall Goldenrod	Solidago altissima	1	3			x	S5				G5	C	U
Canada Goldenrod	Solidago canadensis var. canadensis	1	3			x	S5				G5	C	X
Goldenrod species	Solidago sp.					x							
Rock Dandelion	Taraxacum erythrospermum		5	-1		x	SE5				GNR	IX	IR
Common Dandelion	Taraxacum officinale		3	-2		x	SE5				G5	IC	IC
Yellow Salsify	Tragopogon dubius		5	-1		x	SE5				GNR	IC	IX
Touch-me-not Family	Balsaminaceae					x							
Jewelweed	Impatiens capensis	4	-3			x	S5				G5	C	C
Mustard Family	Brassicaceae					x							
Garden Yellowrocket	Barbarea vulgaris		0	-1	3	x	SE5				GNR	IC	IC
Pink Family	Caryophyllaceae					x							
Bouncing-bet	Saponaria officinalis		3	-3	3	x	SE5				GNR	IC	IX
Teasel Family	Dipsacaceae					x							
Fuller's Teasel	Dipsacus fullonum		5	-1	3	x	SE5				GNR	IC	IC
Pea Family	Fabaceae					x							
Crown-vetch	Securigera varia		5	-2	1	x	SE5				GNR	IX	IX
Alsike Clover	Trifolium hybridum		1	-1		x	SE5				GNR	IC	IX
Mint Family	Lamiaceae					x							
Common Motherwort	Leonurus cardiaca					x						IC	IC
American Wild Mint	Mentha arvensis	3	-3			x	S5				G5	C	X
Loosestrife Family	Lythraceae					x							
Purple Loosestrife	Lythrum salicaria		-5	-3	1	x	SE5				G5	IC	IC

Common Name	Botanical Name	Coefficient of Conservatism	Wetness Index	Weediness Index	Invasive Species Ontario	Ponds	Provincial L Rank	ESA Status	COSEWIC Status	SARA Status	Global Rank	Regional Status 7E - Carolinian Zone - 2017 (Oldham 2017)	Local Status Middlesex (Oldham 2017)
Evening-primrose Family	Onagraceae					x							
Common Evening-primrose	Oenothera biennis	0	3			x	S5				G5	C	X
Wood Sorrel Family	Oxalidaceae					x							
Common Yellow Oxalis	Oxalis stricta	0	3			x	S5				G5	C	X
Plantain Family	Plantaginaceae					x							
Common Plantain	Plantago major		-1	-1		x	SE5				G5	IC	IC
Smartweed Family	Polygonaceae					x							
Curly-leaf Dock	Rumex crispus		-1	-2		x	SE5				GNR	IC	IC
Rose Family	Rosaceae					x							
Multiflora Rose	Rosa multiflora		3	-3	1	x	SE5				GNR	IC	IX
Madder Family	Rubiaceae					x							
Cleavers	Galium aparine	4	3			x	S5				G5	C	X
Willow Family	Salicaceae					x							
Butter-and-eggs	Linaria vulgaris		5	-1	4	x	SE5				GNR	IC	IC
Nettle Family	Urticaceae					x							
Stinging Nettle	Urtica dioica ssp. dioica		-1	-1	3	x	SE2				G5T5?	IR	IR
Vervain Family	Verbenaceae					x							
Blue Vervain	Verbena hastata	4	-4			x	S5				G5	C	C
White Vervain	Verbena urticifolia	4	-1			x	S5				G5	C	X
Grape Family	Vitaceae					x							
Riverbank Grape	Vitis riparia	0	-2			x	S5				G5	C	C
Monocots	Monocotyledons					x							
Water-plantain Family	Alismataceae					x							
Broad-leaved Arrowhead	Sagittaria latifolia	4	-5			x	S5				G5	C	C
Northern Water-plantain	Alisma triviale					x						X	X
Sedge Family	Cyperaceae					x							
Shallow Sedge	Carex lurida	6	-5			x	S5				G5	U	R
Iris Family	Iridaceae					x							
Harlequin Blue-flag	Iris versicolor	5	-5			x	S5				G5	C	X
Yellow Iris	Iris pseudacorus		-5	-2	4	x	SNA				GNR	IU	IR
Rush Family	Juncaceae					x							
Dudley's Rush	Juncus dudleyi	1	0			x	S5				G5	C	C
Soft Rush	Juncus effusus					x						C	X
Grass Family	Poaceae					x							
Redtop	Agrostis gigantea		0	-2		x	SNA				G4G5	IC	IC
Orchard Grass	Dactylis glomerata		3	-1	3	x	SNA				GNR	IC	IC
Quack Grass	Elymus repens		3	-3	3	x	SNA				GNR	IC	IC
Reed Canary Grass	Phalaris arundinacea	0	-4			x	S5				G5	C	X
Timothy	Phleum pratense		3	-1		x	SNA				GNR	IC	IC
Canada Blue Grass	Poa compressa	0	2			x	SNA				GNR	IC	IX
Pondweed Family	Potamogetonaceae					x							
Pondweed species	Potamogeton sp.					x							

Table 32 Ponds Floristic Summary & Assessment

Species Diversity		
Total Species:	49	
Native Species:	26	53.06%
Exotic Species	23	46.94%
Total Taxa in Region (List Region, Source)	10000	
% Regional Taxa Recorded	0.49%	
Regionally Significant Species	1	
S1-S3 Species	0	
S4 Species	0	
S5 Species	25	
Co-efficient of Conservatism and Floral Quality Index		
Co-efficient of Conservatism (CC) (average)	2.31	
CC 0 to 3 (lowest sensitivity)	17	65.38%
CC 4 to 6 (moderate sensitivity)	8	30.77%
CC 7 to 8 (high sensitivity)	1	3.85%
CC 9 to 10 (highest sensitivity)	0	0.00%
Floral Quality Index (FQI)	11.77	
Presence of Weedy & Invasive Species		
mean weediness	-1.74	
weediness = -1	12	52.17%
weediness = -2	5	21.74%
weediness = -3	6	26.09%
Presence of Wetland Species		
average wetness value	0.64	
upland	10	20.41%
facultative upland	16	32.65%
facultative	9	18.37%
facultative wetland	7	14.29%
obligate wetland	8	16.33%

Table 33 MAS2 Plant List

Common Name	Botanical Name	Coefficient of Conservatism	Wetness Index	Weediness Index	Invasive Species Ontario	MAS2	Provincial L Rank	ESA Status	COSEWIC Status	SARA Status	Global Rank	Regional Status 7E - Carolinian Zone - 2017 (Oldham 2017)	Local Status Middlesex (Oldham 2017)
Ferns & Allies	Pteridophytes					x							
Horsetail Family	Equisetaceae					x							
Field Horsetail	Equisetum arvense	0	0			x	S5				G5	C	C
Water Horsetail	Equisetum fluviatile	7	-5			x	S5				G5	U	U
Dicots	Dicotyledons					x							
Maple Family	Aceraceae					x							
Manitoba Maple	Acer negundo	0	0		1	x	S5				G5	C	C
Carrot or Parsley Family	Apiaceae					x							
Spotted Water-hemlock	Cicuta maculata	6	-5			x	S5				G5	C	X
Water Parsnip	Sium suave	4	-5		3	x	S5				G5	C	C
Composite or Aster Family	Asteraceae					x							
Common Yarrow	Achillea millefolium		3	-1		x	SE				G5	IX	
Eastern Daisy Fleabane	Erigeron annuus	0	3			x	S5				G5	C	C
Philadelphia Fleabane	Erigeron philadelphicus	1	-3			x	S5				G5	C	C
Boneset	Eupatorium perfoliatum	2	-3			x	S5				G5	C	C
Spotted Joe-pye-weed	Eutrochium maculatum	3	-5			x	S5				G5	C	C
Touch-me-not Family	Balsaminaceae					x							
Jewelweed	Impatiens capensis	4	-3			x	S5				G5	C	C
Borage Family	Boraginaceae					x							
Viper's Bugloss	Echium vulgare		5	-2		x	SE5				GNR	IC	IC
Walnut Family	Juglandaceae					x							
Black Walnut	Juglans nigra	5	3			x	S4?				G5	C	X
Loosestrife Family	Lythraceae					x							
Purple Loosestrife	Lythrum salicaria		-5	-3	1	x	SE5				G5	IC	IC
Water-lily Family	Nymphaeaceae					x							
Variegated Pond-lily	Nuphar variegata	4	-5			x	S5				G5	U	X
American White Water-lily	Nymphaea odorata ssp. odorata	5	-5			x	S5?				G5T5	U	X
Evening-primrose Family	Onagraceae					x							
Small Enchanter's Nightshade	Circaea alpina	6	-3			x	S5				G5	C	X
Smartweed Family	Polygonaceae					x							
Curly-leaf Dock	Rumex crispus		-1	-2		x	SE5				GNR	IC	IC
Buttercup Family	Ranunculaceae					x							
Yellow Marsh-marigold	Caltha palustris	5	-5			x	S5				G5	C	C
Willow Family	Salicaceae					x							
Willow species	Salix species					x							
Crack Willow	Salix fragilis		-1	-3	3	x	SE				GNR	IC	IX
Monocots	Monocotyledons					x							
Water-plantain Family	Alismataceae					x							
Northern Water-plantain	Alisma triviale					x						X	X
Arum Family	Araceae					x							
Calamus	Acorus calamus		-5	-1		x	SNA				G4?	IR	IR
Rush Family	Juncaceae					x							
Dudley's Rush	Juncus dudleyi	1	0			x	S5				G5	C	C
Soft Rush	Juncus effusus					x						C	X
Path Rush	Juncus tenuis	0	0			x	S5				G5	C	X

Common Name	Botanical Name	Coefficient of Conservatism	Wetness Index	Weediness Index	Invasive Species Ontario	MAS2	Provincial L Rank	ESA Status	COSEWIC Status	SARA Status	Global Rank	Regional Status 7E - Carolinian Zone - 2017 (Oldham 2017)	Local Status Middlesex (Oldham 2017)
Grass Family	Poaceae					x							
Fowl Manna Grass	Glyceria striata	3	-5			x	S5				G5	C	X
Reed Canary Grass	Phalaris arundinacea	0	-4			x	S5				G5	C	X
Pondweed Family	Potamogetonaceae					x							
Pondweed species	Potamogeton sp.					x							
Bur-reed Family	Sparganiaceae					x							
Stemless Bur-reed	Sparganium emersum	5	-5			x	S5				G5	U	R
Cattail Family	Typhaceae					x							
Narrow-leaved Cattail	Typha angustifolia	3	-5			x	SNA				G5	IC	IX

Table 34 MAS2 Floristic Summary & Assessment

Species Diversity		
Total Species:	27	
Native Species:	21	77.78%
Exotic Species	6	22.22%
Total Taxa in Region (List Region, Source)	10000	
% Regional Taxa Recorded	0.27%	
Regionally Significant Species	1	
S1-S3 Species	0	
S4 Species	0	
S5 Species	18	
Co-efficient of Conservatism and Floral Quality Index		
Co-efficient of Conservatism (CC) (average)	3.05	
CC 0 to 3 (lowest sensitivity)	11	52.38%
CC 4 to 6 (moderate sensitivity)	9	42.86%
CC 7 to 8 (high sensitivity)	1	4.76%
CC 9 to 10 (highest sensitivity)	0	0.00%
Floral Quality Index (FQI)	13.97	
Presence of Weedy & Invasive Species		
mean weediness	-2.00	
weediness = -1	2	33.33%
weediness = -2	2	33.33%
weediness = -3	2	33.33%
Presence of Wetland Species		
average wetness value	-2.37	
upland	1	3.70%
facultative upland	3	11.11%
facultative	6	22.22%
facultative wetland	5	18.52%
obligate wetland	12	44.44%

Table 35 Summary

	Total # of Species	# Exotic Species	# Native Species	FQI
Total Study Area	228	138	90	46.99
FOD7-4	55	32	23	21.39
CUP3	56	31	25	17.78
FOM9-2	71	38	33	19.30
FOD4-2	107	63	44	29.61
CUM1	79	35	44	14.37
FOD7-3	50	29	21	16.16
CUM1-1	32	13	19	9.15
FOD5	37	27	10	25.21
FOM9-1	53	41	12	32.48
CGL-1	79	40	39	21.98
MAM2	42	29	13	16.71
MAM2-2	44	24	20	14.08
MAM3	22	13	9	6.38
MAM2-11	21	13	8	12.20
PONDS	49	26	23	11.77
MAS2	27	21	6	13.97

Appendix D

Representative Photolog

Sunningdale North- Site Photos



Photo 1. Pond A looking south near 13 Robinson Green.



Photo 4. Pond B between 4 Robinson Fairway and 12 Robinson Fairway.



Photo 2. Axford Drain Upstream of Pond A near 3 Robinson Fairway.



Photo 5. Pond C near Robinson Fairway.



Photo 3. Axford Drain Upstream of Pond A near 13 Robinson Fairway.



Photo 6. Axford Drain between golf course and Wonderland Road.



Photo 6. Axford Drain to the west of Wonderland Road.



Photo 9. Irrigation Pond.



Photo 7. Meadow near Wonderland Road.



Photo 10. Small wetland between 3 Robinson and 11 Thompson Fairway.



Photo 8. Perched culvert under Sunningdale Road West.



Photo 11. View of woodland within the Study Area.



Photo 12. Golf course lands and fairway.



Photo 15. View of Medway Creek from Cart bridge near 3 Thompson.



Photo 13. Golf course lands.



Photo 16. Photo looking north towards CUP3-9 from 6 Thompson.



Photo 14. Trees on the Golf Course.



Photo 17. Woodland (CUP3-8) bear 13 Robinson and 14 Robinson.



Photo 18. Cart Bridge across Medway Creek looking north from 6 Thompson.



Photo 21. Tributary A looking west.



Photo 19. Photo from 16 Thompson looking at Meadow and Wetland feature.



Photo 22. Tributary A looking west.



Photo 20. CUM1 viewed from 7 Thompson looking southwest.



Photo 23. Small wetland (MAM3) at west end of Tributary A.



Photo 24. Irrigation Pond.



Photo 27. CUT1 near cart access pathway.



Photo 25. Photo looking north between FOM9-1 and CUP3-9 near 6 and 16 Thompson.



Photo 28. MAM2 small wetland feature near 7 Thompson.



Photo 26. CUT1 looking northeast.



Photo 29. FOD4-2 looking north from on top of ridge.



Photo 30. CUM1 on 3 Thompson.



Photo 33. View of 9 Thompson and FOD4-2.



Photo 31. CUM1 on 3 Thompson.



Photo 34. Photo in forest of FOD5 at top of slope.



Photo 32. CUM1 on 3 Thompson.

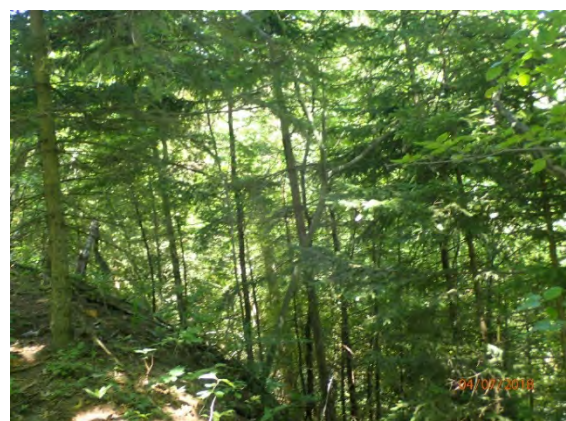


Photo 35. Photos in FOD5 at top of slope.



Photo 36. Photo of Medway Creek looking downstream from Cart Pathway.



Photo 39. MAM2 at corner of Agricultural field near Sunningdale Road.



Photo 37. View of FOD5 from Medway Creek.



Photo 40. Agricultural Field with seed corn.



Photo 38. Medway Creek with Cattail Pocket.



Photo 41. Meadow on old farm property along Wonderland Road.



Photo 42. View towards Woodland.



Photo 45. CUT1 near 15 Thompson.



Photo 43. CUP3-8 near 7 Thompson.



Photo 46. CUM1 looking north.



Photo 44. Meadow near 7 Thompson and CUP3-8.



Photo 47. CUM1 near 7 Thompson.



Photo 48. FOM9-1 near Medway Creek.



Photo 49. Bank along the Medway at northeast corner of the site.

Appendix E

Breeding Bird Survey

Table 1 Sunningdale North 2018 - Breeding Bird Survey

Breeding Bird Survey	Common Name	Scientific Name	OB	PO	PB	CONF	#	Notes	
Station 1, June 14, 2018, 7:25-7:35am	American Crow	Corvus brachyrhynchos		H			2	audible	
	European Starling	Sturnus vulgaris			P		5	visual-grazing	
	American Robin	Turdus migratorius		S			1	audible	
	Red-winged Blackbird	Agelaius phoeniceus			P		3	visual of 1 pair, 1 calling	
	Song Sparrow	Melospiza melodia		S			1	male calling	
	Chipping Sparrow	Spizella passerina		S			1	call	
	Tree Swallow	Tachycineta bicolor		H			1	visual-flying	
	Common Grackle	Quiscalus quiscula		S			2	call and flying	
	Black-capped Chickadee	Poecile atricapillus		H			1	foraging	
	Cedar Waxwing	Bombycilla cedrorum			P		2	visual and call of pair at top of tree	
	Northern Flicker	Colaptes auratus		S			1	call	
	Black-capped Chickadee	Poecile atricapillus			P		5	call, flying, visual	
	American Robin	Turdus migratorius		S			4	calling and males running along ground	
	Northern Cardinal	Cardinalis cardinalis			P		2	male calling, pair flying	
Station 2, June 14, 2018, 7:47-7:57am	Red-winged Blackbird	Agelaius phoeniceus		H			2	2 males visual	
	Blue Jay	Cyanpcitta cristata		S			2	2 males calling	
	Chipping Sparrow	Spizella passerina		S			1	call	
	European Starling	Sturnus vulgaris				FY	1	juvenile calling	
	Yellow Warbler	Setophaga petechai		S			1	call	
	Tree Swallow	Tachycineta bicolor		H			1	flying	
	American Goldfinch	Spinus tritis		H			1	calling/flying	
	Song Sparrow	Melospiza melodia		H			2	calling, flying	
	Red-winged Blackbird	Agelaius phoeniceus			P		1	visual- 1 pair	
	Killdeer	Charadrius vociferus		S			1	calling	
	Common Grackle	Quiscalus quiscula			P		2	visual- 1 pair	
	American Robin	Turdus migratorius		S			1	calling	
	Eastern Phoebe	Sayornis phoebe		S			1	call	
	Black-capped Chickadee	Poecile atricapillus		S			1	call	
Station 3, June 14, 2018, 8:10-8:20am	Song Sparrow	Melospiza melodia		S			1	call	
	Northern Cardinal	Cardinalis cardinalis		S			1	call	
	Common Yellowthroat	Geothlypis trichas		S			1	call	
	Canada Goose	Branta canadensis			P		20	call and flying in V	
	Blue Jay	Cyanpcitta cristata		S			1	call	
	Baltimore Oriole	Icterus galbula		S			1	call	
	Black-and-white Warbler	Mniotilta varia		H			1	visual flying	
	Mourning Dove	Zenaida macroura		S			1	call	
	Eastern Wood-pewee	Contopus virens		S			1	visual and call	
	Yellow Warbler	Setophaga petechai		S			1	call	
	Common Grackle	Quiscalus quiscula		S			1	call	
	Station 4, June 14, 2018, 8:30-8:40am	Turkey Vulture	Cathartes aura		H			1	visual-flying
		Blue Jay	Cyanpcitta cristata		S			1	calling
		Song Sparrow	Melospiza melodia		S			1	calling
Red-winged Blackbird		Agelaius phoeniceus			A		3	2 males, 1 female agitated	
Northern Cardinal		Cardinalis cardinalis		H			1	visual	
American Robin		Turdus migratorius		S			3	call and visual	
Canada Goose		Branta canadensis		H			1	visual-flying	
American Goldfinch		Spinus tritis			P		2	1 pair flying to tree	
Red-tailed Hawk		Buteo jamaicensis		S			1	call	
Black-capped Chickadee		Poecile atricapillus		S			1	call	
House Sparrow		Passer domesticus		S			1	call	
Station 5, June 14, 2018, 8:50-9:00am		European Starling	Sturnus vulgaris				CF	2	visual-carrying food, walking
		Tree Swallow	Tachycineta bicolor		P			8	visual-flying over pond
		American Goldfinch	Spinus tritis		H			1	visual-flying
	Mallard	Anas platyrhynchos			D		9	pairs in pond	

Breeding Bird Survey	Common Name	Scientific Name	OB	PO	PB	CONF	#	Notes
	Common Grackle	Quiscalus quiscula		H			1	visual-flying
	Song Sparrow	Melospiza melodia		S			1	call
	Red-winged Blackbird	Agelaius phoeniceus			P		7	males fighting, female present
	Cedar Waxwing	Bombycilla cedrorum		S			3	visual and call
Station 6, June 14, 2018, 9:10-9:20am	American Robin	Turdus migratorius				FY	1	visual-juvenile, male gathering nesting materials
	Common Grackle	Quiscalus quiscula				AE	5	visual in tree and with nesting material, feeding young
	American Goldfinch	Spinus tritis		S			1	call
	Red-winged Blackbird	Agelaius phoeniceus			P		4	visual-pair
	Barn Swallow	Hirundo rustica		H			3	visual-flying
	Turkey Vulture	Cathartes aura		H			2	flying
	Song Sparrow	Melospiza melodia		S			1	call
	Black-capped Chickadee	Poecile atricapillus		S			1	calling
	Yellow Warbler	Setophaga petechai		S			1	call
Station 7, June 14, 2018, 9:30-9:40am	Common Yellowthroat	Geothlypis trichas		S			1	call
	Red-winged Blackbird	Agelaius phoeniceus		S			3	males calling and visual
	Song Sparrow	Melospiza melodia		S			2	calling
	American Robin	Turdus migratorius		S			1	calling
	Killdeer	Charadrius vociferus		S			1	calling
	European Starling	Sturnus vulgaris		S			6	calling and visual
	Blue Jay	Cyanpcitta cristata		S			1	call and visual, attacking crow
	Eastern Kingbird	Tyrannus tyrannus		H			1	attacking crow
	Tree Swallow	Tachycineta bicolor		H			1	visual
	American Goldfinch	Spinus tritis		H			2	
Station 8, June 14, 2018, 9:45-9:55am	Cedar Waxwing	Bombycilla cedrorum		S			1	call
	Mourning Dove	Zenaida macroura		S			1	call
	Black-capped Chickadee	Poecile atricapillus		S			3	calling
	Red-winged Blackbird	Agelaius phoeniceus		S			1	call
	Common Grackle	Quiscalus quiscula		S			1	call
	American Goldfinch	Spinus tritis		H			1	visual-flying
	American Robin	Turdus migratorius			P		2	pair foraging
	Yellow Warbler	Setophaga petechai		S			1	call
	Eastern Phoebe	Sayornis phoebe		S			1	calling in distance
	Blue Jay	Cyanpcitta cristata			N		2	pair collecting nesting material
	Northern Cardinal	Cardinalis cardinalis		S			1	calling from tree top

Code

Observed

X

Possible Breeding

H

S

Probable Breeding

P

T

D

V

A

B

N

Confirmed Breeding

DD

NU

FY

AE

FS

CF

NE

NY

Table 2 Sunningdale North 2018 - Breeding Bird Survey

Breeding Bird Survey	Common Name	Scientific Name	OB	PO	PB	CONF	#	Notes	
Station 1, July 4, 2018, 7:32-7:42 am	Northern Cardinal	Cardinalis cardinalis		S			1	call	
	Red-winged Blackbird	Agelaius phoeniceus			P		2	pair flying together	
	Chipping Sparrow	Spizella passerina		H			1	visual	
	Barn Swallow	Hirundo rustica			P		2	flying pair	
	Ring-billed Gull	Larus delawarensis		H			1	visual flying	
	House Wren	Troglodytes aedon		S			1	call	
	American Robin	Turdus migratorius		S			2	running along ground/calling	
	Black-capped Chickadee	Poecile atricapillus		S			1	call	
	Field Sparrow	Spizella pusilla		S			1	call	
	Cedar Waxwing	Bombycilla cedrorum				N	2	pair with nesting material	
	Brown-headed Cowbird	Molothrus ater		S			1	visual/call	
	Northern Rough-winged Swallow	Stelgidopteryx serripennis		H			1	flying	
	Northern Flicker	Colaptes auratus		S			1	call	
	Station 2, July 4, 2018, 8:20-8:30am	Northern Cardinal	Cardinalis cardinalis		H			2	visual
Red-winged Blackbird		Agelaius phoeniceus		S			1	call	
Field Sparrow		Spizella pusilla		S			1	call	
Common Grackle		Quiscalus quiscula		S			2	call	
American Goldfinch		Spinus tritis		H			1	visual-flying	
Chimney Swift		Chaetura pelagica		H			1	flying	
Chipping Sparrow		Spizella passerina		S			1	call	
Tree Swallow		Tachycineta bicolor		H			9	visual-flying	
Gray Catbird		Dumetella carolinensis		S			1	call	
Baltimore Oriole		Icterus galbula		S			1	call	
Rose-breasted Grosbeak		Pheucticus ludovicianus		S			1	call	
Station 3, July 4, 2018, 8:35-8:45am		Eastern Phoebe	Sayornis phoebe		S			1	call
		Common Grackle	Quiscalus quiscula		S			4	visual/call
		Northern Cardinal	Cardinalis cardinalis		S			1	call/visual
	Black-capped Chickadee	Poecile atricapillus		S			1	multiple calls	
	Northern Flicker	Colaptes auratus		S			1	call	
	Red-winged Blackbird	Agelaius phoeniceus		H			1	visual	
	Chipping Sparrow	Spizella passerina		S			1	call	
	Great Crested Flycatcher	Myiarchus crinitus		S			1	call, possible visual	
	Blue Jay	Cyanpitta cristata		S			2	calling	
	American Goldfinch	Spinus tritis		S			1	call	
	Yellow-bellied Sapsucker	Sphyrapicus varius		S			1	call	
	Mourning Dove	Zenaida macroura			P		2	pair	
	Cedar Waxwing	Bombycilla cedrorum		S			1	call	
	Song Sparrow	Melospiza melodia		S			1	call	
Tree Swallow	Tachycineta bicolor		H			1	flying		
Pine Warbler	Setophaga pinus		H			1	visual		
Downy Woodpecker	Picoides pubescens		S			1	call, visual		
Station 4, July 4, 2018, 7:46-7:56am	American Robin	Turdus migratorius		S			1	visual/calling	
	Cedar Waxwing	Bombycilla cedrorum		S			2	calling	
	Barn Swallow	Hirundo rustica		H			3	flying/foraging	
	Field Sparrow	Spizella pusilla				FY	3	collecting material, 1 juvenile	
	House Finch	Haemorhous mexicanus		S			1	call	
	Common Grackle	Quiscalus quiscula			P		4	pair, visual	
	Brown-headed Cowbird	Molothrus ater		H			1	visual	
	Cedar Waxwing	Bombycilla cedrorum		S			1	calling	
	Great Blue Heron	Ardea herodias		H			1	flying	
	Tree Swallow	Tachycineta bicolor		H			1	flying	
	American Goldfinch	Spinus tritis		H			3	visual- flying	

Breeding Bird Survey	Common Name	Scientific Name	OB	PO	PB	CONF	#	Notes
Station 5, July 4, 2018, 8:00-8:10	Eastern Kingbird	Tyrannus tyrannus		H			2	visual/foraging
	Barn Swallow	Hirundo rustica		H			3	visual
	Mallard	Anas platyrhynchos		S			10	call/visual
	Canada Goose	Branta canadensis			P		15	visual/call
	Common Yellowthroat	Geothlypis trichas		S			1	call
	Red-winged Blackbird	Agelaius phoeniceus			P		10	pairs/call/visuals
	Field Sparrow	Spizella pusilla		S			1	call
	Cedar Waxwing	Bombycilla cedrorum			P		2	pair- call/visual
	Song Sparrow	Melospiza melodia		S			1	call
	American Robin	Turdus migratorius		S			2	call/visual
	Blue Jay	Cyanpcitta cristata		H			1	visual
	Common Grackle	Quiscalus quiscula			N		1	visual-collecting material
	Red-tailed Hawk	Buteo jamaicensis		S			1	call
	Northern Cardinal	Cardinalis cardinalis		S			1	call from tree top
	House Finch	Haemorhous mexicanus		S			1	call
	Ring-billed Gull	Larus delawarensis		H			1	flying
	American Crow	Corvus brachyrhynchos		S			1	visual/call
Station 6, July 4, 2018, 8:54-9:04am	American Goldfinch	Spinus tritis		S			3	visual/calls
	American Robin	Turdus migratorius				CF	3	2 males fighting, female feeding young in tree
	Red-winged Blackbird	Agelaius phoeniceus		S			2	visual/call
	Blue Jay	Cyanpcitta cristata		S			1	call
	Northern Cardinal	Cardinalis cardinalis		S			1	call
	Song Sparrow	Melospiza melodia		S			1	call
	Common Grackle	Quiscalus quiscula		S			1	call/visual
	Tree Swallow	Tachycineta bicolor		S			1	visual/call
	Barn Swallow	Hirundo rustica		H			1	visual
	European Starling	Sturnus vulgaris		H			1	visual-flying
	Field Sparrow	Spizella pusilla		S			1	call
	Ovenbird	Seiurus aurocapilla		S			1	call
	Red-eyed Vireo	Vireo olivaceus		S			1	call
	Eastern Kingbird	Tyrannus tyrannus		H			2	playing
	Killdeer	Charadrius vociferus		S			1	visual/calling
	Mourning Dove	Zenaida macroura		H			1	flying
	Spotted Sandpiper	Actitis macularius			V		1	visual/call- keeps returning to one area
Yellow Warbler	Setophaga petechai		H			1	visual	
Station 7, July 4, 2018, 9:14-9:24am	Yellow Warbler	Setophaga petechai		S			1	call
	Killdeer	Charadrius vociferus		S			1	call
	Red-winged Blackbird	Agelaius phoeniceus		S			2	call
	American Goldfinch	Spinus tritis		S			3	flying/calling
	Downy Woodpecker	Picoides pubescens		S			1	visual/call
	House Finch	Haemorhous mexicanus		S			1	call
	Field Sparrow	Spizella pusilla		S			1	call
	Song Sparrow	Melospiza melodia		S			1	call
	Chipping Sparrow	Spizella passerina		S			1	call
	Mourning Dove	Zenaida macroura		H			1	visual-flying
	Northern Cardinal	Cardinalis cardinalis		H			1	visual-foraging
	American Robin	Turdus migratorius		S			1	visual/call
	Blue Jay	Cyanpcitta cristata		S			1	call
	Common Grackle	Quiscalus quiscula		H			1	visual
	Purple Martin	Progne subis		S			3	visual/calls
	House Sparrow	Passer domesticus		S			2	call
	Station 8, July 4, 2018, 9:50-10:00am	Northern Cardinal	Cardinalis cardinalis		S			1
Common Grackle		Quiscalus quiscula		S			1	call
Red-winged Blackbird		Agelaius phoeniceus		S			1	visual/call

Breeding Bird Survey	Common Name	Scientific Name	OB	PO	PB	CONF	#	Notes
	Downy Woodpecker	Picoides pubescens		S			1	call-drumming
	House Finch	Haemorhous mexicanus		S			1	call
	Rose-breasted Grosbeak	Pheucticus ludovicianus		H			1	visual
	Gray Catbird	Dumetella carolinis			P		2	pair-visual/call
	Song Sparrow	Melospiza melodia		S			1	call
	Barn Swallow	Hirundo rustica		H			1	visual
	Field Sparrow	Spizella pusilla		S			1	call
	Northern Flicker	Colaptes auratus		S			1	call
	American Goldfinch	Spinus tritis		S			1	call
	House Wren	Troglodytes aedon		S			1	call
	Indigo Bunting	Passerina cyanea		S			1	call
	Yellow Warbler	Setophaga petechai		H			1	visual
	Scarlet Tanager	Piranga olivacea		S			1	call
	Yellow-bellied Sapsucker	Sphyrapicus varius		S			1	call
	Pine Warbler	Setophaga pinus		S			4	calls from conifer tree
	Mourning Warbler	Geothlypis philadelphia		S			1	call
	Nashville Warbler	Oreothlypis ruficapilla		S			1	call
	Common Yellowthroat	Geothlypis trichas		S			2	call

CODE

Observed

X

Possible Breeding

H

S

Probable Breeding

P

T

D

V

A

B

N

Confirmed Breeding

DD

NU

FY

AE

FS

CF

NE

NY

Appendix F

Bird Species

Table 1 Bird Species

Scientific Name	Common Name	S Rank	MNRF	COSEWIC	SARA	OBBA	PIF	Middlesex Local Significance	Middlesex Srank	Ebird Local Records	ERI Observations
Accipitridae	Hawks, Kites, Eagles & Allies										
Accipiter cooperii	Cooper's Hawk	S4	NAR	NAR		CO		L3	S4	x	x
Accipiter striatus	Sharp-shinned Hawk	S5				CO		L3	S5	x	
Buteo jamaicensis	Red-tailed Hawk	S5		NAR		CO			S5	x	x
Buteo lagopus	Rough-legged Hawk	S1B/S4N	NAR	NAR					S1B,S4N	x	
Buteo lineatus	Red-shouldered Hawk	S4B		NAR				L1	S4B	x	x
Buteo platypterus	Broad-winged Hawk	S5B						L2	S5B	x	
Circus cyaneus	Northern Harrier	S4B	NAR	NAR		CO			S4B	x	
Haliaeetus leucocephalus	Bald Eagle	S2N/S4B		NAR				L1	S2N,S4B	x	x
Alaudidae	Larks										
Eremophila alpestris	Horned Lark	S5B				PR		L3	S5B	x	
Alcedinidae	Kingfishers										
Megaceryle alcyon	Belted Kingfisher	S4B/S5B				CO			S4B	x	
Apodidae	Swifts										
Chaetura pelagica	Chimney Swift	S4B/S4N	THR	THR	Schedule 1	CO			S4B,S4N	x	x
Anatidae	Ducks, Geese & Swans										
Aix sponsa	Wood Duck	S5				CO		L4	S5	x	
Anas platyrhynchos	Mallard	S5				CO			S5	x	x
Anas rubripes	American Black Duck	S4						L2	S4	x	
Branta canadensis	Canada Goose	S5				CO			S5	x	x
Branta hutchinsii	Cackling Goose	S4M								x	
Bucephala albeola	Bufflehead	S4							S4	x	
Bucephala clangula	Common Merganser	S5B/S5N							S5	x	
Cygnus columbianus	Tundra Swan	S4							S4	x	
Ardeidae	Hérons and Bitterns										
Ardea alba	Great Egret	S2B							S2B	x	
Ardea herodias	Great Blue Heron	S4				PO			S4	x	x
Butorides virescens	Green Heron	S4B				PR		L3	S4B	x	
Bombycillidae	Waxwings										
Bombycilla cedrorum	Cedar Waxwing	S5B				CO			S5B	x	x
Caprimulgidae	Nightjars										
Chordeiles minor	Common Nighthawk	S4B		THR		PR		L1	S4B	x	
Cardinalidae	Cardinals, Grosbeaks & Allies										
Cardinalis cardinalis	Northern Cardinal	S5				CO			S5	x	x
Passerina cyanea	Indigo Bunting	S4B				CO			S4B	x	x
Pheucticus ludovicianus	Rose-breasted Grosbeak	S4B				CO			S4B	x	x
Piranga olivacea	Scarlet Tanager	S4B				CO		L2	S4B	x	x
Cathartidae	Vultures										
Cathartes aura	Turkey Vulture	S5B				CO		L3	S5B	x	x
Certhiidae	Creepers										
Certhia americana	Brown Creeper	S5B				CO		L2	S5B	x	

Scientific Name	Common Name	S Rank	MNRF	COSEWIC	SARA	OBBA	PIF	Middlesex Local Significance	Middlesex Srank	Ebird Local Records	ERI Observations
Charadriidae	Plovers										
Charadrius vociferus	Killdeer	S5B/S5N				CO			S5B,S5N	x	x
Columbidae	Pigeons & Doves										
Columba livia	Rock Pigeon	SNA				CO			SNA	x	
Zenaida macroura	Mourning Dove	S5				CO			S5	x	x
Corvidae	Crows & Jays										
Corvus brachyrhynchos	American Crow	S5B/S4N				CO			S5B	x	x
Cyanocitta cristata	Blue Jay	S5				CO			S5	x	x
Cuculidae	Cuckoo & Anis										
Coccyzus americanus	Yellow-billed Cuckoo	S4B				PO		L3	S4B	x	
Emberizidae	New World Sparrows & Allies										
Junco hyemalis	Dark-eyed Junco	S5B							S5B	x	
Melospiza georgiana	Swamp Sparrow	S5B				CO		L2	S5B	x	
Melospiza melodia	Song Sparrow	S5B/S4N				CO			S5B	x	x
Passer domesticus	House Sparrow	SNA							SNA	x	x
Passerculus sandwichensis	Savannah Sparrow	S4B				CO		L1	S4B	x	
Passerella iliaca	Fox Sparrow	S4B							S4B	x	
Pipilo erythrophthalmus	Eastern Towhee	S4B				PR		L2	S4B	x	
Spizella arborea	American Tree Sparrow	S4B							S4B	x	
Spizella passerina	Chipping Sparrow	S5B/S4N				CO			S5B	x	x
Spizella pusilla	Field Sparrow	S4B						L3	S4B	x	
Tachycineta bicolor	Tree Swallow	S4B							S4B	x	x
Zonotrichia albicollis	White-throated Sparrow	S5B				PO		L2	S5B	x	
Zonotrichia leucophrys	White-crowned Sparrow	S4B							S4B	x	
Falconidae	Carcaras & Falcons										
Falco columbarius	Merlin	S5B		NAR					S5B	x	
Falco peregrinus	Peregrine Falcon	S3B		SC					S3B	x	
Falco sparverius	American Kestrel	S4				CO		L2	S4	x	
Fringillidae	Finches & Allies										
Haemorhous mexicanus	House Finch	SNA				CO			SNA	x	x
Haemorphous purpureus	Purple Finch	S4B						L3	S4B	x	
Loxia leucoptera	White-winged Crossbill	S5B							S5B	x	
Spinus pinus	Pine Siskin	S4B							S4B	x	
Spinus tristis	American Goldfinch	S5B/S4N				CO		L3	S5B	x	x
Gaviidae	Loons										
Gavia immer	Common Loon	S5B,S5N			NAR				S5B,S5N	x	
Gruidae	Cranes										
Grus canadensis	Sandhill Crane	S5B							S5B	x	
Hirundinidae	Swallows										
Hirundo rustica	Barn Swallow	S4B	THR	THR	No Schedule	CO		L3	S4B	x	x
Progne subis	Purple Martin	S3/S4B				CO		L2	S4B	x	x
Stelgidopteryx serripennis	Northern Rough-winged Swallow	S4B				CO		L2	S4B	x	x

Scientific Name	Common Name	S Rank	MNRF	COSEWIC	SARA	OBBA	PIF	Middlesex Local Significance	Middlesex Srank	Ebird Local Records	ERI Observations
Tachycineta bicolor	Tree Swallow	S4B				CO			S4B		x
Icteridae	New World Blackbird										
Agelaius phoeniceus	Red-winged Blackbird	S4/S5				CO			S4	x	x
Dolichonyx oryzivorus	Bobolink	S4B	THR	THR		CO	RD	L2	S4B	x	
Euphagus carolinus	Rusty Blackbird	S4B	NAR	SC	Schedule 1				S4B	x	
Icterus galbula	Baltimore Oriole	S4B				CO			S4B	x	x
Icterus spurius	Orchard Oriole	S4B				CO		L4	S4B	x	
Molothrus ater	Brown-headed Cowbird	S4B				CO			S4B	x	x
Quiscalus quiscula	Common Grackle	S5B/S4N				CO			S5B	x	x
Laridae	Gulls, Terns & Skimmers										
Larus argentatus	Herring Gull	S5B/S5N							S5B,S5N	x	
Larus delawarensis	Ring-billed Gull	S5B/S4N							S5B,S4N	x	x
Mimidae	Mockingbirds, Thrashers & Allies										
Dumetella carolinensis	Gray Catbird	S4B				CO		L4	S4B	x	x
Toxostoma rufum	Brown Thrasher	S4B				PR		L1	S4B	x	
Motacillidae											
Anthus rubescens	American Pipit	S4							S4	x	
Pandionidae	Osprey										
Pandion haliaetus	Osprey	S5B							S5B	x	
Paridae	Chickadees and Titmice										
Poecile atricapillus	Black-capped Chickadee	S5				CO		L4	S5	x	x
Parulidae	Wood Warblers										
Cardellina canadensis	Canada Warbler	S4B		THR			RD	L2	S4B	x	
Cardellina pusilla	Wilson's Warbler	S4B							S4B	x	
Colaptes auratus	Northern Flicker	S4B				CO			S4B	x	x
Geothlypis philadelphia	Mourning Warbler	S4B						L2	S4B	x	x
Geothlypis trichas	Common Yellowthroat	S5B				PR			S5B	x	x
Mniotilta varia	Black-and-white Warbler	S5B						L3	S5B	x	x
Oreothlypis celata	Orange-crowned Warbler	S4B							S4B	x	
Oreothlypis peregrina	Tennessee Warbler	S5B							S5B	x	
Oreothlypis ruficapilla	Nashville Warbler	S5B						L2	S5B	x	x
Setophaga americana	Northern Parula	S4B							S4B	x	
Setophaga caerulescens	Black-throated Blue Warbler	S5B							S5B	x	
Setophaga castanea	Bay-breasted Warbler	S5B							S5B	x	
Setophaga coronata	Yellow Rumped Warbler	S5B						L3	S5B	x	
Setophaga dominica	Yellow-throated Warbler	SNA								x	
Setophaga magnolia	Magnolia Warbler	S5B						L1	S5B	x	
Setophaga palmarum hypochrysea	Eastern Palm Warbler	S1B							S1B	x	
Setophaga pensylvanica	Chestnut-sided warbler	S5B				PR		L1	S5B	x	
Setophaga petechia	Yellow Warbler	S5B				CO			S5B	x	x
Setophaga pinus	Pine Warbler	S5B						L3	S5B	x	x
Setophaga ruticilla	American Redstart	S5B				PR		L2	S5B	x	

Scientific Name	Common Name	S Rank	MNRF	COSEWIC	SARA	OBBA	PIF	Middlesex Local Significance	Middlesex Srank	Ebird Local Records	ERI Observations
Setophaga striata	Blackpoll Warbler	S4B							S4B	x	
Setophaga tigrina	Cape May Warbler	S5B					RD		S5B	x	
Setophaga virens	Black-throated Green Warbler	S5B						L2	S5B	x	
Vermivora cyanoptera	Blue-winged Warbler	S4B				PO		L1	S4B	x	
Phalacrocoracidae		Cormorants									
Phalacrocorax auritus	Double-crested Cormorant	S5B		NAR					S5B	x	
Phasianidae		Patridges, Grouse, Turkeys									
Meleagris gallopavo	Wild Turkey	S5				CO			S5	x	x
Picidae		Woodpeckers									
Dryocopus pileatus	Pileated Woodpecker	S5						L2	S5	x	
Leuconotopicus villosus	Hairy Woodpecker	S5				CO				x	x
Melanerpes carolinus	Red-bellied Woodpecker	S4				CO		L1	S4	x	x
Picoides pubescens	Downy Woodpecker	S5				CO			S5	x	x
Sphyrapicus varius	Yellow-bellied Sapsucker	S5B				CO		L2	S5B	x	x
Poliioptilidae		Gnatcatchers									
Poliioptila caerulea	Blue-gray Gnatcatcher	S4B				PO		L4	S4B	x	
Rallidae		Railes, Gallinules & Coots									
Rallus limicola	Virginia Rail	S5B				PR		L1	S5B	x	
Regulidae		Kinglets									
Regulus calendula	Ruby-crowned Kinglet	S4B						L4	S4B	x	
Regulus satrapa	Golden-crowned Kinglet	S5B						L3	S5B	x	
Scolopacidae		Sandpipers, Phalaropes & Allies									
Actitis macularius	Spotted Sandpiper	S5				PR		L3	S5	x	
Calidris minutilla	Least Sandpiper	S4B/S5N							S4B,S5N	x	
Scolopax minor	American Woodcock	S4B				PO		L4	S4B	x	
Sittidae		Nutchatches									
Sitta canadensis	Red-breasted Nuthatch	S5				PR		L3	S5	x	
Sitta carolinensis	White-breasted Nuthatch	S5				CO			S5	x	x
Strigidae		Typical Owls									
Bubo virginianus	Great Horned Owl	S5				CO			S4	x	
Sturnidae		Starlings									
Sturnus vulgaris	European Starling	SNA				CO			SNA	x	x
Trochillidae		Hummingbirds									
Archilochus colubris	Ruby-throated Hummingbird	S5B				PR		L2	S5B	x	
Troglodytidae		Wrens									
Thryothorus ludovicianus	Carolina Wren	S4				CO		L3	S4	x	
Troglodytes aedon	House Wren	S5B				CO			S5B	x	x
Troglodytes hiemalis	Winter Wren	S5B				PO		L4	S5B	x	
Turdidae		Thrushes									
Catharus fuscescens	Veery	S4B				PO		L3	S4B	x	
Catharus guttatus	Hermit Thrush	S5B							S5B	x	
Catharus minimus	Gray-cheeked Thrush	S4B							S4B	x	

Scientific Name	Common Name	S Rank	MNRF	COSEWIC	SARA	OBBA	PIF	Middlesex Local Significance	Middlesex Srank	Ebird Local Records	ERI Observations
Catharus ustulatus	Swainson's Thrush	S4B							S4B	x	
Hylocichla mustelina	Wood Thrush	S4B	THR	SC	No Schedule	PR	RD	L4	S4B	x	
Sialia sialis	Eastern Bluebird	S5B	NAR	NAR		CO		L1	S5B	x	
Turdus migratorius	American Robin	S5B				CO			S5B	x	x
Tyrannidae	Tyrant Flycatchers										
Contopus cooperi	Olive-sided Flycatcher	S4B		THR			RD		S4B	x	
Contopus virens	Eastern Wood-pewee	S4B	SC	SC	No Schedule	PR			S4B	x	x
Empidonax alnorum	Alder Flycatcher	S5B						L3	S5B	x	
Empidonax flaviventris	Yellow-bellied Flycatcher	S5B							S5B	x	
Empidonax minimus	Least Flycatcher	S4B				PO		L3	S4B	x	
Empidonax traillii	Willow Flycatcher	S5B				CO			S5B	x	
Myiarchus crinitus	Great Crested Flycatcher	S4B				PR			S4B	x	x
Sayornis phoebe	Eastern Phoebe	S5B/S4N				CO		L3	S5B	x	x
Tyrannus tyrannus	Eastern Kingbird	S4B				CO		L3	S4B	x	x
Vireonidae	Vireos										
Vireo gilvus	Warbling Vireo	S5B				PR			S5B	x	
Vireo olivaceus	Red-eyed Vireo	S5B				CO			S5B	x	
Vireo solitarius	Blue-headed Vireo	S5B						L3	S5B	x	
									0	141	55

Appendix G

Amphibian and Reptiles List

Table 1 Reptile and Amphibian Survey

Scientific Name	Common Name	S Rank	MNRF	COSEWIC	SARA	Ontario Atlas	ERI Observtions
Turtles							
<i>Emydoidea blandingii</i>	Blanding's Turtle	S3	THR	END	Schedule 1	x	
<i>Sternotherus odoratus</i>	Eastern Musk Turtle	S3	SC	SC	Schedule 1		
<i>Chrysemys picta marginata</i>	Midland Painted Turtle	S4				x	
<i>Graptemys geographica</i>	Northern Map Turtle	S3	SC	SC	Schedule 1	x	
<i>Chelydra serpentina</i>	Snapping Turtle	S3	SC	SC	Schedule 1	x	
<i>Clemmys guttata</i>	Spotted Turtle	S2	END	END	Schedule 1		
<i>Glyptemys insculpta</i>	Wood Turtle	S2	END	THR	Schedule 1		
<i>Trachemys scripta elegans</i>	Red-eared Slider	SNA				x	
Snakes							
<i>Storeria dekayi</i>	Dekay's Brownsnake	S5	NAR	NAR		x	
<i>Thamnophis sirtalis sirtalis</i>	Eastern Gartersnake	S5				x	x
<i>Lampropeltis triangulum</i>	Milksnake	S4	NAR	SC	Schedule 1	x	
<i>Disdophis punctatus</i>	Ring-necked snake	S4					
<i>Nerodia sipedon sipedon</i>	Northern Watersnake	S5	NAR	NAR			
<i>Storeria occipitomaculata</i>	Red-bellied snake	S5					
<i>Opheodrys vernalis</i>	Smooth Greensnake	S4					
<i>Regina septemvittata</i>	Queensnake	S2	END	END	Schedule 1	x	
<i>Heterodon platirhinos</i>	Eastern hog-nosed snake	S3	THR	THR	Schedule 1	x	
Salamanders							
<i>Plethodon cinereus</i>	Eastern Red-backed Salamander	S5				x	
<i>Ambystoma hybrid</i>	Jefferson X Blue-spotted Salamander	S2/S4					
<i>Notophthalmus viridescens viridescens</i>	Eastern Newt	S4?					
<i>Ambystoma maculatum</i>	Spotted Salamander	S4					
<i>Necturus maculosus</i>	Mudpuppy	S4	NAR	NAR		x	
Frogs and Toads							
<i>Lithobates catesbeianus</i>	American Bullfrog	S4				x	x
<i>Anaxyrus americanus</i>	American Toad	S5				x	x
<i>Hyla versicolor</i>	Gray Treefrog	S5				x	x
<i>Lithobates clamitans</i>	Green Frog	S5				x	x
<i>Lithobates pipiens</i>	Northern Leopard Frog	S5	NAR	NAR		x	
<i>Lithobates palustris</i>	Pickerel Frog	S4	NAR	NAR		x	
<i>Pseudacris crucifer</i>	Spring Peeper	S5				x	x

Scientific Name	Common Name	S Rank	MNRF	COSEWIC	SARA	Ontario Atlas	ERI Observtions
<i>Pseudacris triseriata</i>	Western Chorus Frog	S5				x	
<i>Lithobates sylvaticus</i>	Wood Frog	S5				x	
					Total	21	6

Legend

S Rank		COSEWIC	
S1	Critically Imperiled	NAR	Not at Risk
S2	Imperiled	SC	Special Concern
S3	Vulnerable	T	Threatened
S4	Apparently Secure	E	Endangered
S5	Secure	XT	Extirpated
SU	Unrankable	DD	Data Deficient
SNA	Unranked		
SX	Presumed Extirpated		
SH	Possibly Extirpated		
S#?	Rank Uncertain		

COSSARO		SARA Schedule	
NAR	Not at Risk	Schedule 1	Officially protected under SARA
SC	Special Concern	Schedule 2	Threatened/Endangered; may be reassessed for consideration for inclusion to Schedule 1
THR	Threatened	Schedule 3	Special concern; may be reassessed for consideration for inclusion to Schedule 1
END	Endangered		
EXP	Extirpated		
DD	Data Deficient		

Appendix H

Mammals List

Table 1 Mammal Species Reported

Scientific Name	Common Name	S Rank	MNRF	COSEWIC	SARA	Mammal Atlas	ERI Observations
Didelphimorphia	Opposums						
<i>Didelphis virginiana</i>	Virginia Opossum	S4					
Insectivora	Shrews and Moles						
<i>Blarina brevicausa</i>	Northern Short-tailed Shrew	S5				x	
<i>Condylura cristata</i>	Star-nosed Mole	S5					
<i>Sorex fumeus</i>	Smoky Shrew	S5					
Chiroptera	Bats						
<i>Myotis septentrionalis</i>	Northern Myotis	S3	END	END	Schedule 1		
<i>Eptesicus fuscus</i>	Big Brown Bat	S4					
<i>Lasionycteris noctivagans</i>	Silver-haired Bat	S4					
<i>Lasiurus borealis</i>	Red Bat	S4					
<i>Lasiurus cinereus</i>	Hoary Bat	S4					
<i>Myotis leibii</i>	Eastern Small-footed Myotis	S2/S3	END	END			
<i>Myotis lucifugus</i>	Little Brown Myotis	S4	END	END	Schedule 1	x	
<i>Perimyotis subflavus</i>	Tricolored Bat	S3	END	END	Schedule 1		
Lagomorpha	Rabbits and Hares						
<i>Lepus europaeus</i>	European Hare	SNA					
<i>Sylvilagus floridanus</i>	Eastern Cottontail	S5				x	x
Rodentia	Rodents						
<i>Castor canadensis</i>	Beaver	S5				x	
<i>Marmota monax</i>	Woodchuck	S5				x	x
<i>Microtus pennsylvanicus</i>	Meadow Vole	S5				x	
<i>Napaeozapus insignis</i>	Woodland Jumping Mouse	S5					
<i>Ondatra zibethicus</i>	Muskrat	S5					x
<i>Peromyscus leucopus</i>	White-footed Mouse	S5				x	
<i>Peromyscus maniculatus</i>	Deer Mouse	S5				x	
<i>Rattus norvegicus</i>	Norway Rat	SNA					
<i>Sciurus carolinensis</i>	Eastern Grey Squirrel	S5				x	x
<i>Tamiasciurus hudsonicus</i>	Red Squirrel	S5				x	x
<i>Tamias striatus</i>	Eastern Chipmunk	S5				x	x
Carnivora	Carnivores						
<i>Canis latrans</i>	Coyote	S5				x	
<i>Lynx rufus</i>	Bobcat	S4					
<i>Mephitis mephitis</i>	Striped Skunk	S5				x	x
<i>Mustela erminea</i>	Ermine	S5				x	
<i>Mustela frenata</i>	Long-tailed Weasel	S4					
<i>Mustela vison</i>	American Mink	S4				x	

Scientific Name	Common Name	S Rank	MNRF	COSEWIC	SARA	Mammal Atlas	ERI Observations
Procyon lotor	Northern Raccoon	S5				X	x
Vulpes vulpes	Red Fox	S5				x	
Artiodactyla	Deer and Bison						
Odocoileus virginianus	White-tailed Deer	S5				x	x
					Total	18	9

Legend

S Rank

S1 Critically Imperiled
 S2 Imperiled
 S3 Vulnerable
 S4 Apparently Secure
 S5 Secure
 SU Unrankable
 SNA Unranked
 SX Presumed Extirpated
 SH Possibly Extirpated
 S#? Rank Uncertain

COSEWIC

NAR Not at Risk
 SC Special Concern
 T Threatened
 E Endangered
 XT Extirpated
 DD Data Deficient

COSSARO

NAR Not at Risk
 SC Special Concern
 THR Threatened
 END Endangered
 EXP Extirpated
 DD Data Deficient

SARA Schedule

Schedule 1 Officially protected under SARA
 Schedule 2 Threatened/Endangered; may be reassessed for consideration for inclusion to Schedule 1
 Schedule 3 Special concern; may be reassessed for consideration for inclusion to Schedule 1

Appendix I

Butterfly List

Table 1 Butterfly Species Inventory

Scientific Name	Common Name	S Rank	MNRF	COSEWIC	SARA	NHIC	TEA ATLAS	ERI Observations
<i>Aglais milberti</i>	Milbert's Tortoiseshell	S5					x	
<i>Asterocampa clyton</i>	Tawny Emperor	S3					x	
<i>Cercyonis pegala</i>	Common Wood-Nymph	S5					x	
<i>Danaus plexippus</i>	Monarch	S2N, S4B	SC	END	Schedule 1		x	x
<i>Erynnis brizo</i>	Sleepy Duskywing	S1					x	
<i>Euphyes dion</i>	Dion Skipper	S4					x	x
<i>Euphyes vestris</i>	Dun Skipper	S5					x	
<i>Lethe eurydice</i>	Eyed Brown	S5					x	
<i>Limenitis arthemis arthemis</i>	White Admiral	S5					x	
<i>Lycaena epixanthe</i>	Bog Copper	S4/S5					x	
<i>Lycaena hyllus</i>	Bronze Copper	S5					x	
<i>Nymphalis antiopa lintnerii</i>	Lintner's Mourning Cloak	S5					x	
<i>Papilio polyxenes</i>	Black Swallowtail	S5					x	
<i>Pieris oleracea</i>	Mustard White	S4					x	x
<i>Pieris rapae</i>	Cabbage White	SNA					x	x
<i>Poanes hobomok</i>	Hobomok Skipper	S5					x	
<i>Poanes viator</i>	Broad-winged Skipper	S4					x	
<i>Polites peckius</i>	Peck's Skipper	S5					x	
<i>Polites themistocles</i>	Tawny-edged Skipper	S5					x	
<i>Polygonia comma</i>	Eastern Comma	S5					x	
<i>Polygonia interrogationis</i>	Question Mark	S5					x	
<i>Satyrium calanus</i>	Banded Hairstreak	S4					x	
<i>Speyeria aphrodite</i>	Aphrodite Fritillary	S5					x	
<i>Thymelicus lineola</i>	European Skipper	SNA					x	x
<i>Vanessa atalanta</i>	Red Admiral	S5					x	
<i>Vanessa cardui</i>	Painted Lady	S5					x	
<i>Vanessa virginiensis</i>	American Lady	S5					x	
<i>Wallengrenia egeremet</i>	Northern Broken-Dash	S5					x	
					Total	0	28	5

Legend

S Rank		COSEWIC	
S1	Critically Imperiled	NAR	Not at Risk
S2	Imperiled	SC	Special Concern
S3	Vulnerable	T	Threatened
S4	Apparently Secure	E	Endangered
S5	Secure	XT	Extirpated
SU	Unrankable	DD	Data Deficient
SNA	Unranked		
SX	Presumed Extirpated		
SH	Possibly Extirpated		
S#?	Rank Uncertain		

COSSARO		SARA Schedule	
NAR	Not at Risk	Schedule 1	Officially protected under SARA
SC	Special Concern	Schedule 2	Threatened/Endangered; may be reassessed for consideration for inclusion to Schedule 1
THR	Threatened	Schedule 3	Special concern; may be reassessed for consideration for inclusion to Schedule 1
END	Endangered		
EXP	Extirpated		
DD	Data Deficient		

Appendix J

Fish Inventory

Table 1 Fish Species Inventory

Scientific Name	Common Name	S Rank	MNRF	COSEWIC	SARA	Locally Significant	NHIC	UTRCA	ERI Observations
Cypriniformes									
Campostoma anomalum	Central Stoneroller	S4		NAR				X	
Carassius auratus	Goldfish	SNA							X
Cyprinus carpio	Common Carp	SNA						X	
Nocomis biguttatus	Hornyhead Chub	S4		NAR				X	
Nocomis micropogon	River Chub	S4		NAR				X	
Notropis photogenis	Silver Shiner	S2S3		THR				X	
Notropis rubellus	Rosyface Shiner	S4		NAR				X	
Notropis volucellus	Mimic Shiner	S5						X	
Pimephales notatus	Bluntnose Minnow	S5	NAR	NAR				X	
Pimephales promelas	Fathead Minnow	S5							X
Rhinichthys atratulus	Blacknose Dace	S5						X	
Semotilus atromaculatus	Creek Chub	S5						X	X
Cyprinella spiloptera	Spotfin Shiner	S4						X	
Luxilus chrysocephalus	Striped Shiner	S4		NAR				X	
Luxilus cornutus	Common Shiner	S5						X	X
Lythrurus umbratilis	Redfin Shiner	S4		NAR				X	
Cariodes cyprinus	Quillback	S4						X	
Catostomus commersonii	White Sucker	S5						X	
Hypentelium nigricans	Northern Hog Sucker	S4						X	
Moxostoma anisurum	Silver Redhorse	S4						X	
Moxostoma duquesnei	Black Redhorse	S2		THR				X	
Moxostoma erythrurum	Golden Redhorse	S4		NAR				X	
Moxostoma valenciennesi	Greater Redhorse	S3					X	X	
Esociformes									
Esox lucius	Northern Pike	S5						X	
Perciformes									
Ambloplites rupestris	Rock Bass	S5						X	X
Lepomis cyanellus	Green Sunfish	S4		NAR				X	
Lepomis gibbosus	Pumpkinseed	S5						X	X
Micropterus dolomieu	Smallmouth Bass	S5						X	
Micropterus salmoides	Largemouth Bass	S5						X	X
Etheostoma blennioides	Greenside Darter	S4		NAR				X	
Etheostoma caeruleum	Rainbow Darter	S4						X	
Etheostoma flabellare	Fantail Darter	S4						X	
Etheostoma microperca	Least Darter	S4		NAR				X	
Etheostoma nigrum	Johnny Darter	S5						X	

Scientific Name	Common Name	S Rank	MNRF	COSEWIC	SARA	Locally Significant	NHIC	UTRCA	ERI Observations
Perca flavescens	Yellow Perch	S5						x	
Percina maculata	Blackside Darter	S4						x	
Lepomis peltastes	Northern Longear Sunfish	S3		NAR				x	
Salmoniformes									
Oncorhynchus mykiss	Rainbow Trout	SNA						x	
Siluriformes									
Noturus flavus	Stonecat	S4						x	
					Total	0	1	37	7

Legend

S Rank		COSEWIC	
S1	Critically Imperiled	NAR	Not at Risk
S2	Imperiled	SC	Special Concern
S3	Vulnerable	T	Threatened
S4	Apparently Secure	E	Endangered
S5	Secure	XT	Extirpated
SU	Unrankable	DD	Data Deficient
SNA	Unranked		
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SH	Possibly Extirpated		
S#?	Rank Uncertain		

COSSARO		SARA Schedule	
NAR	Not at Risk	Schedule 1	Officially protected under SARA
SC	Special Concern	Schedule 2	Threatened/Endangered; may be reassessed for consideration for inclusion to Schedule 1
THR	Threatened	Schedule 3	Special concern; may be reassessed for consideration for inclusion to Schedule 1
END	Endangered		
EXP	Extirpated		
DD	Data Deficient		

Appendix K

Aquatic Photolog

Sunningdale Road Aquatic Habitat Assessment



Photo 1. Downstream of Sunningdale Road looking north (Oct 2018).



Photo 4. Downstream of Sunningdale Road Logjam (October 2018).



Photo 2. Downstream of Sunningdale Road Section (October 2018).



Photo 5. Downstream of Sunningdale Road looking south (October 2018).



Photo 3. Downstream of Sunningdale Road looking north (October 2018).



Photo 6. Culvert at Downstream side of Sunningdale Road (October 2018).



Photo 7. Upstream Culvert under Sunningdale Road (October 2018).



Photo 10. Axford drain culvert from Pond facing north (June 2018).



Photo 8. Culvert along Axford Drain north of Sunningdale Road (October 2018).



Photo 11. Pond A looking south towards Sunningdale Road (June 2018).



Photo 9. Axford Drain north of Sunningdale Road on golf course facing south (October 2018).



Photo 12. Axford Drain upstream of Pond A (October 2018).



Photo 13. A pool in the Axford Drain (October 2018).



Photo 16. Pond B looking north (October 2018).



Photo 14. A riffle in the Axford Drain (October 2018).



Photo 17. Pond C looking east (June 2018).



Photo 15. Inlet from Pond B within Axford Drain (October 2018).



Photo 18. Axford drain looking west towards Wonderland Road (October 2018).



Photo 19. Axford Drain looking towards Wonderland Road (June 2018).



Photo 22. Drainage ditch running alongside agricultural field (October 2018.)



Photo 20. Large CSP under Wonderland Road facing West (June 2018).

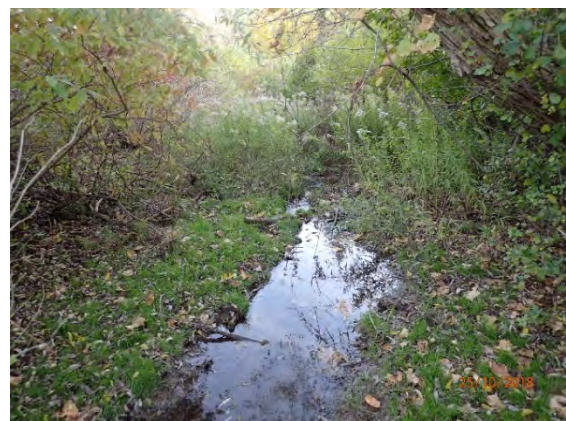


Photo 23. Forgotten tributary looking south towards 16 Thompson green (October 2018).



Photo 21. Axford Drain looking west on private property (June 2018).



Photo 24. Forgotten tributary looking north towards 15 Thompson fairway (October 2018).



Photo 25. Tributary A looking west between 3 Robinson and 11 Thompson fairway (October 2018).



Photo 28. Small wetland at the west extent of Tributary A (June 2017).



Photo 26. Tributary A looking west between 3 Robinson and 11 Thompson fairway (June 2018).



Photo 29. Irrigation Pond looking northwest (June 2018).



Photo 27. Tributary A looking west between 3 Robinson and 11 Thompson fairway (June 2018).



Photo 30. Irrigation Pond facing west (June 2018).

Appendix L

Significant Wildlife Habitat

Table 1 Sunningdale North 2018 - Significant Wildlife Habitat Assessment

Wildlife Habitat	Wildlife Species	Candidate SWH ELC Ecosite Codes	Candidate SWH Habitat Criteria and Information Sources	Confirmed SWH Defining Criteria	Study Area Assessment Details
Wildlife Habitat: Waterfowl Stopover and Staging Areas (Terrestrial)					
Rationale: Habitat important for migrating waterfowl	American Black Duck Blue-winged Teal Gadwall Green-winged Teal Northern Shoveler Tundra Swan American Wigeon Northern Pintail	CUM1 CUT1 - Plus evidence of annual spring flooding from melt water or run-off within these Ecosites. - Fields with seasonal flooding and waste grain in the Long Point, Rondeau, Pt. Pelee, Lake St. Clair, Grand Bend areas may be important for Tundra Swans.	Fields with sheet water during Spring (mid March to May). * Field flooding during spring melt and run-off provides important invertebrate foraging habitat for migrating waterfowl. *Agricultural fields with waste grains are commonly used by waterfowl, these are not considered SWH unless they have spring sheet water available. <u>Information Sources:</u> Anecdotal information from the landowners or local naturalist clubs may be good information in determining occurrence * Reports and other information available from Conservation Authorities *Sites documented through waterfowl planning processes *Field Naturalists Clubs *Ducks Unlimited *Natural Heritage Information Center (NHIC) Waterfowl Concentration Area	Studies carried out and verified presence of annual concentration of any listed species, evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects. * Any mixed aggregations of 100 or more individuals required. *The area of flooded field ecosite habitat plus a 100-300m radius buffer dependent on local site conditions and adjacent land use is the significant wildlife habitat *Annual use of habitat is documented from information sources or field studies (annual use can be based on studies or determined by past surveys with species numbers and dates). *SWH MISTcxlix Index #7 provides development effects and mitigation measures.	SWH type not present
Wildlife Habitat: Waterfowl Stopover and Staging Areas (Aquatic)					
Rationale: Important for local and migrant waterfowl populations during the spring or fall migration or both periods combined. Sites identified are usually only one of a few in the eco-district.	Canada Goose Cackling Goose Snow Goose American Black Duck Northern Pintail Northern Shoveler American Wigeon Gadwall Green-winged Teal Blue-winged Teal Hooded Merganser Common Merganser Lesser Scaup Greater Scaup Long-tailed Duck Surf Scoter White-winged Scoter Black Scoter Ring-necked duck Common Goldeneye Bufflehead Redhead Ruddy Duck Red-breasted Merganser Brant Canvasback	MAS1 MAS2 MAS3 SAS1 SAM1 SAF1 SWD1 SWD2 SWD3 SWD4 SWD5 SWD6 SWD7	• Ponds, marshes, lakes, bays, coastal inlets, and watercourses used during migration. Sewage treatment ponds and storm water ponds do not qualify as a reservoir managed as a large wetland or pond/lake does qualify. • These habitats have an abundant food supply (mostly aquatic invertebrates and vegetation in shallow water) <u>Information Sources:</u> • Environment Canada • Naturalist clubs often are aware of staging/stopover areas. • OMNRF Wetland Evaluations indicate presence of locally and regionally significant waterfowl staging. • Sites documented through waterfowl planning processes (eg. EHJV implementation plan) • Ducks Unlimited projects • Element occurrence specification by Nature Serve: http://www.natureserve.org • Natural Heritage Information Centre (NHIC) Waterfowl Concentration Area	Studies carried out and verified presence of: • Aggregations of 100 [±] or more of listed species for 7 days [±] , results in > 700 waterfowl use days • Areas with annual staging of ruddy ducks, canvasbacks, and redheads are SWH cxlix • The combined area of the ELC ecosites and a 100m radius area is the SWH cxlviii • Wetland area and shorelines associated with sites identified within the SWHTG cxlviii Appendix K cxlix are significant wildlife habitat. • Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects"ccxi • Annual Use of Habitat is Documented from Information Sources or Field Studies (Annual can be based on completed studies or determined from past surveys with species numbers and dates recorded). • SWH MISTcxlix Index #7 provides development effects and mitigation measures.	SWH type not present

Wildlife Habitat	Wildlife Species	Candidate SWH ELC Ecosite Codes	Candidate SWH Habitat Criteria and Information Sources	Confirmed SWH Defining Criteria	Study Area Assessment Details
Wildlife Habitat: Shorebird Migratory Stopover Area					
<p>Rationale: High quality shorebird stopover habitat is extremely rare and typically has a long history of use.</p>	<p>Greater Yellowlegs Lesser Yellowlegs Marbled Godwit Hudsonian Godwit Black-bellied Plover American GoldenPlover Semipalmated Plover Solitary Sandpiper Spotted Sandpiper Semipalmated Sandpiper Pectoral Sandpiper White-rumped Sandpiper Baird's Sandpiper Least Sandpiper Purple Sandpiper Stilt Sandpiper Short-billed Dowitcher Red-necked Phalarope Whimbrel Ruddy Turnstone Sanderling</p>	<p>BBO1 BBO2 BBS1 BBS2 BBT1 BBT2 SDO1 SDS2 SDT1 MAM1 MAM2 MAM3 MAM4 MAM5</p>	<ul style="list-style-type: none"> • Shorelines of lakes, rivers and wetlands, including beach areas, bars and seasonally flooded, muddy and un-vegetated shoreline habitats. • Great Lakes coastal shorelines, including groynes and other forms of armour rock lakeshores, are extremely important for migratory shorebirds in May to mid-June and early July to October. • Sewage treatment ponds and storm water ponds do not qualify as a SWH. <p><u>Information Sources:</u></p> <ul style="list-style-type: none"> • Western hemisphere shorebird reserve network. • Canadian Wildlife Service (CWS) Ontario Shorebird Survey. • Bird Studies Canada • Ontario Nature • Local birders and naturalist clubs • Natural Heritage Information Centre (NHIC) Shorebird Migratory Concentration Area 	<p>Studies confirming:</p> <ul style="list-style-type: none"> • Presence of 3 or more of listed species and > 1000☉shorebird use days during spring or fall migration period. (shorebird use days are the accumulated number of shorebirds counted per day over the course of the fall or spring migration period) Whimbrel stop briefly (<24hrs) during spring migration, any site with >100☉ Whimbrel used for 3 years or more is significant. • The area of significant shorebird habitat includes the mapped ELC shoreline ecosites plus a 100m radius area cxlviii • Evaluation methods to follow “Bird and Bird Habitats: Guidelines for Wind Power Projects”ccxi • SWH MISTcxlix Index #8 provides development effects and mitigation measures. 	<p>SWH type not present. Spotted Sandpiper noted on site during field surveys.</p>
Wildlife Habitat: Raptor Wintering Area					
<p>Rationale: Sites used by multiple species, a high number of individuals and used annually are most significant.</p>	<p>Rough-legged Hawk Red-tailed Hawk Northern Harrier American Kestrel Snowy Owl Special Concern: Short-eared Owl Bald Eagle</p>	<p>Hawks/Owls: Combination of ELC Community Series; need to have present one Community Series from each land class;</p> <p>Forest: FOD, FOM, FOC.</p> <p>Upland: CUM; CUT; CUS; CUW.</p> <p>Bald Eagle: Forest community Series: FOD, FOM, FOC, SWD, SWM or SWC on shoreline areas adjacent to large rivers or adjacent to lakes with open water (hunting area).</p>	<ul style="list-style-type: none"> • The habitat provides a combination of fields and woodlands that provide roosting, foraging and resting habitats for wintering raptors. • Raptor wintering (hawk/owl)sites need to be > 20 ha cxlviii, cxlix with a combination of forest and upland.xvi, xvii, xviii, xix, xx, xxi. • Least disturbed sites, idle/fallow or lightly grazed field/meadow (>15ha) with adjacent woodlands cxlix • Field area of the habitat is to be wind swept with limited snow depth or accumulation. • Eagle sites have open water and large trees and snags available for roosting cxlix <p><u>Information Sources:</u></p> <ul style="list-style-type: none"> • OMNRF Ecologist or Biologist • Naturalist clubs • Natural Heritage Information Centre (NHIC) Raptor Winter Concentration Area • Data from Bird Studies Canada • Results of Christmas Bird Counts • Reports and other information available from Conservation Authorities 	<p>Studies confirm the use of these habitats by:</p> <ul style="list-style-type: none"> • One or more Short-eared Owls or; One of more Bald Eagles or; At least10 individuals and two of the listed hawk/owl species☉ • To be significant a site must be used regularly (3 in 5 years) cxlix for a minimum of 20 days by the above number of birds☉. • The habitat area for an Eagle winter site is the shoreline forest ecosites directly adjacent to the prime hunting area☉ • Evaluation methods to follow “Bird and Bird Habitats: Guidelines for Wind Power Projects”ccxi • SWH MISTcxlix Index #10 and #11 provides development effects and mitigation measures. 	<p>The study area has not currently been assessed. Surveys to take place in winter 2018/2019. Candidate SWH.</p>

Wildlife Habitat	Wildlife Species	Candidate SWH ELC Ecosite Codes	Candidate SWH Habitat Criteria and Information Sources	Confirmed SWH Defining Criteria	Study Area Assessment Details
Wildlife Habitat: Bat Hibernacula					
Rationale: Bat hibernacula are rare habitats in all Ontario landscapes	Big Brown Bat Tri-coloured Bat	Bat Hibernacula may be found in these ecosites: CCR1 CCR2 CCA1 CCA2 (Note: buildings are not considered to be SWH)	<ul style="list-style-type: none"> Hibernacula may be found in caves, mine shafts, underground foundations and Karsts. Active mine sites should not be considered as SWH The locations of bat hibernacula are relatively poorly known. <u>Information Sources</u> <ul style="list-style-type: none"> OMNRF for possible locations and contact for local experts Natural Heritage Information Centre (NHIC) Bat Hibernaculum Ministry of Northern Development and Mines for location of mine shafts. Clubs that explore caves (eg. Sierra Club) University Biology Departments with bat experts. 	<ul style="list-style-type: none"> All sites with confirmed hibernating bats are SWH ⑤. The area includes 200m radius around the entrance of the hibernaculum cxlviii, ccvii, ⑤ for most development types and 1000m for wind farms ccv. Studies are to be conducted during the peak swarming period (Aug. – Sept.). Surveys should be conducted following methods outlined in the “Bats and Bat Habitats: Guidelines for Wind Power Projects”ccv. • SWH MISTcxlix Index #1 provides development effects and mitigation measures	SWH type not present.
Wildlife Habitat: Bat Maternity Colonies					
Rationale: Known locations of forested bat maternity colonies are extremely rare in all Ontario landscapes.	Big Brown Bat Silver-haired Bat	Maternity colonies considered SWH are found in forested Ecosites. All ELC Ecosites in ELC Community Series: FOD FOM SWD SWM	<ul style="list-style-type: none"> Maternity colonies can be found in tree cavities, vegetation and often in buildings xxii, xxv, xxvi, xxvii, xxxi (buildings are not considered to be SWH). Maternity roosts are not found in caves and mines in Ontarioxxii. Maternity colonies located in Mature deciduous or mixed forest standsccix, ccx, ccv with >10/ha large diameter (>25cm dbh) wildlife treesccvii Female Bats prefer wildlife tree (snags) in early stages of decay, class 1-3 ccxiv or class 1 or 2 ccxii . Silver-haired Bats prefer older mixed or deciduous forest and form maternity colonies in tree cavities and small hollows. Older forest areas with at least 21 snags/ha are preferredccx, lxiv <u>Information Sources:</u> <ul style="list-style-type: none"> OMNRF for possible locations and contact for local experts University Biology Departments with bat experts 	<ul style="list-style-type: none"> Maternity Colonies with confirmed use by; >10 Big Brown Bats⑤ • >5 Adult Female Silverhaired Bats⑤ The area of the habitat includes the entire woodland or a forest stand ELC Ecosite or an Ecoelement containing the maternity colonies⑤. Evaluation methods for maternity colonies should be conducted following methods outlined in the “Bats and Bat Habitats: Guidelines forWind Power Projects” ccv. SWH MISTcxlix Index #12 provides development effects and mitigation measures. 	Wooded areas (FOD7, FOD7-3, CUP3-8, CUP3-9) is present within the study area. Potential for bat roosting trees to be present. Targeted bat surveys were not completed within the study area. A bat cavity tree assessment should be completed prior to removal of any trees. Candidate SWH
Wildlife Habitat: Bat Migratory Stopover Area					
Rationale: Stopover areas for long distance migrant bats are important during fall migration. Hoary Bat Eastern Red Bat Silver-haired Bat	Hoary Bat, Eastern Red Bat, Silver-haired Bat	No specific ELC types.	<ul style="list-style-type: none"> Long distance migratory bats typically migrate during late summer and early fall from summer breeding habitats throughout Ontario to southern wintering areas. Their annual fall migration may concentrate these species of bats at stopover areas. This is the only known bat migratory stopover habitats based on current information. Information Sources OMNRF for possible locations and contact for local experts University of Waterloo, Biology Department 	<ul style="list-style-type: none"> Long Point (42°35'N, 80°30'E, to 42°33'N, 80°03'E) has been identified as a significant stop-over habitat for fall migrating Silver-haired Bats, due to significant increases in abundance, activity and feeding that was documented during fall migration ccxv. The confirmation criteria and habitat areas for this SWH are still being determined. SWH MIST cxlix Index #38 provides development effects and mitigation measures 	SWH type not present. Not SWH.

Wildlife Habitat	Wildlife Species	Candidate SWH ELC Ecosite Codes	Candidate SWH Habitat Criteria and Information Sources	Confirmed SWH Defining Criteria	Study Area Assessment Details
Wildlife Habitat: Turtle Wintering Areas					
<p>Rationale: Generally sites are the only known sites in the area. Sites with the highest number of individuals are most significant.</p>	<p>Midland Painted Turtle Special Concern: Northern Map Turtle Snapping Turtle</p>	<p>Snapping and Midland Painted Turtles; ELC Community Classes; SW, MA, OA and SA, ELC Community Series; FEO and BOO Northern Map Turtle; Open Water areas such as deeper rivers or streams and lakes with current can also be used as over-wintering habitat</p>	<ul style="list-style-type: none"> For most turtles, wintering areas are in the same general area as their core habitat. Water has to be deep enough not to freeze and have soft mud substrates. Over-wintering sites are permanent water bodies, large wetlands, and bogs or fens with adequate Dissolved Oxygen cix, cx, cxi, cxii Man-made ponds such as sewage lagoons or storm water ponds should not be considered SWH. <p><u>Information Sources:</u></p> <ul style="list-style-type: none"> EIS studies carried out by Conservation Authorities. Field Naturalists Clubs OMNRF Ecologist or Biologist Natural Heritage Information Centre (NHIC) 	<ul style="list-style-type: none"> Presence of 5 over-wintering Midland Painted Turtles is significant[Ⓔ]. One or more Northern Map Turtle or Snapping Turtle over-wintering within a wetland is significant[Ⓔ]. The mapped ELC ecosite area with the over wintering turtles is the SWH. If the hibernation site is within a stream or river, the deepwater pool where the turtles are over wintering is the SWH. Over wintering areas may be identified by searching for congregations (Basking Areas) of turtles on warm, sunny days during the fall (Sept. – Oct.) or spring (Mar– May) cvii. Congregation of turtles is more common where wintering areas are limited and therefore significant cix, cx, cxi, cxii. SWH MISTcxlix Index #28 provides development effects and mitigation measures for turtle wintering habitat. 	<p>Permanent waterbodies (ponds) are present within the study area, however they are human created, thus are not considered SWH. The City of London believe these ponds to be habitat, therefore for the purposes of this report ERI will consider these features as candidate.</p> <p>Candidate SWH.</p>
Wildlife Habitat: Reptile Hibernaculum					
<p>Rationale: Generally sites are the only known sites in the area. Sites with the highest number of individuals are most significant.</p>	<p>Snakes: Eastern Gartersnake Northern Watersnake Northern Red-bellied Snake Northern Brownsnake Smooth Green Snake Northern Ring-necked Snake Special Concern: Milksnake Eastern Ribbonsnake</p>	<p>For all snakes, habitat may be found in any ecosite other than very wet ones. Talus, Rock Barren, Crevice, Cave, and Alvar sites may be directly related to these habitats. Observations or congregations of snakes on sunny warm days in the spring or fall is a good indicator.</p>	<ul style="list-style-type: none"> For snakes, hibernation takes place in sites located below frost lines in burrows, rock crevices and other natural or naturalized locations. The existence of features that go below frost line; such as rock piles or slopes, old stone fences, and abandoned crumbling foundations assist in identifying candidate SWH. Areas of broken and fissured rock are particularly valuable since they provide access to subterranean sites below the frost line^{lxiv}, l, li, lii, cxii . Wetlands can also be important over-wintering habitat in conifer or shrub swamps and swales, poor fens, or depressions in bedrock terrain with sparse trees or shrubs with sphagnum moss or sedge hummock ground cover. <p><u>Information Sources:</u></p> <ul style="list-style-type: none"> In spring, local residents or landowners may have observed the emergence of snakes on their property (e.g. old dug wells). Reports and other information available from Conservation Authorities. Field Naturalist Clubs University herpetologists Natural Heritage Information Centre (NHIC) 	<p>Studies confirming:</p> <ul style="list-style-type: none"> Presence of snake hibernacula used by a minimum of five individuals of a snake sp. or; individuals of two or more snake spp. Congregations of a minimum of five individuals of a snake sp. or; individuals of two or more snake spp. near potential hibernacula (eg. foundation or rocky slope) on sunny warm days in Spring (Apr/May) and Fall (Sept/Oct)[Ⓔ] Note: If there are Special Concern Species present, then site is SWH • Note: Sites for hibernation possess specific habitat parameters (e.g. temperature, humidity, etc.) and consequently are used annually, often by many of the same individuals of a local population (i.e. strong hibernation site fidelity). Other critical life processes (e.g. mating) often take place in close proximity to hibernacula. The feature in which the hibernacula is located plus a 30 m radius area is the SWH[Ⓔ] SWH MISTcxlix Index #13 provides development effects and mitigation measures for snake hibernacula. 	<p>No areas to access sites below the frost line observed and no rocky habitat. Not SWH.</p>

Wildlife Habitat	Wildlife Species	Candidate SWH ELC Ecosite Codes	Candidate SWH Habitat Criteria and Information Sources	Confirmed SWH Defining Criteria	Study Area Assessment Details
Wildlife Habitat: Colonially-Nesting Bird Breeding Habitat (Bank and Cliff)					
Rationale: Historical use and number of nests in a colony make this habitat significant. An identified colony can be very important to local populations. All swallow population are declining in Ontario.	Cliff Swallow Northern Roughwinged Swallow (this species is not colonial but can be found in Cliff Swallow colonies)	Eroding banks, sandy hills, borrow pits, steep slopes, and sand piles Cliff faces, bridge abutments, silos, barns. Habitat found in the following ecosites: CUM1 CUT1 CUS1 BLO1 BLS1 BLT1 CLO1 CLS1 CLT1	<ul style="list-style-type: none"> Any site or areas with exposed soil banks, undisturbed or naturally eroding that is not a licensed/permitted aggregate area. Does not include man-made structures (bridges or buildings) or recently (2 years) disturbed soil areas, such as berms, embankments, soil or aggregate stockpiles. Does not include a licensed/permitted Mineral Aggregate Operation. <p><u>Information Sources:</u></p> <ul style="list-style-type: none"> Reports and other information available from Conservation Authorities. Ontario Breeding Bird Atlas Bird Studies Canada; NatureCounts http://www.birdscanada.org/birdmon/ Field Naturalist Clubs. 	Studies confirming: <ul style="list-style-type: none"> Presence of 1 or more nesting sites with 8cxlix or more cliff swallow pairs and/or rough-winged swallow pairs during the breeding season. A colony identified as SWH will include a 50m radius habitat area from the peripheral nestscvii Field surveys to observe and count swallow nests are to be completed during the breeding season. Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects"ccxi SWH MISTcxlix Index #4 provides development effects and mitigation measures 	No large banks present within the habitat Northern Rough-winged Swallow observed during breeding bird surveys and incidentally during other site surveys. No nests observed. Not SWH.
Wildlife Habitat: Colonially-Nesting Bird Breeding Habitat (Trees/Shrubs)					
Rationale; Large colonies are important to local bird population, typically sites are only known colony in area and are used annually.	Great Blue Heron Black-crowned Night Heron Great Egret Green Heron	SWM2 SWM3 SWM5 SWM6 SWD1 SWD2 SWD3 SWD4 SWD5 SWD6 SWD7 FET1	<ul style="list-style-type: none"> Nests in live or dead standing trees in wetlands, lakes, islands, and peninsulas. Shrubs and occasionally emergent vegetation may also be used. Most nests in trees are 11 to 15 m from ground, near the top of the tree. Information Sources • Ontario Breeding Bird Atlas ccv, colonial nest records. Ontario Heronry Inventory 1991 available from Bird Studies Canada or NHIC (OMNRF). Natural Heritage Information Centre (NHIC) Mixed Wader Nesting Colony Aerial photographs can help identify large heronries. Reports and other information available from Conservation Authorities. MNRF District Offices. Field Naturalist Clubs. 	Studies confirming: <ul style="list-style-type: none"> Presence of 2(€) or more active nests of Great Blue Heron or other listed species. The habitat extends from the edge of the colony and a minimum 300m radius or extent of the Forest Ecosite containing the colony or any island<15.0ha with a colony is the SWH cc, ccvii Confirmation of active heronries are to be achieved through site visits conducted during the nesting season (April to August) or by evidence such as the presence of fresh guano, dead young and/or eggshells SWH MISTcxlix Index #5 provides development effects and mitigation measures. 	SWH type not present
Wildlife Habitat: Colonially-Nesting Bird Breeding Habitat (Ground)					
Rationale: Colonies are important to local bird population, typically sites are only known colony in area and are used annually.	Herring Gull Great Black-backed Gull Little Gull Ring-billed Gull Common Tern Caspian Tern Brewer's Blackbird	Any rocky island or peninsula (natural or artificial) within a lake or large river (two-lined on a 1;50,000 NTS map). Close proximity to watercourses in open fields or pastures with scattered trees or shrubs (Brewer's Blackbird) MAM1 – 6 MAS1 – 3 CUM CUT CUS	<ul style="list-style-type: none"> Nesting colonies of gulls and terns are on islands or peninsulas associated with open water or in marshy areas. Brewers Blackbird colonies are found loosely on the ground in or in low bushes in close proximity to streams and irrigation ditches within farmlands. Information Sources Ontario Breeding Bird Atlas, rare/colonial species records. Canadian Wildlife Service Reports and other information available from Conservation Authorities. Natural Heritage Information Centre (NHIC) Colonial Waterbird Nesting Area MNRF District Offices. Field Naturalist Clubs. 	Studies confirming: <ul style="list-style-type: none"> Presence of > 25 active nests for Herring Gulls or Ring-billed Gulls, >5 active nests for Common Tern or >2 active nests for Caspian Tern(€). Presence of 5 or more pairs for Brewer's Blackbird(€). Any active nesting colony of one or more Little Gull, and Great Black-backed Gull is significant(€). The edge of the colony and a minimum 150m radius area of habitat, or the extent of the ELC ecosites containing the colony or any island <3.0ha with a colony is the SWH cc, ccvii Studies would be done during May/June when actively nesting. Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects"ccxi SWH MISTcxlix Index #6 provides development effects and mitigation measures. 	Ring-billed gull observed flying overhead during breeding bird survey, but not found using site. SWH type not present

Wildlife Habitat	Wildlife Species	Candidate SWH ELC Ecosite Codes	Candidate SWH Habitat Criteria and Information Sources	Confirmed SWH Defining Criteria	Study Area Assessment Details
Wildlife Habitat: Migratory Butterfly Stopover Areas					
<p>Rationale: Butterfly stopover areas are extremely rare habitats and are biologically important for butterfly species that migrate south for the winter</p>	<p>Painted Lady Red Admiral <u>Special Concern</u> Monarch</p>	<p>Combination of ELC Community Series; need to have present one Community Series from each landclass:</p> <p><u>Field:</u> CUM CUT CUS</p> <p><u>Forest:</u> FOC FOD FOM CUP</p> <p>Anecdotally, a candidate site for butterfly stopover will have a history of butterflies being observed.</p>	<p>A butterfly stopover area will be a minimum of 10 ha in size with a combination of field and forest habitat present, and will be located within 5 km of Lake Erie or Lake Ontario cxlix.</p> <ul style="list-style-type: none"> The habitat is typically a combination of field and forest, and provides the butterflies with a location to rest prior to their long migration south xxxii, xxxiii, xxxiv, xxxv, xxxvi. The habitat should not be disturbed, fields/meadows with an abundance of preferred nectar plants and woodland edge providing shelter are requirements for this habitat cxlviii, cxlix. Staging areas usually provide protection from the elements and are often spits of land or areas with the shortest distance to cross the Great Lakes xxxvii, xxxviii, xxxix, xl, xli. <p><u>Information Sources:</u></p> <ul style="list-style-type: none"> MNRF District Offices Natural Heritage Information Centre (NHIC) Agriculture Canada in Ottawa may have list of butterfly experts. Field Naturalist Clubs Toronto Entomologists 	<p>Studies confirm: • The presence of Monarch Use Days (MUD) during fall migration (Aug/Oct)xl. MUD is based on the number of days a site is used by Monarchs, multiplied by the number of individuals using the site. Numbers of butterflies can range from 100-500/dayxxxvii, significant variation can occur between years and multiple years of sampling should occur xl, xlii.</p> <ul style="list-style-type: none"> Observational studies are to be completed and need to be done frequently during the migration period to estimate MUD. MUD of >5000 or >3000 with the presence of Painted Ladies or Red Admiral's is to be considered significant.ⓔ SWH MIST cxlix Index #16 provides development effects and mitigation measures. 	<p>Not within 5 km of Lake Ontario. Milkweed and Monarchs recorded on site. SWH type not present.</p>
Wildlife Habitat: Landbird Migratory Stopover					
<p>Rationale: Sites with a high diversity of species as well as high numbers are most significant.</p>	<p>All migratory songbirds. Canadian Wildlife Service Ontario website: http://www.ec.gc.ca/nature/default.asp?lang=En&n=421B7A9D-1 All migrant raptors species: Ontario Ministry of Natural Resources: Fish and Wildlife Conservation Act, 1997. Schedule 7: Specially Protected Birds (Raptors)</p>	<p>All Ecosites associated with these ELC Community Series; FOC FOM FOD SWC SWM SWD</p>	<ul style="list-style-type: none"> Woodlots >5 haⓔ in size and within 5 km iv, v, vi, vii, viii, ix, x, xi, xii, xiii, xiv, xv of Lake Erie and Lake Ontario. If woodlands are rare in an area of shoreline, woodland fragments 2-5ha can be considered for this habitatⓔ If multiple woodlands are located along the shoreline those Woodlands <2km from Lake Erie and Lake Ontario are more significant cxlix Sites have a variety of habitats; forest, grassland and wetland complexes cxlix. The largest sites are more significant cxlix Woodlots and forest fragments are important habitats to migrating birdsccxviii, these features located along the shore and located within 5km of Lake Erie and Lake Ontario are Candidate SWH cxlviii. <p><u>Information Sources:</u></p> <ul style="list-style-type: none"> Bird Studies Canada Ontario Nature Local birders and field naturalist clubs 	<p>Studies confirm:</p> <ul style="list-style-type: none"> Use of the habitat by >200 birds/day and with >35 spp with at least 10 bird spp. recorded on at least 5 different survey datesⓔ. This abundance and diversity of migrant bird species is considered above average and significant. Studies should be completed during spring (Mar to May) and fall (Aug to Oct) migration using standardized assessment techniques. Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects"ccxi SWH MIST cxlix Index #9 provides development effects and mitigation measures. 	<p>Not within 5 km of Lake Ontario. SWH type not present</p>

Wildlife Habitat	Wildlife Species	Candidate SWH ELC Ecosite Codes	Candidate SWH Habitat Criteria and Information Sources	Confirmed SWH Defining Criteria	Study Area Assessment Details
Wildlife Habitat: Deer Winter Congregation Areas					
<p>Rationale: Deer movement during winter in the southern areas of Ecoregion 7E are not constrained by snow depth, however deer will annually congregate in large numbers in suitable woodlands to reduce or avoid the impacts of winter conditions cxlviii.</p>	<p>White-tailed Deer</p>	<p>All Forested Ecosites with these ELC Community Series; FOC FOM FOD SWC SWM SWD</p> <p>Conifer plantations much smaller than 50 ha may also be used.</p>	<ul style="list-style-type: none"> • Woodlots >100 ha in size or if large woodlots are rare in a planning area woodlots>50haⒺ • Deer movement during winter in the southern areas of Ecoregion 7E are not constrained by snow depth, however deer will annually congregate in large numbers in suitable woodlands cxlviii. • Large woodlots > 100ha and up to 1500 ha are known to be used annually by densities of deer that range from 0.1-1.5 deer/ha ccxxiv. • Woodlots with high densities of deer due to artificial feeding are not significantⒺ. Information Sources • MNR District Offices. • LIO/NRVIS 	<p>Studies confirm:</p> <ul style="list-style-type: none"> • Deer management is an MNR responsibility, deer winter congregation areas considered significant will be mapped by MNR cxlviii. • Use of the woodlot by whitetailed deer will be determined by MNR, all woodlots exceeding the area criteria are significant, unless determined not to be significant by MNR Ⓔ • Studies should be completed during winter (Jan/Feb) when >20cm of snow is on the ground using aerial survey techniquesccxxiv , ground or road surveys. or a pellet count deer density surveyccxxv. • SWH MIST cxlix Index #2 provides development effects and mitigation measures. 	<p>White-tailed deer present on site during the summer months. SWH type not present</p>

Table 2 Rare Vegetation Community - Sunningdale North 2018 - Significant Wildlife Habitat Assessment

	ELC Ecosite Codes	Habitat Description	Detailed Information and Sources	Defining Criteria	Assessment Details
Cliffs and Talus Slopes					
Rationale: Cliffs and Talus Slopes are extremely rare habitats in Ontario.	Any ELC Ecosite within Community Series: TAO CLO TAS CLS TAT CLT	A Cliff is vertical to near vertical bedrock >3m in height. A Talus Slope is rock rubble at the base of a cliff madeup of coarse rocky debris	Most cliff and talus slopes occur along the Niagara Escarpment. <u>Information Sources:</u> • The Niagara Escarpment Commission hasdetailed information on location of these habitats. • OMNRF Districts • Natural Heritage Information Centre (NHIC) has location information available on their website • Field Naturalist Clubs • Conservation Authorities	• Confirm any ELC Vegetation Type for Cliffs or Talus Slopes lxxviii • SWH MISTcxlix Index #21 provides development effects and mitigation measures.	SWH type not present.
Sand Barren					
Rationale: Sand barrens are rare in Ontario and support rare species. Most Sand Barrens have been lost due to cottage development and forestry	ELC Ecosites: SBO1 SBS1 SBT1 Vegetation cover varies from patchy and barren to continuous meadow (SBO1), thicketlike (SBS1), or more closed and treed (SBT1). Tree cover always < 60%.	Sand Barrens typically are exposed sand, generally sparsely vegetated and caused by lack of moisture, periodic fires and erosion. Usually located within other types of natural habitat such as forest or savannah. Vegetation can vary from patchy and barren to tree covered, but less than 60%.	A sand barren area >0.5ha in size(Ⓔ). <u>Information Sources:</u> • OMNRF Districts. • Natural Heritage Information Centre (NHIC) has location information available on their website. • Field Naturalist Clubs • Conservation Authorities	• Confirm any ELC Vegetation Type for Sand Barrens lxxviii • Site must not be dominated by exotic or introduced species (<50% vegetative cover are exotic sp.)Ⓔ. • SWH MISTcxlix Index #20 provides development effects and mitigation measures.	SWH type not present.
Alvar					
Rationale: Alvars are extremely rare habitatas in Ecoregion 7E.	ALO1 ALS1 ALT1 FOC1 FOC2 CUM2 CUS2 CUT2-1 CUW2 Five Alvar Indicator Species: 1) Carex crawei 2) Panicum philadelphicum 3) Eleocharis compressa 4) Scutellaria parvula 5) Trichostema brachiatum These indicator species are very specific to Alvars within Ecoregion	An alvar is typically a level, mostly unfractured calcareous bedrock feature with a mosaic of rock pavements and bedrock overlain by a thin veneer of soil. The hydrology of alvars is complex, with alternating periods of inundation and drought. Vegetation cover varies from sparse lichen-moss associations to grasslands and shrublands and comprising a number of characteristic or indicator plants. Undisturbed alvars can be phyto- and zoogeographically diverse, supporting many uncommon or are relict plant and animals species. Vegetation cover varies from patchy to barren with a less than 60% tree cover lxxviii.	An Alvar site > 0.5 ha in size lxxv. Alvar is particularly rare in Ecoregion 7E where theonly known sites are found in the western islands of Lake Erie.cxcix <u>Information Sources:</u> • Alvars of Ontario (2000), Federation of Ontario Naturalists lxxvi. • Ontario Nature – Conserving Great Lakes Alvarsccviii. • Natural Heritage Information Centre (NHIC) has location information available on their website. • OMNRF Staff. • Field Naturalist Clubs. • Conservation Authorities.	• Field studies that identify four of the fiveⒺ Alvar Indicator Species lxxv, cxlix at a Candidate Alvar site is Significant. • Site must not be dominated byexotic or introduced species (<50% vegetative cover are exotic sp.). • The alvar must be in excellent condition and fit in with surrounding landscape with few conflicting land uses lxxv • SWH MISTcxlix Index #17 provides development effects and mitigation measures.	SWH type not present.

	ELC Ecosite Codes	Habitat Description	Detailed Information and Sources	Defining Criteria	Assessment Details
Old Growth Forest					
Rationale: Due to historic logging practices and land clearance for agriculture, old growth forest is rare in Ecoregion 7E.	Forest Community Series: FOD FOC FOM SWD SWC SWM	Old Growth forests are characterized by heavy mortality or turnover of overstorey trees resulting in a mosaic of gaps that encourage development of a multi-layered canopy and an abundance of snags and downed woody debris.	Woodland area is >0.5ha. <u>Information Sources:</u> • OMNRF Forest Resource Inventory mapping • OMNRF Districts. • Field Naturalist Clubs • Conservation Authorities • Sustainable Forestry Licence (SFL) companies will possibly know locations through field operations. • Municipal forestry departments	Field Studies will determine: • If dominant trees species of the are >140 years old, then the area containing these trees is Significant Wildlife Habitat cxlviii • The forested area containing the old growth characteristics will have experienced no recognizable forestry activities cxlviii (cut stumps will not be present) • The area of forest ecosites combined or an eco-element within an ecosite that contain the old growth characteristics is the SWH. • Determine ELC vegetation types for the forest area containing the old growth characteristics lxxviii • SWH MISTcxlix Index #23 provides development effects and mitigation measures	SWH type not present.
Savannah					
Rationale: Savannahs are extremely rare habitats in Ontario.	TPS1 TPS2 TPW1 TPW2 CUS2	A Savannah is a tallgrass prairie habitat that has tree cover between 25 – 60%lxxix, lxxx, lxxxi, lxxxii, lxxxiii. In ecoregion 7E, known Tallgrass Prairie and savannahremnants are scattered between Lake Huron and Lake Erie, near Lake St. Clair, north of and along the Lake Erie shoreline, in Brantford and in the Toronto area (north of Lake Ontario).	No minimum size to site (E). Site must be restored or a natural site. Remnant sites such as railway right of ways are not considered to be SWH. <u>Information Sources</u> • Natural Heritage Information Centre (NHIC) has location data available on their website. • OMNRF Districts. • Field Naturalists Clubs. • Conservation Authorities.	Field studies confirm one or more of the Savannah indicator species listed in cxlix Appendix N should be present (E). Note: Savannah plant spp. list from Ecoregion 7E should be usedcxlviii. • Area of the ELC Ecosite is the SWH. • Site must not be dominated by exotic or introduced species (exotic sp.). • SWH MISTcxlix Index #18 provides development effects and mitigation measures	SWH type not present.
Tallgrass Prairie					
Rationale: Tallgrass Prairies are extremely rare habitats in Ontario.	TPO1 TPO2	A Tallgrass Prairie has ground cover dominated by prairie grasses. An open Tallgrass Prairie habitat has < 25% tree cover lxxix, lxxx, lxxxi, lxxxii, lxxxiii . In ecoregion 7E, known Tallgrass Prairie and savannah remnants are scattered between Lake Huron and Lake Erie, near Lake St. Clair, north of and along the Lake Erie shoreline, in Brantford and in the Toronto area (north of Lake Ontario).	No minimum size to site (E). Site must be restored or a natural site. Remnant sites such as railway right of ways are not considered to be SWH. <u>Information Sources:</u> • OMNRF Districts. • Natural Heritage Information Centre (NHIC) has location information available on their website. • Field Naturalists Clubs. • Conservation Authorities.	Field studies confirm one or more of the Prairie indicator species listed in cxlix Appendix N should be present (E). Note: Prairie plant spp. list from Ecoregion 7E should be usedcxlviii • Area of the ELC Ecosite is the SWH. • Site must not be dominated by exotic or introduced species (<50% vegetative cover are exotic sp.). • SWH MISTcxlix Index #19 provides development effects and mitigation measures.	SWH type not present.

	ELC Ecosite Codes	Habitat Description	Detailed Information and Sources	Defining Criteria	Assessment Details
Other Rare Vegetation Communities					
Rationale: Plant communities that often contain rare species which depend on the habitat for survival.	Provincially Rare S1, S2 and S3 vegetation communities are listed in Appendix M of the SWHTGcxlvi. Any ELC Ecosite Code that has a possible ELC Vegetation Type that is Provincially Rare is Candidate SWH.	Rare Vegetation Communities may include beaches, fens, forest, marsh, barrens, dunes and swamps.	<p>ELC Ecosite codes that have the potential to be a rare ELC Vegetation Type as outlined in appendix M cxlvi.</p> <p>The OMNRF/NHIC will have up to date listing for rare vegetation communities.</p> <p>Information Sources</p> <ul style="list-style-type: none"> • Natural Heritage Information Centre (NHIC) has location information available on their website. • OMNRF Districts. • Field Naturalists Clubs. • Conservation Authorities. 	<p>Field studies should confirm if an ELC Vegetation Type is a rare vegetation community based on listing within Appendix M of SWHTGcxlvi.</p> <ul style="list-style-type: none"> • Area of the ELC Vegetation Type polygon is the SWH. • SWH MIST cxlix Index #37 provides development effects and mitigation measures. 	SWH type not present.

Table 3 Specialized Wildlife Habitat - Sunningdale North 2018 - Significant Wildlife Habitat Assessment

Specialized Wildlife Habitat: Waterfowl Nesting Area	Wildlife Species	ELC Ecosite Codes	Habitat Criteria and Information Sources	Defining Criteria	Assessment Details
<p>Rationale: Important to local waterfowl populations, sites with greatest number of species and highest number of individuals are significant.</p>	<p>American Black Duck Northern Pintail Northern Shoveler Gadwall Blue-winged Teal Green-winged Teal Wood Duck Hooded Merganser Mallard</p>	<p>All upland habitats located adjacent to these wetland ELC Ecosites are Candidate SWH: MAS1 MAS2 MAS3 SAS1 SAM1 SAF1 MAM1 MAM2 MAM3 MAM4 MAM5 MAM6 SWT1 SWT2 SWD1 SWD2 SWD3 SWD4</p> <p>Note: includes adjacency to Provincially Significant</p>	<p>A waterfowl nesting area extends 120 m cxlx from a wetland (> 0.5 ha) or a wetland (>0.5ha) and any small wetlands (0.5ha) within 120m or a cluster of 3 or more small (<0.5 ha) wetlands within 120 m of each individual wetland where waterfowl nesting is known to occur cxlx.</p> <ul style="list-style-type: none"> Upland areas should be at least 120 m wide so that predators such as racoons, skunks, and foxes have difficulty finding nests. Wood Ducks and Hooded Mergansers utilize large diameter trees (40cm dbh) in woodlands for cavity nest sites. <p>Information Sources:</p> <ul style="list-style-type: none"> Ducks Unlimited staff may know the locations of particularly productive nesting sites. OMNRF Wetland Evaluations for indication of significant waterfowl nesting habitat. Reports and other information available from Conservation Authorities. 	<p>Studies confirmed:</p> <ul style="list-style-type: none"> Presence of 3 or more nesting pairs for listed species excluding Mallards(̄), or; Presence of 10 or more nesting pairs for listed species including Mallards(̄). Any active nesting site of an American Black Duck is considered significant. Nesting studies should be completed during the spring breeding season (April - June). Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects"ccxi A field study confirming waterfowl nesting habitat will determine the boundaryof the waterfowl nesting habitat for the SWH, this may be greater or less than 120 m cxlviii from the wetland and will provide enough habitat for waterfowl to successfully nest. SWH MISTcxlix Index #25 provides development effects and mitigation measures. 	<p>SWH type not present.</p>
<p>Rationale: Nest sites are fairly uncommon in Ecoregion 7E and are used annually by these species. Many suitable nesting locations may be lost due to increasing shoreline development pressures and scarcity of habitat.</p>	<p>Osprey Special Concern: Bald Eagle</p>	<p>ELC Forest Community Series: FOD, FOM, FOC, SWD, SWM and SWC directly adjacent to riparian areas – rivers, lakes, ponds and wetlands</p>	<p>Nests are associated with lakes, ponds, rivers or wetlands along forested shorelines, islands, or on structures over water.</p> <ul style="list-style-type: none"> Osprey nests are usually at the top a tree whereas Bald Eagle nests are typically in super canopy trees in a notch within the tree's canopy. Nests located on man-made objects are not to be included as SWH (e.g. telephone poles and constructed nesting platforms). Information Sources Natural Heritage Information Centre (NHIC) compiles all known nesting sites for Bald Eagles in Ontario. MNR values information (LIO/NRVIS) will list known nesting locations. Note: data from NRVIS is provided as a point anddoes not represent all the habitat. Nature Counts, Ontario Nest Records Scheme data. OMNRF District. Check the Ontario Breeding Bird Atlas ccv or Rare Breeding Birds in Ontario for species documented Reports and other information available from Conservation Authorities. Field Naturalists clubs 	<p>Studies confirm the use of these nests by:</p> <ul style="list-style-type: none"> One or more active Osprey or Bald Eagle nests in an areacxlviii . Some species have more than one nest in a given area and priority is given to the primary nest with alternate nests included within the area of the SWH. For an Osprey, the active nest and a 300 m radius around the nest or the contiguous woodland stand is the SWH ccvii, maintaining undisturbed shorelines with large trees within this area is important cxlviii. For a Bald Eagle the active nest and a 400-800 m radius around the nest is the SWH. cvii, ccvii Area of the habitat from 400-800m is dependant on site lines from the nest to the development and inclusion of perching and foraging habitat cvii To be significant a site must be used annually. When found inactive, the site must be known to be inactive for > 3 years or suspected of not being used for >5 years before being considered not significant. ccvii Observational studies to determine nest site use, perching sites and foraging areas need to be done from early March to mid August. Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects"ccxi SWH MISTcxlix Index #26 provides development effects and mitigation measures. 	<p>No evidence of Bald Eagle or Osprey Nests or sightings were observed during breeding bird survey or other site visits. Fish were observed in the creek, but forest communities are present along the edge of the waterway. Not SWH.</p>

	Wildlife Species	ELC Ecosite Codes	Habitat Criteria and Information Sources	Defining Criteria	Assessment Details
<p>Specialized Wildlife Habitat: Woodland Raptor Nesting Habitat</p> <p>Rationale: Nests sites for these species are rarely identified; these area sensitive habitats are often used annually by these species.</p>	<p>Northern Goshawk Cooper's Hawk Sharp-shinned Hawk Red-shouldered Hawk Barred Owl Broad-winged Hawk</p>	<p>May be found in all forested ELC Ecosites. May also be found in SWC, SWM,SWD and CUP3</p>	<p>All natural or conifer plantation woodland/forest stands >30ha with >4ha of interior habitat lxxxviii, lxxxix, xc, xci, xciii, xciv, xcv,xcvi, cxxxiii. Interior habitat determined with a 200m buffercxlviii • Stick nests found in a variety of intermediate-aged to mature conifer, deciduous or mixed forests within tops or crotches of trees. Species such as Coopers hawk nest along forest edges sometimes on peninsulas or small off-shore islands.</p> <ul style="list-style-type: none"> • In disturbed sites, nests may be used again, or a new nest will be in close proximity to old nest. <p>Information Sources</p> <ul style="list-style-type: none"> • OMNRF Districts. • Check the Ontario Breeding Bird Atlas ccv or Rare Breeding Birds in Ontario for species documented. • Check data from Bird Studies Canada. • Reports and other information available from Conservation Authorities. 	<p>Studies confirm: • Presence of 1 or more active nests from species list is considered significantcxlviii. • Red-shouldered Hawk andNorthern Goshawk – A 400m radius around the nest or 28 ha area of habitat is the SWH ccvii. (the 28 ha habitat area would be applied where optimal habitat is irregularly shaped around the nest)</p> <ul style="list-style-type: none"> • Barred Owl – A 200m radius around the nest is the SWH ccvii. • Broad-winged Hawk and Coopers Hawk,– A 100m radius around the nest is the SWHccvii. • Sharp-Shinned Hawk – A 50m radius around the nest is the SWHccvii. • Conduct field investigations from early March to end of May. The use of call broadcasts can help in locating territorial (courting/nesting) raptors and facilitate the discovery of nests by narrowing down the search area. • SWH MIST cxlix Index #27 provides development effects and mitigation measures. 	<p>Forest habitat found within the study area, but not large enough (<30ha) to support Woodland Raptor Nesting. A Red-tailed Hawk was observed calling from a tree top and flying during a site visit. No raptor or nests of the outlined species were observed during breeding bird survey or incidentally. Not SWH.</p>
<p>Specialized Wildlife Habitat: Turtle Nesting Area</p> <p>Rationale: These habitats are rare and when identified will often be the only breeding site for local populations of turtles.</p>	<p>Midland Painted Turtle <u>Special Concern Species:</u> Northern Map Turtle Snapping Turtle</p>	<p>Exposed mineral soil (sand or gravel) areas adjacent (<100m) cxlviii or within the following ELC Ecosites: MAS1 MAS2 MAS3 SAS1 SAM1 SAF1 BOO1 FEO1</p>	<ul style="list-style-type: none"> • Best nesting habitat for turtles are close to water and away from roads and sites less prone to loss of eggs by predation from skunks, raccoons or other animals. • For an area to function as a turtle nesting area, it must provide sand and gravel that turtles are able to dig in and are located in open, sunny areas. Nesting areas on the sides of municipal or provincial road embankments and shoulders are not SWH. • Sand and gravel beaches adjacent to undisturbed shallow weedy areas of marshes, lakes, and rivers are most frequently used. <p>Information Sources:</p> <ul style="list-style-type: none"> • Use Ontario Soil Survey reports and maps to help find suitable substrate for nesting turtles (well drained sands and fine gravels). • Check the Ontario Herpetofaunal Summary Atlas records or other similar atlases for uncommon turtles; location information may help to find potential nesting habitat for them. • Natural Heritage Information Centre (NHIC) • Field Naturalist Clubs 	<p>Studies confirm:</p> <ul style="list-style-type: none"> • Presence of 5 or more nesting Midland PaintedTurtles[ⓔ] • One or more Northern Map Turtle or Snapping Turtle nesting is a SWH[ⓔ]. • The area or collection of sites within an area of exposed mineral soils where the turtles nest, plus a radius of 30-100m around the nesting area dependant on slope, riparian vegetation and adjacent land use is the SWH.cxlvi • Travel routes from wetland to nesting area are to be considered within the SWH as part of the 30-100m area of habitat.cxlx • Field investigations should be conducted in prime nesting season typically late spring to early summer. Observational studies observing the turtles nesting is a recommended method. • SWH MIST cxlix Index #28 provides development effects and mitigation measures for turtle nesting habitat 	<p>Candidate SWH Golfcourse grounds crew reported seeing turtles; however, none were observed by ERI</p>
<p>Specialized Wildlife Habitat: Seeps and Springs</p> <p>Rationale: Seeps/Springs are typical of headwater areas and are often at the source of coldwater streams.</p>	<p>Wild Turkey Ruffed Grouse Spruce Grouse White-tailed Deer Salamander spp.</p>	<p>Seeps/Springs are areas where ground water comes to the surface. Often they are found within headwater areas within forested habitats. Any forested Ecosite within the headwater areas of a stream could have seeps/springs.</p>	<p>Any forested area (with headwaters of a stream or river system cxvii, cxlix.</p> <ul style="list-style-type: none"> • Seeps and springs are important feeding and drinking areas especially in the winter will typically support a variety of plant and animal species cxix, cxx, cxxi, cxxii, cxiii, cxiv. <p>Information Sources</p> <ul style="list-style-type: none"> • Topographical Map. • Thermography. • Hydrological surveys conducted by Conservation Authorities and MOE. • Field Naturalists Clubs and landowners. • Municipalities and Conservation Authorities may have drainage maps and headwater areas mapped. 	<p>Field Studies confirm:</p> <ul style="list-style-type: none"> • Presence of a site with 2 or more[ⓔ] seeps/springs should be considered SWH. • The area of a ELC forest ecosite or an ecoelement within ecosite containing the seeps/springs is the SWH. The protection of the recharge area considering the slope, vegetation, height of trees and groundwater condition need to be considered in delineation the habitat cxlviii. • SWH MIST cxlix Index #30 provides development effects and mitigation measures 	<p>SWH type not present</p>

	Wildlife Species	ELC Ecosite Codes	Habitat Criteria and Information Sources	Defining Criteria	Assessment Details
Specialized Wildlife Habitat: Amphibian Breeding Habitat (Woodland)					
Rationale: These habitats are extremely important to amphibian biodiversity within a landscape and often	Eastern Newt Blue-spotted Salamander Spotted Salamander Gray Treefrog Spring Peeper Western Chorus Frog Wood Frog	All Ecosites associated with these ELC Community Series; FOC FOM FOD SWC SWM SWD Breeding pools within the woodland or the shortest distance from forest habitat are more significant because they are more likely to be used due to reduced risk to migrating amphibians	<ul style="list-style-type: none"> • Presence of a wetland, pond or woodland pool (including vernal pools) >500m² (about 25m diameter) ccvii within or adjacent (within 120m) to a woodland (no minimum size).clxxxii, lxiii, lxv, lxvi, lxvii, lxviii, lxix, lxx Some small wetlands may not be mapped and may be important breeding pools for amphibians. • Woodlands with permanent ponds or those containing water in most years until mid-July are more likely to be used as breeding habitat cxlvi Information Sources: <ul style="list-style-type: none"> • Ontario Herpetofaunal Summary Atlas (or other similar atlases) for records • Local landowners may also provide assistance as they may hear spring-time choruses of amphibians on their property. • OMNRF Districts and wetland evaluations • Field Naturalist clubs • Canadian Wildlife Service Amphibian Road Call Survey • Ontario Vernal Pool Association: http://www.ontariovernalpools.org 	<p>Studies confirm;</p> <ul style="list-style-type: none"> • Presence of breeding population of 1 or more of the listed newt/salamander species or 2 or more of the listed frog species with at least 20 individuals (adults or eggs masses) lxxi or 2 or more of the listed frog species with Call Level Codes of 3(E). • A combination of observational study and call count surveys cviii will be required during the spring (March-June) when amphibians are concentrated around suitable breeding habitat within or near the woodland/wetlands. • The habitat is the wetland area plus a 230m radius of woodland arealxiii, lxv, lxvi, lxvii, lxviii, lxix, lxx, lxxi . If a wetland area is adjacent to a woodland, a travel corridor connecting the wetland to the woodland is to be included in the habitat. • SWH MIST cxlix Index #14 provides development effects and mitigation measures. 	SWH type not present
Specialized Wildlife Habitat: Amphibian Breeding Habitat (Wetland)					
Rationale: Wetlands supporting breeding for these amphibian species are extremely important and fairly rare within Central Ontario landscapes.	Eastern Newt American Toad Spotted Salamander Four-toed Salamander Blue-spotted Salamander Gray Treefrog Western Chorus Frog Northern Leopard Frog Pickerel Frog Green Frog Mink Frog Bullfrog	ELC Community Classes SW, MA, FE, BO, OA and SA. Typically these wetland ecosites will be isolated (>120m) from woodland ecosites, however larger wetlands containing predominantly aquatic species (e.g. Bull Frog) maybe adjacent to woodlands.	<ul style="list-style-type: none"> • Wetlands>500m² (about 25m diameter) ccvii ,supporting high species diversity are significant; some small or ephemeral habitats may not be identified on MNRF mapping and could be important amphibian breeding habitats clxxxii . • Presence of shrubs and logs increase significance of pond for some amphibian species because of available structure for calling, foraging, escape and concealment from predators. • Bullfrogs require permanentwater bodies with abundant emergent vegetation. Information Sources: <ul style="list-style-type: none"> • Ontario Herpetofaunal Summary Atlas (or other similar atlases) • Canadian Wildlife Service Amphibian Road Surveys and Backyard Amphibian Call Count. • OMNRF Districts and wetland evaluations. • Reports and other information available from Conservation Authorities. 	<p>Studies confirm:</p> <ul style="list-style-type: none"> • Presence of breeding population of 1 or more of the listed newt/salamander species or 2 or more of the listed frog/toad species with at least 20 individuals (adults or eggs masses) lxxi or 2 or more of the listed frog/toad species with Call Level Codes of 3(E). or; Wetland with confirmed breeding Bullfrogs are significant(E). • The ELC ecosite wetlandarea and the shoreline are the SWH. • A combination of observational study and call count surveys cviii will be required during the spring (March-June) when amphibians are concentrated around suitable breeding habitat within or near the wetlands. • If a SWH is determined for Amphibian Breeding Habitat (Wetlands) then Movement Corridors are to be considered as outlined in Table 1.4.1 of this Schedule. • SWH MIST cxlix Index #15 provides development effects and mitigation measures. 	Bullfrogs found calling within Pond A and call codes for Pond C were met for SWH during amphibian call survey. SWH.
Specialized Wildlife Habitat: Woodland Area-Sensitive Bird Breeding Habitat					
Rationale: Large, natural blocks of mature woodland habitat within the settled areas of Southern Ontario are important habitats for area sensitive interior forest song birds	Yellow-bellied Sapsucker Red-breasted Nuthatch Veery Blue-headed Vireo Northern Parula Black-throated Green Warbler Blackburnian Warbler Black-throated Blue Warbler Ovenbird Scarlet Tanager Winter Wren Pileated Woodpecker Special Concern: Cerulean Warbler Canada Warbler	All Ecosites associated with these ELC Community Series; FOC FOM FOD SWC SWM SWD	<ul style="list-style-type: none"> • Habitats where interior forest breeding birds are breeding, typically large mature (>60 yrs old) forest stands or woodlots >30 ha. cv, cxxxi, cxxxii, cxxxiii, cxxxiv, cxxxv, cxxxvi, cxxxvii, cxxxviii, cxxxix, cxl, cxli, cxlii, cxliii, cxliv, cxlv, cxlvi, cl, cli, clii, cliii, cliv, clv, clvi, clvii, clviii, clix, • Interior forest habitat is at least 200 m from forest edge habitat. cxliv Information Sources <ul style="list-style-type: none"> • Local birder clubs. • Canadian Wildlife Service (CWS) for the location of forest bird monitoring. • Bird Studies Canada conducted a 3-year study of 287 woodlands to determine the effects of forest fragmentation on forest birds and to determine what forests were of greatest value to interior species • Reports and other information available from Conservation Authorities. 	<p>Studies confirm:</p> <ul style="list-style-type: none"> • Presence of nesting or breeding pairs of 3 or more of the listed wildlife species. (E) • Note: any site with breeding Cerulean Warblers or Canada Warblers is to be considered SWH.(E) • Conduct field investigations in spring and early summer when birds are singing and defending their territories. • Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects"ccxi • SWH MIST cxlix Index #34 provides development effects and mitigation measures. 	Forest habitat present within the study area but is not large enough (<30 ha) to support Woodland Area Sensitive Breeding Birds. Only Red-breasted Nuthatch of the species listed were observed during breeding bird surveys or incidentally during other on-site surveys completed in 2017. Not SWH.

	Wildlife Species	ELC Ecosite Codes	Habitat Criteria and Information Sources	Defining Criteria	Assessment Details
Specialized Wildlife Habitat: Marsh Breeding Bird Habitat					
Rationale: Wetlands for these bird species are typically productive and fairly rare in Southern Ontario landscapes.	American Bittern Virginia Rail Sora Common Moorhen American Coot Pied-billed Grebe Marsh Wren Sedge Wren Common Loon Green Heron Trumpeter Swan Special Concern: Black Tern Yellow Rail	MAM1 MAM2 MAM3 MAM4 MAM5 MAM6 SAS1 SAM1 SAF1 FEO1 BOO1 For Green Heron: All SW, MA and CUM1 sites.	<ul style="list-style-type: none"> Nesting occurs in wetlands. All wetland habitat is to be considered as long as there is shallow water with emergent aquatic vegetation present cxxiv. For Green Heron, habitat is at the edge of water such as sluggish streams, ponds and marshes sheltered by shrubs and trees. Less frequently, it may be found in upland shrubs or forest a considerable distance from water. Information Sources OMNRF District and wetland evaluations. Field Naturalist clubs Natural Heritage Information Centre (NHIC) Records. Reports and other information available from Conservation Authorities. Ontario Breeding Bird Atlas. 	Studies confirm: <ul style="list-style-type: none"> Presence of 5 or more nesting pairs of Sedge Wren or Marsh Wren or breeding by any combination of 4 or more of the listed species (E). Note: any wetland with breeding of 1 or more Black Terns, Trumpeter Swan, Green Heron or Yellow Rail is SWH (E). Area of the ELC ecosite is the SWH. • Breeding surveys should be done in May/June when these species are actively nesting in wetland habitats. • Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects"ccxi SWH MIST cxlix Index #35 provides development effects and mitigation measures 	SWH type not present.
Specialized Wildlife Habitat: Open Country Bird Breeding Habitat					
Rationale: This wildlife habitat is declining throughout Ontario and North America. Species such as the Upland Sandpiper have declined significantly the past 40 years based on CWS (2004) trend records.	Upland Sandpiper Grasshopper Sparrow Vesper Sparrow Northern Harrier Savannah Sparrow Special Concern Short-eared Owl	CUM1 CUM2	<ul style="list-style-type: none"> Large grassland areas (includes natural and cultural fields and meadows) >30 ha clx, clxi, clxii, clxiii, clxiv, clxv, clxvi, clxvii, clxviii, clxix. Grasslands not Class 1 or 2 agricultural lands, and not being actively used for farming (i.e. no row cropping or intensive hay or livestock pasturing in the last 5 years) (E). Grassland sites considered significant should have a history of longevity, either abandoned fields, mature hayfields and pasturelands that are at least 5 years or older. The Indicator bird species are area sensitive requiring larger grassland areas than the common grassland species. Information Sources: <ul style="list-style-type: none"> Agricultural land classification maps, Ministry of Agriculture. Local bird clubs. Ontario Breeding Bird Atlas EIS Reports and other information available from Conservation Authorities. 	Field Studies confirm: <ul style="list-style-type: none"> Presence of nesting or breeding of 2 or more of the listed species. (E) A field with 1 or more breeding Short-eared Owls is to be considered SWH. The area of SWH is the contiguous ELC ecosite field areas. Conduct field investigations of the most likely areas in spring and early summer when birds are singing and defending their territories. Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects"ccxi SWH MIST cxlix Index #32 provides development effects and mitigation measures 	SWH type not present.
Specialized Wildlife Habitat: Shrub/Early Successional Bird Breeding Habitat					
Rationale: This wildlife habitat is declining throughout Ontario and North America. The Brown Thrasher has declined significantly over the past 40 years based on CWS (2004) trend records.	Indicator Spp: Brown Thrasher Clay-coloured Sparrow Common Spp. Field Sparrow Black-billed Cuckoo Eastern Towhee Willow Flycatcher Special Concern: Yellowbreasted Chat Golden-winged Warbler	CUT1 CUT2 CUS1 CUS2 CUW1 CUW2 Patches of shrub ecosites can be complexed into a larger habitat for some bird species	<ul style="list-style-type: none"> Large field areas succeeding to shrub and thicket habitats >10ha clxiv in size. Shrub land or early successional fields, not class 1 or 2 agricultural lands, not being actively used for farming (i.e. no rowcropping, haying or livestock pasturing in the last 5 years) (E). Shrub thicket habitats (>10 ha) are most likely to support and sustain a diversity of these species clxxiii. Shrub and thicket habitat sites considered significant should have a history of longevity, either abandoned fields or pasturelands. Information Sources: <ul style="list-style-type: none"> Agricultural land classification maps, Ministry of Agriculture. Local bird clubs. Ontario Breeding Bird Atlas Reports and other information available from Conservation Authorities. 	Field Studies confirm: <ul style="list-style-type: none"> Presence of nesting or breeding of 1 of the indicator species and at least 2 of the common species. (E) A habitat with breeding Yellowbreasted Chat or Golden-winged Warbler is to be considered as Significant Wildlife Habitat. (E) The area of the SWH is the contiguous ELC ecosite field/thicket area. Conduct field investigations of the most likely areas in spring and early summer when birds are singing and defending their territories Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects"ccxi SWH MIST cxlix Index #33 provides development effects and mitigation measures. 	SWH type not present.

	Wildlife Species	ELC Ecosite Codes	Habitat Criteria and Information Sources	Defining Criteria	Assessment Details
Specialized Wildlife Habitat: Terrestrial Crayfish Rationale: Terrestrial Crayfish are only found within SW Ontario in Canada and their habitats are very rare. Ccii	Chimney or Digger Crayfish; (Falicambarus fodiens) Devil Crayfish or Meadow Crayfish;(Cambarus Diogenes)	MAM1 MAM2 MAM3 MAM4 MAM5 MAM6 MAS1 MAS2 MAS3 SWD SWT SWM CUM1 with inclusions of above meadow marsh ecosites can be used by terrestrial crayfish.	Wet meadow and edges of shallow marshes (no minimum size) should be surveyed for terrestrial crayfish. • Constructs burrows in marshes, mudflats, meadows, the ground can'tbe too moist. Can often be found far from water. • Both species are a semiterrestrial burrower which spends most of its life within burrows consisting of a network of tunnels. Usually the soil is not too moist so that the tunnel is well formed. Information Sources: • Information sources from "Conservation Status of Freshwater Crayfishes" by Dr. Premek Hamr for the WWF and CNF March 1998	Studies Confirm: • Presence of 1 or more individuals of species listed or their chimneys (burrows) in suitable meadow marsh, swamp or moist terrestrial sites cci • Area of ELC ecosite or an ecoelement area of meadow marsh or swamp within the larger ecosite area is the SWH. • Surveys should be done April to August in temporary or permanent water. Note the presence of burrows or chimneys are often the only indicator of presence, observance or collection of individuals is very difficult cci • SWH MIST cxlix Index #36 provides development effects and mitigation measures.	SWH type not present.
Specialized Wildlife Habitat: Special Concern and Rare Wildlife Species Rationale: These species are quite rare or have experienced significant population declines in Ontario.	All Special Concern and Provincially Rare (S1-S3, SH) plant and animal species. Lists of these species are tracked by the Natural Heritage Information Centre (NHIC).	All plant and animal element occurrences (EO) within a 1 or 10km grid. Older element occurrences were recorded prior to GPS being available, therefore location information may lack accuracy	When an element occurrence is identified within a 1 or 10 km grid for a Special Concern or provincially Rare species; linking candidate habitat on the site needs to be completed to ELC Ecosites lxxviii Information Sources: • Natural Heritage Information Centre (NHIC) will have Special Concern and Provincially Rare (S1-S3, SH) species lists with element occurrences data. • NHIC Website "Get Information" : http://nhic.mnr.gov.on.ca • Ontario Breeding Bird Atlas • Expert advice should be sought as many of the rare spp. have little information available about their requirements.	Studies Confirm: • Assessment/inventory of the site for the identified special concern or rare species needs to be completed during the time of year when the species is present or easily identifiable. • The area of the habitat to the finest ELC scale that protects the habitat form and function is the SWH, this must be delineated through detailed field studies. The habitat needs be easily mapped and cover an important life stage component for a species e.g. specific nesting habitat or foraging habitat. • SWH MIST cxlix Index #37 provides development effects and mitigation measures.	See below.
Special Concern and Rare Wildlife Species: Birds					
	Eastern Wood-Pewee (<i>Contopus virens</i>)	Open, deciduous, mixed or coniferous forest;predominated by oak with little understorey; forest clearings, edges; farm woodlots, parks (OMNR 2000)	Deciduous mixed woods found within study area. Observed during breeding bird surveys completed in 2018. SWH.		
Special Concern and Rare Wildlife Species: Fish					
	Greenside Darter (<i>Etheostoma blennioides</i>)	Found in creeks and small to medium rivers with abundant gravel and rubble riffles. Associated with vegetation, particularly filamentous green algae).	Axford Creek has potential habitat for species. Not observed during fish community habitat assessment. Not SWH.		
Special Concern and Rare Wildlife Species: Reptiles					
	Snapping Turtle (<i>Chelydra serpentina</i>)	Any freshwater habitat, but typically found in slow-moving water with soft mud or sand bottom and abundant vegetation.	No turtles were found within the study area. Discussions with golf course greens crew identified recent observations of snapping turtle on property adjacent to the study area, but no records were found within the study area. Not SWH.		

	Wildlife Species	ELC Ecosite Codes	Habitat Criteria and Information Sources	Defining Criteria	Assessment Details
Special Concern and Rare Wildlife Species: Mussel					
	Rainbow Mussel (<i>Villosa iris</i>)	Small to medium-sized rivers with a moderate to strong current and sand, rocky or gravel bottoms. Found in or near riffle areas and long vegetation in water less than 1 metre deep.	Medway Creek has suitable habitat, and historical records have been found of the species. Axford drain has no mussel species present within it. Not found during aquatic habitat assessment. Not SWH.		
Special Concern and Rare Wildlife Species: Insects					
	Monarch (<i>Danaus plexippus</i>)	Open areas with milkweed species (<i>Asclepias sp.</i>) (MNR 2000)	Open areas present with the study area. Common milkweed (<i>Asclepias sp.</i>) observed within the study area, but will not be impacted by the project. SWH.		
Specialized Wildlife Habitat: Amphibian Movement Corridors					
Rationale: Movement corridors for amphibians moving from their terrestrial habitat to breeding habitat can be extremely important for local populations.	Eastern Newt American Toad Spotted Salamander Four-toed Salamander Blue-spotted Salamander Gray Treefrog Western Chorus Frog Northern Leopard Frog Pickerel Frog Green Frog Mink Frog Bullfrog	Corridors may be found in all ecosites associated with water. • Corridors will be determined based on identifying the significant breeding habitat for these species in Table 1.1	Movement corridors between breeding habitat and summer habitat clxxiv, clxxv, clxxvi, clxxvii, clxxviii, clxxix, clxxx, clxxxi. • Movement corridors must be determined when Amphibian breeding habitat is confirmed as SWH from Table 1.2.2 (Amphibian Breeding Habitat –Wetland) of this Schedule ⑤. <u>Information Sources:</u> • MNR District Office. • Natural Heritage Information Centre (NHIC). • Reports and other information available from Conservation Authorities. • Field Naturalist Clubs	• Field Studies must be conducted at the time of year when species are expected to be migrating or entering breeding sites. • Corridors should consist of native vegetation, with several layers of vegetation. • Corridors unbroken by roads, waterways or bodies, and undeveloped areas are most significant cxlix • Corridors should have at least 15m of vegetation on both sides of waterwaycxlix or be up to 200m widecxlix of woodland habitat and with gaps <20mcxlix . • Shorter corridors are more significant than longer corridors, however amphibians must be able to get to and from their summer and breeding habitatcxlix. • SWH MIST cxlix Index #40 provides development effects and mitigation measures	SWH type present

Table 4 Specialised Wildlife Habitat - Sunningdale North 2018 - Significant Wildlife Habitat Assessment

	Wildlife Species	ELC Ecosite Codes	Habitat Criteria and Information Sources	Defining Criteria	Assessment Details
EcoDistrict					
Bat Migratory Stopover Area Rationale: Stopover areas for long distance migrant bats are important during fall migration. Hoary Bat Eastern Red Bat Silver-haired Bat	No specific ELC types.		<ul style="list-style-type: none"> • Long distance migratory bats typically migrate during late summer and early fall from summer breeding habitats throughout Ontario to southern wintering areas. Their annual fall migration may concentrate these species of bats at stopover areas. • This is the only known bat migratory stopover habitats based on current information. Information Sources <ul style="list-style-type: none"> • OMNRF for possible locations and contact for local experts • University of Waterloo, Biology Department 	<ul style="list-style-type: none"> • Long Point (42°35'N, 80°30'E, to 42°33'N, 80°03'E) has been identified as a significant stop-over habitat for fall migrating Silver-haired Bats, due to significant increases in abundance, activity and feeding that was documented during fall migration ccxv. • The confirmation criteria and habitat areas for this SWH are still being determined. • SWH MIST cxlix Index #38 provides development effects and mitigation measures 	Study Area is not located appropriate habitat. Not SWH.

Appendix M

Species at Risk

Table 1 Species at Risk and Special Conservation Concern Screening

Scientific Name	Common Name	S-Rank	COSEWIC	ESA/COSSARO	SARA	ERI Observation	Habitat Preference	Suitable Habitats within the Subject Property	Rationale	Background Source
Bats										
Myotis lucifungus	Little Brown Myotis	S5	END	END	END	No	Uses caves, quarries, tunnels, hollow trees or buildings for roosting; winters in humid caves; maternity sites in drak warm areas such as attics and barns; feeds primarily in wetlands and forest edges	Yes	Wooded area present within the study area. Likely to required a cavity tree assessment, follow up acoustic survey following MNRF protocol if suitable roosting habitat found.	Dobbyn 1994
Myotis septentrionalis	Northern Myotis	S3	END	END	END	No	Hibernates during winter in mines or caves; during summer males roost alone and females form maternity colonies up to 60 adults; roosts in houses, man-made structures but prefers hollow trees or under loose bark; hunts within forest, below canopy	Yes	Wooded area present within the study area. Likely to required a cavity tree assessment, follow up acoustic survey following MNRF protocol if suitable roosting habitat found.	Dobbyn 1994
Perimyotis subflavus	Tri-coloured Bat	S3?	END	END	END	No	Open woods near water; roosts in trees, cliff crevices, buildings or caves; hibernates in damp, draft free, warm caves, mines or rock crevices	Yes	Wooded area present within the study area. Likely to required a cavity tree assessment, follow up acoustic survey following MNRF protocol if suitable roosting habitat found.	Dobbyn 1994
Myotis leibii	Small-footed Myotis	S2/S3?	END	END		No	Rock outcrops, hollow trees, bridges, buildings, and caves and hibernate in caves and mines. They forage in a broad range of habitats.	Yes	Wooded area present within the study area. Likely to required a cavity tree assessment, follow up acoustic survey following MNRF protocol if suitable roosting habitat found.	MNRF, 2018
Birds										
Hirundo rustica	Barn Swallow	S4B	THR	THR	THR	Yes	Prefer foraging in open areas including suburban parks, agricultural fields, beaches and over open water. Breeding habitat includes open area for foraging, in close proximity to a source of mud and structures of cliffs.	Yes	Buildings and bridges present in the surrounding study area. Observed during breeding bird surveys and as incidental observations.	BSC 2007, MNRF, 2017
Chaetura pelagica	Chimney Swift	S4B, S4N	THR	THR	THR	Yes	Breed in urban and suburban habitats and are most common in areas with large concentrations of chimneys. Nest in hollow trees, tree cavities, caves and chimneys. Feed over urban neighbourhoods, grasslands, forests, fields and marshes.	No	Houses and man made structures present within and surrounding the study area. Not observed during breeding bird surveys or incidental observations.	MNRF, 2017
Vireo griseus	White-eyed Vireo	S2B				No	Found in dense shrub and thicket habitat.	No	Only small area of thicket present surrounded by open area and beside road within the study area. Not observed during breeding bird survey or as an incidental observation.	Cornell, 2018
Contopus virens	Eastern Wood-pewee	S4B	SC	SC	SC	Yes	Wooded habitat including roadsides, woodlots, orchards, urban trees, and mature woodlands. Prefer deciduous forest near clearings and along forest edges.	Yes	Deciduous forest with little understory located within the study area. Observed during breeding bird survey or incidental observation.	MNRF 2017
Vascular Plants										
Liparis liliifolia	Purple Twayblade	S2/S3	THR	THR	THR	No	Open oak woodland, savannah, mixed deciduous forest, thicket shrub, shrub alvar, deciduous swamp and conifer plantations	Yes	Mixed deciduous forest and conifer plantations are present. Not observed during site inventories.	MNRF, 2018
Enemion biternatum	Eastern False Rue-anemone	S2	THR	THR	THR	No	Deciduous forest and thickets with rich, moist soil, often in valleys, floodplains and ravine bottoms. Typically near mature watercourses and within mature forests with a composition of maple and beech trees.	Yes	Deciduous forest and valleylands present within the study area. Not observed during site investigations.	MNRF, 2018
Cystopteris protrusa	Lowland Brittle Fern	S2/S3				No	Habitats include moist to mesic deciduous woodlands, edges of wooded bluffs, shaded banks of rivers, wooded areas along rocky streams, upper slopes of ravines and shaded areas along cliffs. Maple-basswood and oak oak-hickory woodlands.	Yes	Mixed and deciduous woodlands present along the Medway Creek watercourse. Not found during flora surveys.	Illinois Wildflower, 2018
Muhlenbergia tenuiflora	Slim-flowered Muhly	S2				No	Habitat includes upland areas of hilly woodlands, rocky woodlands, upland savannas, bluffs, wooded slopes and banks of rivers. Prefers deciduous trees especially oaks.	No	Habitat not present on site. Not found during flora surveys.	Illinois Wildflower, 2018
Viola striata	Striped Cream Violet	S3				No	Moist to mesic deciduous woodlands, banks of rivers and streams in shaded areas, open woodlands, woodland borders, moist meadows, shrubby hedges and ditches.	Yes	Potential aquatic habitat and woodland exists along Medway Creek. Not found during flora surveys.	Illinois Wildflower, 2018
Hybanthus concolor	Eastern Green-violet	S2				No	Moist to mesic deciduous woodlands, wooded slopes, shaded terraces along streams and damp ravines with calcareous rocks.	Yes	Woodlands, and wooded slopes present within Study Area.	Illinois Wildflower, 2018
Jugland cinerea	Butternut	S3?	END	END	END	Yes	Prefers moist, well-drained soil and is often along streams, but can be found in well drained gravel sites specifically of limestone. Grows in sunny openings and near forest edges in rich, moist and well drained soils.	Yes	Well drained soil present around the within the study area. One individual observed during vegetation inventory.	MNRF 2017, SARA 2017
Fish										
Moxostoma valenciennesi	Greater Redhorse	S3				No	Inhabits medium to large-size rivers that have substantial flows with course substrate. Cannot tolerate polluted waters.	No	Small tributary with gravel, cobble and sand substrate. Not observed during site inventories.	MNRF, 2018
Notropis photogenis	Silver Shiner	S2/S3	THR	THR	SC	No	Deep riffles or pools in medium to large streams with moderate to high gradients and prefer substrates from course boulder, gravel and pebbles to fine sand, mud and clay.	No	Small tributary with gravel, cobble and sand substrate. Not observed during site inventories.	MNRF, 2018
Etheostoma blennioides	Greenside Darter	S4		NAR	SC	No	Widely distributed in a variety of habitats, but prefers creeks, small to medium rivers with abundant gravel and rubble riffles and associated with filamentous algae.	No	Small tributary with gravel, cobble and sand substrate. Not observed during site inventories.	COSEWIC, 2006

Scientific Name	Common Name	S-Rank	COSEWIC	ESA/COSSARO	SARA	ERI Observation	Habitat Preference	Suitable Habitats within the Subject Property	Rationale	Background Source
Moxostoma duquesnei	Black Redhorse	S2	THR	THR		No	Present in pool and riffle areas of medium sized rivers and streams usually less than 2m deep. Few aquatic plants, moderate to fast current and sandy or gravel bottom are typical characteristics of habitat.	No	Small tributary with gravel, cobble and sand substrate. Not observed during site inventories.	MNRF, 2018
Herpetofauna										
Heterodon platirhinos	Eastern Hog-nosed Snake	S3	THR	THR	THR	No	Prefer sandy, well drained habitats such as beaches and dry forests. Found in Ontario in the Carolinian Region and Great Lakes-St. Lawrence Region.	Yes	Dry forests are present within the study area, but high traffic, surrounding open habitat, lawn maintenance and constant site use limits potential of species to be present. Not observed during site inventories. Not observed within study area.	MNRF, 2018
Chelydra serpentina serpentina	Snapping Turtle	S3	SC	SC	SC	No	Any freshwater habitat, but typically found in slow-moving water with soft mud or sand bottom and abundant vegetation.	Yes	Ponds, marshes and ditch habitat present within the study area. Not observed during surveys.	MNRF 2017, Ontario Nature 2017
Molluscs										
Ptychobranchius fasciolaris	Kidneyshell	S1	END	END	END	No	Small to medium sized rivers with shallow, clear, swift-moving water with gravel and sand.	Yes	Small stream connected to Medway is present within study area, but has barriers to fish from a perched culvert and DICB. Not observed during surveys.	MNRF, 2018
Villosa iris	Rainbow Mussel	S2/S3	SC	SC	END	No	Small to medium-sized rivers with a moderate to strong current and sand, rocky or gravel bottoms. Found in or near riffle areas and long vegetation in water less than 1 metre deep.	Yes	Small stream connected to Medway is present within study area, but has barriers to fish from a perched culvert and DICB. Not observed during surveys.	MNRF, 2018
Lampsilis fasciola	Wavy-rayed Lampmussel	S1	SC	THR	SC	No	Small to medium rivers with clear water. Lives in shallow riffle areas with clean gravel or sand bottoms.	Yes	Small stream connected to Medway is present within study area, but has barriers to fish from a perched culvert and DICB. Not observed during surveys.	MNRF, 2018

Appendix N

Significant Woodland Evaluation

Table 1. Vegetation Patch A – Woodland Evaluation.

Assessment Component	Rationale	Score
1.1 Site Protection	A) Low- no hydrological feature present within patch	Low
	B) Medium- patch represents a gentle slope 10- 25 %	Low
1.2 Landscape Integrity	A) Low- % of local vegetation	Low
	B) Medium- golf course	Low
	C) Low -patch less than 10 Ha	Low
2.1 Age and Site Quality	A) Medium- mid aged community	Medium
	B) Low- Coefficient of Conservation	Medium
	C) Medium- fair/poor disturbance	Medium
2.2 Size and Shape	A) Low- patch size less than 2 Ha	Low
	B) Low- poor interior patch perimeter	Low
	C) Low - low bird diversity	Low
2.3 Diversity of Natural Communities and Associated Species	A) Low - 1 community series	Low
	B) Low- homogenous patch	Low
	C) Low- no amphibians	Low
	D) Low- conifer present, small community	Low
	E) Low- no fish community	Low
3 Endangered and Threatened Species (TE habitat)	No SAR present	

Assessment Component	Rationale	Score
4.1 Distinctive, Unusual or High Quality Natural Communities	A) Low- not ranked	Low
	B)Low- undetermined	Low
	C) Low- undetermined	Low
	D) Low- undetermined	Low
4.2 Distinctive, Unusual or High Quality Landforms	A) Low- low diversity	Low
Number of High	0	
Number of Medium	1	
Number of Low	6	
Presence of SAR	N	
Not Significant Woodland		

Table 2: Vegetation Patch B – Woodland Evaluation.

Assessment Component	Rationale	Score
1.1 Site Protection	A) Medium- watercourse within 50m of patch	Medium
	B) Medium- patch represents a patch on moderate to steep slope	Medium
1.2 Landscape Integrity	A) Medium- % of local vegetation	Medium
	B) Medium- golf course	Medium
	C) Low -patch less than 10 Ha	Medium
2.1 Age and Site Quality	A) Medium- mid aged community	Medium
	B) Low- Coefficient of Conservation	Medium
	C) Medium- fair/poor disturbance	Medium
2.2 Size and Shape	A) Low- patch size less than 2 Ha	Low
	B) Low- poor interior patch perimeter	Low
	C) Low - low bird diversity	Low
2.3 Diversity of Natural Communities and Associated Species	A) Low - 1 community series	Low
	B) Low- homogenous patch	Low
	C) Medium- amphibians present in drain and adjacent forest land	Low
	D) Low- conifer present, small community	Low
	E) Low- no fish community	Low
3 Endangered and Threatened Species (TE habitat)	No SAR present	

Assessment Component	Rationale	Score
4.1 Distinctive, Unusual or High Quality Natural Communities	A) Low- not ranked	Low
	B)Low-	Low
	C) Low- no trees larger than 50	Low
	D) Low- undetermined	Low
4.2 Distinctive, Unusual or High Quality Landforms	A) Low- low diversity	Low
Summary of Significance of 8 Ecological Criteria		
Number of High	0	
Number of Medium	3	
Number of Low	4	
Presence of SAR	N	
Not Significant Woodland		

Table 3. Vegetation Patch C – Woodland Evaluation.

Assessment Component	Rationale	Score
1.1 Site Protection	A) Medium- watercourse within 50m of patch	High
	B) High- patch represents a patch on steep slope as part of valleyland	High
1.2 Landscape Integrity	A) Medium- % of local vegetation	High
	B) High-Valleyland connecting	High
	C) Low -patch less than 10 Ha	High
2.1 Age and Site Quality	A) Medium- mid aged community	Medium
	B) Low- Coefficient of Conservation	Medium
	C) Medium- fair/poor disturbance	Medium
2.2 Size and Shape	A) Low- patch size less than 2 Ha	Low
	B) Low- poor interior patch perimeter	Low
	C) Low - low bird diversity	Low
2.3 Diversity of Natural Communities and Associated Species	A) Low - 2 community series	Low
	B) Low- homogenous patch	Low
	C) Low- no amphibians	Low
	D) Low- conifer present, small community	Low
	E) Low- no fish community	Low
3 Endangered and Threatened Species (TE habitat)	SAR Present	

Assessment Component	Rationale	Score
4.1 Distinctive, Unusual or High Quality Natural Communities	A) Low- not ranked	Low
	B)Low-	Low
	C) Medium- trees 50 or above rare in this community	Low
	D) Low- undetermined	Low
4.2 Distinctive, Unusual or High Quality Landforms	A) Low- low diversity	Low
Summary of Significance of 8 Ecological Criteria		
Number of High	2	
Number of Medium	1	
Number of Low	4	
Presence of SAR	Y	
Significant Woodland		

Table 4. Vegetation Patch D – Woodland Evaluation.

Assessment Component	Rationale	Score
1.1 Site Protection	A) Medium- watercourse within 50m of patch	Medium
	B) Low- patch represents a patch on gentle slope	Medium
1.2 Landscape Integrity	A) Medium- % of local vegetation	Medium
	B) Medium- golf course	Medium
	C) Low -patch less than 10 Ha	Medium
2.1 Age and Site Quality	A) Medium- mid aged community	Medium
	B) Low- Coefficient of Conservation	Medium
	C) Medium- fair/poor disturbance	Medium
2.2 Size and Shape	A) Low- patch size less than 2 Ha	Low
	B) Low- poor interior patch perimeter	Low
	C) Low - low bird diversity	Low
2.3 Diversity of Natural Communities and Associated Species	A) Low - 1 community series	Low
	B) Low- homogenous patch	Low
	C) Low- no amphibians	Low
	D) Low- conifer present, small community	Low
	E) Low- no fish community	Low
3 Endangered and Threatened Species (TE habitat)	No SAR present	No

Assessment Component	Rationale	Score
4.1 Distinctive, Unusual or High Quality Natural Communities	A) Low- not ranked	Low
	B)Low-	Low
	C) Low- no trees larger than 50	Low
	D) Low- undetermined	Low
4.2 Distinctive, Unusual or High Quality Landforms	A) Low- low diversity	Low
	B) Low	
	C) Low	
Summary of Significance of 8 Ecological Criteria		
Number of High	0	
Number of Medium	3	
Number of Low	4	
Presence of SAR	N	
Not Significant Woodland		

Table 5. Vegetation Patch E – Woodland Evaluation.

Assessment Component	Rationale	Score
1.1 Site Protection	A) Medium- groundwater evidence/watercourse within 50m of patch	High
	B) High- patch represents a patch on steep slope	High
1.2 Landscape Integrity	A) Medium- % of local vegetation	High
	B) High- riparian corridor	High
	C) Low -patch less than 10 Ha	High
2.1 Age and Site Quality	A) Medium- mid aged community	Medium
	B) Low- Coefficient of Conservation	Medium
	C) Medium- fair/poor disturbance	Medium
2.2 Size and Shape	A) Low- patch size less than 2 Ha	Medium
	B) Low- poor interior patch perimeter	Medium
	C) Medium - medium bird diversity	Medium
2.3 Diversity of Natural Communities and Associated Species	A) Low - 2 community series	Low
	B) Low- homogenous patch	Low
	C) Low- no amphibians	Low
	D) Low- conifer present, small community	Low
	E) low- no fish community	Low
3 Endangered and Threatened Species (TE habitat)	No SAR present	No

Assessment Component	Rationale	Score
4.1 Distinctive, Unusual or High Quality Natural Communities	A) Low- not ranked	Low
	B)Low-	Low
	C) Medium- rarely trees over 50 dbh	Low
	D) Low- undetermined	Low
4.2 Distinctive, Unusual or High Quality Landforms	A) Low- low diversity	Low
	B) Low	Low
	C) Low	Low
Summary of Significance of 8 Ecological Criteria		
Number of High	2	
Number of Medium	2	
Number of Low	3	
Presence of SAR	N	
Significant Woodland		

Table 6. Vegetation Patch F – Woodland Evaluation.

Assessment Component	Rationale	Score
1.1 Site Protection	A) Low-	Low
	B) Low-	Low
1.2 Landscape Integrity	A) Low- % of local vegetation	Medium
	B) Medium- golf course	Medium
	C) Low -patch less than 10 Ha	Medium
2.1 Age and Site Quality	A) Medium- mid aged community	Medium
	B) Low- Coefficient of Conservation	Medium
	C) Medium- fair/poor disturbance	Medium
2.2 Size and Shape	A) Low- patch size less than 2 Ha	Low
	B) Low- poor interior patch perimeter	Low
	C) Low - low bird diversity	Low
2.3 Diversity of Natural Communities and Associated Species	A) Low - 1 community series	Low
	B) Low- homogenous patch	Low
	C) Low- no amphibians	Low
	D) Low- conifer present, small community	Low
	E) low- no fish community	Low
3 Endangered and Threatened Species (TE habitat)	No SAR present	No
4.1 Distinctive, Unusual or High Quality Natural Communities	A) Low- not ranked	Low
	B)Low-	Low
	C) Low- no trees larger than 50	Low
	D) Low-	Low

Assessment Component	Rationale	Score
4.2 Distinctive, Unusual or High Quality Landforms	A) Low- low diversity	Low
	B) Low	Low
	C) Low	Low
Summary of Significance of 8 Ecological Criteria		
Number of High	2	
Number of Medium	2	
Number of Low	3	
Presence of SAR	N	
Not Significant Woodland		